

OFFICE OF

RESEARCH SERVICES, INNOVATION AND ENTREPRENEURSHIP

2017-2018 ANNUAL REPORT

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DEAN'S MESSAGE

2017-2018 has been a remarkable year in the Office of Research Services, Innovation and Entrepreneurship (ORSIE) with significant contributions from the institutional research, applied research and entrepreneurship teams. I am proud of our role in helping faculty achieve their research goals and ensuring students have opportunities to enhance their learning.

For the fifth year in a row, Durham College (DC) was named one of Canada's top 50 research colleges by Research Infosource Inc. clearly demonstrating the quality and importance of applied research in solving challenges through innovation and collaboration with external stakeholders.

The advancements in research, technology and experiential learning took a major leap forward with the launch of our Hub for Applied Research in Artificial Intelligence for Business Solutions, known as the AI Hub, in December 2017. A place where wisdom and insight are exchanged and knowledge is created, this new applied research centre will provide unique value propositions that will create additional opportunities for faculty and students to collaborate with industry partners.

In March 2018, the Centre for Craft Brewing (CCBI) at the Whitby campus held its grand opening. As DC's second applied research centre, CCBI offers craft brewers access to expertise and state of the art technology.

Highlights from the year also include the work done by ORSIE's Institutional Research and Planning (IRP) team that assisted in the study that demonstrated the \$913.3 million impact that the college has on the economy of Durham Region. The IRP team also made significant advancements in the use of data visualization to enhance understanding of various datasets.

The FastStart DC team had a successful year as they hosted CBC's Dragon's Den for the third consecutive year, while continuing to support student entrepreneurs by providing the tools and resources they need to launch their business ventures. Now in its second year of operation, the student-driven Enactus DC social entrepreneurship team continued work on its two initial projects, Project Y.O. and Project Grassroots.

As you review the highlights from 2017-2018, I hope you will be inspired to join us and become involved in research and scholarly activities at DC.



Debbie McKee Demczyk
Dean, ORSIE



RESEARCH TEAM

ORSIE EMPLOYEES

- Debbie McKee Demczyk, dean
- Mike Aylward, brewmaster, Centre for Craft Brewing Innovation
- Isabella Blandisi-Van Hee, project co-ordinator, Applied Research (from September 2017)
- Jay Fisher, manager, Experiential Learning
- Joshua Gerrow, junior research analyst, Institutional Research and Planning
- Chris Gillis, P. Eng., manager, Applied Research Business Development
- Rashmi Gupta, director, Institutional Research and Planning
- Matthew Hack, research and planning analyst, Institutional Research and Planning (from September 2017)
- Jane Hilton, project manager, Grants and Special Projects
- Dean Howley, entrepreneurship co-ordinator, FastStart DC (from September 2017)
- Shelley Irving, administrative assistant
- Dr. Shafiqul Islam, project co-ordinator, Applied Research (to June 2017)
- Lindsey Jeremiah, entrepreneurship co-ordinator, FastStart DC (on leave)
- Adam Jog, research and planning analyst, Institutional Research and Planning (from September 2017)
- Sara Lidstone, research assistant, Institutional Research and Planning (from September 2017 to March 2018)
- Kyle Paul, research and planning analyst, Institutional Research and Planning (to June 2017)
- Megan Parker, finance and ethics compliance co-ordinator
- Ruchie Raj Kumar, project co-ordinator, Applied Research (from September 2017)
- Stefanie Serio, research and planning analyst, Institutional Research and Planning (to March 2017)
- Samantha Sinclair, research and planning analyst, Institutional Research and Planning (on leave)
- Dr. Vibha Tyagi, manager, Applied Research Partnerships

RESEARCH CO-ORDINATORS

- Danny Aniag – School of Business, IT & Management
- Linda Cheng – School of Media, Art & Design
- Vlad Chiriac – School of Justice & Emergency Services
- Lorraine Closs – School of Health & Community Services
- Philip Jarvis – School of Science & Engineering Technology
- Dr. David Smith – School of Interdisciplinary Studies
- Wendy Smith – Centre for Food (from March 2018)

APPLIED RESEARCH

ANNUAL RESEARCH DAY

ORSIE hosted its seventh annual Research Day on April 27, 2018 to showcase the applied research and innovation projects of faculty and student researchers together with local business and community partners.

Ryan Turnbull, founder and president of Eco-Ethonomics Inc., delivered the keynote address on the advancement of social innovation and social enterprises in Canada. He spoke about how industry, college faculty and students can solve humanity's toughest challenges.

The event also featured a demonstration of WeTraq, a global tracking device designed to help families stay connected with loved ones with autism, dementia and Alzheimer's. Conceptualized by WeTraq CEO and founder Ishaan Singla, and brought to reality through a collaboration with DC students and faculty, the credit card-sized device can be kept by those at risk of wandering so that family members can track their whereabouts.

