

CONCORDIA ENGINEERING

NEWS

DISTRICT 3

INNOVATION AND ENTREPRENEURSHIP CENTRE:
YEAR ONE



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MESSAGE FROM CHRISTOPHER TRUEMAN

I N T E R I M D E A N



In early November, right after the Montreal municipal election, Concordia's president, Alan Shepard, addressed 600 audience members at the Board of Trade of Metropolitan Montreal. He called for the city to establish a network of start-up business network zones, bringing together companies, Non-Governmental Organizations (NGOs) and universities. This network would help break down the walls between the "ivory towers" of academia and the outside world, spur local innovation and entrepreneurship, and give students excellent real world experience.

The Faculty has helped pioneer innovation and entrepreneurship for Concordia with the District 3 Innovation Centre. Now entering its second year, the centre has galvanized the efforts of numerous alumni, students and faculty members. You can read a lot more about the initiative inside. I want to thank the former dean, Robin Drew, for encouraging and nurturing District 3 in its earliest days, as well as Xavier-Henri Hervé, BEng 87, for driving it forward. It has taken a large community of people inside and outside Concordia to make this a success story, and I hope this community will continue to grow over the coming years. If you are interested in getting involved, whether as a mentor, or as the initiator of a new business idea, don't hesitate to call or e-mail the staff at District 3.

Meanwhile, our Faculty continues to play a growing role in another forwards-thinking area—energy efficiency. I am particularly happy to report that this fall, Andreas Athienitis, from the Department of Building, Civil and Environmental Engineering, was named the NSERC/Hydro-Québec Industrial Research Chair in Optimized Operation and Energy Efficiency: Towards High Performance Buildings. The funding from our government and industry partners goes toward a research and training program focused primarily on commercial and institutional buildings. One of the key areas of study will be the development of new techniques to reduce buildings' electricity consumption during peak demand periods, such as the dinner hour, on extremely cold days in winter, and during heat waves, when air conditioning presents a heavy load.

As I write this, fall is giving way to winter, and it's apparent just what a difference "smart buildings" can make. Even during the months of December, January and February, well designed buildings can absorb solar energy and reduce their dependency on the electricity grid.

Jonathan VanderSteen and Benjamin Kelly, from the universities of Guelph and McMaster, wrote a few years ago that "engineers are only really useful to humanity if they can address concerns regarding risks to human health, community

wellbeing, and the integrity of the biosphere." This socially and eco-conscious side of engineering and of computer science has never been more important in our Faculty than it is today. Inside you will read about several issues in global engineering that are enlisting our faculty members and students, and those of other universities, to play their part in helping bring about positive change in communities as diverse as Bangalore, India; Kampala, Uganda; and a rural community in Nepal. In our increasingly international Faculty, projects like this remind us all that our work is connected to similar efforts all over the world to ensure that technology really does bring lasting benefits to those that use it.

I wish you and your families a wonderful holiday season and a very happy new year!

A handwritten signature in black ink, reading "Christopher Trueman".

Christopher Trueman, PhD
Interim Dean and Professor
Faculty of Engineering and
Computer Science

FACULTY NEWS HIGHLIGHTS

Concordia's Formula Racing team attended the Society for Automotive Engineers' Formula SAE competition in Lincoln, Nebraska, **June 19-22, 2013**, pitting their vehicle, CFR13, against those of 80 other teams from across the globe. Finishing 21st overall, the team continues to make gains in the rankings at each competition they attend. During the spring and summer, SAE teams also participated in races at Formula North in Barrie, Ontario, and at Baja SAE in Rochester, New York.

On **July 31, 2013**, Westmount Science Camp, in only its second year, was held at the Faculty for the first time. The concept is simple: scientists show children what science is — and what scientists do — with hands-on, interactive experiments and demonstrations. Children from 6 to 13 participated in activities organized by Women in Engineering, by the student

chapter of the SAE, by Space Concordia, and by associate professor Sheldon Williamson.

Concordia University has expanded the Provost Fellows Program. Fellows assume leadership roles on critical campus strategic initiatives and projects, designed in conjunction with Fellows' individual interests and long-range career goals. On **August 1, 2013**, Ali Dolatabadi, Associate Professor in the Department of Mechanical and Industrial Engineering, was appointed Fellow in Interdisciplinary Teaching, and Deborah Dysart-Gale, Chair and Associate Professor in the Centre for Engineering in Society, was named Fellow in Innovation.

On **August 14, 2013**, the journal, Circuits, Systems, and Signal Processing (CSSP) announced the establishment of the M.N.S. Swamy Best Paper Award, which will be awarded to the best

paper published in the journal every two years. The award recognizes the contributions of M.N.S. Swamy, from the Department of Electrical and Computer Engineering, who has been editor-in-chief since 1999.

District 3 Innovation Centre wrapped up a successful first year with its inaugural Innovation Awards Ceremony on **September 5, 2013**. Eleven student teams worked on various projects over the summer, some mandated by aspiring entrepreneurs and some mandated by outside industry. District 3 continues to recruit new industry and student participants.

The second Dean of the Faculty, Clair Callaghan, has passed away. He was a professor at Sir George Williams University, later Concordia University, and served as Dean from from 1969 to 1977. He died **September**





RAMI KANDELA AND ALI ELAWAD OF SPACE CONCORDIA'S CONSAT-2 TEAM WORK ON THEIR SATELLITE WITH MAARTEN MEERMAN, SENIOR SYSTEMS DESIGNER AT COMMUNICATIONS COMPANY MDA. SPACE CONCORDIA IS ENTERED INTO THE SECOND CANADIAN SATELLITE DESIGN CHALLENGE. THEY WON THE FIRST COMPETITION.

