

Curriculum Vitae

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ENGINEERING EDUCATION

2003 – 2007

Doctor of Philosophy

Mechanical Engineering, University of Toronto

2001 – 2002

Master of Engineering

Mechanical Engineering, City College of New York (CCNY)

1995 – 2001

Bachelor of Engineering (Cum Laude)

Mechanical Engineering, City College of New York (CCNY)

LEGAL EDUCATION

2015 – 2017

Bachelor of Science in Law

School of Law, Northwestern California University

LEADERSHIP TRAINING

2019 – 2020

Gold College Leadership Program (Certificate)

University of Alberta

RESEARCH AND TEACHING INTERESTS

Research: Heat transfer and fluid mechanics; Energy transfer from fires; Thermal spraying; Fabrication of protective and functional coatings; Determination and application of the material properties of thermal-

sprayed coatings; Cold spraying; Solidification in pipes; HVAC heating equipment performance.

Teaching: Conduction Heat Transfer; Convection Heat Transfer; Fluid Mechanics; Engineering Physics; Mechanical Engineering Laboratory; Thermo-Fluids Systems Design; Building Systems Design; Capstone Design Project.

HONORS AND AWARDS

- | | |
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| 2024 | Rosalind Smith Business Award, The National Black Coalition of Canada, "for exceptional and prolonged service working in a profession." |
| 2021 | Fellow, The Institution of Mechanical Engineers (United Kingdom), "in recognition of contributions to heat transfer, design, research, and the teaching of mechanical engineers." |
| 2021 | President's Award for Meritorious Service, Thermal Spray Society, ASM International (United States) |
| 2021 | Jules Stachiewicz Medal, Canadian Society for Mechanical Engineering, "in recognition of significant contributions in research and development of advanced thermal spray heating coatings and modelling of phase change phenomena." |
| 2020 | Ningbo 3315 Individual Talent Scheme Award for Research and Innovation, Ningbo City, China |
| 2019 | Fellow, The Institute of Materials, Minerals and Mining (United Kingdom), "in recognition of contributions in senior academic management roles to R&D and its application in Surface Engineering and to the profession." |
| 2019 | President's International Fellowship Initiative Award, Chinese Academy of Sciences |
| 2019 | Mentorship Award, Faculty of Engineering, University of Alberta |
| 2019 | Fellow, ASM International (United States), "for significant contributions in research and development of advanced thermal spray coatings, teaching and mentoring of young professionals, and service to the thermal spray community." |

- 2012 Annual Award for Excellence in Teaching, Mechanical Engineering Club, Department of Mechanical Engineering, University of Alberta
- 2012 Best in Track Technical Paper Award for Manufacturing, “Flame spray deposition of electrically conductive traces on polymer substrates for system integrated composite structures”, Composites, Las Vegas, Nevada, United States
- 2010 Summit Early Accomplishment Award, Association of Professional Engineers and Geoscientists of Alberta (APEGA)
- 2008 Simmons Award - Best Student Paper, Institute for Liquid Atomization and Spray Systems (ILASS), United States
- 2006 Travel Stipend, Institute for Liquid Atomization and Spray Systems (ILASS), United States
- 2006 Best Paper Award, “Impact of partially molten plasma-sprayed zirconia particles on glass surfaces”, International Thermal Spray Conference and Exposition, Seattle, Washington, United States
- 2001 Dupont Mechanical Engineering Distinguished Graduate, City College of New York, United States
- 2001 Peggy Benline Award, Municipal Engineers of New York, United States
- 1999 Eliza Ford Award, City College of New York, United States
- 1998 ALCOA Award, ALCOA, United States
- 1995 – 1999 Honors Scholar, City College of New York, United States

RESEARCH AND TEACHING EXPERIENCE

University of Alberta, Edmonton, AB

Associate Vice-President (Research and Innovation), 2022 – Present

Associate Chair (Research), 2018 – 2021

Professor, 2017 – Present

Associate Professor, 2013 – 2017

Assistant Professor, 2007 – 2013

This is a tenured position that involves independent research activities, teaching and training responsibilities, and administrative duties.

