

LOOKING BACK
SEEING THE FUTURE

200 FT.
61 M

OVER
80
YEARS

of Education, Research and Outstanding Patient Care
by the
Department of Ophthalmology and Visual Sciences
at the University of Alberta

70 FT.
21.3M

Judith Friedman PhD

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Published by the University of Alberta Faculty of Medicine and Dentistry, in celebration of over 80 years of service in education, research and patient care by the Department of Ophthalmology and Visual Sciences

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LOOKING BACK SEEING THE FUTURE

Acknowledgments from the Author

It has been a privilege to help document the history of the Department of Ophthalmology and Visual Science from 1923, when Dr. R. Bruce Wells became the first ophthalmologist to join the University of Alberta, to the present. This project could not have been completed without the kind assistance of past and present members of the Department (physicians, nurses, technicians, technologists, orthoptists, opticians, researchers, and administrative assistants) who very generously shared their time and recollections with me.

I would like to thank current Department Chair Dr. Karim Damji who instigated the project as part of the celebration of the Department's 80th anniversary and the prior Chairmen of the Department, Drs. Ian MacDonald, Mark Greve, Garry Drummond, and Henry Wyatt who kindly shared their memories of the Department with me and were patient with my many questions.

I would never have been able to uncover the Department's history without the aid of those who helped me to locate its remaining records. From the University of Alberta I would like to thank: Jim Franks and Alicia Odeen (University of Alberta Archives), Trish Chatterley (John W. Scott Health Sciences Library), Jeff Papineau (Bruce Peel Special Collections), Peggy Sue Ewanyshyn (Digitization Librarian, University of Alberta Libraries), Sandra Shores (Senior IT and Facilities Officer, University of Alberta Libraries), Kendra Brunt (Director of Administration Faculty of Medicine and Dentistry) and Amy Samson, (Historian, Faculty of Medicine and Dentistry). Philip Pype, (Archivist, Cultural Development, City of Medicine Hat Esplanade Arts & Heritage Centre) helped me to track down information on Dr. 'Wint' Duggan. Special thanks are owed to Pete Smith (Royal College of Physicians and Surgeons of Canada Archives) without whom I would never have been able to trace many of the Department's early residents. In addition I would like to thank Ann Haver (Administrative

Coordinator, Canadian Orthoptic Council), Louis-Etienne Marcoux (Secretary-Treasurer, Canadian Orthoptic Council), Kent Rose (Program Director, Ophthalmic Medical Technology Training Program, Yellowknife, NWT), Nick Alhadeff (Dr. Mark Marshall's nephew), and Abshir Moalin (Tele-ophthalmology Coordinator) for providing me with information about the Department's programs and people.

Oral and written histories helped to fill in the blanks where there were no records and breathed life into the past. I would like to thank each and every individual who took part in the project, this work would have been poorer without their contributions. I would also like to thank Drs. Paul Grewal and Jessica Ting who, as residents, helped with oral interviews.

I owe a debt of gratitude to Dr. Rod Morgan who was an outstanding guide through the history of the Department. He has a unique perspective of its past from the point of view of an undergraduate medical student, resident, and a long-standing clinical faculty member. He was also very generous in answering my many questions as the project progressed. Murray Scambler graciously helped me to get in touch with many retired members of the Department. Dr. Bill Pearce shared his recollections and photographs of important parts of the Department's past endeavours in providing care for communities in the Northwest Territories and in laying the groundwork for the study of ocular genetics which has been such a large part of the research of the Department. Dr. Chris Rudnisky was extremely generous in sharing not only his recollections, but his photographs of the early years of tele-ophthalmology in the Department. Chief orthoptist Brad Wakeman very kindly answered many of my questions about the Pediatric Ophthalmology clinics and shared photographs of their evolution over time. Finally, Janice Hengsbach RN and Dr. Ernest Hodges shared their passion for providing care to patients in the developing world with me and Janice's photographs illustrate this part of the Department's work.

The saying goes that "a picture is worth a thousand words." For their generous help in locating, supplying, and granting permissions for images I would like to thank: Ken Dalton (RAH Medical Photography), Mathew Martin (UAH Medical Photography), Richard Siemens (Sr. Photographer, Marketing and Communications, University of Alberta), N. Torben Bech-Hansen, (Departments of Medical Genetics and Surgery, University of Calgary), Suzanne

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I am thankful for the help that I received from the staff of the Department during this project, particularly from Holly Ridyard, Darlene Conroy, Juliana Wozniak, Stephanie McNamara, Hunaiza Kimara, Karmen Wachniak, and Priya Swamy. Special thanks are owed to Charla Riddell who took on the daunting task of transcribing the oral interviews.

Finally, I would like to thank Drs. Karim Damji, Garry Drummond, Ian MacDonald, Rod Morgan, and Bill Pearce for their help reviewing the manuscript and Aimee Mah whose skilled graphical design work has brought this book to life.

-Judith Friedman

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— FOREWORD —

Over the past 80 years, the Department of Ophthalmology and Visual Sciences has remained dedicated to providing excellence in patient care, teaching, research, and leadership. It was established as the Department of Ophthalmology and Rhino-Oto-Laryngology in 1937. By 1946, Dr. Mark Marshall (the Department's chairman) had become director of graduate medical education at the University of Alberta. He established what came to be known locally as the "Marshall Plan," which led to the development of several residency programs, including ophthalmology, at the University of Alberta. Some ophthalmology residents made extraordinary contributions while still in training and many others obtained valuable training elsewhere, and then returned to serve the Department.

The ophthalmology residency program has produced the majority of ophthalmologists practicing in Western Canada, some of whom have gone on to become world leaders in specialized fields of ophthalmology. Its leading graduates have often returned to join the Department at the University of Alberta and introduced new advancements in strabismus, glaucoma, cornea, cataract, retina, and other subspecialty areas. This book provides highlights of these contributions, illustrating knowledge translation at various levels: the first corneal transplant done in Western Canada by Dr. Don Hassard in 1962; the development of tele-ophthalmology by Drs. Matt Tennant, Chris Rudnisky and Mark Greve in 1999; the discovery of various genetic leads for hereditary eye disorders by Drs. William Pearce, Ian MacDonald, Michael Walter, Ordan Lehmann, and others; the development of a world class ophthalmic surgical simulation centre led by Dr. Morley Kutzner in 2014; and Canada's first ocular gene therapy trial for choroideremia in 2015 led by Dr. Ian MacDonald. These contributions as well as others are also summarized in a recent article in the *Canadian Journal of Ophthalmology*.¹

Residents and other trainees joining the Department would do well to learn more about the history of the Department as well as the recent development of the Eye Institute of Alberta. I challenge you to build on this heritage and identity and to continue contributing to the University, the health system, and the peoples it seeks to serve locally and globally.



Dr. Richard Fedorak, MD, FRCPC, FRCP (London), FRSC
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Professor of Medicine in the Division of Gastroenterology
University of Alberta

¹Nazarali SA, Nazarali S, Friedman J and Damji KF. Ophthalmology at the University of Alberta: Over 8 Decades of People-driven Contributions. *Can J Ophthalmol*. 2017; <http://dx.doi.org/10.1016/j.jcjo.2017.06.010>



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A Medical School for Alberta

At the University of Alberta's first convocation in 1908, university president Henry Marshall Tory argued that the final goal of the University should be the "uplifting of the whole people."¹ From the beginning Tory intended that the University should contain a Faculty of Medicine, and plans for the campus drawn up in 1909 included space for an associated teaching hospital. In 1912, twenty-five students petitioned the University Senate requesting that a medical course be offered at the University. The Faculties of Applied Science and Medicine were established in 1913 and the University of Alberta accepted its first class of medical students. At that time, medical students could not finish their education at the University of Alberta. Provisions were made for students to complete their education at the University of Toronto or McGill University.²

The University of Alberta Department of Ophthalmology and Visual Sciences has its origin in 1923 when Dr. Robert Bruce Wells was recruited to teach Ophthalmology at the decade-old medical

school. Also joining the Faculty at this time was Dr. Claude Vernon Jamieson who taught Rhino-Oto-Laryngology. These two specialties, often called EENT (eye, ear, nose, and throat) were commonly practiced together and would remain closely associated both educationally and administratively at the University of Alberta through 1960 before they were split into separate divisions.³

The recruitment of Wells and Jamieson took place in response to a massive influx of students following the end of the First World War. From 1919 to 1920 the University of Alberta partnered with McGill University and the University of Toronto in offering a six-year medical program. Students would receive their first four (and later five) years of training at the University of Alberta and then go on to receive the remainder of their training at either McGill University or the University of Toronto.⁴

An endowment of \$500,000 made by the Rockefeller Foundation in 1920 provided a stable financial basis for the expansion of the Faculty of Medicine. This included the construction of a new state-of-the-art Medical Building in 1920. The first

◀ Wells Pavillion, 1960. Courtesy of Medical Photography, University of Alberta Hospital.

①

classes were taught there in the Fall Session of 1921. Finally, in 1922 the City of Edmonton and the University of Alberta negotiated the transfer of the Strathcona Hospital (constructed in 1913 on University land) to the University; it was renamed the University of Alberta Hospital. The transfer enabled the Faculty of Medicine to teach four years of the course in Medicine for the first time in 1922–1923.⁵ The first medical class to train entirely at the University of Alberta graduated in 1925.⁶

The development of an Out-Patient Department at the University of Alberta Hospital, which provided care for those unable to pay for medical treatment, and the Soldier's Civil Re-establishment Pavilion, which was funded by the Federal Government, facilitated the training of students during the early years of the medical school.⁷ The Pavilion was later renamed in honour of Dr. Wells, although the official origin of the change of designation remains a mystery. One story suggests that it was Wells's student, partner, and later successor Mark Marshall who put up the sign painted "Wells Pavilion." The Pavilion was destroyed in the 1980s to make way for the current Walter C. Mackenzie Health Sciences Centre.⁸



- ⤴ The University of Alberta Hospital, 1923. Courtesy of the University of Alberta Archives 81-104 2-158.
- ⤵ Medical Staff of the University of Alberta Hospital in 1931. In the front row seated at the far left is Dr. R. Bruce Wells; at the far right is Dr. Claude Jamieson. Dr. Mark Marshall is standing second from the right in the back row. Courtesy of Medical Photography, University of Alberta Hospital.

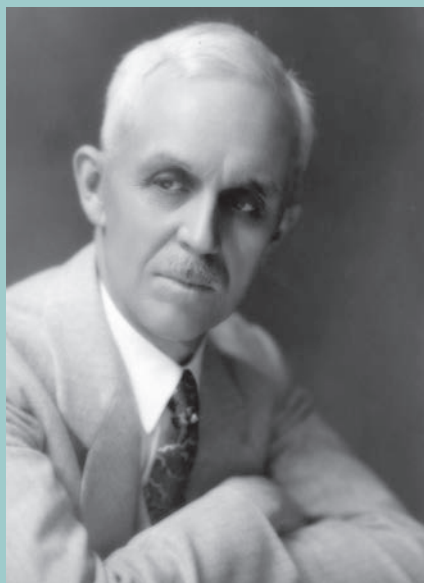


Sub-Department, Department or Division?

What is now the Department of Ophthalmology and Visual Sciences has undergone a number of changes in name and status over its history. It has been referred to variously as Ophthalmology and Rhino-Otolaryngology, Ophthalmology and Oto-Auro-Laryngology, and Ophthalmology and Oto-Laryngology before the specialties of ophthalmology and otolaryngology became separate entities in 1960. In addition, the unit has existed at various times as a Sub-Department of the Department of Surgery, a Department of the Faculty of Medicine, a Division of the Department of Surgery and finally once again as a Department of the Faculty of Medicine. There are no clear records of exactly when these shifts took place. Additionally, the status of Ophthalmology at the University of Alberta differed sometimes from that at the University of Alberta Hospital as the two institutions were administratively separate. University appointments were academic in nature, whereas the University of Alberta Hospital was clinically focused and had its own clinical staff and internal departmental structure. In 1956, Ophthalmology and Otolaryngology lost departmental status at the University of Alberta Hospital, where the specialties were split into separate Divisions within the Department of Surgery. The Department of Ophthalmology and Otolaryngology remained unified at the University of Alberta until 1960, when it was reorganized into two separate Divisions within the Department of Surgery (mirroring the organization at the University of Alberta Hospital). Ophthalmology gained independent Departmental status in 1969. In 2013 the Department was renamed the Department of Ophthalmology and Visual Sciences to reflect its broad mandate.⁹

The Department's Origin

Dr. Robert Bruce Wells (1923 - 1936)



There is no question that the first Head of Ophthalmology at the University of Alberta was Dr. Robert Bruce Wells.¹⁰ Wells was born in Lynedoch, Ontario, in 1867. He received his MB from the University of Toronto in 1894. In 1896 he went to the United States for post-graduate training at the Manhattan Eye and Ear Hospital and the Chicago Eye and Ear Infirmary. He travelled abroad again in 1913, this time to

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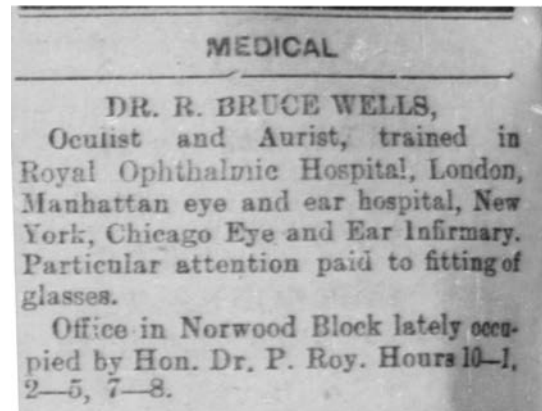
train in London at the Royal Ophthalmic Hospital, as well as in Paris and Vienna. Wells practiced medicine in Ontario before moving west to Edmonton, where he registered to practice in 1905 locating his offices in the Norwood Block on Jasper Avenue. Wells quickly became one of the most respected eye, ear, nose, and throat doctors in the young city.¹¹

Dr. Wells began teaching the course Ophthalmology 51, “A preliminary course consisting of lectures and demonstrations with instruction in the use of instruments and applications,” to fifth-year medical students at the University of Alberta in 1923. As the Faculty of Medicine began offering a sixth and final year in medicine in 1924, Wells added the course Ophthalmology 52, “Clinical work at the hospital.” He was appointed Lecturer in Ophthalmology in 1924 and was promoted to Clinical Professor in 1931, the same year that Ophthalmology appears as a stand-alone sub-department of the Department of Surgery and Clinical Surgery, albeit a sub-department consisting of a single professor. The two Sub-Departments of Ophthalmology and Oto-Laryngology shared two Demonstrators between them – Dr. Mark Robert Marshall and Dr. William

Sloane Seale Armstrong. (Marshall went by the name Levey until 1949; to avoid confusion he will be referred to by his chosen name throughout). In 1931 Wells became a Charter Fellow of the Royal College of Physicians and Surgeons of Canada.¹²

Wells continued as Head of what was then the Sub-Department of Ophthalmology until he retired due to ill health on 24 September 1936, after which he was appointed Professor Emeritus. In his letter of resignation, Wells requested that he be succeeded by his former student and partner Dr. Mark Marshall. However, the Chairman of Surgery Dr. Alexander Munro instead requested that Allan Rankin, the Dean of the Faculty of Medicine, combine the Sub-Departments of Ophthalmology and Oto-Auro-Laryngology into a single Department that would be made independent of the Department of Surgery. The University of Alberta records this change as having been made in 1937. Dr. Claude Vernon Jamieson, who had been appointed to the University of Alberta at the same time as Wells, was made the Head of this new combined Department. Wells died in Edmonton in 1940.¹³

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↗ An advertisement of Dr. Wells's medical practice in *The Edmonton Bulletin*, 15 December 1906. Image courtesy of Peel's Prairie Provinces (peel.library.ualberta.ca), a digital initiative of the University of Alberta Libraries.

↖ Dr. R. Bruce Wells, Head of Ophthalmology (1923–1936). Courtesy of the University of Alberta Archives, 81-117-1-90.

Dr. Claude Vernon Jamieson (1936-1940)

Dr. Claude Vernon Jamieson was born in Almonte, Ontario, in 1881. He graduated from medicine at the University of Toronto in 1907. Following postgraduate training in London, he moved to Edmonton in 1912, establishing his practice in eye, ear, nose, and throat.¹⁴

Jamieson began teaching Rhino-Oto-Laryngology for the Faculty of Medicine at the University of Alberta in 1923 and was appointed Lecturer in Rhino-Oto-Laryngology in 1924. In 1931 he became Clinical Professor of Oto-Laryngology and head of the Sub-Department of Oto-Laryngology, which shared two demonstrators with the Sub-Department of Ophthalmology. Jamieson was a Charter Fellow of the Royal College of Physicians and Surgeons of Canada.¹⁵

Following the resignation of Dr. Wells in 1936, Jamieson was appointed Head of what became the joint Department of Ophthalmology and Rhino-Oto-Laryngology. He retired from his post at the University in 1940 and died in Edmonton in 1962.¹⁶



① Dr. Claude Vernon Jamieson, Head of Ophthalmology and Rhino-Oto-Laryngology (1936-1940). Courtesy of the University of Alberta Archives, 2315-2.

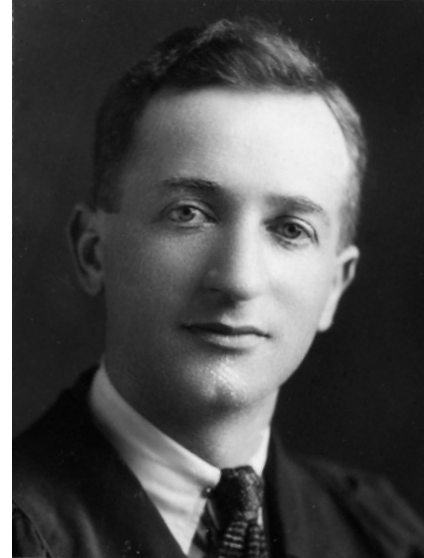
② Dr. Mark Marshall, 1924. Courtesy of the Faculty of Medicine and Dentistry.

①

**Dr. Mark Robert
Marshall (1940-1960)**

Dr. Mark Robert Marshall succeeded Jamieson as the Head of the Department of Ophthalmology and Rhino-Oto-Laryngology in 1940. Marshall's leadership and strong commitment to excellence in education and patient care helped shape the Department for the two decades that he was its leader and well beyond.¹⁷

There are conflicting descriptions of Marshall's early years though he was likely born in Izmir, Turkey. Residing in Canada at the outbreak of the First World War, Marshall volunteered for the Canadian Expeditionary Force in 1914. He served in the Canadian Army Machine Gun Corps during the First World War and rose from Private, on enlistment, to the rank of Captain. Marshall received the Military Medal and Star and the British War and Victory Medal. He remained in the military for some time following the war and co-authored the "History of the Canadian Machine Gun Corps, C.E.F." with Major H. T. Logan in 1919. During his time as an undergraduate, Marshall served as Adjutant to the University of Alberta Canadian Officers' Training Corps. In July 1943, following a request to the College of Physicians and Surgeons that rhinotolaryngologists and ophthalmologists apply for military service during the Second World War, Marshall re-enlisted in the military.¹⁸



"SMALL IN STATURE, BUT A GIANT
IN CANADIAN OPHTHALMOLOGY,"

-A. GARDNER WATSON
(MARK MARSHALL)



DR. R. B. WELLS
DR. M. B. LEVEY

(Eye, ear, nose & throat).

Offices removed to
621-622 Tegler Block.
Edmonton, Alta.



In 1920 Marshall moved to Edmonton, enrolling in medical school at the University of Alberta. During at least part of his time as a student, he lodged with Dr. Wells in his home on Connaught Drive in the Glenora neighbourhood. Marshall was an engaged and very active participant in student life – he played in the soccer and tennis leagues, was a member of the French Club and Dramatic Society, was news editor and then editor-in-chief of the student newspaper *The Gateway*, and was the producer of a very successful “Med Night” dramatic production in 1923. He was also president of his fourth year medical class, led the medicine debating team in 1923–1924, and was president of the Students’ Union in 1924–1925.¹⁹

Marshall’s aptitude for ophthalmology was apparent from early in his medical education. In 1925, as a fifth-year medical student, he was the only one to earn a Class 1 standing in the combined Ophthalmology and Rhino-Oto-Laryngology exam. At the end of his fifth year Marshall chose to transfer to McGill University where he graduated MD CM in 1926. By early 1927, Marshall had returned to Edmonton and gone into practice with his old instructor Dr. R Bruce Wells. They set up offices in the Tegler Block in downtown Edmonton (eye, ear, nose and throat). Marshall travelled to the United Kingdom to study ophthalmology at Moorfields Eye Hospital, London, earning a Diploma in Laryngology and Otology (DLO) and becoming a member of the Ophthalmological Society

of the United Kingdom in 1930. That year he also registered as a medical specialist in Alberta. Marshall made additional trips abroad to study in Vienna (receiving a diploma in Ophthalmology from the University of Vienna in 1934), Paris, and New York.²⁰

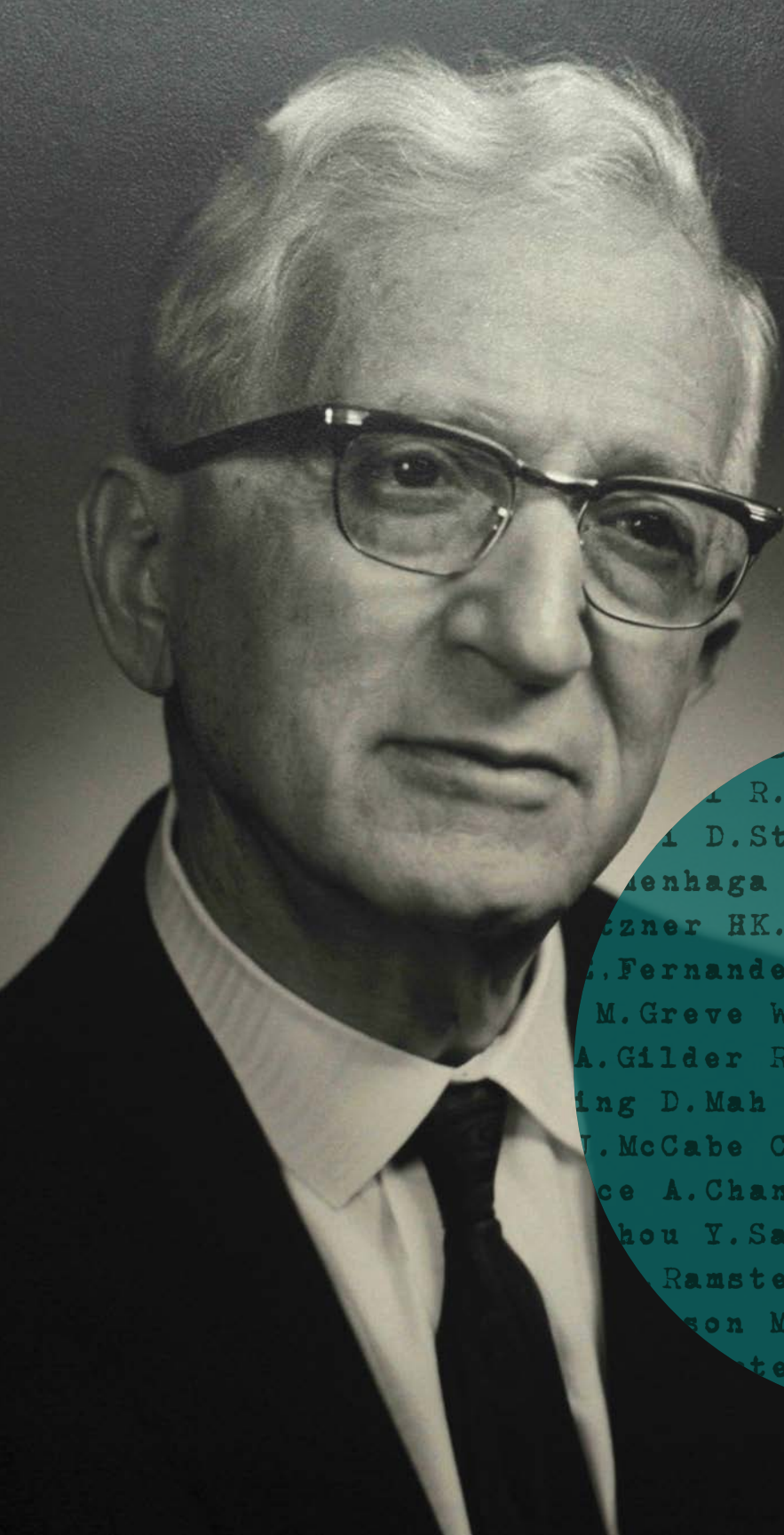
- ◀ Dr. Mark Marshall, 1966. Courtesy of Medical Photography, University of Alberta Hospital.
- ◀ An advertisement of the medical practice of Dr. Wells and Dr. Marshall (then Levey) in *The Wainwright Star*, 30 March 1927. Image courtesy of Peel’s Prairie Provinces (peel.library.ualberta.ca), a digital initiative of the University of Alberta Libraries.
- ◀ Dr. Mark Marshall (left) receiving the COS Award for the Advancement of Ophthalmology from Society President Dr. Sean Murphy, 26 June 1979, Toronto ON. Courtesy of the Canadian Ophthalmological Society.

In 1931, Marshall returned to the University of Alberta as a Demonstrator in Ophthalmology and Oto-Laryngology. Due to the close relationship between the disciplines of ophthalmology and otolaryngology, Marshall and his fellow demonstrator Dr. William Sloane Seale Armstrong had dual appointments to both sub-departments. In 1936, Marshall was appointed Lecturer of Ophthalmology. Following the resignation of Jamieson in 1940, Marshall became Clinical Professor of Ophthalmology and Head of the Department of Ophthalmology and Rhino-Oto-Laryngology. He would remain Head of the Department until his resignation was accepted in 1960. Marshall was promoted from Clinical Professor to full Professor of Ophthalmology in 1943. Marshall remained active within the Division of Ophthalmology and continued to teach until he retired from the University of Alberta in 1968.²¹

Described by A. Gardner Watson as “small in stature, but a giant in Canadian ophthalmology,” Marshall was well respected within the profession. Based on his experience he received a Certification (without examination) in Ophthalmology from the Royal College of Physicians and Surgeons of Canada in 1945. Marshall was elected a Fellow of the Royal College of Physicians and Surgeons of Canada in 1951, was chairman of the Royal College’s Committee on Ophthalmology during the 1950s, and served as an examiner for the Royal College examinations in

Ophthalmology in 1962. In 1953, Marshall became a Fellow of the American College of Surgeons. A founding member of the Ophthalmological and Otolaryngological Society of Alberta, he served as secretary for twenty-five years.²²

Marshall was also an active member of the Canadian Ophthalmological Society (COS). In 1954, he served as President of the COS and as president of the Canadian section of the International Congress of Ophthalmology. That same year, Marshall organized a satellite meeting of the International Congress in Montreal. During the early 1960s, Marshall was the chairman of the COS committee that prepared the brief on ophthalmology for the Royal Commission on Health Services (Hall Commission). He also served as the COS delegate to the International Council of Ophthalmology. In 1979, Marshall received the COS Award for the Advancement of Ophthalmology, and the COS semi-centennial award in recognition for outstanding service to eye care in 1987. He died in Toronto in 1990.²³



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The Department Dr. Mark Robert Marshall (1940-1960)

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The end of the Second World War saw the Department of Ophthalmology and Rhino-Oto-Laryngology staffed by only two individuals: Dr. Mark Marshall as Head and Professor of Ophthalmology and Rhino-oto-laryngology and Dr. William Armstrong as Lecturer in Rhino-oto-laryngology. Marshall taught the ophthalmology classes and Armstrong the rhino-otolaryngology classes.¹

Marshall was a master at quietly getting things done. In 1936–1937 he donated money for a Trust that funded research in ophthalmology, guest speakers, and graduate students from the University of Alberta who were studying at other institutions. He continued to add to this fund over time and it exists today as the Mark Marshall Fund and fosters ophthalmology research at the University

of Alberta. In another example, in 1954 a small one-storey building was erected without fanfare north of the Colonel Mewburn Pavilion on the University of Alberta Hospital site close to 87th Avenue; funds for the building were donated by Marshall. Marshall relocated his practice there until his retirement.²

During the 1950s, the small Department of Ophthalmology and Rhino-Oto-Laryngology began to grow from one instructor in each specialty and a demonstrator in rhino-oto-laryngology in 1950, to eight members – half specializing in each specialty by 1959. One of the most important developments in the Department was the addition, in 1958, of its first geographic full-time appointment – Dr. Thomas Alexander Somerville ‘Alastair’ Boyd MB ChB (Glasgow) FRCS (England) who was appointed Associate Professor of Ophthalmology. Previously all appointments had been part-time or sessional ones; professors and instructors earned the majority of their income through private medical practice and received a small honorarium for their teaching. This first geographic full-time appointment was made possible by an

◀ Dr. Mark Robert Marshall, Head of the Department of Ophthalmology and Rhino-Oto-Laryngology/Oto-Laryngology (1940–1960). Courtesy of the Department of Ophthalmology and Visual Sciences.

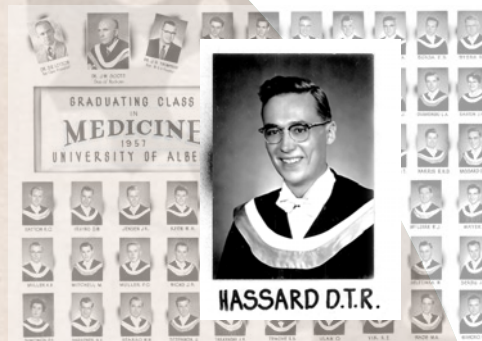
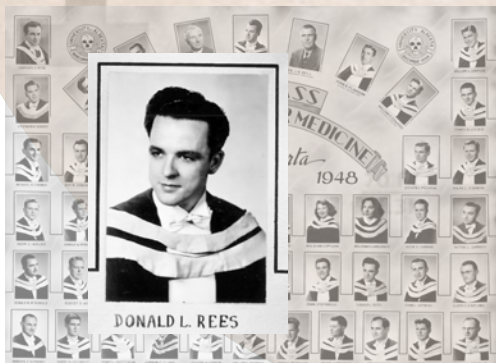
infusion of government funding, which occurred after the American Medical Association placed the University of Alberta Medical School on “confidential probation” after its 1956 inspection. The probation was lifted in 1959.³

In 1959 Marshall, who wished to develop an independent Department of Ophthalmology, submitted his resignation as Head of the Department of Ophthalmology and Otolaryngology and Chairman of the Committee on Graduate training; it was accepted by Dean Walter Mackenzie and was effective 31 August 1960. Following his resignation, Ophthalmology and Otolaryngology at the University of Alberta was split into two Divisions within the Department of Surgery (mirroring the arrangement already adopted at the University of Alberta Hospital). This change was initially made on a provisional basis until the leadership of the resulting department/division was decided. Ophthalmology would not regain departmental status until 1969, after much lobbying of Dean Mackenzie by Marshall and Boyd.⁴

Throughout his Headship Marshall had a strong commitment to both patient care and to education – commitments that echo down through the Department to the present day. He published papers on both clinical and educational topics. Marshall travelled to northern Alberta to provide ophthalmology care to members of the First Nations communities on a voluntary basis.

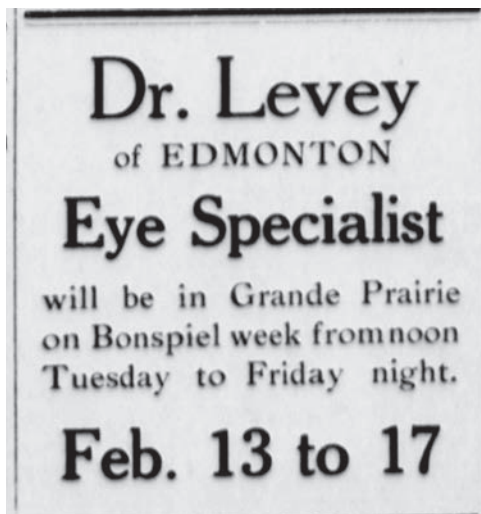
He also served residents in small towns in northern Alberta by providing basic eye care. There would be ads in the local paper for weeks beforehand announcing the visit. On his arrival Marshall would see patients in a hotel room, local clinic or hospital. He would often take a fitting optician with him on these trips to fill glasses prescriptions for patients. In the hospital, Marshall’s care of his patients was meticulous and exacting. Patients from central and northern Alberta would be sent to him for care. Former intern Dr. Robert Macbeth (later the Chairman of the Department of Surgery at the University of Alberta) recalled his precise technique and the perfection and beauty of his surgical dressings. However, it was through Marshall’s educational efforts that the Department – in spite of its small size – would go on to have a large impact on the development of Post-Graduate Medical Education at the University of Alberta. As discussed below on page forty seven, Marshall was a major force behind the design and functioning of the Residency Training Program at the University of Alberta.⁵

Other notable ophthalmology residents who trained under Dr. Mark Marshall

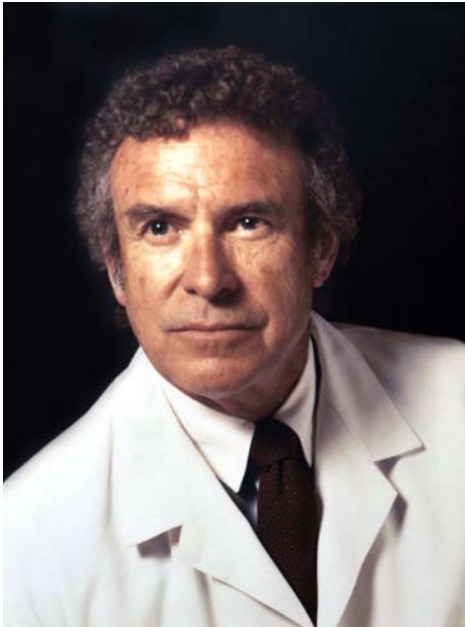


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 By the time Marshall retired from the University of Alberta at the end of 1968, he had seen fifteen residents successfully through the residency program in ophthalmology. Many of these graduates chose to practice in Edmonton and made important contributions to the Department including: Dr. D.L. Rees (1956), Dr. D. Hassard (1962), and Dr. H.K. Shutt (1968). Images courtesy of the Faculty of Medicine and Dentistry.
- Dr. Marshall (then Levey) advertises an upcoming visit to Grand Prairie in *The Northern Tribune*, 2 February 1933. Image courtesy of Peel's Prairie Provinces (peel.library.ualberta.ca), a digital initiative of the University of Alberta Libraries.



The Division Dr. John Winston 'Wint' Duggan (1960-1964)



In September 1960, Dr. John Winston 'Wint' Duggan MD MMS FRCSC became the new Head of the Division of Ophthalmology at the University of Alberta. Duggan was born in Medicine Hat, AB, in 1921. He and his elder brother Hector both became physicians. Duggan enrolled in the accelerated medical program at the University of Alberta graduating in September 1943. Following graduation he served in the Royal Canadian

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Army Medical Corps rising to the rank of Captain.⁶

Following his military service, Duggan became one of the first class enrolled in residency training at the University of Alberta in 1946 and was the first resident in ophthalmology. Duggan completed his basic science training and the first two years of his residency training at the University of Alberta Hospital under the direct guidance of Dr. Marshall. In 1949, as arranged by Marshall who was the Chairman of the Committee on Graduate Training, Duggan travelled to Tulane University in New Orleans, Louisiana, where he completed his residency training in 1950 earning a Master of Medical Science (MMS). He certified in ophthalmology in 1950 and became a Fellow of the Royal College of Surgeons of Canada in 1952.⁷

➤ Dr. J. W. 'Wint' Duggan, Head of the Division of Ophthalmology (1960-1964). Courtesy of the Department of Ophthalmology and Visual Sciences.

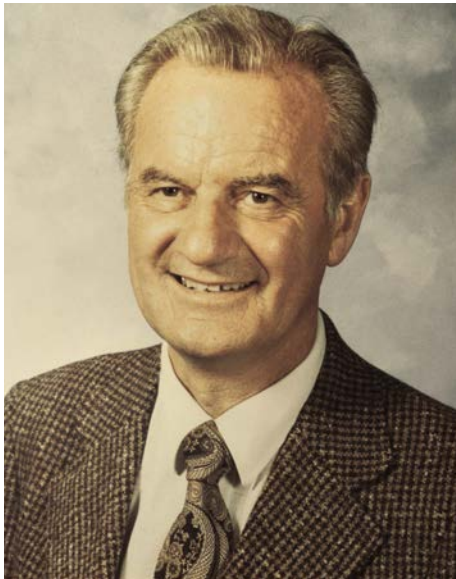
Duggan then returned to Edmonton where he received an appointment to the Department of Ophthalmology and Rhino-Oto-Laryngology. By 1952 Duggan was appointed Instructor in Ophthalmology and was teaching undergraduate ophthalmology. Duggan remained with the Department teaching and conducting research, rising through the ranks to Assistant Clinical Professor of Ophthalmology. Duggan was appointed Associate Professor and Head of Ophthalmology in 1960 following the acceptance of Marshall's resignation.⁸

When Duggan became Head of Ophthalmology the Division of Ophthalmology was a small one with only a single geographic full-time appointment, Dr. Boyd who had been appointed in 1958. It had also suffered a recent loss. Dr. R. W. Roberson, a Clinical Lecturer, had recently died in July 1960. He was replaced by another "Marshall Plan" graduate Dr. Donald L. Rees who became a Sessional Instructor. Dr. Marshall remained an Honorary Member of the Division.⁹

However, Duggan would be Head of Ophthalmology for only a short time. He resigned effective 1 January 1964 and moved his medical practice to San Jose, California where he would remain until he retired in 1989. Dr. Duggan died in Saratoga, California in 2005. As Duggan's departure left the Division of Ophthalmology without a director in the middle of the academic year, Dr. Marshall

was appointed temporary Head of the Division of Ophthalmology to allow the Selection Committee time to consider his replacement.¹⁰

**The Division and Department
Dr. Thomas Alexander Summerville
'Alastair' Boyd
(1964 -1969 /1969 -1980)**



Assistant Professor Dr. Thomas Alexander Summerville 'Alastair' Boyd MB ChB (Glasgow) FRCS (England) was appointed to be Head of the Division of Ophthalmology in 1964 following the departure of Dr. Duggan. Boyd was born in Glasgow in 1918. He studied medicine at the University of Glasgow graduating in 1942. Following his internship he served as a member of the Royal Army Medical Corps in England, Europe and

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the Middle East from 1943-1947. It was during this time that he first began his training in ophthalmology. This specialist training continued in Glasgow after his release from the RAMC. He earned his Diploma in Ophthalmic Medicine and Surgery in 1948 and he became a Fellow of the Royal College of Surgeons of England (Ophthalmology) in 1954. In 1958 Boyd became the first Geographic Full Time member of the Department when he was appointed Associate Professor of Ophthalmology.¹¹

Boyd's appointment in 1958 marked a turning point in the development of the Department. Initially, all the members of the Faculty of Medicine were part-time clinical faculty. This changed in 1954 with the introduction of geographic full-time appointments. These new appointees were expected to concentrate their energies on teaching and research and their personal

● Dr. T. A. S. 'Alastair' Boyd, Head of the Division of Ophthalmology (1964–1969), Chairman of the Department of Ophthalmology (1969–1980). Courtesy of the Department of Ophthalmology and Visual Sciences.

earnings as physicians were capped at a level set by the University. Nevertheless, funding levels ensured that the number of geographic full-time appointments to the Department would remain at low levels for the next several decades and part-time clinical faculty would continue to play a vital role in the Department as both instructors and researchers. Moreover, the number of ophthalmologists practicing in the city remained limited due to the regulation of the number of residents trained, hospital appointments, and available beds and equipment.¹²

Shortly after his arrival, Boyd began working closely with Dr. Joseph Donovan Ross a General Practitioner from Stony Plain who served as the Minister for Health for the provincial Social Credit Government from 1957 to 1969. Ross oversaw the development of the Alberta Health Plan that would later allow Alberta to join the National Medicare Plan on 1 July 1969. Ross was very interested in preventative medicine and this concern included blindness and its prevention. With funding from the provincial government, Boyd would open the Glaucoma Clinic in 1959. In 1962, Boyd submitted a report on “Blindness Control in Alberta” to the Minister of Health and when the Division of Blindness Control was created in 1966 Boyd was appointed Director. He ran the province-wide Division of Blindness Control from his offices at the University of Alberta through the mid-1970s.¹³

Upon becoming Head of the Division of Ophthalmology in 1964, Boyd set out an aggressive plan for the development of ophthalmology at the University of Alberta. He advocated the adoption of the Consultation-Investigation clinic model to facilitate research, student education, and patient care. Clinical services for patients would facilitate clinical research opportunities and provide a learning and research environment for residents. However, the initial goals of using the clinics to prioritize research and teaching were soon overwhelmed by patient care. To support work in the clinics Boyd sought to further develop the already present Glaucoma Diagnostic Clinic (1959) and Strabismus Clinic (1960) and created paramedical training programs (see below). As the field of ophthalmology developed and as personnel became available, Boyd added subspecialty clinics in retinal detachment, corneal disease and eye bank, external eye disease, contact lenses, medical and neuro-ophthalmology, uveitis, and genetic diseases. Boyd pushed for increased opportunities for research experiences for residents, believing it to be an important component of their education. He intended to expand the faculty to cover all sub-disciplines and he requested a dedicated operating room and ophthalmic nursing staff at the University of Alberta Hospital.¹⁴

From the time of his application to Head of Division, Boyd was a tireless advocate of the notion that Ophthalmology should become a separate Department within the

Faculty of Medicine. He argued that, due to its specialized nature, “ophthalmology could achieve higher standards in service, teaching and research if it were to become an independent department in the Medical School of the University of Alberta.”¹⁵ In the late 1960s the Royal College of Physicians and Surgeons of Canada, the Canadian Ophthalmological Society and the Ophthalmological and Otolaryngological Society of Alberta (of which Dr. Marshall was secretary) joined in calling for the creation of independent departments of ophthalmology within Canadian universities. The ceaseless lobbying by Boyd and Marshall would finally be rewarded in 1969 when Ophthalmology became a separate Department at the University of Alberta.¹⁶

During his time as Head of Ophthalmology Boyd realized many of his initial goals. He developed research and training clinics, gradually increasing the number of subspecialties present. Boyd was also able to greatly increase the number of clinical faculty, although his plans to expand the number of geographic full-time positions were repeatedly frustrated by financial difficulties. When he became Head of the Division of Ophthalmology Boyd was the only geographic full-time faculty member with on-site clinical faculty members Dr. Rees as Lecturer and Drs. Hassard and Morgan as sessional instructors. By 1973, a number of subspecialties were clinically represented in the Department: anterior segment and aphakia (Hassard), external

eye diseases (Gow), glaucoma (Boyd, Wyatt), low-vision aid (Leitch) neuro-ophthalmology (Shutt), ocular motility (Boyd, Morgan), ocular genetics (Pearce), ocular oncology (Rootman, Shutt), ocular pathology (Rootman), retinal angiography (Boyd, Pearce, Schindler) and retinal surgery (Schindler). However, there were only three geographic full-time faculty – Drs. Boyd, Wyatt and Pearce. Nevertheless, Boyd had succeeded in one of his most cherished goals, returning Ophthalmology to the full Departmental status. Alastair Boyd retired from his position as Chairman of the Department of Ophthalmology in 1980. He died in Edmonton in 1992.¹⁷

Subspecialties Established by 1973:

- Anterior Segment and Aphakia (Hassard)
- External Eye Disease (Gow)
- Glaucoma (Boyd & Wyatt)
- Low Vision Aid (Leitch)
- Neuro-Ophthalmology (Shutt)
- Ocular Motility and Strabismus (Boyd & Morgan)
- Ocular Genetics (Pearce)
- Ocular Oncology & Pathology (Rootman & Shutt)
- Retinal Angiography (Boyd, Pearce & Schindler)
- Retinal Surgery (Schindler)

The Department Dr. Henry Turner Wyatt (1980-1992)

In 1980 Dr. Henry Turner Wyatt MB BS MD FRCS (England) FRCSC became the new Chairman of the Department of Ophthalmology succeeding Dr. Boyd on his retirement. Wyatt was born in Hull, England, in 1932. He studied medicine at the Royal Free Hospital School of Medicine in London, qualifying MB BS in 1955. Following his obligatory post graduate year Wyatt became Medical Officer for the British Antarctic Survey from 1956 to 1959, serving for three summers and two winters stationed first at Detalle and then Stonington Islands. On his return to Britain, Wyatt carried out research on climatic physiology from 1960 to 1962 as a Junior Associate at the Medical Research Council and was engaged in studying human adaptation to extreme climates. In 1963 Wyatt earned an MD from the University of London for his thesis “The Physiology of Men During Sledging Expeditions.”¹⁸

Wyatt developed an interest in ophthalmology and in 1962 undertook two years of specialist training at the Oxford Eye School. In 1966 he continued his ophthalmology training at the Liverpool Eye School and earned his FRCS England

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(Ophthalmology) in 1969. Wyatt was drawn to practice medicine in Canada because of the universal healthcare system that was then being implemented nationally and the presence of wild and remote places. In order to help facilitate his applications, he took two tours with the Grenfell Association in Labrador, providing eye care to residents in remote outposts along the coast.¹⁹

In August 1970, Wyatt joined the Department of Ophthalmology as an Associate Professor, becoming its second geographic full-time appointment. His main responsibility upon his appointment was to set up a Department of Ophthalmology at the Charles Camsell Hospital. This would enable the University of Alberta Department of Ophthalmology to begin teaching medical students and residents at both the University and Charles Camsell Hospital sites. Wyatt also participated in the Arctic Ophthalmological Survey of Eye Disease in the Canadian North (1970-1971) and helped to establish the Department’s program to provide ophthalmic care to residents living in the Inuvik Zone of the Northwest Territories (see below). Wyatt took over as the

Director of the Glaucoma Diagnostic Clinic
1 June 1973.²⁰

Wyatt's appointment as Chairman of the Department of Ophthalmology coincided with repeated periods of economic recession. This led the province of Alberta to carry out a dramatic restructuring in the fields of health and education which in turn resulted repeated budget cuts and shortages for healthcare in the Edmonton region and at the University of Alberta. These continuing budgetary issues would complicate the three major challenges of his tenure: recruiting new full and part-time members for the Department, improving the Department's educational offerings, and expanding research in the Department.²¹

When Wyatt became Chairman in 1980 following Dr. Boyd's retirement, the Department consisted of two geographic full-time appointments: Wyatt specializing in glaucoma, and Bill Pearce specializing in ocular genetics and pediatrics. The other subspecialties were covered by clinical professors in private practice who served as part-time instructors. By 1987 the situation was little changed. Wyatt (Glaucoma) and Pearce (Genetics/Pediatrics) remained the only geographic full-time faculty members. The remaining subspecialties were covered by part-time clinical professors. There were two long-serving clinical professors who were both graduates of the original "Marshall Plan": D. Rees (General) and D. Hassard (Corneal Disease). Two graduates of the Department's residency training

program served as associate clinical professors: R. Morgan (Ocular Motility) and H.K. Shutt (Neuro-ophthalmology). Of the six assistant clinical professors three were previous residents: H. Climenhaga (Corneal Disease), G. Grant (Retina and Posterior Segment), and F.L. Leong-Sit (External Eye Disease). R. Schindler (Retina and Posterior Segment) and two new appointments, R. Johnson (Oculoplastics) and W. Astle (Pediatrics), rounded out the Department. B. Mielke from the University of Alberta Department of Pathology served as an honorary clinical professor.²²

Throughout his tenure as Chairman, Wyatt tirelessly advocated for increased resources for the Department, both material and personnel. By 1989 facilities at the University of Alberta Hospital and the Clinical Sciences Building had undergone long-needed modernization and expansion, including the development of a new day surgical unit. However, funding cutbacks at the Camsell had reduced operating time available for the staff which in turn reduced resident teaching time. The subspecialties of retinal and posterior segment diseases continued to be taught at the Royal Alexandra Hospital (see below). Wyatt faced a constant battle to keep the surgical facilities supplied with up-to-date equipment in response to rapid changes in the field.²³

At the end of Wyatt's tenure as Chairman of the Department of Ophthalmology changes brought about by budgetary issues and the reorganization of provincial healthcare began a process that would bring about an important transformation and revitalization of the Department. In an attempt to rationalize and reduce healthcare costs the province of Alberta was beginning the process of regionalizing healthcare – bringing specialty care together in limited locations rather than equipping all hospitals with the equipment and physicians needed to provide a full range of specializations. The Minister of Health gave hospitals a limited window of time in which to provide plans for restructuring. Ambulatory surgery and out-patient clinics rather than in-patient hospital beds were seen as the way of the future and as a more cost-effective means of providing care to patients.²⁴

The University of Alberta Department of Ophthalmology, hospitals with which it was affiliated and other ophthalmology departments and divisions located in other hospitals within the city of Edmonton and its surrounding region had come together in order to secure and fundraise for high cost equipment – for example the purchase of a YAG laser which was made possible by donations from the Rotary Club and the

University of Alberta Hospitals Foundation. The laser was then made available to all qualified ophthalmologists in the city of Edmonton.²⁵

In January 1991, the Ophthalmological Society of Alberta held a workshop to discuss the regionalization of hospital ophthalmology services in Edmonton. Aware that regionalization was already under consideration by the government, regional health authorities, and hospital boards, the city's ophthalmologists seized the opportunity to provide these authorities with a plan of their own for consolidating ophthalmology services. In the spring of 1991 the Task Force on Hospital Ophthalmology Services was formed and began looking into ways to regionalize hospital services in Edmonton.²⁶



➤ Dr. Henry T. Wyatt, Chairman of the Department of Ophthalmology (1980–1992). Courtesy of the Department of Ophthalmology and Visual Sciences.

