Niagara College Canada
APPLIED DREAMS.

SOLUTIONS FOR INDUSTRY

2014·15

RESEARCH & INNOVATION

ANNUAL REPORT

niagaracollege.ca/research

Research & Innovation

DR. MARC NANTEL
Associate Vice-President

DR. MIKE DUNCAN
NSERC Industrial Chair in Precision Agriculture and Environmental Technologies,

KRYSTLE GRIMALDI
Manager, Projects & Operations

JIM LAMBERT, C.E.T.
Centre Manager
Advanced Manufacturing Innovation Centre

CAROLYN MULLIN
Manager, Dissemination & Outreach

NIGEL CORISH
Research Project Manager
Canadian Food & Wine Institute Innovation Centre

GORDON KOSLOWSKI
Research Project Manager
Advanced Manufacturing Innovation Centre

GREGOR MacLEAN
Research Project Manager
Agriculture & Environment Innovation Centre

NEIL WILKINSON
Research Project Manager
Business & Commercialization Solutions and Digital Media & Web Solutions

JOSE GABRIE
Research Lab Technologist
Canadian Food & Wine Institute Innovation Centre

BEN LAURENCE
Research Lab Technologist
Advanced Manufacturing Innovation Centre

RACHEL BROWN
Research Grants & Contracts Officer

KRISTINE CANNIFF
Industry Liaison Officer

DAVID DIPIETRO
Course-Based Research Co-ordinator

CHRISTINE RAYMOND
Human Resources & Events Officer

JANE SCOTT
Web and Graphic Design Officer

FLORRIE NEUFELD
Administrative Assistant
Niagara-on-the-Lake Campus

MICHELLE TOPOLINSKY
Administrative Assistant
Welland Campus

KEVIN POULIN
Systems Administrator

We have included many stories on these pages, but we have more to share. Visit us on the web to view our videos: niagararesearch.ca/Default/Resources

A year of great strides for research and innovation

Hi and welcome to the Niagara College Research & Innovation Division Annual Report for 2014-15. Please spend a few minutes with us, perusing these pages and learning all about our stories celebrating the students, faculty and staff who have made this past year a resounding success.

In partnership with government and industry, Research & Innovation has involved 1,847 students and 91 faculty and researchers in 168 projects, which represent increases over last year of 46%, 97%, and 118%, respectively. These projects included faculty and students from 44 programs at the college, which is also an increase of 63%.

Together these numbers represent a whole lot of research and innovation action, and many, many satisfied industry partners who now have in hand solutions to their new product development, process improvement, or related service.

Our Division plays a key role in helping Niagara College students become value-added personnel, fostering professional development for our faculty and staff, and supporting the college in realizing its regional economic development mandate.

In these pages, you will read about several interesting projects and people in applied research at Niagara College. We now have three Innovation Centres: the Advanced Manufacturing Innovation Centre, the Agriculture & Environment Innovation Centre and the Canadian Food & Wine Institute Innovation Centre. Supporting the work in those three main areas of specialization are the Business & Commercialization Solutions, and the Digital Media & Web Solutions, because sometimes companies need a little bit more than a straight technology solution; they need the whole package – including everything from initial market research to the development of a new mobile app – and we're there to provide it.

Enjoy our Annual Report, and if you find yourself visiting our Welland Campus in the near future, check out the construction progress on the Walker Advanced Manufacturing Innovation Centre building: our new home as of Spring 2016!

DR. MARC NANTEL
Associate Vice-President, Research & Innovation
Niagara College

TABLE OF CONTENTS

SOLUTIONS FOR INDUSTRY 2014-15

ADVANCED MANUFACTURING INNOVATION CENTRE

PROJECT MANAGER:
Gordon Koslowski

Located at the Welland Campus of Niagara College, the Advanced Manufacturing Innovation Centre provides small regional manufacturers access to needed facilities, equipment, technical expertise – including 3D technologies and related software – and serves to assist them in product development, technology adoption, expansion into new markets and commercialization.

PROJECTS SPOTLIGHT

Developing an Efficient Landscape Surface Cleaner

INDUSTRY PARTNER: 1000 Islands Lawn & Landscaping

PROJECT DURATION: Nov. 2014 to June 2015

PROJECT TYPE: Mechanical Engineering Design and Improvement

FUNDING: NRED Voucher, OCE VIP 1, NSERC ARD

RESEARCH TEAM: Costa Aza, Bryan Mewhiney *(faculty)*; Stephanie Bucknall, Akinshola Akinrinade, David McKechnie, Kyle Ranger *(students)*

CHALLENGE: Over time, aging outdoor surfaces face problems such as brick shifting, cracking, and vegetation growth. The traditional landscaping method of pressure washer cleaning uses a lot of water and can create a mess. Harrison Olajos, owner of 1,000 Islands Lawn and Landscaping (1,000 Islands), based out of Brockville, Ont., had a concept but no means to create and test a functional prototype to improve the efficiency of outdoor surface cleaning and restoration.

SOLUTION: The team took the original cleaning machine concept and made it a reality through collaborative efforts, prototype design, redesign, testing, and fabrication. They produced a working surface cleaning prototype that semi-automates the cleaning process, reduces the overall messiness, and completes the cleaning more efficiently.

Expanding an Uplifting Product Line

INDUSTRY PARTNER: Easily Moved Equipment

PROJECT DURATION: May to Aug. 2014

PROJECT TYPE: Mechanical Engineering Design and Improvement

FUNDING: Niagara Region Economic Development (NRED) Voucher

RESEARCH TEAM: Costa Aza *(faculty)*; Dave McKechnie *(student)*

CHALLENGE: Niagara Falls-based Easily Moved Equipment (EME) is currently the only crane fabricator offering a 5-tonne aluminum gantry crane. Although they had increasing industry demand for a 10-tonne gantry crane made of aluminum they did not have the expertise or equipment to determine the viability of a 10-tonne crane, to expand their product line.

