



Mechanical & Industrial Engineering
UNIVERSITY OF TORONTO

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Toronto, ON M5S 3G8

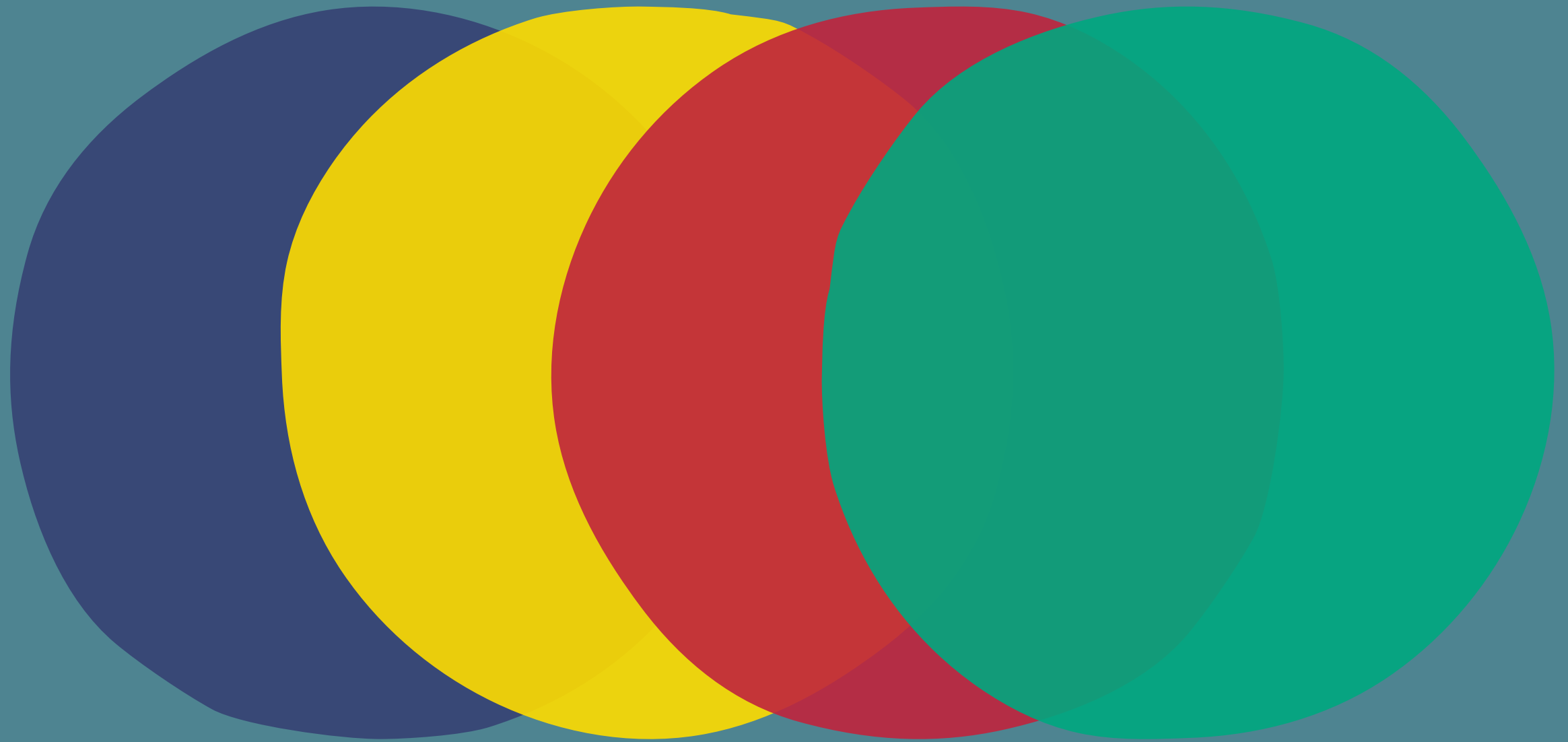
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momentum

Alumni & Industry Magazine
Mechanical & Industrial Engineering
University of Toronto



Volume 1, Issue 1
Engineering by Design



Momentum

—Energy of a physical object in motion.

—Force of a nonphysical process, such as an idea or a course of events.

Momentum

Alumni & Industry Magazine

Volume 1, Issue 1

Engineering by Design

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Message from the Chair



As Chair of the Department of Mechanical & Industrial Engineering (MIE) since July 2009, I am pleased to introduce our new magazine, *Momentum*. MIE has been moving rapidly to achieve a high reputation worldwide in education and research.

In this inaugural issue, I would like to share with our alumni and industry partners the recent design initiatives of our Department. Design experience is a vital part of our students' engineering education: understanding the multidisciplinary nature of design, new technologies, innovations and acquiring the industry perspective, are essential to both academia and industry.

With this in mind, MIE has recently established the University of Toronto Institute for Multidisciplinary Design & Innovation (UT-IMDI) to provide students with practical, industry-based summer internship opportunities.

Our capstone design courses—introduced in the Industrial Engineering program in 2010 and in the Mechanical Engineering program in 2011—put fourth-year students' newly acquired engineering skills to the test.

