Community Engagement

Silicon Valley Connection

The entrepreneurial spirit of Silicon Valley (and the warm weather!) have drawn many Applied Sciences alumni south of the border. Last fall, SFU president Andrew Petter visited companies in the Valley and hosted an Alumni and Friends event at the Grand Hyatt Hotel in San Francisco on Oct 18. Thanks to all Applied Sciences alumni who attended to reconnect with SFU and to those who supported the event!

Special thanks to Mark Chua, a Computing Science alumnus currently working at Twitter in San Francisco, who has volunteered to coordinate alumni events in the Bay area. If interested, Mark can be reached at ymc3@alumni.sfu.ca.
SFU Alumni Appreciation Project

Leading up to the university’s 50th anniversary in 2015, we are inviting people to share with us the difference that SFU alumni are making.

SFU graduates are making a positive difference to others and their communities through their careers and professions, volunteer contributions, and personal projects and passions. Help us showcase these special alumni by submitting a note to the Alumni Appreciation Project. We invite you to have a look through the notes of appreciation that others have already shared at www.sfu.ca/appreciation/about.html.

If you know an SFU grad who is making a difference in your life or in your community, then we want to hear about it! How it works:

1. Visit the website above and submit a short message sharing how a graduate has made a difference. You can animate your story by uploading a photo or embedding code for a video or audio file.
2. We’ll contact the person to verify the information.
3. With their permission, we upload your message to this site for all to see.

Partnerships

Ballard Power and SFU take fuel cells into new frontiers

Ballard Power Systems and SFU have received a recent injection of funds to build a joint state-of-the-art, fuel-cell testing facility. Ballard and SFU have collaborated for several years already to build more durable, lower-cost fuel cells for transportation use. Automotive Partnership Canada (APC) recently provided the partners $3.4 million to purchase new Nano X-ray Computed Tomography tools that will become part of a nationally unique fuel-cell testing and characterization facility. This project is estimated to cost a total of $6.5 million, and is the second major project that builds on the SFU-Ballard relationship.

“This will be an unprecedented, world-class testing facility dedicated entirely to this project over the next four years,” says principal investigator Erik Kjeang, an internationally known fuel cell expert and director of SFU’s Fuel Cell Research Laboratory (FCRel). “Beyond its capabilities, that’s a strength in itself.”

Says Ballard’s Research Manager Shanna Knights: “It’s a unique opportunity, to have dedicated access to highly specialized equipment and access to university experts who are focused on Ballard’s needs.”

Researchers will use the facility to develop and advance the technology required for the company’s next generation of fuel cell products, helping to meet its targets related to extending fuel cell life while improving efficiency.

Kjeang, an assistant professor in SFU’s School of Mechatronic Systems Engineering, says the new, sophisticated nano-scale scanning capabilities will enable researchers to see inside the fuel cell micro-structure and track how its components degrade over time. The research will play an important role in the university’s focus on advancing clean energy initiatives.

“Partnerships with leading companies such as Ballard solidify SFU’s reputation as a world-class innovator in fuel cell research,” says Nimal Rajapakse, dean and professor, Faculty of Applied Sciences. “This testing facility will be used for cutting-edge research and training of HQP (highly qualified personnel) that will help to strengthen the competitiveness of the Canadian automotive and clean energy industry. We are grateful that Automotive Partnership Canada has provided new funding to support the SFU-Ballard research collaboration.”

APC supported the first major project between SFU and Ballard in 2011 with $4.1 million in funding. The funding was directed towards joint efforts in creating the next generation of heavy-duty (bus) fuel cells with enhanced durability. Kjeang continues to lead this complementary project with Ballard that involves nearly 40 students and researchers.

Kjeang began his career at Ballard in 2008. He later joined SFU to continue his research interests while keeping a foot in industry. Other notable research partnerships between Mechatronic Systems Engineering and Ballard Power Systems:

- Professor Farid Golnaraghi – assisting Ballard in developing a test bed to support fuel cell advancements related to durability, servicing and safety.
- Associate Professor Majid Bahrami – developing improvements in the performance of air-cooled fuel cell systems.
- Assistant Professor Krishna Vijayaraghavan – working with Ballard to identify performance degradation in the occurrence of cross-over leaks in large fuel cell stack.

Erik Kjeang, fuel cell researcher at SFU lab.
Using technology to combat crime

SFU researchers will help law enforcement agencies fight crime by deploying the latest 21st century technology.