SOLUTION: With the use of EME's existing 5-tonne gantry crane as a benchmark, the research team designed a new 10-tonne aluminum gantry crane, incorporating many of the parts that are currently being used in the 5-tonne design to improve on the company's economies of scale. The team also provided EME with engineered drawings for the new parts, as well as stress analysis reports for the new crane, validating its usability and safety. The company immediately secured a purchase order for one new crane with plans to sell more, and hired one new staff position.

Using 3D Technology to Expand a Product Line

INDUSTRY PARTNER: Rumidifier Home Comforts Inc.

PROJECT DURATION: Nov. 2014 to June 2015

PROJECT TYPE: Mechanical Engineering Design and Improvement

FUNDING: NRED Voucher, OCE VIP 1, NSERC ARD

RESEARCH TEAM: Costa Aza, Bryan Mewhiney *(faculty)*; Stephanie Bucknall, Akinshola Akinrinade, David McKechnie, Kyle Ranger *(students)*

CHALLENGE: Rumidifier Home Comforts Inc. (Rumidifier), based out of Ottawa, Ont., wanted to expand its product line by adding an electricity-free humidifier run by the heat generated by baseboard heaters. The company had the concept but no means to design and test it.

SOLUTION: With the design concepts from the original baseboard Rumidifier available, the research team was able to leverage its 3D technology and create a successful prototype design that works with traditional baseboard heaters. The team not only created several prototypes for this project, but also developed a testing chamber used to record temperature and humidity levels of the prototype during testing. Empirical results demonstrating the concept's success were delivered, together with a comprehensive research report, and functioning prototype. The company plans to commercialize this new product in 2016.

Andrew McCuaig

Research Assistant
Advanced Manufacturing Innovation Centre

When Andrew McCuaig discovered a sales career was not for him, he shifted his focus to the industrial world, finding fulfillment working at the Advanced Manufacturing Innovation Centre.

The research assistant is halfway through his studies in the College's Mechanical Engineering Technology Co-op program, after having earned a diploma in international business and spending several years as a sales liaison with large corporate accounts.

"There is no way I would have been prepared for the engineering program the first time around, because the professors expect such high quality, and I wouldn't have been able to do it," he notes.

Today, doing his co-op with the research centre, he has earned experience on productivity projects, reverse engineering projects, design work and created feasibility reports to determine new ways to manufacture parts.

"There is just so much to learn here. Every team member tends to specialize in a different area, and they make it seem easy. Then you realize what they're doing is incredibly tough, because eventually you have to learn what they're doing to be able to complete your own project."

His most recent project involves a productivity assessment for a Niagara peach farm, which expects to increase its peach crop by 25 per cent this year, but the processing and packing plant is already running at 100 per cent. The business turned to the College's research centre to use 3D equipment and related software to first scan the facility, build the current model in a virtual world, using ReCap and CAD software, and then manipulate the layout to produce a new, efficient production facility.

McCuaig sees many parallels between his business experiences and his current studies, and work. "Industrial engineering is very close to business; they are both all about making the most out of what you have."

He says his sales experience contributes to his ability to interact easily with industry partners, discussing their challenges, and then presenting the team's solutions.

Originally interested in aerospace, McCuaig's recent project work on productivity has now diverted his focus into lean manufacturing.

While he calls Moncton, N.B. home, he has spent the past 10 years in Niagara. When not working or studying, he admits to thoroughly enjoying other aspects of student life, and he devotes his spare-time energy to road cycling. **R&I**

ADVANCED MANUFACTURING INNOVATION CENTRE BY THE NUMBERS

58	7	2	7
PROJECTS	STUDENTS	PROGRAMS	RESEARCHERS

Tom Koole

Research Associate
Agriculture & Environment Innovation Centre

Although not in his official title, Tom Koole might be considered an interpreter.

The research associate with the Agriculture & Environment Innovation Centre is officially employed as a computer programmer, but in the six years he has worked with the College's research division, many of the projects he has done involve interpreting the vision of the rest of the team.

"I take ideas that Sarah [Lepp, senior research associate] and Mike [Dr. Mike Duncan, Industrial Research Chair in Precision Agriculture and Environmental Technologies] have, and figure out a way to program them into a solution that is available for everyone to use."

Koole started working with the division part-time while completing the computer programmer/analyst program at the College. His work has concentrated largely on the precision agriculture side of the team's work, which involves developing affordable and sustainable tools to aid growers in their business.

The St. Catharines native worked full-time in the summers, and on graduation in 2010 he switched back to part-time, so that he could pursue his Honours BSc in Computer Science, from Brock University. He graduated in 2014.

Since then he has worked full-time, developing the new web crop portal, which is meant to make data collection, analysis and applications easier for consultants, grain growers and researchers.

While the programming might not prove as challenging, Koole has been pushed outside his comfort zone lately with a new task: teaching programming for a new set of research assistants.

"Because I have been here so long, much of what I do is intuitive, so I have to slow myself down to teach new students something that is second nature to me."

In his spare time, Koole admits to spending more time in front of a screen, as one of the principals for a company called Manic North, and for his own application development for Android and IOS.

He has seen about 10,000 users download his Welland Canal Status app, which keeps tabs on bridges as ships move through the canal, and he sees about 1,000 users per year download his tracker of Roll up the Rim Tim Hortons wins.