Working in small teams and with industry partners, students are challenged to find an innovative solution to an open-ended, industry-generated engineering problem.

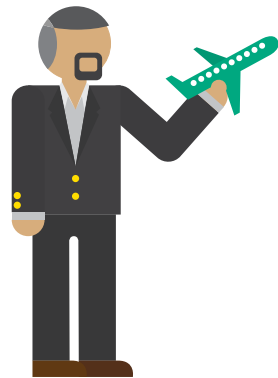
Design activity is further enhanced by the NSERC Chair in Multidisciplinary Engineering Design established in 2012 and held by Professor Kamran Behdinan. As part of the NSERC Design Chair program, we have also appointed endowed Design Chairs: The Wallace G. Chalmers Chair held by Associate Professor Axel Guenther, and the Clarice Chalmers Chair of Engineering Design held by Associate Professor Greg A. Jamieson, creating a 'design hub' for U of T Engineering.

This first edition of *Momentum* introduces you to a number of students, alumni, industry partners and researchers who are pushing engineering design and design education ahead. I hope you will join us and take part in our community, as we continue to gain momentum.

Jean W. Zu
Professor & Chair

Industry Experience, by Design

Prof. **Kamran Behdinan** leads the new Institute for Multidisciplinary Design & Innovation.



It's the middle of the fall term and Professor Kamran Behdinan is receiving student resumes for the next round of industry-based summer internships, though the application process has not even opened yet. "U of T Engineering students are very proactive," he says.

Word is spreading

Behdinan heads the University of Toronto Institute for Multidisciplinary Design & Innovation (UT-IMDI), which launched in 2012. The institute facilitates summer internships for U of T Engineering students, with the support of industry-based, value-added projects.

During the institute's inaugural year, nine undergraduates from the departments of Mechanical & Industrial Engineering, Materials Science & Engineering and Division of Engineering Science, landed exclusive aerospace jobs with Bombardier, Pratt & Whitney Canada and UTC Aerospace Systems, completing their assignment over the summer and working under the supervision of a senior engineer and a faculty member.



"I see a lot of excitement to establish multidisciplinary engineering design education across the whole Faculty"

From designing process maps, to standardizing business procedures, to modelling the costs of flight delays and cancellations, students had the opportunity to design solutions for these topics, among others.

As the institute's inaugural director, Behdinan—who joined the Department in 2011—was recently named the NSERC Chair in Multidisciplinary Engineering Design. He was previously the founding Chair of the Department of Aerospace Engineering and NSERC Engineering Design Chair-holder at Ryerson University. As a researcher, Behdinan's focus is on multifunctional, lightweight structures, as well as improving aerospace and automotive systems by refining multi-scale simulations of nano-structured materials. In addition, he serves as the president of the Canadian Society of Mechanical Engineering (CSME).

"UT-IMDI is a good experiential learning opportunity for students," he says. "They gain experience working on a real engineering project in a real-life setting. It's good for their career—whether they want to go to industry, or they want

to go on to a graduate program. Ultimately, they gain a better understanding of what the industry needs are."

First-time UT-IMDI student **Kristina Menton** (MechE 1T4), appreciated the level at which her company, Pratt & Whitney, designed for her a true employee experience. Her project, the validation of emissions for six of Pratt & Whitney's engine models, gave her the opportunity to assist her supervisor, John Hu, with testing at the Montréal facility.

"What I appreciated about being a UT-IMDI student is that they really put extra into my experience," says Menton, who is also completing a minor in sustainable energy. "When I went to Montréal, I got a tour of the plant and met a lot of people. It was above and beyond."

"Before going to Pratt & Whitney, I really knew nothing about professional engineering and industry research and development. I didn't know the processes and just how many different departments and areas there are within a company doing R&D. It opened my eyes."

“We’re building emphasis on the continuity of engineering design in engineering education”



“It’s a short period of time. The students have to deliver,” Behdinan explains. “Projects are well-defined and monitored very well. We also provide additional faculty mentorship, someone the students can approach if they have any questions during the course of the project.”

In practice, a mechanical engineer must be able to communicate with an electrical engineer; an industrial engineering may consult with a civil engineer, and so on. As part of his mandate as NSERC Chair in Design, Behdinan is seeking ways to enhance engineering design education. That means establishing multidisciplinary design projects, as well as continuing to incorporate industry collaboration and support, are top priorities.

“I see a lot of excitement to establish multidisciplinary engineering design education across the whole Faculty,” he says. To achieve this, the goal will be to establish capstone projects comprised of multi-departmental student teams. The projects would span all nine undergraduate engineering programs at U of T Engineering.

“We’re building emphasis on the continuity of engineering design in engineering education,” says Behdinan who is

enthusiastic about the support he’s received from Dean **Cristina Amon** and faculty advisors, who together will work to improve student-design opportunities even further.

The institute is also partnering with additional companies in its second year. By the fifth year, it will expand to include companies other than aerospace, to more than 70 summer projects annually. Though UT-IMDI was established in the Department of Mechanical & Industrial Engineering, students in all engineering disciplines have the opportunity to apply, based on the project needs, through a competitive interview process. While current opportunities will be aimed for undergraduates, there are plans to expand to the MEng program.