DC OUTSTANDING STUDENT RESEARCHER AWARDS:

First place

- Eric Mackie, third-year student, Computer Programmer Analyst

Second place (tie)

- Gregory Barnet, third-year student, Mechanical Engineering Technology
- Scott Rocha, second-year student, Computer Programmer

Third place

- Bolin Leung, graduate, Horticulture – Food and Farming

DC OUTSTANDING FACULTY RESEARCHER AWARDS:

First place

- Amit Maraj, professor, School of Business, IT & Management

Second place

- Clint MacDonald, professor, School of Business, IT & Management

Third place

- Rob Braithwaite, professor, School of Science & Engineering Technology



FEATURED STUDENT RESEARCHERS



Having worked as a research assistant while studying at DC, **Joey Lees** was hired as a principal investigator (PI) for ORSIE after he graduated from the Computer Programmer Analyst program. Through Professor Amit Maraj, Lees started working with ORSIE after expressing interest in working in information technology (IT) with a focus on research.

As a part of ORSIE research team, Lees has had the opportunity to engage with students on a professional level, gaining experience in many aspects of his chosen field and applying his skills and knowledge in health care and education through the lens of IT and Artificial Intelligence (AI).

His main area of research is AI and accessibility, exploring ways technology is being used to make life easier for people who face a variety of physical challenges on a daily basis; he is confident AI can be used as a tool to make people's lives easier.

His projects include using AI-driven image recognition, natural language processing and optical character recognition. He was also involved with the development of the recently established AI Hub, where he worked on projects that delivered real-world value for private companies. Lees also assisted in the development of modules for AI workshops. Additionally, he was engaged in an internal applied research project using AI speech recognition to transcribe video lectures for students.

In the future he would like to study wearable technology and any kind of AI health care detection that can be used to help in the diagnosis of patients. He also hopes to initiate change and influence people to learn and take advantage of emerging technologies.



Matthew Wierzbicki also began working with ORSIE as a research assistant and went on to become a principal investigator after graduating from DC's Computer Programmer Analyst program.

Prior to getting involved in research, Wierzbicki had limited knowledge of AI, however, after being encouraged by his professor, he applied to work at ORSIE and has since gained valuable experience, especially because AI is a big part of the computer science field.

While learning the language and formulas used in AI was initially a challenge, Wierzbicki met it head on. AI is a new technology that it is constantly and rapidly developing. What little information was available was often abstruse and difficult to break down but through the AI boot camps and workshops offered through the hub, Wierzbicki and his fellow researchers were able to learn through both guided lessons and experimentation. The opportunity to work with emerging technology while also gaining professional IT experience has been invaluable.

In addition to AI, Wierzbicki also has a keen interest in learning more about and working further with Augmented Reality (AR). During his studies at DC, he enrolled in a course called "Emerging Technologies" where he studied and developed a comprehensive report on the subject. He believes that in addition to AI, AR is also a prominent emerging technology in the field of information technology.

Currently, he is working on an AI project involving infusing an AI recommender system into new media such as websites and a mobile application. Prior to that, he researched AI with respect to image recognition, using state-of-the-art technology found at the most advanced companies all over the world. This was a unique opportunity made possible through his association with ORSIE.

Of AI, he says, "AI is where the world is going... it will change the future and revolutionize many services."

Wierzbicki encourages other students to get involved with research. Not only will they gain practical experience in their field, but they will have opportunities to learn things beyond what is taught in their programs. It's experiential learning at its best.

FEATURED RESEARCHER – AMIT MARAJ

2018 Leadership Excellence for Faculty – Silver Award



Amit Maraj is a professor for the School of Business, IT & Management. He also works as a principal investigator for ORSIE. Professor Maraj is an avid advocate for research activities and specifically applied research at DC. His work mainly focuses on research related to AI and improving the student experience. He also played an integral role in the establishment and launch of DC's AI Hub.

Professor Maraj started his academic career as a graduate of DC's Computer Systems Technology program. He continued his education at The University of Ontario Institute of Technology (UOIT) and subsequently earned a Bachelor of Information Technology in IT Security. Following that, he completed his Masters of Science in Computer Science at UOIT and will be returning in the fall of 2018, to work towards earning a PhD in Computer Science.

While he is interested in all facets of AI, Natural Language Processing (NLP) is a particular focus, as Professor Maraj examines communication and the relationships between computer technology and human languages.

His goal is to not only create opportunities for the college but also industry partners, making AI accessible so that everyone has an opportunity to learn and educate others about this emerging field.

In addition to working on conventional research projects, Professor Maraj has launched boot camps and workshops, giving students the opportunity to gain foundational knowledge about AI while also providing them with the skills required to be part of a team working on an AI applied research projects.

Collaborating with students, not only as a mentor but also as a colleague, is a favourite aspect of Professor Maraj's research work. He finds it gratifying to see his students grow, and watch their knowledge of AI expand. He enjoys "having the opportunity to be an integral part of the student experience."

APPLIED RESEARCH PROJECTS

ADVANCING AGRICULTURE, AGRI-BUSINESS AND TOURISM

Developing a recipe for low alcohol/no-alcohol beer

Industry partner: Premium Near Beer Ltd.

Principal investigators: Dave Coutts, Dirk Bendiak

Technicians/brewers: Mike Aylward, Erin Broadfoot

Research assistants: Casey Chessman, Amy Boekman

Lower alcohol, high flavour beers are one of craft brewing's biggest growth areas. The research team delivered a non-alcoholic India Pale Ale recipe that helped Premium Near Beer Inc., secure a deal on the popular CBC show, Dragon's Den. Samples of these beers have also been accepted by the LCBO for distribution in their stores.