26, 2013, at his home in Halifax, Nova Scotia. Clair Callaghan's links with Concordia remained very close over the years. In 1984 he received an honorary doctorate from the University.

The Faculty welcomed back close to 80 alumni at its annual Homecoming festivities,

October 3 to 6, 2013. This year the University celebrated class reunions for years that end in 3 or 8 — 1973 right up to 2008. Guest speakers were Tony Porowski, BEng 78, and Michael Snow, BEng 83.

The Faculty hosted the 10th meeting of the International Energy Agency's Solar Heating and Cooling Programme. Entitled "Towards Net Zero Energy Solar Buildings," the meeting, from **October 7 to 9, 2013**, united experts from all around the world. Professor Andreas Athienitis gave a presentation about the progress made by the Canada-wide network he directs, the Smart Net-Zero Energy Buildings Strategic Research Network.

A multidisciplinary team of Concordia students brought back a bronze medal from

the International Genetically-Engineered Machine Competition (iGEM) North American Jamboree. The competition, held at the University of Toronto, **October 4 to 6, 2013**, attracted some of the best universities in Canada and the United States.

Concordia's student team had a strong performance at HackMit, **October 5 and 6, 2013**, hosted by the Massachusetts Institute of Technology. Their contest entry, Pebble Go, allows users to navigate a city using Google maps, which beams through information via an Android device to a wristwatch. Thanks to their performance, Concordia is now ranked 19th out of 110 universities across North America for its participation in "Major League Hacking."

Thanks to the generosity of Professor Ching Y. Suen from the Department of Computer Science and Software Engineering, who is also the Concordia Research Chair on Artificial Intelligence and Pattern Recognition, on **October 21, 2013**, Concordia created a new graduate award known as the Centre for Pattern Recognition

and Machine Intelligence Graduate Scholarship. The scholarship is worth \$1,000 and will be awarded each year to one or two graduate students of outstanding merit. Suen is a world-renowned specialist who has served numerous national and international professional societies, organized numerous international conferences, published extensively and has received many awards.

Professor Andreas Athienitis has been named the NSERC/Hydro-Québec Industrial Research Chair in Optimized Operation and Energy Efficiency: Towards High Performance Buildings. The announcement was made **September 3, 2013**, and a celebratory reception was held **November 22, 2013**, with representatives from NSERC and Hydro-Québec. President Alan Shepard was in attendance. The research promoted by the new Industrial Research Chair aims at the development of new techniques to reduce buildings' electricity consumption during peak demand periods.

CHANGING FACES

In the past year, the Faculty has welcomed four new members.

Christian Moreau is a Tier 1 Canada Research Chair based in the Department of Mechanical and Industrial Engineering. In aircraft jet engines, the flow of hot combustion gases can damage internal components if their surfaces are not properly protected with a temperature-resistant coating. Moreau's team develops diagnostics and modeling tools to improve coating materials and to tailor them for optimum performance in industrial applications. His work will improve energy efficiency and can boost economic growth in the aerospace sector.

Jeremy Clark joins the Concordia Institute for Information Systems Engineering as an Assistant Professor. He was an NSERC Canada Graduate Scholar at the University of Waterloo, where his PhD dissertation on designing and deploying secure voting systems that provide a provably correct tally was awarded Waterloo's Gold Medal. He then became an NSERC Postdoctoral Fellow at Carleton University. His current research interests include redesigning the web's certificate trust model, enforcing genomic privacy with cryptography, and improving and extending Bitcoin, the online currency.

Tiberiu Popa joins the Faculty as an Assistant Professor in Computer Science and Software Engineering. He completed a bachelor's degree in mathematics in 2001 and a master's degree in mathematics in 2003, both at the University of Waterloo. In 2010, Tiberiu obtained a PhD from the University of British Columbia, and his thesis received the Alain Fournier annual thesis award. He was then a post-doctoral fellow and later a senior researcher at ETH Zurich until June 2013. Tiberiu's main research interests are in digital geometry processing, spatial-temporal surface acquisition, free viewpoint video, and 2D to 3D conversions.

Ayda Basyouni joins the Faculty on a limited-term appointment in the Concordia Institute for Information Systems Engineering. Her research interests include resource management techniques for wireless networks.



"What I work on will reach millions and millions of people."

JOSHUA WHATLEY

PICKING UP TROPHIES AND UNBEATABLE SOFTWARE EXPERIENCE

Are there many undergraduate students who can say they've worked on a brand new product for one of the world's biggest corporations? Joshua Whatley can. He worked for Microsoft at the company's huge Redmond "campus" in the state of Washington during the summer of 2013. His assignment: working on the customer search feature for the brand-new Windows 8.1. A major part of his role as a software development engineer was to try to destroy stuff.

"You take what a developer is doing and build programs to try to break it," he says. In many cases this is the best way to find a software's weak spots and

correct them. For Whatley, the three-month experience was invaluable. "At Microsoft, you are paired with a mentor. My mentor was a wise man, like a guru. You can ask these people any question you want."

This Montreal native knows the value of gaining hands-on experience and learning wherever he can. After a six-year stint in Calgary, where he completed high school, he travelled through Europe not once but twice, visiting France, Britain, Spain, Italy and Greece. He successfully applied for the software engineering program with Concordia in 2009.

What draws him to his chosen field? "I love the puzzle-solving aspect. It's a mental challenge."

There is a competitive streak in Whatley that loves to win. It's apparent when he talks about his extensive involvement with the Software Engineering and Computer Science Society. First as Vice President of Competitions, and now as President, he has been instrumental in Concordia's recent participation in the Computer Science Games. In 2013, teams he was on picked up third place in the team software engineering category and third place in the sports category.

"Nothing can really prepare you for programming an app in three hours," says Joshua. "You learn how to work better as a team."