Several models came under consideration and discussions on which version should be selected were quite enthusiastic. Town halls were held where the Edmonton's ophthalmologists met to discuss the issues. The Department of Ophthalmology was concerned that the needs of academic ophthalmology and the residency training program be taken into consideration whichever governance model was chosen.²⁷

By June 1992 the Task Force on Hospital Ophthalmology was recommending a two-site model for regionalization with a North-Side/South-Side breakdown in centres of care. Pediatric services would remain at the University of Alberta Hospital because of the development of the Children's Health Centre of Northern Alberta (now the Stollery Children's Hospital). The Department of Ophthalmology would remain in charge of training ophthalmologists and the teaching unit would be located at the University of Alberta Hospital with a clinical service located in downtown Edmonton along with some specialized services (e.g. retina). The Dean of Medicine at the University of Alberta, Dr. Douglas Wilson, supported the two-site model which would maintain the location of the academic program at the University of Alberta Hospital. However, the path to regionalization was to be a complicated one. It began under Wyatt and would be brought to completion by his successor Dr. Ian MacDonald.²⁸

During his twelve years serving as Chairman, which ended in the summer of 1992, Dr. Wyatt had made great strides towards expanding the size of the Department. Part-time clinical professors now included: Drs. W.F. Astle (Pediatrics), D. Climenhaga (Pathology/Cornea), G. Grant (Retina), E. Hodges (Contact Lens/Cornea), R. Johnson (Oculoplastics/Orbit/Lacrimal), F.L. Leong-Sit (External Eye Disease/Cataract), R. Morgan (Cataract), H.K. Shutt (Neuro-ophthalmology), and L. Uniat (Retina). A third geographic full-time assistant professor was recruited in 1988, Dr. G. Drummond (Pediatrics), along with a fourth geographic full-time assistant professor, Dr. R. Casey (Glaucoma/Ocular Pathology), and a maximum part-time assistant clinical professor, Dr. J. Lewis (Neuro-ophthalmology), in 1991. Wyatt's replacement as Chairman, Dr. Ian MacDonald (Genetics/Pediatrics) joined the Department as the fifth geographic full-time professor in 1992.²⁹

➤ Resident Classes (1980-1992). Courtesy of the Department of Ophthalmology and Visual Sciences.



G. Grieve • R. Lang • M. Kutzner •
 S. Short • D. Brown • A. Gilder • H.
 Climenhaga • J. vanWestenburgge
 • L. Smith • L. Uniat • D. Conrad
 • D. Cote • R. Leishman • G.
 Drummond • A. MacDonald •
 G. Ratzlaff • J. Novak • J. Walker
 • F. Dossetor • L. Onge-Tone • W.
 Okada • R. Casey • J. Lewis • M.
 Phillips • E. Kwan • E. Skochylas
 • G. Williams • I. Westra • G.
 Wuebbolt • A. Ball • F. Theriault



Resident Classes during Dr. Wyatt's
 service as Chairman of The Department
 of Ophthalmology

(1980-1992)

Facilities & Clinics

The University of Alberta Hospital

As a very small specialty within the Faculty of Medicine, ophthalmology was often short of dedicated space and resources at the University of Alberta Hospital. Indeed, Marshall remarked that during the 1940s not only was there no dedicated space allotted to the ophthalmology in the Hospital, but that ophthalmologists were required to provide their own equipment! In 1954, through Marshall's independent planning, a small one-story building was erected by the provincial department of public works north of the Colonel Mewburn Pavilion on the University of Alberta Hospital site and he relocated his practice there. Following the construction of the "1956 Wing" of the University of Alberta Hospital, Eye, Ear, Nose, and Throat patients were located there at Station 57. By the early 1960s the University of Alberta Hospital had increased its Outpatient Department size so that Ophthalmology Clinics could be carried out there. However, ophthalmology continued to lack a dedicated operating room and surgical nurses. This limited the nature of the surgeries that could be performed. Other regional Edmonton

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hospitals, also suffered from limited operating room time and equipment.³⁰

In the spring of 1969 the Department of Ophthalmology moved into the second floor of the newly built Clinical Science Building. This move provided the Department with additional space for teaching, clinical services, and research. The orthoptic and glaucoma clinics were also relocated to the Clinical Sciences Building along with other patient services such as retinal and fluorescein angiography and various outpatient clinics whose composition changed over time. The Department also housed the northern Alberta Eye Bank and biochemistry laboratory rooms and, from 1977–78, the surgical skills laboratory.³¹

Maintaining the facilities at the University of Alberta Hospital was a constant struggle as Department Chairs tried to keep the facilities up-to-date. Funding was often not easy to come by. Dr. Marshall brought his own instrument trays which he cared for meticulously. Marshall taught care and efficiency with his tools by instructing his students in this field, even keeping track of how long knives and other reusable instruments could be safely used, as part



of his cost-efficiency. By 1977 upgrades to ophthalmology equipment at the University of Alberta Hospital were becoming urgent. The field of ophthalmology was beginning to undergo rapid changes with the development of new microsurgical techniques and the specialized equipment needed was frequently quickly outdated by the rapid advancement of technology. Such specialized equipment was often paid for by donations. The Edmonton Winspear Foundation purchased the second and third phacoemulsification machines for the University of Alberta Hospital and ophthalmic companies also donated

expensive equipment. Major renovations to the Department's operating rooms did not take place until 1988-89 when a four theatre unit day surgical facility was established in the Walter C. Mackenzie Health Sciences Centre. The Department's facilities in the Clinical Sciences Building were also expanded at about this time.³²

⤴ Aerial Image of the University of Alberta Hospital Campus, 1960. Courtesy of Medical Photography, University of Alberta Hospital. Annotated by Dr. Rod Morgan.

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The Glaucoma Clinic

Dr. Alastair Boyd opened the Glaucoma Diagnostic Clinic in the Wells Pavilion at the University of Alberta Hospital in January 1959. He designed the Clinic along the Consultation-Investigation Clinic model in which clinical services and patient care were intended to aid in clinical research and provide a space in which residents could be taught and conduct their own research projects. However, the initial plans to prioritize research and teaching were quickly overwhelmed by the demands of patient care. Barbara Salter, who came from England to be Boyd's secretary received glaucoma technical skills training from the Division residents Dr. Hassard and Dr. Patrick and took on the role of the Chief Glaucoma Technician. Remembered with great affection by the other technicians, Miss Salter served as Chief Technician until her retirement in May 1987. She died in Perth, Australia in 2017. Maralynne Hawkins, a graduate of the technician training program (see below), replaced Miss Salter as Chief Technician and held that position until she resigned due to ill health in 1991.³³ Ophthalmologists from across the city soon began sending their patients to the Clinic for "visual field" reports and this contributed to the rapid increase in the number of patients seen in the Glaucoma Diagnostic Clinic.³⁴

"THE PATIENTS BECAME LIKE
FAMILY."

-MARALYNNE HAWKINS

Funds for the Glaucoma Diagnostic Clinic were initially drawn from a grant from the Special Services and Research Committee of the University of Alberta Hospital. From April 1963 through March 1965, funding was provided by National Health Research Grants. In 1965 arrangements were made for the Provincial Government to take over responsibility for the expenses of the technical and clerical staff, instruments, and materials for the Glaucoma Clinic as it became part of the Alberta Blindness Control Program when it launched in 1965 with Boyd as the Director of the Program. This change in funding structure also included shifting to a fee per service funding model under which fees would be charged for testing that had previously been covered by research funding. In Alberta many patients received medical insurance from Medical Services (Alberta) Incorporated that was founded in 1948. In 1969, this physician-sponsored pre-paid program became part of a provincial program before it was incorporated into Medicare which was adopted in Alberta 1 July 1969. By 1969, demand for the clinic's services had increased substantially.³⁵

Many of the technicians who worked at the clinic graduated from the University's Glaucoma Technician Training Program (see below). While many of these technicians would work for the Department for only a short period of time, some of them would work for the Glaucoma Diagnostic Clinic for decades to come. For these dedicated technicians, the Clinic

The Role of Associated Ophthalmic Staff in the Development of the Department

The eye clinics, which were developed by the Division and Department of Ophthalmology from 1959 onward, served a vital role in patient care, resident training and research. The paramedical and administrative staff were vital to the smooth running of these clinics and the staff members formed strong bonds with the patients who were treated there – sometimes over decades with individual patients and over generations within families.

Division of Ophthalmology Paramedical and Administrative Staff, May 1968. Standing (left to right): Barbara Salter, Aiko Lawrie, Gillian Budd, Mrs. Rose, Unknown. Seated (left to right): Unknown, Glenda MacDonald, Maralynne (Kocurek) Hawkins. Courtesy of Medical Photography, University of Alberta Hospital.

became more than just a job – it became an extended family. Close relationships also developed between the technicians and the patients who would often travel long distances from elsewhere in the province for, in the early years, three successive days of testing. Glaucoma patients would return frequently over the years for follow-up testing and, in the case of families with familial glaucoma, the technicians came to know generations of the affected families. Indeed, as one of the long-term technicians Maralynne Hawkins recalled “the patients became like family.”³⁶

Dr. Wyatt took over the Glaucoma Diagnostic Clinic in June 1973. The numbers of patients seen in the clinic continued to expand and by the late 1980s Wyatt was actively looking for a second clinician to help with patient care. Dr. Ron Casey, then a senior resident, agreed to seek fellowship training in glaucoma. He trained in ocular pathology at the University of London in 1990 and in glaucoma at Moorfields Eye Hospital, London in 1991. Casey’s “letters home revealed the wonder he felt to train in such a rich environment and his intention to bring this knowledge back to train others.”³⁷ Casey returned to Edmonton in 1991 as the fourth geographic full-time appointment in glaucoma and ocular pathology. In 1989, the Glaucoma Diagnostic Clinic received a much-needed renovation as part of a larger rebuild of the Department of Ophthalmology within the Clinical Sciences Building.³⁸



- ▲
 Graduates of the Glaucoma Technician Program, 1968. Standing (left to right): L. Carmen Fitzmaurice, Linda Walker, Jeannie Reimer. Courtesy of Medical Photography, University of Alberta Hospital.
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 Glaucoma Technician Iris Odynski, May 1971. Courtesy of Iris Odynski.
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 Orthoptist Betty Newton and an unidentified pediatric patient, February 1973. Courtesy of Medical Photography, University of Alberta Hospital.



The Orthoptic Clinic / Pediatric Ophthalmology and Adult Strabismus Clinic

In 1960-61, Dr. Marshall established a small Orthoptic Clinic in the University of Alberta Hospital with a single orthoptist. The Orthoptic Clinic's primary function was to diagnose and evaluate strabismus. Although specific records are lacking it seems that funding for the clinic was initially drawn from the Alberta Ministry

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of Health. Dr. Boyd became the second director of the clinic.³⁹

The Clinic remained a small one until the move into the Clinical Sciences Building in 1969 when it occupied six rooms in the new Department of Ophthalmology. In order to staff the Clinic Boyd started an Orthoptic Training Program (see below). In July 1969, Dr. Rod Morgan, a former resident, returned to the Department as a part-time clinical lecturer following fellowship training in pediatric ophthalmology at Smith-Kettlewell Institute of Visual

Sciences in San Francisco, John's Hopkins Wilmer Eye Institute in Baltimore, and Children's Hospital in Washington, DC. He became the Director of the Ocular Motility Program from 1969 to 1973 when Boyd once more became director of the Orthoptic Clinic.⁴⁰

Around 1986, the Orthoptic Clinic evolved into the Pediatric Ophthalmology and Adult Strabismus Unit. Dr. Pearce became the Director in November 1986 and held that post until June 1991, after which Dr. Garry Drummond became Director. During the 1989 rebuild of the Department of Ophthalmology three rooms were set aside for pediatric and strabismus patients.⁴¹



- ⤴ Orthoptist Mary Heacock and an unidentified pediatric patient, March 1985. Courtesy of Medical Photography, University of Alberta Hospital.
- ⤵ Examination room in the Pediatric Ophthalmology and Adult Strabismus Unit from 1969 to 2007, Clinical Sciences Building. Courtesy of Brad Wakeman.

The Low Vision Clinic

In late 1968 Boyd began to explore the idea of creating a Low Visual Aid Clinic as part of the Blindness Control Program. In 1970 the Low Vision, or Low Visual Aid, Clinic was started by Dr. Garry Leitch who joined the Department of Ophthalmology as a Clinical Lecturer immediately following his residency. The Low Vision Clinic was located in the Clinical Sciences Building and worked in conjunction with Canadian National Institute for the Blind (CNIB) personnel to provide visual aids to individuals with low vision. By 1973 the Clinic had gained in size and was being used in resident teaching. Dr. Leitch left Edmonton for the United States in 1978. There is little information on the Low Vision Clinic during the 1980s; although it continued to function and be used in resident teaching through the late 1980s no specific staff member was associated with it.⁴²

Dr. James Lewis, a former University of Alberta medical student and resident, was appointed to take charge of the Low Vision Clinic in November 1991 when he joined the Department as a Clinical Lecturer following the completion of his fellowship in neuro-ophthalmology and pediatric neuro-ophthalmology. Prior to his return, the Clinic had been run by a General Practitioner in association with the CNIB. Following his appointment, the Low Vision Clinic was once again used for resident teaching. Lewis ran the Low Vision Clinic

for a full day every other week with a nurse from the CNIB from 1991 until the Regional Eye Centre opened in the Royal Alexandra Hospital in 1996.⁴³

The Clinical Sciences Building

In the spring of 1969 the Ophthalmology Department moved into the second floor of the newly built Clinical Sciences Building. This move provided the Department with much-needed additional space for teaching, clinical services, and research. Patient services such as the Glaucoma Clinic, Orthoptic Clinic, and fluorescein angiography were also located within the Department in the Clinical Sciences Building as were the Eye Bank and Biochemistry Laboratory. Five rooms were also dedicated to Outpatient Department Clinics. The Department quickly expanded into the new space and a variety of ambulatory patient clinics were instituted.⁴⁴

Within a few years the Department had once more run out of space and Boyd requested additional space and the renovation of the current space in the Clinical Sciences Building in 1977. By 1988, the need for the Department to be redesigned had become acute, and Wyatt requested considerable renovations and reorganization of the space. This time the changes were approved, and in 1989 the rebuild of the Department was completed. The number of examining rooms in the Clinical Sciences Building was expanded to ten (seven clinical examining rooms and three examining rooms for pediatric and strabismus patients). In 1990, both general and subspecialty clinics were operating

out of the Clinical Sciences Building. The general ophthalmology clinics were biased towards the subspecialty interest of the staff ophthalmologists Dr. H.K. Shutt (neuro-ophthalmology), Dr. D. Climenhaga (cornea, uveitis and pathology), and Dr. R. Morgan (cataract). Subspecialty clinics included: pediatrics, ocular genetics, neuro-ophthalmology, glaucoma, pathology, contact lens, and low vision.⁴⁵



^ The Clinical Sciences Building, University of Alberta. Courtesy of Richard Siemens, Copyright University of Alberta.

> Charles Camsell Hospital, Edmonton. Courtesy of Dr. Bill Pearce.

The Charles Camsell Hospital



The Charles Camsell Hospital has its origin as the Charles Camsell Indian Hospital which was built by the Indian Health Service and opened in 1946. It was created in order to provide segregated medical care to members of First Nations and Inuit communities in Alberta, northern British Columbia, Yukon and the Northwest Territories. Initially, the Camsell functioned primarily as a tuberculosis sanitarium, but it also served as a general hospital for First Nations and Inuit patients. The Camsell developed a close relationship with the University of Alberta Medical School. The school began teaching fourth-year medical students at the Camsell from 1946–1947. The hospital provided the medical school with additional facilities for the training of medical students, and the medical school, in turn, provided the patients of the Camsell with specialist medical care, including ophthalmology.⁴⁶

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A new facility was opened in 1967, but a decrease in the rate of tuberculosis among First Nations and Inuit communities and a shift from inpatient to outpatient models of care meant that the hospital was underutilized. Private practitioners were granted admitting privileges and soon only 23% of the patients were First Nations and Inuit. However, Alberta Hospital Services only partially funded the Charles Camsell Hospital, leaving National Health and Welfare to subsidize the hospital's operating budget. Negotiations to transfer the Camsell to the Alberta Government were completed in 1978 but the formal transfer did not take place until 1980.⁴⁷

Dr. Alastair Boyd had noted that the advent of Alberta Health Care in 1969 had reduced the number of patients seeking care at the University of Alberta Hospital Outpatient Department. He felt that this had a negative impact on resident training. This led Boyd to recruit Dr. Henry Wyatt in 1970 with the intention that he should take charge of developing a teaching unit at the Camsell hospital. In the beginning, because the Camsell was still under the jurisdiction of National Health and Welfare, two-thirds of Wyatt's salary was paid by the Federal Government. Renovations for an eye department at the Camsell were swiftly undertaken and the unit opened later in 1970. The clinic offered excellent space and examining rooms as well as instruments, operating rooms, and space to set up ambulatory patient clinics. This allowed the Department to increase the number

of clinics offered and provided additional space for surgery. From 1970, the Charles Camsell Hospital also cared for patients in the Inuvik Zone who could not be treated in the local area (discussed below).⁴⁸

The Department of Ophthalmology began training undergraduate medical students at the Camsell in 1970. In 1971 residents also began training at the Camsell, marking the first time that ophthalmology residents were trained outside of the University of Alberta Hospital. In August 1971, an additional geographic full-time member – the Department’s third – Dr. William ‘Bill’ Pearce was also recruited in part to help provide supervision to residents at the Camsell Hospital. Soon Boyd was pleased to remark that Wyatt and Pearce were able to provide extended and focussed supervision which “had proved very popular with the residents.”⁴⁹ Soon after his arrival, Pearce replaced Wyatt as Head of the Charles Camsell Eye Department. Dr. Lin Leong-Sit, a former resident, joined the Department as an assistant clinical professor in 1979 and worked at the Camsell Eye Department as did Dr. Royce Johnson in the mid-1980s.⁵⁰

By 1990, the Charles Camsell Hospital was providing six half-day clinics for outpatients and one day of minor operations per week. The clinics were general ophthalmology but biased towards the subspecialties of the staff ophthalmologists: Dr. R. Johnson

(Eyelids/Lacrimal/Orbit), Dr. F.L. Leong-Sit (External Eye Disease/Cataract), and Dr. B. Pearce (Pediatric ophthalmology/Strabismus).⁵¹

The Royal Alexandra Hospital

The Division of Ophthalmology at Royal Alexandra Hospital began negotiations with the Division of Ophthalmology at the University of Alberta to establish a site for residency training at the Royal Alexandra Hospital during the 1960s. The Royal Alexandra Hospital had a large patient population, an excellent in-patient unit (Ward 21) which it shared with the Division of ENT and an up to date operating room (Theatre 11) with a dedicated and well-trained nursing staff. These negotiations remained unsuccessful until after the Royal Alexandra Hospital was chosen as the site for the development of a retinal unit in 1974 (discussed below). The Retinal Diagnostic and Management Unit at the Royal Alexandra Hospital included: a weekday morning out-patient clinic for patients with vitreo-retinal disorders, laser treatments in the clinic, and surgery carried out in the afternoons. Ophthalmology residents began training at the Royal Alexandra Hospital in 1976.⁵²



⤴ Royal Alexandra Hospital, Edmonton. Both images courtesy of Medical Photography, Royal Alexandra Hospital.

Education

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Technician Training

Boyd was an advocate of local technician training in order to facilitate the staffing of clinics for the Department of Ophthalmology. Due to the rapid increase in demand for both the glaucoma and orthoptic clinics, it quickly became clear that additional technicians would be needed and so Boyd set out to develop training programs for both glaucoma technicians and orthoptists at the University of Alberta Hospital.

The lengthy and complicated testing regimen for glaucoma patients meant that the Glaucoma Diagnostic Clinic immediately began training new technicians. During the first decade of the Clinic's operation, fourteen technicians completed training which took one year and included both classroom work and hands-on work with patients. Unfortunately, many of the technicians left the field for a variety of reasons. Of the original fourteen technicians trained after 1960, three remained as staff in the clinic (Barbara Salter, Maralynne Hawkins, and Glenna Macdonald) while nine had left northern Alberta. The Glaucoma Diagnostic Clinic not only provided additional training for technicians who

worked elsewhere in Alberta but also for technicians in Ontario and Manitoba.⁵³

In order to meet the demand for additional technicians, Boyd began an experimental technician training program in 1968 and provided additional training to the current staff members as well. Once new space and resources had been made available by the move into the Clinical Sciences Building in 1969, Boyd proposed an on-going glaucoma and visual field technician training program in the University of Alberta Hospital Glaucoma Clinic. Teaching was provided by Dr. Boyd, Velma Berkeley RN and Chief Technician Barbara Salter. Graduates received Glaucoma Technician Diplomas from the University of Alberta Hospital.

➤ Chief Technician Barbara Salter addressing the graduating glaucoma technicians, ca. 1970. Courtesy of Medical Photography, University of Alberta Hospital.

➤ Glaucoma Technician Graduating Class, March 1982. Left to Right: Tracy Hawrelak, Donna Cleaver. Courtesy of Medical Photography, University of Alberta Hospital.

➤ Glaucoma Technician Graduating Class, May 1973. Left to Right: Gail Chu, Sandi Leskow, Peggy Kaminski, Margaret Berg. Courtesy of Medical Photography, University of Alberta Hospital.



Under the new program two or more technicians could now be trained at a time. Graduates from the Glaucoma Technician Training Program went on to work in hospitals and ophthalmologists' offices in Alberta and other provinces.⁵⁴

When Wyatt took over the Glaucoma Diagnostic Clinic 1 June 1973 he also became a primary instructor to the technicians. The final students of the Glaucoma Technician Training Program graduated in 1983.⁵⁵

The demand for orthoptists grew more slowly.⁵⁶ The Orthoptic Clinic remained small until the move into the Clinical Sciences Building and was well served by a single orthoptist, Gillian Budd. To increase the number of available technicians for the Clinic, Boyd wanted to start a formal Orthoptic Training Program which would be accredited by the Canadian Orthoptic Council. The instructors were to be Drs. Boyd and Morgan and Chief Orthoptist Gillian Budd.⁵⁷

Dr. Rod Morgan FRCSC, a former resident, became a clinical lecturer in the Department of Ophthalmology in July 1969. He served as the Director of the Orthoptic Training Program from 1970 to 1972. During this time the Program graduated three trainees: Andrea Baker (1970), Pat Culhan (1972), and Elizabeth 'Betty' Newton (1972). They passed the American Orthoptic Council Exams. The Orthoptic Training Program received

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accreditation from the Canadian Orthoptic Council in 1972.⁵⁸

Morgan withdrew from the Training Program following the graduation of Culhan and Newton, and Boyd once more took over as the Head of the Orthoptic Clinic. The Orthoptic Training Program continued training occasional students until 1985. As with the graduates of the Glaucoma Training Program, several of those who graduated from the Orthoptic Training Program and remained in Edmonton, would be associated with the clinic throughout their careers.⁵⁹



Orthoptic Technician Graduating Class, May 1972. Standing (left to right): Pat Culhan, Dr. R. Morgan, Betty Newton. Seated Gillian Budd, Chief Orthoptist. Medical Photography, University of Alberta Hospital. Courtesy of Dr. R. Morgan.

Undergraduate Medical Education

The University of Alberta Department of Ophthalmology had its origins in providing undergraduate education for medical students and it maintained a strong commitment to providing the best training possible. Until the appointment of the first geographic full-time professor in 1958 all teaching was done by part-time staff. Dr. Marshall was involved in teaching undergraduates from the beginning of his time at the University until he retired in 1968. Marshall's strict attention to detail made a lasting impression on his students.⁶⁰ Dr. Rod Morgan, as an undergraduate medical student, recalled Marshall as a soft-spoken, skilled, and innovative instructor. Undergraduate medical student, Dr. Eric Schloss, remembered Marshall as "a stickler for detail."⁶¹

Because of its small size the Department relied on part-time clinical lecturers and professors in order to meet the demands of undergraduate medical education. The few geographic full-time professors of course carried a proportionately larger teaching load. In general, full-time professors provided the academic lectures and part-time teachers provided the clinical experience, especially in surgery and service clinics. Until the development of the Eye Department at the Charles Camshell Hospital, all undergraduate teaching took place at the University of Alberta Hospital.⁶²

During the 1970s, second-year medical students received a series of lectures given by geographic full-time staff and clinical part-time staff followed by small group clinical tutorials taught by full-time and clinical part-time staff alike. From the 1971–1972 academic year, third-year students had the opportunity to take an elective in ophthalmology to deepen their knowledge of the specialty. This pattern of teaching continued through the 1980s. In 1976, Dr. Henry Wyatt was awarded the Teacher of the Year Award by Phase II medical students.⁶³

Following his return to the Department in July 1988 after fellowship training in pediatric ophthalmology at the University of Iowa, former resident Dr. Garry Drummond was tasked with the role of Undergraduate Medical Education coordinator. He completely revised the course for September: writing a bound set of lecture notes for the students, preparing fifteen one-hour lectures, and organizing preceptors for three two-hour small group sessions in which students learned ophthalmic skills. Drummond's hard work did not go unrewarded as the course received the Block of the Year Award and he won the Teacher of the Year Award for 1988. Drummond went on to receive 15 further teaching awards from 1989 to 2006 for undergraduate medical student and ophthalmology resident medical/surgical teaching. From 1988 to 1993 Drummond also served as the Undergraduate Elective

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Coordinator. These two week experiences were offered to select second, and to third and fourth year medical students from the University of Alberta and across Canada.⁶⁴

Residency Training Program

Dr. Mark Marshall maintained a life-long commitment to excellence in teaching. He had been active in student education even as an undergraduate, starting a group dedicated to the study of scientific medicine in 1923. As a member of the Faculty of Medicine, Marshall remarked to Acting Dean John Ower in 1941 that the lack of money, equipment, and dedicated space was making it difficult for the Department to attract younger staff doctors, do post graduate training, and even to do undergraduate teaching.⁶⁵

As the Second World War began to wind down, the Council of the Faculty of Medicine established the “Rehabilitation Post-Graduate Committee.” In November 1944, the Committee – which counted among its members then-Acting Dean John Ower, John Scott (then head of the department of medicine and later dean of medicine), and Mark Marshall – recommended the creation of post-graduate residencies and programs primarily for demobilized soldiers. Dean Ower appointed Dr. Marshall Director of Graduate Medical Training, a post that he held from 1946 to 1961. These graduate training programs were developed as the Royal College of Physicians and Surgeons of Canada began offering Certification and Fellowship exams in an increasing number of specialties. The first Certification exams for ophthalmology were held in 1946

with the first Fellowship exams in 1947. Marshall was himself a member of the Nucleus Committee on Certification of Specialists in Ophthalmology which was set up by the Royal College of Physicians and Surgeons in 1944. Initially the Royal College of Physicians and Surgeons offered two sets of exams – Certification (which was practically oriented) and Fellowship (which was more academically oriented). Standards for the exams developed over time and since 1972 the Royal College of Physicians and Surgeons has only offered a single exam.⁶⁶

“ OUR GREATEST RESPONSIBILITY AS TEACHERS IS TO GUIDE, ENCOURAGE, STIMULATE, URGE AND EVEN FORCE OUR TRAINEES TO STUDY. ”

-DR. M.R. MARSHALL

A committee was formed to arrange for the graduate training of physicians at the University of Alberta with the goal that the trainees would be certified by the Royal College of Physicians and Surgeons of Canada, the American College of Physicians and Surgeons, and the various American Specialty boards. These plans were approved by the Council of the Faculty of Medicine in September 1946 and the first residents began their training. The Post Graduate Medical Training program at the University of Alberta became known familiarly as the “Marshall Plan” after its first director. The program designed by Marshall laid the foundation for the residency training program at the University of Alberta. The first training programs were custom-designed by Marshall himself who took an active role in the education of the residents.⁶⁷

The Graduate Training Committee proposed that the graduates of medical schools with one year of rotating internship at an approved hospital could apply to the University of Alberta for a four-year program of postgraduate medical training which would comprise of one year basic sciences training, one year as a senior intern in their chosen specialty, one year as an assistant resident in that specialty, and a final year as resident in that specialty. The basic science training would take place at the University of Alberta and the clinical training in those departments of the University of Alberta and Royal Alexandra Hospitals which had received approved

for graduate training. By December of 1948, Marshall was able to proudly report that the first, carefully selected, group of graduate medical students had completed their basic science and clinical work and were preparing to continue their studies in other medical centres as arranged for by the Committee on Graduate Training.⁶⁸

**"HIS LETTERS HOME
REVEALED THE WONDER
THAT HE FELT TO
TRAIN IN SUCH A RICH
ENVIRONMENT AND HIS
INTENTION TO BRING
THIS KNOWLEDGE BACK
TO TRAIN OTHERS."**

**-ANDREW CRICHTON
AND IAN MACDONALD**

*"RONALD CASEY, MD, FRCSC CANADIAN
JOURNAL OF OPHTHALMOLOGY 42 NO. 2
(2007): 343.*

In 1949, the Royal College of Physicians and Surgeons of Canada approved the University of Alberta Hospital as a site for full residency training in a number of subspecialties including ophthalmology. However, in the early years of the program arrangements were made for students to travel to other institutions to complete their training. Marshall took an active role in arranging for students to receive their training at the best institutions in Canada and the United States and supported their training with his personal funds. Many of these residents returned to Edmonton and the University of Alberta Hospital following the completion of their training and contributed their expertise to the medical and educational program at the University of Alberta as Marshall himself had done. In this way sufficient expertise was built up that from the mid-1950s onward residents were able to complete their entire ophthalmology residency training at the University of Alberta Hospital.⁶⁹

Marshall's commitment to the Graduate Training Program went beyond merely an administrative role. He was determined to see his students succeed. Former residents recall the Sunday morning tests which Marshall would give to residents following rounds. This rigorous testing helped to ensure that his students were prepared for their Royal College of Physicians and Surgeons exams. As Marshall had been known to say: "our greatest responsibility as teachers is to guide, encourage, stimulate, urge and even force our trainees to study."⁷⁰

Even following his resignation as Department Head in 1960 and Director of the Graduate Training Program Committee in 1961, Marshall remained a dedicated and active teacher of ophthalmology to both undergraduate medical students and residents alike. By the time Marshall retired from the University of Alberta at the end of 1968 he had seen fifteen residents successfully through the residency program in ophthalmology. Graduates of the program found positions throughout Canada and into the United States. Many of these graduates returned to practice in Edmonton and made important contributions to the Department including Dr. J.W. Duggan (1950), Dr. D.L. Rees (1956), Dr. D. Hassard (1962), Dr. A. Patrick (1962), Dr. R. Morgan (1968), and Dr. H.K. Shutt (1968).⁷¹

During the 1970s, the Department developed many technical services (glaucoma, visual field, orthoptic, retinal angiography) in addition to outpatient clinics. Unfortunately, Boyd was unable to recruit sufficient geographic full-time staff to maintain these clinics. Some clinics were forced to shut down when part-time staff moved elsewhere. During this decade, residents began to receive teaching not only at the University of Alberta but also at the Charles Camsell Hospital (from 1971) and the Royal Alexandra Hospital (from 1976). From 1971 to 1990, the Department's residents also traveled to the Inuvik Zone to provide patient care to those living in remote northern settlements (see below).

In 1975, Dr. Henry Wyatt became the first Residency Training Program Director who was not the head of the Department.⁷²

Throughout the 1980s, residents received their teaching block in General Ophthalmology, along with oculo-plastics and external eye diseases at the Charles Camsell Hospital, retinal and posterior-segment diseases at the Royal Alexandra Hospital, and subspecialty training at the University of Alberta Hospital. The organization of the residency program changed after Dr. Bill Pearce became the Residency Program Director in July 1986. He developed a Residency Training Manual which clearly outlined the objectives of the program and expanded teaching and mock oral examination practice. The recruitment of further clinical part-time and geographic full-time staff allowed additional teaching clinics to open. A Residency Training Committee was formed and, in 1990, the Department established a Visiting Speaker's Program and held the first Residents Day (now known as Resident Research Day) in May.⁷³

Resident Research Day

The Department's long-standing commitment to resident teaching continued throughout the 1980's. By 1986 a Residency Training Manual was developed and by May 1990 the first Resident Research Day (previously known as Residents Day) was held which celebrated resident research in all areas of ophthalmology including clinical, basic and translational research. This tradition and commitment to research continues annually, and serves as an event for sharing of innovative ideas in vision science.



Underlay - Medical Class of 1923-1924. Courtesy of the Faculty of Medicine and Dentistry.

1923

1924

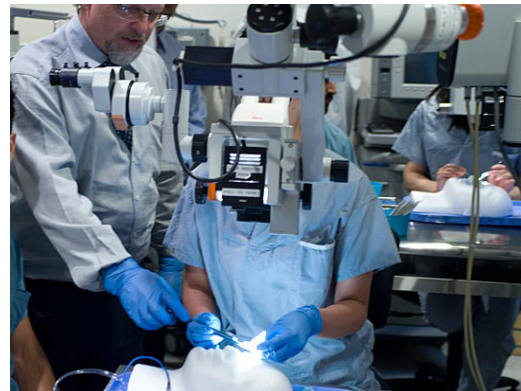
Train and Return

One of the themes throughout the history of the residency training program was the care that the Heads of Ophthalmology and the Residency Program Directors took with encouraging residents to seek out fellowship training and return to the University of Alberta to share their skills and knowledge with the next generation of students. Below is a list of residents (along with their year of graduation) who joined the Department following the completion of their education.

- | | |
|--|---|
| 1950 - L. Duggan (General) | 1997 - J. Leong-Sit (Cornea) |
| 1956 - D. Rees (General) | 2000 - M. Edwards (Glaucoma) |
| 1962 - D. Hassard (Cornea/General) | 2001 - M. Tennant (Retina) |
| 1962 - A. Patrick (General) | 2003 - S. Chan (Uveitis/Cornea) |
| 1968 - R.A. Morgan (Pediatrics/General) | 2005 - C. Rudnisky (General/Tele-ophthalmology) |
| 1968 - H.K. Shutt (Neuro-ophthalmology) | 2005 - E. Weis (Orbit/Oculoplastics/Oncology) |
| 1969 - G. Leitch (General) | 2006 - J. McCabe (General) |
| 1972 - J. Rootman (Pathology/Ocular Oncology) | 2007 - M. Johnson (Neuro-ophthalmology) |
| 1974 - J. Foy (General) | 2007 - S. Kogan (General) |
| 1977 - G. Grant (Retina) | 2007 - D. Mah (Cornea) |
| 1978 - F.L. Leong-Sit (External Eye Disease/General) | 2008 - C. Baker (Retina) |
| 1981 - M. Kutzner (Anterior Segment/General) | 2008 - R. Somani (Retina) |
| 1983 - H. Climenhaga (Cornea) | 2010 - K. Kassiri (General) |
| 1984 - L. Uniat (Retina) | 2012 - R. Riyaz (General) |
| 1985 - D. Cote (General) | 2013 - J. Hodges (General) |
| 1986 - G. Drummond (Pediatrics) | 2013 - M. Rasouli (General) |
| 1989 - R. Casey (Glaucoma/Ocular Pathology) | 2014 - H. Burnett (General) |
| 1989 - J. Lewis (Neuro-ophthalmology) | 2015 - D. Ehmann (Retina) |
| 1989 - M. Phillips (General) | 2016 - J. Ting (General) |
| 1995 - K. Hennig (General) | 2017 - A. Machuk (General) |
| 1996 - B. Hinz (Retina) | 2017 - J. Rayat (Vision rehabilitation) |

Surgical Skills Teaching Laboratory

The development of surgical skills is one of the most important aspects of residency training in ophthalmology. However, the amount of time that residents can spend in operating rooms is limited. In order to encourage students to further develop their surgical skills, Dr. Henry Wyatt developed the first Surgical Teaching Laboratory in 1977–1978. Dr. Don Hassard would frequently attend the lab and give the residents pointers on their surgical techniques as they practiced their incision and suturing skills on porcine eyes using an operating room microscope. During the 1980s, this activity evolved into weekly teaching in the surgical skills laboratory. The inclusion of new equipment, like phacoemulsification machines, allowed students to practice their coordination and a variety of microsurgical techniques before moving into the operating room. The presence of the surgical skills practice lab was much appreciated by the residents and greatly contributed to their surgical skills.⁷⁴



Wyatt's early establishment of the Surgical Teaching Laboratory continues today as the Ophthalmic Surgical Skills Centre (OSSC). Both images courtesy of Medical Photography, Royal Alexandra Hospital.