Funder: Natural Sciences and Engineering Research Council of Canada (NSERC) Engage

ENABLING TECHNOLOGIES OF THE FUTURE

Investigation towards NetZero energy houses, challenges and solutions: the case of the house labs at DC's Whitby campus

Principal investigator: Dr. Ali Taileb

Research assistants: Denyse Zajakovski, Christina Schmidt

This research investigated the possibility of converting the existing houses at the Whitby campus to NetZero energy. Additionally, the potential for integrating renewable energy sources such as wind, geothermal and solar panels and the overall impact on carbon dioxide emissions and fossil fuel dependency was examined.

Funder: DC Internal Research Fund

Soft-machine simulation

Principal investigators: Philip Jarvis and Amit Maraj

Research assistants: Kyle Rowe, Tyler Train, Matthew Chiasson, and Jordan Menard

A flexible software platform was developed to help teach how machines are controlled through programmable logic controls (PLC) using a hardware interface to connect to a windows based PC. The PC running the software enables the design of simple machines (soft-machines) that are controlled via the PLC code.

Funder: DC General Research Fund

Design and developing an encasement for Smart-Home devices

Industry partner: Opilio Labs

Principal investigator: Philip Jarvis

Research assistants: Jaykumar Shah and Tyler Atkinson

Opilio Labs collaborated with DC to design and develop encasements for their Smart-Home devices. Using NX unigraphics, 3D CAD models were developed and a prototype was produced. The prototype samples were then rigorously tested for working operations, assembly features, appearances and injection molding possibilities for high production applications.

Funder: Ontario Centres of Excellence (OCE), College Voucher for Technology Adoption (CVTA)

Health Espresso web portal

Industry partner: iCare Home Health Services

Principal investigator: Amit Maraj

Research assistants: Calvin Lapp and Zac Roden

Health Espresso is an application that tracks the body's vital signs as well as medication reminders and compliance in real-time. This project built on an existing application to accommodate a desktop-based web portal which would allow a "secondary user" such as a hospital, retirement home, etc. to monitor several "primary users" (e.g., patients, residents, clients).

Funder: OCE CVTA

Fossil Hunter—push to launch

Industry partner: Reptoid Games

Principal investigator: John Goodwin

Research assistants: Victoria Jones and Jessica Langley

The Fossil Hunter beta product was tested and recommendations for improvements were made to Reptoid Games in preparation of the game's launch on the Steam network in 2018. Students gained valuable experience in commercial product development as the project was integrated into the curriculum.

Funder: OCE CVTA

RosterPoint mobile hockey website

Industry partner: RosterPoint

Principal investigator: Clint MacDonald

Research assistants: Craig Walker and Mert Kilan

A new registration system and profile editing modules were developed on the company's website to allow hockey players, recruiters and scouts to meet and interact. The player search engine was also redesigned to be compatible with other new systems which will be integrated into the existing customized system for payment processing and database compatibility.

Funder: OCE CVTA

Achieve-Itz application

Industry Partner: Epic Sports Memories

Principal Investigator: Amit Maraj

Research Assistants: Liam Bull, Hamza Naseer and Gregory Barnes

A mock software application, called, Achieve-Itz, was developed to mimic the functionality of a full-scale application that would allow people to maintain a digital record of their life's achievements as well that of a loved one or friend. For this project, a minimum viable website was created to host mock functionality of the company's future intended implementation.

Funder: OCE CVTA

Visualization and infographics for improved business intelligence

Industry partner: Precise ParkLink

Principal and co-investigators: Linda Cheng and Kayleigh Johnston

Tools for data visualization and interactive infographics using D3.js data-driven documents were designed and developed as part of the project, which was integrated into a web design course for the entire class. The industry partner provided the data and the students gained specific knowledge of the java script D3.js.

Funder: OCE CVTA

ENHANCING SCHOLARLY TEACHING AND LEARNING

Paramedic and paramedic student perceptions of teaching as a professional responsibility: implementation of an experiential-learning module principle

Principal investigators: Dale Button, Matthew Walton, Kevin Griffin

As the role and responsibilities of paramedics continue to evolve, this project created and implemented an experiential-learning module focused on authentic practice-based experiences, to prepare students for the new role of paramedic educator. The peer-teaching program consisted of second-year paramedic students voluntarily teaching first-year paramedic students in scheduled sessions.

Funder: DC Internal Research Fund

CULTIVATING HEALTHY LIVES AND RESILIENT COMMUNITIES

Funded by the joint UOIT and DC Innovative Initiatives Fund, to enhance their research capacity, the Paths to Research Partnerships 2018: A Community Forum was held on February 21, 2018. It brought together academic faculty and community partners to forge new collaborations and to learn how to undertake successful research partnerships. The event featured keynote speaker David Phipps, executive director, Research and Innovation Services at York University, and included research presentations and discussion panels with a focus on two themes:

- How to build effective college, university and community collaborations
- Best practices for successful community research partnerships





THE AI HUB

Helping small and medium-sized enterprises (SMEs) adopt AI, creating competitive advantage and economic growth

Launched in December 2017, the AI Hub offers industry partners access to technical expertise, state-of-the-art facilities and platforms, and student talent, so that the companies can uncover business insights while providing intelligent and autonomous solutions to increase their productivity and growth. AI is transforming how enterprise-business systems and consumer interactions and devices are developed and used. The promise of AI is bold but the challenges to adoption, by the 98 per cent of Ontario businesses identified as SMEs, is significant.