Whatley has participated in the games three years running and plans to return for a fourth time. He believes Concordia can bring back even more than the six trophies it won in 2013.

Meanwhile, next summer, Whatley will be back at Microsoft again. He can't get enough of working with some of the most talented people in the world and "knowing what I work on will reach millions and millions of people."

KEENA TROWELL

ENGINEERING FOR SOCIAL JUSTICE

"Whether as a designer or as an engineer, we can never forget we're in the service of people." Keena Trowell, in the final year of her second Concordia degree—adding mechanical engineering to her prior degree in design—says social justice issues have been most important to her throughout her education and work experience. Born in Ghana, she returned there with the Concordia chapter of Engineers Without Borders (EWB) in the summer of 2013, and was struck by people's lack of access to potable water.

"When you don't have it [clean water], you are sick all the time," she says. She describes how even in the wealthiest city of Kumasi, people have three choices for water: bottled, the most expensive kind; water sold in 500 ml bags, of wildly varying quality;


and water from the tap, which no one should drink. Bottled water, at a dollar per 1½-litre bottle, is out of reach for the majority of residents who live on a few dollars per day.

While in Ghana, she worked on a report evaluating an agribusiness project started by EWB at Kwadaso Agricultural College. Students at the college were required to write a business plan as part of their training. One particularly interesting business idea proposed by a student was to provide agrichemicals as a service rather than as a product. The business offered farmers support in the proper use of agricultural products, such as pesticides, that otherwise might be misapplied because of a lack of literacy or of technical acumen. Trowell's report concluded that these

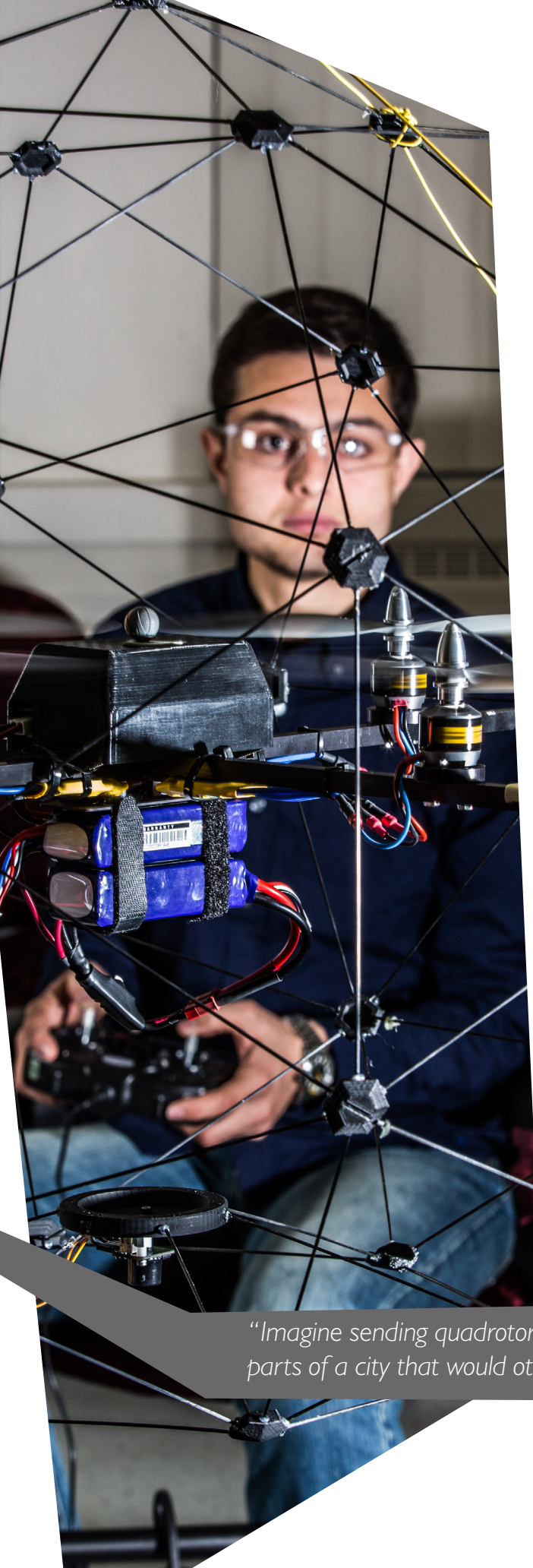
types of businesses were on the right track, but that they could better incorporate social entrepreneurship by identifying local needs and becoming more embedded in the community.

During her stay, there were regular power outages, sometimes for an entire day. She noticed the effects on two local seamstresses that she got to know. One had entirely modernized her trade whereas the other had retained traditional methods that had remained mostly unchanged since the 1920s. Because she was not dependent on electricity, her work day was limited only by the availability of sunlight. This was a powerful reminder that the tendency to view technology in isolation, independent of its overall effects, is a limiting perspective.

Her first degree helped her launch a company in the design of furniture and lighting, and now Trowell is anticipating a second career. She is looking for a graduate program that will blend the technical and social aspects of engineering. Meanwhile, she's finishing up her final-year Capstone design project—an attempt to make a Stirling engine. "We want to build it entirely out of existing vehicle components." It's a model that, not surprisingly, given Trowell's interests, is potentially well suited for applications in the developing world.



"Whether as a designer or as an engineer... never forget we're in the service of people."



OMID DANESH

RISE OF THE MACHINES: ROBOTS THAT COLLABORATE

In the Terminator films starring Arnold Schwarzenegger, Skynet was a computer network with complete control over thousands of military robots, missiles and defense systems. When Skynet became self-aware, it spelled trouble. Skynet declared war on humans and was able to maintain control through an oppressive network of collaborative, aggressive robots.