As the Associate Vice-President (Research and Innovation), I:

- build research and innovation strategy, policies, and performance framework for a \$600M+ annual research-intensive post-secondary academic institution;
- spearhead the visioning, development, and management of the institutional *Strategic Plan for Research and Innovation* content and the broad consultation effort with internal and external diverse communities;
- lead institutional strategies and tactics for international research, including with groups in the Global South;
- initiate, promote, monitor, and maintain high-impact, creative, and ambitious interdisciplinary research initiatives;
- lead strategies and develop policies for institutional research initiatives and structural support;
- build and manage institutional administrative structures and programs for research areas that address grand challenges;
- lead and contribute to initiatives that expand development and growth of the University's research revenue capacity and research infrastructure;
- engage relevant partners and stakeholders at the national and international levels;
- develop and lead the University's research performance program; and
- manage a portfolio operating budget in excess of \$1M per annum with a five-person professional team.

As the Associate Chair (Research), I:

- fostered the on-going development of the Department's research capacity with revenues in excess of \$15M per annum;
- advised the Chair on research-related matters that will impact the Department;
- led the initiation and development of research initiatives within the Department;
- liaised directly with the Associate Vice-President (Research), Faculty of Engineering Dean, Associate Dean (Research and Internationalization) and the Research Services Office to advance the interests of the Department on multi-investigator, multi-department, or multi-faculty research initiatives and opportunities;
- provided mentorship to faculty members on research program development, business strategies, and grantsmanship; and
- facilitated and managed the expansion of research scholarship and infrastructure space in the Department.

My research focus is on the application of heat transfer principles in the development and functionalization of thermal-sprayed coatings, determination of material and wear properties of coatings, performance testing of wildfire chemicals with custom-made sensors, and performance of building equipment systems. My research program has produced experimentally verified models on estimation of the kinematic viscosity of refractory materials, estimation of the

energy generated due to adiabatic shear instabilities of cold-sprayed particles, determination of the temperature distribution in polymeric materials during erosive wear, and the determination of melting and freezing times of solids and liquids, respectively, in finite-length scales. My research program has also developed sensor and sensing technology through fabrication of a heat flux sensor to determine the ignition time of chemically treated wildland vegetative fuels (trees) and using thermal emission signals from plasma-sprayed particles to characterize fully and partially molten zirconia. I have worked to develop smart coatings for structure damage detection, enhanced protective clothing solutions, and coatings for biomedical applications. As well, I have engaged with industry to transfer technology from this novel research program into the stream of commerce or to advance development of policies or industry guidelines.

The novel results, productivity of my research group, and successful engagement with industry sponsors would not have been possible without equipment and a physical infrastructure for conducting experiments. Currently, the Department of Mechanical Engineering at the University of Alberta has such an infrastructure. When I began my employment at the University, no such infrastructure existed. Within the first three years after my hire, I acquired the necessary equipment to produce a fully operational thermal spray infrastructure, complete with requisite equipment such as a plasma spray torch, a flame spray torch, a cold spray nozzle, a robot, and supporting and accessories. I designed the infrastructure and selected equipment that was similar to those used in industry and in government labs. This enables my research group to respond to research problems that are practical, and provide real-world, experiential training to students. From my current knowledge, this infrastructure represents the only one of its kind that is primarily dedicated to research and development and HQP training in Western Canada.