Research

Clinical Research

During the early years of the Department more emphasis was placed on education and patient care than on research. In part this was due to the small number of staff engaged, but it was also due, as Dr. Marshall noted, to the lack of resources and space available. Marshall himself published a single research paper, “A Mould From the Ear” before the Second World War. Opportunities for research increased in the years following the Second World War, although this research was often educational or clinically related. Marshall published educational articles in *Canadian Nurse* and the *Nova Scotia Medical Bulletin*.⁷⁵

Following their appointment as clinical faculty, both Dr. Duggan and Dr. Hassard received grants for their ongoing research. They also worked with residents who were conducting their own research projects. Dr. Don Rees also carried out clinical research working on projects in conjunction with the Department of Anesthesia and the Department of Internal Medicine and experimenting with cryosurgery in ophthalmology. Dr. Morgan remembers Rees as being the first ophthalmologist in Edmonton to use a cryoprobe in cataract

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surgery in 1966-1967 as well as the first to use artificial intraocular lenses in iris-supported implants during the early to mid-1970s.⁷⁶

During the 1960s, residents were encouraged to carry out research and the majority of them were able to publish the results including: Drs. L. Coulas, E. Frankelson, D. Hassard, R. Jans, G. Leitch, R. Morgan, A. Patrick, C. Ridgeway, H. K. Shutt, and P. Zeuge. Two clinical trainees, Ronald Jans (1967) and Elliot Frankelson (1969), also received their MSc in Experimental Surgery before entering into the residency training program.⁷⁷

Dr. Boyd, as the first geographic full-time member of the Department, published steadily throughout his career. As mentioned above, the Glaucoma and Strabismus Clinics were initially intended to be primarily clinical research clinics; the majority of Boyd’s research papers reflect that. In addition to his clinical research, Boyd collaborated with Dr. J. Lauber of the University of Alberta Department of Zoology in a long-term basic science research project studying an avian model of glaucoma.⁷⁸

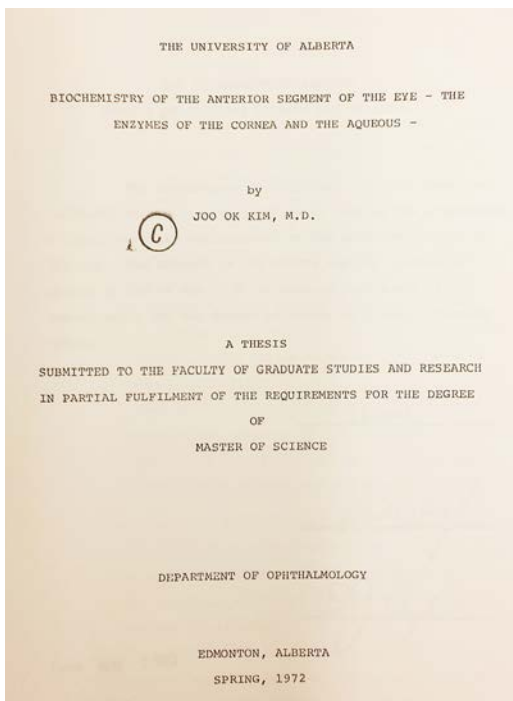
As the Head of Ophthalmology, Boyd set out an ambitious plan to develop research clinics in glaucoma, ocular motility, retinal detachment, corneal disease and eye bank, external eye disease, contact lenses, medical and neuro-ophthalmology, uveitis, and genetic diseases. His goal was for the Department “to achieve excellence in teaching, service and research.”⁷⁹ Boyd also encouraged residents to carry out and publish research; he co-authored a number of articles with department residents.⁸⁰

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"TO ACHIEVE EXCELLENCE
IN TEACHING, SERVICE
AND RESEARCH."

-BOYD

(DESCRIBING THE GOAL OF THE
DEPARTMENT)



The first Master's in Experimental Ophthalmology thesis. Joo Ok Kim, “Biochemistry of the Anterior Segment of the Eye – The Enzymes of the Cornea and the Aqueous” (Master's Thesis, University of Alberta, 1972). Courtesy of Jeff Papineau, Bruce Peel Special Collections, University of Alberta Libraries.

With the addition of two new geographic full-time members, Drs. Wyatt and Pearce, research expanded during the 1970s. Nevertheless, for the most part the Department's research remained clinical in nature due to the demands of teaching and administrative work. Boyd continued to concentrate mainly on glaucoma and orthoptics, Wyatt on conditions common in northern Canada, and Pearce on medical genetics (see below). Clinical faculty, including Drs. Hassard, Morgan, Schindler, and Shutt, also contributed to the Department's research as did many of the residents including: Drs. R. Bowen, E. Fernandes, E. Frankelson, R. Harris, Y. Karas, R. Lang, G. Leitch, A. Lertchavanakul, R. Ombres, M. Poohkay and J. Rootman. In 1971, a Master's in Experimental Ophthalmology was established and the first graduate, Dr. J. O. Kim, worked with Dr. Hassard and received his degree in 1972.⁸¹

The amount of research carried out by the Department declined during the 1980s. Boyd resigned in 1980 and Wyatt found that teaching and administration took up much of his time. The Department was also short of funding, pressed for space, and in need of modernization which did not occur until 1989. During the 1980s much of the Department's research was carried out by Drs. Pearce and Hassard. Fewer resident publications occurred in the 1980's; Drs. H. Climenhaga, R. Lang, R. Ombres, and L. Ong-Tone published research during this period and senior residents presented

papers at the Annual General Meeting of the Ophthalmological Society of Alberta.⁸²

Between 1990 and 1992 research in the Department began to undergo a resurgence. Two new geographic full-time faculty (Dr. G. Drummond in 1988 and Dr. R. Casey in 1991) were appointed. The much-needed renovation of 1989 provided additional space and resources. This was tempered, however, by the sudden death of Dr. D. Hassard in September 1990. Following his death, Dr. Pearce was the only faculty member receiving grants for research. During this time, as part of their residency requirements, residents would undertake research projects, many of which resulted in publication in peer reviewed journals.⁸³

Ocular Genetics

Dr. Alastair Boyd's glaucoma research included the study of several families with hereditary glaucoma; he hoped to develop a genetic diseases clinic within the Department. Boyd's interest in following up on this genetic research led to the recruitment of Dr. W. G. 'Bill' Pearce in 1971.⁸⁴

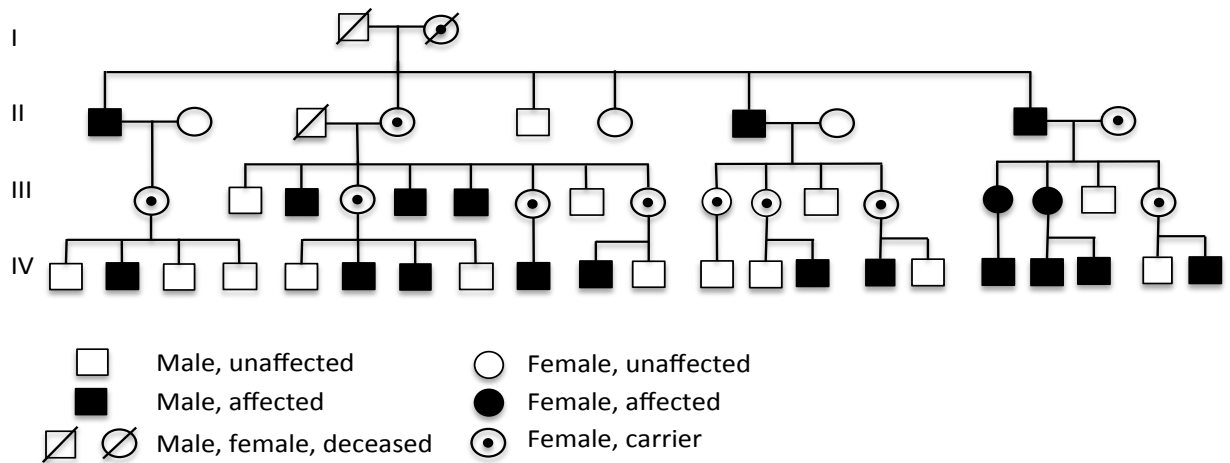
Bill Pearce was born in Vancouver, B.C. in 1931. He attended medical school at the University of British Columbia, graduating in 1956. Following his internship in Spokane, WA and a period as a locum on Vancouver Island, Pearce traveled to the UK for residency training in General Surgery. After two years Pearce switched his focus to ophthalmology, receiving his Diploma in Ophthalmology in 1963 and becoming a Fellow of the Royal College of Surgeons (England) in Ophthalmology in 1965. In 1965, in addition to his work at St. Mary's and Western Ophthalmic Hospital in London, Pearce became a part-time Ophthalmic Research Assistant at the Medical Research Council Population Genetics Research Unit in Oxford. It was during this time that his passion for ocular genetic research was born.⁸⁵

Pearce returned to Canada in 1969, taking up a position at the University of Toronto Department of Ophthalmology, setting up pediatric ophthalmology and ocular genetics clinics. However, drawn by his interest in participating in a new program

providing care to communities in the Inuvik Zone of the Northwest Territories, Pearce relocated to the University of Alberta in August 1971 as an associate professor and the Department's third geographic full-time faculty member.⁸⁶

Upon arriving in Edmonton Pearce was appointed to both the Charles Camsell Hospital and the University of Alberta Hospital. Pearce set up his ocular genetics clinic in the Clinical Sciences Building. To aid in his genetics research and counseling he also introduced retinal phenotyping clinics. Pearce's diagnostic accuracy enabled him to successfully identify family members with hereditary eye diseases – a key starting point for later genetic analysis. He began compiling what would grow to be a database of more than 1500 people with rare genetic eye diseases.⁸⁷

For the next two decades, Pearce was the only ophthalmologist with genetic research interests in Edmonton. He developed relationships with the Medical Genetics Unit at the University of Alberta Hospital. He applied for, and received, grants to fund his research projects on medical genetics. The retinal phenotype for genetic counseling clinic that Pearce developed in 1972 was the first, and for many years only, in the province. By 1977, Pearce had developed an international reputation in ophthalmic genetics.⁸⁸



During the 1980s Pearce continued his research on ophthalmic genetics. In the mid-1980s Pearce met with Brian Lowry, from the Medical Genetics Department of the Calgary Children's Hospital, and arranged to conduct an ocular genetics clinic in Calgary. He developed a collaboration with N. Torben Bech-Hansen PhD, a molecular geneticist who was interested in studying some of the families that Pearce had identified in which the X-linked incomplete form of congenital stationary night blindness was segregating. They began a project to map the gene involved which continued into the 1990s.⁸⁹

The database of rare genetic eye diseases that Pearce built up over the course of his career became a draw for other researchers who later joined the Department including Dr. Ian MacDonald and Michael Walter, PhD.⁹⁰

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^ Pedigree of a family with X-linked recessive Congenital Stationary Night Blindness (CSNB). The segregation pattern contains a relationship between an affected male, II-9, and a carrier female, II-10, resulting in two affected female children, III-14 and III-15, who inherited the mutant gene from each parent; consequently, all of their sons were affected with CSNB. Courtesy of Dr. N.T. Bech-Hansen.

Patient Care

Eye Bank and Corneal Transplant Service



In 1962, Dr. Don Hassard performed the first corneal transplant in Western Canada at the University of Alberta Hospital. Born in Grand Prairie, AB, Hassard received his MD and residency training from the University of Alberta earning his FRCSC in 1962 and went into practice with Dr. Duggan. Hassard became interested in corneal transplant surgery while he was working as a consultant at the Charles Camsell Hospital. In 1963, Hassard left Edmonton for the United States to undertake a two-year fellowship

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in corneal surgery sponsored by Lions Club International at the Eye Bank Institute in Washington D.C. Upon his return to Edmonton he was appointed a Sessional Instructor in the Division of Ophthalmology.⁹¹

In 1965 Hassard established the Eye Bank and Corneal Transplant Service at the University of Alberta Hospital. The service covered patients in Alberta, Saskatchewan, and Manitoba. Prior to the establishment of the Eye Bank, Hassard himself would often drive to rural hospitals to collect donated tissue. Hassard worked with Mae Cox at the CNIB Eye Bank which helped to organize donors for the service. By 1966, Hassard was able to report that he had carried out fourteen corneal and two scleral transplants.⁹²

◀ Dr. Don Hassard, April 1990. Courtesy of Phil Cox.

▶ Corneal Transplant Patients at the University of Alberta Hospital, September 1971. Courtesy of Medical Photography, University of Alberta Hospital.

As is the case today, the number of transplants that could be performed was limited by the availability of donated tissue. Hassard became the Medical Director of the Northern Division of the Lions Eye Bank of Alberta and was a member of the Board of the HOPE Program (Human Organ Procurement and Exchange) which was founded in 1979. Between 1965 and 1986 Dr. Hassard carried out 1500 corneal transplants. Due to scheduling constraints on the operating room, most transplants took place at short notice and late at night or in the early hours of the morning. Remembered as a meticulous surgeon, Hassard remained an active clinical faculty member of the Department until his sudden death while operating at the age of 59 in September 1990.⁹³



Northern Care Service

Members of the Department of Ophthalmology and Visual Sciences have long provided ophthalmic care to patients in underserved communities. Dr. Marshall drove to small communities in northern Alberta to provide care to patients who were unable to travel to Edmonton to be seen by an ophthalmologist. Dr. Duggan worked at the Charles Camsell Hospital while it was run by the Federal Government as an 'Indian Hospital' and provided care to First Nations and Inuit patients drawn from throughout the province of Alberta, northern British Columbia, and the Yukon and western Northwest Territories. During the early 1970s, members of the Department and residents also provided care to patients in isolated communities in northern Alberta.⁹⁴

In 1970-1971 the Department of Ophthalmology participated in the Arctic Ophthalmological Survey of Eye Disease in the Canadian North arranged by the Northern Medical Services of the Department of National Health and Welfare. Drs. Boyd and Wyatt later represented the Department of Ophthalmology at the Symposium on Arctic Ophthalmology which was held as part of the 1973 Canadian Ophthalmological Society meeting.⁹⁵

The Northern Health Service of the Federal Government made arrangements with university hospitals in Edmonton,

Winnipeg, Montreal, and Toronto to provide specialist care to patients in selected regions of the Arctic. This arrangement allowed people in the Arctic to receive specialist care that they would otherwise have had to travel to a major urban centre to get and provided the medical schools involved with the project with a unique opportunity to teach their postgraduate students in a remote rural setting. Following the Arctic Ophthalmological Survey, the University of Alberta reached an agreement with the Northern Health Service of the Federal government to provide ophthalmic care to people living in the Inuvik Zone of the Northwest Territories. This program ran from 1971 to 1990.⁹⁶

- 7 Aklavik, NWT ca. 1971-1972. Courtesy of Dr. Bill Pearce.
- > Outside the plane at Tulita (Fort Norman) NWT, mid-1970s. Left to Right: Optician Bill Carmichael, Station Nurse (name unknown), Dr. Bill Pearce. The pilot (Marten Hartwell) is not shown. Courtesy of Dr. Bill Pearce.



The Northwest Territories were divided into four zones: Mackenzie, Inuvik, Keewatin, and Baffin. The Inuvik Zone, which was the responsibility of the University of Alberta, included the health districts of: Aklavik, Tsiigehtchic (Arctic Red River), Déline (Fort Franklin), Fort Good Hope, Fort McPherson, Tulita (Fort Norman), Inuvik, Norman Wells, and Tuktoyaktuk. Patients in the Inuvik Zone who could not be cared for in the local area hospital were referred to the Charles Camsell Hospital in Edmonton for further treatment. As part of the program specialists in pediatrics, orthopedics, ENT, ophthalmology, gynaecology, and psychiatry all traveled to the Northwest Territories on a regular basis to provide specialist care to people living in remote communities.⁹⁷

In the fall of 1970, Dr. Wyatt began working on plans to provide ophthalmic care for patients in these remote communities. Dr. Pearce also played an important role in organizing the Department's work in the Inuvik Zone following his arrival in 1971. From 1971 through 1990 the Department's ophthalmologists and residents (along with their equipment) traveled to Inuvik, Aklavik, Déline (Fort Franklin), Fort Good Hope, Fort McPherson, Tulita (Fort Norman), Norman Wells, Paulatuk, Sachs Harbour and Tuktoyaktuk three times a year. In addition to diagnosing and arranging for treatment of ophthalmic diseases and trauma, ophthalmologists also prescribed glasses for their patients produced by an optician who traveled

with them. This care was given primarily in nursing stations which were set up in the late 1950s to serve communities of 100 or more individuals. Ophthalmology was considered one of the most valuable specialist services provided by this program.⁹⁸



▲ Inside the Fort McPherson Nursing Station ca. 1975–1978. Left to Right: Optician Bill Carmichael, Station Nurse (name unknown), Resident Dr. Pam Ombres, Dr. Bill Pearce. Courtesy of Dr. Bill Pearce.

In 1972, an ophthalmic medical technician stationed in Yellowknife began to provide ophthalmological services to residents of the Mackenzie Zone. Dr. Hugh Rose, the only full-time ophthalmologist in Yellowknife, found that utilizing ophthalmic technicians helped him to practice more efficiently. He tried to visit most communities once a year while technicians visited communities 1-8 times a year, depending on size. The technicians served as case-finders and identified those who needed glasses. Any individuals showing signs of abnormality were reported to Rose for follow-up. Cases requiring advanced care were referred to Edmonton. The Yellowknife Ophthalmic Medical Technologist Training Program opened in 1978–1979 and the first student graduated in 1981.⁹⁹

In 1985, Dr. Leonard Smith, a former resident of the Department of Ophthalmology, set up his practice in Yellowknife NWT. In 1991 Dr. Pearce took a last tour of the Inuvik Zone with Smith before Smith assumed sole care of patients throughout the Northwest Territories. Smith remains the only ophthalmologist in the NWT. He and 12 traveling certified ophthalmic medical technicians based in Yellowknife provide eye care to 14000-15000 patients each year in the Northwest Territories and the Kitikmeot Region of Nunavut.¹⁰⁰

The Department stopped directly providing service to the Inuvik Zone in 1990, but it continued to serve (as it still does) as a consultation centre for northern Alberta, the western Northwest Territories, and, in part, for the Yukon, British Columbia, and Saskatchewan.¹⁰¹



▲ Deline (Fort Franklin) Nursing Station.
Courtesy of Dr. Bill Pearce.

Retina Service

The origins of the Retina Service in Edmonton were in the Retinal Angiography Unit which Dr. Alastair Boyd set up at the University of Alberta Hospital in 1958. Dr. Bill Pearce joined Boyd in that unit on his arrival and developed new services in electrophysiology and dark adaptation of the retina as part of his ocular genetics work during the early 1970s. All staff had access to the retinal photocoagulation equipment.¹⁰²

In 1974, the Regional Hospitals Planning Council decided to develop a Retina Unit for northern Alberta. At about this time Dr. Reid Schindler, a former University of Alberta medical student who had recently completed his fellowship training at the Wills Eye Retina program in Philadelphia followed by a travelling 'fellowship' in Europe studying in Essen, Munich, Leiden, Moorfields Eye Hospital (London) and Oxford University, decided to return to Edmonton to begin his practice. Boyd offered Schindler a clinical faculty position in the Department of Ophthalmology. Schindler arrived in March 1974 and obtained hospital privileges at the University of Alberta, Charles Camsell, and Royal Alexandra Hospitals. Schindler joined Pearce as part of the retinal angiography consultation service and began the retinal surgical service. Both Pearce and Schindler had received training in new surgical techniques for treating diabetic retinopathy and the Department was eager to begin offering

this service following the acquisition of the necessary equipment.¹⁰³

Although the Department had initially hoped to base the Retina Unit at the Charles Camsell Hospital, the Edmonton Area Hospital Planning Council opted to locate the unit at the Royal Alexandra Hospital instead. The hospital had a very good operating room and dedicated nursing staff as well as an excellent Eye/ENT ward. The new Retinal Diagnostic and Management Unit was provided with outpatient as well as surgical equipment including the city's first vitrectomy equipment and an intra-operative photo coagulation instrument for this young and rapidly developing subspecialty. Bruce Winship, the Department photographer moved to the Royal Alexandra Hospital from the University of Alberta Hospital to join the unit. In 1976–1977 Schindler began offering a retinal rotation for residents at the Royal Alexandra Hospital.¹⁰⁴

By 1977, it was already clear that a second retinal surgeon was needed to meet demand. Schindler encouraged Dr. Garry Grant, a University of Alberta medical graduate and ophthalmology resident to undertake a fellowship in retina and vitreous surgery at the Wills Eye Hospital in Philadelphia. The Department promised that he would become clinical faculty in 1979 upon his return and he joined Schindler in his practice. Following Grant's

return to Edmonton, Schindler returned to Wills Eye Hospital in Philadelphia for a three-month period to receive additional training in oncology.¹⁰⁵

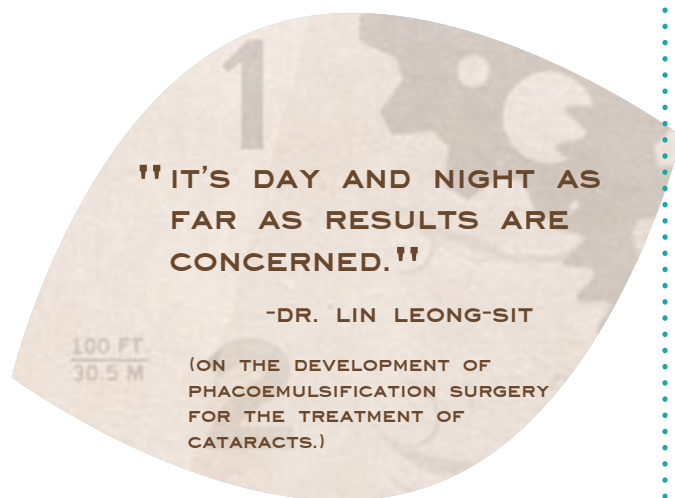
The volume of retina work in Edmonton quickly expanded. Schindler and Grant's surgical practice was largely based at the Royal Alexandra Hospital where they conducted elective and emergency surgery four or five days a week. They also screened premature infants for retinopathy of prematurity in the Neonatal Intensive Care Units (NICU's) at the Royal Alexandra and University of Alberta Hospitals. Surgery was occasionally carried out at the Charles Camsell and University of Alberta Hospitals. Patients were referred to the Retina Unit from Red Deer north in Alberta, Saskatchewan, the Northwest Territories and northern British Columbia. Both Schindler and Grant were active in training residents in retinal and posterior-segment diseases and retinal surgery at the Royal Alexandra Hospital.¹⁰⁶

Following Schindler's decision to relocate his practice to Arizona, the Department recruited Dr. Linda Uniat, another University of Alberta medical graduate and former resident, as an assistant clinical professor and a second retinal specialist in October 1987. She joined the Department following her fellowships in ocular pathology and vitreoretinal diseases and surgery at Washington University, St. Louis. Uniat had previously been a Lecturer in

Ophthalmic Pathology for the Department in 1985 between her two fellowships. Both Grant and Uniat continued to train residents in the retinal subspecialty at the Royal Alexandra Hospital.¹⁰⁷

Phacoemulsification

One of the most important improvements in ophthalmology during the 1980s and 1990s was the rapid development and adoption of phacoemulsification surgery and artificial lens implants for the treatment of cataracts, one of the most common eye surgeries. Once a controversial operation, phacoemulsification and artificial lens implants turned what had been a major surgical procedure – requiring general anaesthetic, hospitalization for several days and an extended period of healing which resulted in the patient having to wear glasses or contact lenses to correct their vision – into a shorter, out-patient procedure which could be carried out under local anaesthetic with implanted lenses and a dramatically reduced period of healing.¹⁰⁸



The University of Alberta Department of Ophthalmology was an early adopter of phacoemulsification surgery for cataracts. This was in large part due to its geographic proximity to the city of Calgary where Dr. Howard Gimbel was the first Canadian surgeon to use and creatively develop this technology. In 1980, he opened a private eye clinic the Gimbel Eye Centre; in 1984 he opened a private surgical centre, the Gimbel Eye Surgical Centre, where he offered phacoemulsification surgery for cataracts.¹⁰⁹

News of the new surgical technique spread quickly among patients who began to travel to Calgary for surgery. This led Dr. John Buski, an ophthalmologist who set up his practice in Edmonton in 1976, to travel to Santa Monica for training in the new technique from Dr. Robert Sinskey. Upon his return to Edmonton, he arranged the purchase of Cavitron phacoemulsifiers for both the General Hospital and his private surgical suite. He became the second Canadian to perform phacoemulsification cataract surgery followed shortly thereafter by Dr. Don Hassard.¹¹⁰

The University of Alberta Hospital became the second location in Edmonton that offered phacoemulsification cataract surgery. Dr. Don Hassard was first, and likely organized the purchase of the first phacoemulsification machine. Dr. Rod Morgan was also an early adopter and he worked with Francis Winspear and the Edmonton Winspear Foundation to

purchase two additional machines. Dr. Morley Kutzner, who completed his residency at the University of Alberta in 1981, was also interested in the new surgery. Dr. Henry Wyatt helped Kutzner to approach Gimbel for training in the new technique; he was the first at the Royal Alexandra to perform this surgery.¹¹¹

By 1985, an increasing amount of cataract surgery being done by Department members used the phacoemulsification technique. Initial difficulties instructing residents with the new technique were soon overcome and by 1990 residents were able to hone their microsurgical techniques using the surgical microscope and phacoemulsification machine in the surgical skills lab, receiving training in the technique from Dr. Lin Leong-Sit at the Charles Camsell Hospital and from Dr. Rod Morgan at the University of Alberta Hospital.¹¹²



Pediatric Ophthalmology

The Department of Ophthalmology Pediatric Ophthalmology Unit has its origins in the Orthoptic Clinic started by Dr. Mark Marshall in 1960. Over the next twenty-five years Drs. Alastair Boyd, Rod Morgan, and Bill Pearce all had strong pediatric components to their practices. A pediatric ophthalmology and strabismus clinic was started by Pearce at the Charles Camsell Hospital in the early 1970s. Betty Newton, a graduate of the orthoptic program, attended on Fridays to do orthoptic assessments on pediatric and


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adult strabismus patients. In November 1986, Dr. W. 'Bill' Astle, who had completed his fellowship in pediatric ophthalmology UCLA Jules Stein Institute UCLA in 1984, was appointed to the Department as an assistant clinical professor. That same month Bill Pearce became the Director of what had now become the Pediatric Ophthalmology and Adult Strabismus Unit at the University of Alberta Hospital. He held this post until June, 1991 when Dr. Garry Drummond became Director.¹¹³

Dr. Garry Drummond, had developed an interest in pediatric ophthalmology and strabismus during his residency in

the Department. He was encouraged to seek out fellowship training in the subject with the goal of returning to the Department and developing the Pediatric Ophthalmology Unit. Drummond did – undertaking a fellowship in pediatric ophthalmology at the University of Iowa in 1987–1988 before being recruited as the Department’s third geographic full-time member with a subspecialty in pediatrics and adult strabismus in July 1988.¹¹⁴

Hoping to expand the Department’s offerings into pediatric neuro-ophthalmology, Drs. Wyatt and Pearce encouraged another University of Alberta medical graduate and resident Dr. James Lewis to undertake fellowship training in neuro-ophthalmology and pediatric neuro-ophthalmology. After completing his fellowships in adult neuro-ophthalmology (University of Miami) and pediatric neuro-ophthalmology (University of Toronto), Lewis returned to the Department in November 1991 as an assistant clinical professor with a maximum part-time appointment in neuro-ophthalmology. Lewis began offering a full day clinic in pediatric neuro-ophthalmology in the Clinical Sciences Building immediately thereafter. Dr. Astle moved to Riyadh, Saudi Arabia in 1991 and settled in Calgary in 1994.¹¹⁵

 Orthoptist Mary Heacock and an unidentified pediatric patient, March 1985. Courtesy of Medical Photography, University of Alberta Hospital.



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The Department

Dr. Ian MacDonald (1992–2006)

In September 1992, Professor Ian MacDonald MSc MD CM (McGill) FCCMG FRCSC was appointed the new Chair of the Department of Ophthalmology. MacDonald was born in Montreal in 1951. He studied biology as an undergraduate at McGill University and became interested in the science of genetics, meeting many of Canada's early medical genetics specialists including Dr. F. Clarke Fraser (one of North America's pioneer medical geneticists) and Dr. Charles Scriver (who developed screening tests for metabolic diseases in newborns). While working on his MSc in genetics MacDonald's supervisor, Dr. Bill Grant, encouraged him to study medicine and he did, enrolling in McGill's medical school. After receiving his MD, CM in 1979, MacDonald went on to practice family medicine for two years. Then he applied for and won a fellowship in clinical genetics

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funded by the Imperial Order of the Daughters of the Empire which offered him the opportunity to work with Dr. Alasdair Hunter in Ottawa.¹

It was during MacDonald's clinical genetics fellowship that he realized that he would need additional training in ophthalmology in order to correctly diagnose the disorders which he was studying (see below). This led to his undertaking residency training in ophthalmology at the University of Ottawa. MacDonald became a Fellow of the Canadian College of Medical Genetics (Clinical Genetics) in 1986 and a Fellow of the Royal College of Physicians and Surgeons of Canada (Ophthalmology) in 1989.²

Following his fellowship and residency training, the Department of Ophthalmology at the University of Ottawa asked him to continue his ocular genetics research. MacDonald became an Ontario Ministry of Health Career Scientist and set up a lab in the Department of Biochemistry at the University of Ottawa. He also served as Acting Head of Ophthalmology at Ottawa General Hospital. MacDonald's work in ocular genetics came to the attention of Dr. Bill

◀ Dr. Ian MacDonald, Chair of the Department of Ophthalmology (1992–2006). Courtesy of Medical Photography, Royal Alexandra Hospital.

Pearce who was nearing retirement and had hopes to recruit a successor to continue his work at the University of Alberta. The current Department Chair, Dr. Henry Wyatt, was also planning to stand down from the post prior to retirement and the University of Alberta Department of Ophthalmology was recruiting a new Chair. Pearce asked MacDonald to come to Edmonton for an interview and he was recruited as a geographic full-time Professor of Ophthalmology and Chair of the Department.³

MacDonald's arrival in Edmonton in August 1992, came at a pivotal moment in the history of the University of Alberta's Department of Ophthalmology. The Department was still very small with only five geographic full-time faculty members: R. Casey (Glaucoma), G. Drummond (Pediatrics), I. MacDonald (Genetics/Pediatrics), B. Pearce (Genetics/Pediatrics), and H. Wyatt (Glaucoma). The remaining subspecialties were covered by nine part-time clinical faculty members: D. Climenhaga (Pathology/Cornea), G. Grant (Retina), E. Hodges (Contact Lens/Cornea), R. Johnson (Oculoplastics/Orbit/Lacrimal), F.L. Leong-Sit (External Eye Disease/Cataract), J. Lewis (Neuro-ophthalmology), R. Morgan (Cataract), H.K. Shutt (Neuro-ophthalmology), and L. Uniat (Retina). The ongoing, and complicated, process of the regionalization of hospital based ophthalmology in the Edmonton Health Region also added a great deal of uncertainty to the future

of the Department (discussed below). Additionally, this was a period of severe and repeated provincial cutbacks to both the funding of the University of Alberta and to Edmonton-area hospitals through the Regional Health Authority (Capital Health Authority from June 1994). For example, at the Royal Alexandra Hospital the budget was cut by \$20 million in 1993 with further cutbacks expected in the future. Fortunately, MacDonald had more immediate success expanding the research capacity of the Department with the successful recruitment of Dr. Michael Walter in 1993 (see below).⁴

Regionalization marked a major turning point in the history of the Department. For the first time, the majority of ophthalmologists in the city of Edmonton were practicing in the same hospital and affiliated with the Department as clinical faculty. Crucially, regionalization allowed for the development of dedicated operating rooms, nursing, and technical staff, a nursing station, specialized clinics, and office space. It helped to foster a closer relationship between Edmonton ophthalmologists and enabled more ophthalmologists to become involved in the residency training program and clinical research at the Regional Eye Centre at the Royal Alexandra Hospital. However, the transition was not easy and funding and recruitment issues continued to challenge the Department for many years.

➤ Regional Eye Centre Staff, 1998. Courtesy of Medical Photography, Royal Alexandra Hospital.



Success by a Small Department

In spite of the difficulties, Dr. MacDonald recalls that regionalization enabled the Department to create a critical mass of individuals invested in teaching and patient care which, in turn, developed a new culture and identity.⁵ This identity was shaped by the individuals listed below who, despite the low numbers were able to ensure excellence in patient care, teaching and research during regionalization:

GEOGRAPHIC FULL TIME:

G. Drummond (Pediatrics), I. MacDonald (Genetics/Pediatrics) and B. Pearce (Genetics/Pediatrics)

PART TIME:

R. Casey (Glaucoma/Pathology) and J. Lewis (Neuro-ophthalmology/General/Low Vision/Pediatric Neuro-ophthalmology)

VOLUNTEER PART TIME CLINICAL FACULTY:

J. Buski (Glaucoma/Pathology), D. Climenhaga (Cornea/Uveitis/Pathology), H. Climenhaga (Cornea/Cataract), D. Cote (General/Cataract), J. Foy (General), M. Greve (Retina & Vitreous), K. Hennig (General), B. Hinz (Retina & Vitreous), E. Hodges (Contact Lens/Cornea), R. Johnson (Oculoplastics/Orbit/Lacrimal), M. Kutzner (External Eye Disease/Cataract), F.L. Leong-Sit (External Eye Disease/Cataract), J. Leong-Sit (External Eye Disease), E.A. Macdonald (General/Cataract), R. Morgan (General/Cataract), M. Phillips (General), J. Rudnisky (General), H.K. Shutt (Neuro-ophthalmology/General), and L. Uniat (Retina & Vitreous).

Following regionalization in 1996, the Department consisted of only three geographic full time faculty members: G. Drummond (Pediatrics), I. MacDonald (Genetics/Pediatrics), and B. Pearce (Genetics/Pediatrics) with the rest of the teaching provided by voluntary part time clinical faculty and Dr. Walter carrying out bench research. In 1998, faculty numbers dropped to a critical low with just two geographic full time faculty members, two maximum part time faculty members, and nineteen voluntary part time clinical faculty members. The main research area of the Department was ocular genetics.⁶

A third round of budget cuts in 1998 once more resulted in a reduction of operating time for members of the Department – this time removing 20% of operating time at the Royal Alexandra Hospital and all pediatric operating time at the University of Alberta Hospital for Dr. MacDonald. The severe reduction in operating room time concerned the residents who felt that their training was being adversely impacted. This lack of resources also made recruiting new ophthalmologists to the program extremely difficult.⁷

Nevertheless, MacDonald remained determined to build capacity in the Department. As had prior Heads of Ophthalmology, MacDonald took a long-term view. He encouraged

graduating residents to undertake additional training with the intent to return to the Department to share their knowledge and skills with the next generation of students. Of the thirty-one graduates of the residency training program from 1993 to 2006, nine became members of the Department: Drs. Stanley Chan, Marianne Edwards, Kevin Hennig, Brad Hinz, Joe Leong-Sit, James McCabe, Chris Rudnisky, Matt Tennant, and Ezekiel Weis. Many returned to Edmonton following fellowship training elsewhere. This was especially important in the face of Edmonton's comparatively small and rapidly aging community of ophthalmologists.⁸

MacDonald was also a fierce defender of the public provision of ophthalmology services in the face of a push towards privatization in the mid-1990s and early 2000s. Alberta's Premier Ralph Klein advocated the controversial policy of contracting out certain medical services to private sector clinics that were allowed to charge facilities fees to patients in addition to charging surgical fees to the provincial Medicare programme. This particularly impacted ophthalmology where Howard Gimbel's private clinics had been offering first phacoemulsification cataract surgery and later other ophthalmological procedures since the 1980s. The Federal Government penalized Alberta \$422 000 per month for breaching the Canada Health Act and allowing patients to be charged private facilities fees until the Alberta government began paying the facilities

fees in July 1996. MacDonald argued against allowing the government to devolve healthcare services from the public to the private system in the public press and in professional publications, stating that this amounted to the public subsidization of the private sector. He also noted that by contracting out simple surgeries that Capital Health was making the fiscal situation for hospitals worse – since the most complicated and expensive operations were being conducted at the Regional Eye Centre even while hospital budgets were being cut, resulting in fewer operations being performed. The amount of cataract surgery performed in private facilities jumped from approximately 10% in 1996–1997 to 18% in 1997–1998. In November 2000, the Klein government passed of Bill 11, the Health Care Protection Act, which regulated the contracting out of surgical procedures to private clinics. By 2002 the Capital Health Authority had contracted out 25% of ophthalmology surgery to private clinics in the Edmonton region. By 2006, a minor amount of adult cataract surgery was performed at the Fort Saskatchewan and Westview (Stony Plain) community hospitals and some oculo-plastic procedures were contracted out to private facilities.⁹

MacDonald believed that Edmonton could become a Centre of Excellence in Ophthalmology and lobbied hard to create one at the Royal Alexandra Hospital. The 1995 plan for regionalization had been intended to lay the groundwork for the

creation of a Centre of Excellence in Ophthalmology at the Royal Alexandra Hospital. This plan was reaffirmed in 1998 by the Capital Health Authority and the Royal Alexandra Hospital who supported the development of the Department of Ophthalmology into a Centre of Excellence which encompasses teaching and research as well as patient care. Dr. Ken Shutt took over the role of Chief of Ophthalmology at the Royal Alexandra Hospital which allowed MacDonald more time to concentrate on his work as Department Chair and on developing the Department as a Centre of Excellence. Shutt was a former University of Alberta medical school and residency training program graduate who received fellowship training in neuro-ophthalmology at the Bascom Palmer Eye Institute, University of Miami, Florida in 1969–1970 before returning to Edmonton and joining the Department as a clinical faculty member.¹⁰

In 2001, a plan was proposed for the development of an eye centre of excellence at the Royal Alexandra Hospital. By the end of 2002, MacDonald had established Ophthalmology as a Program under the Regional Health Authority and a Department at the Royal Alexandra Hospital but he continued to battle budget constraints which limited the Department's ability to expand. For a short time it seemed that these plans might come to fruition. Capital Health engaged architects who drew up plans for an extensive renovation of the Department of



Ophthalmology including clerical, clinic, and nursing station renovations in October 2004. By July 2005, the Department was positioned to build a new eye institute for the Edmonton region. Unfortunately, these plans were ultimately cancelled due to economic constraints (see chapter four).¹¹

In October 2002, having reached the end of his second term as Department Chair, MacDonald took a six-month sabbatical at the National Eye Institute at the National Institutes of Health in Bethesda, MD. His time at the NEI allowed MacDonald to return to research full time and to explore new approaches to translational research. He investigated the causes and explored possible treatments of a form of macular degeneration, initially identified in an Alberta family and found to be an autosomal dominant Stargardt-like dystrophy due to mutations in *ELOVL4* (see below).¹²

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Dr. Michael Walter served as Acting Chair of the Department from October 2002 to April 2003 while MacDonald was on sabbatical. At the time the Department had only two geographic full-time ophthalmologists – Drs. MacDonald and Drummond. Dr. Ken Shutt continued to serve as Clinical Chief and Walter took over the university administration. Dr. Lorne Tyrrell, the Dean of Medicine told him that the Chair's job was to recruit. Walter felt that Dr. Ordan Lehmann, an ophthalmologist and visiting PhD student who had worked in his lab over the summer, would make a welcome addition to the Department as an MD/PhD. After Lehmann completed his PhD, Walter worked with Tyrrell to recruit him to the Department as a clinician-scientist. The process completed following MacDonald's return from his sabbatical in the spring of 2003 to begin his third term as Chair of the Department.¹³

2004 marked the beginning of a period of expansion for the Department. Lehmann arrived in Edmonton and was appointed to the Department of Ophthalmology (raising the number of geographic full-time faculty to three) and cross-appointed to the Department of Medical Genetics. In November 2004 he was appointed Canada Research Chair in Glaucoma Genetics. MacDonald felt that Lehmann's recruitment was critical for the development of the Department. Previous residency training program graduates were also beginning to return – some as geographic full-time staff

like Dr. Stan Chan (Cornea and Uveitis) in 2004 and Dr. Chris Rudnisky (General/ Tele-ophthalmology) in 2005 and others as clinical teaching faculty like Dr. Marianne Edwards (Glaucoma) in 2002 and Dr. James McCabe in 2006. Additional geographic full-time appointments included Yves Sauvé, PhD, a retinal scientist and electrophysiologist who was appointed to the Department of Ophthalmology and cross-appointed to the Department of Physiology in 2005, and Dr. Kouros Sabri (Pediatric Ophthalmology) in 2006.¹⁴



▲ Dr. Michael Walter, Acting Chair of the Department of Ophthalmology (2002–2003). Courtesy of the University of Alberta Department of Medical Genetics, 2014.

◀ Dr. Ken Shutt, 1998. Courtesy of Medical Photography, Royal Alexandra Hospital.

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By 2006, the Department had six geographic full-time ophthalmologists: S. Chan (Cornea/Uveitis), G. Drummond (Pediatrics), O. Lehmann (Glaucoma/ Genetics), I. MacDonald (Genetics/ Pediatrics), C. Rudnisky (General/Tele-ophthalmology) and K. Sabri (Pediatrics); one maximum part-time ophthalmologist: J. Lewis (Neuro-ophthalmology); and one geographic full-time electrophysiology scientist (Y. Sauvé). The twenty staff ophthalmologists in the region were all clinical faculty who played teaching roles in the Regional Eye Centre, the operating room, or private offices.¹⁵

In 2006, MacDonald decided to step down from his post as Chair of the Department of Ophthalmology and take a position as Branch Chief for Ophthalmic Genetics and Visual Function at the National Eye Institute of the NIH. He left at the end of December 2006, taking up his new post in January 2007.¹⁶

Under his tenure the Department had been transformed. Regionalization had brought together all of Edmonton's ophthalmologists. No longer separated into 'town' and 'gown', they were all members of the Department with active roles in teaching. Research too had expanded and ocular genetics remained a particular area of strength. The development of the Regional Eye Centre had transformed adult ophthalmology patient care in the Edmonton region by bringing together general and subspecialty ophthalmology in

a single location with dedicated operating rooms, nursing and technical staff, and clinics.

The Regional Eye Clinic

The development of the Regional Eye Centre had transformed adult ophthalmology patient care in the Edmonton region by bringing together general and subspecialty ophthalmology in a single location with dedicated operating rooms, nursing and technical staff, and clinics.

- 1 Electroretinogram (ERG) in the Retinal Unit, Regional Eye Centre, 2003. Courtesy of Medical Photography, Royal Alexandra Hospital.
- 2 Dr. Linda Uniat examining a patient in the Retinal Unit, Regional Eye Centre, 2003. Courtesy of Medical Photography, Royal Alexandra Hospital.
- 3 Performing surgery in one of the new basement operating rooms, 2004. Courtesy of Medical Photography, Royal Alexandra Hospital.