But what if we could make robots collaborate in ways that are helpful instead of harmful? This is Omid Danesh's vision. He is a master's student under the supervision of Chun-Yi Su at the Department of Mechanical and Industrial Engineering and Jamal Bentahar at the Concordia Institute of Information Systems Engineering(CIISE).

Growing up in Iran, Danesh first became interested in robotics when watching his father, a professional animator, trying to create a realistic 3D animation of a flock of birds. "How do you animate one hundred birds at the same time?" he asks. The challenge became one of devising basic algorithms to control the birds' movements within certain parameters. Later on, when he attended the Islamic Azad University in Isfahan, where he studied mechanical engineering, Danesh had a chance to learn about using robots to help people undergoing physiotherapy.

"I realized I wanted to know more about robots and control systems," he says. "I'm thrilled to be one of hundreds of scientists and engineers who are working in this field."

Now he studies how to network robots so they can work together as a team. This makes use of some very sophisticated concepts in control theory, graph theory, and game theory. The potential applications are remarkable. Danesh invites us to think of a team of agile, flying robots, such as quadrotor helicopters, in a network, capable of conducting surveillance missions over a large area in a very short time. Concordia's quadrotors are 1.4-kilogram helicopters with four 25-centimetre propellers inside a carbon fibre cage in the shape of an 80-sided polygon called an octacontagon. The university has been using them in research since 2011.

"Quadrotors could be used to make a real-time map of the inside of a building under attack, so that police officers can be aware of risks inside, beforehand," says Danesh. "Or imagine sending quadrotors to measure air pollution in parts of a city that would otherwise be inaccessible."

Suddenly, the robotized future does not seem quite as terrifying as the one depicted in Terminator.

"Imagine sending quadrotors to measure air pollution in parts of a city that would otherwise be inaccessible."

DISTRICT 3 INNOVATION & ENTREPRENEURSHIP CENTRE: YEAR ONE

A TESTIMONIAL & CALL FOR ACTION
FROM OUR ALUMNI

In the fall of 2011, John Brkich, BEng 71, came to Concordia University for the 40-year reunion of his graduation class. He had no idea he was about to be headhunted. The retired engineer's 29-year career had helped transform fields as diverse as ballistic fingerprinting and process control and automation. His friend and fellow alumnus, Xavier-Henri Hervé, BEng 87, LLD 11, wanted to recruit him for the nascent District 3, an "incubator of innovation" that he had recently founded at Concordia. The reunion that crisp autumn day ended up being about a whole lot more than cocktails and canapés.

District 3 was, at the time, an idea without a name. But the intent was clear. To give students from all Concordia faculties an environment in which they could participate in projects with an innovative or entrepreneurial

mandate. A home for the facility was found on the seventh floor of the Integrated Engineering, Computer Science and Visual Arts Complex. Hundreds of curious Concordians attended an information session in November, 2012. Shortly after, students themselves officially coined the name, District 3—the "3" standing for the founding principles: innovation, collaboration and entrepreneurship. By the spring of 2013, District 3 was open for business.

The speed at which District 3 took flight was largely down to the zeal of Hervé, himself a successful entrepreneur. He had co-founded Mechtronix in 1987. It became one of the fastest-growing aviation simulation companies in the world and Hervé was awarded an honorary doctorate by Concordia,

STUDENTS NARGES ROOFIGARI ESFAHANI
AND DEPINDER SINGH BHULLAR



"The team in District 3 has exceeded my expectations" – John Brkich



JOHN BRKICH AND STUDENTS SERGIU GEAMANU, SHAYESTEH MOHAMMADBEIGY, DEPINDER SINGH BHULLAR, ANDREW HENRY AND RYAN DESGROSELLERS WITH DEBORAH DYSART-GALE, FELLOW FOR INNOVATION AND ONE OF THE DISTRICT 3 PIONEERS, AND XAVIER-HENRI HERVÉ

recognizing his team's business and engineering prowess. As for Brkich, he had grown up in the Montreal area and six years after graduating from Concordia joined the company of yet another alumnus, Bob Walsh BSc (eng.) 63, LLD 09. With Walsh Process Control, Walsh Automation and then a spin-off enterprise called Forensic Technology, Brkich became, in his words, a "process guy"—adroit at finding ways to automate or otherwise improve the performance of diverse systems. In the late 1980s, during a camping trip, he got talking to a firearms expert and discovered just how time-consuming it was to find a possible match between a criminal's gun and a bullet

found at a crime scene. With the use of the latest cameras, computer and software, Brkich felt confident there was a faster way. He was right. Forensic Technology, under the leadership of Bob Walsh, is now the world's leading company for ballistics identification and analysis.

Over the summer of 2013, a dozen teams filled District 3, all engaged in wildly different projects: an inflatable plant-growing bed, a laser-welder, and a chair made from electronic fabrics, to name just a few. Projects came in two varieties: those that were the creations of students who are themselves entrepreneurs, and those mandated by alumni, established industry leaders

and experts. The projects are multidisciplinary collaborations between the interns—graduate and undergraduate students from the Faculty of Engineering and Computer Science, the John Molson School of Business and the Faculty of Fine Arts—and experienced alumni, who provide expert guidance.

Explains Hervé, "One of our key success factors has been the active involvement of our alumni, first as entrepreneurs and leaders, as the industry experts who coach and mentor our Concordia students." He is quick to add "District 3 is a call to action for all alumni who want to take part in entrepreneurship or innovation."

