



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

# NSERC Industrial Research Chair in Strategic Construction Modeling and Delivery: Overview of Program

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# Topics

- Overview of IRC Program
- Industrial Research Chair (IRC) 2012-2016
- Structure of IRC Program
- Research Areas and Projects
- Value of IRC to Industry
- Questions and Discussion



# Our Construction Program



- 6 faculty members
  - 3 Industrial Research Chairs (IRC)
- + 75 graduate students
- + 250 graduates
  - leadership positions
- + \$1 million per year in dedicated funding
- + 500 publications
- 19 Annual Innovation in Construction Forums

Hole School of  
Construction Engineering  
FACULTY OF ENGINEERING UNIVERSITY OF ALBERTA



# Our Partnership: NSERC Industrial Research Chair (IRC)



A partnership between the University,  
NSERC, and Industry (Chairholder:  
Aminah Robinson Fayek)



## Funding

- NSERC 50% (research)
- Industry Partners 50% (research)
- University (overhead and salary)

# Objectives of NSERC Industrial Research Chairs



Advance state of the art in the field

Industrially relevant research to solve problems

Innovation to the Canadian construction industry



**Highly Qualified Personnel**



**Advanced Research & Technology**



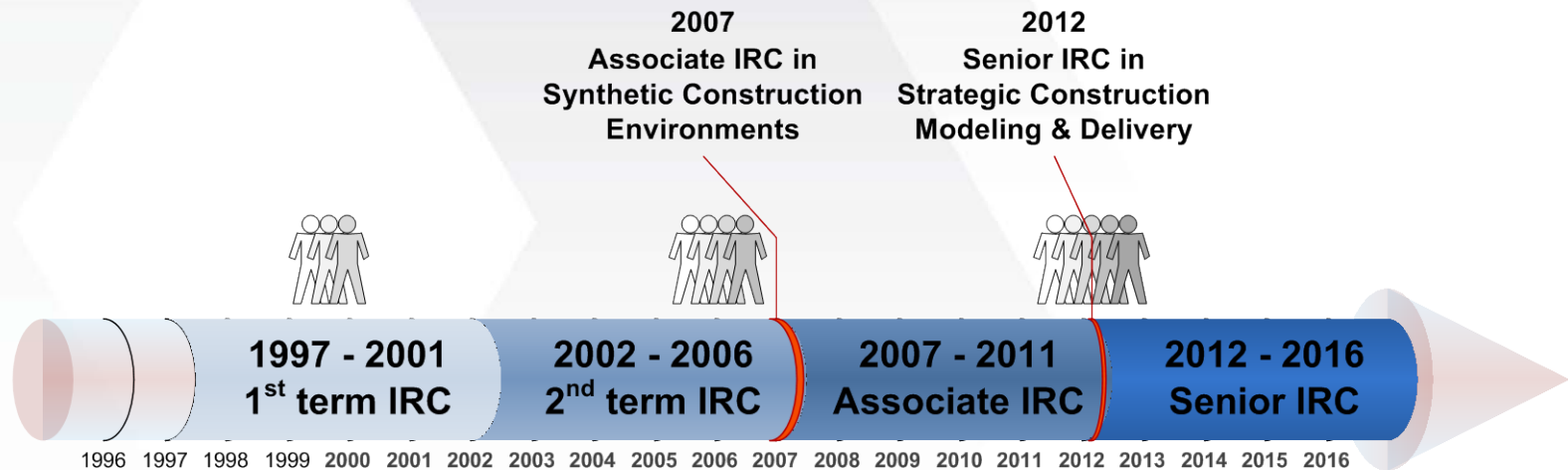
**Knowledge Transfer**

**Products**

# History of IRC Program



**Focus:** Deliver innovation to increase partners' competitiveness and profitability & benefit construction industry as whole



# IRC in Strategic Construction Modeling & Delivery

Industry  
Partners:  
2012-2016



## Owners

- Capital Power Corporation
- Construction Owners Association of Alberta
- Suncor Energy
- TransAlta Corporation

## Contractors/Associations

- Aecon Industrial Western
- Merit Contractors Association
- Progressive Contractors Association of Canada

## Labour Unions/Associations

- Building Trades of Alberta
- Christian Labour Association of Canada



# Research Advisory Committees



**Management  
(Industry &  
University)**

Guide research direction & focus

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Provide strategic support

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Evaluate progress against  
objectives

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Oversee financial matters

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Each brings 20+ years construction management  
experience, international experience