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Facilities

Regionalization

The process of regionalizing all hospital-based adult ophthalmology services in Edmonton began in 1991, when the Ophthalmological Society of Alberta – knowing that the Alberta government favoured regionalization as a cost-cutting measure – decided to take a pro-active approach and attempt to shape the upcoming reorganization. That spring a Task Force was formed to examine the question of consolidating ophthalmology services and several meetings were held including “town hall” workshops with Edmonton-region ophthalmologists. In June 1992, the Task Force initially recommended a two-site model where the Department of Ophthalmology and Pediatric Ophthalmology would remain at the University of Alberta site because of the development of the Children’s Health Centre of Northern Alberta. A second – clinical – site would be located in downtown Edmonton and would have some specialized services like retina. The two sites were seen as an interim measure prior to further consolidation of hospital-based ophthalmology in a single location at a later time. However, this two-stage plan for consolidation was considered problematic and the Edmonton Region

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Health Planning Council authorized a feasibility study of a single-site solution in December 1992.¹⁷

The Steering Committee for the single-site study under Chairman Dr. Gordon Wilkes was Mr. Michael Austin, Dr. David Climenhaga, Dr. Royce Johnson and Dr. Ian MacDonald with Mr. Ed Chown as Secretary. Dr. MacDonald noted that the single-site had a number of advantages relating to cost, equipment provision, and increased access to subspecialty consults. Additionally there was the possibility of streamlining surgical services by recruiting dedicated staff and protecting in-patient beds. However, several issues relating to balancing patient care with residency training would need to be worked out. The Steering Committee also explored concerns regarding the provision of ophthalmology consultation services at other sites as required, whether the regionalization of all ophthalmology services would be compatible with the development of the Children’s Health Centre of Northern Alberta at the University of Alberta Hospital, and how governance of the academic department and clinical services would be organized.¹⁸

The Steering Committee met frequently during the spring of 1993 and presented their report to the Edmonton Region Health Facilities Planning Council on Hospital-Based Ophthalmology in June. The committee recommended that a single site consolidating most hospital-based ophthalmology services be located at the Royal Alexandra Hospital – with the caveat that consultations and emergency treatment be made available at other hospitals for patients who could not be transported. Additionally, the Committee weighed the benefits of consolidating pediatric services at the new site (access to specialized equipment and subspecialists) vs. basing pediatric services at the Children’s Health Centre.¹⁹

The Edmonton Region Health Facilities Planning Council committed to examining the Steering Committee’s recommendations and reporting back by October 1993. Their recommendations were that the Royal Alexandra Hospital host the ophthalmology program for the Edmonton region with the long term goal of establishing a Northern Alberta Eye Institute. In order to proceed, existing ophthalmology services at the Charles Camsell Hospital and the Royal Alexandra Hospital would first be consolidated at the Charles Camsell Hospital. Then ophthalmology services at other Edmonton region hospitals would also be relocated to the Charles Camsell Hospital. Finally all hospital-based ophthalmology would be relocated at a

new site at the Royal Alexandra Hospital. In October, the Edmonton Region Health Facilities Planning Council decided that the Royal Alexandra Hospitals would be the location for the ophthalmology program in the Edmonton region with the plan to proceed towards the establishment of a Northern Alberta Eye Institute. They initially hoped to have achieved regionalization by the end of September, 1994.²⁰

It was decided that the Children’s Health Centre of Northern Alberta (later the Stollery Children’s Hospital) would remain the major clinical site for pediatric ophthalmology in June 1994. Pediatric ophthalmologists would have offices on-site and routine pediatric ophthalmologic surgery would be performed at the Walter C. Mackenzie Health Sciences Centre in the day surgery ward. Complex pediatric ophthalmologic surgery would be carried out at the Royal Alexandra Hospitals site. Basic science ophthalmologic research would remain on the University of Alberta site in the Heritage Medical Research Centre. A Physician Task Force was set up to facilitate the planning of regionalization process and to help allocate material and human resources. Task Force members included: Drs. Ian MacDonald, Garry Drummond, Ernest Hodges, Royce Johnson and John Buski (representing the regional hospitals involved), and Kevin Hennig (representing the ophthalmology residents).²¹

By August 1994, plans were underway to construct a single site for hospital-based ophthalmology to serve patients in Edmonton, northern Alberta, northeastern British Columbia, northwestern Saskatchewan, the Yukon, and the Northwest Territories. The site would provide a wide range of services including health promotion, a wide range of ambulatory clinics (general, ocular genetics, corneal and external eye disease, retinal and vitreous diseases, contact lens, glaucoma, botulinum, and neuro-ophthalmology), laser treatments, day surgery, and inpatient services. The designs were patient-centred. An Ophthalmology Surgical Suite was designed for efficient use and nursing staff were to be dedicated to the ophthalmology service. Space was to be included for the teaching of residents, medical students, nursing students, ophthalmic assistant students, ophthalmic technician students, and in-service education for staff. The surgical laboratory would be relocated to the new site while basic science research would remain at the Heritage Medical Research Centre on the University of Alberta Campus. The region's ophthalmologists had come to universally support regionalization, which was unusual for other medical specialties. All ophthalmologists working at the new site would be encouraged to participate in teaching and research. These plans were adopted by the Edmonton Regional Health Facilities Planning Council in February

1995 with the goal that the new site would be “the major ophthalmology resource for Northern Alberta.”²²

Regionalization occurred in stages. In July 1995, all adult ophthalmologic surgery was transferred from the Sturgeon, Grey Nuns, Misericordia, Edmonton General, Royal Alexandra, and University of Alberta Hospitals to the Charles Camsell Hospital. Pediatric and Adult clinics and all ocular trauma surgery were also carried out at the Charles Camsell Hospital. The Retina Clinic remained at the Royal Alexandra Hospital and Pediatric and Adult Ambulatory clinics remained at the University of Alberta along with limited pediatric day surgery. Most of the equipment for the new facility was repurposed from that in use throughout the region prior to regionalization. In April 1996, the Department of Ophthalmology officially relocated from the second floor of the Clinical Sciences Building to a suite of rooms that were previously part of the Neurology ICU on the second floor of the Royal Alexandra Hospital and the Regional Eye Centre opened.²³

Regionalization significantly changed ophthalmology in the Edmonton region. At the time Dr. Royce Johnson argued in an article in the *Edmonton Journal* “I think we can do a heck of a lot better job by having the high-tech stuff in one place, where we can get the best and everyone

" DR. IAN MACDONALD WAS ABLE TO INSTILL AN ATTITUDE OF COLLEGIALITY AND CONGENIALITY WHICH BROUGHT TOGETHER THE 'TOWN' AND 'GOWN' OPHTHALMOLOGISTS AND ESTABLISHED A NEW COHESIVENESS AND CAMARADERIE TO THE EXPANDED DEPARTMENT IN THE WAKE OF REGIONALIZATION. "

DR. JOHN BUSKI, DR. MARK GREVE, AND DR. JAMES LEWIS

will have access to it." Responding to concerns about the costs of healthcare he added "We can give the public a heck of a lot better service for less of a shot to the taxpayer, better treatment for the buck."²⁴ Those ophthalmologists, like Dr. Ernest Hodges, who had been working in very small departments at city hospitals (where it was sometime difficult to negotiate for resources) found that there were significant benefits to being part of a larger department. By coming together as a unified group in a single location, the Department was better placed to argue for resources during a time of cutbacks. Many, including Dr. John Buski, Dr. Mark Greve, and Dr. James Lewis, recall that

during the process of regionalization Dr. Ian MacDonald was able to instill an attitude of collegiality and congeniality which brought together the 'town' and 'gown' ophthalmologists and established a new cohesiveness and camaraderie to the expanded Department in the wake of regionalization. Ophthalmologists who had not previously been part of the Department were now clinical faculty members. They found themselves part of a vibrant academic community and became involved in teaching. They also had opportunities to engage in clinical research. Patient care also benefitted significantly from regionalization which allowed the Royal Alexandra Hospital to develop into a centre of excellence for ophthalmic surgery. Subspecialty consultation was now available on-site. The large surgical volumes passing through the operating rooms allowed for dedicated nursing and technical staff, which in turn increased efficiency and decreased the need for late night surgeries. Although the path to the regionalization of hospital-based ophthalmology in Edmonton was not an easy one, regionalization has brought notable benefits to the Department in terms of education, research, and patient care.²⁵

Regional Eye Centre (Royal Alexandra Hospital)

Prior to regionalization, the Department of Ophthalmology had clinics and teaching sites at the Charles Camshell Hospital, the Clinical Sciences Building, and the University of Alberta Hospital. Ophthalmologists, some affiliated with the Department and some not, also practiced in the community and at the Sturgeon, Misericordia, Grey Nuns, and Edmonton General Hospitals. This changed following regionalization which saw adult hospital-based ophthalmology in Edmonton centralized at the Royal Alexandra Hospital with pediatric ophthalmology remaining at the University of Alberta.

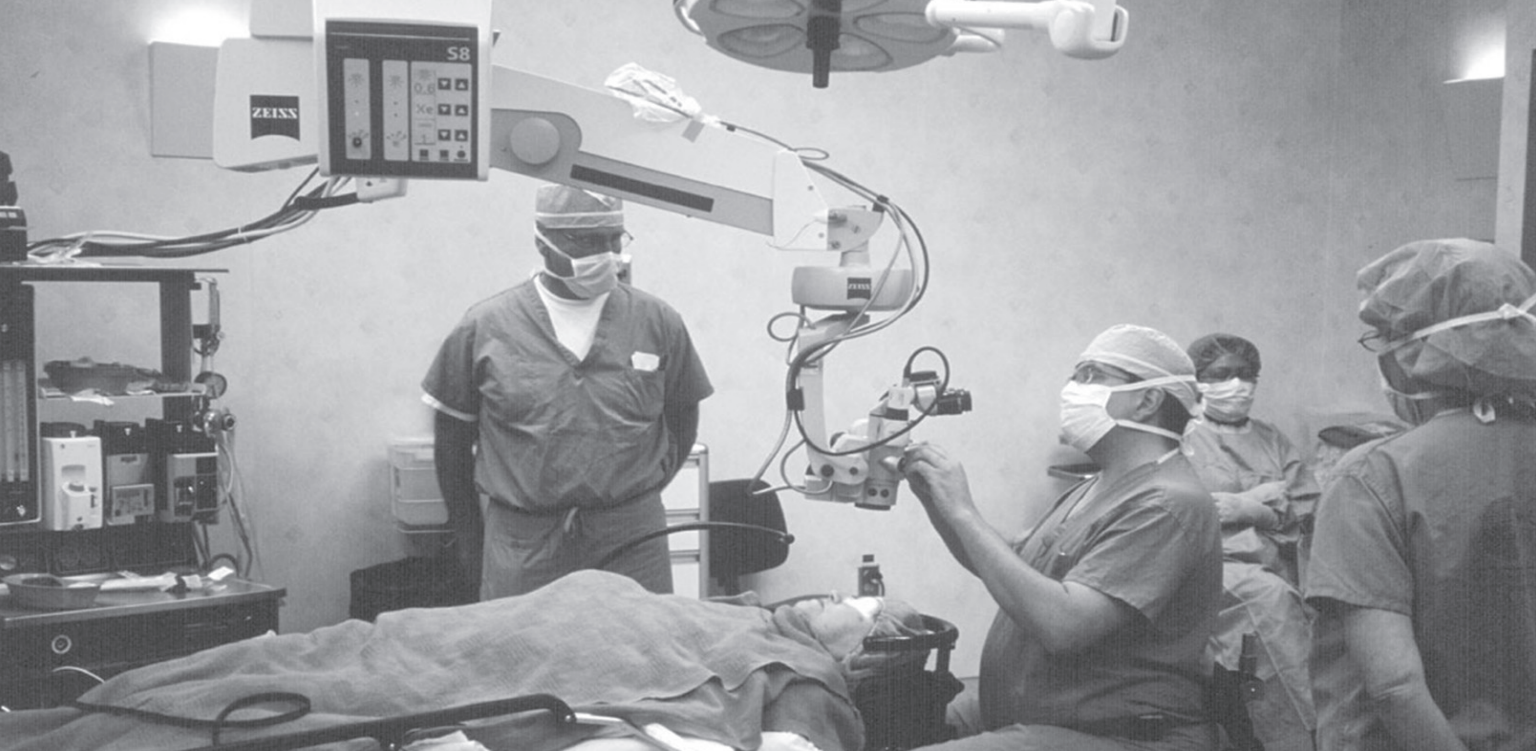
The Regional Eye Centre opened at the Royal Alexandra Hospital in April 1996. It was initially designed to treat 12000 patients a year. The offices of the Department were relocated from the Clinical Sciences Building to Unit 23 on the second floor of the Royal Alexandra Hospital (see above). This space also contained physician offices, a resident lounge and library and a conference room. Immediately adjacent to the offices was the inpatient unit, Patent Care Unit 22, shared with Ear Nose and Throat. The Glaucoma Clinic, where patients received visual field and retinal function testing, was also located on Unit 22. On the main floor, where the old clinical laboratories had been, the new Eye Clinic (1111 ATC) had



six screening rooms, fifteen examination lanes, diagnostic angiography and imaging areas, two minor procedure theatres and laser treatment rooms. This ambulatory clinic provided care to patients in the Edmonton region, northern Alberta, northwestern Saskatchewan, northeastern British Columbia, and the Northwest Territories. Clinics included general ophthalmology, glaucoma, retina, external eye diseases, neuro-ophthalmology, oculoplastics/orbit, low vision and ocular motility (see below).²⁶

Initially, hospital-based adult ophthalmology surgery had been carried out at in all of the hospitals in the Edmonton region. Following regionalization much of this surgery took place in the operating rooms at the Regional Eye Centre. Some surgery also took place in private facilities. When

Regional Eye Centre Staff, 1998. Courtesy of Medical Photography, Royal Alexandra Hospital.



the Regional Eye Centre opened in April 1996, the five newly-renovated ophthalmology operating rooms were located on the main floor of the hospital immediately beneath the inpatient ward on Unit 22. A renovation in 2002 made an additional four operating theatres available to ophthalmology in an ambulatory surgical suite. In September 2004 the ophthalmology operating rooms were moved from the main floor to Unit GB1 on the lower level, a process overseen by Acting Program Manager Bonnie Kissick. These larger and more efficient operating rooms were also equipped with new microscopes which allowed two people to view the operating field at the same time which improved supervision and instruction. Day surgery was also relocated adjacent to the operating theatres in 2005.²⁷



Regionalization and Efficiency

Regionalization allowed a very special relationship to develop between surgeons, nurses, and support staff. The volume of patients treated allowed for dedicated nursing and support staff who often spent many years, and even their entire careers, working in the facility. Having a specially trained and dedicated nursing staff helped to increase efficiencies in the operating room. Prior to regionalization (and in other hospitals currently) surgical nursing staff were not necessarily dedicated to ophthalmology and might be unfamiliar with the equipment and procedures used.²⁸

Pediatric Ophthalmology and Adult Strabismus Unit - Clinical Sciences Building

The Pediatric Ophthalmology and Adult Strabismus Unit developed out of the Orthoptic Clinic which was first founded by Dr. Mark Marshall in 1960. The Unit was housed on the second floor of the Clinical Sciences Building and Dr. Garry Drummond was the director. In 1992, the Unit had five examining rooms – three were used primarily by clinicians and two were used primarily by the two full-time and two part-time orthoptists. Following the arrival of Dr. Ian MacDonald there were now three geographic full-time pediatric ophthalmologists on staff (Drs. Pearce, Drummond and MacDonald). Dr. Rod Morgan also had a significant pediatric practice and Dr. James Lewis covered pediatric neuro-ophthalmology. Pearce retired on 30 May 1998. Finding a replacement was difficult, however, and it was not until 2006 that Dr. Kourosh Sabri was recruited and joined the Department as a geographic full-time pediatric ophthalmologist in September.²⁹

During the process of regionalization the location of Pediatric Ophthalmology was much discussed. It was eventually decided that Pediatric Ophthalmology would remain under the auspices of the Children's Health Centre of Northern Alberta in the Clinical Sciences Building

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rather than regionalizing with the rest of ophthalmology in a single-site at the Royal Alexandra Hospital. Routine pediatric ophthalmology surgery would continue to be carried out in the day surgery ward at the Walter C. Mackenzie Health Sciences Centre while complex surgeries, which required specialized care or equipment, would take place at the Regional Eye Centre.³⁰

In 2000, the Pediatric Ophthalmology and Adult Strabismus Unit received a partial renovation, funded by Luscar Ltd. Following the remodel, the clinic had a smaller waiting room, seven examination rooms (four physician rooms and three orthoptist rooms), and a reconfigured orthoptist workspace and administration area. The clinic was renamed the Luscar Family Eye Clinic. At about this time the Children's Health Centre of Northern Alberta began transitioning into the Stollery Children's Hospital, which officially opened in 2001. Dr. Drummond was named Director of the Division of Pediatric Ophthalmology at the Stollery Children's Hospital – although the actual unit remained in the Clinical Sciences Building and not within the Walter C. Mackenzie Health Sciences Centre.³¹



Dr. Ron Casey operating on a patient, November 2006. Courtesy of Medical Photography, Royal Alexandra Hospital.

Education

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Ophthalmic Medical Technologist Training Program

Trained paramedical staff are vital for the smooth running and development of the Department and its clinics. Although Dr. 'Alastair' Boyd was able to initiate training programs for Glaucoma Technicians and Orthoptists, he was not able to develop a training program for ophthalmic assistants as he initially desired in 1970. Following the consolidation of hospital-based adult ophthalmology due to regionalization, Dr. Ian MacDonald felt that the critical mass had been achieved to begin the development of an ophthalmic assistant training program in Edmonton. Students from the Ophthalmic Medical Technologist Training Program at Yellowknife in the Northwest Territories had already been travelling to Edmonton to receive additional training at the end of their program.³²

By September 1999 the first student was enrolled in an informal ophthalmic medical technologist training program. Brad Wakeman served as primary instructor in a two-year program that mixed didactic and practical training at the Royal Alexandra Hospital and the University of

Alberta Hospital. In addition to receiving instruction from Department staff in the Regional Eye Centre, students also received training in spectacle and contact lens fitting from Murray Scambler, an optician who had been associated with the Department since 1975. The first student graduated in the summer of 2001, registered with the Joint Commission on Allied Health Personnel in Ophthalmology (JCAHPO) association in the United States and took her technician certification exam. A second student was then enrolled. The program was unique in Alberta at the time and plans were made to move towards the accreditation of the program.³³

The Department began the process of seeking accreditation for the Certified Ophthalmic Medical Technologist Program in 2003. By August 2003, two students had already graduated from the program and two more were enrolled, one in each year of their training. The Department believed that they could enroll one student a year in the program. Unfortunately, the program failed to pass the accreditation process with the Canadian Medical Association. The Certified Ophthalmic Medical Technologist Program closed in May 2005, following the graduation of its fourth and final student.³⁴

Undergraduate Medical Education

Having taken on the roles of Undergraduate Medical Education and Elective Program coordinator in 1988, former resident Dr. Garry Drummond continued to serve in those capacities until 1993. He delivered fifteen, one-hour lectures and organized instructors for the three, two-hour small group ophthalmic skills sessions. In addition, he also arranged two-week elective experiences in ophthalmology for medical students. During the 1993–1994 and 1994–1995 academic years Dr. Ron Casey took over the role of Undergraduate Medical Education Director while Drummond became Residency Training Program Director. In 1995, Drummond returned to his roles as Undergraduate Medical Education and Elective Program coordinator. Drummond once again received the “Outstanding Teacher of the Year Award” from 1995 to 2000 and won the “Spotlight on Achievement – Teaching Award” in 1998 and 2000.³⁵

The format of undergraduate medical education changed in 2001 and ophthalmology was no longer offered as a free-standing course, but instead became part of the second year Neurosciences Block. The Faculty of Medicine and Dentistry was shifting towards a problem-based learning approach to medical education, though lack of geographic full-time members meant that undergraduate medical education still offered didactic

teaching and small-group sessions to train students in examination skills and equipment use. Drummond continued to coordinate the ophthalmology component of the course through 2005.³⁶

In 2005, undergraduate medical education underwent further revision, decreasing the lecture content and increasing the self-directed, small group, and problem-based format. The ophthalmology course was completely revised in 2005. The new course was offered in 2006. Ophthalmology continued to be taught within the neurosciences block as self-directed study and during three three-hour practical sessions students received problem-based teaching as well as clinical skills education. During this transition period, Drummond worked with former University of Alberta medical student and Department resident Dr. Chris Rudnisky who had been appointed to the Department as a new geographic full-time faculty member in July 2005 and was strongly interested in education. Drummond continued to serve as Undergraduate Medical Education and Elective Program coordinator through 2006.³⁷

Residency Training Program

Dr. Bill Pearce served as Residency Training Program Director until early 1993 when Dr. Ian MacDonald took over as Acting Director. As Director, MacDonald strongly encouraged residents to conduct research as part of their training and gave them additional time to work on their research. As discussed below, some residents would go on to conduct important ground-breaking and translational research during their residency. In 1994, MacDonald wanted to emphasise the importance of research done by residents so he evolved Residents Day (which had been instituted in May 1992) from a program which involved residents presenting case studies to a visiting speaker to a forum for residents to present the results of their ongoing research to the department as well as a visiting speaker. The Reg Martiniuk Memorial Fund (created in honour of a prior resident) was established in 2004 to endow a book prize for the best resident presentation, determined by the visiting speaker, on what is now known as Resident Research Day.³⁸

In January 1994, former Department resident Dr. Garry Drummond became the Residency Training Program Director. The first six months of his appointment were hectic ones. Drummond rewrote the residency training manual and restructured the residency training committee. Formal academic half days were established and

the rotation blocks refined allowing space for elective training. Drummond also instituted “fireside chat” meetings with the residents which took place weekly over lunch. He served as Residency Training Program Director until August 1995.³⁹

In March 1996, former Department resident Dr. Ron Casey was appointed Director serving until the end of June 1998. Dr. Mark Greve was appointed Residency Training Program Director in January 1999 and served until January 2002. Casey returned to the post of Director in July 2002 and served until June 2006 with former resident Dr. Matt Tennant taking on the post in July 2005. Dr. MacDonald served as Interim Director between appointments.⁴⁰

From 1999 to 2010 the Department also trained University of Manitoba ophthalmology residents. One resident entered the Department’s program every other year with the understanding that they would return to Manitoba following the completion of their training. In all, four Manitoba residents were trained by the Department.⁴¹

Following regionalization, residents received most of their clinical and surgical training at the Regional Eye Centre at the Royal Alexandra Hospital. Inpatient exposure was now limited to the Royal Alexandra Hospital. Clinics at the Regional Eye Centre included general ophthalmology, glaucoma, retina, external eye diseases, neuro-ophthalmology,

oculoplastics/orbit, low vision, and ocular motility. Residents also received office exposure in retina and external eye diseases. The pediatric ophthalmology and adult strabismus block was taught at both the Royal Alexandra Hospital and the University of Alberta Hospital sites. Third and fourth year residents also received training in Dr. MacDonald's ocular genetics clinic.⁴²

Before regionalization, residents were taught by Drs. Garry Grant and Linda Uniat in the Retinal Unit at the Royal Alexandra Hospital as well as in one session per week at the Clinical Sciences Building. In 1994, Grant moved to the United States and Dr. Mark Greve joined the Department following a medical and surgical retina fellowship at Louisiana State University. Greve was particularly interested in resident teaching and began offering two retina teaching clinics and one retina laser clinic per week in the Clinical Sciences Building. Uniat and Greve were joined by former University of Alberta medical school graduate and Department resident Dr. Brad Hinz in 1998 after the completion of medical and surgical vitreoretinal fellowship training at the Johns Hopkins Wilmer Ophthalmological Institute. Following regionalization, residents received retinal teaching by Uniat, Greve, and Hinz in the Regional Eye Centre Eye Clinic. In the winter of 1996, Hinz initiated a weekend retinal symposium in Jasper, AB, which became an annual event. Along with training in the Eye Clinic and

Friday afternoon academic sessions, Greve and Hinz also began to offer in-office retina training.⁴³

The surgical skills laboratory remained an important part of resident training. The laboratory was equipped with an operating room microscope (with video projection), a phacoemulsification unit, and current operating room instruments. In 1992, Dr. F.L. Leong-Sit supervised residents one morning every other week helping them to practice their microsurgical techniques and procedures on porcine eyes and donated human eyes. Drs. MacDonald, Morgan, and Leong-Sit demonstrated surgical techniques to residents during an intra-ocular surgery demonstration day in January 1993. As part of regionalization, the surgical skills laboratory was transferred from the Clinical Sciences Building to the Royal Alexandra Hospital. The Department, always looking to provide optimal training for residents, began to explore the acquisition of more technological surgical simulators in 2005. One was acquired in March, 2006.⁴⁴



Dr. Ian MacDonald (centre) watches a demonstration of a new surgical simulator, March 2006. Courtesy of Dr. Ian MacDonald.

Residents were encouraged to contribute to the Department's history of providing service for underserved populations. This included individuals within the Edmonton region who would otherwise not have accessed ophthalmology services. Dr. Ian MacDonald began discussions with the Boyle McCauley Health Centre around 1997 to provide ophthalmological care to an inner-city population which faced significant barriers to accessing health care. By 1999, MacDonald and the Residency Training Committee had created a clinic within the Health Centre which was staffed and run autonomously by the residents. The clinic was accredited by the Alberta College of Physicians and Surgeons. Resident Dr. Tim Hillson was able to fully equip the "Eye Room" in the Boyle McCauley Health Centre in 2000, thanks to a generous donation from the Royal Alexandra Hospital Foundation. Residents ran the clinic, offering general eye exams and screening for diabetic retinopathy to patients within Edmonton's inner city. Although the "Eye Room" offered residents exposure to a wide variety of social issues in medicine there were concerns regarding resident safety and the program closed in 2002.⁴⁵

From the beginning of his tenure as Department Chair, Dr. Ian MacDonald strongly encouraged residents to become engaged in research during their residencies and to present that research at the Ophthalmological Society of Alberta annual meeting and in publication. The

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annual resident Research Day, instituted in 1994, offered residents a chance to present their work to colleagues within the Department and to listen to an invited guest speaker present Rounds and a keynote address.⁴⁶

The tele-ophthalmology program at the Department has its origins in a resident research project. Dr. Matt Tennant, then a first-year resident, realized that there was an opportunity to use technology to overcome the long distances that people living in remote communities needed to travel in order to access ophthalmological care. This need was especially acute in First Nations communities because their members suffered from higher rates of diabetes for which diabetic retinopathy is a

▲ Drs. Matt Tennant (left) and Chris Rudnisky (right) present the findings of the tele-ophthalmology pilot project at the Association in Vision and Ophthalmology (ARVO) meeting, May 2000. Courtesy of Dr. Chris Rudnisky.

complication. Linda Auger, a Community Health Representative for the Tallcree First Nation near Fort Vermilion approached Tennant after he gave a talk on diabetes and diabetic retinopathy and asked him whether there was anything that could be done to improve the access to care for people in her community.⁴⁷

Tennant discussed the question with Dr. Mark Greve at the retina symposium in Jasper. Greve suggested that they could design a study which could compare images taken with a fundus camera on slide film with those taken with a digital camera and electronically transmitted. Digital cameras were a newly developing (and expensive) technology. It was not at all clear that digital images would be comparable to those taken with slide film and used to diagnose diabetic retinopathy.⁴⁸

Chris Talbot, a friend of Tennant's, worked for MacDonald Dettwiler. The company was interested in developing projects where their satellite technology could be used in the medical field. Satellite transmission offered a way to send information from remote communities to a tertiary care centre in the absence of high-speed internet. A consortium was formed between the University of Alberta, the Royal Alexandra Hospital and MacDonald Dettwiler to develop a tele-ophthalmology service to screen patients in remote communities and transmit those images by satellite to the Royal Alexandra Hospital (the satellite dish was once located

on the rooftop just outside the Department library in Unit 23). The project, I-SITE (Intelligent Screening of Imagery via Tele-ophthalmology), received a grant from Precarn in 1997–1998. Research fellow Dr. Chris Rudnisky helped to establish the study protocols and software.⁴⁹

The tele-ophthalmology pilot program began in 1999, when Dr. Tennant and the Royal Alexandra Hospital photographer Bernd Schwanke travelled 640km north of Edmonton to the small community of Fort Vermilion – a 12 hour drive. A satellite dish had been installed outside of the Fort Vermilion Hospital to send the images. Linda Auger recruited diabetes patients from the surrounding reserves – South Tallcree, North Tallcree, Beaver Ranch, Boyer River, Garden River, Fox Lake, John D'Or, Assumption, and Meander – to travel to the Fort Vermilion Hospital. Local area physicians also recruited patients for the study. At the hospital, patients would have their eyes examined and photographed using both conventional slide film and digital photography. The digital images were sent to Edmonton via satellite (RADARSAT) and later the slide film was shipped to Edmonton for development. The team from Edmonton visited Fort Vermilion four times between October 1999 and June 2000 for the pilot study. The pilot program showed that stereoscopic digital imaging was just as accurate as conventional film for diagnosing diabetic retinopathy.⁵⁰

The digital images produced created very large files that were difficult to transmit via satellite or over the fledgling internet. The original TIFF files were 17.4MB per image and the original computer only had a hard drive with 128MB RAM and an 18 GB hard drive. Data transmission was estimated at 2GB/day via satellite or land line. The images were also transported on digital storage (initially tape drives) – which were also very expensive. The tele-ophthalmology team sought to overcome this short-coming by compressing the images and they demonstrated that this would not cause degradation if done at correct ratios. The tele-ophthalmology pilot project was so successful that it was continued as a Department program (see below).⁵¹



◀ Tele-ophthalmology satellite dish outside the Fort Vermilion hospital, March 2000. Left to Right: Resident Dr. Carl Peters, Medical Photographer Bernd Schwanke, Community Health Representative Linda Auger, Resident Dr. Matt Tennant, Research Fellow Dr. Chris Rudnisky. Courtesy of Drs. Tennant and Rudnisky.



1993



1994



1995



1996



1997



1998



1999

E. Cornock • J. Huang • R. Martiniuk • I. Ahmed • N. Goel • K. Yap • J. Pearson • K. Hennig • B. Hinz • R. Nigam • B. Chow • J. Leong-Sit • M. Gill • A. Kherani • M. Edwards • D. Filafero • T. Hillson • M. Tennant • F. Kherani • C. Peters • S. Chan • R. Chaudhary • C. Chang • R. Dookeran • C. Rudnisky • E. Weis • D. Heyns • J. McCabe



2000



2001



2002



2003

Resident Classes (1992-2006)



2004



2005



2006

Research

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In spite of financial constraints, research expanded in the Department during the 1990s and 2000s. As Chair, Dr. Ian MacDonald supported research at all levels – basic science, clinical, and ocular genetics – and in cases where that research could be translated to patient care, he encouraged those developments. He felt that all residents should become involved in research projects and publish during their residency and developed Research Day to encourage resident participation (see above).⁵²

When regionalization came it split the Department between the Regional Eye Centre at the Royal Alexandra Hospital and the University of Alberta sites. Adult ophthalmology clinical research shifted to the Regional Eye Centre, while the ocular genetics laboratory was located in the Heritage Medical Research Centre and then, following a move in 1998, in the Medical Sciences Building.⁵³

The Department's research would not have been possible without grants from government, industry, non-profit foundations, and individuals. Some of these relationships have been very long-term ones. In 1993, the Odd

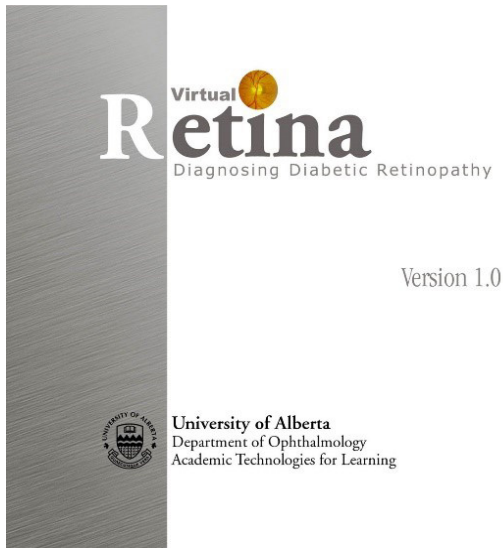
Fellow Rebekah Visual Research Foundation funded the purchase of new electrophysiology equipment (a Nicolet CA 2000 Electrophysiology unit). The local Lions Clubs, in association with the Lions Club International Foundation, have a long record of supporting the Department through fundraising to help with the purchase of equipment for the study of glaucoma, macular dystrophy, and diabetic retinopathy. In 2002, this led to the establishment of the Lions Eye Research Centre at the Royal Alexandra Hospital.⁵⁴

Donations by individuals have also made important contributions to work at the Department. In 1993, Dr. Ken Marshall, Mark Marshall's son, contributed to the fund set up by his father and promised to continue to support ophthalmology in Edmonton. Patients have also been generous donors including Patricia Ann Peat whose Research Fund has helped to fund summer research students. In 2006, the Department held its first 'Night for Sight' event at the Royal Alberta Museum as a thank you to those who had provided donor support for ophthalmology.⁵⁵



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In 1999, the Department revived the Research Fellowship program which had last been active in the 1960s. Dr. Chris Rudnisky, a University of Alberta medical school graduate, joined the Department as a research fellow of Drs. Greve and Tennant in 1999–2000. In collaboration with the University of Alberta Office of Academic Technologies for Learning, Rudnisky developed the ‘Virtual Retina’ program. Run off a CD-ROM, ‘Virtual Retina’ was designed to help teach residents how to evaluate diabetic retinopathy. He also worked with Drs. Greve and Tennant on the tele-ophthalmology pilot project (see above).⁵⁶



↳ Mrs. Dianne Thompson from the Odd Fellow Rebekah Visual Research Foundation dedicating the Nicolet CA 2000 Electrophysiology Unit, March 1993. Courtesy of the Department of Ophthalmology and Visual Sciences.

◀ ‘Virtual Retina’ program designed by Dr. Chris Rudnisky during his Research Fellowship (1999–2000). Courtesy of the Department of Ophthalmology and Visual Sciences.

Basic Science Research Michael Walter, PhD

With the appointment of Michael Walter, PhD in 1993, the Department was able to begin its own on-site basic scientific research. Walter was born in Sudbury, Ontario. Always interested in science as a child, he studied genetics as an undergraduate at the University of Guelph. Walter focused his studies in medical genetics as a graduate student of Dr. Diane Cox at the University of Toronto in the Sick Children's Hospital graduating with a PhD in 1990. He then undertook postdoctoral research under Dr. Peter Goodfellow in London and Cambridge on *SRY* – the gene which determines male sexual development. Towards the end of his postdoc he began thinking about shifting his research towards genes controlling the development of another tissue, the eye.⁵⁷

Walter accepted the position at the University of Alberta, intrigued by the possibility of being a medical geneticist in a primarily clinical department, but one with a strong interest in ocular genetics and a new chair interested in developing the academic side of the Department. Dr. Bill Pearce's database of individuals with rare genetic eye diseases was another draw. Walter admired Pearce's diagnostic accuracy which was a crucial step in isolating ocular genetic diseases for study. Dr. Ian MacDonald's interest in genetics research into choroideremia was also well known. Following Walter's arrival, the

Department was able to create an ocular genetics research group with Pearce as senior clinician, MacDonald as clinician-scientist and Walter as basic scientist.⁵⁸

Following Walter's arrival in September 1993, he set up the ocular genetics lab in space on the sixth floor of the Heritage Medical Research Centre which he shared with MacDonald. As Pearce was already working with Dr. N. Torben Bech-Hansen in Calgary on hereditary retina diseases, Walter began a research project with technician Farideh Mirzayans on an autosomal dominant anterior segment disorder called iridogoniodysgenesis which causes malformations in the iris and cornea. These malformations leave patients with this disorder at extremely high risk of developing glaucoma. Pearce had identified a large family with this disorder and had information on eight generations of the family. Walter also worked with glaucoma specialist Dr. Ron Casey on the project.⁵⁹



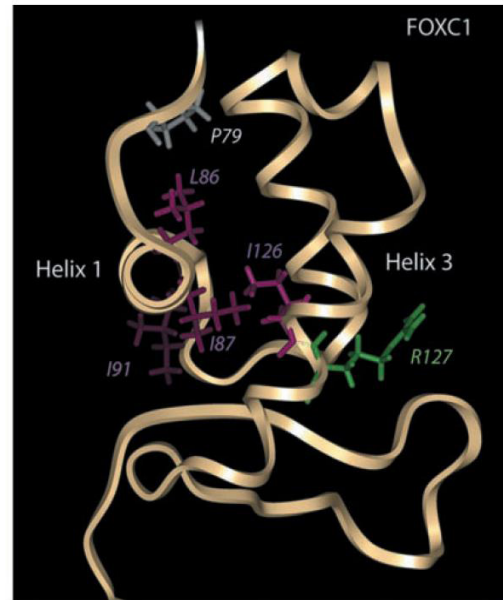
Walter's research was impacted by the tremendous technological changes taking place in the field of molecular biology at the time. He recalls attending the 1986 meeting at Cold Spring Harbour Laboratory, NY, where Kary Mullis announced the discovery of the polymerase chain reaction (PCR) technique. The Human Genome Project (1990–2003) and a number of other technological developments have also sped up the pace of research, making possible in mere hours work that might have taken years to complete in an earlier period. The hunt for the causative gene for iridogoniodysgenesis

➤ “Molecular model of FOXC1 forkhead domain. (A) A ribbon model showing the positions of the disease-causing missense mutations in the FHD of FOXC1. (B) A wire diagram summary of the functional sub-domains of the FOXC1 FHD. Regions 1 and 2: the N-terminal portion of the FHD and α -helix 1 function in the organization of the FHD for transactivation, DNA binding and nuclear localization. Region 3: α -helix 3 is involved in DNA-binding specificity of the FHD and also plays a role in the organization of the FHD with respect to nuclear localization and high efficiency binding. Region 4: the wing 2 region functions in the organization of the FHD for transactivation and DNA binding.” Figure 7 from R.A. Saleem, S. Banerjee-Basu, T.C. Murphy, A. Baxevasis and M.A. Walter, “Essential structural and functional determinants within the forkhead domain of FOXC1,” *Nucleic Acids Research* 32 no. 14 (Jan 2004): 4182-4193.

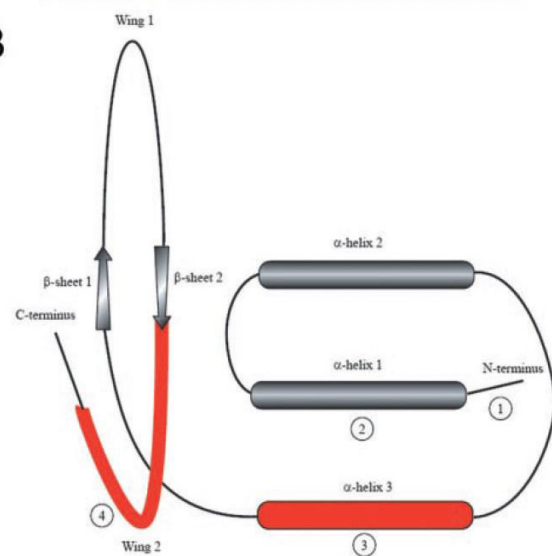
◀ Ocular Genetics Research Group. Left to Right: Dr. Bill Pearce, Dr. Ian MacDonald, Dr. Michael Walter. Bernd Schwanke, Medical Photographer, Department of Ophthalmology. Courtesy of Dr. Bill Pearce.

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B



anomaly occurred prior to the completion of the sequencing of the human genome. It took Walter's lab a year of checking each of the twenty-two autosomes individually for linkage – postdoc Alan Mears drew one chromosome number at a time out of a hat – before the marker was isolated at the tip of chromosome six, the very last chromosome to be examined. Having isolated the region, they worked with another lab to first clone and then sequence the genes in the area, finally discovering the gene involved in Axenfeld-Rieger anomaly and iridogoniodysgenesis anomaly in 1998. Following the completion of the Human Genome Project, it took Walter's graduate student Doug Gould one afternoon to get the intron/exon structure and DNA sequence of a gene – lining up the mRNA with the published genetic sequence – when similar work had taken him two years in the past.⁶⁰

Around 2000, Walter chose to change the direction of the main research done in his lab from locating genes associated with disease to understanding how these genes function to cause disease. This shift to functional analysis has allowed the lab to concentrate on how mutations affect genes in tissue culture. They concentrated on two genes with which they had already been working – *PITX2* and *FOXC1* – and the roles that they played in the development of anterior segment dysgenesis.⁶¹

One of the first papers published after the lab took this dramatic turn won first author Ramsay Saleem the award for best student paper published in the *American Journal of Human Genetics* in 2001. For Walter's work on discovering and studying the transcription factor *FOXC1* and the roles that it plays in ocular development he was awarded the Association for Research in Vision and Ophthalmology (ARVO) Cogan Award in 2002.⁶²

In 1996, the Department of Medical Genetics was established at the University of Alberta with Walter's PhD supervisor, Dr. Diane Cox, as Chair. The department was located on the eighth floor of the Medical Sciences Building. Walter became an adjunct member of the new department. In 1998, his lab was relocated from the Heritage Medical Research Centre to the eighth floor of the Medical Sciences Building. Following the retirement of Diane Cox in 2005, Walter was appointed Chair of Medical Genetics and switched his appointment to being primarily in Medical Genetics and adjunct in Ophthalmology.⁶³



Electrophysiology **Yves Sauvé, PhD**

In 2005, Yves Sauvé joined the Department as a geographic full-time member with an adjunct cross-appointment to the Department of Physiology. Sauvé was born in Montreal and studied Health Sciences in CÉGEP Saint-Jean-sur-Richelieu. Then he attended the Université de Montréal where he studied biochemistry, earning a BSc in 1986. During the summer between his first and second year, Sauvé worked as a counsellor at Camp Papillon, a camp for children with disabilities. The counsellors were given a tour of the Montreal Neurological Institute which sparked his interest in neurochemistry. Then, in Sauvé's final year he took a class in neurochemistry from Professor Tomas Alfredo Reader

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which inspired him so much he undertook an MSc under his supervision graduating in 1988.⁶⁴

For his PhD, Sauvé wanted to explore electrophysiology and undertook this study at McGill University with Dr. John W. Commissiong. Two years into his studies Commissiong moved to the National Institutes of Health in Bethesda, MD. Sauvé switched supervisors to Dr. M. Rasminsky and completed his dissertation in 1995. He then undertook postgraduate work with Dr. Ray Lund who was just in the process of relocating

⤴ Dr. Yves Sauvé with an electroretinogram (ERG) which he uses to measure the response of the retina to light. Courtesy of *The Gateway*.

his lab from Cambridge to the Institute of Ophthalmology, University College London. Sauvé set up the electrophysiology lab, including a white plastic half-dome used for mapping visual receptor fields which was gifted to him by Simon Grant of Charing Cross Hospital and had initially been a prop in a Rolling Stones show in the 1970s. He remained with the Lund lab after completing his postdoc and travelled with Lund to Salt Lake City, Utah in 2001 where he became a research associate professor at the John Moran Eye Center, University of Utah. It was there that Sauvé would learn and develop his expertise with the electroretinogram (ERG).⁶⁵

Sauvé moved to Edmonton in July 2005 – excited by the opportunity to outfit his own lab on the seventh floor of the Medical Sciences Building and carry out his own research projects. He carried out research as a retinal scientist and an electrophysiologist, also helping with clinical work in the latter by interpreting patient ERGs.⁶⁶

Based on an idea given to him by Dr. Ian MacDonald, Sauvé changed the direction of his research and worked on Stargardt-like macular dystrophy (*ELOVLA*) which had a mouse model that could be used for experimental study. Fortunately, one of his colleagues at the Moran Eye Center, Kang Jang, had created the transgenic mouse model for Stargardt-like macular dystrophy and Jang permitted Sauvé to take some of the mice to Edmonton. With

these mouse models Sauvé began studying the phenotypes of retina disorders and conducting experiments in the effect of dietary supplementation on retina function. The mice also served as a model for Sauvé's work on age-related macular degeneration.⁶⁷

Clinical Research

Prior to regionalization several of the Department's clinical faculty were engaged in a number of clinical research projects in different locations. Drs. Rod Morgan and David Climenhaga examined anterior segment surgical techniques. Dr. Ron Casey studied the effect of beta-irradiation as an adjunct to trabeculectomy in children. Dr. Ernest Hodges was undertaking clinical case studies and parasitology of *Acanthamoeba keratitis*. Dr. Garry Grant was a clinical investigator in a multi-centre Canadian macular photocoagulation study, and Drs. David Climenhaga and Lin Leong-Sit also took part in multi-centre drug trials. The development of the Regional Eye Centre in 1996 allowed for expanded clinical research activity, from student research studies to clinical trials. It was also the site where research into tele-ophthalmology was undertaken.⁶⁸

Key Players in Clinical Research During Regionalization

Dr. Rod Morgan
(Anterior Segment Surgical Techniques)

Dr. David Climenhaga
(Anterior Segment Surgical Techniques +
Multi-Centre Drug Trials)

Dr. Ron Casey
(Beta-irradiation as an adjunct to
trabeculectomy in children)

Dr. Ernest Hodges
(Parasitology of *Acanthamoeba keratitis*)

Dr. Garry Grant
(Macular Photocoagulation Study - Multi-
Centre Trial)

Dr. Lin-Leong Sit
(Multi-centre Drug Trials)

Dr. Matt Tennant (resident)
(Tele-Ophthalmology)

Dr. Chris Rudnisky (resident)
(Tele-Ophthalmology)

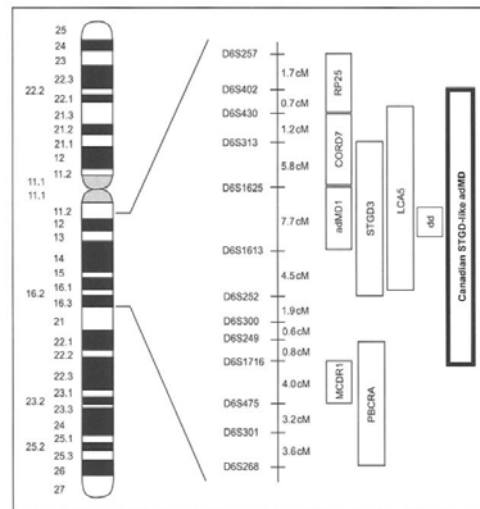
Ocular Genetics

Under Dr. Bill Pearce, ocular genetics had long been a clinical and clinical-research area of strength for the Department, and with the arrival of Drs. MacDonald and Walter it soon became an area of basic research strength as well. Pearce and MacDonald ran weekly ocular genetics clinics in Edmonton, where they saw patients referred by the departments of Pediatrics, Medical Genetics, Internal Medicine and elsewhere. Pearce also conducted an ocular genetics clinic in Calgary. Following his retirement in 1998, MacDonald travelled to the Rockyview General Hospital in Calgary to see ocular genetics patients.⁶⁹

➤ An ideogram of chromosome 6, showing retinal disease loci that have been mapped to 6q. Figure 5 from Pamela S. Lagali, Ian M. MacDonald, Irina B. Griesinger, Michelle L. Chambers, Radha Ayyagari, and Paul W. Wong, "Autosomal dominant Stargardt-like macular dystrophy segregating in a large Canadian family," *Canadian Journal of Ophthalmology* 35 no. 6 (Oct 2000): 315-324. Courtesy of the *Canadian Journal of Ophthalmology*.