The AI Hub collaborates with SMEs from across Durham Region and the Greater Toronto Area to plan, develop, and implement state-of-the-art AI systems and practices into business solutions using technologies such as machine learning, decision support, natural language processing and automation to recommend strategic options, autonomously make decisions and act in a manner that would be considered intelligent. The AI Hub also provides highly sought after AI and machine-learning skills and experience to the students and graduates of DC thereby giving them a competitive advantage in a challenging employment market.

Consultation and advisory and support services are offered to organizations beginning to consider how AI can enhance their business. These introductory services include workshops, seminars, printed and digital collateral, and one-on-one meetings. The development of customized training and information sessions is also a service the AI Hub offers.

Led by faculty researchers Danny Anig, Stephen Forbes, Amit Maraj, Andrew Mayne, and Sam Plati the AI Hub also engages with existing businesses and start-up ventures utilizing advanced AI techniques and solutions to address practical business problems. The business solutions that are created by engaging with the AI Hub address core business needs including:

- Enhancing sales processes and creating revenue growth through AI-based sales systems;
- Establishing, measuring and improving customer sentiment, engagement and market segment performance;
- Developing AI-based personalization and customized product and service delivery systems;
- Developing natural-language products that communicate needs or gather input with domain understanding and possibly prescriptive recommendations for action;
- Developing AI-based solutions that utilize highly sensitive data, including medical data, to predict health requirements and make well-being recommendations; and
- Modelling AI system accountability, operating authorities, and risk management practices.

AI APPLIED RESEARCH PROJECTS

Social media image-caption generation using AI

Principal investigator: Amit Maraj

Research assistants: Matthew Wierzbicki and Dillion Regimbal

This project employed object detection (computer technology that detects semantic objects of a certain class such as humans, buildings, etc.) in digital images and videos to automatically retrieve all items in a social-media image post. The long-term implications for this project include an AI-based video camera, which triggers certain events based on accessibility-required instances. For example, through an AI-based video camera, as a student in a wheelchair approaches a door, the door would automatically open.

Funder: DC Internal Funding

Learning to predict student success with machine learning (ML) and AI

Principal investigator: Andrew Mayne

Research assistants: Musab Nazir, Kevin Astilla, and Sylvia Raposo

This project was designed to venture into the wide space of data mining and predictive modelling using state-of-the-art ML/AI.

A ML/AI-based solution was developed for data mining DC's extensive collection of student records with the goal of predicting student success metrics. The team investigated the general data-mining process and its applications along with theoretical concepts associated with predictive modelling.

Funder: DC Internal Funding

Interactive accessibility assistant

Principal investigator: Amit Maraj

Research assistants: Shawn Matthews and Joey Lees

The increasing popularity of video lectures conducted by professors has the added benefits of reusability and student accessibility. Close captioning for these lectures (i.e. adding subtitles) is presently completed by a third-party service. However, research into Artificial Neural Networks, such as multi-layer perceptions, recurrent neural networks, long and short-term memory networks and seq2seq networks demonstrated that this could be done in-house. A closed-captioning software was developed by integrating several signal-and language- processing AI architectures and incorporating sound and natural-language AI processing in a new and unique way.

Funder: DC Internal Funding

AI Showcase on Parliament Hill

In winter 2018, students and faculty together with ORSIE employees, participated in Colleges and Institute Canada's (CICan) annual Applied Research Symposium on Parliament Hill. They presented on the interactive accessibility assistant project, showcasing the software that was developed to provide accurate closed captioning for DC teaching materials.

Using AI for home health care

Industry partner: iCare Home Health Services

Principal investigator: Amit Maraj

Research assistants: James Pierson, Nick Carpenter, Joey Lees, and Matthew Wierzbicki

A unique feature was added to the Health Espresso app using AI to enhance voice reminders for medication timings, doctor's appointments and other health-related notifications. By integrating sentiment analysis within the speech recognition platform, the AI is able to pick up vague user responses such as, "mhm" and "nah" and interpret them as 'yes' or 'no' in nature. Using natural language processing and computer vision/speech recognition knowledge, the AI feature can now recognize this general sentiment within voice replies.

Funder: NSERC Engage

Microbiome profile management Using AI

Industry partner: uBioDiscovery Inc.

Principal investigator and Co-principal investigators:
Amit Maraj and Shaun Lloyd

Research assistants: Alexander Minz and Christopher O'Marra

This project created a scalable and consistent database to store all uBioDiscovery's client treatment plans and information. This data was then used to train and advance the AI solution. A web portal was also built, which captures clients' health status after their diagnosis and automatically generates a treatment plan (e.g., an appropriate diet based on the gut-bacteria results).