# Research Advisory Committees



**Technical  
(Industry &  
University)**

Scope & details of research  
projects \_\_\_\_\_

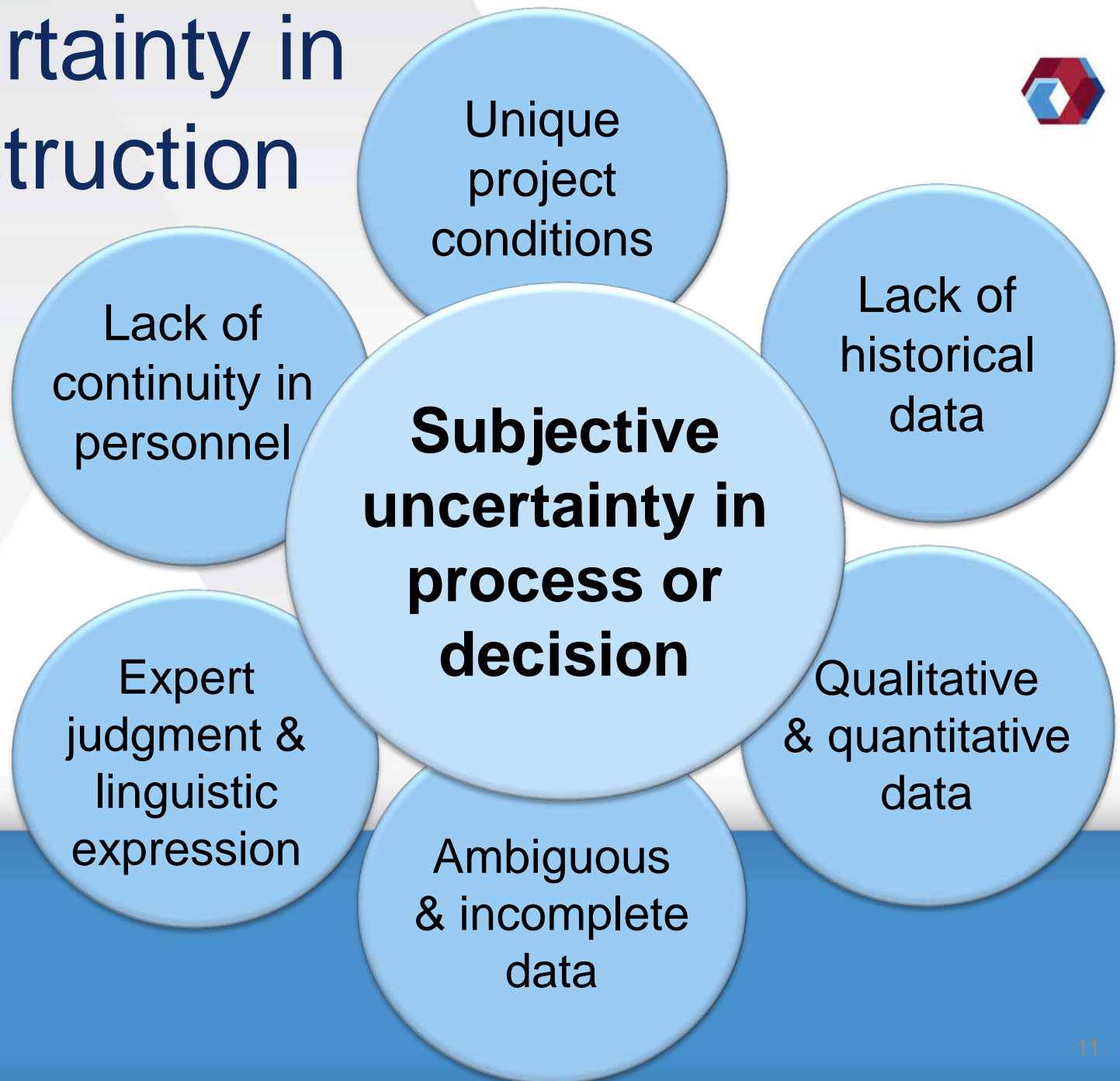
Access to organizations &  
project sites \_\_\_\_\_

Technical guidance to research  
assistants \_\_\_\_\_

Research & technology transfer  
\_\_\_\_\_

Each brings technical skills to assist with detailed  
research activities

# Uncertainty in Construction



# Capturing Industry Expertise



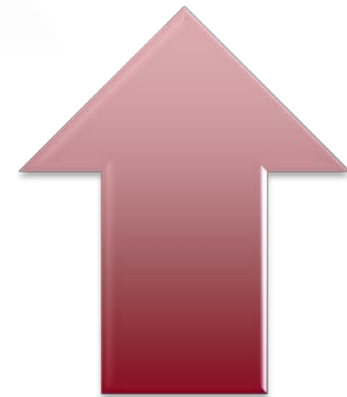
Modeling human & subjective factors critical to decision support



Construction decision-making dependent on experience



More people leaving than entering - capture expertise





Decision support systems based on expert knowledge (fuzzy logic)

Simulation techniques with subjective information

Industry best practices and tools

# Research Themes

# Research Program

## Target Areas in Construction

- Labour Productivity
- Structuring Projects & Teams
- Assessing Competencies & Reducing Risk