➤ Left to Right: Drs. Michael Walter, Bill Pearce, Ian MacDonald. December 2003. Courtesy of Dr. Michael Walter.

Both Pearce and MacDonald worked with the Northern Alberta Hereditary Diseases Program to study the families identified with ocular genetic disorders. Clinical research into ocular genetics was supported by the Odd Fellow Rebekah Visual Research Foundation which sponsored the upgrading of the electrophysiology equipment in 1993. Pearce and MacDonald both had active ocular genetics research projects.⁷⁰



Dr. W. G. 'Bill' Pearce

As mentioned in chapter two, Dr. Bill Pearce had been researching ocular genetics since his arrival in Edmonton in 1971 and had established a notable database with over 1500 individuals with genetic eye disease. In the early 1990s, Pearce was conducting research into X-linked congenital stationary night blindness and was working in collaborations with Dr. N. Torben Bech-Hansen PhD a molecular geneticist from the University of Calgary to locate the genes involved in X-linked congenital stationary night blindness (CSNB) and X-linked congenital motor nystagmus (CMN). In these studies patient recruitment, clinical studies, and electrophysiology examinations took place in the Clinical Sciences Building and the University of Alberta Hospital Division of Genetics helped to trace and recruit family members while the molecular analysis of the patients' DNA was carried out in Calgary. Bech-Hansen's lab successfully cloned and sequenced the gene involved in CSNB in 1998, publishing the results in *Nature Genetics*.⁷¹

Pearce also worked with Mike Walter at the University of Alberta in studying families with hereditary anterior segment disorders. Some of the families had the disorders confined only to the eye – Axenfeld-Rieger anomaly (ARA) and iridogoniodysgenesis anomaly (IGDA) – while others had additional systematic features – Axenfeld-Rieger syndrome (ARS) and

iridogoniodysgenesis syndrome (IGDS). In 1996, Walter and Pearce were able to show that ARA and IGDS were not caused by genes located in the same vicinity. Over the following years they discovered that the genetic mutations responsible for IGDA and ARA were located to a specific region on chromosome six (see above) and that the genetic mutation causing IGDS occurred in the same gene (*RIEGL*) on chromosome four where a different mutation caused ARS – showing that the two diseases were allelic variants.⁷²

Dr. Ian MacDonald

Dr. Ian MacDonald was recruited to the Department in part because of his experience in ocular genetics, particularly the X-linked disorder choroideremia. The origins of Dr. MacDonald's interest in choroideremia research date back to his fellowship in clinical genetics. During this fellowship, Barbara Owens, a reporter from the *Ottawa Citizen* spoke with MacDonald about the state of research in Canada into choroideremia, a disorder which affected members of her family. There was no ongoing research. So MacDonald offered to begin a program studying the disease with the cooperation of Owens' family. He learned the appropriate laboratory techniques and set out to begin mapping the location of the affected gene on the X-chromosome. Part of the research involved collecting samples from the affected kindred. During the course of this research MacDonald realized – as had Dr. Bill Pearce earlier – the importance of correct diagnosis in genetic study. This led MacDonald to undertake residency training in ophthalmology at the University of Ottawa which he completed in 1989. MacDonald continued this research during his time as Ontario Ministry of Health Career Scientist.⁷³

Following his arrival in Edmonton, MacDonald set up his research lab on the sixth floor of the Heritage Medical Research Centre. MacDonald shared his lab with Mike Walter. Walter had the office while

MacDonald used a repurposed broom closet so small that the door couldn't be opened while he was sitting at his desk or it would hit him. Nevertheless, the work done by Walter and MacDonald in the lab was excellent.⁷⁴

MacDonald's first research projects were on proliferative vitreo-retinopathy and the cloning of genes involved in X-linked ocular genetic disorders. He worked in collaboration with Dr. N. Torben Bech-Hansen in Calgary and Drs. Gerald Chader and Paul Wong at the National Eye Institute of the National Institutes of Health in Bethesda MD. MacDonald also continued his work on investigating families with choroideremia via clinical and genetic studies.⁷⁵

In addition, MacDonald identified an Albertan family with a form of autosomal dominant macular dystrophy. He worked with Dr. Paul Wong from the Department of Biological Sciences mapping the gene for the disorder. Eventually MacDonald, Wong, and colleagues in the United States came together to map the genetic mutations causing Stargardt-like macular dystrophy (STGD3) and autosomal dominant macular dystrophy (adMD) to within the gene *ELOVL4* in 2001. The following year, a clinical trial was undertaken in Edmonton in which family members with *ELOVL4* mutations took docosahexaenoic acid (DHA) supplements which showed some success in improving visual acuity in a case of Stargardt-like macular dystrophy.

Because *ELOVLA* was associated with macular degeneration, MacDonald suggested that it might make a good model for research to Yves Sauvé when he arrived in Edmonton in 2005 (see above).⁷⁶

With the expertise that the Department had accumulated, MacDonald also re-examined some of the families initially identified by Pearce with new clinical and scientific technologies. One case was a family with a form of autosomal dominant cone dystrophy which had first been identified by Pearce in the 1970s. Drs. MacDonald and Tennant and Marc Hébert (MacDonald's postdoctoral fellow) examined individuals from four generations of the family using up-to-date clinical and genetic technologies. Following mfERG testing the issue was identified as a cone-rod dystrophy. Genetic analysis revealed the mutation to be a single base-pair addition in the *CRX* gene on chromosome 19.⁷⁷

Dr. Ordan Lehmann

Dr. Ordan Lehmann joined the Department as a clinician-scientist in 2004 and was cross appointed to the Department of Medical Genetics. In 1986, he completed his BA at the University of Cambridge and then undertook medical training at the University of Oxford earning his BM BCh in 1989. Lehmann then specialized in ophthalmology, becoming a Fellow of the Royal College of Ophthalmology in 1994. In 1999, Lehmann began his PhD at University College London where he earned his PhD in 2003 for his thesis “The role of forkhead genes in eye development.” While working on his PhD, Lehmann spent a summer in Dr. Mike Walter’s lab in Edmonton. Impressed by Lehmann’s research, Walter worked to recruit him while he was acting chair of the Department in 2002–2003.⁷⁸

Lehmann set up his lab within the Medical Genetics Department on the eighth floor of the Medical Sciences building. His research specialized in glaucoma genetics. Lehmann began a project looking at the effect of genetic mutations on eye structure and glaucoma and continued his work on the genetics of Axenfeld-Rieger syndrome. His work on the genetics of glaucoma was quickly recognized. Lehmann was appointed Canada Research Chair in Glaucoma Genetics in November 2004 and received an Alberta Heritage Foundation for Medical Research Award in April 2005.⁷⁹



- ⤴ Dr. Ordan Lehmann. Courtesy of the Faculty of Medicine and Dentistry.
- ⤵ Karin Harris, ophthalmic technician, demonstrates an auto-refractor in the Regional Eye Centre Eye Clinic, October 2003. Courtesy of Medical Photography, Royal Alexandra Hospital.
- Demonstration of intra-ocular pressure measurement in the Regional Eye Centre Eye Clinic. Courtesy of Medical Photography, Royal Alexandra Hospital.

Patient Care

Regional Eye Centre

By 2006, the Regional Eye Centre was serving a population of over two million residents spread across the Edmonton region, northern Alberta, the Northwest Territories and parts of the western provinces. There were 36,000 patient visits and 9,000 surgeries conducted annually. Care was provided by twenty-seven staff ophthalmologists, 11 residents, and a team of more than 70 nursing, technical, and support staff. Ambulatory Eye Clinics were held on the first floor of the Royal Alexandra Hospital. These included general ophthalmology, glaucoma, retina, external eye diseases, neuro-ophthalmology, oculoplastics/orbit, low vision, ocular motility and ocular genetics clinics. Surgery took place in Unit GB1 on the lower level where there were four digital operating rooms. Inpatients and day surgery patients were cared for on Patient Care Unit 22 with additional recovery space for cataract surgery patients on the lower level adjacent to the operating theatres. While most of the adult ophthalmological surgery was carried out at the Royal Alexandra Hospital some cataract surgery was carried out at the Fort Saskatchewan and Westview (Stony Plain)

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community hospitals and some oculoplastic procedures were contracted out to staff ophthalmologists and conducted in private facilities.⁸⁰



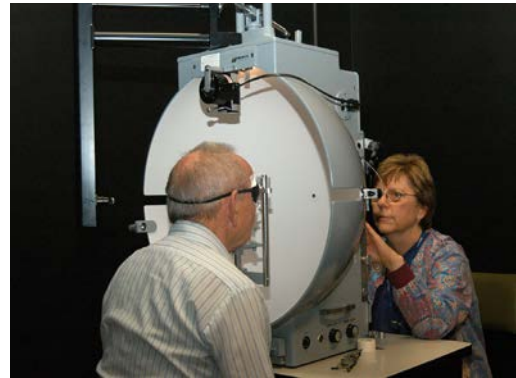
Glaucoma Clinic

Until his retirement from the University at the end of December 1993, Dr. Henry Wyatt continued to run the Glaucoma Clinic with recently returned former resident Dr. Ron Casey, who was the Department's first fellowship-trained glaucoma specialist. Until regionalization the Clinic was held in the Clinical Sciences Building on the University of Alberta Campus. In the early 1990s software upgrades improved the functioning of the automated visual field machines, run by four glaucoma technicians. The Clinic also performed glaucoma testing, Goldmann visual fields, colour testing, dark adaptometry, electroretinography, and visual evoked potentials. While the Clinic served physicians throughout the Edmonton region there were concerns that ongoing budget cutbacks might restrict that capability in the future.⁸¹

Following the opening of the Regional Eye Centre the Glaucoma Clinic moved into its current location in Patient Care Unit 22 on the second floor of the Royal Alexandra Hospital. The Clinic continued to offer visual field and retinal function testing to patients.⁸²

In 2000, multifocal electroretinography (mfERG) equipment was purchased with funding from the Edmonton Public Lottery Fund. This new machine allowed for the diagnosis and assessment of conditions like age-related macular dystrophy, cone

dystrophy, retinitis pigmentosa and Stargardt macular dystrophy. Only a few locations in Canada had mfERG equipment at the time – and Edmonton's was the only one in western Canada making it a prairie resource. Originally, the ERG results were interpreted by Dr. Hébert, a postdoctoral fellow of Dr. MacDonald. The mfERG played an important role in the Department's work in diagnosis and treatment of retinal disease.⁸³



Low Vision Clinic

Dr. James Lewis took over running the Low Vision Clinic in November 1991. This clinic was run in conjunction with the Canadian National Institute of the Blind (CNIB) at the Clinical Sciences Building and was held every other week. Lewis took patient histories, performed examinations, and discussed their condition. The CNIB nurse assessed patients for visual aids and registered them with the CNIB if necessary. The Low Vision Clinic remained at the Clinical Sciences Building until April 1996.⁸⁴

In April 1996, the Low Vision Clinic was moved to the Regional Eye Centre at the Royal Alexandra Hospital. The Low Vision Clinic, like the other ambulatory patient clinics, operated out of the Eye Clinic on the first floor of the Royal Alexandra Hospital. Lewis also provided training to residents in the Low Vision Clinic.⁸⁵

◀ Glaucoma Technician Iris Odynski examining a patient in the Glaucoma Clinic, May 2005. Courtesy of Medical Photography, Royal Alexandra Hospital.

▶ The opening of the Royal Alex Vision Centre, September, 2000. Courtesy of Medical Photography, Royal Alexandra Hospital.

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In order to better serve the patients attending the Low Vision Clinic a private store, the Royal Alex Vision Centre, opened within the Eye Clinic in September 2000. Manned by trained optician George Colgan, the Royal Alex Vision Centre enabled patients of the Low Vision Clinic to test and purchase Low Visual Aids which were not available through the CNIB. It also allowed hospital patients and staff to fill prescriptions for glasses and contact lenses on-site.⁸⁶



Retinal Unit

The Retinal Unit was the only service that remained at the Royal Alexandra Hospital throughout the period of regionalization. The Unit had two examining rooms, a waiting room, a retinal photography room, and a laser room. Drs. Garry Grant and Linda Uniat held outpatient clinics weekday mornings and performed surgery and/or laser treatments in the afternoon. Both doctors consulted at the newborn nurseries at the Royal Alexandra and University of Alberta Hospitals. A full-time retinal photographer was on staff at the Royal Alexandra Hospital. Uniat also held a half-day retinal diagnostic clinic each week at the Clinical Sciences Building.⁸⁷

In July 1994, Dr. Garry Grant relocated his practice to the United States, one among many physicians who left Edmonton during this period of budgetary cutbacks. Fortunately, the Department had been able to recruit Dr. Mark Greve as an assistant clinical professor following his medical and surgical retina fellowship at Louisiana State University and he began his practice following Grant's departure in July. Greve and Uniat continued to hold morning outpatient clinics with afternoons spent conducting surgery or laser treatment.⁸⁸

When all adult ophthalmology surgery was regionalized to the Charles Camsell Hospital in July 1995, this included retinal surgery as well, although the Clinic remained open as usual. Greve recalls

holding clinics at the Clinical Sciences Building in the mornings, travelling to the Royal Alexandra Hospital to hold clinics in the Retinal Unit and then travelling once more to conduct surgery at the Charles Camsell Hospital at the end of the day. When the Regional Eye Centre was opened in April 1996 the Retinal Unit was incorporated into the main Eye Clinic space and one of the operating rooms was equipped for retinal surgery.⁸⁹

The retinal service expanded in 1998 with the return of former University of Alberta medical student and resident Dr. Brad Hinz from a medical and surgical vitreoretinal fellowship at the Johns Hopkins Wilmer Ophthalmological Institute. Residents received retinal teaching by Uniat, Hinz, and Greve in the Regional Eye Centre Eye Clinic. From 1996, this teaching was supplemented with a weekend retinal symposium in Jasper, AB.⁹⁰

Pediatric Ophthalmology and Adult Strabismus Clinics

Prior to regionalization pediatric ophthalmology and adult strabismus clinics were held not only six times a week at the Clinical Sciences Building but also at the Charles Camsell Hospital where Dr. Bill Pearce held two half-day clinics a week. He also held one ocular genetics clinic a week at the Clinical Sciences Building. A full-day pediatric neuro-ophthalmology clinic and two full-day adult neuro-ophthalmology clinics were also held at the Clinical Sciences Buildings by Dr. James Lewis.⁹¹

In 1993, pediatric ophthalmology was centralized at the University of Alberta. Gillian Budd retired and Betty Newton, one of the first graduates of the Orthoptic Training Program, was appointed Chief Orthoptist and Clinic Manager. Pearce transferred all of his pediatric ophthalmology clinics to the Clinical Sciences Centre in August 1994 and his remaining pediatric surgery in September. He retired in 1998.⁹²

After the opening of the Regional Eye Centre at the Royal Alexandra Hospital in April 1996, adult strabismus patients were seen there, while most of the pediatric patients continued to be assessed at the clinic in the Clinical Sciences Building. Similarly, Lewis' neuro-ophthalmology clinics were split, with adults being seen at

the Regional Eye Centre and children at the Clinical Sciences Building. In addition to Drs. Drummond, Lewis, and MacDonald, general ophthalmologists, including former resident Dr. E. Anne Macdonald, also held pediatric ophthalmology clinics at the Clinical Sciences Building. Following regionalization, non-strabismus pediatric surgery was performed at the Regional Eye Centre while pediatric strabismus surgery was carried out at the Stollery Children's Hospital outpatient surgery unit. Dr. Kourosh Sabri joined the Unit as a geographic full-time pediatric ophthalmologist in September 2006.⁹³

In 1997, orthoptist Brad Wakeman joined the Department and Chief Orthoptist Betty Newton retired and was replaced in that role by Candace Bryant-Spraakman, another graduate of the Department's orthoptic training program. One full-time and two part-time orthoptists worked in the clinic that served patients from the Edmonton region, northern Alberta, northeastern British Columbia, northwestern Saskatchewan, and the Northwest Territories. The clinic received a partial renovation in 2000 and was renamed the Luscar Family Eye Clinic.⁹⁴

Tele - ophthalmology Program

Building on the success of the pilot project, the Department launched the tele-ophthalmology program in November 2000. It joined the Screening for Limb, I-Eye, Cardiovascular and Kidney (SLICK) Program. SLICK screened individuals in Alberta's First Nations Communities for complications associated with type 2 diabetes, including diabetic retinopathy. Vans with trained staff and portable equipment, including a retinal camera, travelled to all First Nations communities in Alberta. During the first stage of the project they screened over 1500 patients between December 2001 and July 2003. Most of the patients were screened for diabetic retinopathy by having their pupils dilated and three-dimensional digital photographs taken. Retinal specialists at the Department's tele-ophthalmology unit then assessed the images and followed up with patients as necessary to provide additional care. In this way patients in remote communities received state-of-the-art diagnostic care which they would otherwise have had to travel to Edmonton to access.⁹⁵

Beginning in 2005, the Department partnered with the Aspen Health Region (serving approximately 167,000 people spread over an area of 110,000 square kilometers) to provide screening for diabetic retinopathy via tele-ophthalmology. Patients were assessed by

trained nurses at the hospital in the town of Edson 200 kilometers west of Edmonton. Patient information and digital fundus photographs were transmitted to Edmonton where they were assessed and diagnosis, treatment, and follow-up recommendations were sent back to Edson. Only patients whose medical condition required it needed to make the two hour trip into Edmonton to see an ophthalmologist.⁹⁶

The Department's tele-ophthalmology program is a highly successful example of translational research. Following the success of the tele-ophthalmology pilot project, the Department began to develop tele-ophthalmology into a full-fledged program. The goal was to ensure that all patients "irrespective of geographic, income, time and cultural barriers, have access to medically necessary hospital and physician services."⁹⁷ The Department began training tele-ophthalmology technicians in 2001. Operating from a reading centre located in the Department on Unit 23 at the Royal Alexandra Hospital, the tele-ophthalmology program has, since September 2002, served remote communities in the province of Alberta and the Northwest Territories. In addition, other services began to use the infrastructure created by the program. In November 2003, a tele-genetics reporting system was set up where patient information and ERGs were uploaded to the system for interpretation in Edmonton. In 2005, the tele-ophthalmology team won a Recognition of Excellence and



Achievement in Capital Health (REACH) Award for Innovation. Since that time the tele-ophthalmology program has continued to develop and grow, incorporating new technologies and serving new patient populations in Alberta and elsewhere.⁹⁸

▲ Dr. Mark Greve (seated) and Dr. Matt Tennant examining a stereoscopic image of the optic nerve and macula as part of the tele-ophthalmology program. Photo by Richard Siemens. Copyright University of Alberta.

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Translating Research into Cutting-Edge Patient Care

First as a resident research project, then as a pilot project to a necessary patient care service, the tele-ophthalmology program has served more than 25 000 patients since it first began in January 2000. The Department continues to be at the forefront of this type of translational research both in clinical and basic science (see chapter four).

Global Initiatives

While the tele-ophthalmology program was initially designed to help provide ophthalmology services to remote locations in Canada it quickly became apparent that the technology could be just as easily utilized to help under-served regions in other locations around the globe. The Department then began working with physicians in developing nations to help them develop tele-ophthalmology programs to provide better patient care.

The Department's first international tele-ophthalmology initiative was in India where, in collaboration with Alberta Retina Consultants, the tele-ophthalmology team worked with Dr. Chandrasekhar Sankurathri at the Sri Kiran Eye Hospital, Kakinada to set up a tele-ophthalmology program in January 2005. Another tele-ophthalmology program was developed in Cameroon in November 2006, where the Department and Alberta Retina Consultants worked in conjunction with Dr. Dieter Lemke and Cameroon Baptist Convention Health Services.⁹⁹

Members of the Department have also been involved in global health initiatives on an individual basis. In 1998 and 1999, Dr. Harold Climenhaga worked for brief periods at St. John Ophthalmic Hospital in Jerusalem, where he had spent a year and a half between the completion of his residency training at the Department and undertaking his cornea fellowship training

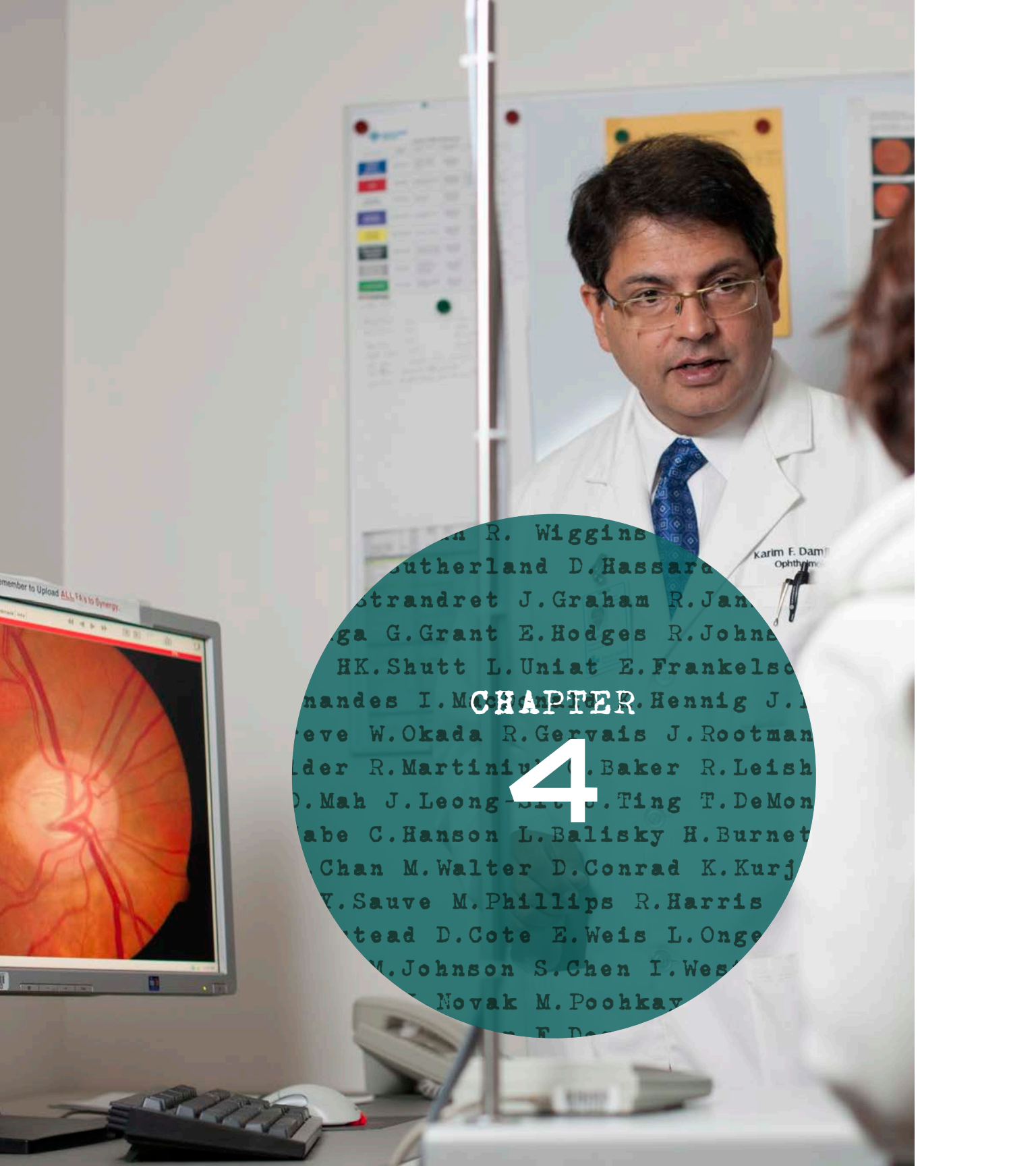
in Atlanta. Dr. Ian MacDonald also worked at the hospital for three weeks in 1998. In 2005 and 2006, Drs. Tennant and Rudnisky travelled to Guatemala where they worked with Edmonton optometrist Dr. Ben Doz and a local ophthalmologist to provide screening and conduct surgeries. Funding for the trips was provided by Rotary of Edmonton and Rotary of Guatemala.¹⁰⁰

Regional Eye Centre surgical nurse, Janice Hengsbach, helped to gather equipment for the first trip and joined Drs. Tennant and Rudnisky on subsequent trips. She recalls how the surgical treatments provided helped the patients and how, the day following surgery, patients would react with “excitement, smiles would turn upwards, they would have come in with faces that were very stoic, patches would come off and the smiles went up, the corners of the mouths went up, so you knew that you had not only released the person from blindness, but you also released the rest of the family from taking care of them, so it was pretty spectacular.” Hengsbach was so bitten by “the mission bug” that she voluntarily took on the task of collecting equipment for subsequent international trips undertaken by members of the Department.¹⁰¹

▲ Dr. Abeba Giorgis treating a glaucoma patient with SLT, 2014. Courtesy of Dr. Karim Damji.

▶ Drs. Matt Tennant (left) and Chris Rudnisky (right) operating in Guatemala, January 2006, Courtesy of Janice Hengsbach.





CHAPTER

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R. Wiggins
D. Hassara
J. Graham R. Jan
G. Grant E. Hodges R. John
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abe C. Hanson L. Balisky H. Burnet
Chan M. Walter D. Conrad K. Kurj
V. Sauve M. Phillips R. Harris
stead D. Cote E. Weis L. Onge
M. Johnson S. Chen I. West
Novak M. Pochkay
F. De

Karim F. Dam
Ophthalmology



The Department

Dr. Garry Drummond (2007)



Professor Garry Drummond MD FRCSC was appointed as Acting Chair of the Department of Ophthalmology in January 2007. Drummond was born in Calgary, AB, and developed an interest in biology and the health sciences during his high school education. He began his pre-medical education at the University of Calgary in 1974. In 1976, Drummond joined the Canadian Armed Forces with the goal of exploring a career as a pilot. He underwent Basic Officer Training at Canadian Forces

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Base Chilliwack during the summer of 1976 and considers it to have been one of the most formative experiences of his life. However, Drummond discovered that he did not wish to pursue a military career and was honorably discharged in June 1977. He chose to concentrate on medicine instead and entered medical school at the University of Calgary in 1979 following the completion of his BSc. Drummond became interested in ophthalmology during medical school and an elective experience with Dr. Merv Kirker solidified this goal. Drummond undertook first internship at the University of Alberta Hospital and later residency training in ophthalmology in the Department of Ophthalmology at the University of Alberta, graduating in 1986.¹

During his residency training, Drummond became fascinated with the challenges posed by pediatric ophthalmology and strabismus, and, encouraged by Drs. Alastair Boyd, Bill Pearce, and Henry

➤ Dr. Garry Drummond, Acting Chair of the Department of Ophthalmology (2007). Courtesy of Medical Photography, Royal Alexandra Hospital.

◀ Dr. Karim Damji discussing tele-glaucoma with an eye clinic photographer. Courtesy John Ulan.

Wyatt, he decided to undertake fellowship training with the goal of returning to the Department as a geographic full-time faculty member. Consequently, Drummond undertook fellowship training in pediatric ophthalmology and adult strabismus at the University of Iowa under the directorship of Dr. William (Bill) Scott. While in Iowa, Drummond was privileged to also serve under the mentorship of Drs. Frank Judisch and Ron Keech. Drummond returned to Edmonton as the Department's third geographic full-time member in July 1988.²

Upon his return, Drummond built on the solid foundation of pediatric ophthalmology developed by his predecessors, updating the training of the technical orthoptist staff, and teaching pediatric ophthalmology and adult strabismus to residents. In 1991, he became the Director of the Pediatric Ophthalmology and Strabismus Unit (see chapter two). In this role Drummond played an active part in discussions regarding regionalization which led to the consolidation of adult ophthalmology in the Regional Eye Centre at the Royal Alexandra Hospital and pediatric ophthalmology at the University of Alberta Hospital. With the development of the Stollery Children's Hospital, Drummond became the Director of the Division of Pediatric Ophthalmology, although the actual Pediatric Ophthalmology and Adult

Strabismus Unit remained in the Clinical Sciences Building until January 2015 (see chapters two, three, and below).³

Drummond accepted a one-year term as Acting Chair of Ophthalmology when Dr. Ian MacDonald resigned as Chair to become the Branch Chief for Ophthalmic Genetics and Visual Function at the National Eye Institute at the National Institutes of Health, Bethesda MD. Drummond was, at the time, the only other full professor and senior geographic full-time member of the Department. He appointed Dr. Ordan Lehmann as vice-chair for research and graduate students. Dr. Royce Johnson became Acting Clinical Chief of the Department. As Department chair, Drummond oversaw the search and selection process for a new chair which was ultimately unsuccessful. However, he did succeed in beginning the process to recruit new members for the Department, including Drs. Karim Damji and Mike Dorey as glaucoma specialists. As had Chairs before and after him, Drummond also continued the process of encouraging Department residents to seek fellowship training elsewhere and recruiting them back to the Edmonton. Those Department residents who he encouraged to undertake fellowship training elsewhere and then return included: Drs. Chad Baker (Retina), Michael Johnson (Neuro-ophthalmology), Dean Mah (Cornea/External Eye Disease), Rizwan Somani (Retina), and Ezekiel Weis (Orbit/Oculoplastics/Oncology).⁴



Early during Drummond's term, the Department suffered a great loss. In January 2007, Dr. Ron Casey, the Department's senior glaucoma specialist, died suddenly. He was only 47 years old. Casey was a University of Alberta medical school graduate and a graduate of the Department's residency training program. At the urging of then-Department Chair Dr. Henry Wyatt, Casey undertook fellowship training in ocular pathology at the University of London and glaucoma at Moorfields Eye Hospital, returning to Edmonton as an assistant professor and the Department's fourth geographic full-time

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"AN OUTSTANDING
GLAUCOMA SPECIALIST"
WITH "VERY GOOD HANDS"

-DRS. DRUMMOND AND LEWIS
(ABOUT DR. RON CASEY)



Dr. Ron Casey (4 July 1959–17 January 2007).
Courtesy of Medical Photography, Royal
Alexandra Hospital.

appointment in February 1991. When Wyatt retired from the Department 1993, Casey, the Department's first fellowship trained glaucoma specialist, took on much of the burden of specialist glaucoma care in the Edmonton region, also introducing new methods of investigation and treatment. In addition to his work in the Glaucoma Clinic, Casey taught glaucoma, ocular pathology, and cataract surgery to the residents. He also served the Department as Undergraduate Medical Education Director (1994–1995) and Residency Training Program Director (1996–1998, 2002–2005). Casey was fondly remembered by his colleagues as an “outstanding glaucoma specialist” and a surgeon with “very good hands” and was sorely missed by the staff at the Glaucoma clinic.⁵ His patients recalled not only his skill, but also his kindness and the care with which he treated them. The Department's annual golf tournament was renamed the Dr. Ron Casey Memorial Golf Tournament in his honour and proceeds from the tournament as well as additional donations were used to create the Dr. Ron Casey Resident Endowment Fund which provides support for the educational activities of the Department's residents.⁶

Drummond completed his term as the Acting Chair of the Department at the end of December 2007 and he was replaced by Dr. Mark Greve at the beginning of January. Drummond continued his role as Director of the Division of pediatric ophthalmology until his retirement, training residents

during clinics and with didactic teaching sessions in the classroom. He held his last pediatric ophthalmology clinic in November 2012 and retired formally at the end of August 2013. Drummond continues to hold a part-time teaching appointment with the Department through the University of Alberta.⁷

Dr. Mark Greve
(2008)



In January 2008, Associate Clinical Professor Mark Greve MD FRCSC became the Acting Chair of the Department of Ophthalmology. Greve was born in Rosthern, Saskatchewan, where he attended school through grade twelve. In 1981, he entered the University of Saskatchewan first studying towards an Arts and Sciences degree and then Pharmacy before entering the College of Medicine in his third year, graduating with his MD in 1988. Greve was drawn towards ophthalmology because the field spanned both medicine and surgery,

⬆ Dr. Mark Greve, Acting Chair of the Department of Ophthalmology (2008). Courtesy of Medical Photography, Royal Alexandra Hospital.

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... treated patients of all ages, and made a real difference to their quality of life. He began his residency in ophthalmology at the University of Saskatchewan in 1989, following the completion of a year of internship at St. Paul's Hospital in Saskatoon. During his residency Greve developed a passion for the practice of retina. Greve applied for retina fellowships and, following the completion of his residency training in 1992, he began a two-year vitreo-retinal fellowship at Louisiana State University, New Orleans, Louisiana under the direction of Dr. Gholam Peyman. During his fellowship training, Greve conducted clinical research as well as mastering surgical retina techniques.⁸

... Greve always intended to return to Canada following his fellowship training. He was recruited by Dr. Ian MacDonald, joining the Department as an assistant clinical professor in July 1994. Greve and Dr. Linda Uniat provided subspecialist retina care in Edmonton. Greve quickly became involved in resident teaching and in the development of the two-day retina symposium which began in 1996. He encouraged residents, beginning with Dr. Brad Hinz, to seek out fellowship training and return to Edmonton. Greve served as Residency Training Program Director from 1999–2002. He encouraged then-resident Dr. Matt Tennant to begin the tele-ophthalmology pilot program and worked alongside him to develop the project first as a pilot program and then as a Departmental program (see chapter three).⁹

Drummond approached Greve about taking on the position of Acting Chair of the Department of Ophthalmology at the end of his one-year term. Greve agreed, becoming Chair in January 2008. During his term Greve faced the increased outsourcing of cataract surgery by the regional health authority – the amount of cataract surgery done outside of the Regional Eye Centre was increased to 25% from 20%. Greve helped to develop the Department’s Fellowship Training Program – beginning with retinal fellowships in 2009 – and continued to work towards the development of an Edmonton Eye Institute (planned for 2011). Dr. Ian MacDonald was recruited back to Edmonton to oversee the development of the Eye Institute (see below). During Greve’s time as acting chair, two new glaucoma specialists joined the Department – Dr. Karim Damji as a geographic full-time professor and Dr. Michael Dorey as an assistant clinical professor – and former resident Dr. Ezekiel Weis rejoined the Department as a geographic full-time assistant professor in orbit, oculoplastics and oncology. At the end of December 2008, Greve completed his one-year term as acting chair.¹⁰

Dr. Ian MacDonald
(2009 - 2014)



Following a two-year term as Branch Chief for Ophthalmic Genetics and Visual Function at the National Eye Institute of the National Institutes of Health, Dr. Ian MacDonald returned to Edmonton as Professor and Chair of the Department of Ophthalmology and Clinical Chief of Ophthalmology for Capital Health and the Edmonton Region in January 2009. MacDonald had come back to Edmonton to lead the development of the Edmonton Eye Institute but, shortly before his return, the 2008 global financial crisis led to a freeze on capital expenditures and the funding for the new centre was no longer available. MacDonald was concerned that the opportunity to create a centre of excellence would be lost.¹¹

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MacDonald returned to a Department that had grown during his absence and now had twenty-four community-based clinical faculty members; nine geographic full-time ophthalmologists: Drs. Stanley Chan (Cornea/Uveitis), Karim Damji (Glaucoma), Garry Drummond (Pediatrics), Michael Johnson (Neuro-Ophthalmology), Ordan Lehmann (Glaucoma/Genetics), Ian MacDonald (Genetics/Pediatrics), Chris Rudnisky (General/Tele-ophthalmology), Kourosh Sabri (Pediatrics), and Ezekiel Weis (Orbit/Oculoplastics/Oncology); and vision scientist Yves Sauvé, PhD. As he had when he first arrived in Edmonton in 1992, MacDonald worked hard to support collegial relationships among all members of the Department.¹²

▲ Dr. Ian MacDonald, Chair of the Department of Ophthalmology/Department of Ophthalmology and Visual Sciences (2009–2014). Courtesy of Medical Photography, Royal Alexandra Hospital.

MacDonald also returned to a Department once more facing severe cuts from both university and hospital budgets with related cuts in available operating time and the demise of the Alberta Heritage Foundation for Medical Research which became Alberta Innovates Health Solutions, a government agency. This brought to a halt plans to recruit additional ophthalmologists to the region in 2010, increased surgical waiting lists, and led to some difficulties in training residents and fellows. In an attempt to further rationalize health care, the provincial government had also reorganized all previous health boards into a single body, Alberta Health Services, with five zones – Edmonton belonging to the Edmonton Zone. On the university side, the new Dean of Medicine, Dr. Philip Baker, had reorganized the Faculty of Medicine and Dentistry into eight schools with Ophthalmology initially made part of the School of Surgery and Anesthesiology. In better news, space for three principal investigators engaged in clinical/wet-bench research was to be made available to the Department in 2011 (see below).¹³

In 2010, MacDonald set out a five year plan for the Department. His top priorities were: to assemble the human resources and plan to expand the physical facilities in order to meet the growing needs for eye care in the Edmonton and northern Alberta, to foster research excellence, develop a mentorship program, establish a research chair in ophthalmology, and establish training programs for ophthalmic

nurses and technicians. However, the restructuring of Alberta Health Services and continuing budget cuts to both university funding and health care made progress difficult for the rest of his term as Chair. Budget restrictions at the University of Alberta hampered the recruitment of geographic full-time staff to the Department, while increases in funding at the hospital were linked to specific objectives, like reducing the waiting time for cataract surgery.¹⁴

In 2011, Ophthalmology lost Program status within the Edmonton Zone which MacDonald had fought so hard to attain in 2002 as it became part of the Department of Surgery. The Department of Ophthalmology retained stand-alone Department status within the Faculty of Medicine and Dentistry and had recently been moved to the School of Neuroscience and Mental Health. In spite of the tight fiscal situation, MacDonald was able to make some key additions to the Department's clinical faculty. In 2012, Drs. Stephanie Dotchin (Pediatrics) and Carlos Solarte (Pediatrics/Adult Strabismus) joined the Department, replacing Dr. Kouros Sabri who had relocated to McMaster University in Hamilton, ON in 2009. Ophthalmologists Drs. Rehan Riyaz and Jennifer Hodges, both former residents, joined the Department in 2013. In 2014, Dr. Jaime Badilla (Oculoplastics) joined the Department along with Dr. Natashka Pollock (Pediatrics) who replaced Dotchin who had relocated to Calgary

the previous year. Dr. Michael Johnson (Neuro-ophthalmology), a former resident who had returned to the Department, left in the spring of 2014, relocating to Lethbridge AB.¹⁵

In 2013, the Department was renamed the Department of Ophthalmology and Visual Sciences in recognition of its broad mandate. Following several years of fundraising and hard work, the Royal Alexandra Foundation established a Research Chair in Ophthalmology at the Royal Alexandra Hospital in July 2013. MacDonald was named the inaugural Chair in March 2014. In June 2014, MacDonald completed his term as Chair of the Department and Clinical Chief of Ophthalmology for Capital Health in the Edmonton region. He then turned his efforts toward establishing the first Canadian ocular gene therapy clinical trial for the treatment of choroideremia, the hereditary eye disease that he had spent much of his career researching (see below).¹⁶

Dr. Karim Damji
(2014 - present)



Professor Karim Damji MD FRCSC MBA became the Chair of the Department of Ophthalmology and Visual Sciences in November 2014. Damji was born in London, England, but grew up in East Africa. He attended high school in Vancouver BC and then entered the University of British Columbia in 1980 where he studied physiology before entering medical school, graduating in 1987. During his training Damji became involved on the Curriculum Planning Committee which was engaged in shifting medical education from a didactic to a self-directed learning model. Between his second and third year of medicine,

he raised funds through the Aga Khan Foundation Canada and through various fundraisers to allow him to do a medical elective in Sierra Leone through Operation Crossroads Africa. This exposed him to the needs of patients living in regions underserved by medical care.¹⁷

It was during this African elective, when he saw some patients with river blindness (onchocerciasis), that Damji first developed an interest in ophthalmology. Following his rotating internship, Damji undertook a research fellowship in ocular pathology at the University of British Columbia with Dr. Jack Rootman, a former Department resident. In 1991, he began residency training at the University of Ottawa, finishing in 1994. In 1992, the focus of the Sally Leston Symposium was glaucoma and Damji was inspired by one of the speakers, Dr. Bruce Shields, to embark on fellowship training at Duke University Eye Centre, Durham NC. He was further encouraged by Dr. Bruce Jackson who was the head of the University of Ottawa Eye Institute to complete additional training and then return to Ottawa. At Duke University Eye Centre Damji undertook first a fellowship in ophthalmic genetics (1994–1995) and then a clinical and research fellowship in glaucoma (1995–1996). During his fellowship training he was privileged to work with Drs. Bruce Shields, David Epstein, Rand Allingham, and Gordon Klintworth who provided him with inspirational models of clinician-educators and clinician-scientists.¹⁸


Damji returned to the University of Ottawa Eye Institute in 1996 as an assistant professor and clinician-investigator. He worked with geneticists Dennis Bulman and resident Sanjoy Gupta on glaucoma and retina research and undertook clinical research on selective laser trabeculoplasty (SLT). He also served as Residency Program Director from 2004 to 2007. Damji developed the ‘sandwich’ fellowship model with several colleagues in Africa and Ottawa and started a glaucoma fellowship using this model while in Ottawa. Damji wanted to expand the model using tele-ophthalmology, but the technology was still in its infancy in Ontario.¹⁹

Following the death of Dr. Ron Casey in 2007, Damji was recruited by the Department of Ophthalmology at the University of Alberta. He was excited by the vision of the University of Alberta which included global citizenship as well as the opportunity to build on the Department’s cutting edge tele-ophthalmology program which he believed could be expanded for the diagnosis of glaucoma in remote locations as well. Following his arrival in Edmonton in 2008, Damji worked with tele-ophthalmology coordinator Abshir Moalin as well as tele-glaucoma coordinator Samreen Amin to begin the tele-glaucoma program first in Edmonton and northern Alberta and then, with funding from Grand Challenges Canada, in Ethiopia and Kenya (see below). Damji served as the inaugural Fellowship Program Director from 2008 to 2012 and

developed ‘sandwich’ fellowships in the Department (see below). He was also Residency Training Program Director from 2012 to 2014 and supported the development of the ophthalmic surgical skills centre (see below).²⁰

After becoming Department Chair and clinical section head in 2014, Damji continued to carry forward the goals set out in the Department’s 2010–2015 Strategic Plan and further engage stakeholders in developing a strategic plan for the following decade (see afterword). Among these goals was the development of a new visual identity – the Eye Institute of Alberta in October 2015 (see below and afterword). Several new clinical faculty have joined the Department in recent years including: Drs. Heather Burnett (General), Sylvia Chen (Glaucoma), David Ehmann (Retina), Andrew Machuk (General), Travis Pollock (Pediatrics), Jaspreet Rayat (Vision Rehabilitation), Hermina Strungaru (General), and Jessica Ting (General). To encourage closer relationships between eye care specialists including physicians, optometrists, and other eye team members Damji initiated the Inter-Professional Eye Care Forum in 2016.²¹

◀ Dr. Karim Damji, Chair of the Department of Ophthalmology and Visual Sciences (2014–present). Courtesy of Medical Photography, Royal Alexandra Hospital.



