IE Courses and Options
Presenters

• **Professor Michael Gruninger**
  - *Information Engineering*

• **Professor Daniel Frances**
  - *Operations Research*

• **Professor Paul Milgram**
  - *Human Factors*
Information Engineering

Professor Michael Gruninger

http://stl.mie.utoronto.ca/gruninger.html
Integrated Proactive Medicine

Information

Reasoning

Personalized CDS Knowledge Base (RDF/OWL, Linked Data)
- Drug package inserts
- National regulations & insurance coverage
- Biomedical ontologies & models
- Certified genetic tests, labs & cost estimates
- Clinical study & trial results
- Pharmacogenomic data

Embedded Clinical Decision Support Systems (e.g., Web Services, Arden Syntax, Gellio)
- Individual molecular data
- Individual clinical data / health record
- Physician order entry

Recommendations
- Alerts
- Reminders

Improved clinical workflows and decision making
From Information to Knowledge to Action: Toronto 311

**Synthesize**

Level $i$

$\Rightarrow$ S: ask contractor to redo road

Level $i-1$

**Merge**

$\Rightarrow$ with contract information

**Extend/Join**

$\Rightarrow$ combine with other pot hole reports

**Predict**

where pot holes may occur

**Verify**

pot hole problem exists

- precondition
- data retrieved
- new/modified hypothesis
Information Engineering

- Information Engineering is the engineering of
  - Information, knowledge, and decision support, and
  - the systems with which they are delivered
  to support the achievement of organizational goals through the efficient and flexible operation of business processes.
Information Engineers...

• ...form a bridge between the technical side (software engineers, data modelers) and the business side (business analysts, process planners, managers)

• Focus on the strategic role of information systems in achieving business goals
  – not only how to build an information system but also why
3rd Year Curriculum Overview

FALL

Core Courses
- MIE343: Industrial Ergonomics and the Workplace
- MIE350: Design and Analysis of Information Systems
- MIE360: Systems Modelling and Simulation

Technical Electives (choose one)
- MIE344: Ergonomic Design of Information Systems
- MIE354: Business Process Engineering
- MIE365: Operations Research III: Advanced OR

CS/HSS Elective
Natural Science Elective
3rd Year Curriculum Overview

WINTER

Core Courses
- MIE335: Algorithms & Numerical Methods
- MIE363: Resource and Production Modelling
- MIE364: Quality Control and Improvement

Technical Electives (choose one)
- MIE345: Case Studies in Human Factors and Ergonomics
- MIE367: Cases in Operations Research
- MIE465: Analytics in Action
- MIE469: Reliability and Maintainability Engineering

CS/HSS Elective
## 4th Year Curriculum Overview

### FALL

**Core Courses**
- MIE463: Integrated System Design
- MIE490: Capstone Design

**Technical Electives:**
- MIE344: Ergonomic Design of Information Systems
- MIE354: Business Process Eng
- MIE451: Decision Support Systems
- MIE498H/Y: Research Thesis

Full list of Technical Electives available at [2018-2019 Academic Calendar](#)

### WINTER

**Core Courses**
- MIE459: Organization Design
- MIE490: Capstone Design

**Technical Electives:**
- MIE498H/Y: Research Thesis
- MIE457: Knowledge Modelling and Management
- MIE465: Analytics in Action
Information Engineering Faculty

- Michael Gruninger
- Christopher Beck

- Mariano Consens
- Scott Sanner (No photo)

- Mark Fox
Careers for Information Engineers

- Designer (products, interfaces)
- Systems Analyst, Systems Architect
- Financial services
- Manager
- Consultant
- Start-Up Company
Graduate Studies for Information Engineers

- Data analytics / Big Data
- Artificial Intelligence
  - Knowledge representation and reasoning
  - Semantic Web
  - Intelligent manufacturing
  - Intelligent scheduling