

IRC KeyNotes



**STRATEGIC CONSTRUCTION
MODELING AND DELIVERY**
INDUSTRIAL RESEARCH CHAIR

Research: Career
Paths Study

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Partner: Curtis Llewellyn
of Suncor Energy Inc.

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Researcher: Mohamed
ElBarkouky

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EVENTS

JANUARY 23, 2014

Joint IRC Advisory Committee Meeting
University of Alberta, Edmonton

APRIL 24, 2014

IRC Management Advisory Committee
Meeting
University of Alberta, Edmonton

JUNE 4–5, 2013

Innovation in Construction: Forum 2014
Northlands Expo Centre, Edmonton

INDUSTRY PARTNERS

Aecon Industrial Western

Building Trades of Alberta

Capital Power Corporation

Christian Labour Association
of Canada

Construction Owners Association
of Alberta

Merit Contractors Association

Progressive Contractors Association
of Canada

Suncor Energy Inc.

TransAlta Corporation



Study to enhance construction trades recruitment and retention

Andrea C. Wong

Alberta's labour market is currently defined by a low unemployment rate and a regional skilled labour shortage that has construction industry employers wondering how to best meet labour demands now and into the future. Construction employers are attempting to address this issue by hiring temporary foreign workers and by exploring new ways of mobilizing local labour. Through the Career Paths of Tradespeople project, the Natural Sciences and Engineering Research Council (NSERC) Industrial Research Chair (IRC) in Strategic Construction Modeling and Delivery is investigating a critical dimension of this challenge: how the career paths tradespeople follow affect the available labour supply.

The project revolves around a comprehensive career paths survey developed by Adel Awad, who previously served as the IRC's postdoctoral fellow. Nima Gerami Seresht, PhD student and researcher currently with the IRC, has since taken over the analysis phase of the project.

"The survey collects detailed information about

education and career experience that you might touch on in job interviews, but that isn't usually recorded in a way that can be analyzed," says Gerami Seresht. This data includes information about education and certifications as well as details regarding career progression in relation to construction sectors, project types, and on-the-job training. The survey also solicited responses regarding general demographic characteristics like age, gender, and city of residence.

IRC partners Building Trades of Alberta, Christian Labour Association of Canada, Merit Contractors Association, Progressive Contractors Association of Canada, and Suncor Energy Inc. have been involved in the project since its inception. They not only collaborated with IRC researchers during survey development to ensure the project scope reflected the data needs of industry, but they also distributed the survey throughout their sizable employee and membership bases, thereby facilitating access to a wide range of construction industry personnel. Over 900 responses were collected through the secure online questionnaire from March through August 2013.

► See CAREER PATHS, page 4



Data collected through the Career Paths of Tradespeople Survey

UNIVERSITY OF ALBERTA/ANDREA C. WONG

The survey includes 159 possible questions that allow respondents to report on their career progression from Registered Apprenticeship Program participant all the way up to company owner, if applicable.

Message from the Chair

Sharing knowledge, developing tools for journey ahead



The NSERC Industrial Research Chair in Strategic Construction Modeling and Delivery team

UNIVERSITY OF ALBERTA/BRENDA PENNER

Right to left: Nima Gerami Seresht, Moataz Omar, Andrea Wong, Mohammad Raoufi, Naimeh Sadeghi, Abraham Tsehayae, Nasir Siraj, and Chairholder Dr. Aminah Robinson Fayek
Not pictured: Dr. Mohammed ElBarkouky, Maria Al-Hussein, & Braden Abraham

In the Alberta construction industry, jobs are plentiful, qualified people are in high demand—and the labour market shows no signs of slowing down. According to the Alberta Ministry of Treasury Board and Finance¹, over the past year, Alberta had the highest employment growth of all Canadian provinces, with 78,100 jobs added. For the year ending June 30, 2013, Alberta also achieved record population growth thanks to international and interprovincial migration². Despite this inward migration, job vacancies have persisted, which indicates a shortage of qualified candidates³. Given these trends, how will we meet labour demands now and into the future? The NSERC Industrial Research Chair (IRC) in Strategic Construction Modeling and Delivery team is working to address this very problem through numerous projects.