Brkich was the ideal alumnus to be a mentor and, as it turned out, a whole lot more. He and his business partner, Andrew Sutherland, BA 04, an alumnus of Concordia who graduated with a degree in sociology, had earlier identified a prime business opportunity. Sutherland had served as a frontline police officer and noticed that when police needed to break down the doors of commercial and some residential buildings, they were exposed to enormous risks. The space in front of a door was known as "the fatal funnel"—a criminal with a gun might be standing on the other side, or there might be hazards from flames and projectiles. To keep police and other



*"District 3 is a call to action for all alumni who want to take part in entrepreneurship or innovation."
– Xavier-Henri Hervé*

emergency responders safe, a device was needed that could break down doors remotely. Sutherland had an idea of how such a device could be built, but as Brkich points out "we had no capabilities to design or build it."

So the project, Law Enforcement, came into being, an official mandate from the company Brkich had co-founded in his retirement, called Off The X. Sutherland spent most of August to October in Montreal, consulting on a weekly basis with the student team that had been formed to work on a functioning prototype.

"The credibility of the university and the students' skill set

was a major plus for us," says Sutherland. "For a project like this, you need professionalism. That is number one and at Concordia, we couldn't have asked for more."

Ryan Desgroseilliers, an undergraduate electrical engineering student, was then—and is still—a member of the team working to convert Sutherland's ideas into a tangible prototype.

He explains the numerous challenges he and his fellow students are overcoming. "We are targeting steel doors," he says. "We need to make sure our device can handle that and not be damaged in the process. We have to manage very high forces—thousands of pounds.

That's very rare for an academic project. The whole point of the device is that it breaks things."

The prototype goes for final testing – user validation – in the spring of 2014. Once that is formalized, District 3 will be asked to participate in the design, prototyping, and testing of other inventions from Brkich and Sutherland.

Brkich couldn't be more pleased with the progress to date. "The team in D3 has exceeded my expectations," he says. Law Enforcement has now become a final-year project—what's called a "Capstone"—for several of the team members. In other words, it will help students earn

credits toward their degree. This is a major coup for the chairs of the departments in engineering, such as Bill Lynch, who leads the Department of Electrical and Computer Engineering, and who pushed hard for innovation and entrepreneurship initiatives to be embedded within university curricula. The plan is for many more projects to become Capstone projects in the future.

"What we need right now is experts in residence—alumni with experience who can help as coaches and mentors," says Hervé. "With the alumni who have already helped us get this far, we've proven District 3 is a win-win for everyone. Now it's a matter of growing it. Join us."

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ENGINEERING SOLUTIONS IN THE GLOBAL CONTEXT

The phrase “global engineering” enjoys considerable cachet these days, thanks in part to the success of organizations such as Engineers Without Borders, and also because many industries have interests in diverse locations around the world. But what exactly is global engineering? Three projects—two from Concordians and one based out of Israel—reveal some of the related issues in a very tangible way.

CEMENT & THE CITY

Govind Gopakumar and David Sadoway examine the critical role infrastructure plays in the life of a changing city. Gopakumar, an Assistant Professor with the Centre for Engineering in Society, is very interested in finding answers to the question: what are the changing relations between infrastructure technologies and society? Sadoway, a postdoctoral fellow and urban studies scholar, supported by Gopakumar’s Social Science and Humanities Research Council (SSHRC) grant, has been working with him since 2012.

“We’re interested in infrastructure change in contemporary cities,” says Gopakumar. “How do people and commodities move in cities, and how do we study the city itself?”

In 2013, Sadoway spent five months in India, interviewing policymakers, engineers and residents about that country’s large-scale \$10 billion (USD)

infrastructure renewal project. He looked in particular at several sites in the city of Bangalore that had purported to solve congestion. One particular project, a connector road, had exceeded its budget and timeframe, and in the end, had only exacerbated traffic problems. A key overall finding was that infrastructure designs were proposed with minimal participation or consultation with local residents, and they also didn’t integrate transportation, energy or environmental objectives.

“We tried to trace back to the origin of the problems,” explains Sadoway. Part of the two-fold research approach—extremely local, combined with the “big picture”—entailed talking to scholars, government representatives and staff in Delhi. What design principles were in place for such projects? What role was there for community consultation? The investigation found that major

infrastructure solutions were being implemented without any participative mechanisms.

Gopakumar points out that in the western world, just as in India, large infrastructure projects can be fraught with similar problems. A short drive from Concordia, the Turcot freeway interchange is crumbling and awaiting a major overhaul. How the project is reconceived and implemented will have major implications for the sustainability of transportation in Montreal.

Gopakumar and Sadoway continue to work intensively on the launch of an international research network devoted to urban infrastructure governance, with scholars to be initially recruited from Concordia, and in India from the School of Architecture and Planning and the National Institute of Urban Affairs, both in New Delhi. The network will then expand to other institutions.



Photo credit: David Sadoway for the Assembly Infrastructure Decongestion Project, Centre for Engineering in Society

A STREET LEVEL APPROACH TO UNDERSTANDING URBAN INFRASTRUCTURE IN BANGALORE, INDIA

“What is the role infrastructure plays in a changing city?”
— Govind Gopakumar

"There is a real innovation culture in Kenya and Uganda. IBM just opened only their twelfth research lab in Nairobi." – Matthew Harsh



Photo credit: Cody Valdes. Creative Commons, BY-NC-SA 2.0

DISPLAY OF ELECTION MONITORING SOFTWARE AT IHUB INNOVATION INCUBATOR IN NAIROBI

INVESTIGATING AFRICAN INNOVATION

Matthew Harsh, an Assistant Professor in the Centre for Engineering in Society, studies how new and emerging technologies can improve livelihoods in Africa. He is in particular considering Kenya and Uganda, neighbouring countries that through their differences and similarities afford great opportunities for case studies.