Funder: OCE, CVTA, National Research Council and Industrial Research Assistance Program (IRAP)

Developing solutions for an interactive education platform

Industry partner: Netwyn Solutions

Principal investigator and Co-principal investigators:
Andrew Mayne and Shaun Lloyd

Research assistants: Joey Lees and Sarah Powell

This project employed state-of-the-art computer vision technology to assist in the process of collecting homework assignments. A prototype system was designed using Google's Vision API and Google Cloud platform and tested to verify the authenticity of homework via photos taken of the finished exercise.

Funder: NRC IRAP

Integration of AI in interactive education platform

Industry Partner: Netwyn Solutions

Principal Investigator and Co-principal investigators:
Andrew Mayne and Shaun Lloyd

Research Assistants: Ryan Ramkalawan and Marko Topitsch

An AI solution was developed for Knowledge Hook, an interactive math education platform designed for use in and out of the K-12 classroom. By performing offline analytics on the data collected, learning opportunities were identified and recommended not only to students but also to the teacher directing the class.

Funder: OCE CVTA

PERFORMANCE MEASURES AT A GLANCE:

TOTAL RESEARCH FUNDING RECEIVED

2016-2017

\$679,683

2017-2018

\$1,005,242

2016-2017

21 STAFF

2017-2018

20 STAFF

2016-2017

84 STUDENTS

2017-2018

65 STUDENTS

2016-2017

39 RESEARCH PROJECTS

2017-2018

40 RESEARCH PROJECTS

CENTRE FOR CRAFT BREWING INNOVATION

On March 27, 2018 the Centre for Craft Brewing Innovation (CCBI) at the Whitby campus was officially launched. This popular centre offers access to expertise, state-of-the-art technology and micro-analytical services, allowing craft brewers to experiment with new recipes and flavour profiles, propagate and maintain yeast strains and conduct scientific analyses to ensure the analytical and microbiological integrity of the beer and comprehensive support for this growing sector of the local economy.

Consisting of a pilot brew line and brew lab, which were purchased using a \$150,000 Applied Research Tools and Instruments grant from NSERC, the CCBI is able to solve the industry challenges of Ontario's continued craft brewing boom. According to the Ontario Craft Brewers February 2018 fact sheet, this segment was one of the fastest growing in the LCBO, seeing 20 to 30 per cent growth year-over-year and the total economic impact of small breweries is estimated to be roughly \$1.4 billion.

Under the direction of an experienced microbiologist and brewmaster, the CCBI helps craft brewers address challenges they may be facing, including experimenting with new recipes and flavour profiles, propagating and maintaining yeast strains and conducting scientific analyses to ensure the analytical and microbiological integrity of their beer. This ultimately leads to the creation of a better product within this growing industry.

In addition to supporting craft brewers, the CCBI also allows students to gain valuable experience by working on research projects with brewers, challenging them to apply what they are learning in class to address real industry problems.



ENTREPRENEURSHIP

FASTSTART DC

FastStart DC is a co-curricular program that provides student entrepreneurs with tools and resources to help them develop and launch their own business ventures.

Working directly with business mentors, coaches, and peers in DC's on-campus entrepreneurship centre, FastStart DC participants create solid business models, design marketing assets, build product prototypes, websites and e-commerce platforms, and explore funding opportunities through a well-established network of community partners.

This past year, FastStart DC accomplished the following:

- Established IdeaEngine – an online intake tool utilizing the DC Connect learning management system – to support 85 new students through the ideation process.
- Achieved a program participation growth rate of 91 per cent, year over year.
- Held three pop-up markets in partnership with Enactus DC to provide student entrepreneurs the outlet to promote and sell their products and services.
- Hosted CBC's Dragons' Den auditions for the third consecutive year, at which five FastStart DC-supported students pitched their businesses.
- Recognized the entrepreneurial spirit of DC students in pitch contests at two of ORSIE's signature events, Celebrate STEAM and Research Day.
- Established a team of student consultants as FastStart DC's marketing agency, serving clients with marketing services including strategy, graphic design, and web development.
- Supported student entrepreneurs in launching new, revenue-generating businesses, five of which are showcased below:

Art on Fire

Jasmine Rutschmann grew up in a rural town with a father who loves to tinker. His love of creating was passed on to the second-year Small Business and Entrepreneurship student, who took quickly to welding and fabricating; skills which she now applies to her business - Art on Fire. She creates and sells unique hand-made art that blends rustic reclaimed metal with striking patterns and imagery.

Jasmine's work has been featured in art shows and tours in both Canada and the United States, with many more on the horizon.

Austin's Creations

Recognizing the value of applied problem solving, Austin McNeil, a first-year Automotive Technician student, leverages his mechanical and electrical know-how to develop creative solutions to his customers' needs. Through his business, Austin's Creations, he uses CAD design and 3D-printing technology to build one-of-a-kind custom parts and devices, which he does efficiently and more economically than his larger competitors.

JMD Alterations & Design

Building on her first diploma in fashion design, Julie Charlesworth, a first-year Small Business and Entrepreneurship student, combined her love of fashion with the entrepreneurial knowledge, skills, and experience she has gained in her current program to create JMD Design and Alterations. She now offers DC students and employees a complete range of clothing design and alteration services through her business and has plans to employ AI to assist with the measurement and patterning of her clients' custom clothing and alterations.