A Centre of Excellence in Patient Care

By 2017, the Department had established itself as a centre of excellence providing care in all subspecialties of ophthalmology. The Department had six geographic full-time staff, forty-one clinical faculty members, and an active recruitment campaign for two additional geographic full-time staff as well as a full-time vision scientist.

GEOGRAPHIC FULL TIME:

Professor and Chair Dr. Karim Damji (Glaucoma), Professor Dr. Ordan Lehmann (Glaucoma/Genetics), Professor Dr. Ian MacDonald (Genetics/Pediatrics), Professor Dr. Chris Rudnisky (General/Tele-ophthalmology), Associate Professor Yves Sauvé, PhD (Visual Scientist), Associate Professor Dr. Ezekiel Weis (Orbit/Oculoplastics/Oncology), and Professor Emeritus Dr. Garry Drummond (Pediatrics/Adult Strabismus) who had a part-time teaching position.

CLINICAL FACULTY

Clinical Professors: Dr. E. Anne Macdonald (General) and Dr. Matthew Tennant (Retina). Associate Clinical Professors: Dr. Stanley Chan (Cornea/Uveitis), Dr. David Climenhaga (Cornea/External Eye Disease), Dr. Marianne Edwards (Glaucoma), Dr. Mark Greve (Retina), Dr. Brad Hinz (Retina), Dr. Ernest Hodges (Cornea), Dr. Royce Johnson (Oculoplastics/Orbit/Lacrimal), Dr. Morley Kutzner (Cataract), Dr. James Lewis (Neuro-Ophthalmology), Dr. Dean Mah (Cornea/External Eye Disease), Dr. Carlos Solarte (Pediatrics/Adult strabismus), and Dr. Linda Uniat (Retina). Assistant Clinical Professors: Dr. Chad Baker (Retina), Dr. David Cote (General), Dr. Michael Dorey (Glaucoma/Anterior Segment), Dr. Kenman Gan (General), Dr. Kevin Hennig (General), Dr. Jonathan Heston (Uveitis/Adult strabismus), Dr. Jennifer Hodges (General), Dr. Kam Kassiri (General), Dr. Geoffrey Kaye (General), Dr. Joseph Leong-Sit (Cornea/External Eye Disease), Dr. Natashka Pollock (Pediatrics), Dr. Eulalia Rech (General), Dr. Rehan Riyaz (General), and Dr. Rizwan Somani (Retina). Clinical Lecturers: Dr. Samer Abuswider (Glaucoma), Dr. Jaime Badilla Garcia (Oculoplastics/Orbit/Lacrimal), Dr. Heather Burnett (General), Dr. Audrey Chan (Oculoplastics), Dr. Sylvia Chen (Glaucoma), Dr. Kulbir Gill (Glaucoma), Dr. Andrew Machuk (General), Dr. Travis Pollock (Pediatrics), Dr. Mahta Rasouli (General), Dr. Jaspreet Rayat (Vision Rehabilitation) Dr. Daniel Senekal (General), Dr. Hermina Strungaru (General), and Dr. Jessica Ting (General).²²

Facilities

Regional Eye Centre/ Eye Institute of Alberta - Royal Alexandra Hospital

The Regional Eye Centre, located in the Royal Alexandra Hospital, remained the main site for the Department's offices, clinics, and adult patient services including nine inpatient beds, fourteen day surgery beds, and nineteen cataract chairs. It provides care for patients in Edmonton and northern Alberta and additional consultation services for northeastern British Columbia, northwestern Saskatchewan and the Northwest Territories. However, by 2007 the Regional Eye Centre was in need of expansion and it received part of the proceeds of the Full House Lottery. In order to build towards the future, plans for an extensive redevelopment and expansion of ophthalmology services from 40,000 patient visits per year to over 100,000 were drawn up in 2007. In 2008, it was expected that a new Edmonton Eye Institute with increased space for teaching clinics and resident resources would be built on the grounds of the Royal Alexandra Hospital by 2011. Unfortunately, the changing

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economic situation led to a freeze on the redevelopment and plans for a new institute remained on hold through 2012.²³

Fortunately, the economic situation rebounded and the Royal Alexandra Foundation began a three million dollar fundraising campaign to “improve the patient experience, fund important research, and provide state-of-the-art training facilities at the Regional Eye Centre.”²⁴ On 30 October 2015, the Regional Eye Centre was given a new visual identity as part of the Eye Institute of Alberta. The Royal Alexandra Hospital Foundation launched a campaign to raise more than four million dollars to renovate the Eye Institute of Alberta, including the ophthalmic surgical skills centre opened in 2014 (see below), and provide funding for research. This campaign goal was reached in early 2017. Additional improvements and renovations are planned in the near future (see afterword).²⁵

◀ Underlay - Regional Eye Centre Staff, November 2010. Courtesy of Medical Photography, Royal Alexandra Hospital.



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- ⤴ The Regional Eye Centre is Renamed the Eye Institute of Alberta, 30 October 2015. Courtesy of Ken Dalton, Medical Photography, Royal Alexandra Hospital.
- ⤵ The logo for the Eye Institute of Alberta consists of three eye silhouettes. Each 'eye' represents service and innovation related to the three areas of focus at the Institute: patient care, education and research (see afterword).

Pediatric Ophthalmology and Adult Strabismus Unit - Clinical Sciences Building and Stollery Children's Hospital

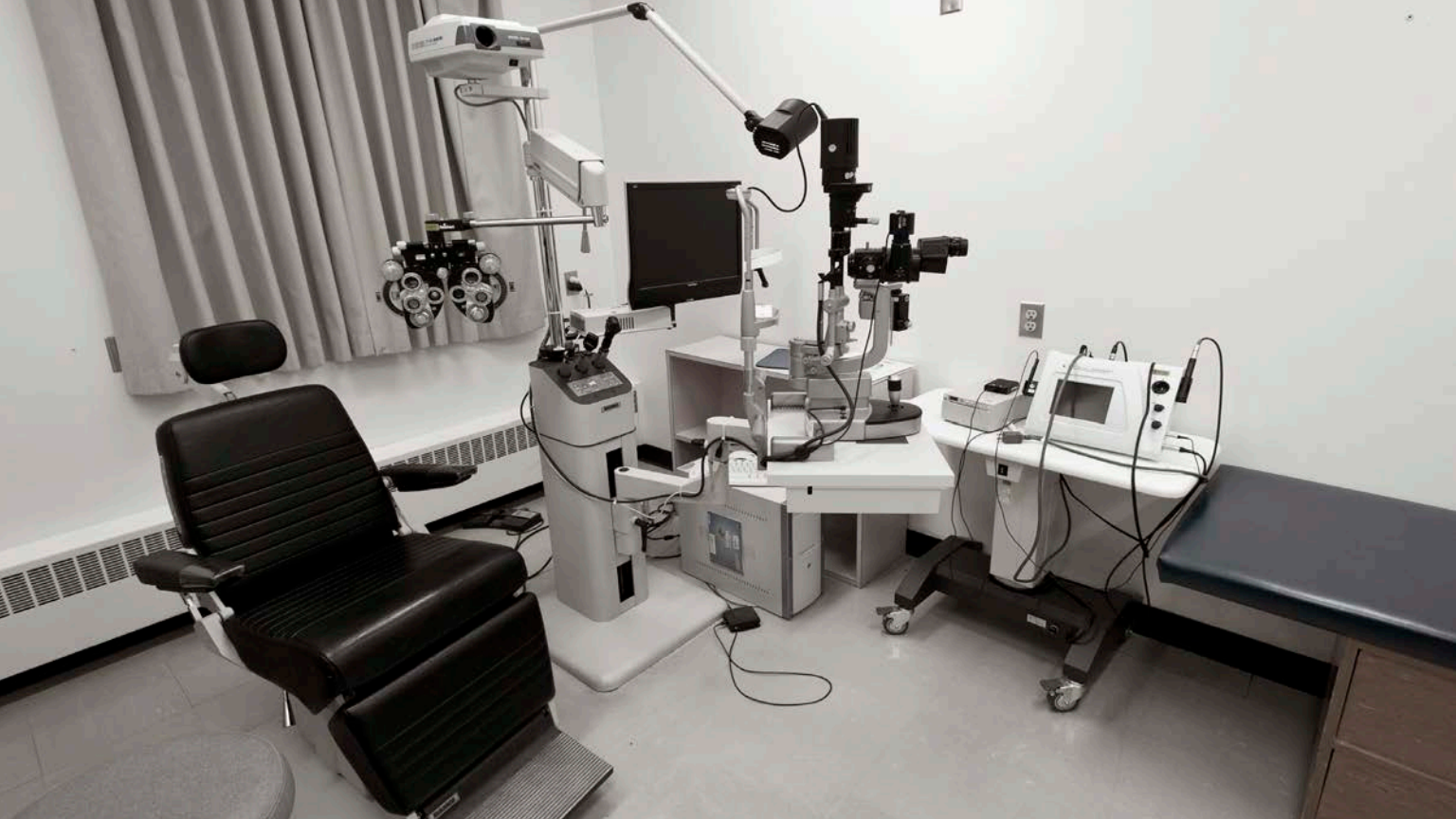
Pediatric Ophthalmology has undergone several changes during the last decade. In 2007, the Pediatric Ophthalmology Clinic in the Clinical Sciences Building underwent a minor renovation following the arrival of Dr. Kourosh Sabri in the fall of 2006. Nonetheless, some of the clinic equipment was original to 1969 when the facility first opened. By 2012, the University of Alberta had decided to reclaim the space in the Clinical Sciences Building where the Pediatric Ophthalmology and Adult Strabismus Unit was located. Plans were made to move the Pediatric Ophthalmology Clinic into the Stollery Children's Hospital within the main Walter C. Mackenzie Health Sciences Centre. This had been something that the Department had hoped would occur since the early 1990s.²⁶

Dr. Carlos Solarte took on the task of overseeing the development of the new Pediatric Ophthalmology Clinic. In December 2014, the old clinic in the Clinical Sciences Building was closed and in January 2015 the new clinic, still in the process of construction, was opened in the Walter C. Mackenzie Health Science Centre. The clinic was furnished with new equipment. It had expanded to nine fully equipped examination lanes, with

three additional testing and procedure rooms, and computer work stations for physicians. In November 2016, the new clinic was dedicated the Stollery Family Day Classic Ophthalmology Clinic. Drs. Garry Drummond, James Lewis, Carlos Solarte, and Natashka Pollock moved their offices from the Clinical Sciences Building into the Edmonton Clinic Health Academy. The division of pediatric ophthalmology surgery remains the same as it has been since regionalization – intraocular and complicated procedures take place at the Royal Alexandra Hospital and extraocular procedures are carried out at the Stollery Children's Hospital.²⁷



⤴ A hospital within a hospital, the Stollery Children's Hospital is located within the Walter C. Mackenzie Health Sciences Centre. Courtesy of the University of Alberta.



Katz Group Centre for Pharmacy and Health Research

Research space has been at a premium for the Department for much of its history. This changed in September 2011, when space for three principal investigators was made available on the seventh floor of the new Katz Group Centre for Pharmacy and Health Research on the University of Alberta campus, adjacent to the hospital complex. This includes wet-bench research space and space for imaging and clinical research and trials. Dr. Ian MacDonald established his lab in this new building and plans were made to recruit additional vision scientists. The clinical research lab was outfitted with a human ERG and a multifocal ERG supplied by Dr. Yves Sauvé. In 2012, a Canadian Foundation for Innovation grant enabled the purchase of a microperimeter, a handheld optical coherence tomography device (to image small animals, including fish), an animal fundus camera and an angiography camera as well as outfitting a clinical exam room.²⁸

- ◀ Pediatric Ophthalmology Examining Room in the Clinical Sciences Building following renovation in 2007. Courtesy of Medical Photography, University of Alberta Hospital.
- ◀ Pediatric Ophthalmology Examining Room in the Walter C. Mackenzie Health Sciences Centre, January 2015. Courtesy of Medical Photography, University of Alberta Hospital.
- ▶ Katz Group Centre for Pharmacy and Health Research, University of Alberta. Courtesy of the University of Alberta.



Education

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Ophthalmic Medical Technologist Training

The Department has always had a strong commitment to providing high-quality education to undergraduate medical students, residents and technical staff. Although the Ophthalmic Medical Technologist Training Program did not receive accreditation in 2005, the Department continues to host students from the Yellowknife Ophthalmic Medical Technologist Training Program who receive additional exposure to subspecialties including pediatrics, oculoplastics, retina, cornea, glaucoma, and refractive surgery at the end of their training. Dr. Ian MacDonald attempted to gain institutional support to restart its Ophthalmic Medical Technologist Training program as a BSc in ophthalmic sciences, but was unsuccessful. Dr. Karim Damji continues to move forward with plans for a new program (see afterword).²⁹

Training and Retaining

By September 1999, the first student was enrolled in the informal ophthalmic medical technologist training program. One student was enrolled per year in the two-year program until 2003. By 2005, the program had successfully graduated four ophthalmic medical technologists who went on to register with the Joint Commission on Allied Health Personnel in Ophthalmology (JCAHPO) association in the United States. Three of the four graduates continue an active role within the community in Edmonton and Calgary.

Undergraduate Medical Education

In 2007, former University of Alberta medical student and Department resident Dr. Chris Rudnisky became Undergraduate Medical Education Director as Dr. Garry Drummond took on the role of Acting Chair of the Department. Ophthalmology was taught as self-directed study within the neurosciences block and students received three, three-hour problem-based teaching and clinical skills education sessions as well. The curriculum for undergraduate medical education was updated in 2014, reducing formal teaching to four hours but leaving the three skills transfer sessions. The Department continues to offer undergraduate medical students from across Canada clinical elective experiences. Dr. Rudnisky was also the Director of the Elective Program from 2007 to 2011 when Dr. James Lewis joined him as Co-Director of Undergraduate Medical Education and became the Director of the Elective Program. Rudnisky and Lewis remain co-directors in 2017.³⁰



- ^
 Dr. Chris Rudnisky, 2003. University of Alberta. Courtesy of Medical Photography, Royal Alexandra Hospital.
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 Dr. James Lewis, 2010. University of Alberta. Courtesy of Medical Photography, Royal Alexandra Hospital.

Residency Training Program

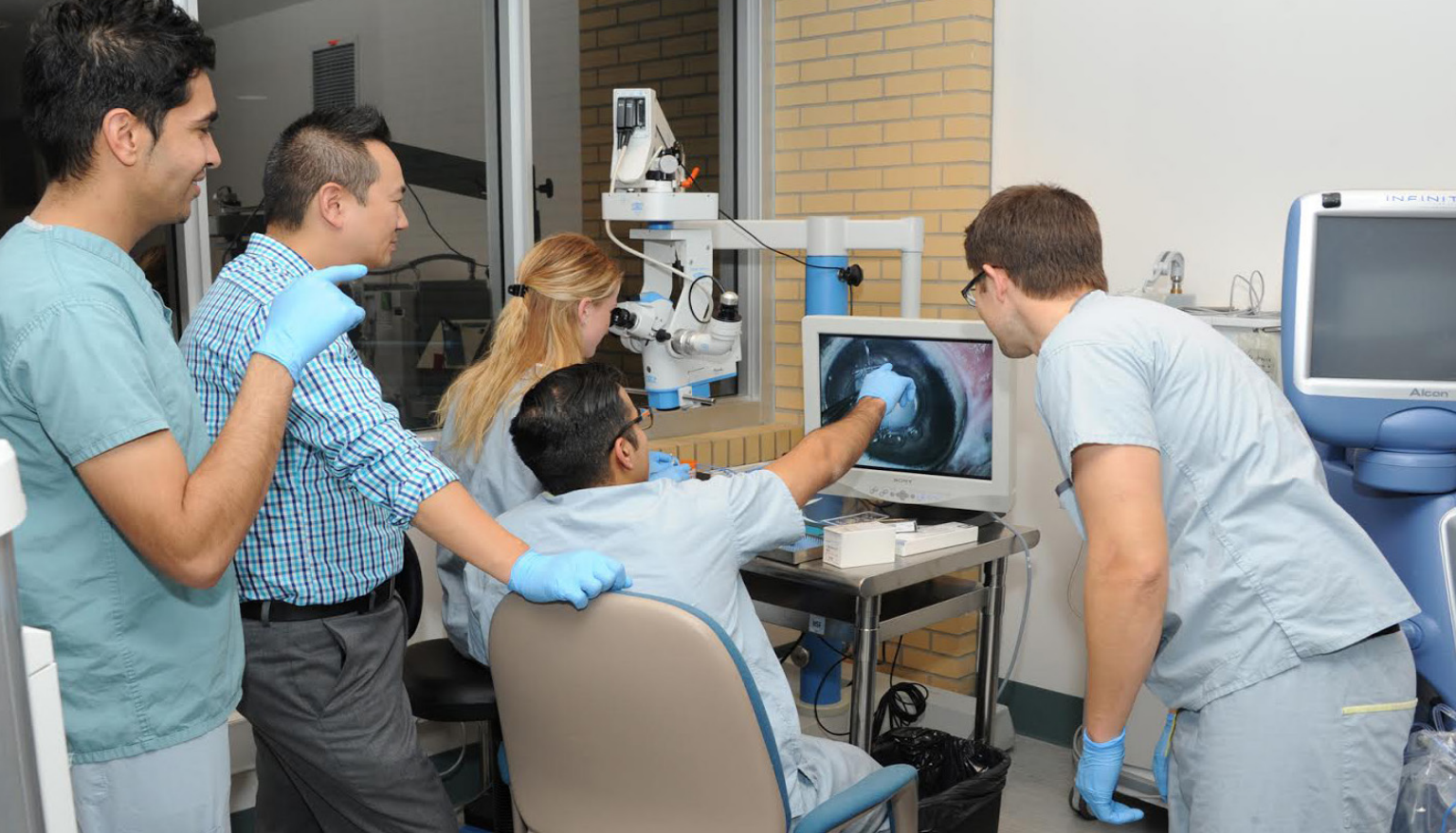
The Department is proud of its long history of resident training (see chapters two and three). The former and current directors take great pride in encouraging the best from their residents, and helping those who are interested to seek fellowship training elsewhere. Dr. Matt Tennant served as Residency Training Program Director from 2005 to 2011. Dr. Marianne Edwards became Director in 2011 and served until 2012. She was replaced by Dr. Karim Damji who served as Director until 2014. Dr. Ian MacDonald served as Acting Director between appointments. In November 2014, Dr. Carlos Solarte and Dr. Marianne Edwards became co-directors of the Residency Training Program. Edwards served through October 2016. Solarte remains Residency Training Program Director in 2017.³¹

In 2007, the Department stopped admitting new residents from the University of Manitoba for training. Instead, a third resident position was made available every few years. Over the last decade, the Residency Training Program has been challenged from time to time by the outsourcing of cataract surgery to private non-teaching facilities, something that the Department has resisted. Intermittent reduction of surgical time at the Royal Alexandra Hospital due to financial restraints has also sometimes occurred. However, the Department has always

fought for sufficient resources for resident training. While many of the Department's instructors have been recognized internally for their outstanding teaching, Dr. Linda Uniat received the national Canadian Medical Association May Cohen Award for Woman Mentors for demonstrating outstanding mentoring abilities in 2010.³²

Over the last decade, the Department has introduced a number of new learning experiences for residents. Resident Glaucoma Day, initiated by Dr. Marianne Edwards in 2008, brings together residents from the University of Alberta and the University of Calgary. Residents from Calgary and Edmonton also learn together at the annual Optics Day Symposium (started by former residents Drs. Kam Kassiri and Ryan Yau) which alternates between Edmonton and Calgary. In 2010, the Department implemented a half-day Resident Appreciation Day during which residents undertook a team building activity. This had become Resident Wellbeing Day by 2013, when residents enjoyed a day that included indoor and outdoor activities away from the Department. Residents also continued to attend the weekend Retina Symposium in Jasper. In 2013, an annual Resident/Staff activity that included family members was instituted.³³

Through electives and research projects residents were encouraged to take part in the Department's long tradition of providing care for individuals in



underserved regions. This included remote regions within northern Alberta and the Northwest Territories as well as abroad. As the Department's global health initiatives expanded, residents became increasingly involved in these international eye health projects – including becoming involved in projects in Ivory Coast, Cameroon and Sierra Leone.^{34 & 35}

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Residents in a cornea teaching session in the Ophthalmic Surgical Skills Centre, October 2014. Courtesy of Medical Photography, Royal Alexandra Hospital.

Ophthalmic Surgical Skills Centre

Since 1977–1978 when the Department first opened its surgical skills laboratory, it has endeavoured to make sure that students had access to the most up-to-date technology for their training.³⁶ This included equipping the laboratory with phacoemulsification equipment and surgical simulators as these became available (see chapter three). The Virtual Retina technology developed by Dr. Chris Rudnisky during his research fellowship was also used to help residents develop their diagnostic skills.³⁷

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"THE IDEA IS TO MIMIC, AS CLOSELY AS POSSIBLE, THE CONDITIONS THAT EXIST IN THE OPERATING ROOM."

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30.5 M

2

-DR. MORLEY KUTZNER

(DESCRIBING THE INTENT OF THE OPTHALMIC SURGICAL SKILLS CENTRE)

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A new surgical simulator, EYESI was acquired by the Department in October 2007. It was only one of three available in Canada at the time and helped to place the Department in a position of leadership in surgical simulation training. The simulator was located in the Department library in Unit 23 at the Royal Alexandra Hospital and was available to students 24/7. "I'd say I've improved 100 per cent" by using the simulator said Dr. Thomas Lee, then a fourth-year resident.³⁸ A study by the Department residents themselves of residents using the surgical simulator in 2007–2008 showed that the skills of both junior and senior residents improved as they spent time practicing with the surgical simulator.³⁹

However, the wet lab used by residents was closed in 2008 due to space constraints at the Royal Alexandra Hospital. Residents attended wet lab sessions at a laboratory on the University of Alberta campus instead, which was not as convenient and lacked the specialized equipment in the original lab. Consequently, the Department made the development of a new wet lab at the Royal Alexandra Hospital a priority. Assembling the funding, material, and space for the new ophthalmic surgical skills centre would take until 2014. The project was spearheaded by Dr. Morley Kutzner with help from the Royal Alexandra Hospital Foundation, private and industry donors. Residents were also able to participate in the planning process.⁴⁰

The ophthalmic surgical skills centre integrates wet lab space with state of the art surgical simulation. It has a virtual reality simulator to assist with cataract and retina surgery, resources to facilitate wet lab surgery, and is currently undergoing a digital upgrade with multimedia resources. The lab contains six work stations each with phacoemulsification machines, surgical microscopes, and a complete set of microsurgery instruments. The flagship Zeiss microscope was donated by Dr. Harold Climenhaga and the phacoemulsification machines and surgical microscopes were donated by individuals and corporations. The renovation and some of the equipment purchases were funded by the Royal Alexandra Hospital Foundation. Residents have 24 hour access to the lab.⁴¹

The ophthalmic surgical skills centre is housed on Station 24 at the Royal Alexandra Hospital which used to be a four-bed patient ward. “The idea is to mimic, as closely as possible, the conditions that exist in the operating room” says Dr. Morley Kutzner.⁴² As well as residents practicing their surgical technique, the



- 1 Resident Dr. Thomas Lee demonstrating the EYESI surgical simulator. Courtesy of Medical Photography, Royal Alexandra Hospital.
- 7 Residents in the ophthalmic surgical skills centre, October 2014. Courtesy of Medical Photography, Royal Alexandra Hospital.

space is used by current surgeons to prepare for complex surgeries. A new curriculum designed for the space began being taught in September 2014. In 2015, the Department committed to maintaining the ophthalmic surgical skills centre as a state of the art facility with funding support from the Royal Alexandra Hospital Foundation. The Foundation committed to raising one million dollars for the ophthalmic surgical skills centre in 2015–2016. In 2017, with funding provided for complete surgical instrumentation trays and artificial eye models for each resident, a strabismus surgery simulation program was developed and initiated by Dr. Drummond.⁴³



- ⤴ Resident Dr. Jessica Ting practices her skills in the ophthalmic surgical skills centre, July 2014. Courtesy of the Royal Alexandra Hospital Foundation.
- ⤵ Dr. Beatrice Wong-Adante, Research Fellow in Tele-ophthalmology, 2009–2010. Courtesy of Medical Photography, Royal Alexandra Hospital.

Fellowship Training Program

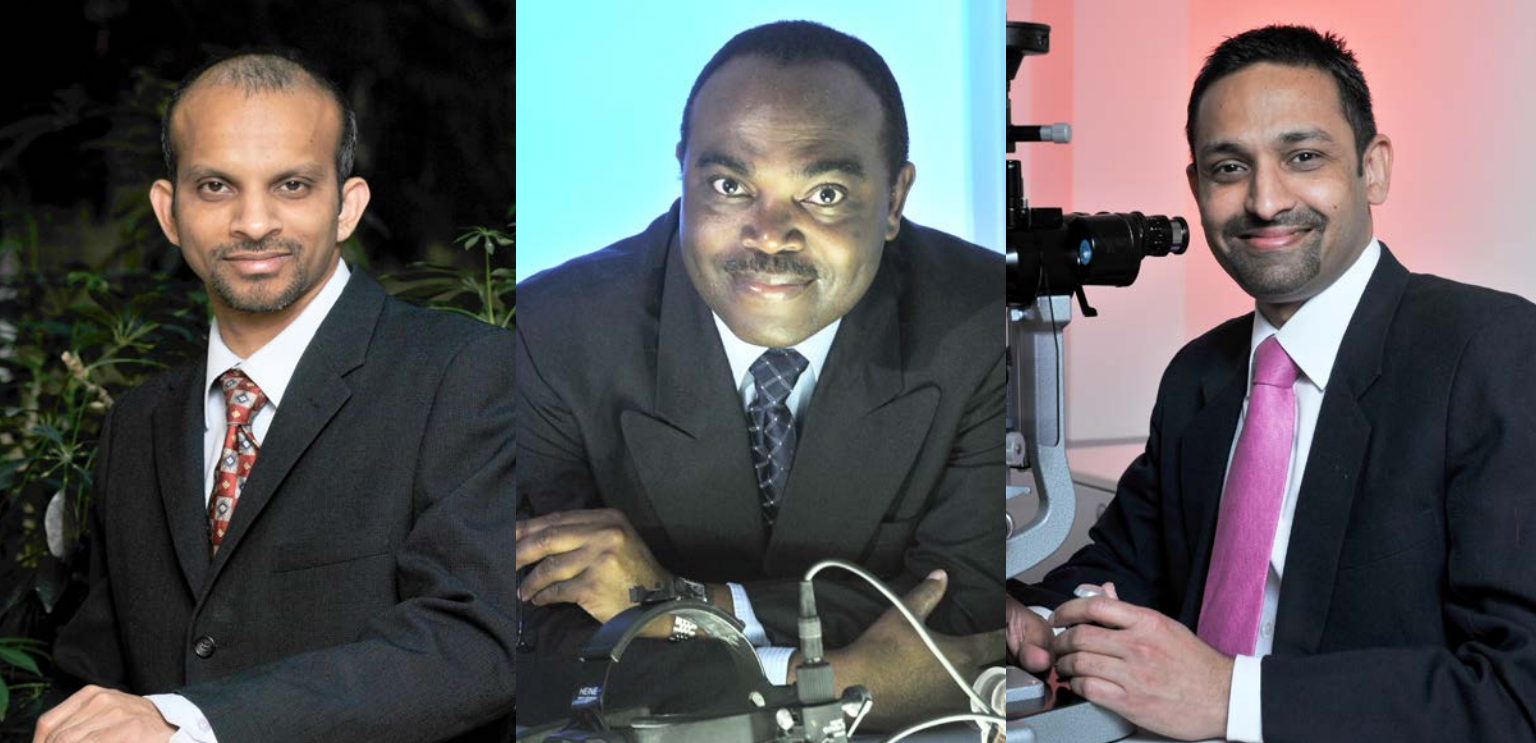
During the last decade, the Department has greatly expanded its fellowship training. Dr. Karim Damji was appointed the Department's first Director of Fellowship Programs in September 2008. In 2012, Dr. Mark Greve became Fellowship Director and remains in that role in 2017. A list of the Department's fellows appears in tables and notes.⁴⁴

From 2009, pre-residency research fellowships began to be offered on a regular basis. Dr. Beatrice Wong-Adante had a research fellowship in tele-ophthalmology from September 2009–May 2010. There have also been three glaucoma research fellows – Drs. Faazil Kassam (2011–2012), Sourabh Arora (2012–2013), and Simrenjeet Sandhu (2016–2017). In addition, Dr. Ioannis (John) Dimopoulos, formerly Dr. Yves Sauv s graduate student, became a research fellow for Dr. Ian MacDonald for three years and was a key figure in the success of the ocular gene therapy trial. For many, the research fellowship has served as a transition to an ophthalmology residency.⁴⁵

By 2009, the Department had grown sufficiently in size and developed the required expertise to begin offering clinical, surgical, and research subspecialty training fellowships. The first three fellows trained in 2009–2010. They were Dr. Tejeswara Vara Prasad Dhupam (clinical fellowship

in medical and surgical retina), Dr. Enitan Sogbesan (clinical and research fellowship in glaucoma), and Dr. Rajat Maheshwari (fellowship in oculoplastic, orbit, and ocular oncology). Two of the fellows were from India. Dhupam (Kakinada, Andhra Pradesh) and Maheshwari (Jalna, Maharashtra) returned to their home provinces to share their expertise upon the completion of their training. Dr. Enitan Sogbesan joined the Division of Ophthalmology at McMaster University as a geographic full-time member in 2010.⁴⁶





Department international fellows were funded through a variety of sources, including Orbis, the International Council of Ophthalmology, personal funds, and funding through the Royal Alexandra Hospital Foundation. Fellows were encouraged to carry out research and presented their findings at Research Day and through publication. They also interacted with residents, instructing them on an informal as well as on a formal basis. Dr. Qi Zhou (Peking Union Medical College Hospital, Beijing, China) became the Department's first clinical and research fellow in ocular genetics in 2010–2011. By 2013, the Department's retina fellowship program entered into the San Francisco Match program.⁴⁷

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As part of the Department's commitment to global health initiatives and providing service in underserved regions, Dr. Karim Damji leveraged a 'sandwich' fellowship program model in glaucoma in 2010 with funding from Orbis, the International Council of Ophthalmology and the Royal Alexandra Hospital Foundation. Damji had helped to develop the 'sandwich' fellowship program at the University of Ottawa in 2006 and brought that expertise with him to the Department.⁴⁸

▲ The Department's first three fellows. From left to right: Dr. Tejeswara Vara Prasad Dhupam, (Clinical Fellow in Medical and Surgical Retina, 2009–2010), Dr. Enitan Sogbesan (Clinical and Research Fellowship in Glaucoma, 2009–2010), and Dr. Rajat Maheshwari (Oculoplastic, Orbit and Ocular Oncology, 2009–2010). Courtesy of Medical Photography, Royal Alexandra Hospital.

The aim of the ‘sandwich’ fellowship model was to build capacity in underserved regions by providing fellows from Africa with both clinical and leadership training in layers using a geographically distributed mode. Fellows would train in Canada and rotate home in turn to share their clinical experience. Faculty from Canada also traveled to Africa to teach and to support the development of glaucoma services at the fellows’ home institution. The ‘sandwich’ fellowships became part of the ‘STOP Glaucoma in Sub-Saharan Africa’ program (see below).⁴⁹

‘Sandwich’ fellowships help to build capacity in underserved regions by providing both clinical and leadership training for individuals with training in both Canada and their home institutions, allowing staff in the developed and developing world to interact and learn from one another and helping to ensure that these highly-trained physicians are enabled to successfully utilize their new skills in their home institutions. Damji stated: “My hope is, by training at least two, three or four individuals in each country, that they can then begin to train their own folks and do their own programming, helping people help themselves.”⁵⁰

Sheila Marco, from Nairobi, Kenya, was the Department’s first ‘sandwich’ fellow. Following training, Marco became one of two glaucoma specialists treating approximately one-and-a-half million

people with advanced glaucoma (Damji trained the first specialist while at the University of Ottawa). Kenya, with a population of thirty-eight million, most of whom live outside of urban area, had only eighty ophthalmologists. Through the fellowship, Marco received training in Edmonton from Drs. Damji, Michael Dorey, Marianne Edwards, and Ordan Lehmann, training in Kenya from Damji, and training with Indian glaucoma specialists at LV Prasad in cataract and pediatric glaucoma.⁵¹

Her time in Edmonton allowed Marco to experience an ideal situation and trained her in several surgical techniques which have lower rates of infection than the one then in use in Kenya. “My training through this sandwich fellowship program has given me more experience and knowledge and more confidence to deal with complicated cases. I have now had experience with different types of glaucoma and learned different ways of managing glaucoma cases” Marco stated.⁵² She went on to conduct a clinical trial comparing two different surgical techniques at the University of Nairobi upon the completion of her fellowship in July 2011. Marco promised: “I’m going to use whatever I’ve gathered here and pass it on to the next generation.”⁵³ During the part of the program where Damji travelled to Kenya to teach he also learned alongside Marco, treating more advanced and challenging cases than were common in Canada. Marco is currently

a lecturer at the University of Nairobi Department of Ophthalmology, Nairobi, Kenya.⁵⁴

Damji next expanded the glaucoma 'sandwich' fellowship to Ethiopia with funding from the Royal Alexandra Hospital Foundation, the International Council of Ophthalmology, Orbis, and the Light for the World foundation. Although three million people in Ethiopia live with glaucoma, only three of the country's one hundred ophthalmologists were glaucoma specialists. In November 2011, Dr. Fisseha Ayele (Gondar, Ethiopia) arrived in Edmonton to begin training to become Ethiopia's fourth glaucoma specialist. During the first part of the program Ayele trained with Drs. Edwards, Damji, and Dorey. Then Drs. Damji and Dorey travelled to Gondar, Ethiopia where they provided mentorship in Ayele's home institution, the University of Gondar. Ayele completed fellowship training in 2013 and is currently an Assistant



Professor of Ophthalmology and head of the Department of Ophthalmology and the glaucoma clinic at the University of Gondar. Dr. Girum Gessesse was another beneficiary of the glaucoma 'sandwich' fellowship program. He commenced training in 2012 and returned to teach at Jimma University becoming the fifth glaucoma specialist in Ethiopia. He is currently teaching at St. Paul's Millennium Medical College in Addis Ababa, Ethiopia.⁵⁵

"I'M GOING TO USE
WHATEVER I'VE
GATHERED HERE AND
PASS IT ON TO THE
NEXT GENERATION."

-DR. S. MARCO

- ◀ Dr. Sheila Marco, 'Sandwich' Fellow in Glaucoma (2010–2011). Courtesy of Medical Photography, Royal Alexandra Hospital.
- ▶ Optician Murray Scambler and then Program Manager Karr-Ming Lee at the November 2008 Night for Sight Event. Courtesy of Medical Photography, Royal Alexandra Hospital.

Research

The Department conducts research in ocular genetics, tele-ophthalmology, ocular brachytherapy, patient-care outcomes, clinical trial research, and supports global ophthalmology research. Since May 2008, Dr. Yves Sauvé has served as the Director of Research for the Department. The Department's research work has been generously supported by grants and donations from the government, community associations, individuals, industry, and non-profit foundations. Some of these relationships are relatively new while others are of long standing. In 2016, the Philippine Bayanihan Association of Alberta donated \$150,000 to the Department. The many Lions Club chapters in Edmonton and northern Alberta, the Lions Club International Foundation, and the Odd Fellow Rebekah Research Foundation have had a relationship with the Department that spans decades, and their funding has enabled the purchase of important equipment for research and patient care.⁵⁶

Former patients have also been important donors. After receiving treatment for retina issues and cataracts by Drs. Brad Hinz and Stanley Chan, Edmonton businessman Cal Nichols and his wife Edna became supporters of the Department.

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In 2015 they funded the Cal Nichols Ophthalmology Endowment to support resident training (see tables and notes).⁵⁷ To thank donors and supporters of the Department, Karr-Ming Lee, the Program Manager of Ophthalmology at the Royal Alexandra Hospital, organized 'Night for Sight' events.⁵⁸

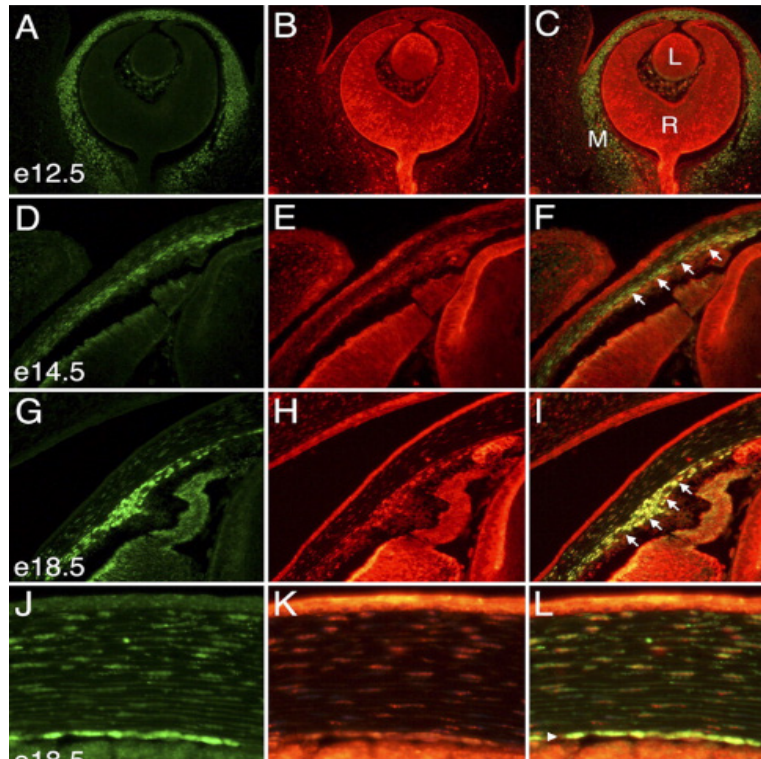


In 2010, the Department, in partnership with CFI and AB Enterprise and Advanced Education, adopted the fundraising model of the U.S. Foundation Fighting Blindness. Chair Ian MacDonald and Crown prosecutor Mark Huyser-Wierenga hosted 'Out of Sight' fundraisers for vision research in restaurants where diners ate in conditions that simulated low vision. These Gala events, held in 2010, 2011, 2012, and 2014, helped to raise funds to outfit translational research space at the University of Alberta.⁵⁹

The Royal Alexandra Hospital Foundation has been particularly notable in its funding of research in the Department. The Department received research funding through the Foundation from the Full House Lottery in 2006–2007. Beginning in 2010, the Royal Alexandra Foundation worked with the Department to develop a Research Chair in Ophthalmology at the Royal Alexandra Hospital. Some of the proceeds from the 2011 Full House Lottery went towards the endowment and, in July 2013, the Royal Alexandra Foundation Chair in Ophthalmology was established.⁶⁰



“Expression of PITX2 and PAWR during eye development. Transverse views of an e12.5 eye (*A–C*), iridocorneal angles from e14.5 (*D–F*), and e18.5 (*G–I*) eyes and central cornea from e18.5 eye (*J–L*) are shown. Sections were co-immunostained to detect PITX2 (*green*) and PAWR (*red*). L, lens; R, retina; M, periorcular mesenchyme. *Single-headed arrows* (*F* and *I*) indicate mesenchyme within the emerging iridocorneal angle; the *single-headed arrow* in *L* denotes the corneal endothelium, and the *double-headed arrow* spans the corneal stroma.”
Figure 6 from Moulinath Acharya et al., “Human PRKC Apoptosis WT1 Regulator Is a Novel PITX2-interacting Protein That Regulates PITX2 Transcriptional Activity in Ocular Cells,” *The Journal of Biological Chemistry* 284 no. 50 (Dec 2009): 34829–34838.