He is the co-principal investigator of a project funded by the National Science Foundation in the United States. The aim is to understand how local computer science is supporting an important shift in Africa:

the change from absorbing technologies from overseas to creating home-grown innovations. In Nairobi in Kenya, Harsh has observed a dispersed research culture spread among several universities and innovation incubators, whereas in Kampala in Uganda, there is a more centralized community linked to Makerere University.

Harsh is interested to know whether there is a uniquely African computer science, distinct from that found elsewhere. He notes how important mobile technology has been in the African continent,

given its relatively low cost to individuals and its accessibility.

He agrees with his colleagues Gopakumar and Sadoway that "it's very difficult to solve a problem if you start with a technology already in mind. You need to start with the community, then bring in local experts and resources to drive innovation."

Over the coming years, Harsh's research will help assess the impact of technology in Kenya and Uganda and its role in relevant economic and social innovation.

CLEANER COOKING FOR IMPROVED HEALTH

Mark Talesnick has followed a rather unlikely path to come to Concordia to talk about global engineering. On October 7, 2013, the professor visited the District 3 workspace as a guest of the Centre for Engineering in Society. He opened his presentation with a chuckle, "I'm just a guy who played junior hockey for Wolfe Island, Ontario."

Talesnick is now the UNESCO Chair of Sustainable Engineering for Developing Communities at the Technion Institute of Technology in Israel. He earned his bachelor's degree at the University of Toronto before going on to Israel, where he continued his studies and captained Israel's first-ever hockey team. After several years of what he calls a fairly "standard" academic career—

teaching, researching and publishing—in 2006 he took a sharp turn into the world of engineering for developing countries.

"There is no doubt that there is a huge disparity between those that have and those that have not," he said to the assembled audience of faculty members, students, and guests. He brought home the stark reality of life in many parts of the world through his description of a summer project that is run out of the Technion. Last summer, students from around the world and from various disciplines, including engineering, public health, architecture and journalism, went to a small rural community in Nepal. There it became apparent that cooking with wood stoves was posing serious risks to local women—namely, drastically

increasing their susceptibility to cancer. Another problem was that the excrement of local cattle was entering the water supply.

The visitors worked with locals on a solution to the many problems. They recommended and helped implement the adoption of biogas reactors—a simple technology that converts excrement and other organic waste into heat and electricity. The reactors generated enough energy to power a stove cleanly. Moreover, the reduced use of wood helped address another major problem—deforestation.

"The students who got involved in this project became leaders through the process," said Talesnick. "It was life-changing for them."

MARK TALESNICK PRESENTS AT CONCORDIA, OCTOBER 7, 2013.



HUGH MCQUEEN AT 80



Hugh McQueen — a Professor Emeritus in engineering and one of Concordia's most familiar faces — started working at the age of nine, delivering beer and food for a corner grocery store. He's worked pretty relentlessly ever since.

McQueen was born in 1933 in Alloa, Scotland, a town near Glasgow. He moved to Montreal in 1942, at the height of the Second World War. During the crossing, his ship was torpedoed by a German U-boat: a Canadian corvette rescued the passengers and escorted them to safety. McQueen's father stayed behind in Scotland for a further six years, but was legally prohibited from sending money to his wife and children. In their new home in Montreal, the McQueens were dirt poor — so Hugh got a job with the grocer.

How did he mark his 80th birthday on September 29, 2013? Not surprisingly, with work. The expert in materials and manufacturing was finishing a conference presentation about the history of forging from 5000 B.C. to the present.

McQueen's career spans over half a century. He earned degrees from Loyola College (before it merged with Sir George Williams University to form Concordia University in 1974), as well as from McGill University and Notre Dame University in Indiana. McQueen became a Concordia faculty member in 1968.

He witnessed and helped create remarkable change in that time, including the launch of the university's first graduate program in engineering in the early 1970s. "All of the courses were offered at night," he says. "The other big schools — École Polytechnique and McGill — didn't offer that."

This was emblematic of the role McQueen played in helping Concordia stake out unique turf where it could innovate

and thrive. Later, he became the leader of the university's initiative to give engineering students an understanding of the social aspects of their chosen field. He was attentive to the news topics of the day and brought them into the classroom: in 1973, when the oil-trading countries in the Middle East halted shipments to North America and drove prices skywards, McQueen started teaching energy strategy.

McQueen still cycles to work every day from his home in Notre-Dame-de-Grâce — in fact, he has ridden the same bicycle for more than 50 years. He is deeply committed to environmental issues and sustainability. In addition to a number of academic honours, McQueen won the 2010 Sustainability Champion Award at Concordia.

Outside of his research area of metallurgy, in which he has put out close to 500 publications, McQueen is a history buff. He is probably the most knowledgeable person alive about Montreal's 154-year-old Victoria Bridge. He and his wife Josephine have six children (three of whom studied at Concordia) and seven grandchildren.

When McQueen reflects on all the changes he has seen, what stands out is the profound difference in technology. "In my home, until I was 16, there was no TV, just two radios — one in the kitchen and one in the living room."

Fast-forward to 2013, when televisions and, of course, the internet are ubiquitous. "My grandchildren are very into computers," he says, admiring their ingenuity. "They are pecking at their iPads, but I don't even know which side of an iPad to look at!"

What technology certainly cannot substitute for, though, is hard work and curiosity, which McQueen still possesses in spades.



EMPIRICAL MEASURES FOR SUCCESSFUL SOFTWARE

Peter Rigby, Assistant Professor in the Department of Computer Science and Software Engineering, has devoted considerable energy to figuring out answers to the following question: “how do people work together to produce successful software?” It’s an area of study that appears, at first glance, to contain a lot of intangibles.

Originally from Ottawa, Rigby lived for many years on the west coast, completing his doctorate at the University of Victoria before moving closer to home and working first as a postdoctoral researcher at McGill University. He became a faculty member at Concordia in the summer of 2012.