# Labour Productivity

Skilled labour shortage:  
need to optimize

Labour = 1/3  
to 1/2 project  
costs:  
productivity in  
decline

Uncertainty:  
numerous  
interacting  
factors  
determine  
productivity

“Connect the  
dots” between  
subjective  
factors &  
productivity



# Structuring Projects & Teams

Alberta:  
high cost  
(19%) &  
schedule  
(17%)  
growth

Project  
magnitudes  
& multiple  
parties

“Identical”  
projects:  
different  
outcomes

Critical  
factors not  
modeled:  
human  
nature, skill  
sets, key  
personnel

Challenge  
in  
transferring  
“lessons  
learned”:  
experience  
& past  
projects





## Assessing Competencies & Reducing Risks

Most  
bankruptcy  
from  
construction  
(2007- 09)  
(16%)

Contractor &  
owner  
competency

More people  
leaving than  
entering: need  
to capture  
expertise

Modeling  
human &  
subjective  
factors critical  
to decision  
support

# Sample Research Projects



Labour  
productivity  
modeling

Career paths  
of  
tradespeople

Structuring  
projects and  
teams



Owner versus  
contractor  
roles

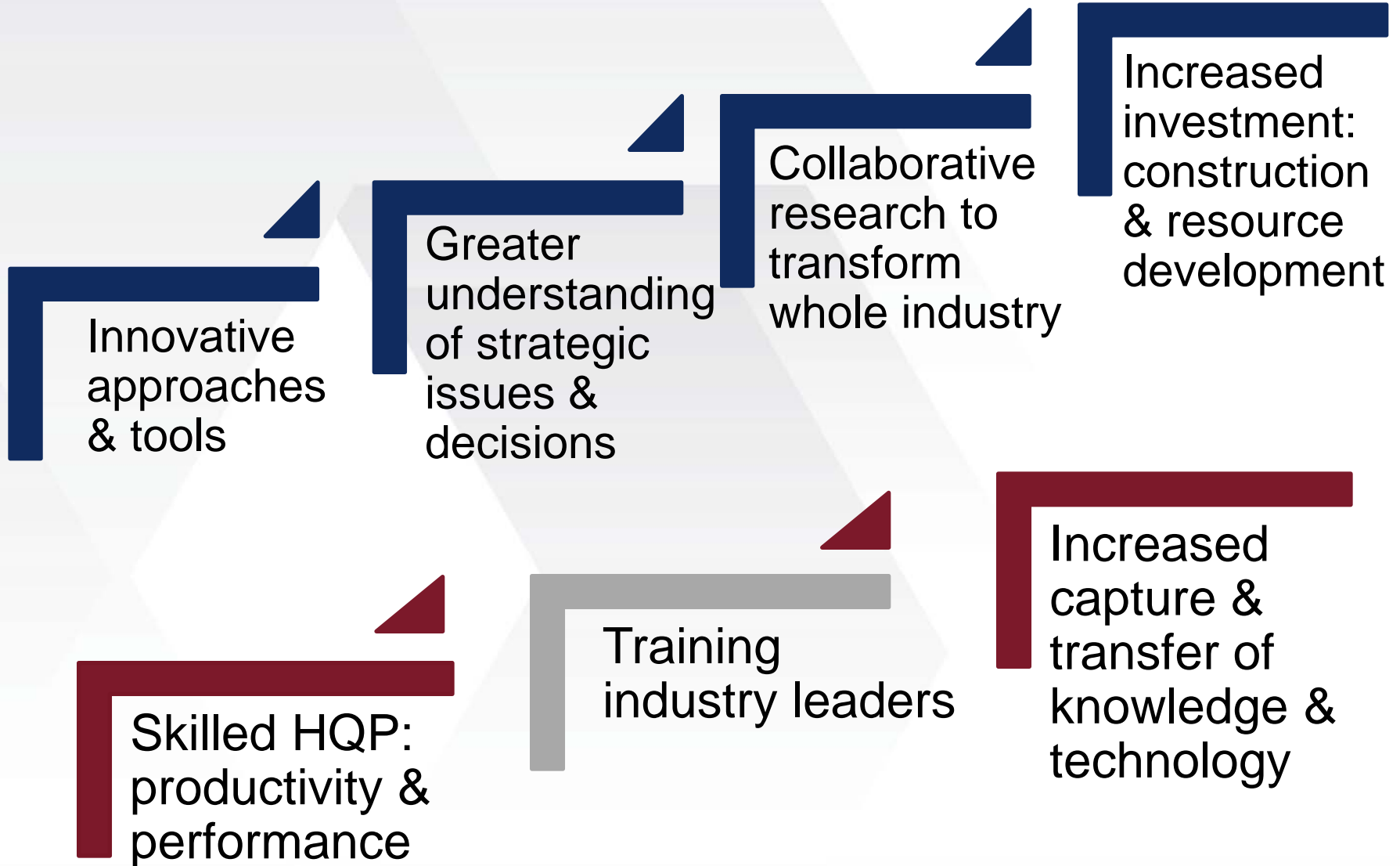


Contractor  
pre-  
qualification  
tools



Project risk  
analysis

# Value of IRC to Industry



# Thank you

# Questions & Discussion

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