In the winter months, Koole does get away from the monitors to play badminton, and he intentionally unplugs at some point every summer with a visit to cottage country. **R&I**

AGRICULTURE & ENVIRONMENT INNOVATION CENTRE BY THE NUMBERS

8	9	5	16
PROJECTS	STUDENTS	PROGRAMS	RESEARCHERS

AGRICULTURE & ENVIRONMENT INNOVATION CENTRE

PROJECTS SPOTLIGHT

Developing a Crop Portal

INDUSTRY PARTNER: Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), Ontario crop/agricultural consultants and Ontario grain growers

PROJECT DURATION: Apr. 2014 to Oct. 2017

PROJECT TYPE: Cloud Service and Precision Agriculture Process Development

FUNDING: Grain Farmers of Ontario (GFO) and Growing Forward 2 (Agricultural Adaptation Council)

RESEARCH TEAM: Dr. Mike Duncan, Industrial Research Chair for Colleges – Precision Agriculture & Environmental Technologies; Sarah Lepp *(Senior Research Associate)*; Tom Koole *(Research Associate)*; Cody Harvey, Jordan Haine and Ryan Tunis *(students)*

CHALLENGE: Farming equipment is powerful, sophisticated and costly, and Ontario grain farmers are seeking validation for this equipment.

SOLUTION: The team has developed a web service, also known as a Crop Portal, to process grower data and apply custom algorithms and to help validate precision agriculture practices, including variable rate. For the 2015 growing season, the variable rate seeding and nitrogen practices will be collected and evaluated using the Crop Portal.

Assessing Water Usage for Niagara Winery

INDUSTRY PARTNER: Cave Spring Cellars

PROJECT DURATION: Jan. to March 2015

PROJECT TYPE: Water Audit Template & Report

FUNDING: NSERC CCI IE

RESEARCH TEAM: Annie Michaud *(faculty)*; Steve Vanderhorst *(student)*

CHALLENGE: Cave Spring Cellars is very proactive with its water usage and treatment but had not previously had a water audit completed, and it did not have the equipment or accessories to complete the work. Water usage data would provide a baseline for Cave Spring and a starting point to continue gathering data and potentially reduce overall water usage or water as a ratio in its wine production.

SOLUTION: The team provided a summary of tools with recommendations to track water usage on hoses and the bottle cleaning line. Once monitoring devices were purchased and installed by Cave Spring, the wine production team recorded water usage by task during a two-week period. The research team summarized these results, extrapolated them over a longer period of time, created a recording template and provided recommendations for future water tracking and reductions.

Testing Light Sources in a Greenhouse Setting

INDUSTRY PARTNER: Jeffery's Greenhouses Inc.

PROJECT DURATION: Sept. 2012 to March 2015

PROJECT TYPE: Growing Methodology

FUNDING: NSERC CCI IE

RESEARCH TEAM: Tanya Blankenburg, Olga Piedrahita and Bill MacDonald *(faculty)*; Joanna Dowbiggin, Leanna Kozak, Maxine Murphy, Marek Paterski, Joshua Petzold, & Jheanelle Roebbelen *(students)*

CHALLENGE: Jeffery's Greenhouses Inc. grows a wide variety of ornamental plants with approximately 10 acres of greenhouse production. Greenhouse growers maximize growing space by planting in layers, which has its limitations based on light availability. There is often a compromise due to light levels required by several bedding plants.

SOLUTION: The team explored the use of supplementary LED lights to compensate for the light being filtered by the top canopy. Common top canopy species were selected, the canopy light filtering characteristics were determined and LED combinations that will allow for improved plant health were tested and compared.

PROJECT MANAGER
Gregor MacLean

Niagara College's Agriculture & Environment Innovation team specializes in developing innovative solutions to address today's agricultural, environmental and ecological challenges. Expertise in precision agriculture, renewable energies, environmental management, GIS, horticulture and greenhouse operations is enhanced by computational power to process big data; a 20,000 square-foot greenhouse; aquaponics and hydroponics systems; environmental labs, and on-campus wetlands and lagoons.

COURSE-BASED RESEARCH

CO-ORDINATOR:
David DiPietro

Course-based Research projects are part of a strategy implemented by Deans, Associate Deans, Faculty and the Research & Innovation division to augment content from the classroom with real-life projects and scenarios. These projects typically involve students working with an industry partner to solve real-world challenges. Students are provided increased contact with a specific industry, presenting their fresh ideas to a client. In other words, everyone benefits from the collaboration.

PROJECTS SPOTLIGHT

United Way/NPRN – Training Manuals

PROJECT DURATION: 3 months

PROJECT TYPE: Course-based Project

AREA OF SPECIALIZATION: Human Resources

RESEARCH TEAM: Human Resources Management *(Organizational Training & Development – MGMT 9740)*: Holly Catalfamo *(faculty)*

CHALLENGE: The United Way of South Niagara and the Niagara Poverty Reduction Network needed training manuals that could be used across all non-profit organizations. Due to the lack of resources and staff, most non-profit organizations did not have the appropriate training manuals and programs within their agency.

SOLUTION: Human Resources Management (graduate certificate) students were able to provide a diagnostic assessment of training needs and develop a customized program. Students were able to provide the United Way with a customized training manual for volunteer employees, while also providing a generic manual and program for the Niagara Poverty Reduction Network, so that they could distribute it to their agencies. It was estimated that the cost savings could extend to nearly $200,000 (or $10,000 per non-profit)— a significant amount for not-for-profits in the region. The manuals and programs were implemented immediately.

Welland Museum – Web Development

PROJECT DURATION: 3 months

PROJECT TYPE: Course-based Project

AREA OF SPECIALIZATION: Web Design

RESEARCH TEAM: New Media Web Design *(Integrated Rich Media Projects – WEBD 1113)*: Mark Hardwick *(faculty)*; Myles Fisher and Dave Grobbo *(students)*

CHALLENGE: The Welland Museum was under construction and receiving upgrades to its building. During this time period, they realized that it would be a great time to revamp their website as well in order to successfully launch their new facility, but did not have the budget or expertise to complete the redesign.

SOLUTION: Two students from the New Media Web Design program were assigned to the Welland Museum project, redesigning the website with their own creative twist on the existing logos and webpages. The team provided museum staff with new pages, web layouts and functionalities such as mobile compatibility, in time for the launch of the newly renovated building.