In IRC KeyNotes, we have previously highlighted the ongoing Labour Productivity Analysis and Modeling study, and the Tracking Tool we developed to help the Association of Construction Workforce Acquisition (ACWA) monitor and report on data involving temporary foreign workers in their employment. This time, in our cover feature about the Career Paths of Tradespeople project, we turn our attention to another angle of the industry's labour sourcing strategy.

When proposing a new project, IRC researchers work closely with industry partners to assess business needs and objectives and to define the project scope, objectives, and end product. These measures ensure that the IRC fulfills academic requirements while providing industry with the best possible solution for the problem at hand. Successful collaboration doesn't end after the initiating and planning stages. Partners and researchers continually work together to develop relevant tools and best practices that will help the Alberta construction

industry lead the way into the future. As Mohamed ElBarkouky points out ("Mohamed ElBarkouky: Building Connections"), the support and involvement of NSERC and our industry partners gives our student researchers real-world exposure to construction issues. It also gives them the opportunity to work directly with industry leaders (see "Curtis Llewellyn: From sea to sky without limits"). This results in smarter tools ready to be adopted immediately, and savvy students who upon graduation enter the workforce as highly qualified personnel.

The continued success of our projects is built on consistent communication and collaboration between researchers and partners for the entire project duration. In the case of the Career Paths of Tradespeople study, a number of partners helped during survey development and distribution. As a group, we are already discussing possible extensions for this project based on the data we have collected so far.

Maintaining a culture of collaboration gives us the flexibility we need to fine tune our research. Working closely with industry enables us to remain current despite any shifting needs and unforeseen challenges that may arise. This is how we keep our research on the cutting edge. ■

Aminah Robinson Fayek, PhD, PEng

NSERC Industrial Research Chair in Strategic
Construction Modeling and Delivery

Professor, University of Alberta

1. Alberta Ministry of Treasury Board and Finance, *Weekly economic review* December 6, 2013 (Edmonton: Alberta Ministry of Treasury Board and Finance, 2013), http://www.finance.alberta.ca/aboutalberta/economic_bulletins/current_economic_review.pdf.

2. Statistics Canada, *The Daily, Thursday, September 26: 2013: Canada's total population estimates, 2013* (Ottawa: Statistics Canada, 2013), <http://www.statcan.gc.ca/daily-quotidien/130926/dq130926a-eng.htm>.

3. Ted Mallett, *Help wanted—Private sector job vacancies in Canada: Q3 2013* November (Toronto: Canadian Federation of Independent Business, 2013), <http://www.cfib-fcei.ca/cfib-documents/rr3312.pdf>.



Partner Profile

Curtis Llewellyn: From sea to sky without limits

Andrea C. Wong

Before moving to Edmonton at the age of 15, Curtis Llewellyn grew up in Squamish, BC, a small town en route to Whistler on the winding Sea-to-Sky highway. Though his own career path has also taken many twists and turns—not all of them expected—Llewellyn has proved that a lifelong enthusiasm for learning takes you places.

Llewellyn's first introduction to the industrial construction sector was as a teenager in the early 1970s, when he spent summers working as a labourer for Dow Chemical. Following graduation, he registered for computer programming courses at the Northern Alberta Institute of Technology (NAIT). In those days, computer programming meant fumbling with punch cards and enduring long delays while waiting for programs to run. In the end, Llewellyn said, "I found it was not for me," so when his summer employer Dow Chemical offered to take him on as a pipefitter apprentice, he seized the opportunity.

In the mid-1970s, a shortage of tradespeople meant work was plentiful. Llewellyn rapidly accumulated work hours, completing his four-year apprenticeship in just three and a half years.

However, by the early 1980s, he was again contemplating going back to school to further his education. "There was no work for pipefitters—or trades in general. Engineers were unemployed." Observing the state of the industry and the economy, and assessing his own interests and strengths, he made a strategic choice: "The only folks doing well were the bankers, and the banks were run by economists. Thus, I became an economist—the idea of doing math seemed easier than writing reports."

While completing his bachelor of arts degree in economics and mathematics at the University of Alberta, Llewellyn again returned to the trades for summer employment, this time as a turnaround supervisor or foreman/manager on construction sites.