University of Toronto, Department of Mechanical and Industrial Engineering, Toronto, ON
Research Assistant, 2003 – 2007

This research assistantship formed the basis of my doctoral program, which dealt with photography and temperature measurements of plasma-sprayed droplets during spreading of and heat transfer from these droplets. For the first time, through use of a novel experimental assembly using a fast CCD camera, in-situ photographs of the splats during spreading were captured. A rapid two-color pyrometer system was also used to collect thermal radiation from the droplet during flight and spreading to follow the evolution of their temperature. The experimental results that were obtained enabled me to develop predictive models for the spread factor of plasma-sprayed droplets and the thermal contact resistance between the spreading droplets and the solid surfaces upon which they were deposited. The novel results of these models informed analysis on splashing and fragmentation of the plasma-sprayed droplets, which enabled explanations of observed three-dimensional defects, such as porosity, in the

coatings that the droplets formed. In particular, the contributions on splat photography and estimation of the splat-substrate thermal contact resistance have been widely applied and used as input parameters into existing three-dimensional numerical models of droplet impact and solidification or were used to confirm the results of those models. This program of research was a collaborative effort between the University of Toronto and the National Research Council Canada. In addition to developing and executing the objectives of the program, I was also the liaison between the academic and government supervisors of the program.

APPLIED ENGINEERING EXPERIENCE

HALGAMM, Edmonton, AB

Partner/Design Engineer, 2009 – Present

- Partnership for mechanical engineering design and consultation in heat transfer and thermo-fluids sciences.
- Lead projects on the assessment of coatings and surface finishes.
- Conduct analyses on freezing of water and phase change materials.
- Led the installation of thermal spray equipment.
- Developed industry market study reports for IRAP-NRC and thermal spray manuals for the oil & gas industry.

Johnson, Mirmiran, and Thompson, Baltimore, MD

Design Engineer, January – December 2002

- Performed facilities engineering tasks such as HVAC design and unit selection, plumbing design, and fire protection design.
- Designed instrumentation and controls (I/C) for chemical feed systems and municipal potable water flow rate monitoring.
- Provided post-design services during project construction phase.

Mariano D. Molina (MDM) Consulting Engineers, P.C., Jersey City, NJ

HVAC Engineer, June – November 2001

- Performed load calculations necessary for HVAC system selection, ductwork and piping design.
- Used AutoCAD to show the layout of demolition, ductwork, piping, and air-conditioning systems.

UNIVERSITY OF ALBERTA ADMINISTRATIVE LEADERSHIP IN RESEARCH MANAGEMENT, ENGAGEMENT, REVENUE GENERATION, INTERNATIONALIZATION, AND REPUTATION BUILDING

Preamble: My contributions to administrative leadership at the University of Alberta have occurred through my role as the Associate Vice President (Strategic Research Initiatives and Performance), as Associate Chair (Research) in the Department of Mechanical Engineering, and through service on several institutional and faculty committees.

Structural and Strategic Planning: I created and formalized governance structures and strategic plans for research by:

- building an institutional research and innovation strategy, policies, and performance framework;
- spearheading the visioning, development, and management of the institutional [Strategic Plan for Research and Innovation](#) content and the broad consultation effort with internal and external diverse communities;
- leading strategies and developing policies for institutional research initiatives and structural support;
- drafting terms of reference documents for the faculty-level Research Planning and the Physical Planning Committees;
- developing an online faculty-level academic research resource center to provide information, guidelines, and documents to faculty members to operate and manage their research programs; and
- designing and implementing online, user-friendly faculty-level research space requisition, delegation, human resources, and lab safety assessment platforms.

These have resulted in creating a shared vision for research at the institutional level, streamlined research operations, and increased operational efficiencies. At the faculty-level, I led the development of the first ever Department research annual report to present on the current state of research and funding and lay out the framework for strategic research areas and research-based initiatives.

Research Awareness and Engagement: I lead initiatives at both the institutional and faculty level to build research awareness and collaborative engagement activities internally and externally with industry, government, highly-qualified personnel (HQP), and industry partners. For awareness, I revamped the [institutional website for research](#) and the faculty Department website to include:

- focus on research areas for addressing grand challenges;
- research areas of strength, featuring all professors and their expertise;
- employment opportunities for research students and other research trainees; and
- a complete set of videos that highlight the research capabilities, strengths, and accomplishments of the institution and faculty Department.