Yorkshire Valley Farms – Recipe Development

PROJECT DURATION: 3 months

PROJECT TYPE: Course-based Project

AREA OF SPECIALIZATION: Recipe Development

RESEARCH TEAM: Modern Culinary Applications *(Recipe Development – CULN 1325)*: Ted Reader, Amy Proulx *(faculty)*

CHALLENGE: Yorkshire Valley Farms had cuts of chicken for which they did not have recipes. They wanted to come up with recipes to use chicken so that they were not being wasteful, but did not have the knowledge or expertise to move forward.

SOLUTION: With very specific criteria in mind (organic, small-mid-sized serving portions, healthy and quick to grab as a snack), students in the Modern Culinary Applications course were able to provide recipes and ideas for the chicken products. Through a series of costing and recipe development, the students prepared and presented the chicken products to Yorkshire Valley Farms. The best products were selected and presented at the Royal Agricultural Winter Fair.

"Course-based project work empowers the students to be problem-solvers, to gain skills that will be necessary in the business world." ~John Sustersic

John Sustersic

Professor of Marketing
Business Division

Implementing course-based research projects into the daily curricula might be more work in some ways, but Professor John Sustersic finds the work reaps many rewards.

The marketing professor, who has more than 14 years' teaching experience, came to Niagara College two years ago, teaching several marketing courses for the business division, including entrepreneurship, market entry and distribution, international marketing and marketing management.

"There are so many positives, for the students, for the client, and for me and the college," notes Sustersic, who also has more than a decade of field experience in such positions as a marketing manager, product manager, and consultant.

Before that, the St. Catharines resident earned his BA in psychology and sociology at Laurier University and his MBA at Queen's University.

"You can structure the class around the project, so that the concepts are taught, but then they are directly applied to the real world. Many students aren't used to working in teams, but they take it on, and then they get to put the project experience on their resumes."

In the past academic year, Sustersic implemented five course-based projects into his courses, two in each of the fall and winter terms, and one that wrapped up in the spring term.

The spring term project focused on market entry for a Slovenian company looking to bring its natural anti-oxidant product to North America. With family roots in Slovenia, Sustersic speaks the language, and worked in the country in 2002, so he had a direct link with the company.

Students conducted research into potential trade barriers, such as tariffs and taxes, and examined the other dominant players in the market. The student teams were able to present their findings and receive immediate feedback through a series of Skype meetings.

"These projects help the students connect the dots deeper than just reading a case study, and the work helps keep me current and connected to clients. Everyone benefits."

With his new full-time position as professor of marketing, Sustersic is looking forward to seeing how he can implement course-based projects into a new set of courses. **R&I**

COURSE-BASED RESEARCH BY THE NUMBERS

63	1,807	19	26
PROJECTS	STUDENTS	PROGRAMS	RESEARCHERS

PROJECT HOW TO:

From idea to commercialization, here are the steps taken by the research team for the challenge of developing a Canadian-made version of a Mediterranean-style yogurt accoutrement for a Greek yogurt bar

01 Market Research

02 'Golden palate' *tastings by our resident chefs*

03 Product Development

04 Sensory Analysis

05 Recipe Refinement

06 Consumer Testing

07 Shelf-life Analysis

08 Nutrition Analysis & Labelling

09 Final Label Design

10 Sourcing Co-packer

11 Final Report: *final recipes delivered; company serves them in yogurt bar*

INNOVATION INSPIRATION

The Canadian Food & Wine Institute Innovation Centre team offers a full suite of services to support industry innovation and commercialization of new products and processes. Centre expertise includes:

RECIPE & NEW PRODUCT DEVELOPMENT

Developing new products, improving existing products, entering new product categories or increasing product quality and ease of operations

NUTRITIONAL LABELLING & ANALYSIS

Using the science labs to analyze the content of food and beverages, or developing proper nutrition labels and packaging according to acceptable food regulatory standards

VALUE-ADDED PRODUCT DEVELOPMENT

Raw food producers can transform raw ingredients into value-added goods

FOOD & BEVERAGE REGULATORY ASSISTANCE

Guiding you through the appropriate and applicable food safety standards

SENSORY & CONSUMER TESTING

Engaging consumers and trained panellists to guide the recipe development process

FOOD & BEVERAGE LABORATORY SERVICES

Including analytical testing for food and beverage products including beer and wine

RESOURCES & CAPABILITIES
Commercial Brewery and Hopyard
Commercial Winery and Vineyard
Commercial Kitchens
Microbiology Lab
Chemistry Lab
Sensory and Consumer Testing Labs
Shelf-Life Testing Lab
Packaging Lab
Commercialization Solutions

STUDENT SUCCESS SPOTLIGHT

Genevieve Bisset

Recent graduate was able to parlay her education and work experience with the CFWI Innovation Centre into a dream job on the west coast

Genevieve Bisset is living an inspired life on Canada's west coast.

The 2015 graduate of the College's Culinary Innovation and Food Technology program credits her work with the Canadian Food & Wine Institute (CFWI) Innovation Centre with her ability to find full-time work even before she had graduated.

The Guelph native started working as a research assistant with the CFWI Innovation Centre about halfway through her studies.

She says the classroom work was enhanced by the project work, and allowed her to not only develop her skills, but to discover what she does and doesn't like about the business.

Students with the Innovation Centre work on a number of projects to solve the challenges presented by real-world industry partners, which can include product development, sensory analysis, microbiology, chemistry, shelf-life analysis, nutritional labelling, or food safety.

"My program at the college gave me the understanding and the skills, but then working on these projects allowed me to do hands-on work, using those skills, developing and refining them, which then put me in front of possible employers," she recalls.

While she worked on several projects as a research assistant with the CFWI Innovation Centre, one project in particular set her on her career path.

Celebrity chef Vikram Vij came to the college for direction in obtaining the necessary health-related regulatory approvals for a line of home curries being produced at his facility in Vancouver, B.C.

