



DISCOVER

**BIOLOGICAL
SCIENCES**

GRADUATE
STUDIES

Faculty of
SCIENCE
University of Alberta



THE SCIENCE OF LIFE

BIOLOGY

THROUGH THE DEPARTMENT OF BIOLOGICAL SCIENCES YOU CAN STUDY ALMOST ANY ASPECT OF LIFE IMAGINABLE.

Our award-winning, internationally recognized faculty study biological processes ranging from microbial antibiotic resistance, to polar bear habitat selection.

DIVERSITY

WE OFFER MSC and **PHD PROGRAMS** that investigate fundamental biological problems from molecular pathways to global ecological scale, and across geological time.

Our graduate students study existing and ancient life forms including viruses, bacteria, fungi, nematodes, plants, insects and other invertebrates, fish, birds, and mammals, as well as extinct plants, fish, reptiles and dinosaurs.

We offer the opportunity to use unparalleled interdisciplinary approaches that encompass proteomics, genomics, structural biology, chemical biology, next generation sequencing, molecular biology, genetics, biochemistry, mathematical modelling, GIS analysis, quantitative and population genetics, behavioural, population, community, evolutionary, and molecular ecology, state-of-the-art wildlife monitoring, habitat modelling, mathematical/simulation modelling, and field camps.

WORLD-CLASS FACILITIES

THE DEPARTMENT OF BIOLOGICAL SCIENCES is home to world-class facilities that support unparalleled multidisciplinary research approaches. In addition to nine superb biological collections, our facilities include the following:

- Bamfield Marine Sciences Centre
- Advanced Microscopy Facility
- Aquatics Facility
- GIS Facilities
- Biogeochemical Analytical Laboratory
- Drosophila Service Unit
- Greenhouses
- Low-Level Mercury Analytical Laboratory
- Microarray and Proteomics Facility
- Molecular Biology Service Unit

EXCEPTIONAL PROFESSIONAL DEVELOPMENT

MANY OPPORTUNITIES EXIST FOR PROFESSIONAL DEVELOPMENT INCLUDING:

- Conference participation, attendance, and organization
- Outreach to community organizations, government agencies, stakeholder groups, service agencies, local and national media, grade school children, and undergraduates
- Graduate teaching and learning certification
- The chance to be involved in teaching undergraduate students at all levels of their program, including senior research projects
- A variety of workshops and courses sponsored by campus organizations

A photograph of two students, Susan Anthony and Nicole Webster, sitting on a rocky coastline. They are wearing backpacks and are looking down at something in their hands, likely the sea urchins and snails they are collecting. The background shows a blue ocean with white waves crashing against the rocks. The text 'ECOLOGY & EVOLUTION' is overlaid in large white letters, and 'GRADUATE PROGRAM AREAS' is overlaid in smaller white letters below it. A blue banner at the bottom contains the caption.

ECOLOGY & EVOLUTION

GRADUATE PROGRAM AREAS

MSc student **SUSAN ANTHONY** (left) and PhD student **NICOLE WEBSTER-BORDELAIS** (right) collecting sea urchins and snails on the wave-exposed side of Bordelais Island, Barkley Sound, west coast of Vancouver Island, BC



A STRONG COHORT OF EVOLUTIONARY BIOLOGISTS AND ECOLOGISTS

in the Department of Biological Sciences study living and ancient microbes, plants, and animals, and the ways in which they adapt, evolve, and interact with each other and the environment to establish ecosystems.

The manner in which anthropogenic influences and climate change affect ecosystems is a major area of investigation.

RESEARCH AREAS:

- Arctic and Northern Ecosystems
- Biogeochemistry and Ecology of Wetlands, Streams, and Lakes
- Climate Change impact on Ecosystems
- Chemical Ecology
- Conservation Biology
- Ecosystem Function and Change
- Evolution
- Landscape and Spatial Ecology
- Mathematical Biology and Modeling
- Microbial Ecology and Evolution
- Paleontology
- Plant-animal Interactions
- Population Ecology
- Systematics



MOLLECULAR & CELLULAR BIOLOGY

GRADUATE PROGRAM AREAS

Fluorescent micrograph of a *Drosophila melanogaster* ring gland, a neuroendocrine gland used as a model to study steroid hormone regulation. Prepared by **QIUXIANG OU**, Kirst King-Jones lab.