Llewellyn was so interested in economics, he began postgraduate studies. However, life took him down a different road, as "I also started a family at the same time—poor planning on my part."

Looking for work that would allow him to support his new family, he was offered a job as an economist, but as the pay was "significantly less" than what he knew he could make as a construction tradesperson, he decided to consider other possibilities.

Through his diverse training and experience in the trades and in academia, Llewellyn had acquired a unique skill set. He had become a skilled communicator adept at acting as an



Curtis Llewellyn, construction director of offsite fabrication at Suncor Energy

SUNCOR ENERGY INC./CURTIS LLEWELLYN

Llewellyn is an active member of the NSERC Industrial Research Chair in Strategic Construction Modeling and Delivery's technical advisory committee, where he represents Suncor. He makes a point of getting involved in the IRC's collaborative research initiatives and events.

intermediary between tradespeople, owners, and engineers. He had a strong background in economics, and could read and understand technical drawings and specifications. He also discovered a knack for planning and forecasting.

Soon enough, he was offered work as a supervisor, then as a project manager, and then as a manager of construction. He was employed in a variety of settings including with industrial construction companies; engineering, procurement, and construction houses; and owners.

Currently, Llewellyn works for Suncor Energy Inc. as construction director for the offsite fabrication team. In this capacity, he represents Suncor on the technical advisory committee of the Natural Sciences and Engineering Research Council (NSERC) Industrial Research Chair (IRC) in Strategic Construction Modeling and Delivery. He has also served as a panelist at the annual Innovation in Construction Forum hosted by the Hole School of Construction Engineering at the University of Alberta.

Llewellyn has built a career on his ability to bring seemingly separate elements—academia and industry, trades and engineering, and economic theory and technical drawings—together so that each informs the other. It comes as no surprise, then, that his vision for the future involves innovation in the form of broad-based collaboration.

"We need to be more innovative, get the trades, construction companies and owners working together, with all groups winning and losing together. If we do not, we will see a decrease in project growth in Alberta," Llewellyn said.

By actively collaborating with the contractors, labour groups, and other construction owners represented in the IRC's partnership base, Llewellyn is already helping the industry take strides toward that future.

"Our world is changing. We need to be competitive, and the easiest [way to make] gains is through proven innovations. For all [these] groups to benefit from innovation, we need to communicate what is available and what has been successful."

He believes such efforts will lead to "increased acceptance" and "ultimately, increased utilization" of new technologies and practices.

He similarly encourages recent university graduates and trades apprentices to draw connections between their own different experiences and areas of learning.

"Go and learn as much as you can, ask questions, try new areas of work, and set the example that every job can be done efficiently and safely."

Above all, Llewellyn says, "Do not let barriers hold you back." ■

CAREER PATHS survey statistical analysis currently in progress

Continued from page 1

The high number of responses is good news to Peter Pilarski, vice president of Merit Contractors Association. In Pilarski's mind, labour strategies focused on immigration programs are only temporary solutions. He said that longer term solutions will require a "collective" effort to attract and recruit Canadians to the trades, and to support them through training and other career development opportunities once they enter the industry's workforce. Results of the Career Paths study will offer insight into how to accomplish these tasks.

This is not the first time that IRC researchers have turned their attention toward sourcing and optimizing skilled labour in a province where human resources are in short supply. Previously, the research group designed a database tool to track and report on statistics regarding hired temporary foreign workers, and the group continues to study labour productivity. The Career Paths of Tradespeople project is unique in that it considers construction employees not only in the contexts of their present organizations, but in the contexts of the many sectors and roles that have contributed to their careers.

"Finding new leaders... will benefit our industry's growth and hopefully we will be better able to compete internationally for investment in Alberta projects."

— **Curtis Llewellyn**

Construction director, offsite fabrication at Suncor Energy Inc.

Specialized training and experience are required for trade positions, so trends in the educational and career trajectories of tradespeople can significantly impact the numbers of qualified candidates looking for work in different construction sectors and at different levels of expertise. By revealing these trends, the Career Paths of Tradespeople project will equip construction stakeholders with the information they require to address the Alberta skilled labour shortage.