"He was restricted to only selling his vegetable products across Canada, so once we got in there and put the processes in place, he will be able to sell his meat products throughout all of Canada," Bisset explained. "We helped develop and refine his processes for him to meet the regulatory standards."

The work helped solidify Bisset's desire to work on the regulatory side of the business, rather than on culinary innovation, she notes.

And after spending time at the B.C. facility of Vij's Inspired Indian Cuisine, company officials decided they liked what they saw in Bisset, and offered her a full-time job on graduation, as the Quality Assurance and HACCP Co-ordinator.

"I never dreamed we'd be able to work with a celebrity chef, or that he would work with a student to accomplish his goals, but here I am working to maintain the food safety program we helped put in place while still students.

"'The biggest fear coming out of school as a graduate is looking for a job, and not knowing what you are going to do. I was given this path right into a job from working on this project." **R&I**

"My program at the college gave me the understanding and the skills, but then working on these projects allowed me to do hands-on work, using those skills, developing and refining them, which then put me in front of possible employers."
~Genevieve Bisset

WHERE ARE THEY NOW?

Employment for our recent students and graduates

GRADUATE	COMPANY
Victoria Stroh	Puratos
Oksana Sytchouk	Mortimer's Fine Foods
Jessica Reese	Vineland Estates Winery
Genevieve Bisset	Vij's at Home
Aissa Thomas	Le Bon Croissant Bakery
Rebecca Griffin	Senior Research Associate, CFWI Innovation Centre
Chris Heagle	Freelance chef and consultant *(served as assistant manager, Back of House, Ontario Celebration Zone, Pan Am & Parapan Am Games)*

Cameron Kyle

Research Associate
Business & Commercialization Solutions

Whether helping boost the social media presence of a local craft brewer, or investigating the North American market opportunities of a European company, Cameron Kyle developed what he calls foundational skills in marketing while working with Research & Innovation's Business & Commercialization team.

The 2013 graduate of the College's Business Administration – Marketing, Advanced program worked both as a student research assistant, and then as a research associate after graduation.

While he was part of a team on several projects, he says he solidified his educational experience while working on a strategic social media project for Oast House Brewers, and while heading up a research project on market viability for Lyngsoe Systems, a dominant logistics provider in European countries such as Denmark and Germany.

"The opportunity to work with such a diverse range of professionals and businesses proved an invaluable experience, equipping me with the knowledge and the confidence needed to be successful in my future endeavours," Kyle notes.

While he confesses that he used to be shy and work independently before his time with the research team, Kyle credits his time of team collaboration on these industry projects with helping him solidify his career goals in marketing, and empowering him to take on bigger challenges in his next educational stage: pursuing a Bachelor of Science in Marketing at Niagara University.

In fact, he and a team of colleagues were recently named semifinalists in EntrepreNU, a school-wide competition addressing food accessibility challenges in Niagara Falls, N.Y. More than 40 teams participated by developing a sustainable business concept to address the issue. At stake were mentorship opportunities from professors and industry professionals, along with $10,000 in start-up funding to put the plan into action.

"Research & Innovation provided tremendous support and opportunities to develop myself. Working alongside faculty, colleagues and industry partners, I was able to become more confident in my own knowledge and capabilities," he explains.

"My time with the division was one of the most rewarding and valuable experiences of my career as a marketing professional. The work makes a positive impact not only on the business, but it helps to stimulate the local economy as well." **R&I**

BUSINESS & COMMERCIALIZATION SOLUTIONS BY THE NUMBERS

9	5	12	15
PROJECTS	STUDENTS	PROGRAMS	RESEARCHERS

BUSINESS & COMMERCIALIZATION SOLUTIONS

PROJECTS SPOTLIGHT

Improving a Website Through Market Research

INDUSTRY PARTNER: 420Intel.com

PROJECT DURATION: May to July 2014

PROJECT TYPE: Market Research

FUNDING: NRED Voucher

RESEARCH TEAM: Malcolm Howe *(faculty)*; Joshua Giancola *(graduate)*

CHALLENGE: 420Intel.com was interested in developing a professional, business-focused portal for legal marijuana news and information, but did not have the expertise to understand the competitive environment for marijuana consultants and growing system suppliers. They also needed assistance to investigate content sources of marijuana news and information to curate for the site, as well as related rules and regulations for advertising in this industry.

SOLUTION: The team developed consumer profiles of marijuana growing system purchasers, including the financing options available to purchasers. They produced an analytical database of almost 60 leading North American medical marijuana consultants, including pricing analysis and perceptual mapping. A database was created with 30 of the most credible, reliable, and professional marijuana content sources. As a result of this initiative, 1.5 full-time equivalent (FTE) positions have been created.

Reading the Competitive Marketplace

INDUSTRY PARTNER: Mango Chutney

PROJECT DURATION: Jan. to March 2015

PROJECT TYPE: Branding and Marketing Plan

FUNDING: NSERC CCI-IE

RESEARCH TEAM: Malcolm Howe, Terri Champion *(faculty)*; Dylan Fabiano and Shelby Sargo *(students)*

CHALLENGE: Mango Chutney has been serving authentic, Indian food in the city of Cambridge since 2010. Their home-style cooking philosophy has now been extended into a line of frozen meal products. In entering this unfamiliar retail market, the company needed market research on the local frozen food market to outline possible target markets, competitors and various customer profiles.

SOLUTION: In collaboration with Mango Chutney, the team segmented and examined the frozen food industry to discover possible target markets, frozen food trends and the level of competition in the local frozen food market. Data analysis of nutritional value, sizing and components of competitor products was conducted to illustrate the market environment. Strategies were recommended for Mango Chutney to capitalize on their current market position.

Brand Strategy Targets Wine Industry

INDUSTRY PARTNER: Hamill Machine Company Inc.