SFU professors Uwe Glässer (Computing Science), Patricia Bartingham (Criminology) and Martin Andersen (Criminology) are creating the Public Safety and Security High Performance Computing (HPC) lab. This lab will store large volumes of crime data, entrusted by agencies such as the RCMP and Vancouver Police Department, to be sorted and analyzed for revealing patterns. The team just received $200,000 from the Canada Foundation for Innovation to fund the lab.

“High performance computing in a secure lab will enable us to address new research questions that require intensive analysis of massive datasets from diverse sources, using a common computational methodology across different application fields,” said Glässer. “This broader perspective is essential in understanding the ecosystem of organized crime and terrorist activities in the quest for developing effective intervention strategies.”

Potential risk to Canadians of becoming victims of crime depends on many variables such as geography, economic status and lifestyle. In order to mitigate risk and improve crime prevention, detecting and understanding patterns in crime is crucial. Glässer and his team aim to do this by linking criminology research and computing science in the area of big data.

Their plan is to develop new ways to manipulate, analyze and find patterns in massive, complex datasets drawn from surveillance and other crime-related data. Using methods such as computational topology, social network analysis, data mining, and agent-based simulations, the research will link three themes:

1. Maritime security
2. Organized crime, and
3. Urban and rural crime

Maritime security will entail investigating threats – such as smuggling, human trafficking, piracy or terrorism – that may develop in the Asia-Pacific Gateway and Corridor Initiative, and the Northwest Passage. Using innovative computational models and algorithmic methods, Glässer and his team aim to detect, automatically extract and highlight anomalous behaviour, especially multi-vessel interactions that may point to suspicious activity.

To help combat organized crime, the research will build on existing collaborations with provincial and federal governments, combining computational and mathematical analysis, social network analysis and data mining techniques. This research involves identifying possible criminal organizations in a growing police record database, and understanding how organized crime networks form, strengthen and evolve.

For urban and rural crime, the lab will enable unprecedented analysis of crime patterns, especially the decision process involved in how criminals choose their targets, the similarity of crime sites and the mobility of offenders.

The lab will be built at SFU’s Burnaby campus in an existing secure building. The team’s goal is to reduce the cost of crime prevention and security. With better knowledge and understanding of computational criminology, they hope to support the RCMP and other Canadian law enforcement and intelligence agencies, as well as policy makers, in reducing and preventing crime.
Alumni Snapshot: Doug Goertzen

What I do:
Kardium has always been focused on being as lean and efficient as possible. As such, many of its employees perform several roles. My role involves guiding the strategic direction and corporate culture, hiring the team, working closely with the engineering group, raising capital, and managing HR, Finance and IT. I am fortunate enough to be involved in many of the company's operational aspects, work with exceptionally talented team members, and love what I do.

What I do makes a difference because...:
My goal is to be part of a team that builds a remarkably successful company, providing a great place to work and delivering innovative products that truly improve people’s quality of life. Kardium is well on its way to becoming such a company. The most important contribution I have made is hiring a team of remarkably talented, incredibly intelligent individuals capable of overcoming many of the challenges that arise when trying to design and commercialize one of the most sophisticated medical devices ever created.

Advice I would give to students who want to pursue the same path:
When starting your career, find a company with great people where you can learn how to build teams and develop new products. Focus more on getting valuable experience and working with smart individuals than on compensation – this will pay off in the long run. Be prepared to work hard in order to succeed.

How I keep up to date in my field:
Kardium is developing an ablation catheter to treat atrial fibrillation. This was a completely new field for me. In order to learn about it, I attended numerous medical conferences and interviewed many doctors. Now I am fortunate enough to work closely with the leading electro physiologists in the world and learn directly from them.

How my degree from SFU prepared me for my job:
The engineering, math and economics courses I took were essential in helping me understand and quantify the world. The basic principles of analysis I learned in university still underlie many of my decision-making strategies today. The engineering co-op program also helped me land a job at a great company, which allowed me to create connections to people I am fortunate enough to still work with today at Kardium.
Eight undergraduate Mechatronic Systems Engineering students started the SF-1 Team to build an open-wheeled, Formula-One-inspired racing car according to Formula SAE [Society of Automotive Engineers] standards. Spencer Steele led the group during the 2012-2013 academic year as founder and captain of the SF-1 Team.

You started the concept for the car with seven other people as part of your final year capstone project in Mechatronic Systems Engineering. How many people are now involved with the SF-1 Team?

At the moment there are about 30 members on the team. Most have a background in engineering but there are a couple from SFU interactive arts and technology, business and science. The team has a hierarchical structure, with management at the top and structured “sub” teams lower down that specialize in designing various components of the car, as well as in marketing and graphic design.