“Our students are very engaged. They want the institute to grow and evolve because they see the benefits,” says Behdinan who knows the impact U of T Engineering students will have on the needs of Canadian industries.

“The institute is moving forward much faster than I could have ever imagined.”

July 1, 2011 to December 1, 2012

Honours & Awards

Alumni

International

Chorafas Foundation: Dimitri N. Chorafas Research Award
Michael Jong Kim (PhD IndE 1T2)

National

Canadian Microelectronics Corporation (CMC): Douglas R. Colton Medal for Research Excellence
Xinyu Liu (PhD MechE 0T9)

University of Toronto

Arbor Award
Ronald Factor (IndE 7T0)
William Kirkpatrick (Eng Bus 5T3)
Stan Gasner (IndE 6T4)

Engineering Alumni Association (EAA) Engineering Hall of Distinction
William Buckley’s (MechE 7T1)
J.E. Robertson (MechE 7T1, MEng 7T7)
Dr. Christopher F.M. Twigge-Molecey (MechE MASc 6T9, PhD 7T2)

Engineering Alumni Association (EAA) L.E. Ted Jones Award of Distinction
Wayne Choi (IndE 1T1)
Andrew Oldham (MechE 1T1 + PEY)

Honorary Graduated
Pierre Rivard (MEng MechE 9T4)

Regional: Provincial & City-wide

YWCA Toronto:
Women of Distinction Award
Anne Sado (IndE 7T7)

Honours & Awards



Award period of July 1, 2011 to December 1, 2012. We apologize if your award is not listed.

Please contact Nina Haikara at nina@mie.utoronto.ca with details about your award and we will add it to our online record.

Faculty

International

Alexander von Humboldt Foundation
Andreas Mandelis

American Association for the Advancement of Science (AAAS): Fellow
Sanjeev Chandra
Andrew A. Goldenberg
Andreas Mandelis
Chul B. Park

American Physical Society (APS): Joseph F. Keithley Award
Andreas Mandelis

American Psychological Association (APA): Franklin V. Taylor Award
John W. Senders

American Society of Mechanical Engineers (ASME): Fellow
Sanjeev Chandra
David A. Steinman

American Society of Mechanical Engineers (ASME): Heat Transfer Memorial Award
Javad Moʃtaghimi

American Society of Mechanical Engineers (ASME): M. Eugene Merchant Manufacturing Medal
Chul B. Park

British Society of Rheology (BSR): Annual Award
David F. James

European Society for Experimental Mechanics (EURASEM): Robert Hooke Award
Shaker A. Meguid

Hispanic Engineer & Information Technology (HE&IT) magazine: Top Hispanic Women in Technology
Cristina H. Amon

Hispanic Engineer National Achievement Awards (HENAAC): Great Minds in STEM, Hall of Fame Inductee
Cristina H. Amon

Human Factors & Ergonomics Society (HFES): Jack A. Kraft Innovator Award
John W. Senders

Ig Nobel Prize: Public Safety
John W. Senders

The Korean Academy of Science & Technology (KAST): Fellow
Chul B. Park

International Society of Engineering Asset Management (ISEAM): Fellow
Viliam Makis

Society of Women Engineers (SWE): Achievement Award
Cristina H. Amon

National

Canadian Academy of Engineering (CAE): Fellow
Michael W. Carter

Canadian Association of Physicists (CAP): CAP-INO Medal for Outstanding Achievement in Applied Photonics
Andreas Mandelis

Canadian Society for Mechanical Engineering (CSME): Fellow
David Sinton
Pierre E. Sullivan
Murray J. Thomson

Canadian Society for Mechanical Engineering (CSME): C.N. Downing Award
Chul B. Park

Canadian Society for Mechanical Engineering (CSME): Robert W. Angus Medal
Jean Zu

Engineering Institute of Canada (EIC): Fellow
Murray J. Thomson

Royal Society of Canada (RSC): Fellow
Cristina H. Amon
Chul B. Park

Women of Influence Magazine: Ranked Among Canada’s 25 Most Influential Women
Cristina H. Amon

Regional Awards: Provincial & City-wide

Ontario Ministry of Economic Development & Innovation: Early Researcher Awards (ERA)
Aimy Bazylak
Timothy C. Y. Chan

Ontario Professional Engineers Awards (OPEA): Engineering Medal for Research & Development
Shaker A. Meguid

Ontario Professional Engineers Awards (OPEA): Young Engineer Medal
Goldie Nejat

University of Toronto

Connaught Innovation Award
Yu Sun

Connaught New Researcher Award
Timothy C. Y. Chan

Distinguished Professor Award in Plasma Engineering
Javad Moʃtaghimi
McLean Award
Craig A. Simmons

President’s Teaching Award
Jim Wallace

Mechanical & Industrial Engineering

MIE Teaching Award
Markus Bussmann

Staff

University of Toronto

Excellence Through Innovation Award
Brenda Fung, Graduate Program Administrator

Faculty of Applied Science & Engineering

Quality of Student Experience Award
Shannon Osborne (IndE 0T6), External Relations & Student Life Liaison