NXT LVL Leadership Training

Along with his partners Will and Fioti, Malcolm Hooper, a second-year Police Foundations student, drew upon his personal background in Cadets and competitive sports to develop an advanced leadership training program. His business, NXT LVL Leadership Training, offers teams and players programming that combines dry-land training with leadership training to help give them a competitive edge on the field, rink, or court.

Syncing Solutions

While working as an applied research assistant in ORSIE, Ramandeep Rathor, a first-year Computer Programmer Analyst student, came to understand the wants and needs of small businesses looking to use technology to solve problems. Ramandeep's company, Syncing Solutions, assists his customers with the design and implementation of technological solutions that are designed to improve efficiency and effectiveness without demanding prohibitive price points.



ENACTUS DC

SOCIAL ENTREPRENEURSHIP

In 2017-2018, the student-driven Enactus DC social-entrepreneurship team completed its second year, taking action to make a positive economic and social impact in society. Under the guidance of faculty/staff advisors, Enactus DC students applied their knowledge to cooperatively work with external partners to create impactful self-sustaining projects. This year Enactus DC continued work on its initial two projects, Project Y.O. (Youth Opportunities) and Project Grassroots.

Project Y.O. assists at-risk youth starting at DC with staying in college. The project informs young people on social assistance about the potential of college, the benefits of college, financial literacy and more. Co-created in partnership with the Region of Durham Income and Employment Support Division, this program supported these young people and created a bridge for them to find success as a DC student. This highly successful project has now transitioned to the DC Office of Diversity, Inclusion and Transitions as a core college service.

Project Grassroots is a collaborative partnership between DC and the Durham Catholic District School Board that seeks to develop local food production solutions and experiential-learning environments for students, to empower them towards food literacy and social entrepreneurship. Working with the students and staff at St. Mary High School in Pickering, the team co-developed an outdoor-education facility concept. The onsite facility will create a sustainable-food production model which promotes food security, local self-reliance and improves the livelihoods of students, their families and the community in an economically, socially and environmentally sustainable way.

This year Enactus DC also initiated two new projects. #DCSHOPS provides student entrepreneurs with a channel to sell their products during peak shopping seasons. The team also collaborated with Girls Inc. to empower young females in the region through food education and entrepreneurship. Next year these projects will continue along with new initiatives focused on youth empowerment, entrepreneurship, eco-living and financial education.

Enactus Canada Awards

In spring 2017, Jay Fisher, FastStart faculty lead, and Lindsey Jeremiah, entrepreneurship coordinator, were inducted as John Dobson Enactus Fellows at the Enactus Canada National Competition in Vancouver, British Columbia. The award is given to advisors who have made outstanding contributions as mentors and coaches. In addition, Fisher also received Enactus Canada's Rookie Faculty Advisor of the Year award for providing support and leadership to the Enactus DC team.

RESEARCH ETHICS

All research conducted at DC involving human participants must be reviewed and approved by the college's Research Ethics Board (REB). The REB ensures the research is conducted in a way that is ethically responsible and complies with relevant standards and guidelines.

RESEARCH ETHICS BOARD:

- Kay Corbier (chair) - School of Health & Community Services
- Dr. Jordanne Christie – School of Interdisciplinary Studies
- Fabiola Longo - School of Health & Community Services
- Virginia Harwood – School of Justice & Emergency Services
- Terri Korkush – Community member
- Dr. Lynne Kennette - School of Interdisciplinary Studies
- Keri Semenko – School of Health & Community Services



ACCOMPLISHMENTS

In 2017-2018, the REB reviewed 17 research ethics applications; 11 were approved by the DC REB and six were approved by the UOIT REB as part of the Board of Record Agreement. The majority of the applications were focused on research related to education (16). One was health related. Nine applications originated from DC researchers and external researchers submitted eight applications.

The majority of research was funded by other organizations (eight) such as the Ontario Council on Articulation and Transfer and eCampus Ontario. Seven were unfunded and two were funded internally.

Over the course of the year, the REB received 21 completion reports, seven requests for renewals, seven research application amendments and one request for use of secondary data. Kay Corbier, REB chair and DC faculty member, attended the Canadian Association of Research Ethics Boards (CAREB) conference that took place in Halifax in April 2017. Topics included reviewing online research and protecting researcher confidentiality.

Four past and present members of the REB presented at DC's Professional Development Day in June 2017. The presentation highlighted REB processes and course-based research.

In June 2017, several board members also attended the Colleges Ontario Heads of Applied Research REB Professional Development Day. Session topics included student-based research and online research.

DC and UOIT renewed their reciprocal REB review agreement for another two years.

The REB Protocol Manual was also updated in June 2017 to provide members with up-to-date guidance.

RESPONSIBLE CONDUCT OF RESEARCH REPORT

There were no allegations or breaches of the Responsible Conduct of Research Framework in 2017-2018. This includes all activities related to research where there has been a failure to comply with any policy throughout the life cycle of a research project – from application for funding, to the conduct of the research and the dissemination of research results.

INSTITUTIONAL RESEARCH AND PLANNING

The Institutional Research and Planning (IRP) team, in addition to their regular commitments, completed two major projects, the Ontario Council on Articulation and Transfer (ONCAT) funded research project and the use of an interactive data visualization tool to develop and present Program Information Packages (PIP).