“I like sociology,” says Rigby. “The research I do is like sociology in

a software engineering context.” His data-driven, empirical work reveals a lot about how humans can collaborate successfully. He has examined projects at tech giant, Microsoft, as well as at the Department of National Defence, analyzing the processes by which software is “peer-reviewed” in attempts to find flaws and fix them.

What he has found is that formal and rigid review structures are not effective and the best companies have opted instead for “people over process” – adapting review structures according to needs. A very complex project might require more than the traditional two reviewers; less complexity might mean fewer reviewers. Also, it’s been proven that an incremental approach works the best. In

other words, it’s a bad idea that a coder work in isolation for, say, a month, before anyone checks in on the progress made. Ideally, coders should have their work continually checked in increments so that small problems don’t become bigger problems.

“Group problem solving is better than an individualistic approach,” says Rigby.

Rigby has a passion for software that goes back many years to when he was young. “I always liked programming,” he says. “It’s addictive. It’s like a puzzle, except in this case, the puzzle has a function.”

When asked what the future might hold for software development, he is enthusiastic about the proliferation of “apps”

in the industry, “Innovations are coming from people messing around on little devices,” he says.

His advice for his students who will live in this new reality upon graduation? “Embrace change. The software world changes so quickly.”

And his advice for companies? Not surprisingly, he draws his answer straight from his research findings. “Implement empirically-supported measures that have a basis in data.” It’s down to the old maxim that what cannot be measured cannot be managed.

A LIFETIME OF ACHIEVEMENT

The office of Claudio Vissa, BEng 76, MEng 79, on the fifth floor of a downtown Montreal skyscraper, overlooks the domed roof of the cathedral, Marie Reine du Monde, and beneath it, the Place du Canada. His co-workers walk in and out of his office without a hint of formality, at ease with the engineer who has done so much to build the global reputation of the company, AECOM. Now as vice president of Hydropower and Dams in North America, and active on the international scene, Vissa can look back with pride on a career that started out decades ago on construction sites in Italy.

"The satisfaction of life is bringing new vision to problems," he says. His construction background gives him the practical acumen to resolve engineering problems in

a way that might elude others. In the late 1990s, working on the Malana Hydro Project in India at a time when the local business community was starting to lose confidence in hydro power, Vissa was able to organize it so as to reduce the construction time from a projected 60 months to only 30. He's repeated this kind of feat time and time again.

Born in 1943 in Udine, a town north-east of Venice, construction was the Vissa family's trade, dating back generations. "My parents, grandparents, and great-grandparents all did construction. It's in my genes," he says.

When he was 14, the family immigrated to Canada in search of a more prosperous future. The young Vissa worked in construction and it wasn't until he was 19 that he started his

formal education. At Montreal's YMCA Elementary School he learned English. He completed his high school and was accepted into engineering at Sir George Williams University (now Concordia).

"I am very grateful to Sir George Williams and Concordia for giving me the strength and providing the opportunities that helped make me what I am today," he says.

Vissa launched a career in engineering during a very exciting time for Québec. Then-premiere, Robert Bourassa, was determined to make the province an energy powerhouse. Vissa worked on the James Bay hydro-electric project. There were three competing concepts; Bourassa chose "La Grande Complex" which would provide 15,000 megawatts of power –

the one Vissa had worked on.

In 2011, Vissa was selected from among 50,000 employees as one of only 10 AECOM Fellows. The award recognizes a lifetime of professional achievement, industry advancement, and technical success. Upon receiving the award, he explained what has helped propel him so far: "Passion, and commitment in gathering and motivating the professional teams that work with me, helping clients, listening to their needs, showing my appreciation, as well, for the contributions of my collaborators."

It's an ethos that is clearly appreciated by all those Vissa works with, and indeed, by all of the clients to whom he's provided progressive hydro-electric solutions around the world.



LIGHT FOR THE WORLD

BY YIRAN FENG, BENG 07



When I was in high school in China, I visited an exhibition by the renowned industrial designer, Luigi Colani. After reading some books and articles about industrial design, I made up my mind that this was exactly what I wanted to study. One of the best schools for this is the Royal College of Art in the United Kingdom, but it's for graduate students only. I sent an email to their industrial design department in 2002, inquiring which subject is the best to study at the undergraduate level in preparation. The answer that came back was, mechanical engineering.

Luckily, there was an agency doing promotion for Concordia University in Shanghai. In January 2003, I travelled abroad for the first time. Montreal, the unknown city, full of French, and a blizzard! The foundations were just then being laid down for the Integrated Engineering and Visual Arts Complex.

For me, Martin Pugh was an excellent professor. I miss his lectures in material science. He later became a very helpful tutor for my final year Capstone project. Because of the timeframe for applying to the Royal College of Art, I actually had to do my Capstone project in my third year, which is unusual. Luckily, everything went very well. I had a great team. We won the department's Richard M.H. Cheng Award for excellence in an engineering design.

That award became a pivotal piece in my portfolio. I got an interview with the Royal College of Art in March 2007, so I had to fly out to London from Montreal. My professor for my course in product design and development, Mohammed Abdo, told the whole class that I was going for an interview at the world's best design school. It was a very memorable three-day journey. Air Canada lost my luggage in transit and sent it to me the last day of my stay.