Students

International

American Society of Mechanical Engineers (ASME): Centennial Thesis Award
Michelle Chen (MechE 1T2)

National

Government of Canada: Vanier Canada Graduate Scholarship
Matthew Ooms (MASc MechE 1T2)

Canadian Society for Mechanical Engineering (CSME): Gold Medal Award
Andrew Pienkow (MechE 1T1 + PEY)

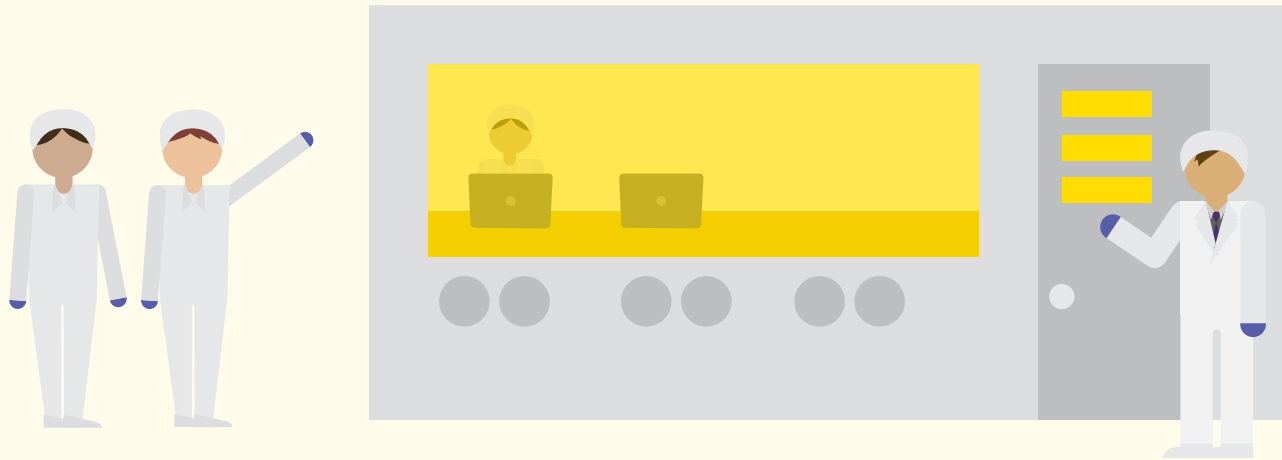
University of Toronto

Gordon Cressy Student Leadership Award
Michelle Chen (MechE 1T2)
Stephanie Chow (IndE 1T1 + PEY)
Moontasir Kabir (MechE 1T1 + PEY)
Wayne Lin (IndE 1T1 + PEY)
Andrew Oldham (MechE 1T1 + PEY)
Marc Pilon (MechE 1T0 + PEY +1)
Kathryn Tang (MechE 1T1 + PEY)
Sabrina Tang (IndE 1T1 + 1)

Department of Mechanical & Industrial Engineering
Chalmers Design Award
Ayman Alabdallah (MechE 1T2)

Chairs of Design[☼]

How MIE is creating a hub of design activity.



Looking in through the yellow-tinted UV glass of the Microfluidics Foundry laboratory, it casts the researchers inside as actors in a doomsday film.

PhD candidate **Lian Leng** (MIE) and MASc student Arianna McAllister (IBBME) are outfitted in head-to-toe protective white suiting, including hairnets and slips that cover their shoes. But the clean room is not a film set. It's a space where designs are realized, with the goal of advancing today's biomedical applications.

"It's a multi-user facility, and a good opportunity for different disciplines to interact," says Mechanical Engineering Associate Professor **Axel Guenther**, who is cross-appointed to the Institute of Biomaterials and Biomedical Engineering (IBBME). "It's a modern kitchen, not unlike cooking. You start with a design, go through a recipe, bake, and come out with a microdevice made of plastic and rubber."

A graduate of the Swiss Federal Institute of Technology, ETH Zürich, Guenther's research group examines microenvironments for applications in materials science and biomedicine. Often described as 'lab-on-a-chip,' these tiny-channeled devices—functioning like blood vessels—can process one or more laboratory tests through a single small chip.

"The vision behind this field is to shrink conventional lab equipment," says Guenther, who in 2010 received the Canadian Society of Mechanical Engineering I. W. Smith Award for outstanding achievement in creative mechanical engineering within 10 years of graduation.

Guenther's team is receiving widespread media attention for their 3-D 'skin printer'—a device that prints engineered human tissue—first conceived by Leng during her Master's thesis. The research collaboration includes Associate Professor Milica Radisic of the Department of Chemical

"From a design perspective, we're creating an opportunity to open MIE to the whole Faculty"

Engineering & Applied Chemistry and core professor at IBBME, and Dr. Marc Jeschke at Sunnybrook Health Sciences Centre and Research Institute.

The skin printer could have multiple medical applications, most notably skin generation for hospital burn units.

"The goal of our research community is to produce devices that are seamless. Simple, easy to understand, but at the same time very intuitive," says Guenther who was recently appointed to the Wallace G. Chalmers Chair of Engineering Design.