PROJECT DURATION: Oct. 2014 to Jan. 2015

PROJECT TYPE: Branding and Marketing Plan

FUNDING: NRED Voucher

RESEARCH TEAM: Malcolm Howe *(faculty)*; Joshua Giancola *(graduate)*; Dylan Fabiano and Shelby Sargo *(students)*

CHALLENGE: Hamill Machine Company Inc., a general machine shop located in Niagara Falls, recently diversified into small manufacturing for wine supplies and food equipment, serving the U.S. and Canada. The company needed assistance with brand recognition, and with marketing its products and services to the wine industry.

SOLUTION: The team was able to produce a detailed marketing plan that incorporates the marketing mix in hand, with specific suggestions and insights. The report addresses target markets and the best methods to connect with these groups, as well as examples of marketing materials and an online marketing strategy. As a result of this initiative, one full-time welding position was retained, and another full-time equivalent position was created.

PROJECT MANAGER:
Neil Wilkinson

From initial market research to commercialization strategies, the Business & Commercialization team offers a full suite of solutions. The team pairs industry partners with faculty, recent graduates and students with the expertise to meet applied research and innovation needs in many areas, including human resources, international business, operations management and sales and marketing.

DIGITAL MEDIA & WEB SOLUTIONS

PROJECT MANAGER:
Neil Wilkinson

The Digital Media & Web Solutions team works with small- and medium-sized businesses to assist with the design, creation and implementation of various technology applications, including PC, web and mobile applications, as well as 3D visualization, video production, and graphic design. To do this, the team uses the most up-to-date programming languages, platforms and software packages.

PROJECTS SPOTLIGHT

Going Lean with Raspberry Pi

INDUSTRY PARTNER: Haver & Boecker *(formally W.S.Tyler)*

PROJECT DURATION: Sept. 2014 to June 2015

PROJECT TYPE: The use of the Raspberry P1 Computer in an Industrial Lean Manufacturing Application

FUNDING: NSERC ARD

RESEARCH TEAM: David Natalie *(senior research associate)*; Ron Bond, Jordan Haine, and Kristin Clancy *(graduates)*

CHALLENGE: W.S. Tyler had a need for monitoring and feedback in its assembly operations, but wanted to find a more inexpensive and easier to use solution than the current state-of-the-market technology, Programmable Logic Controllers (PLC).

SOLUTION: In a demonstration project, the research team determined that Raspberry Pi, a small, inexpensive, easily programmable computer, can be used in an industrial application, to collect machine data in real time, analyze it, and communicate the information in order to adjust operations. The end result is a fully functional prototype.

Enhancing Company's Online Capabilities

INDUSTRY PARTNER: Stolk Construction

PROJECT DURATION: Dec. 2014 to Mar. 2015

PROJECT TYPE: Website Update and Employee Portal

FUNDING: NRED Voucher

RESEARCH TEAM: David Natalie *(senior research associate)*; Kristin Clancy *(graduate)*

CHALLENGE: Stolk Construction is a long-time industrial, commercial and institutional contractor located in Port Colborne. The administrative staff faced struggles to update the website, since the technology was proprietary and dated. The company's owners wanted to add a secure area for employees to access schedules and other important documents.

SOLUTION: The team was engaged to rebuild the site on a modern open-source platform that allows easier updates and supports an employee portal. Using WordPress to create a modern, clean, responsive website, the team also added a plug-in to allow Stolk staff to login to a secure employee portal. The human resources department now quickly and easily distributes information to employees.

Creating a Web Portal

INDUSTRY PARTNER: ASW Steel

PROJECT DURATION: Dec. 2014 to Mar. 2015

PROJECT TYPE: Customer Portal

FUNDING: NRED Voucher/ OCE Voucher for E-Business

RESEARCH TEAM: David Natalie *(senior research associate)*; Myles Fisher *(student)*

CHALLENGE: ASW Steel Inc. is among the premier steel-making facilities in North America, offering a unique combination of carbon, stainless, and other specialty steel-making capabilities. This Welland-based SME wanted a secure customer portal on its website but did not have the expertise to allow this deeper connection to its customers, while providing greater business growth opportunities.

SOLUTION: The team upgraded the ASW Steel website to run on the WordPress content management system, which allows the ASW team to easily manage and update their web content, ensuring the site is relevant to customers and is attractive to search engines. The team also installed and configured the WP-Client plugin to create the client portal allowing clients to access estimates and invoices, test certificates, order status and history, and a quality control reporting system.

E-Business Solutions for Industry

Students and recent graduates help industry keep up-to-date with technology

Modern business-to-business solutions most often involve the latest e-business solutions. But for small- to medium-sized companies (SMEs), the ability to keep up-to-date is often either cost prohibitive, or hindered by a lack of expert knowledge.

Enter the students and recent graduates from the Digital Media & Web Solutions team, many of whom are students or graduates of the College's New Media Web Design program.

Through industry projects funded by various levels of government, these skilled researchers tackle the e-business challenges of local SMEs, and gain valuable experience towards their own employment along the way. For example, the division was awarded funding by the Ontario Centres of Excellence in the form of Vouchers for E-Business.

The division's recent assistants include Myles Fisher, who has worked on several industry projects over the past few years, while completing his schooling. Fisher, who also has a BA in Multimedia from McMaster University, worked with a Welland steel company to redesign its current website to incorporate a client-only portal. He helped another company takes its product into the digital realm. The company had developed a combination board and video game, but wanted a responsive, user-friendly website to allow users to download the game.

Christina Testana had already proved herself in the design world, winning gold for best label design at the 2014 Ontario Wine Awards, before joining the research team to work on digital projects.

Using the Wordpress platform, she designed or re-designed websites for several companies, making sure they were responsive on mobile platforms, and met each company's brand standards, while also being user-friendly to the company's staff, who would take over the ongoing updates once the projects were finished.

"I never got to experience how flexible Wordpress can be, while in the classroom, so I'm happy I was able to learn more when working on these projects," Testana notes.