The IRP research team conducted the research project *A Critical Reflection on the Footprint of Articulation Agreements at Selected College-University Pairs*, funded by ONCAT. While previous research primarily focused on the student experience, this project explored the institutional perspective on credit transfer at three college-university pairs. Through an examination of student transfer data, physical articulation agreements, and key informant interviews, the research team identified several key recommendations and best practices that have the potential to make the credit transfer process more consistent among Ontario institutions.

The IRP team made concerted efforts to promote data visualization in key reports. In 2017-2018, the team successfully transitioned the Program Information Packages to the Tableau platform to provide an interactive experience for the college's Comprehensive Program Review teams.

PERFORMANCE MEASURES AT A GLANCE:

- 1,073 Student Feedback Questionnaire reports:
 - 913 unique faculty members
 - 20,512 student respondents
 - 39 administrative summary reports
- Key Performance Indicator (KPI) report cards:
 - 143 programs
 - 20 service areas
 - 14 for DC Leadership Team
- 140 Program Health Matrix (PHM) reports
- Nine PHM school snapshots
- 10 environmental scans to support decisions on new program development
- 21 program information packages and presentations for program review and renewal
- 22 Student Affairs reports
- 34 ad hoc projects



ADDITIONAL PROJECTS

IRP collaborates with a number of stakeholders to provide data that supports planning, reporting or other strategic partnership initiatives. Other reports and presentations of particular note include:

PRESENTATION/REPORT	STAKEHOLDER
DC-UOIT Pathways, KPI Report, Economic Impact Study – Economic Modelling Specialists International (EMSI)	DC Board of Governors
Enrolment Management Plan metrics, Signature Program analysis/report, University-College Applicant Survey report	Enrolment Advisory Committee, DC
Dual-credit student enrolment and post-secondary conversion	School-College Work Initiative, DC
KPI administration training	DC
First Generation, Aboriginal student data analysis – annual report, OpenSIMS review	Ministry of Training, Colleges and Universities

Additionally, the IRP team collaborated with EMSI to study the economic impact and return on investment of DC. The results of this study show that the total impact of the college on the regional economy during the analysis year amounted to \$913.3 million, which is equal to approximately 4.9 per cent of the region's gross regional product.

SURVEY DEVELOPMENT, ANALYSIS AND REPORTING

IRP supported the following projects for strategic planning and decision making through survey development, administration and reporting:

1. Board effectiveness: evaluated and reported on the DC Board of Governors' self-assessment and provided information to support a board action plan.
2. KPI Opportunity 101 and KPI Administrator feedback: successfully recruited KPI administrators, and sought feedback on their KPI survey administration experience.

IRP also developed an assessment survey which evaluated students' usage, familiarity and satisfaction with resources and support provided for First Generation and Indigenous students by Office of Diversity, Inclusion and Transition, and by Student Academic Learning Services.

SCHOLARSHIP REPORT

PUBLICATIONS

Kennette, L. N. & Penn, A. (2018). Exploring the benefits of two-stage collaborative exams. *Currents in Teaching and Learning*, 10(1), 39-46.

Kennette, L. N. (2018). Using media in the classroom: A cautionary tale and some encouraging findings (Chapter 4). In W. S. Altman, L. Stein & J. E. Westfall (Eds.), *Essays from Excellence in Teaching Volume XVII*, Society for the Teaching of Psychology, 21-23.

Kennette, L. N. (2017, October 26) Going paperless: Is this generation ready? *NISOD Innovation Abstracts*, 39(25). <https://www.nisod.org/publications/innovation-abstracts/>

Kennette, L. N. & Hanzuk, W. (2017, Spring). The benefits of co-mingling with faculty outside your school: A reflection. *Catalyst*, 41, 13-14.

Kennette, L. N. & Hanzuk, W. (2017, May 1). Group work and collaborative activities for all. *Faculty Focus*. <https://www.facultyfocus.com/articles/instructional-design/group-work-collaborative-activities/>

Kennette, L. N., Van Havermaet, L. R. & Redd, B. R. (2017, April 27). Use it or lose it: Why and how to provide opportunities for your students to practice course content. *NOBA Project* [Invited blog] <http://noba.to/vxjt6das>

Kennette, L.N. & **Myatt, B.** (2018). How the post-secondary classroom can benefit from positive psychology principles. *Psychology Teaching Review*, 24(1), 63-66.

Redd, B. R., & **Kennette, L. N.** (2017). Getting students to read instructor feedback (and maybe actually learn from it). *College Quarterly*, 20(2), <http://collegequarterly.ca/2017-vol20-num02-spring/getting-students-to-read-instructor-feedback-and-maybe-actually-learn-from-it.html>

Wachowiak MP, Wachowiak-Smolíková R, Johnson MJ, Hay DC, Power K, **Williams-Bell F.M.** (2018) Quantitative feature analysis of continuous analytic wavelet transforms of electrocardiography and electromyography. *Phil. Trans. R. Soc.* <http://dx.doi.org/10.1098/rsta.2017.0250>

Williams-Bell, F. M., Aisbett, B., Murphy, B. A., & Larsen, B. (2017). The effects of simulated wildland firefighting tasks on core temperature and cognitive function under very hot conditions. *Frontiers in physiology*, 8, 815.