As Chair, he is among a group of MIE researchers looking to create a design hub that spreads across U of T Engineering.

Made possible through a generous gift by the Chalmers family, the Wallace G. Chalmers Chair and Clarice Chalmers Chair of Engineering Design were established at MIE in 1995. The family had previously supported a Creative Design Research Unit in 1986 and established the Design Scholarship Awards in 1987.

MIE colleague, Associate Professor **Greg Jamieson**, is the first Industrial Engineering faculty member to be appointed to the Clarice Chalmers Chair of Engineering Design.

"Is there a coherent vision of design in Industrial Engineering? As the Chalmers Chair, I want to ask that question," says Jamieson. "My expectation is that we will discover a design perspective in industrial engineering that doesn't look very different from another engineering discipline."

Jamieson (MASc MIE 9T8, PhD MIE 0T3) specializes in human-automation interaction and human-machine interface design, investigating how human operators interact with technology.

Leading the Cognitive Engineering Laboratory (CEL), his team is currently working on the concept of a highly

automated nuclear control plant. "We're trying to anticipate what interacting with these highly automated tools will be like," says Jamieson. "And to use that insight to tell us how we can modify the technology designs, before it's too far into its development cycle that it can't be changed or adapted to the operators."

Professors Guenther and Jamieson are collaborating with NSERC Chair in Multidisciplinary Engineering Design, Professor Kamran Behdinan, to further enhance design activity.

"We are developing 'IDEA' courses that will allow non-industrial engineering students to gain further insight into human factors," says Jamieson. "A lean business operation may need the skill set of a chemical engineering graduate, who knows chemical processes, who can also complete a human factors assessment." IDEA courses are expected to launch in 2014/2015 and will build on existing industry partnerships and capstone projects.

Guenther will establish more undergraduate summer projects, taking advantage of U of T Engineering's cutting-edge research centres. Research and design are partnered closely but use different methods. Researchers tend to look for principals that can be generalized, whereas designers are often trying to find a solution to a specific problem or set of problems. The researcher must think like a designer, but also consider the theory.

"Our undergraduate researchers are exceptionally gifted when it comes to the design part of the equation," says Guenther. "There's a lot of opportunity for undergraduates to get involved, not only in translating commercial products, but also discovering unique scientific perspectives."

Utilizing the design resources already available within MIE, the three design chairs will be of emerging value to U of T Engineering. "From a design perspective, we're creating an opportunity to open MIE to the whole Faculty," says Jamieson. It's a role MIE looks forward to designing. ☼

Capstone Q&A

The capstone design course puts both mechanical and industrial engineering students' newly acquired engineering skills into practice with a real-life engineering case.

Fourth-year students work in small teams to research and find a solution to an open-ended, industry-related engineering problem.

We asked four MIE alumni, whose organizations are partnering with capstone, what it's like to participate in the capstone student experience.



Mahvareh Ahghari (MEng IndE oT6)
Research Coordinator, Ornge Transport Medicine
Capstone project: Process Improvement at Ornge Communication Centre (OCC)

Why did your company partner with capstone design?

Collaboration with universities has always been one of the effective strategies in our company's Research & Development Division. It's a win-win strategy. As a partner in the transport medicine sector, we identify real-world projects to help students apply what they learned from school into practice. In return, we use the expertise of the university to advance our research program and improve our operational processes. We believe MIE's capstone program is a well-designed course to develop Industry-University collaborations.

What have you observed about today's U of T Engineering students?

They are smart, hardworking and very qualified to fulfill the client's project needs.

How does capstone help prepare new graduates for their future careers?

Students not only gain exposure to real-world projects before graduating, they also gain confidence in applying scientific methods. And, they develop a network within industry.



Ramy Ghattas (MechE oT9)
NDE Project Engineer, Ontario Power Generation
Capstone project: Eddy Current Signal Response Model for Nuclear Application

Describe your career path and current role, and how U of T Engineering helped prepare you.

The field of robotics and its application to real-life challenges has always been an interest of mine. This interest has driven my career path into investigating robotic-tool development for harsh environments. U of T Engineering supported my inquisitiveness by providing me with practical

experience through summer research positions, several industry-based course projects and the ability to apply engineering theory in technical extracurricular clubs.

What have you observed about today's U of T Engineering students?

The students are always technically competent and enthusiastic to learn more. Many of them have practical experience, and are able to identify our needs and work to find the solutions. Most importantly, they are keen to face challenges and jump many hurdles to devise a well thought-out solution.



Tammy Sieminowski (MD 1993, MEng IndE rTo)
Attending Physician, Neurorehabilitation at Bridgepoint Hospital
Capstone projects: Bridgepoint Hospital Discharge Scheduling and Bridgepoint Hospital and Laboratory Testing

Describe your career path and current role and how U of T Engineering helped prepare you.

I trained as a Family Physician at the University of Toronto then worked in many different clinical environments in several different countries. An interest in process improvement in health care led me to Professor Michael Carter, who encouraged me to pursue a graduate degree in MIE.