Since the survey officially closed, Gerami Seresht has been busy compiling and analyzing the received data. He is applying various methods of statistical analysis to answer questions like "How are people starting their careers? Did they begin as a labourer, as an apprentice, or as a [Registered Apprenticeship Program] student? Do these starting points affect career

progression toward supervisory roles?" and "How does moving around from sector to sector affect someone's career?"

Findings also have significant potential to influence the way employers, labour groups, and educational institutions work together to train construction tradespeople. The results of Gerami Seresht's analysis will be useful in evaluating and refining existing training programs for tradespeople in Alberta, and in identifying potential target areas for new program development.

Merit plans to use the information not only to develop and improve the programs and services they offer to their own members, but also to address industry-wide issues. For the latter purpose, Pilarski says the study's results will prove useful when "working with various levels of government to address any barriers faced by tradespeople making their way through their careers."

To Curtis Llewellyn, construction director for Suncor's offsite fabrication team, the results of the Career Paths study have the potential to impact the industry beyond the training of individual tradespeople. Llewellyn agrees that "[Tradespeople] need to know what opportunities are available to them and what they need to focus on to be successful in their career growth," but he also sees an opportunity for labour groups to use the study's results proactively "to help target their next leaders." Better career development support for tradespeople will also help construction owners—and the industry as a whole.

"Any information to help our contractors grow and become more efficient is positive. Finding new leaders for field construction will benefit our industry's growth and hopefully we will be better able to compete internationally for investment in Alberta projects," said Llewellyn.

Though Gerami Seresht's analysis is still in progress, so far, he finds the results "exciting, and full of research potential." The results of the analysis will provide important feedback regarding education, training, and career development in the Alberta construction industry that will help enhance recruitment practices, on-the-job training, and employee retention. Furthermore, the study's methodology and web-based survey product can be re-used in future to periodically collect career path data. The survey can also be used to target specific groups of construction industry personnel for further study.

Initial results of the Career Paths of Tradespeople survey will be released to participating industry partners in the new year. ■



...to all our 2013 award and appointment recipients!

ERNIE TROMPOSCH

IRC Management Advisory Committee Member
Construction Owners Association of Alberta
NOVA Chemicals Corporation
Outstanding Individual Contribution to the Enrichment of the Hole School of Construction Engineering

MOATAZ OMAR

PhD Candidate and IRC Researcher
Ernie Tromposch Graduate Scholarship

ABRAHAM TESHAYAE

PhD Candidate and IRC Researcher
Robert Stollery/USF and G Insurance Company of Canada Award in Construction Engineering and Management

AMINAH ROBINSON FAYEK

Chairholder
*Killam Annual Professorship
Appointment to NSERC Advisory Committee on University-Industry Grants (three-year term)*



Researcher Profile

EIBarkouky bridges gap between theory and practice

Andrea C. Wong and Caleb Caswell

Though Mohamed EIBarkouky has only occupied the position of postdoctoral fellow for the NSERC Industrial Research Chair (IRC) in Strategic Construction Modeling and Delivery since June 2013, he is a familiar face around the Hole School of Construction Engineering.

Previously, as a PhD student and researcher under the supervision of Dr. Aminah Robinson Fayek, EIBarkouky worked with Petro-Canada (now part of Suncor Energy Inc.) to develop project delivery systems using fuzzy consensus approaches. He learned to integrate both academic and industrial contributions into his work in new and exciting ways, and gained an appreciation of the creative research potential in construction engineering.

After completing his PhD in 2010, EIBarkouky remained in Canada as a senior project engineer with Voice Construction. A year later, opportunity led him back to Egypt where he accepted a position as assistant professor at his former school, the American University in Cairo.

According to EIBarkouky, there are many similarities between the construction industries in Egypt and Canada. Just like in Canada, weather conditions in Egypt pose unique challenges. Although compared with Alberta's average winter temperatures, the Egyptian record winter low of -2°C sounds pleasantly balmy, in summer parts of Egypt have been known to reach alarming highs of 48°C . In both Egypt and Canada, "unavailability of skilled labour is an issue."

However similar their construction industries, EIBarkouky found that the research environment in Egypt differed from the one he had experienced in Canada at the University of Alberta.

"Funds were not available, so graduate students could not devote as much time to conducting rigorous research because they needed to work outside of academia to support themselves as they pursued their education," said EIBarkouky.