I also created a presence for faculties on social media platforms such as LinkedIn. I increased the number of local Department research engagement collisions with international partners through funded and structured research collaborations and exchanges with top-tier universities (e.g., RWTH Aachen University; Indian Institutes of Technology; Indian Institute of Science) and research institutes in Europe (e.g., Fraunhofer IWS; Czech Academy of Sciences; Helmholtz-Hereon) and Asia (e.g., Chinese Academy of Sciences; NITI Aayog). Nationally, I successfully negotiated collaborative research and training agreements with government research institutes (e.g., InnoTech Alberta; National Research Council Canada) to conduct collaborative work in areas such as advanced manufacturing, surface engineering, autonomous systems, and quantum technologies.

Research Revenue Generation and Capital/Infrastructure Expansion:

Through my work at the faculty-level, I led proactive research revenue generation and capital (infrastructure) initiatives in order to:

- diversify our research revenue position;
- provide long-term financial stability to professors and researchers by acquiring larger research funding packages; and
- strengthen and expand the research capital equipment and infrastructure base of the Department.

As a result of my initiatives, the Department:

- secured \$7.1M in funding for autonomous systems in manufacturing, health, and sustainable systems (Major Innovation Fund investment);
- received \$1.3M in Alberta Innovates Strategic Research Grant funding;
- enjoyed a 49% year-over-year increase in total external research funding in the 2021 fiscal year alone, with another 85% increase in funding from not-for-profit and philanthropic organizations for research, a 52% increase in Government of Alberta funding in 2020, and a 20% increase in corporate funding;
- more than doubled sponsored research revenue funding in two fiscal years;
- diversified its research funding sources to include increased support from not-for-profit organizations for scholarly activity where research impacts community and society; and
- expanded its research infrastructure footprint by 16,800 net assignable square feet.

At the institutional level, my broader efforts over the last year alone have resulted in:

- major initiatives such as the Quantum Growth Initiative, the Black-led Research Network Initiative, the Security and Defence Growth Initiative, and the Alberta Advanced Manufacturing International Hub, all aimed at strengthening research capacity, renewing infrastructure, and expanding funding through the lens of long-term sustainability;

- Research and funding focus for internationalization initiatives such as through new President's India Advisory Council Initiative aligned with NSERC Alliance International and MITACS grant programs;
- More than \$272M secured through major initiatives in the 2022/2023 fiscal year;
- a 52% increase in MITACS funding for industry- and community-sponsored work-integrated training in research and innovation;
- increase in total institutional sponsored research revenue to more than \$620M, marking a first in the history of the institution; and
- diversification of opportunities and funding, including from philanthropic sources that leverage additional funding for research and innovation education and training.

Recognition and Celebration of Scholarship: I worked directly with the faculty Awards Nominating Chair to develop strategies to encourage and support applications for awards and honors. I developed a process that identified relevant research awards and honors, catalogued them, and engaged with staff to support the drafting and review of applications from faculty members. I also collaborated with the institutional Office of the Vice President (Research and Innovation) for feedback to strengthen the applications. The process and mentorship produced positive outcomes, with increased submissions and successful applications. Faculty members have:

- won Faculty of Engineering's Career Leadership Award, Research Career Award, Mentorship Award, and the Graduate Teaching Award.
- been elected as Fellows in the American Society of Mechanical Engineers, ASM International, the Institute of Materials, Minerals and Mining, the Canadian Academy of Engineering, the Canadian Society for Mechanical Engineering, and the Canadian Society of BioEngineering.
- received the Association of Professional Engineers and Geoscientists of Alberta's (APEGA) Summit Research Excellence and Excellence in Education Awards.