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**Basic Science Research
Michael Walter, PhD**

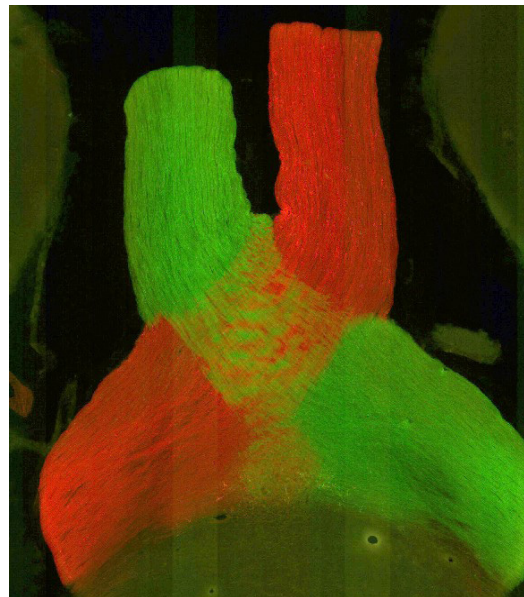
In 2005, Michael Walter became Chair of the Department of Medical Genetics and changed his appointment to an adjunct one in the Department of Ophthalmology. His lab uses biochemistry, cell biology, and computer modeling to create predictive models of *FOXC1* and *PITX2* and their roles as transcription factors. His main project continues to be the study of *FOXC1*, its function as a transcription factor and examining how mutations in *FOXC1* cause disease. He is also exploring possible pathways to enhance therapeutic

treatments. The lab also continues to study the *PITX2* transcription factor, identifying the genes that it regulates, and examining how mutations in *PITX2* lead to disease. Walter continues to collaborate with Dr. Ordan Lehmann on the study of Axenfeld-Rieger Syndrome and they have recently begun to work on pigmentary glaucoma.⁶¹

Electrophysiology

Yves Sauvé, PhD

Yves Sauvé and his lab have continued their research with *ELOVL4* transgenic mouse models. He has developed a core facility of mouse models to phenotype retinal disorders. With funding from a grant from the Alberta Heritage Foundation for Medical Research, he conducted a study which showed that dietary supplementation with docosahexaenoic acid (DHA) slows the progression of retinal degeneration in the mouse model. Since this mouse model may be analogous to age-related macular degeneration in humans, he has built on this research and, with funding from the Canadian Institutes of Health Research, undertaken a preliminary human trial of DHA supplementation in patients with wet and dry macular degeneration. Sauvé has also begun a research program using the Nile rat model for diabetic retinopathy. He has identified changes which occur prior to damage to the retina. His lab is looking for the trigger to this cascade of changes in order to prevent the damage and to look for possible protective medications.⁶²



Photomicrograph representation tracing the visual projections from the left and right eye of the Nile grass rat, an animal model of human vision. Courtesy of Dr. Yves Sauvé.

Clinical Research

In the last decade members of the Department have been engaged in a number of clinical research projects. A systematic review conducted in collaboration with the School of Public Health supported the notion that tele-ophthalmology for diabetic retinopathy and age-related macular degeneration was as effective as in-person examination and potentially increases patient participation in screening. Drs. Chris Rudnisky and Matt Tennant have continued to develop tele-ophthalmology care in remote regions. In conjunction with colleagues at the National Institutes of Health and the University of Tennessee, Dr. Matt Tennant explored the development of automated screening for diabetic retinopathy.⁶³

Dr. Karim Damji spearheaded a study which proved that digital photography was just as accurate as film photography for the diagnosis of glaucoma. He also conducted another study which compared the cost-effectiveness of tele-glaucoma and traditional hospital-based consultation. This research project helped the development of the Department's tele-glaucoma program (see below). A randomized controlled surgical trial was carried out by Dr. Karim Damji, resident Dr. Jessica Ting and Dr. Chris Rudnisky in which they compared standard trabeculectomy surgery with minimally invasive surgery using Trabectome. He and resident Dr. Jessica Ting also conducted a

study which showed the usefulness of this new device in the treatment of exfoliation glaucoma.⁶⁴

Dr. Ezekiel Weis conducted epidemiological studies on temporal arteritis, intra-ocular and ocular adnexal tumours, and developed seminal guidelines for the diagnosis, treatment, and follow-up of uveal melanomas. Dr. Michael Dorey has been involved in a number of studies involving minimally invasive glaucoma surgery such as comparing cataract surgery with iStent to cataract surgery with Trabectome.⁶⁵

The increased utilization of the Regional Eye Centre – originally designed for 12,000 patients a year, but seeing 43,000 patients per year by 2010 – meant that space for conducting clinical research was limited. The opening of the Katz Group Centre for Pharmacy and Health Research in September 2011 made new clinical and basic science research space available to the Department (see above). Dr. Ioannis (John) Dimopoulos, utilized this new space, first as Dr. Sauv e's MSc student in his clinical translational research on DHA supplementation and wet age-related macular degeneration, and later as Dr. MacDonald's research fellow on the choroideremia gene therapy research trial (see below).⁶⁶

Ocular Genetics

Dr. Ian MacDonald

Over the last decade, ocular genetics has remained one of the major subjects of research in the Department. This research has basic science, clinical and translational aspects. Ocular genetics clinics have been run by the Department since the arrival of Dr. Bill Pearce in 1971 (see chapters two and three). Following his return to Edmonton in 2009, Dr. Ian MacDonald offered ocular genetics clinics in both Edmonton and Calgary. However, he soon stopped travelling to Calgary for clinics and worked with genetics counselors in both Calgary and Edmonton to review patient files and results. Because the Department has the personnel, ERG equipment, and expertise to diagnose ocular genetics disorders, it receives patients from Manitoba, Saskatchewan, and British Columbia.⁶⁷

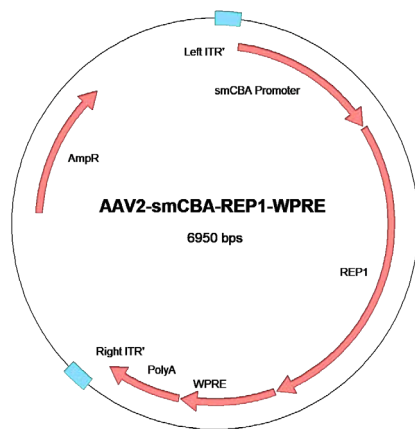
On his return to Edmonton, Dr. Ian MacDonald continued his research in examining the genotype and phenotype of choroideremia. The development of gene therapy treatment for Leber congenital amaurosis using an adeno-associated viral vector – first in animal and then in human trials – suggested that a similar treatment for choroideremia might be possible. Such a treatment would require the development of a viral vector containing a copy of the functioning gene. The virus would be surgically implanted beneath the retina which would absorb the vector, incorporate

the new DNA, and hopefully manufacture the protein.⁶⁸

MacDonald realized that creating the vector in Edmonton would not be possible. MacDonald reached out to colleague Dr. Miguel Seabra MD PhD of the Molecular and Cellular Medicine Section, Imperial College London. Seabra had developed the first mouse model for choroideremia. Seabra and ophthalmologist Dr. Robert MacLaren MB ChB DPhil FRCOphth FRCS from the Nuffield Department of Clinical Neurosciences at the University of Oxford co-developed a genetic therapy for choroideremia which utilized deactivated adenovirus as a means to deliver a functional copy of the choroideremia gene into retinal cells. In 2011, the first patient was treated as part of a multi-centre clinical trial of the use of this vector as a treatment for choroideremia. In January 2014, MacLaren and Seabra reported that the six patients who had received the replacement gene as part of the trial had seen improvements in their vision and recommended that the therapy continue to be assessed.⁶⁹

The Alberta Ocular Gene Therapy Team was constituted in 2011. They applied for and won, in February 2012, a five-year grant for proposals for Emerging Teams from the Canadian Institutes for Health Research which had partnered with the Choroideremia Research Foundation Canada, Inc. and the Foundation Fighting Blindness. The goal was to begin a

Phase 1 (safety) gene therapy trial for choroideremia, a heritable ocular condition that predominantly affects males. The Team also applied for funding from the Canadian Foundation for Innovation with matching support from local fundraising ('Out of Sight' events) and Alberta Advanced Education and Technology (now Alberta Economic Development and Trade). Key equipment was purchased to outfit a translational research laboratory for clinical research in the Katz Group Centre for Pharmacy and Health Research (see above).⁷⁰



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Initially, the Team was comprised of staff from three University of Alberta laboratories: Ian MacDonald and graduate student Paul Freund (Department of Ophthalmology), Elena Posse de Chaves (Department of Pharmacology), and Yves Sauvé (Departments of Ophthalmology and Physiology) with Tania Bubela and her graduate student Shelly Benjaminy (School of Public Health), and Gary Goldsand (an expert in ethics). Two vitreo-retinal surgeons were added, Drs. Matt Tennant and Rizwan Somani, who travelled to Oxford to learn the surgical technique used to insert the viral vector underneath the retina in the English trial. A genetic counsellor, Stephanie Chan (now Hoang), Stephanie Kowal (a researcher in knowledge translation), and two clinical fellows (Dr. Ioannis Dimopoulos and Dr. Manlong Xu) also joined the Team.⁷¹

r Viral Vector used for the Choroideremia Gene Therapy Trial in 2015. Courtesy of Dr. Ian MacDonald.



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In 2013, MacDonald and the Alberta Ocular Gene Therapy Team received additional funding from Alberta Innovates-Health Solutions to conduct the clinical trial. A close collaboration was established with Dr. Robert MacLaren of the University of Oxford to acquire a vector to introduce the replacement choroideremia gene into the eye. TEC Edmonton's John Simon was particularly helpful in navigating the authorization from Health Canada for importation of the vector from Children's Nationwide Hospital in Columbus Ohio where it had been manufactured. Enough viral vector was made available to treat six individuals. Volunteer participants were recruited for the trial. Alberta Health Services provided permission for the surgery to occur at the Royal Alexandra Hospital.⁷²

In May 2015, the first two patients underwent the experimental surgery in which the vector with a working copy of the CHM gene was placed underneath the retina in the Ophthalmology operating room at the Royal Alexandra Hospital. Six individuals received the viral vector over a six week period. This trial was the first of its kind in Canada and only the second in the world to undertake an experimental treatment on patients with choroideremia. The patients who received the experimental therapy were followed over a two-year period ending in 2017. The results of the clinical trial will be published in the near future.⁷³

Ocular Genetics

Dr. Ordan Lehmann

Over the last decade, Dr. Ordan Lehmann has continued to carry out research into ocular genetics, concentrating on the genetic causes of glaucoma. His lab studies the function of *FOXC1* and *PITX2* and the role that mutations in these transcription factors have in causing a variety of diseases. Lehmann has a particular interest in how very small deletions and duplications within human chromosomes lead to disease. Using pediatric ocular genetics disorders, Lehmann's lab has explored the role of copy number variation in ocular development and glaucoma. He has discovered new phenotypes of Axenfeld-Rieger Syndrome, which cause pediatric glaucoma and central nervous system abnormalities. Lehman has also studied how the environment interacts with genetics in ocular diseases, and has integrated human and zebrafish genetic techniques in an animal model for the study of ocular genetics. Lehmann was the University of Alberta's Canada Research Chair in Glaucoma from 2004 to 2014.⁷⁴

r Dr. Ian MacDonald (standing) observes Dr. Rizwan Somani (seated) performing retinal gene therapy surgery, May 2015. Courtesy of Ken Dalton, Medical Photography, Royal Alexandra Hospital.

Team to Prevent Blindness / Alberta Vision Net

Dr. Lehmann is a strong believer in the value of translational and collaborative research. In 2008, he initiated the Team to Prevent Blindness. This interdepartmental and interdisciplinary team at the University of Alberta investigated ocular disease using clinical, genetic, molecular, and physiological approaches. Team members came from a variety of departments and included: Ordan Lehmann (Ophthalmology and Medical Genetics) as Team Leader, Mike Walter (Medical Genetics and Ophthalmology), Joe Casey (Biochemistry), Yves Sauvé (Ophthalmology and Physiology), Ted Allison (Biological Sciences and Medical Genetics), Andrew Waskiewicz (Biological Sciences), Ian MacDonald (Ophthalmology), and David Eisenstat (Pediatrics and Medical Genetics).⁷⁵

In 2014, the Team to Prevent Blindness transitioned into Alberta Vision Net, spearheaded and chaired by Lehmann. This province-wide initiative brought together researchers from more than ten departments at the University of Alberta and the University of Calgary and encourages links between clinical and basic science researchers from a variety of fields. The three major objectives of Alberta Vision Net are: “To foster fundamental and translational research to improve understanding and treatment of disease,” to

“Explore high impact novel research ideas, that offer the realistic prospect of fresh therapeutic approaches” and to “Provide a rich cross-disciplinary environment and so offer outstanding training for fellows, residents and students.”⁷⁶ Alberta Vision Net hosts visiting speakers throughout the academic year and holds an annual AVN Research Day.⁷⁷ Funding is offered through the Catalyst Research Grant program that provides seed funding to “studies that offer the prospect of advancing scientific understanding and or improving patient care.”⁷⁸

Patient Care

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Regional Eye Centre/ Eye Institute of Alberta - Royal Alexandra Hospital

Over the last decade, the Royal Alexandra Hospital has been home to the academic program and adult clinics of the Department. Known until October 2015 as the Regional Eye Centre, it provided tertiary care in all subspecialties for a population of almost four million people in a region covering Edmonton, central and northern Alberta, as well as the other Prairie Provinces, British Columbia, and the Northwest Territories with pediatric ophthalmology centred at the Stollery Children's Hospital on the University of Alberta Campus. Occasionally patients from the United States and elsewhere in the world would travel to Edmonton to take advantage of the Department's expertise in ocular genetics and visual physiology.⁷⁹

By 2009, the Regional Eye Centre had become a centre of excellence for patient care. As Dr. Matt Tennant put it:

"I BELIEVE THAT THE STRENGTH OF OUR DEPARTMENT LIES IN ITS MEMBERS. OUR STAFF OPHTHALMOLOGISTS ARE INCREDIBLE BOTH IN TERMS OF CLINIC AND SURGICAL SKILLS AND IN THE FACT THEY ALL PARTICIPATE IN THE TEACHING OF RESIDENTS AND MEDICAL STUDENTS. THE NURSES ON STATION 22 AND IN THE OPERATING ROOM ARE EXCEPTIONAL. AS A STAFF OPHTHALMOLOGIST I AM SO VERY THANKFUL THAT WE HAVE ACCESS TO THIS INCREDIBLE RESOURCE FOR OUR PATIENTS. THE CLINIC STAFF ARE EXCELLENT, GOING OUT OF THEIR WAY TO HELP PATIENTS WHEN IN NEED"⁸⁰



Originally designed for 12,000 patients per year, the Regional Eye Centre was operating at more than three times that capacity by 2009, treating more than 40,000 patients per year with the number of patients seen increasing annually. The Department's community-based ophthalmologists and geographic full-time staff provided a full range of services and subspecialties from general ophthalmology and cataract surgery to anterior segment, cornea, glaucoma, low vision, neuro-ophthalmology, ocular genetics, orbit and oculoplastics, pediatric ophthalmology, retina, uveitis, and visual electrophysiology.⁸¹

The Royal Alex Vision Centre, which provided standard glasses and contacts as well as low vision aids, was closed in

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August 2011 after twelve years. The space was reincorporated into the Eye Clinic in order to develop a retinal imaging centre. With the development of better treatments for age-related macular degeneration, the number of patients utilizing the Low Vision Clinic began to decline. Dr. James Lewis ran the clinic until it closed in June 2014.⁸²

The Outpatient Eye Clinic, with five patient care areas, remains on the main floor of the Active Treatment Centre of the Royal Alexandra Hospital (Room 1111) which is where the patient clinics, most subspecialty clinics, and eye emergency clinics are held. The Glaucoma Clinic remains on the second floor in Unit 22 (Room 2212). With all subspecialties represented in the Eye Clinic, patients presenting with ophthalmic

emergencies like retinal tears are able to be diagnosed and treated promptly, providing excellent patient care. In 2016, Alberta Health Services Improvement Way provided consultation on improving workflow in the Eye Clinic in preparation for future renovations.⁸³

The surgery unit remains located in Unit GB1 on the lower level of the Active Treatment Centre. The close relationship forged between surgeons, nurses, and support staff following regionalization has resulted in what operating room nurse Janice Hengsbach calls “champagne treatment” for patients.⁸⁴ Patient Care Manager Bonnie Kissick was a key factor in this success – galvanizing team members and ensuring that patients were always put first and that there was timely access for emergency and elective surgery. As patient demand has increased over the last decade so too has the number of surgeries. By 2015, the Department was performing 10,761 day surgeries and 2,098 inpatient surgeries at the Royal Alexandra Hospital per year.⁸⁵

The inpatient unit remains located in Unit 22 on the second floor of the Royal Alexandra Hospital. Nurses in the unit work in close collaboration with the operating room to prepare patients for day surgery and provide care for inpatients. After hours and on the weekend patients presenting with ophthalmological emergencies are treated by residents and ophthalmologists in Unit 22.⁸⁶

The number and type of surgeries carried out fluctuates according to the hospital budget and targeted government initiatives. During periods of fiscal restraint, the number of operating room hours available to the Department decreases (see above). This also has the effect of increasing waiting lists. In order to decrease the time patients wait for surgical treatment, the government periodically increases the funding for specific surgeries like cataract removal (in 2010, 2011, and 2016) and corneal transplants (in 2015).⁸⁷

 Regional Eye Centre Staff, September 2007. Courtesy of Medical Photography, Royal Alexandra Hospital.



Pediatric Ophthalmology Clinic - Clinical Sciences Building and Stollery Children's Hospital

Since regionalization, pediatric ophthalmology care has been concentrated at the Stollery Children's Hospital on the University of Alberta Campus. Pediatric ophthalmology surgeries were split, with the majority of extraocular surgeries taking place at the Stollery while complicated and intraocular surgeries are carried out at the Royal Alexandra Hospital.⁸⁸

There have been many changes in pediatric ophthalmology over the last decade. Dr. Kourosh Sabri who joined the Department as a geographic full-time member in 2006 relocated to McMaster University in Hamilton ON in 2009. Dr. Ian MacDonald rejoined the Department in 2009. In 2012, the Department recruited Dr. Carlos Solarte as a clinical faculty member and Dr. Stephanie Dotchin as a geographic full-time faculty member. Solarte, who was born and trained in Columbia, undertook fellowship training in pediatric ophthalmology and strabismus at the University of Toronto

Unit 22 Staff, September 2007. Courtesy of medical photography, Royal Alexandra Hospital.

Regional Eye Centre Operating Room Staff in Operating Room 2, Royal Alexandra Hospital, September 2007. Courtesy of Medical Photography, Royal Alexandra Hospital.

Hospital for Sick Children. Following subspecialty training, Solarte worked as a pediatric ophthalmologist in Columbia and Saudi Arabia, and Medical Director of Orbis International. Dotchin had undertaken fellowship training at Moorfields Eye Hospital in London, UK, and a pediatric ophthalmology fellowship at the Children's Hospital of Philadelphia before joining the Department. Dotchin relocated to Calgary in 2013.⁸⁹

Dr. Garry Drummond, the Department's senior pediatric ophthalmologist, began winding up his practice in 2012 and retired from full-time work and medical practice at the end of August 2013. Solarte became the lead in the Pediatric Ophthalmology Service in August 2013. In 2014, Dr. Natashka Pollock was recruited to the Department as a clinical faculty member. Pollock received her BSc, MSc, and MD/PhD (Neuroscience) from the University of Calgary before undertaking her residency in ophthalmology at the University of British Columbia and fellowship training in pediatric ophthalmology at Royal Children's Hospital, Melbourne, Australia. Pediatric ophthalmology clinics were also run by Drs. E. Anne Macdonald, Kam Kassiri, Jennifer Hodges and Mahta Rasouli. Dr. James Lewis continues to run neuro-ophthalmology clinics.⁹⁰

Orthoptists have always played an important role in the running of the Department's Pediatric Ophthalmology Clinic since its inception in 1960 (see chapter two). Candace Bryant-Spraakman, a graduate of the Department's Orthoptic Training Program, retired from the role of Chief Orthoptist in 2011. The current Chief Orthoptist is Brad Wakeman. At the end of December 2014, the Pediatric Ophthalmology Clinic, which had been located on the second floor of the Clinical Sciences Building since 1969, closed. It opened again in January 2015 in newly outfitted and expanded quarters in the Stollery Children's Hospital in the Walter C. Mackenzie Health Sciences Centre. Funds for the new clinic were provided, in part, by the Stollery Family Day Classic. Following the development of the new clinic Solarte felt that patients would "be seen with the highest standard that we have in the world. ... We have become a centre of excellence for Northern Canada."⁹¹ In November 2016, the new clinic was dedicated the Stollery Family Day Classic Ophthalmology Clinic.⁹²



**"WE HAVE BECOME A
CENTRE OF EXCELLENCE
FOR NORTHERN CANADA."**

-DR. CARLOS SOLARTE

(DESCRIBING THE PEDIATRIC
OPHTHALMOLOGY CLINIC POST RENEWAL
IN JANUARY 2015)

- ◀ Orthoptist Brad Wakeman examines a patient in the new Pediatric Ophthalmology Clinic in the Stollery Children's Hospital, Walter C. Mackenzie Health Sciences Centre. Courtesy of Medical Photography, University of Alberta Hospital.
- ▶ Dr. Ezekiel Weis performing brachytherapy surgery to treat ocular melanoma at the Cross Cancer Institute, September 2017. Courtesy of Wendy Read, Brachytherapy, Cross Cancer Institute.

Ocular Oncology

In 2008, Dr. Ezekiel Weis, a former resident, returned to the Department as a geographic full-time faculty member (Orbit/Oculoplastics/Oncology). Weis chose ophthalmology after taking an elective in the subject as a University of Calgary medical student. As a resident at the University of Alberta, Weis developed an interest in ocular oncology when he saw eye cancer patients being sent to Toronto because it was the closest centre of excellence. Determined to make these treatments available here in Alberta, Weis undertook extensive fellowship training at the University of Ottawa (oculoplastics and orbit), University of British Columbia (orbital disease), and the National Medical Centre, Amsterdam, Netherlands (orbital disease) in addition to an observership in ocular oncology at Wills Eye Hospital, Philadelphia.⁹³



Unfortunately, funding which had been earmarked for the development of the eye cancer program was withdrawn because of the 2008 financial crisis. After three years of lobbying for funding, the Ocular Brachytherapy Program started at the Cross Cancer Institute in Edmonton with the first patient receiving surgery 31 October 2011. The technique surgically places a small gold disk in which ‘seeds’ of plastic and silicone coated radioactive iodine have been embedded on the wall of the eye. This allows the cancer to be selectively irradiated while minimizing damage to surrounding tissues. After about a week of radiation treatment the implant is surgically removed.⁹⁴

The program is a prairie resource, treating patients from Manitoba and Saskatchewan as well as Alberta who might otherwise have travelled to Toronto or Philadelphia for treatment. The Alberta Cancer Foundation provided \$235,000 for the equipment and the first year’s operational expenses. The program has since been funded by Alberta Health Services. Ken Hughes, the Alberta Health Services Board Chair says of the program “Not only are patients and their families better off but this will create a centre of excellence right here in Alberta, ensuring patients for years to come will benefit from the knowledge and expertise we are amassing.”⁹⁵

The Success of Ocular Brachytherapy in Alberta

By 2017, the Ocular Brachytherapy Program had treated approximately 250 patients and was the second busiest program in Canada. Rather than traveling to Toronto, patients from the province of Alberta, northern British Columbia, Saskatchewan, parts of Manitoba and the Northwest Territories are able to receive treatment in Edmonton instead. The early results were outstanding, with no recurrences of cancer and with 99% of patients keeping their eyes following treatment.⁹⁶



- ◀ Pill box used to prepare the radioactive plaque for ocular brachytherapy. Courtesy of Wendy Read, Brachytherapy, Cross Cancer Institute.
- ▶ Dr. Matt Tennant using 3-D glasses to assess digital fundus photographs in the tele-ophthalmology room, November 2008. Courtesy of Medical Photography, Royal

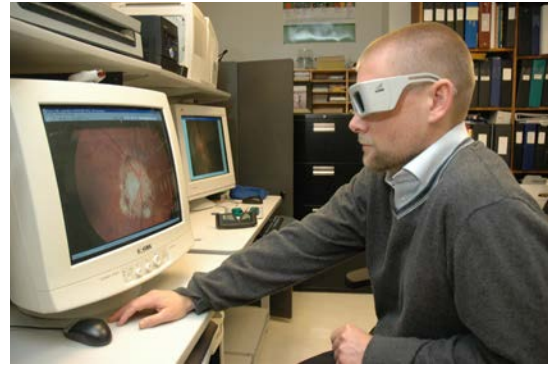
Providing Care to Underserved Populations

④

Tele-ophthalmology Initiatives

Over the last decade the Department's tele-ophthalmology program has continued to grow and adopt new technologies. Over 25,000 patients have been served since the program began in 2000, and the number screened using tele-ophthalmology increases annually. The program now serves all First Nations and Métis communities in Alberta through mobile units as well as Edson, Fort McMurray, High Level, Lac La Biche, and the Northwest Territories. The use of tele-ophthalmology means that only a small number of individuals are required to travel to Edmonton for follow up care. In 2008 the tele-ophthalmology team (Dr. Mark Greve, Dr. Matt Tennant, Dr. Chris Rudnisky, Chris Tennant and Jayson Eppler) received a Canadian Institutes of Health Research National Knowledge Translation Award for their outstanding efforts to bring better eye care to rural Canadians.⁹⁷

The program has grown from utilizing stereoscopic digital photographs to incorporate additional diagnostic imaging technologies like optical coherence



tomography (OCT), Heidelberg retina tomography (HRT), and visual fields. It has also moved beyond merely screening for diabetic retinopathy to being used to screen for glaucoma (from January 2007) and as a reporting system for ocular genetics (from 2003 to 2016).⁹⁸

The tele-glaucoma program was developed as one in which glaucoma specialists from the Department worked in conjunction with optometrists to provide patient care. Patients saw their optometrist as their front-line ophthalmic health care provider. The optometrist collected and upload patient information into the tele-ophthalmology system for grading by glaucoma specialists. Only 10-15% of patients would need to see an ophthalmologist for follow-up care while the rest could be managed by their optometrist.⁹⁹

Dr. Ezekiel Weis successfully lobbied for funds from Alberta Health Services to create a tele-oncology program and a provincial eye cancer image database that could be accessed in any physician's office. The funding supported the purchase and maintenance of computers for the physician exam lanes in the Outpatient Clinic at the Royal Alexandra Hospital. Weis adopted the 'synergy' system to store and view digital images. Synergy was already in use at the Rockyview General Hospital and was implemented at the Outpatient Eye Clinic at the Royal Alexandra Hospital in spring 2012. Dr. Weis uses it for the province-wide Ocular Brachytherapy Program. His research has demonstrated that it is a safe and reliable method for following many types of intra-ocular lesions. It dramatically reduces wait times and subsequently improves access to care.¹⁰⁰

The Department's tele-ophthalmology program continues to provide training to technicians who operate at remote sites where they take patient histories, check visual acuity, record eye pressures, and use digital fundus cameras to capture images of their eyes. This information is then uploaded onto a secure server where it is reviewed by physicians. Results are then returned to the referring physician and follow-up care, if required, is arranged. The tele-ophthalmology program has been supported by donations from the Royal Alexandra Hospital Foundation.¹⁰¹

In 2016, the Canadian Institutes of Health Research launched a new Strategy for Patient-Oriented Research (SPOR) Network in Diabetes and Related Complications with \$12.45 million in grant funding with an additional \$19 million from partners. As co-investigators in the Diabetic Retinopathy Screening – National Tele-ophthalmology goal group, Drs. Tennant and Rudnisky received a grant to support the development technologies related to the screening of diabetic retinopathy by tele-ophthalmology.¹⁰²

Global Ophthalmology Initiatives

Over the last decade, the Department and its members have become increasingly involved in global ophthalmology initiatives, helping to provide patient care and build capacity in developing nations.

Several members of the Department have travelled on short trips to developing nations on their own initiative to provide surgical care to patients there. Many of these trips were either self-funded or received funding from charitable organizations (most often the Rotary Foundation). This includes trips to Guatemala (Drs. Rudnisky and Tennant and RN Janice Hengsbach, 2007; Dr. Ernest Hodges and RNs Janice Hengsbach and Harvey Berg, 2009 and 2010), India (Dr. Mark Greve and RN Janice Hengsbach, 2008, 2011, and 2014), Cameroon (Drs. Ernest Hodges and Jennifer Hodges, 2008), Vietnam (Dr. Ernest Hodges, 2009), Ivory Coast (Dr. Ernest Hodges and RN Janice Hengsbach 2011; RN Janice Hengsbach, 2012 and 2013). Dr. Greve helped to establish a retinal program in Kakinada, India.¹⁰³

Dr. Carlos Solarte has been involved with Orbis since 2002, working for the organization in a variety of capacities, including director of the Flying Eye Hospital. Since joining the Department in 2012, he has tried to volunteer with Orbis for two weeks a year to teach

ophthalmology at different locations around the globe where the organization is working to strengthen ophthalmology care. Recent locations for these teaching trips include Brazil (2014), China (2016), Peru (2016), and Cameroon (2017).¹⁰⁴

Global ophthalmology has been a passion of Dr. Karim Damji's since he was a medical student. Like Dr. Solarte he has volunteered for Orbis, and has travelled with them sporadically since 1998. Since developing the glaucoma 'sandwich' fellowship model in 2006, Damji has visited the Aga Khan University Hospital in Nairobi, Kenya as well as the University of Nairobi for one week annually, and different locations in Ethiopia for one to two weeks annually. From 2015 onwards he has made one week visits annually to the French Medical Institute for Children in Kabul, Afghanistan.¹⁰⁵

Department residents and fellows have also been able to participate in global ophthalmology projects. Facilitated by Solarte's connections with Orbis, residents have been able to participate in projects in El Salvador (Dr. Heather Burnett, 2012) and Cameroon (Drs. Maya Tong and David Plemel, 2017). Resident Dr. Jessica Ting, took part in projects in Togo (2012), Fiji (2013), and Indonesia (2016). Resident Dr. Imran Jivraj joined Dr. Damji during a trip to the Aga Khan University in Karachi, Pakistan (2015). Research fellow Dr. Sourabh Arora participated in the development of the tele-glaucoma system in Ethiopia and Kenya (see below).¹⁰⁶

From 2010, the Department began to develop a more institutional program in global ophthalmology with the development of glaucoma ‘sandwich’ fellowships (see above) and the evolution of the ‘STOP Glaucoma in Sub-Saharan Africa’ program. The goals of the STOP Glaucoma program were: to build professional institutional capacity, to raise awareness of glaucoma among affected communities while reducing the associated stigma, to enhance glaucoma diagnosis, and to support the development of effective, efficient, and appropriate glaucoma treatments.¹⁰⁷

By 2015, the Department was involved in a number of international collaborations. Glaucoma programs were supported at Addis Ababa University, Jimma University, and Gondar University in Ethiopia and at the Aga Khan University, University of Nairobi, and Kisi Innovation Eye Institute in Kenya. The Department and Alberta Retina Consultants supported retina programs in Cameroon, the Srikanan Institute of Ophthalmology and Alberta Retina Clinic in Kakinada, India. Many faculty participated in Orbis projects around the globe.¹⁰⁸



- ▲ Dr. Mark Greve (left) during a trip to India in 2008. Dr. Tejeswara Dhupam (right) became a Medical and Surgical Retina Fellow in the Department (2009–2010). Courtesy of Janice Hengsbach.
- ▲ Dr. Ernest Hodges operating during a trip to Guatemala in 2009. Courtesy of Janice Hengsbach.

International Telemedicine Initiatives

Several members from the Department have also been involved in developing tele-ophthalmology programs in underserved regions. In 2007, the Department collaborated with Alberta Retina Consultants to expand the Cameroonian tele-ophthalmology program established the year before. They installed a new fundus camera at Banso Baptist Hospital in Cameroon, established a tele-ophthalmology station, and provided training to the staff. Retina specialists in Edmonton received patient information via the internet and consulted with the Cameroonian doctors by email. In 2008, the Department collaborated with Alberta Retinal Consultants to establish a tele-ophthalmology program in Congo, in partnership with Dr. Magloire Nzolantima. Retina specialists at Alberta Retina Consultants provided their tele-ophthalmology consultation services pro bono.¹⁰⁹

The lack of available equipment and training in Cameroon frustrated Tennant, who wished to raise funds to purchase equipment and train a local ophthalmologist to conduct surgeries not currently available. In April 2010, Dr. Emmanuel Tambe from Cameroon arrived in Edmonton to begin a clinical fellowship in medical and surgical retina and vitreous with Dr. Tennant followed by an additional

4



six months of training in India with former fellow Dr. Dhupam at the Srikiran Institute of Ophthalmology before Tambe returned to Cameroon as the country's first retinal specialist.¹¹⁰

^ Ophthalmology Team from the University of Alberta visiting the Glaucoma Unit developed jointly at Addis Ababa University in Ethiopia in 2014. Left to right: Dr. Michael Dorey (glaucoma specialist, University of Alberta), Dr. Girum Gessese (glaucoma specialist, Jimma University, Ethiopia), Dr. Sourabh Arora (tele-glaucoma research fellow, University of Alberta), Dr. Abeba Giorgis (glaucoma specialist, Addis Ababa University), Dr. Abiye Mulugeta (glaucoma specialist, Addis Ababa University), Dr. Lisa Heckler (glaucoma fellow, University of Alberta), and Dr. Karim Damji (glaucoma specialist, University of Alberta). Courtesy of Dr. Karim Damji.

In 2012, Grand Challenges Canada named Damji one of fifteen “rising stars” in global health and awarded him a \$100,000 grant over two years to support the development of methodologies to prevent and treat glaucoma. The need for additional treatment for glaucoma in Sub-Saharan Africa was acute, as the disease affects people at earlier ages and more severely than in the west, often resulting in blindness which can be economically devastating for families. Funds from this grant helped to support the development of the tele-glaucoma pilot program in Kenya and Ethiopia. Images were captured in the field and transmitted to a tertiary care centre for assessment. Ethiopian and Kenyan specialists were mentored by Damji and colleagues, which helped to improve their ability to diagnose and treat glaucoma and enabled them to, in turn, share this knowledge with others.¹¹¹

Damji was also awarded a University of Alberta McCalla Professorship in 2012–2013. He used the Professorship to develop tele-glaucoma web-based learning modules for health care professionals. These learning modules would be used to train nurse practitioners taking part in the tele-glaucoma pilot program in Kenya and Ethiopia, allowing them to access tele-glaucoma from within a primary care setting. Research fellow Dr. Sourabh Arora, tele-glaucoma coordinator Samreen Amin, and medical student Safia Nazarali worked with Dr. Damji on this project and helped him to improve the system to better benefit

patients. Dr. Sylvia Chen also helped to spearhead an optic nerve web atlas with support from Dr. Damji, Dr. Simrenjeet Sandhu (then a research fellow and later a resident in the Department) and Dr. Maryam Abtahi (a clinical and research fellow in glaucoma).¹¹²



2007



2008



2009



2010



2011



2012



2013

M. Johnson • S. Kogan • D. Mah •
 C. Baker • R. Somani • T. Lee • C.
 Ramstead • K. Kassiri • R. Yau • M.
 Carle • K. Gan • R. Riyaz • A. Ting •
 C. Hanson • J. Hodges • M. Rasouli •
 H. Burnett • C. Waite • D. Ehman • A.
 Zhou • I. Jivraj • J. Ting • K. Kurji • A.
 Machuk • J. Rayat



2014



2015



2016



2017

Resident Classes during Contemporary
 Times of the Department
 (2007 - 2017)

E

200 FT.
61 M

1

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100 FT.
30.5 M

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70 FT.
21.3 M

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50 FT.
15.2 M

4

E

C

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D

40 FT.
12.2 M

5





We are most fortunate to have inherited a magnificent legacy, and this book strives to capture key elements of this tradition. Over the past eight decades, our predecessors within the Department have exemplified admirable values: courage and determination, keeping the patient interest first at all times, making a special effort to serve those in underserved areas regionally and globally, generating new knowledge that can be applied to improve the quality of life for every patient, and freely sharing knowledge and skills while continuing to learn. I acknowledge with gratitude and respect, the extraordinary contributions and example of our predecessors which forms an integral part of our identity. It is my sincerest hope that successive generations who are part of our Department can internalize and carry forward with pride the important contributions and values that we have inherited. If this is done then I believe we will continue to grow from strength to strength, achieving remarkable impact locally and globally. The Mark Marshall memorial lecture series, initiated in 2017, aims to embed this understanding for all those associated with our Department.



Once, when I was with my predecessor in office Dr. Ian MacDonald, he shared with me the following quote by a Bengali poet Rabindranath Tagore:

*I slept and dreamt that life was joy.
I awoke and saw that life was service.
I acted and behold, service was joy.*

This quote has since served to inspire me and resonates with my philosophy of servant leadership – I do find great joy in serving people and the Department! On a regular basis, I ask myself ‘what can I do better to strengthen our institutional foundations, positively impact the quality of life for our patients and create a more enabling environment for our learners and our staff?’

◀ Poster advertising the inaugural Mark Marshall memorial lecture series.

◀ Dr. Karim Damji, 2016. Courtesy of Medical Photography, Royal Alexandra Hospital.



I am honoured and humbled to lead a Department that exemplifies extraordinary collegiality and that offers a highly enabling environment for outstanding patient care, teaching, research and leadership development. Our current achievements are due to the generous spirit and contributions of our staff, their family members (who stand behind every individual that serves), the leadership that exists within the Faculty of Medicine and Dentistry (FOMD) and Alberta Health Services (AHS), and the magnanimity and support of countless donors that have contributed through the Royal Alexandra Hospital Foundation, the Stollery Children's Hospital Foundation, and the Faculty of Medicine and Dentistry as well as other avenues.

↖ Eye Institute of Alberta team members, June 2017. Courtesy of Ken Dalton, Medical Photography, Royal Alexandra Hospital.

➤ The logo for the Eye Institute of Alberta consists of three eye silhouettes. Each 'eye' represents service and innovation related to the three areas of focus at the Institute: patient care, education and research. The overlapping of shapes demonstrates the tight integration of these areas. The silhouettes and their transparency also evoke the transmission of light, which is central to improving a patient's vision related quality of life and to the spirit of enlightenment that enables outstanding teamwork, as well as the discovery and sharing of knowledge for the benefit of all.

As we look ahead, what are the Department's goals for the next decade? To respond, it would be worthwhile to briefly highlight internal and external environmental considerations.

The large and diverse patient population we serve in a one million square mile area in central and northern Alberta as well as adjacent provinces and territories is aging, with an attendant increase in serious age related eye diseases that necessitate basic as well as more complex eye care. In addition, loss of vision affects overall quality of life and preventative efforts will save health dollars. There is a projected shortfall and suboptimal distribution of ophthalmic personnel throughout Canada and several practitioners within our zone are or will be retiring in the near future. The Regional Eye Centre treats more than 45,000 patients annually. Clinical, educational, and administrative space is a major constraint at the Royal Alexandra Hospital (RAH) site.

An important development in 2015 was the unveiling of a new visual identity – the Eye Institute of Alberta – which tied together various sites within the Edmonton Zone. The Regional Eye Centre will remain the hub of ophthalmic services for the diverse populations we serve, and will incorporate the new brand more formally during renovations in 2017–2018. The RAH eye clinic is also in the midst of a transformative journey to improve patient, provider, and learner experiences thanks to unwavering support from the Royal Alexandra Hospital Foundation and AHS Improvement Way (AIW).





- The unveiling of the Eye Institute of Alberta identity, November 2015. Campaign Co-chairs Cal Nichols and Kimberly Shulha are seen to the left and right of the Eye Institute logo. The Royal Alexandra Hospital Foundation provided generous support for this campaign and the CEO of the Foundation Andrew Otway can be seen at the podium. The hub of the Eye Institute is based at the Royal Alexandra Hospital with additional sites at the Stollery Children's Hospital, the Westview Health Centre, the Fort Saskatchewan Community Hospital, and the Katz Group Centre for Pharmacy and Health Research (clinical and basic research). Courtesy of Ken Dalton, Medical Photography, Royal Alexandra Hospital.
- Drs. Karim Damji (left) and Morley Kutzner (right) stand in the newly opened ophthalmic surgical skills centre, 2014. Courtesy of the Royal Alexandra Hospital Foundation.

In the recent past the pediatric ophthalmology clinic has been rebuilt, thanks to the vision of Dr. Garry Drummond and the leadership of Dr. Carlos Solarte as well as support from the Stollery Children’s Hospital Foundation and AHS (see chapter four).

There is an active research program involving heritable eyes diseases, gene therapy, electrophysiology, glaucoma and retinal disease (see chapters two through four). Alberta Vision Net, initiated by Dr. Ordan Lehmann in 2014, is an exemplary provincial initiative that links clinical and basic science vision science researchers from a variety of fields (see chapter four).


The Department has a vibrant teaching and learning environment with a strong commitment to undergraduate and postgraduate medical education (see chapters two through four). The latter includes residency, fellowship and graduate student support. The Department’s first resident, Dr. J. ‘Wint’ Duggan went on to Head the Department in 1960. Research fellows have been sponsored by the Department since 1966, clinical fellows since 2008, and innovative and capacity-building ‘sandwich’ fellows since 2010. The very first Master’s in Experimental Ophthalmology thesis, “Biochemistry of the Anterior Segment of the Eye – The Enzymes of the Cornea and the Aqueous,” was written by Dr. Joo Ok Kim in 1972.



There is a very high level of commitment to teaching and learning from geographic full-time faculty as well as clinical faculty. One example involved planning for and launching, in 2014, the ophthalmic surgical skills centre led by Dr. Morley Kutzner (see chapter four).




UNIVERSITY OF ALBERTA
FACULTY OF MEDICINE & DENTISTRY
Department of Ophthalmology and Visual Sciences



EYE
INSTITUTE
OF ALBERTA

PATIENT CARE
EDUCATION
RESEARCH

AT ROYAL ALEXANDRA HOSPITAL



INTERPROFESSIONAL EYE CARE FORUM

Goals:

- a. To focus on patient centered emergency eye care
- b. To promote diverse as well as collaborative interprofessional perspectives
- c. To foster mutual understanding and collegiality

Jan 23, 2016
7:30 AM – 1:30 PM

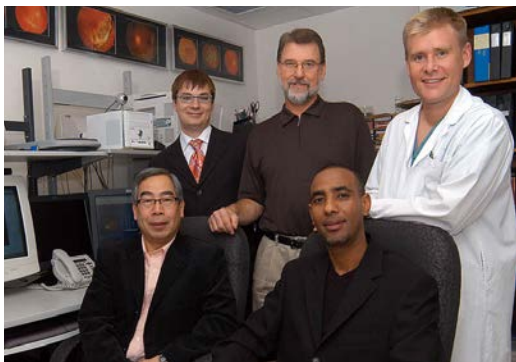
VENUE:
Maple Leaf Room
Lister Conference Centre
University of Alberta
87 Ave 116 St
Edmonton AB, T6G 2H6

The program is open to Family Physicians, Emergency Physicians, Ophthalmologists, Optometrists, Residents, Students and other Eye Care Professionals

For registration and more information please visit <http://www.cvent.com/d/yfqlw0>

Other clinical faculty have been involved in undergraduate education, residency training and fellowship program director roles. An annual inter-professional eye care forum was also launched in 2016 that brings together eye care stakeholders to foster mutually beneficial learning and the sharing of ideas to improve the vision health of Albertans.

The Department has a rich history of providing care for underserved populations in the North (see chapters two and three). In the recent past, the tele-ophthalmology program, developed by Drs. Matthew Tennant, Mark Greve and Christopher Rudnisky has received accolades from many, including a Canadian Institutes of Health Research (CIHR) Knowledge Translation Award in 2008. Since 1999, tele-ophthalmology within the Department has provided high quality cost effective care to patients in remote communities while saving individuals unnecessary travel to Edmonton. The program serves patients in Alberta and the



- ^
Brochure for the inaugural Interprofessional eye care forum.
- <
The tele-ophthalmology team, October 2005. Standing (Left to Right): Dr. Chris Rudnisky, Departmental Photographer Bernd Schwanke, Dr. Matt Tennant; Seated (Left to Right): Biomedical Engineer Tony Wan, Tele-ophthalmology Coordinator Abshir Moalin. Courtesy of Medical Photography, Royal Alexandra Hospital.