With the website projects she worked on, graduate Kristin Clancy found herself well-prepared to step into employment as a web designer and developer with a St. Catharines-based website design company.

"Working with the research division was helpful in giving me real-world experience to start my career, because I had the opportunity to work directly with clients on a variety of projects," says Clancy, who also obtained a BA in Interactive Arts and Science from Brock University.

Fisher currently works as a graphic/web designer for a Niagara Falls promotions company which holds a marketing role with such large-scale events as the Niagara Falls and Hamilton Comic Cons.

Both he and Testana worked on the Niagara Falls Comic Con, so they now also have a portfolio of work which has been seen by thousands of people.

"Working in the team environment with research was beneficial to me. Since our projects were often developed with the help of other co-workers, it's helped me communicate ideas to others more effectively, and to become a better listener, too," Fisher notes. **R&I**

Top: Christina Testana receives gold for best label design at the 2014 Ontario Wine Awards. Bottom: Myles Fisher at work in the innovation lab.

DIGITAL MEDIA & WEB SOLUTIONS BY THE NUMBERS

19	3	2	8
PROJECTS	STUDENTS	PROGRAMS	RESEARCHERS

Ted Reader

Chef Professor, Researcher
Canadian Food & Wine Institute Innovation Centre

When you have achieved the lofty title of "Godfather of the Grill," there seems to be little left to master in the barbecue world.

For Ted Reader, a celebrity chef with 23 products on the market and 17 cookbooks published (no doubt earning him that Godfather title), the next logical step was to share his knowledge with the next generation.

He came to the Canadian Food & Wine Institute (CFWI) two years ago as a part-time instructor, taking on such courses as modern culinary applications, recipe development, and international product development, for the Institute's various culinary arts programs.

After his first year of teaching, Reader was approached to take on some research projects as well, guiding student researchers through recipe and product development with the CFWI Innovation Centre.

"Real-life work experience is the best way to teach students about how to develop a product, giving them motivation, meaning and purpose to their work," he notes. "And in the end, you've hopefully made something delicious, too!"

The industry partners seem to agree, enthusiastically accepting final recipes, and in some cases, taking the new formulations into full-scale production lines.

One project involved recipe development based on customer-specified requirements, such as organic, nut-free, or gluten-free, as well as being produced within a certain budget. The resulting recipes were to be used as samples at a trade show.

The other project involved creating formulations for meat items using a variety of raw materials. With guidelines in place from the industry partner, students created products that could then be taken into plant production.

"Each project was a great experience both for the teacher and the students, who were helped by having one focus, but being creative. The whole experience rocked!" Reader says, adding he is looking forward to finding more research time in a busy year ahead.

To learn more about the Godfather of the Grill, who uses more than 100 barbecues, grills and smokers to create knee-weakening recipes, visit tedreader.com. **R&I**

CANADIAN FOOD & WINE INSTITUTE INNOVATION CENTRE BY THE NUMBERS

11	16	4	19
PROJECTS	STUDENTS	PROGRAMS	RESEARCHERS

CANADIAN FOOD & WINE INSTITUTE INNOVATION CENTRE

PROJECTS SPOTLIGHT

Kosher HACCP Guide

INDUSTRY PARTNER: Kashruth Council of Canada

PROJECT DURATION: June to Oct. 2015

PROJECT TYPE: Food Safety Protocols

FUNDER: NSERC CCI

RESEARCH TEAM: Dr. Amy Proulx *(faculty)*; Michael Van Ninhuys *(research associate)*; Spencer Dion *(student)*

CHALLENGE: Canada's largest kosher certifier, the Kashruth Council of Canada wanted to redevelop and formalize its guidance document to include a universal code for kosher requirements, but did not have the knowledge to develop such a system.

SOLUTION: The research team developed a HACCP (Hazard Analysis and Critical Control Point) guidance document, which integrates the GFSI certification framework, providing an overview on how to meet kosher requirements in a quality control system. The document will also assist in training plant personnel, will allow for internal audits, and will provide a system for food manufacturing plants to ensure that kosher procedures are followed and costly mistakes are avoided.

Enriching Lives by Enhancing Product Line

INDUSTRY PARTNER: Community Living Grimsby, Lincoln & West Lincoln

PROJECT DURATION: April to July 2015

PROJECT TYPE: Product Line Expansion

FUNDING: NSERC CCI

RESEARCH TEAM: Dr. Amy Proulx *(faculty)*; Rebecca Griffin *(senior research associate)*; Beatrix Princzne Csemer *(graduate/research associate)*; Darcy Devereaux, Cole Renda *(students)*

CHALLENGE: Community Living operates a social enterprise whereby their clients, persons with developmental disabilities, are provided employment in their commercial kitchen. They wanted to expand their 'Well Preserved' line of hand-crafted condiments and jellies with a new product line incorporating ingredients from local partners. Although they had their own kitchen, they lacked the necessary food science skills and regulatory expertise.

SOLUTION: The research team created and tested several recipes, keeping in mind the need for straightforward recipe instructions. In the end, they created four new products: an Asian-inspired barbecue sauce, a pepper peach salsa, a Mexican salsa and a pear brandy plum barbecue sauce.

Developing New Recipes for Game Meat Company

INDUSTRY PARTNER: Black Angus Fine Meats and Game

PROJECT DURATION: Dec. 2014 to July 2015

PROJECT TYPE: Product Development and Shelf-life Extension

FUNDING: NSERC CCI

RESEARCH TEAM: Ted Reader, Olaf Mertens, Sunan Wang *(faculty)*; Rebecca Griffin *(recent graduate/research associate)*; Chris Heagle, Spencer Dion *(student)*

CHALLENGE: Niagara-based Black Angus Fine Meats had demand from its distributors and retailers for a fresh, raw game meat product line with a clean label that also has an appropriate shelf-life, while retaining desired sensory/product attributes.