EXTERNAL LEADERSHIP IN RESEARCH ENGAGEMENT AND SCHOLARSHIP

Preamble: I serve my community as an internationally recognized leader in my field of research and in the business community by undertaking governance activities in organizations external to the University of Alberta.

Editor-in-Chief, *Journal of Thermal Spray Technology* (2023 – Present; Lead Editor, 2016 – 2023): My service with the *Journal of Thermal Spray Technology* began in 2011 as a Guest Associate Editor. I was promoted to Lead Editor in 2016, where my responsibilities included managing the review processes of all subject-specific special issues and leading a team of eight expert editors. I also selected and managed the process for review and perspectives

papers. In addition to assessing the technical quality of novel research studies, I worked with the Editor-in-Chief to promote the Journal and increase awareness of the published articles. As a result of my efforts and close collaboration with the Editor-in-Chief, the Journal impact factor has increased steadily by 63% over the last five years. My experience has proved useful in instances when I serve as a mentor of junior faculty and researchers. I use my knowledge of the journal adjudication process and promotion of high-quality research to create initiatives to enhance scholarly activities at the University of Alberta. I now currently serve as the Editor-in-Chief where I lead and manage the scholarly, administrative, personnel, and outreach activities of this preeminent journal in the thermal spraying and materials science communities.

Immediate Past President, ASM–Thermal Spray Society (TSS) Board (2020 – 2022): The vision that I established for the Thermal Spray Society (TSS) continues with the current President and Vice-President. As the Immediate Past President, I served as an advisory and voting member on the TSS Board Executive and the Board. I also led the TSS Nominating Committee to select a broad slate of diverse candidates for Board membership and awards.

President, ASM–Thermal Spray Society (TSS) Board (2018 – 2020): My vision for the TSS was to refocus efforts on increasing TSS membership, especially of female and young experts and practitioners, increase gender diversity on the Board, develop efforts and programs to recognize the achievements of members of the TSS, and advance efforts on dissemination of science and technology developments in the thermal spraying field. I led the TSS to increase membership, presented a slate of candidates for Board membership that includes qualified female experts, selected a well-established and well-recognized female researcher in our field to deliver one of the plenary presentations at our seminal *International Thermal Spray Conference* in May 2019, and I continue to work with the Editor-in-Chief of the *Journal of Thermal Spray Technology* to identify, select, disseminate, and promote research work that has been developed in the thermal spraying field to the larger materials science and engineering communities.

Vice-President, ASM–Thermal Spray Society (TSS) Board (2016 – 2018): As Vice-President-elect, I focused on my past efforts to engage with industry and academic leaders, increase outreach, promote the Society outside of the thermal spray field, and increase global exposure of the Society. During my tenure, and in my former role as Chair of the Thermal Spray Society Training Committee, I created or strengthened relationships between industry and government stakeholders and the TSS. I was responsible for leading the Technical Programming Committee, where I guided and led committee chairs as they organized conferences and smaller topicals to disseminate innovative research and development results. This created greater international presence for the Society. My experience as the General Chair of the North American Cold Spray Conference was an invaluable resource that enabled me to be an effective leader

of the committee chairs. I used the skills that I acquired to facilitate the efforts of my research group, collaborators, and the Department in creating stronger relationships with industry and government and create greater national and international presence.

President, Canadian Cold Spray Alliance (2015 – 2023): The Canadian Cold Spray Alliance has as its object to develop awareness of cold spraying in Canada by organizing conferences, seminars, outreach activities, and by providing scholarships and grants to students enrolled in accredited Canadian universities. I am responsible for leading the board of directors in the creation of the corporation, drafting the Bylaws, and organizing conference events in collaboration with partners such as InnoTech Alberta and ASM-TSS.