CONFERENCE PRESENTATIONS

Burgess, A., **Gillis, C.**, McKay, C., **Kennette, L. N.**, & Lloyd, M. (2018). How to build effective college, university, and community collaborations [Panel]. *Paths to Research Partnerships: A Community Forum*, Durham College & University of Ontario Institute of Technology, Oshawa, Ontario, February 21, 2018.

Closs, L., Levine, D., **Williams-Bell, F.W.**, Wood, S. (2018) *Best practices for successful community research partnerships* [Panel]. Paths to Research Partnerships: A Community Forum, Durham College & University of Ontario Institute of Technology, Oshawa, Ontario, February 21, 2018.

Coffey, S., **Graham, L.**, Anyinam, C., Muirhead, B., **de la Rocha, A.**, Zitzelsberger, H., Vogel, E., Ballantyne, N., Vanderlee, R., **Chorney, D.**, **Munro-Gilbert, P.**, Papaconstantinou, E., Sun, W., & Robertson, L. *Post-Secondary Education: The Missing Link in Tackling the Global Opioid Abuse Epidemic*. The 12th annual International Technology, Education and Development (INTED) Conference. Valencia, Spain, March 5, 6 and 7, 2018.

Coffey, S., **Graham, L.**, **de la Rocha, A.**, **Chorney, D.**, Zitzelsberger, H., Papaconstantinou, E. & Anyinam, C. (2017). *Advancing the philosophical roots of the artistry of simulation*. 4th Annual Philosophy of Education Conference. George Brown College, Toronto, Ontario, May 26, 2017.

Corbier, K., **Kennette, L. N.**, **Parker, M.**, & **Chorney, D.** (2017). *Tips for Completing Research Ethics Applications*, Durham College Professional Development Day, June 21, 2017.

Graham, L., Coffey, S., **de la Rocha, A.**, Papaconstantinou, E., **Chorney, D.**, Vogel, E., & Muirhead, B. (2017). *iPad iPractice*. INACSL conference, Washington, D.C., June 21-24, 2017.

Kennette, L. N., Poinsett, M. & Beechler, M. P. (2017). *Choose your own adventure: Some ideas for engaging test reviews*. [Roundtable Discussion] Annual convention of the Midwestern Psychological Association, Chicago, IL, April 2017.

Kennette, L. N., Lin, P. S., Van Havermaet, L. R., & Redd, B. R. (2017) *Universal Design for Learning (UDL): Tools and Techniques*. [Roundtable Discussion] Annual convention of the Midwestern Psychological Association, Chicago, IL, April 2017.

Longo, F., **de la Rocha, A.**, & Mairs, S. (2017). *Transforming caring science in nursing curriculum*. Third Annual European Conference: Caring Science Sacred Science. Lucca, Italy, June, 2017.

Mairs, S., **de la Rocha, A.**, & Longo, F. (2017). *Gerontological nursing competencies & standards of practice in nursing education*. Canadian Gerontological Nursing Association (CGNA) Biennial Conference Ottawa, Ontario, May 4-6, 2017.

Marshall, A., Hector-Alexander, A. Newbold, L. Bedward, M.A. *The Black Left: Left Out and Underestimated. Black Portraiture [s] IV: The Color of Silence*. Harvard, Massachusetts, USA, March 22 – 24, 2018

Papaconstantinou, E., Coffey, S., **Graham, L., de la Rocha, A.**, Zitzelsberger, H. (2017). *Concepts of Shock* (Virtual Showcase Presentation). Sim Expo, Toronto, Ontario, November 30 to December 1, 2017.

OTHER

Marianne Cochrane - Reviewer of The Registered Nurses' Association of Ontario (RNAO) publication: *Best Practice Guideline (BPG), Adopting eHealth Solutions: Implementation Strategies*.

Michael Williams-Bell received an award at the 4th annual Oshawa Fire Services Community Awards Night for contributions to the fire service through collaboration on applied research to improve the quality of training and safety for firefighters.



LOOKING FORWARD 2018-2019

As we move into 2018-2019, there are many new opportunities and initiatives on the horizon.

In the fall of 2018, FastStart DC will move into the Centre for Collaborative Education, a new multi-level building that will serve as an educational access point for students while bringing together local, Indigenous and global community groups in addition to key business sectors.

With funding received from NSERC, ORSIE will fully implement the AI Hub. AI is transforming how management decisions are made, products are developed, services are delivered and customer engagement occurs. Through the AI Hub, faculty and students will assist SMEs to create products, solutions, and processes that have commercial value and continue to enable industry partners to scale, compete, grow revenue, and expand their workforce through artificial intelligence-enabled systems and management practices.

In partnership with the Regional Municipality of Durham, Social Services Department and other community organizations, DC was awarded a Community and College Social Innovation Fund grant to support a social innovation research project entitled *The Co-design of a Youth-led Housing Hub: Developing a Unique and Scalable Housing Model for Youth Living on Their Own in Durham*. After conducting focus groups with youth, aged 16 to 17 years old who live independently from their families, a need was identified for a supported housing model. This two-year participatory action research project will co-design a housing hub where youth would live in a community with other youth and benefit from a combination of organic and formal community supports.