This experience contrasted with the IRC's unique industry-academic research partnership that he had experienced as a PhD student.

"Studying with the IRC at the University of Alberta, there are so many available research opportunities. Not only do NSERC and the partners provide funding that allows the students to work directly on research and development, but most importantly they facilitate students' exposure to the industry," he said, adding that "This relationship makes it possible to bridge the gap [between academia and industry] and transfer skills and knowledge directly to construction personnel."

EIBarkouky ultimately decided to return to Canada and accepted his current job as the IRC's postdoctoral fellow. In this position, he combines his familiarity with the IRC's research program with the expertise he has gained during his education and his career so far. For him, "It's an amazing experience because you get to deal with different cultures, different experience backgrounds, and bring everyone and everything together to achieve academic and applied results."



Mohamed EIBarkouky

UNIVERSITY OF ALBERTA/ANDREA C. WONG

Formerly a PhD researcher with the NSERC Industrial Research Chair in Strategic Construction Modeling and Delivery, EIBarkouky has returned to the group in the position of postdoctoral fellow.

He also finds the theoretical basis of the work exciting.

"Many of our theories are brought over from other disciplines, like electrical engineering and business. Fuzzy logic and other artificial intelligence techniques come from the world of process control and information technology, but we have borrowed and adapted them to fit our work," he said.

This emphasis on interdisciplinarity and collaboration are what make the IRC's research so interesting, as "There are so many opportunities for innovation."

As he helps support and coordinate the research efforts of the IRC as a group, EIBarkouky is also continuing his own research with Dr. Robinson Fayek.

"Working with Dr. Robinson Fayek was the best opportunity I got as a student, and I am lucky to be working with her now."

The IRC is just as lucky to have EIBarkouky back on the team. ■

The IRC's previous postdoctoral fellow, Dr. Adel Awad, has since moved on to Major Projects Group Inc. where he currently serves as Project Controls Manager. We wish him all possible success in his new position.



Innovation in Construction FORUM 2014

JUNE 4-5, 2014
EDMONTON EXPO CENTRE
EDMONTON, ALBERTA, CANADA

The Hole School of Construction Engineering invites you to Innovation in Construction: Forum 2014.

Last year's event showcased a diverse array of presenters from Alberta and beyond representing many different perspectives on and expertise in construction. Forum 2014 will continue to showcase high calibre speakers of direct interest to our industry partners and the regional construction industry as a whole.

Join us for:

<p>Engaging presentations featuring renowned experts and case studies of recent, high profile projects</p>	<p>Interactive, hands-on workshops introducing the latest industry software advancements taught by the experts who developed them</p>	<p>Networking and recruitment opportunities with recent engineering graduates</p>
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Joint IRC Meeting on January 23

New collaborations to set course for the future



Dr. AbouRizk and Dr. Robinson Fayek UNIVERSITY OF ALBERTA

Dr. Simaan AbouRizk holds the NSERC IRC in Construction Engineering & Management. Dr. Aminah Robinson Fayek holds the NSERC IRC in Strategic Construction Modeling and Delivery.

On January 23, 2014, representatives of the NSERC Industrial Research Chair in Strategic Construction Modeling and Delivery will be meeting with those of the NSERC Industrial Research Chair in Construction Engineering and Management. The two Chairs, under the direction of Dr. Aminah Robinson

Fayek and Dr. Simaan AbouRizk, respectively, will be meeting to discuss opportunities for collaboration.

The two Chairholders have a long history of working together. Dr. Robinson Fayek joined the University of Alberta's Department of Civil and Environmental Engineering in 1997. With

Dr. AbouRizk and his senior NSERC IRC in Construction Engineering and Management providing mentorship, in 2007 she was awarded an NSERC Associate IRC in Construction Engineering and Management. In 2012, she was awarded her own senior NSERC IRC in Strategic Construction Modeling and Delivery. This Chair retained some of the partners she worked with as an Associate IRC while adding new partners to the group.

The two IRCs and their advisory committees will be discussing areas of their current research programs that may benefit from the amalgamation of their distinct areas of expertise.



STRATEGIC CONSTRUCTION MODELING AND DELIVERY

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