Did you have a background in the automotive industry or as a mechanic before starting this? If not, what prepared you to tackle this project?

Over the years I have restored and modified a couple of my own cars in our family shop in Maple Ridge but have never pursued professional training in the automotive industry. I had no doubt that I had the abilities and resources to build the car going in, but designing a car from the ground up with nothing to build off was daunting. When it comes to Formula SAE, initiative and motivation prove to be much more important than training or education in my opinion.

What is your role with the SF-1 Team now?

As I am done taking classes and awaiting convocation I have surrendered my position of captain to the new co-captains, Jeremy Thompson and Geordie Goodall, who I believe have the drive to propel the team forward. As the founder and one of the major sponsors of the team, I still intend to help any way I can, but in more of a supporting role.

What would you consider to be your dream job?

I am currently interviewing at a couple of local companies across the Lower Mainland. My dream job would be at a small company where I can make a difference and be involved in the management, design and fabrication of a specialized technology. I have a couple of my own ideas though and could see starting up my own company in the next couple of years.

What do you hope the SF-1 Team accomplishes next?

SF-1 has always been more than just building a race car; I built this team to improve the reputation of SFU and its students. In order to compete with other universities, colleges and technical schools across North America the team needs a suitable shop space on campus where they can work. Right now, that is the number one goal of the team because without one there is no chance of the team reaching sustainability, let alone competing on an international level.

Who inspires you?

My own father, Mark Steele, inspires me every day. He taught me that hard work is the number one ingredient to being successful and that practice makes perfect. I wouldn’t be where I am today if it weren’t for him.
Kudos

Ryan D’Arcy, Krishna Vijayaraghavan, Uwe Glässer
Canada Foundation for Innovation (CFI) funding
Funding from the Canada Foundation for Innovation will support three FAS faculty members in setting up infrastructure for research and enriched training for students.

Neuroscientist Ryan D’Arcy, Computing and Engineering Science, will use the funding to help establish his medical imaging lab at Surrey Memorial Hospital, where it will serve as a cornerstone to Surrey’s Innovation Boulevard. He will focus on the translation from critical care instruments to point-of-care technologies for diagnostic and therapeutic applications.

Krishna Vijayaraghavan, Mechatronic Systems Engineering, will establish a clean energy technology laboratory. His focus on wind energy will bring new research capacity to SFU with infrastructure to simulate wind turbines and smart grids or wind turbine drivetrains.

Uwe Glässer received funding to set up a secure high-performance computing lab (see Research story).

Cenk Sahinalp
NSERC CREATE Grant; appointed Tier 1 CRC
Cenk Sahinalp, Computing Science, was SFU’s first recipient of the NSERC Collaborative Research and Training Experience (CREATE) grant. Sahinalp and fellow SFU researchers will receive $1.5 million over six years, working with the University of Bielefeld in Germany to train graduate students to manage and analyze big data in biological sciences. Sahinalp was also appointed to Tier 1 Canada Research Chair in Computational Genomics.

Ash Parameswaran
APEGBC Meritorious Achievement Award
Ash Parameswaran, Engineering Science, won the 2013 Meritorious Achievement Award from the Association of Professional Engineers and Geoscientists of BC. Parameswaran was recognized for his long-term achievements in the field of engineering science, including his “lab-on-a-chip” [LOC] technology.

Maryam Sadeghi
SFU’s 2013 Entrepreneur of the Year
Maryam Sadeghi, PhD graduate in Computing Science, was named SFU’s 2013 Entrepreneur of the Year. Sadeghi is the founder of award-winning MetaOptima Technology Inc., which provides digital health solutions for skin cancer prevention and diagnosis. She also leads SFU’s new Digital Health Hub, based at SFU Surrey campus and aimed at accelerating health technologies developed by SFU students and researchers.

Jian Pei
Board of directors, ACM SIGKDD (Special Interest Group on Knowledge Discovery and Data Minding) and IEEE Fellow
Computing Science’s Jian Pei joined the Board of Directors of the Association for Computing Machinery’s (ACM) Special Interest Group on Knowledge Discovery and Data Mining (SIGKDD). Pei is also the first SFU Computing Science faculty member to be elevated to the grade of Fellow with the IEEE, for his contributions to data mining and knowledge discovery. This is the highest grade of membership and is highly regarded by the technical community.
Kudos

Fourth annual FAS Awards of Excellence round-up:

FAS held its fourth annual Awards of Excellence, during which Dean Nimal Rajapakse acknowledged the outstanding achievements of seven FAS faculty, staff and students in 2013. The 2013 Awards of Excellence winners are as follows:

- Superior Performance in Teaching: Lesley Shannon, Engineering Science
- Superior Performance in Research by a Senior Faculty Member: Ke Wang, Computing Science
- Superior Performance in Research by an Early Career Faculty Member: Carlo Menon, Engineering Science
- Superior Performance in Service (Faculty): Rob Cameron, Computing Science
- Superior Performance in Service (Staff): Chingtai Wong, Computing Science
- Superior Performance in Teaching Assistance: Behrad Kajbafzadeh (Engineering Science) and Ricardo Jahns Gigglberger (Computing Science)

Recent NSERC awards

Farid Golnaraghi (Director and Professor, School of Mechatronic Systems Engineering) and Behraad Bahreyni (Assistant Professor, Mechatronic Systems Engineering) received an NSERC Strategic Project Grant ($374,100) to work on a project titled “A new MEMS gyroscope design based on nonlinear coupling and internal resonance.”

Behraad Bahreyni (Mechatronic Systems Engineering) and Albert Leung (Engineering Science) received an NSERC/DND grant of $1 million over three years for their project titled “Micromachined Acoustic Particle Acceleration Sensors.”

JC Liu and Xu Cheng

TOMCCAP Best Paper Award

Jiangchuan Liu, associate professor in the School of Computing Science, and PhD graduate Xu Cheng received the Transactions on Multimedia Computing, Communications and Applications (TOMCCAP) Nicolas D. Georganas Best Paper Award from the Association for Computing Machinery (ACM). Their paper, bringing together the highly relevant topics of social media and multimedia streaming, was recognized as the most significant work published in TOMCCAP Volume 8, as nominated by the journal’s readers and selected by the TOMCCAP Editorial Board.
Welcome New Faculty

The Faculty of Applied Sciences welcomed several new faculty members in 2013, bringing with them valuable research backgrounds and expertise in their fields.

**Computing Science**
William (Nick) Sumner, Assistant Professor

**Engineering Science**
Fabio Campi, Lecturer

**Mechatronic Systems Engineering**
Jiacheng (Jason) Wang, Assistant Professor
Kevin Oldknow, Lecturer
FAS continues to thrive with its very active (and hardworking) student body, faculty members and staff who support operations within the Faculty.

The 2013-2018 Academic Plan guides the overall activity of the Faculty over five years. As we are now well into this Academic Plan, I wanted to recap a few initiatives we’ve been developing:

1. **Graduate co-op program.** FAS already has the largest undergraduate co-op program at SFU. We’ve extended the co-op program to now include graduate students. This has been very well-received by employers. Co-op is providing these highly trained students with workplace skills and in turn, they contribute their advanced knowledge to employers.

2. **Professional graduate programs.** FAS is preparing to launch new professional programs directed to selected industry sectors. This September, a four-semester professional master’s program in large-scale data analysis (big data) will be offered. Visit [www.sfu.ca/computing/BigData](http://www.sfu.ca/computing/BigData) to learn more about this in-demand program.

3. **Pursuit of international partners.** Learning from our successful Dual Degree Program in Computing Science with Zhejiang University in China, FAS has been targeting new relationships in China and India. We’ve signed a student mobility agreement with Beijing Institute of Technology for engineering and a student mobility/research agreement with Indian Institute of Technology Bombay. Also, FAS has laid the groundwork with Indian Oil Corp. to collaborate on research related to alternative fuel technologies.

4. **Strengthen research collaboration with industry and other partners.** Faculty members in FAS have been very successful at strengthening our outreach and building clusters of research strength, particularly in clean energy systems and healthcare technologies. Working with external parties such as MDA and Fraser Health Authority has enabled FAS to accelerate its ability to build research capacity among undergraduate and graduate students, as well as among faculty members. FAS will be hosting an industry networking event this spring to expand our research partners.

5. **Establish learning outcomes and assessment (LOA).** Each of the FAS schools – Computing Science, Engineering Science and Mechatronic Systems Engineering – are in the process of defining student outcomes and assessments for courses to improve alignment of teaching/learning activities. This will guide faculty in reducing redundancies and creating activities that support stated learning objectives.

If you are curious to learn more about the FAS Academic Plan, it can be downloaded from the Vice-President, Academic, website at [www.sfu.ca/vpacademic/academic_planning/academic_plans](http://www.sfu.ca/vpacademic/academic_planning/academic_plans)

I wish you the best of luck in all of your endeavours this new year. Please feel free to send me any comments. I welcome your feedback.

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