Why did your company partner with capstone design?

Working with students is immensely rewarding. They are invariably enthusiastic, eager to learn and bring fresh ideas to longstanding problems.

What do you see as the benefits for companies to become a capstone partner?

Formulating problems for the capstone project can be enlightening in its own right. It forces us to really think about what's not working well, and why. Working through the capstone project with the students, we gain insight and understanding into our own work environment, involve stakeholders we may have overlooked previously, consider

novel solutions and learn from their data analysis. At the end of the project, we are provided with a comprehensive report, presentation and user-friendly tools for future use.

How does capstone help prepare new graduates for their future careers?

It allows them to apply their skills. And in many ways, it also allows the students to focus their engineering degree on a specific field or style of engineering career, which is critical to their future.



Yi Zhou (MEng MechE oT5)
Chief Stress Engineer at FENCO Division of SNC-Lavalin Inc.
Capstone project: Thermal Study of Gas-Gas Heat Exchanger

Why did your company partner with capstone design?

Students have been working at FENCO Division of SNC-Lavalin Inc. as co-op students in the past. By chance, they mentioned a capstone design project, and I think it's a good opportunity for both sides. Students need the chance to practice what they learned and companies can benefit from their contribution more effectively.

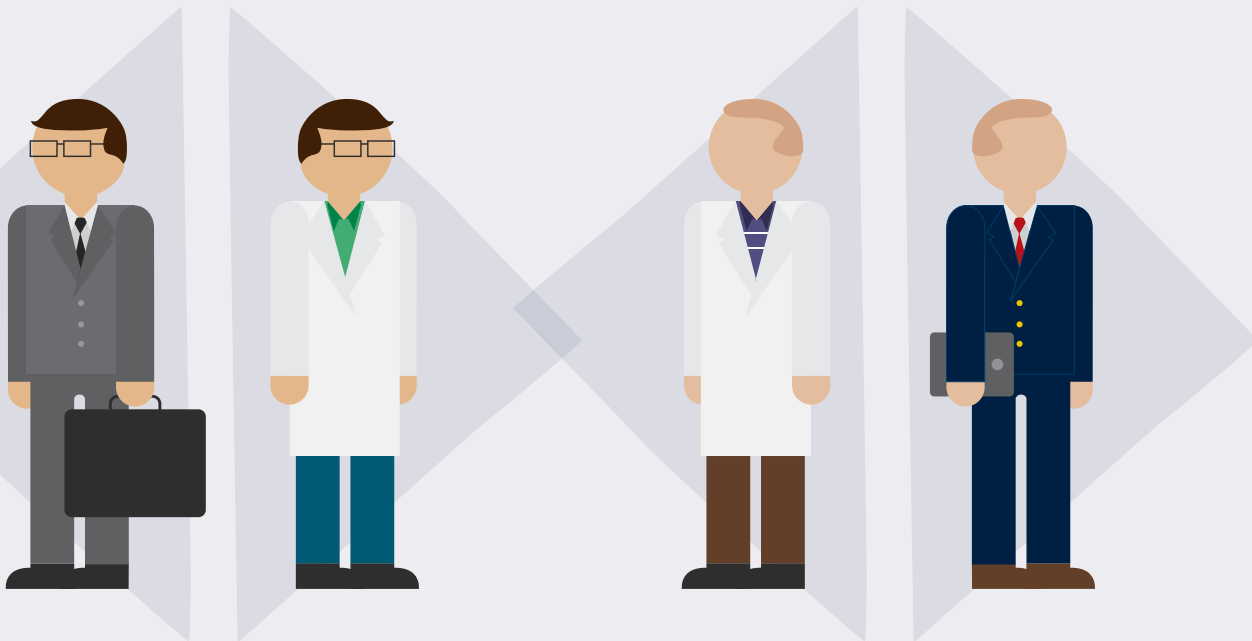
What are the benefits for companies to become a capstone partner?

Companies can carry on with R&D projects, which are not otherwise affordable. Also, theoretical study on some subjects requires academic knowledge and experience. Best of all, we may find good candidates for future hiring.

How does capstone help prepare new graduates for their future careers?

Working on a project that relates to real engineering practices gives insight to what they have been learning in the classroom. Even though they may work for a different company later on, they come away from the capstone experience with the knowledge of what it's like to work in industry upon graduation.

Designing^{⚙️} a New Flexible PhD



The new flex-time PhD option launched in the Department of Mechanical & Industrial Engineering bridges the gap between workplace research and development, and academia.

“It’s a great opportunity to complete my PhD while I continue to work as a consultant.”

For the department’s first flex-time students, **Chris Boyle** and **Daniel Firka**, the option to pursue a PhD while continuing to work is highly motivating.

Daniel Firka is the owner of Druida, an Argentinean-based software and consulting company. Having developed his business in South America over the past 18 years, Firka is researching quality assurance algorithms, under the supervision of Industrial Engineering Professor **Viliam Makis**.

“An example of quality assurance is a candy factory, where we can take samples to measure quality characteristics such as weight,” says Firka. “Entering this information into the software will tell you what adjustments need to be made, and helps the factory ensure quality.”