Chair, Natural Science and Engineering Research Council (NSERC) Scholarships and Fellowships Selection Committee – Civil and Mechanical Engineering (2014 – 2015): I was selected by my peers and administrative leaders at NSERC to serve as a committee member and chair of the NSERC Scholarships and Fellowships Selection Committee for Civil and Mechanical Engineering. This external university experience with our national funding agency, combined with my work in the University of Alberta on the Vanier Graduate Scholarship Review Committee and as the Fellowships Representative on the Killam Foundation Committee, has enabled me to develop ideas for training and engagement of graduate students. It has further allowed me to provide substantive guidance to junior faculty members on the selection of potential graduate students and on methodologies to secure funding for them. I have created and *beta*-tested, receiving input from several faculty members, an evaluation tool to aid in proper selection of graduate students by junior faculty members who are new to academia.

Technical Program Chair/General Chair, North American Cold Spray Conference (2011 – 2016): In the role of General Chair of the North American Cold Spray Conference, I led a committee of experts in cold spraying and staff event planners in the organization of a bi-annual conference when it is held in Canada. I led the committee in securing expert speakers, building a technical program, organizing competitive and engaging events for the students, reaching out to industry and government for sponsorships, exhibitions and funding support, and developing promotional strategies to attract the interest of potential attendees and increase registrations. The primary object of the conference is to disseminate research results and increase awareness of innovation in cold spraying. The conference serves to create networks and business development opportunities for the attendees and the industry, academic, and government stakeholders. Under my leadership, the North American Cold Spray Conference is now a recurring topical in Canada and the US that consistently generates net revenue to fund future installments of the event and support various prizes for the student events, which are an integral part of the technical programs.

LEADERSHIP IN EDUCATION AND TRAINING

Practical Codes Course for Students (2014 – 2020): In collaboration with the International Pressure Equipment Integrity Association (IPEIA), Cenovus Energy, the Mechanical Engineering Club, and the Mechanical Engineering Graduate Students' Association (MEGSA), I developed and organized the annual one-day Codes Course for the Oil & Gas Industry for Students that is taught by practicing experts in the field. The purpose of this course is to provide current undergraduate and graduate students with substantive training on the types of codes that are used in the oil & gas industry, safety issues, and application of those codes in design, installation, and maintenance of equipment. Emphasis is usually placed on pressure vessels. In addition to ensuring that provision of the course came to fruition, I worked with the Mechanical Engineering Club and MEGSA to ensure that students understood the value of the course and were motivated to participate. Through organization of this course, I have taken the opportunity to train the members of the executive management team of both the Mechanical Engineering Club and MEGSA on promotion, student engagement, advancement, and leading delivery of a professional training course.

Practical Training Program for Adult Learners (2013 – 2015): In my capacity as Chair of the Thermal Spray Society Training Committee of ASM International, I spearheaded the creation of a certificate program that is offered through ASM International that offers a suite of on-site and classroom training courses to practitioners in thermal spraying. I believe that these courses and the program should provide participants with training on the science and foundational elements of thermal spraying, as well as provide practical and experiential training. This was accomplished by offering courses on the theory of plasma, flame, and high-velocity oxy-fuel spraying, microstructural and mechanical analyses of thermal-sprayed coatings, robotics for thermal spraying, thermal spray diagnostics, and thermal spraying for the oil & gas industry. In particular, the course that was premised on thermal spraying for the oil & gas industry emphasized the savoir-faire of fabricating coatings specifically for the oil & gas industry and standard methods of assessing the quality of the fabricated coatings in the field. I developed and delivered the course on thermal spraying for the oil & gas industry, and I have since trained another expert instructor who now currently offers the course.