SOLUTION: The research team created 5 game sausages and 5 game burgers using several different species (venison, boar, duck, bison, and lamb). The resulting recipes, which were tested using sensory analysis and for shelf-life, will be introduced to several retailers. Black Angus was also able to improve its process for developing its existing product lines as a result of this project.

PROJECT MANAGER:
Nigel Corish

The Canadian Food & Wine Institute Innovation Centre team offers a full suite of services to support industry innovation and commercialization of new products and processes. From new recipe development to shelf-life testing and nutritional labelling, the CFWI Innovation Centre pairs industry partners with faculty, recent graduates and students with the right expertise and equipment to meet industry's needs.

Research & Innovation

2014-15 BY THE NUMBERS

168	1,847	44	91
PROJECTS	STUDENTS	PROGRAMS	RESEARCHERS

*Total figures includes areas of specialization as well as course-based research

Niagara College's Research & Innovation Division provides real-world solutions for business, industry and the community through applied research and knowledge transfer activities. We conduct projects that provide innovative solutions, such as producing and testing prototypes, evaluating new technologies, and developing new or improved products or processes for small- and medium-sized businesses. With funding support from various regional, provincial and federal agencies, students and graduates are hired to work alongside faculty researchers to assist industry partners leap forward in the marketplace.

FACTS & FIGURES

The Research & Innovation division plays an increasingly important role within the strategic mandate of Niagara College. By expanding technical service offerings and engaging more students in course-based research we increased our numbers year over year:

COMPANIES ACCESSING RESEARCH & INNOVATION

2013-14	127 companies accessed services
2014-15	211 companies accessed services

↑66%

TECHNICAL SERVICES

2013-14	27 services
2014-15	44 services

↑63%

RESEARCH PROJECTS

2013-14	77 research projects
2014-15	168 research projects

↑118%

RESEARCH FUNDERS

INNOVATION.CA CANADA FOUNDATION FOR INNOVATION | FONDATION CANADIENNE POUR L'INNOVATION

Federal Economic Development Agency for Southern Ontario
Agence fédérale de développement économique pour le Sud de l'Ontario

NSERC CRSNG

NRC-CNRC Canada
NRC Industrial Research Assistance Program | Programme d'aide à la recherche industrielle du CNRC

Ontario

Ontario Centres of Excellence

Niagara Region

Niagara College Canada
APPLIED DREAMS.

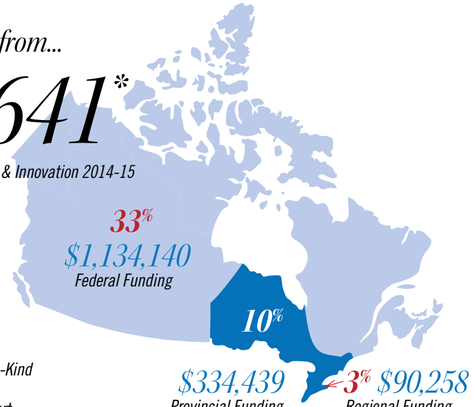
FUNDING FOR RESEARCH

Where the funding comes from...

*$3,438,641**

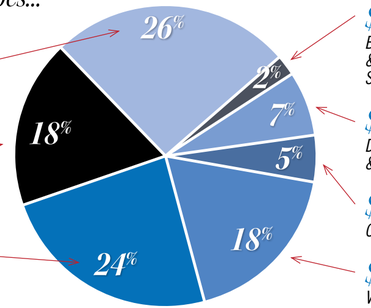
Total funding for Niagara College Research & Innovation 2014-15

** This figure includes $1,621 in International Funding*



9%	$322,147	Industry Cash
29%	$1,004,203	Industry In-Kind
16%	$551,833	College Support

Where the funding goes...



$892,333 Canadian Food & Wine Institute Innovation Centre

$606,878 Advanced Manufacturing Innovation Centre

$836,073 Agriculture & Environment Innovation Centre

$65,656 Business & Commercialization Solutions

$239,347 Digital Media & Web Solutions

$174,900 Course-based Research

$623,454 Various

2014-15 Hightlights

APRIL 2014

NSERC awards R&I $287,795 in funding for equipment, including an aquaponics system

MAY 2014

*Hired lab technologist **Jose Gabrie** for Canadian Food & Wine Institute Innovation Centre*

JUNE 2014

***Black Angus Fine Meats** commercializes product developed as part of student culinary innovation contest*

JULY 2014

***MADD Virgin Craft Lager** wins gold at U.S. Open Beer Championships*

AUGUST 2014

***Dr. Amy Proulx earns Young Scientist Award** from International Union of Food Science and Technology (IUFoST)*

OCTOBER 2014

***Placed 12 in Top 50 Research Colleges** list published by Research Infosource Inc.*

NOVEMBER 2014

***Celebrity Chef Vikram Vij** oversees grand opening of the Canadian Food & Wine Institute Innovation Centre labs*

DECEMBER 2014

*Goodbye Niagara Research, hello **Research & Innovation***

FEBRUARY 2015

*Surpassed **1,000 followers** on LinkedIn Company page*

Dr. Mike Duncan** undertakes several high-profile speaking opportunities related to his **precision agriculture research and the team's new web portal

MARCH 2015

***Construction begins** on the Walker Advanced Manufacturing Innovation Centre; **34 companies accessed 63 technical services** during the first year of the **Technology Access Centre** operations of the Advanced Manufacturing Innovation Centre*

Our team of researchers, students and administrators are ready for you. We provide

SOLUTIONS FOR INDUSTRY

2014·15

Advanced Manufacturing Innovation Centre

Agriculture & Environment Innovation Centre

Canadian Food & Wine Institute Innovation Centre

Business & Commercialization Solutions

Digital Media & Web Solutions

nc Research & Innovation

FOR APPLIED RESEARCH PARTNERSHIP OPPORTUNITIES CONTACT US AT:

w niagaracollege.ca/research

e research@niagaracollege.ca

t 905.735-2211 Ext 7172