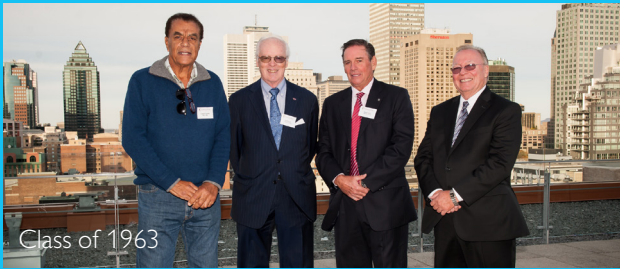
My acceptance letter finally came in April that year! I moved to London that fall and began work on a double degree, MSc and MA, from the Imperial College and the Royal College of Art. I have always liked working with light, so after graduating, I did an internship at United Visual Artists, a top interactive lighting design studio. I then found my current job with CU Phosco Lighting. This is a family business, dating back to 1920. The company designs and manufactures exterior lighting luminaries, floodlights, lighting columns and masts.

The most valuable experience I picked up at Concordia is the relationship skills needed for group projects. Knowing how to deal with a person you like or don't like is very important, which also applies to work. Overall, to be a good designer, it's important to get inspiration from everything in the world. Enjoy all sorts of movies, music and playing games—but don't get addicted!



LED luminaire, designed by CU Phosco lighting, installed in North Wales, United Kingdom.

H O M E C O M I N G



Class of 1963



Class of 1968



Hugh McQueen and the Class of 1973



Class of 1978



Members of the Class of 1978



Class of 1983

This year, Concordia organized a host of exciting activities for alumni at Homecoming, celebrated October 3-6, 2013. The Faculty of Engineering and Computer Science celebrated the reunions of classes that graduated in the years ending in 3 or 8, i.e. the Class of 1973 right up to 2008! At the Dean's Cocktail Reception, Christopher

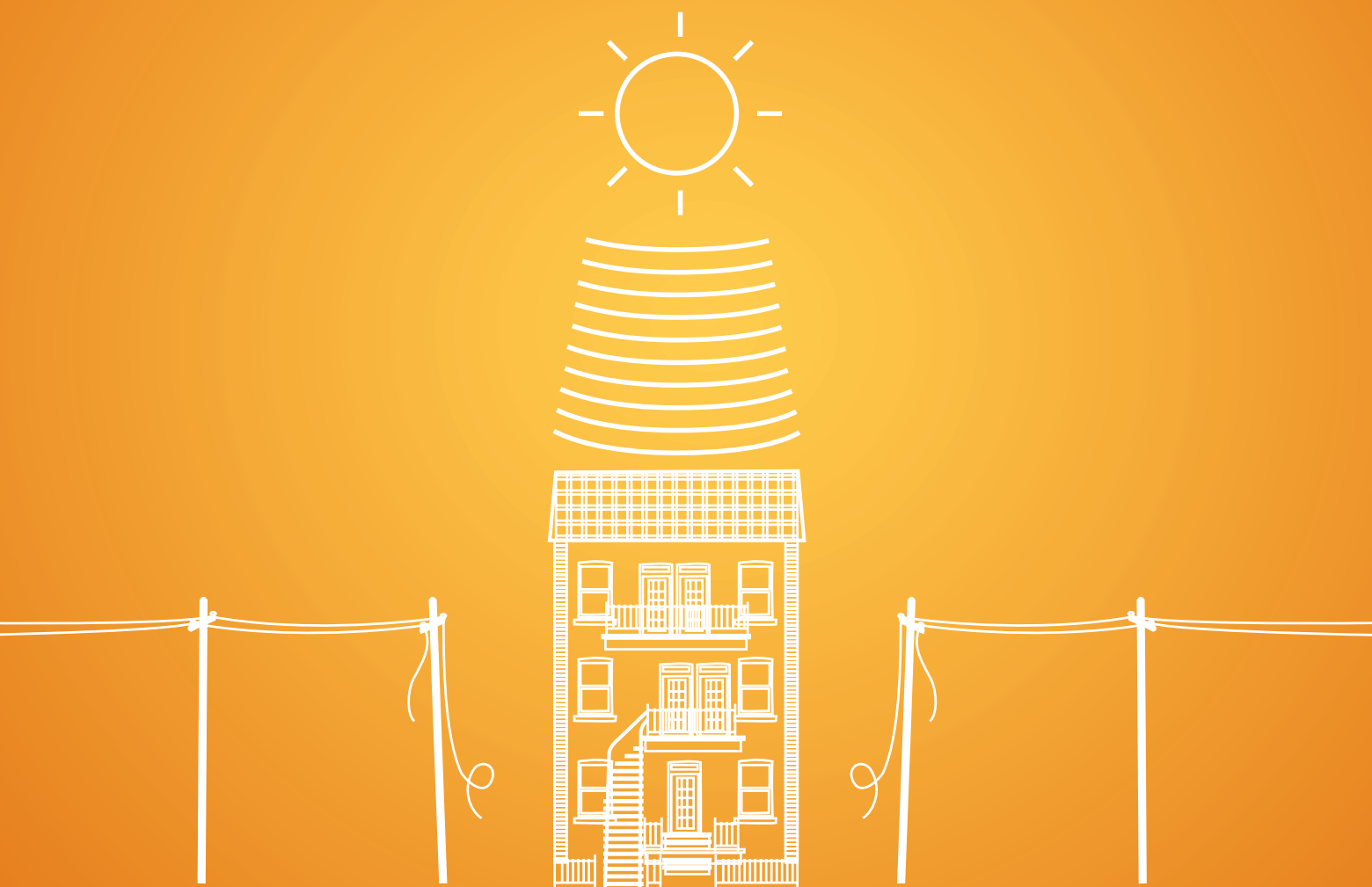
Trueman welcomed guests from far and wide; Deborah Dysart-Gale, Chair of the Centre for Engineering in Society was the charismatic MC; and guest speakers, Tony Porowski, BEng, 1978, and Michael Snow, BEng 1983, gave moving and entertaining speeches.



Charles Benoualid BComp Sci '83 with his wife

Alumni admire SAE's Supermileage Vehicle

SMALL PLANET  BIG THINKING



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