Firka’s research will involve a multidimensional analysis, examining how these quality decisions can be more informed, based on the collection of data, and multiple variables in the chain, to predict quality in manufacturing.

“It’s a great opportunity to complete my PhD while I continue to work as a consultant.”

Chris Boyle, supervised by Mechanical Engineering Professor **Shaker A. Meguid**, is a mechanical engineer with the Nuclear Waste Management Organization (NWMO). NWMO was established in 2002 by Ontario Power Generation Inc. (OPG), Hydro-Québec and New Brunswick Power Corporation in accordance with the Nuclear Fuel Waste Act (NFWA) to assume responsibility for the long-term management of Canada’s used nuclear fuel.

Used nuclear fuel is currently stored on an interim basis at licensed facilities. That includes nuclear reactor sites

in Ontario, Quebec and New Brunswick, where it is generated, and at Atomic Energy of Canada Limited’s (AECL) nuclear research site in Manitoba and Chalk River Laboratories in Ontario.

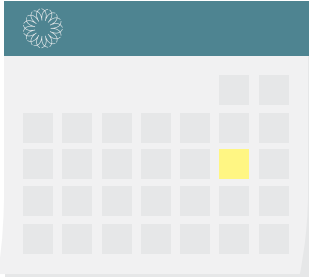
“Since 1968, approximately 2 million fuel bundles, each about the size of a fire log, have been used and stored at these reactor sites,” says Boyle. “The entire inventory of used fuel bundles produced to date, if stacked end-to-end, would fill six hockey rinks to the top of the boards.”

The proposal: a deep geological repository 500 metres below ground, to serve as a new storage site. Boyle is examining the structural integrity of used fuel containers (UFC), developing a coupled thermo-mechanical model that simulates how the UFC will evolve and withstand thousands of years of underground storage. A voluntary site selection process is ongoing to determine the final site. Over 20 communities across Canada are currently involved in the process.

Boyle appreciates the collaborative benefit for the student, the company, and the university. “Working in an R&D intensive environment and pursuing my PhD on a flex-time basis is a great way to combine the applied engineering experience with a theoretical project,” says Boyle. “We’ll be able to share the results of the research with the international nuclear waste management community, both in industry and academia.”

The program requirements of the MIE flex-time PhD option are the same as the requirements of the full-time PhD program. Students in this option are expected to be self-funded. ⚙️

Upcoming Events



Stay connected

The Department of Mechanical & Industrial Engineering invites our alumni to engage with current students and reconnect with former classmates by participating in a number of annual events.

If you would like to get involved, please contact us at: alumni@mie.utoronto.ca 416-978-5450.



MIE Seminar Series

September through April
2 pm Fridays

Mechanical Building
(5 King's College Rd.), Room 102
mie.utoronto.ca/seminars

Capstone Design Showcase

Thursday, April 11, 2013
6–8 pm

Hart House Great Hall
7 Hart House Circle
For more information about capstone, email capstone@mie.utoronto.ca

MIE Momentum: An Evening of Celebration with Alumni & Industry

Friday, April 12, 2013
6–9 pm

Colony Grand Ballroom
89 Chestnut Street
Complimentary ticket for members of the class of 6T3 & 8T8, \$100 per person, \$1,000 per sponsored table

mie.utoronto.ca/alumni

MIE Spring Reunion Lunch & Open House

Saturday, June 1, 2013
Noon–2 pm

Mechanical Building
(5 King's College Rd.)

Free to attend. For more information about the alumni & industry dinner & MIE Spring Reunion events, email alumni@mie.utoronto.ca

Spring Reunion 2013

Saturday, June 1, 2013

Honoured Years: 3T8, 4T3, 4T8, 5T3, 5T8, 6T3, 6T8, 7T3, 7T8, 8T3, 8T8, 9T3, 9T8, 0T3, 0T8

springreunion.utoronto.ca

Skule Kids
9:30 am–4 pm

Children & grandchildren of alumni attending Spring Reunion are invited to join interactive & hands-on workshops exploring science & engineering!

Sessions run: 10 – 11:30 am, 11:30 am – 2 pm, 2 – 4 pm

Galbraith Building
35 St. George St., Lobby
Toronto ON, M5S 1A4

\$25 per child includes lunch, materials & t-shirt. Contact Elizabeth Christy, 416-946-0816 enrichment@ecf.utoronto.ca

Engineering Lectures
10–11 am

Sidney Smith Hall, Room TBA

Engineering Commercialization Panel
2–4 pm

University of Toronto
St. George Campus, Room TBA

Classes of 9T8, 0T3 & 0T8 Reunion
2–4 pm

An afternoon celebration highlighting alumni who have achieved early successes in their professions while providing an opportunity to network & reconnect with old friends. Each year will have separate presentation during the first hour, then all years will come together for a reception.

Those who register before May 1 will be entered in a draw to receive 2 tickets to Biz Skule in the fall.

University of Toronto
St. George Campus, Room TBA

Class of 9T3 Reunion
5–10 pm

Join us for a reception to celebrate 20 years since graduation.