Northwest Territories and has been utilized for diabetic retinopathy, glaucoma, ocular genetics, and oncology (see chapters three and four).

Building on this tradition of providing care for those in underserved regions, the Department has, for more than a decade, been involved in global health initiatives in developing countries and underserved communities (see chapters three and four). Amongst current ophthalmologists, there are many ongoing connections to international organizations and affiliations that involve the prevention and treatment of avoidable blindness. Hence there is an opportunity to export Canadian values globally and engage in focused and mutually beneficial sharing of knowledge, skills and institutional capacity building approaches.



Red stars indicate countries in which ophthalmologists within the Department have participated in global health or underserved area initiatives. Initiatives in developing countries include capacity building to improve local ophthalmology services and long-term sustainability, training and fellowships for local eye care providers, tele-ophthalmology for screening and management of diabetic retinopathy and glaucoma, and direct service delivery in performing cataract and subspecialty surgeries. Courtesy of Dr. Jessica Ting.

With the above in mind along with strategic plans from FOMD and AHS, the Department has held planning retreats and defined its vision, mission, values and key goals. These are summarized below.

VISION

To lead patient-centered eye care through outstanding and integrated service, education, research and leadership.

MISSION

A multi-disciplinary team of healthcare professionals committed to furthering excellence in the care of patients with visual disorders through:

- provision of a comprehensive range of services for the diagnosis, treatment, and prevention of visual disorders;
- provision of undergraduate, postgraduate and graduate training in ophthalmology, and continuing medical education opportunities;
- translational vision science, and
- development of effective partnerships with organizations in Canada and abroad

VALUES

- Patients first – accessible, comprehensive, efficient, and effective care. An outstanding patient care experience every time.
- Outstanding health quality and safety
- Support for innovation in practice, education and research
- A culture of curiosity, collaboration and collegiality
- High performance team based leadership
 - Respect for every team member
 - Engaging Stakeholders
 - Anticipating issues and respond to change thoughtfully
 - Stewardship of resources (human, financial, physical, other)
 - Accountable to patients, members of the Department and other stakeholders

¹Bellan L, Buske L. Ophthalmology human resource projections: are we heading for a crisis in the next 15 years? *Can J Ophthalmol.* 2007;42:34–8. Bellan L, Buske L, Wang S, Buys YM. The landscape of ophthalmologists in Canada: present and future. *Can J Ophthalmol.* 2013;48:160–166.

GOALS FOR 2015-2025

Clinical: (i) to further develop infrastructure and quality improvement initiatives for the Eye Institute of Alberta, (ii) to recruit outstanding talent in areas of high need and (iii) to improve cost-effective access for local and select global under-served populations.

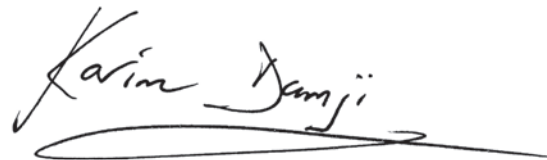
Educational: (i) to expand high quality, integrated learning opportunities for all members of the team, (ii) to enhance residency, fellowship and global health programs, and reintroduce an ophthalmic technician training program and (iii) to provide a digital upgrade for the ophthalmic surgical skills centre and develop scholarship in various educational domains.

Research: (i) to achieve excellence in collaborative translational vision science through a strategic focus on recruitment of high quality faculty and trainees, (ii) to formalize a research mentorship program and (iii) to develop a clinical trials centre.

Leadership: (i) to develop capacity for sustainable high quality leadership and management and (ii) to re-establish and sustain connections with our alumni.

Resource mobilization: (i) to cultivate and steward relationships with existing and new donors and garner resources to support priority strategic initiatives. This includes strengthening key Department endowments for education and research (see tables and notes) and (ii) to develop a global health travel fund to facilitate support staff and trainee travel.

I wish to express my profound gratitude, respect and admiration for all our team members and valued supporters. I hope current and future trainees and faculty members can draw inspiration and example from our rich history and that this will propel their efforts as they embark on further strengthening our Department, the Eye Institute, and the people we seek to serve.



Dr. Karim F. Damji, MD, FRCSC, MBA
Professor and Chair Department of Ophthalmology and Visual Sciences
University of Alberta
Clinical Section Head for Ophthalmology, Edmonton Zone
Alberta Health Services

E

200 FT.
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40 FT.
12.2 M

5



Department Fellows and Fellowships through the years

LEGEND

(Research Fellowship)

(Postdoctoral Fellowship)

('Sandwich' Fellowship)

(Clinical, Surgical & Research Fellowship)

+

1960

1966-1967 Dr. Ronald Jans (Research Fellowship)

1967-1968 Dr. Angus Kirk (Research Fellowship)

1970

1980

1990

1995-1998 Dr. Alan Mears
(Postdoctoral Fellowship - Michael Walters)

1999-2000 Dr. Chris Rudnisky
(Research Fellowship in Tele-ophthalmology)

1995-1998 Dr. Marc Hébert
(Postdoctoral Fellowship - Ian Macdonald)

2000

2009-2010 Dr. Tejeswara Vara Prasad Dhupam
(Clinical Fellowship in Medical and Surgical Retina)
2009-2010 Dr. Rajat Maheshwari
(Fellowship in Oculoplastic, Orbit & Ocular Oncology)

2009-2010 Dr. Beatrice Wong-Adante
(Research Fellowship in Tele-ophthalmology)
2009-2010 Dr. Enitan Sogbesan
(Clinical & Research Fellow in Glaucoma)

2010

2010 Dr. Emmanuel Tambe
(Clinical Fellowship in Medical & Surgical Retina & Vitreous)

2011-2012 Dr. Faazil Kassam
(Research Fellowship in Glaucoma)

2011-2013 Dr. Nigel Rawlings
(Clinical Fellowship in Medical & Surgical Retina & Vitreous)

2011-2013 Dr. Fisseha Ayele
(‘Sandwich’ Fellowship in Glaucoma)

2014 Dr. Lisa Heckler
(Clinical Fellowship in Glaucoma)

2014-2017 Dr. Simrenjeet Sandhu
(Research Fellowship in Glaucoma)

2015-2017 Dr. Camille Dejos
(Postdoctoral Fellowship - Yves Sauvé)

2015-2017 Dr. Steven Lapere
(Clinical Fellowship in Medical & Surgical Retina & Vitreous)

2017-2019 Dr. Uriel Rubin
(Clinical Fellowship in Medical & Surgical Retina & Vitreous)

2018-2019 Dr. Tesfaye Tadesse Dumecha
(‘Sandwich’ Fellowship in Glaucoma)

2010-2011 Dr. Qi Zhou
(Clinical & Research Fellowship in Ocular Genetics)

2010-2011 Dr. Sheila Marco
(‘Sandwich’ Fellowship in Glaucoma)

2012-2013 Dr. Sourabh Arora
(Research Fellowship in Glaucoma)

2012-2013 Dr. Samer Abuswider
(Clinical Fellowship in Glaucoma)

2012-2013 Dr. Girum Gessesse
(‘Sandwich’ Fellowship in Glaucoma)

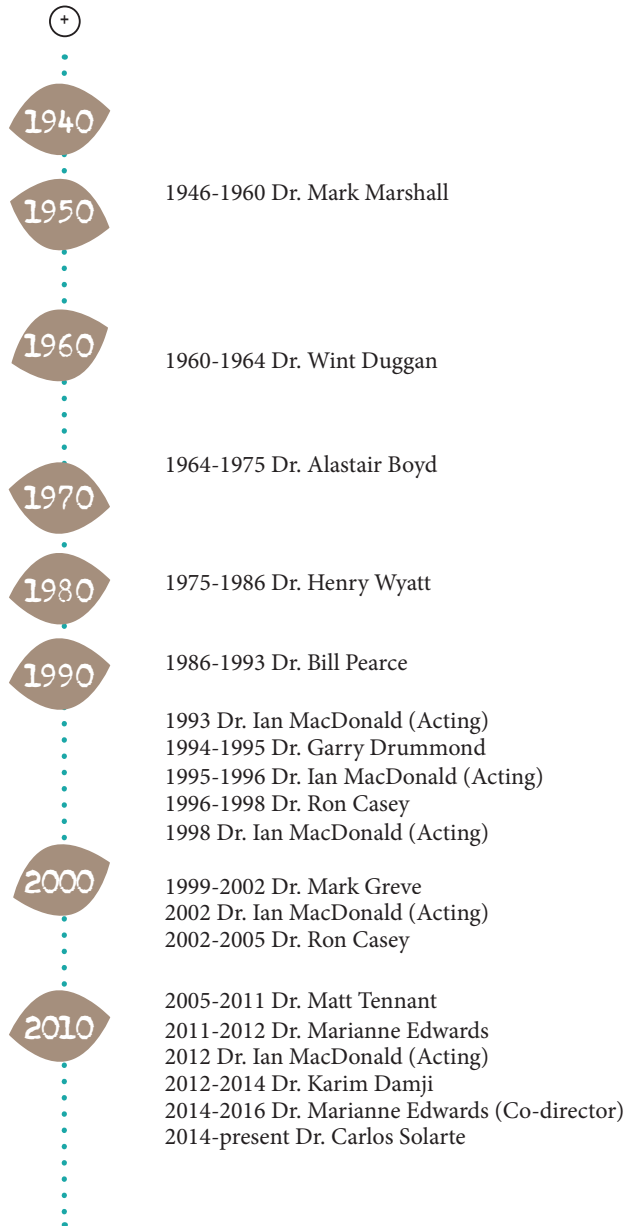
2013-2015 Dr. Hila Zommer
(Clinical & Research Fellowship in Orbit & Oculoplastics)

2014 - 2015 Dr. Markus Groppe
(Clinical Fellowship in Medical & Surgical Retina & Vitreous)

2014-2017 Dr. John Dimopoulos
(Research Fellowship in Ophthalmology)

2016 - 2017 Dr. Assaf Dotan
(Clinical Fellowship in Medical & Surgical Retina & Vitreous)

Residency Training Program Directors



Residency Training Program Graduates

1950	Duggan, John Winston 'Wint' (General)	1950	
1953	Wiggins, Robert L.		
1954	Colley, R.Q.		
1956	Rees, Donald Leslie (General)		
1957	Mitchell, Douglas Grant		
1958	Sutherland, Robert Logan	1960	
			1962 Hassard, Donald (Cornea/General) Patrick, Andrew (General) Coulas, Len
			1965 Ridgeway, Clayton Ali, Syed Heidler
			1966 Standret, Don
			1967 Graham, John
			1968 Morgan, Rod (Pediatric/General) Shutt, Ken (Neuro-ophthalmology)
		1970	1969 Leitch, Garry (General) Zuege, Peter
1970	Jans, Ronald		
1971	Bowen, Richard Frankelson, Elliot		
1972	Kirk, Angus		
1973	Rootman, Jack (Pathology/Ocular Oncology) Story, Richard		
1974	Poohkay, Marvin Singh, Omah Foy, James		
1975	Karas Yair Fernades, Eugene Balisky, Larry		
1976	Gervais, Robert		
1977	Grant, Garry (Retina)		
1978	Harris, Ross Leong-Sit, Lin (External Eye Disease/General) Ombres, Pam Ombres, Richard		
1979	DeMong, Thaddeus		

LEGEND
(Indicates specialty for those residents who joined the Department upon the completion of their training)

⊕

1980 Grieve, Gary
Lang, Rob

1981 Kutzner, Morley (Anterior Segment/General)
Short, Stanley

1982 Brown, Dennis
Gilder, Anita

1983 Climenhaga, Harold (Cornea)
vanWestenbrugge, J.

1984 Smith, Leonard
Uniat, Linda (Retina)

1985 Conrad, Dennis
Cote, David (General)
Leishman, Robert

1986 Drummond, Garry (Pediatric)
Macdonald, Anne (General)
Ratzlaff, Glen

1987 Novak, John
Walker, John (Rob)

1988 Dossetor, Frances
Onge-Tone, Lindsay

1989 Okada, William
Casey, Ronald (Glaucoma/Ocular pathology)
Lewis, James (Neuro-ophthalmology)
Phillips, Mary (General)

1990

1990 Kwan, Eddie
Skochylas, Ed
Williams, Geoffrey

1991 Westra, Igor
Wuebbolt, Gordon

1992 Ball, Arlene
Theriault, Francois

1993 Cornock, Elizabeth
Huang, John
Martiniuk, Reginald

1994 Ahmed, Irma
Goel, Nand
Yap, Keith

1995 Pearson, John
Hennig, Kevin (General)

1996 Hinz, Brad (Retina)
Nigam, Rashmi

1997 Chow, Bill
Leong-Sit, Joe (Cornea)

1998 Gill, Manjot
Kherani, Amin

— TABLES & NOTES —

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2000

- 2000 Edwards, Marianne (Glaucoma)
- Filaferro, Danny
- 2001 Hillson, Tim
- Tennant, Matthew (Retina)
- 2002 Kherani, Femida
- Peters, Carl
- 2003 Chan, Stanley (Uveitis/Cornea)
- Chaudhary, Ripan
- 2004 Chang, Charmaine
- Dookeran, Ravi
- 2005 Rudnisky, Chris (General/Tele-ophthalmology)
- Weis, Ezekiel (Orbit/Oculoplastics/Oncology)
- 2006 Heyns, Daniel
- McCabe, James (General)
- 2007 Johnson, Michael (Neuro-ophthalmology)
- Kogan, Sylvia (General)
- Mah, Dean (Cornea/External Eye Disease)
- 2008 Baker, Chad (Retina)
- Somani, Rizwan (Retina)
- 2009 Lee, Thomas
- Ramstead, Cory

2010

- 2010 Kassiri, Kam (General)
- Yau, Ryan
- 2011 Carle, Michelle
- Gan, Kenman
- 2012 Riyaz, Rehan (General)
- Ting, Andrew
- 2013 Hanson, Chris
- Hodges, Jenny (General)
- Rasouli, Mahta (General)
- 2014 Burnett, Heather (General)
- Waite, Chris
- 2015 Ehmann, David (Retina)
- Zhou, Alysia
- 2016 Jivraj, Imran
- Ting, Jessica (General)
- 2017 Kurji, Khaliq
- Machuk, Andrew (General)
- Rayat, Jaspreet (Vision Rehabilitation)

LEGEND

(Indicates specialty for those residents who joined the Department upon the completion of their training)

List of Endowments

1936-1937	Mark Marshall Fund (Research) To foster the research mission in the field of Ophthalmology at the U of A.
1985	Edwin Isaac Clarke Scholarship Fund (Scholarship) For scholarships and grants for research in the field of Ophthalmology and Cancer.
2003	Reg Martiniuk Memorial Fund (Award) 1) For best presentation at the annual research day for the Department. 2) For educational materials for the department library.
2004	Helen Colburn Memorial Fund in Ophthalmology (Research) To conduct research in relation to the causes and methods of cures for eye disease.
2004	Peat Student & Resident Fund Ophthalmology (Research) Undergraduate and postgraduate students.
2007	Dr. Ron Casey Resident Endowment Fund (Resident Support) Support for educational activities for ophthalmology residents including conferences, books, ophthalmology equipment, journals and software.
2011	Alberta Odd Fellow Rebekah Visual Research Graduate Award (Fellowship) Fund a graduate student who is studying and conducting research in vision science.
2015	Cal Nichols Ophthalmology Endowment (Resident Support) For support of resident training.

Notes

Chapter 1

1. As quoted in E. A. Corbett, *Henry Marshall Tory: A Biography*, (Edmonton: University of Alberta Press, 1992), 100.
2. Walter H. Johns, *A History of the University of Alberta: 1908-1969*, (Edmonton: University of Alberta Press, 1981), 32, 49; Robert Macbeth, *The Department of Surgery at the University of Alberta: The First Half Century, 1922-1975*, (Edmonton: Department of Surgery, University of Alberta, 2009), 3; *University of Alberta Calendar 1913-1914*, 107; *University of Alberta Calendar 1915-1916*, 77-78.
3. *Who's Who at the University of Alberta 1919-1939*, (Edmonton: The Archives, University of Alberta, 1993), 64-65, 158.
4. *University of Alberta Calendar 1921-1922*, 80.
5. *University of Alberta Calendar 1923-1924*, 25-28.
6. Scott, *History of the Faculty of Medicine*, 41.
7. Macbeth, *Department of Surgery*, 37-45.
8. James Baxter and Derald Oldring, "The History of Otolaryngology in Canada: University of Alberta," *Journal of Otolaryngology* 27 no. 2 (April 1998): 115.
9. The *University of Alberta Calendar* was the main source of information on the status of the Department at the University. I have followed the *Calendar* rather than the status of Ophthalmology within the *University of Alberta Hospital* when the two diverge. *University of Alberta Calendar 1960-1961*, 380; Angus McGugan, *The First Fifty Years: A History of the University of Alberta Hospital 1914-1964*, (Edmonton: 1964), 61-65.
10. Several terms were used to refer to the individual in charge of Departments/Divisions. 'Head' appears to have been used interchangeably for Department and Division leaders, particularly prior to ca. 1970. This is the term used by Scott. Division Director and Department Chairman, later Chair, are also common terms. This is the terminology preferred by Macbeth. In this book 'Head' will be used to refer to the individual in charge of the Department/Division of Ophthalmology until 1969 when Alastair Boyd was appointed Chairman of Ophthalmology.
11. "Obituaries," *Canadian Medical Association Journal* 42 no.3 (Mar 1940): 305; *University of Alberta Archives* (hereafter UAA), *Who's Who*, 58; Herber C. Jamieson, *Early Medicine in Alberta*, (Edmonton: Canadian Medical Association Alberta Division, 1947), 166; "Dr. R. Bruce Wells," *The Edmonton Bulletin*, 15 December 1906; Macbeth, *Department of Surgery*, 43, 53-5.
12. *University of Alberta Calendar 1923-24*, 93, 204; *University of Alberta Calendar 1924-1925*, 18; *Royal College of Physicians and Surgeons of Canada Archive* "Dr. Robert Bruce Wells."
13. Macbeth places the change from Division to Department Status in 1936 although it isn't recorded in the *University Calendar* until 1937. Macbeth, *Department of Surgery*, 54; *University of Alberta Calendar 1937-1938*, 16; UAA WAR Kerr papers, Accession No. 68-1 Item 3/3/3/4/10/1/8 R. B. Wells to A. R. Munroe, 24 September 1936 and A. R. Munroe to Dean Rankin 30 September 1936; "Obituaries," 305.
14. *Who's Who*, 64-65; "Obituaries," *Canadian Medical Association Journal* 87 no. 17 (27 Oct 1962): 934.
15. *University of Alberta Calendar 1923-1924*, 93, 204; *University of Alberta Calendar 1924-1925*, 18, 90,

- 201; University of Alberta Calendar 1931-1932, 18. University of Alberta Calendar 1937-1938, 16; Royal College of Physicians and Surgeons of Canada Archive “Dr. Claude Vernon Jamieson.”
16. “Obituaries,” 934; UAA WAR Kerr Accession No. 68-1 Item 3/3/3/4/10/1/8 A. R. Munroe to Dean Rankin 30 September 1936; Who’s Who, 64-65.
17. Dr. Mark Robert Levey changed his name to Dr. Mark Robert Marshall in 1949.
18. Marshall is variously said to have been born in Kingston, ON (Attestation Papers), Austria (Who’s Who), and Izmir, Turkey (Macbeth and Alhadeff). Nick Alhadeff, email to Judith Friedman, 13 May 2016; Levey, Mark Robert (18215) RG 150, Accession 1992-93/166, Box 5611 – 79, Library and Archives Canada; Who’s Who, 92-93; Macbeth, Department of Surgery, 124, 125, 462; H.T. Logan and M.R. Levey, “History of the Canadian Machine Gun Corps, C.E.F.,” Unpublished ms., 1919, Directorate of History and Heritage, Ottawa; C.S. Grafton, *The Canadian ‘Emma Gees’: A History of the Canadian Machine Gun Corps*, (London ON: Hunter Print. Co, 1938; University of Alberta, *Evergreen and gold: the annual publication of the students of the University of Alberta*, Vol. 4, 1923/1924, 31; A. Gardner Watson, “Obituary Mark Robert Marshall, MD, FACS, FRCSC,” *Canadian Journal of Ophthalmology* 26 no. 1 (Feb 1991): 51; UAA R. Newton Papers Accession No. 68-1 Item No. 3-4-4-10-4 Council for the Faculty of Medicine Minutes 14 July 1943; Elise A. Corbet, *Frontiers of Medicine: A History of Medical Education and Research at the University of Alberta*, (Edmonton: University of Alberta Press, 1990): 58.
19. Mark Levey – Library and Archives Canada, Canada Census 1921, <http://www.bac-lac.gc.ca/eng/census/1921/Pages/item.aspx?itemid=620890> (accessed 24 September 2017); “Inter Faculty Soccer League,” *The Gateway*, 20 October 1921; “The Gateway,” *The Gateway*, 7 February 1922; “Faculties and Friends of Med Club Thanked,” *The Gateway*, 13 March 1923; “Fourth Year Meds Organize,” *The Gateway*, 30 October 1923; *Evergreen and gold*, 31; “Mark Levey, The New President of Students’ Union,” *The Gateway*, 14 March 1924; Macbeth, Department of Surgery, 124-126.
20. The record of Marshall’s post-graduate training is incomplete. Macbeth states that, following his internship in Montreal, Marshall returned to Edmonton where worked with Wells in his practice while making trips abroad to London (where he received a Diploma in Laryngology and Otolaryngology), Paris, Vienna, and New York between 1927 and 1935. Marshall’s record at the Royal College of Physicians and Surgeons does not list this degree but rather his memberships in UK Ophthalmology societies and the receipt of a Diploma in Ophthalmology from the University of Vienna. The COS notes that he trained at Moorfields in London. “Faculty of Medicine,” *The Gateway*, 15 May 1925; “Professional,” *The Wetaskiwin Times*, 3 March 1927, 2; “Medicine,” *The Gateway*, 14 May 1930; UAA, Who’s Who, 92-93; Macbeth, Department of Surgery, 124-126; Royal College of Physicians and Surgeons of Canada Archive “Dr. Mark Robert (Levey) Marshall (1894-1990)” ; Canadian Ophthalmological Society, “Picture and Bio – President,” n.d..
21. “New P.T. Instructor,” *The Gateway*, 4 October 1940; University of Alberta Calendar 1931-1932, 18; University of Alberta Calendar 1964-65, 333; Macbeth, Department of Surgery, 124-126; Royal College of Physicians and Surgeons of Canada Archive “Dr. Mark Robert (Levey) Marshall (1894-1990)” ; UAA Who’s Who, 92-93; Watson, “Obituary,” 51.
22. Royal College of Physicians and Surgeons of Canada Archive “Dr. Mark Robert (Levey) Marshall (1894-1990)” ; Meghan Kennedy, email to Judith Friedman, 25 July 2017; Watson, “Obituary” 51.
23. Suzanne Purkis, email to Judith Friedman, 10 July 2017; “50th Anniversary Meeting Programme,” *Canadian Journal of Ophthalmology* 22 no. 2 (March 1987): 88; Watson, “Obituary,” 51.

Chapter 2

1. University of Alberta Calendar 1945-1946, 23.
2. University of Alberta Board of Governors, Report of the Board of Governors of the University of Alberta 1936-1937 (Edmonton: University of Alberta, 1937), 25; UAA Accession No. 80 Item No. 282 Correspondence Concerning University Trust Fund for Ophthalmology June 1966; J. Ross Vant and A.W. Cashman, More than a Hospital: University of Alberta Hospitals 1906-1986, (Edmonton: University of Alberta Hospital Board, 1986), 232; Walter Johns, A History of the University of Alberta: 1908-1969 (Edmonton: University of Alberta Press, 1981), 249; A. Gardner Watson, "Obituary Mark Robert Marshall, MD, FACS, FRCSC," Canadian Journal of Ophthalmology 26 no. 1 (Feb 1991): 51.
3. University of Alberta Calendar 1958-1959, 28; Following its 1956 inspection the American Medical Association placed the University of Alberta medical school on "confidential probation" which enabled Dean Stewart to successfully lobby the Provincial Government for additional resources. As a result government funding to the University of Alberta almost tripled during the following three years. Medicine received many of these funds resulting in much needed additions to both buildings on campus and to permanent faculty members. The probation was lifted in 1959 after a follow-up visit by the accreditation team. Rod Macleod, All True Things: A History of the University of Alberta (Edmonton: University of Alberta Press, 2008), 165-166.
4. UAA Accession No. 80-162 Item 195 Folder 10-10-D-11 Ophthalmology and Otolaryngology Committee Meeting Minutes 4 December 1959; UAA Accession No. 80-162 Item 195 Folder 10-10-D-11 J. S. Thompson to W. H. Johns 15 December 1959.
5. E. S. Dowding and M. R. Levey, "A Mould From The Ear," Canadian Medical Association Journal 41 no. 4 (Oct 1939): 336-339; M. R. Levey, "Eye Lessons in General Practice," Nova Scotia Medical Bulletin 25 no. 2 (Feb 1946): 41-47; "Dr. Levey at Municipal Hospital July 29 to Aug. 3," Northern Tribune, 18 July 1935; Eric Schloss, "A Jewish Retrospective of the University of Alberta," Heritage: The Journal of the Jewish Archives and Historical Society of Edmonton & Northern Alberta 11 no. 3 (Summer 2009): 15; Robert Macbeth, The Department of Surgery at the University of Alberta: The First Half Century, 1922-1975, (Edmonton: Department of Surgery, University of Alberta, 2009), 125-126; "Blasting at Town Gravel Pit, F. Christian Injured," The Western Globe, 4 March 1937; Watson, "Obituary," 51; Rod Morgan, email to Judith Friedman, 19 April 2017; Rod Morgan, email to Judith Friedman, 6 September 2017.
6. "Ewart/Duggan family fonds," http://archives.esplanade.ca/manuscripts/Results.aspx?AC=GET_RECORD&XC=/manuscripts/Results.aspx&BU=http%3A%2F%2Farchives.esplanade.ca%2Fsearch.aspx&TN=holdings&SN=AUTO17608&SE=1763&RN=0&MR=20&TR=0&TX=1000&ES=0&CS=0&XP=&RF=WebBriefFonds&EF=&DF=WebFull&RL=0&EL=0&DL=0&NP=255&ID=&MF=GENERICENGWPMMSG.INI&MQ=&TI=0&DT=&ST=0&IR=127&NR=0&NB=0&SV=0&SS=0&BG=&FG=&QS=&OEX=ISO-8859-1&OEH=utf-8, (accessed 6 October 2015).
7. Royal College of Physicians and Surgeons of Canada Archive, "J. W. Duggan."
8. Macbeth, Department of Surgery, 332; University of Alberta Calendar 1952-1953, 25; University of Alberta Calendar 1959-1960, 30; University of Alberta Calendar 1960-1961, 380. Duggan's initial appointment was as Acting Chief of the Division of Ophthalmology. It seems that Duggan was appointed because he had his FRCSC while Boyd did not. UAA Accession No. 80-162 Item No. 295 Minutes of the Committee on Ophthalmology and Otolaryngology 23 February 1960.

9. Marshall was listed as an Honorary Member in 1960-1961 but not in 1961-1962 although he would still continue to teach and remained affiliated with the UAH. Macbeth, Department of Surgery, 411; University of Alberta Calendar 1960-1961, 380; University of Alberta Calendar 1961-1962, 375.
10. Macbeth, Department of Surgery, 331-332; UAA Accession No. 80-162 Item Not. 283 Mackenzie to Drance 25 November 1963; UAA, Accession No. 80-162, Item No. 283 Mackenzie to Murray 13 December 1963; “Ewart, Duggan Family fonds;” “John Duggan Obituary – Los Gatos, CA Mercury News,” <http://www.legacy.com/obituaries/mercurynews/obituary.aspx?n=john-winston-duggan&pid=3469438&fhid=2112> (accessed 31 August 2016).
11. Boyd’s appointment as Head of Division also meant that Ophthalmology’s provisional divisional status would become permanent. The correspondence shows that stronger applicants would had required that Ophthalmology be returned to independent Departmental status. UAA Accession No. 80-162 Item no. 282 Correspondence re: Head of Division, 1964. Boyd received a Special Certificate in Ophthalmology in 1959 from the Royal College of Canada and received his Fellowship in 1972. UAA Accession No. 80-162 Item no. 282 Boyd Application for Head of Division, 1963; University of Alberta Calendar 1959-1960, 30; Royal College of Physicians and Surgeons of Canada, “Boyd, T.A.S.”
12. Faculty of Medicine first introduced geographic full-time positions in 1954. UAA Accession No. 81-70 Item No. 239 Report to the University Senate February 28, 1958; Rod Morgan, email to Judith Friedman, 19 April 2017.
13. UAA Accession No. 80-162 Item no. 282 Boyd Application for Head of Division, 1963; C. Stuart Houston, *Steps on the Road to Medicare: Why Saskatchewan Led the Way*, (Montreal: McGill-Queen’s University Press, 2002), 127; UAA Accession No. 80-162 Item No. 159 Second Brief from the Glaucoma Diagnostic Clinic August 1969; UAA Accession No. 80-162 Item 156 Glaucoma Clinic May 1971; UAA Accession No. 81-70 Item no. 240 Department of Ophthalmology Annual Report 1975-1976; Vant and Cashman, *More Than A Hospital*, 232-3.
14. UAA Accession No. 80-162 Item no. 282 Boyd Application for Head of Division, 1963; UAA Accession No. 80-162 Item 282 Teaching in Ophthalmology 1965.
15. UAA Accession No. 80-162 Item no. 282 Boyd Application for Head of Division, 1963.
16. UAA Accession No. 80-162 Item no. 282 Boyd Application for Head of Division, 1963; UAA Accession No. 80-162, Item No. 282: Kelly to MacKenzie, June 1967; Marshall to MacKenzie, June 1968; MacKenzie to Tyndall 25 March 1969; Boyd to MacKenzie 10 April 1969; MacKenzie to Haney 10 March 1969; Boyd to Wyman 14 May 1969; UAA, Accession No. 80-162 Item No. 283 Boyd to MacKenzie 14 May 1969; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988.
17. UAA Accession No. 80-162 Item No. 156 Department of Ophthalmology Annual Report 1969-70; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1973-74; Macbeth discusses Boyd’s personal quest to see Ophthalmology returned to departmental status at some length. Macbeth, Department of Surgery, 333-334; UAA Accession No. 85-108 Item No. 30 Boyd to Cameron 8 November 1977.
18. Wyatt served as Acting Chairman from July 1980 and began his first five-year term as Chairman on 1 July 1982. “Department Chairs Filled,” *Folio* Vo. 18 no. 49 (17 June 1982): 2; Curriculum Vitae, Henry Turner Wyatt; Oral Interview, 12 October 2015.
19. Henry Wyatt, Oral Interview, 12 October 2015.
20. UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1970-71;

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- UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1971-72; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1973-74; Henry Wyatt, Oral Interview, 12 October 2015.
21. Macleod, All True Things, 251-284; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988.
22. UAA Accession No. 98-110 Royal College of Physicians and Surgeons Survey Report 1987; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988.
23. UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988; UAA Accession No. 93-11 Item no. 12 Pearce to Goldsand 19 April 1989; UAA Accession No. 98-110 Special Survey Pre-Questionnaire November 1990.
24. UAA Accession No. 95-73 Item No. 41 Hospital-Based Ophthalmology Services Within the Edmonton Region 10 June 1992.
25. UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988.
26. UAA Accession No. 95-73 Item No. 41 Memo re: Workshop January 11, 1991, 6 January 1991; UAA Accession No. 95-73 Item No. 41 Hospital-Based Ophthalmology Services Within the Edmonton Region 10 June 1992.
27. UAA Accession No. 95-73 Item No. 41 Models of Governance for a Centralized Ophthalmology Service 24 October 1991; UAA Accession No. 95-73 Item No. 41 Minutes Edmonton Region Health Facilities Planning Council Task Force on Hospital Ophthalmology Services 28 November 1991; UAA Accession No. 95-73 Item No. 41 Pearce to Skinner 16 January 1992.
28. UAA Accession No. 95-73 Item No. 41 Hospital-Based Ophthalmology Services Within the Edmonton Region 10 June 1992; UAA Accession No. 95-73 Item No. 41 Wilson to Skinner 4 August 1992.
29. UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988; UAA Accession No. 98-110 Special Survey Pre-Questionnaire November 1990, UAA Accession No. 98-110 Item No. 9 On Site Special Survey 1991; UAA Accession No. 98-110 Item No. 9 Faculty Response to Special Survey 1991; UAA Accession No. 98-110 Item No. 9 Goldsand to McCullough 30 July 1993.
30. UAA Accession No. 80-162 Item 295 File 10-10-D-11 Levey to Ower 3 October 1941; Vant and Cashman, More than a Hospital, 232; Johns, University of Alberta: 1908-1969, 249; UAA Accession No. 80-162 Item no. 282 Boyd Application for Head of Division, 1963; John W. Scott, "As the Chairman Saw It," (Department of Medicine, University of Alberta, Edmonton), 1988, 26; Rod Morgan, Written Interview, 24 October, 2016; Rod Morgan, email to Judith Friedman, 19 April 2017.
31. UAA Accession No. 80-162, Item No.358, CSB Department of Ophthalmology, Maiani to Blakney 5 June 1969; UAA Accession No. 80-162, Item No. 282, Orthoptic Training Application 2 June 1969; UAA Accession No. 80-162 Item No. 358 Currie to Hallin 11 June 1969; UAA Accession No. 72-55 Item No. 59 Department of Ophthalmology Annual Report 1969-70; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988.
32. Rod Morgan, Written Interview, 24 October 2016; Rod Morgan, email to Judith Friedman, 19 April 2017; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988; UAA Accession No. 93-11 Item no. 12 Pearce to Goldsand 19 April 1989; UAA Accession No. 98-110 Special Survey Pre-Questionnaire November 1990.
33. UAA Accession No. 80-162 Item 282 Glaucoma Diagnostic Clinic, 1965; UAA Accession No. 80-162

- Item no. 282 Boyd Application for Head of Division, 1963; Vant and Cashman More than a Hospital, 232-3; Maralynne Hawkins, Peggy Kaminski, and Iris Odynski, Oral Interview, 19 November 2015; Maralynne Hawkins, Glaucoma Clinic Staff Records, n.d.; “Barbara SALTER Death Notice – Osborne Park, Western Australia | The Western Australian,” <http://www.westannouncements.com.au/obituaries/thewest-au/obituary.aspx?page=lifestory&pid=184262391> (accessed 25 July 2017); Maralynne Hawkins, email to Judith Friedman, 26 July 2017.
34. UAA Accession No. 80-162 Item 282 Glaucoma Diagnostic Clinic, 1965; UAA Accession No. 80-162 Item no. 282 Boyd Application for Head of Division, 1963; Vant and Cashman More than a Hospital, 232-3.
35. UAA Accession No. 80-162 Item 282 Glaucoma Diagnostic Clinic, 1965; UAA Accession No. 80-162 Item No. 282 Homan to Boyd 28 February 1967; Macbeth, Department of Surgery, 294; Vant and Cashman, More than a Hospital, 305; Houston, Steps on the Road to Medicare, 127; UAA Accession No. 80-162 Item No. 159 Second Brief from the Glaucoma Diagnostic Clinic August 1969.
36. Maralynne Hawkins, Peggy Kaminski, and Iris Odynski, Oral Interview, 19 November 2015; Maralynne Hawkins, Glaucoma Clinic Staff Records, n.d.
37. Andrew Crichton and Ian MacDonald, “Ronald Casey, MD, FRCSC,” *Canadian Journal of Ophthalmology* 42 no. 2 (2007): 343.
38. UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1972-73; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1973-74; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988; UAA Accession No. 98-110 Item No. 9 Faculty Response to Special Survey 1991; “Deaths,” *Canadian Medical Association Journal* 176 no. 9 (24 April 2007), 1379.
39. Canadian Orthoptic Council, “History of Orthoptics in Canada,” September 1993, iii; Vant and Cashman, More than a Hospital, 233-4.
40. Canadian Orthoptic Council, “History of Orthoptics in Canada,” September 1993, iii; UAA Accession No. 80-162 Item No. 358 Currie to Hallin 11 June 1969; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1974-75; Rod Morgan, short cv, 19 October 2015.
41. UAA Accession No. 93-11 Item no. 12 Pearce to Goldsand 19 April 1989; William Pearce, Curriculum Vitae, May 2010; Brad Wakeman, email to Judith Friedman 21 September 2016.
42. UAA Accession No. 80-162 Item No. 159 Boyd to Macbeth 29 November 1968; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1970-71; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1971-72; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1973-74; Reid Schindler, Written Interview, 24 April 2016; UAA Accession No. 98-110 Royal College of Physicians and Surgeons Survey Report 1987.
43. UAA Accession No. 98-110 Item No. 9 RCPSC Pre-Survey Questionnaire 22 September 1992; James Lewis, Oral Interview, 10 December 2015; James Lewis, email to Judith Friedman 9 March 2017.
44. UAA Accession No. 80-162, Item No. 358, Maiani to Blakney 5 June 1969; UAA Accession No. 80-162, Item No. 282, Orthoptic Training Application 2 June 1969; UAA Accession No. 80-162 Item No. 358 Currie to Hallin 11 June 1969; UAA Accession No. 72-55 Item No. 59 Department of Ophthalmology Annual Report 1969-70; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1970-71; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1971-72.

45. UAA Accession No. 85-108 Item No. 30 Boyd to Cameron 8 November 1977; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988; UAA Accession No. 93-11 Item no. 12 Pearce to Goldsand 19 April 1989; UAA Accession No. 98-110 Special Survey Pre-Questionnaire November 1990.
46. J. Winston Duggan and R. E. Hatfield, “Phlyctenular Keratoconjunctivitis Among Canadian Eskimos and Indians,” *American Journal of Ophthalmology* 46 no. 2 (Aug 1958): 210; UAA Accession No. 80-162 Item No. 1 Report From the University of Alberta to the American Association of Medical Colleges and the Council on Medical Education of the American Medical Association ca. 1956; Maureen Lux, *Separate Beds: A History of Indian Hospitals in Canada, 1920s-1980s*, (Toronto: University of Toronto Press, 2016), 47, 60-1.
47. Lux, *Separate Beds*, 158-9.
48. UAA Accession No. 80-162 Item No. 158 Boyd to MacKenzie 30 October 1970; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1970-71; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1971-72; Henry Wyatt, Oral Interview, 12 October 2015; Sixten S. R. Haraldson, *Evaluation of the Canadian Eskimo Health Service*, (Northwest Territories: 1974), 33.
49. UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1971-72.
50. From the 1950s interns and surgical residents trained at the Camsell under Drs. Meltzer and Mattas. Lux, *Separate Beds*, 60-62. UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1970-71; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1971-72; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988; Lin Leong-Sit, Oral Interview, 17 February 2016; UAA Accession No. 98-110 Royal College of Physicians and Surgeons Survey Report 1987.
51. UAA Accession No. 98-110 Special Survey Pre-Questionnaire November 1990.
52. Boyd to Woywitka 27 May 1956; Boyd to Woywitka 27 January 1966; Nicholas Woywitka, Royal Alexandra Hospital Ophthalmic Archives, March 1995; Reid Schindler, Written Interview, 24 April 2016; UAA Accession No. 81-70 Item No. 240 Department of Ophthalmology Annual Report 1975-76; UAA Accession No. 98-110 Special Survey Pre-Questionnaire November 1990.
53. UAA Accession No. 80-162 Item No. 159 Second Brief from the Glaucoma Diagnostic Clinic August 1969; Maralynne Hawkins, *Glaucoma Clinic Staff Records*, n.d..
54. UAA Accession No. 80-162 Item No. 159 Second Brief from the Glaucoma Diagnostic Clinic August 1969; UAA Accession No. 80-162 Item No. 158 Boyd to MacKenzie 30 October 1970; Maralynne Hawkins, *Glaucoma Clinic Staff Records*, n.d..
55. UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1973-74; Maralynne Hawkins, *Glaucoma Clinic Staff Records*, n.d.; Maralynne Hawkins, Peggy Kaminski, and Iris Odynski, Oral Interview, 19 November 2015
56. Rod Morgan, email to Judith Friedman, 19 April 2017.
57. Canadian Orthoptic Council, “History of Orthoptics in Canada,” September 1993, iii; UAA Accession No. 80-162 Item No. 358 Currie to Hallin 11 June 1969.
58. UAA Accession No. 72-55 Item No. 59 Department of Ophthalmology Annual Report 1969-70; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1970-71; Rod Morgan, email to Judith Friedman 28 October 2015; UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1972-73; Minutes of the Canadian Orthoptic Council, 24 June 1972.

59. Canadian Orthoptic Council Report to Canadian Ophthalmological Society 15 April 1985; Minutes Executive Meeting Canadian Orthoptic Council, 27 January 1989. Alberta report to Canadian Orthoptic Council, 15 June 1990; Alberta report to Canadian Orthoptic Council 18 June 1991.
60. Schloss, “Jewish Retrospective,” 15; Macbeth, Department of Surgery, 125-126; Watson, “Obituary,” 51.
61. Schloss, “Jewish Retrospective,” 15.
62. UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1970-71.
63. UAA Accession No. 80-162 Item No. 157 Department of Ophthalmology Annual Report 1971-72; UAA Accession No. 91-20-73 PAC Report Ophthalmology August 1988; UAA Accession No. 91-20-73 PAC Report Ophthalmology Appendix August 1988.
64. Garry Drummond, Written Interview, 8 December 2015.
65. UAA Accession No. 80-162 Item 295 File 10-10-D-11 Levey to Ower 3 October 1941.
66. UAA R. Newton Papers Accession No. 68-1 Item 3-4-4-10-4 Council of Faculty of Medicine Minutes 20 November 1944; Robert Lampard, *Deans Dreams and a President: The Deans of Medicine at the University of Alberta 1913-2009*, (Red Deer: Robert Lampard, 2011), 58, 75; John W. Scott. *The History of the Faculty of Medicine at the University of Alberta 1913-1963*, (Edmonton: The University of Alberta, 1963), 24-5; David A.E. Shephard, *The Royal College of Physicians and Surgeons of Canada 1960-1980* (Ottawa: The Royal College of Physicians and Surgeons of Canada, 1985), 1-2, 19-20, 235-237, 337; Royal College of Physicians and Surgeons Council, “Nucleus Committee,” 25 May 1944, pp. 20-21.
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200 FT.

Congratulations to the Department of Ophthalmology and Visual Sciences and the Faculty of Medicine and Dentistry at the University of Alberta, with special recognition to historian Dr. Judith Friedman PhD and Department Chairman Dr. Karim Damji MD, FRCSC, MBA, on the creation of this wonderful book.

Looking Back, Seeing the Future: Over 80 Years of Education, Research and Outstanding Patient Care by the Department of Ophthalmology and Visual Sciences at the University of Alberta, outlines the rich history of the evolution of the Department of Ophthalmology at the University of Alberta, dating from inception in 1923 to the present. It narrates the Department's past and includes a glimpse into the future in an inspiring "afterword" written by Dr. Damji. As one of countless individuals interviewed for this book, I had the opportunity to witness first-hand the tenacity and tireless precision with which Dr. Judith Friedman undertook to search out and confirm the detail and accuracy of this historical record. I believe that anyone interested in the History of Medicine and, in particular, the History of Ophthalmology in Canada will find this book fascinating.

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UNIVERSITY OF ALBERTA
FACULTY OF MEDICINE & DENTISTRY
Department of Ophthalmology and Visual Sciences

70 FT.
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