THE DEPARTMENT OF BIOLOGICAL SCIENCES is home to many scientists who use bacterial, plant, and animal models to understand the molecules and mechanisms responsible for fundamental biological processes.

RESEARCH AREAS:

- Cellular and Organismal Adaptation
- Cellular Biogenesis
- Chromatin Structure
- Developmental Genetics
- Hereditary Disease Origin and Progression
- Host-pathogen Interactions
- Immune System Evolution and Function
- Nervous and Endocrine System Function
- Microbial Disease Causation and Antibiotic Resistance
- Plant Biotechnology and Genomics
- Regulation of Metabolism
- Sex Determination

A woman wearing a green knit beanie, a headlamp, and a dark jacket is smiling and holding a small white snowshoe hare. She is in a snowy, wooded area at night. The background is dark with snow-covered branches. The text 'PHYSIOLOGY & DEVELOPMENT' is overlaid in large white letters, and 'GRADUATE PROGRAM AREAS' is below it in smaller white letters. A blue banner at the bottom contains text about a PhD student.

PHYSIOLOGY & DEVELOPMENT

GRADUATE PROGRAM AREAS

PhD student **YASMINE MAJCHRZAK** studying the effects of food limitation in female snowshoe hares outside Kluane National Park, Yukon.



SCIENTISTS IN THE DEPARTMENT OF BIOLOGICAL SCIENCES strive to understand how cells, organs, and organisms develop and function.

RESEARCH AREAS:

- Cell Division
- Cell Biology
- Comparative Physiology
- Embryogenesis
- Endocrinology
- Molecular Physiology of Trees
- Muscle and Nervous System Development
- Neurobiology
- Plant Development and Differentiation
- Vascular Pattern Formation and Differentiation in Plants
- Sex Determination



SO MUCH TO OFFER

STUDENT ORGANIZATIONS

GRADUATE STUDENTS IN THE DEPARTMENT OF BIOLOGICAL SCIENCES are very active in departmental and University affairs, conference organization and participation, and outreach activities that are coordinated by the Biology Graduate Student's Association (BGSA). Each year the BGSA organizes and hosts the large and highly successful R.E. Peter Biology Conference, where hundreds of undergraduate and graduate students present their research findings in symposia and poster sessions. Each R.E. Peter Conference is opened with a plenary talk given by an internationally renowned scientist invited by the BGSA. The BGSA also organizes workshops and social events.

SUPERB COLLECTIONS & MUSEUMS

WE ARE HOME TO OUTSTANDING COLLECTIONS that span the biological sciences and serve as excellent teaching and research resources:

- Cryptogamic Herbarium
- E.H. Strickland Entomological Museum
- Freshwater Invertebrate Collection
- Jim van Es Invertebrate and Malacology (Molluscs) Collection
- Museum of Zoology
- Parasite Collection
- Paleobotanical Collection
- Vascular Plant Herbarium
- Laboratory for Vertebrate Paleontology

EXCELLENT FUNDING OPPORTUNITIES

MAJOR SCHOLARSHIPS ARE AVAILABLE TO GRADUATE STUDENTS through national agencies, as well as Alberta Innovates Health Solutions and Alberta Innovates Technology Futures. Our graduate students also have access to University of Alberta entrance awards, including MSc and Doctoral recruitment scholarships, the Walter H. John's Graduate Fellowship, and the President's Doctoral Prize of Distinction.

A number of smaller general awards are also available at the university and departmental level. Most graduate students accepted to the Department of Biological Sciences receive graduate teaching assistantships, and all students are guaranteed funding for a set period of time upon acceptance.

FUTURE CAREERS

OUR GRADUATE STUDENTS GO ON TO AN ARRAY OF CAREERS that span multiple sectors, including government agencies, industry, education, non-governmental organizations, and academic institutions. Noted careers include:

- Biologists
- Consultants
- Photo-Journalists
- Academic and Industrial Post-Doctoral Fellowships
- Professors and Instructors
- Course Coordinators
- Professional Schools (Medicine, MBA, Law)
- Research Technicians, Scientists, Associates
- Science Writers/Reporters



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