East Common Room, Hart House
7 Hart House Circle

Early bird (register before May 1): \$45 (includes hors d'oeuvres & a drink)
Regular price: \$55

Those who register before May 1 will be entered in a draw to receive 2 tickets to Biz Skule in the fall.

Engineering Reception & Dinner for 3T8, 4T3, 4T8, 5T3, 5T8, 6T3, 6T8, 7T3, 7T8, 8T3, 8T8
6–11 pm

Join us for a reception & dinner

Hyatt Regency Toronto
370 King St. West
Toronto ON, M5V 1J9

Early bird (register before May 1): \$100
Regular price: \$120

—
For more information about these or other U of T Engineering Spring Reunion events contact Megan Murphy, 416-978-4941, meganm@ecf.utoronto.ca

Facts & Figures

2012/2013

National Ranking

U of T
Engineering:
1st in Canada

Boundless Campaign Goal for U of T Engineering

\$200 million

Active/Living Alumni

8,947 undergraduate alumni
2,934 graduate alumni

Department

53 faculty
30 staff

Undergraduate Enrolment: 1252

826 mechanical
426 industrial

Graduate Enrolment: 485

174 MEng
171 PhD
117 MAsC
22 MEngDM
1 other status

CapStone: MechE projects

45 domestic & **5** international
24 participating companies

CapStone: IndE projects

25 domestic & **3** international
23 participating companies

International Exchange

16 international student
exchange partner
universities

Globex student/faculty
summer exchange with
Peking University (PKU)

Professional Experience Year (PEY) Participation

Mechanical Engineering:
124 students, **75** companies
Industrial Engineering:
64 students, **37** companies

Research

- Advanced Manufacturing & Materials Engineering
- Applied Mechanics & Design
- Biomedical Engineering
- Energy and Environmental Engineering
- Human Factors/Ergonomics
- Information Engineering
- Operations Research
- Robotics, Mechatronics & Instrumentation
- Thermal and Fluid Sciences Engineering

Research laboratories

56

Interdisciplinary Centres

- Centre for Advanced Coating Technologies (CACT)
- Centre for Advanced Diffusion-Wave Technologies (CADIFT)
- Centre for Maintenance Optimization & Reliability Engineering (C-MORE)
- Centre for Microfluidic Systems in Chemistry and Biology (CMS)
- Centre for Research in Healthcare Engineering (CRHE)
- Centre for Sustainable Energy (CSE)
- Institute for Robotics & Mechatronics (IRM)
- University of Toronto Institute for Multidisciplinary Design & Innovation (UT-IMDI)

Research Chairs

- Alumni Chair in Bioengineering, **Cristina Amon**
- Canada Research Chair in Diffusion-Wave Sciences and Technologies, **Andreas Mandelis**
- Canada Research Chair in Fuel Cell Materials & Manufacturing, **Olivera Kesler**
- Canada Research Chair in Mechanobiology, **Craig Simmons**
- Canada Research Chair in Micro & Nano Engineering Systems, **Yu Sun**
- Canada Research Chair in Microcellular Plastics, **Chul Park**
- Canada Research Chair in Smart & Functional Polymers, **Hani Naguib**
- Clarice Chalmers Chair of Engineering Design, **Greg Jamieson**
- NSERC Chair in Multidisciplinary Engineering Design, **Kamran Behdinan**
- University of Toronto Distinguished Professor in Plasma Engineering, **Javad Mostaghimi**
- Wallace G. Chalmers Chair of Engineering Design, **Axel Guenther**

Total Research Funding 2012*

\$6,065,340 Three Councils
\$2,824,844 Institutional Initiatives
\$1,706,753 Government, Other
\$764,995 Corporate
\$1,451,187 Not-for-profit
\$12,813,119 Total

*University of Toronto Business Intelligence (UTBI)

Room for Design

The Department has unveiled three extensively upgraded spaces to better serve students and faculty: the Mechanical Building Energy Lab, formerly named the Heat Engines Lab, and two new student project spaces: the Student Woodworking Shop and the NSERC Design Chair Capstone Design Fabrication Studio.

The new Energy Lab is both modern and traditional—a unique product of both the University's long history of energy education and research. Among the lab's many improvements are clear safety guards to the steam-powered air compressor and internal combustion engine. A second phase of renovations to the energy lab will

include the installation of a new steam turbine generator.

Having the facilities where students can construct their designs is fundamental. The Student Woodworking Shop and NSERC Design Chair Capstone Design Fabrication Studio will prove invaluable, as students

build prototypes for their capstone design projects. The MC-78 Student Machine Shop has also extended its weekday hours during the academic year and machinist Keith Hockley will be on-site to assist students in realizing design. ☺

Tomas Bernreiter (MechE 0T2, MEng 0T7), Laboratory Engineer and Manager (centre) demonstrates the natural gas internal combustion engine from behind new protective barriers during the Energy Lab Open House, September 2012.



Room for Design

Energy Lab (MC120),
formerly the Heat Engines
Lab, includes improved
tutorial space for students.

We hope
you enjoyed
the first issue
of Momentum.

If you have comments or questions please feel
free to email momentum@mie.utoronto.ca