Technical Design Resources (2012 – 2014): Most experts will acknowledge that teaching design and decision-making skills to undergraduate students may be challenging. Given the difficulties that are inherent in teaching design and the design process, I have written a textbook on thermo-fluids systems design that is published by John Wiley and Sons. This textbook has been developed to bridge the gap between the fundamental concepts of fluid mechanics, heat transfer, and thermodynamics and the practical design of thermo-fluids components and systems. Emphasis is placed on the use of manufacturer's catalogs to select equipment, and the textbook uses codes and practical rules-of-thumb to guide

decision-making in the practical design process. The textbook comes complete with workshop modules that can be utilized for active learning in seminar-type sessions. The book has had impact, such that to date, I have been advised by colleagues in industry or observed on numerous occasions that our mechanical engineering alumni utilize the book in their design projects and practice as engineers-in-training (E.I.T.) and as professional engineers (P.Eng.). These alumni are both undergraduate and graduate students.

Outside the University, I collaborated with InnoTech Alberta to develop a training manual for thermal spraying for the oil & gas industry that is currently being used by ASM International. The manual focuses on the provision of information that enables the training of adult learner practitioners in the thermal spraying field.

Undergraduate Research Opportunities Program (UROP) (2008 – 2011): I created the UROP in the Department of Mechanical Engineering at the University of Alberta in an effort to promote and provide information about the research and graduate programs in the Department to the undergraduate students enrolled in the mechanical engineering program. The program involved tours to the research laboratories in the Department and information seminars about research, projects, and funding. The program was a great success, doubling the number of students who received the NSERC CGS-M awards to enroll in the M.Sc. program. At the end of my term as organizer and leader of the program, the Department was at a high of 54% of the M.Sc. students enrolled in the program originating from our own undergraduate program. This indicated enthusiasm and interest from our own undergraduate students in pursuing further scholastic training in the Department.

Minor in Business (2016 – 2017): The Faculty of Engineering at the University of Alberta has embarked upon a commendable initiative to offer both technical and non-technical minors to undergraduate students. I was invited by the Dean's Office to participate in this initiative. My strategy has been to concentrate my efforts on the minor in Business, to develop the substantive details of that minor program, and formulate the promotional and informational prospectus for the minor. This minor program will supplement the engineering training of the undergraduate students who choose to participate, by providing them with introductory training in a variety of choice business areas. The Engineering Profession is unique in that it is highly analytical, yet requires consideration of business, social, and legal issues. The minor in Business was designed with a view to enabling engineering students to develop an analytical framework within which various organizational and business problems are addressed. It is envisaged that, with an ability to create solutions to these organizational and business challenges, engineering students will be better prepared and informed to serve the Profession. As of the date of submission of this curriculum vita and application package, the proposed minor in Business has already passed through the review and governance process and will be offered to undergraduate students in September 2018.

LEADERSHIP IN EQUITY, DIVERSITY, AND INCLUSION (EDI)

Preamble: My contributions to equity, diversity, and inclusion (EDI) are premised on creating substantive opportunities for marginalized or under-represented groups wherein the members develop transferable, marketable skills that are shock-proofed and aligned to research and innovation, transition to post-secondary studies, and build a professional network for future employment prospects and sustainable upward mobility.

Black-led Research Network Initiative (2023 – Present): Through my role as Associate Vice-President, I have mobilized researchers and college/faculty research administrators through a Black-led Research Network Initiative. The goal of the initiative is to build and expand capacity at all stages of Black-led research. The effort will continue to be underpinned by a robust sustainability campaign that will secure funding to support Black researcher flexibility, agility, and growth. Over the first ten months of this initiative, we have secured more than \$400K in funding and are awaiting sponsor responses on \$3.8M in additional funding.

Experiential Learning in Innovation, Technology, and Entrepreneurship (ELITE) Program for Black Youth (2020 – Present): I am the creator and Director of the ELITE Program for Black Youth. The goal of the Program is to provide Black Youth experiential learning and paid work-integrated training internships in science, technology, engineering, and mathematics (STEM) fields, business, and psychology. As the creator of the Program, I envisaged a structure based on a holistic learning and training approach, wherein interns gain remunerated hands-on experience in work environments, receive entrepreneurship training through our Entrepreneurship Design Series, and engage in our Wellness and Coaching Series to build the foundations for professional and mental health resiliency. I designed the ELITE Program to be a collaborative English-French bilingual university-community-government-industry initiative that aims to provide Black Youth the necessary tools to fully engage and participate in innovation and entrepreneurial ecosystems. The English language website for the Program is www.eliteprogram.ca, along with our [2023 annual impact report](#). During our first two and a half years, I accomplished the following:

- Offer program in Edmonton and Ottawa for Canadian national presence;
- Trained over 150 interns, including eleven ELITE Program staff trainees;
- Attracted interns from Edmonton, Calgary, Ottawa, Montréal, Vancouver, and Toronto;
- Transition interns to university from high school, industry work, graduate research studies, law school, and medical school;
- Engaged with more than 50 internship hosts from academia, industry, and government through more than 160 unique work-integrated projects;
- Collaborated with community partners, school boards, and for-profit organizations to promote the ELITE Program and deliver the Entrepreneurship Design Series;

- Secured more than \$2M in cash funding;
- Secured \$1M in scholarship opportunities for interns and intern alumni; and
- Manage an annual operating budget of more than \$500K.

Black Youth Mentorship and Leadership Program (2020 – 2021): I co-led a program that sought to socially and economically empower Black Youth (15 to 19 years old) to contribute meaningfully to Canadian society. My role was to develop and advise on the structure, governance, and operational delivery of the program. The goal of the program is to improve economic outcomes, community belonging, and leadership skills, as well as foster a positive cultural identity for black youth. I also spearheaded the program's goal of engaging the mentees in the University's research and technology development programs to provide exposure to experiential learning.

OTHER NOTABLE CONTRIBUTIONS AT THE UNIVERSITY OF ALBERTA

Lead, COVID-19 University Research Impact Team (2020 – 2021): I was the Lead of the Faculty of Engineering's COVID-19 research, resumption, and safety team. As the Lead, I managed and led all aspects of research administration that are affected by the COVID-19 pandemic. I also served as the Faculty of Engineering representative on the Central University's Research Impact Team. I guided development of policies, developed strategic and operational plans, led engagement with researchers and faculty members, and sourced and administered funding and government subsidies that aimed to relieve some of the negative impacts of the pandemic.

Chair, Panel of Chairs of the University Appeals Board (UAB) (2016 – 2019): I was a Chair on the Panel of Chairs of the University Appeals Board (UAB), where I led the adjudication of the appeal of disciplinary decisions that were made by the Faculties. My authority as a Chair of the UAB was enabled by the *Code of Student Behavior* and the *Code of Applicant Behavior*. I chaired and wrote all the decisions of the Panel as they related to appeals lodged by student appellants.

Member, Bylaws Drafting and Advocacy (2015 – 2018): As a member of the Bylaws Amendment and Drafting Committees of the Association of Academic Staff: University of Alberta (AAS:UA), I worked assiduously and diligently to draft the substantive provisions of the new set of AAS:UA Bylaws. In addition, I worked to ensure engagement and participation from members in directing the vision of the Association, worked with legal counsel to ensure legal accuracy and internal consistency of the provisions, and liaised with AAS:UA staff to ensure that the provisions were reasonable and pragmatic.

Fourth Year Undergraduate Program Advisor, Department of Mechanical Engineering (2015 – 2017): In my capacity as the fourth-year undergraduate program advisor, it was my responsibility to provide program-based advice to students in the undergraduate program, while ensuring that students were treated fairly and in accordance with the policies prescribed in the *University of Alberta Calendar*. In advocating on behalf of the students, I used the skills that I acquired through my legal training in the proper interpretation of relevant policy provisions and in advocating for the students, all while ensuring that students conformed to the requirements provisioned in the *Calendar*.

Lead, Student Recruitment for Research (2015 – 2016): I was asked by the Dean's Office in the Faculty of Engineering to lead the graduate student recruitment effort through the Canadian Graduate Engineering Consortium (CGEC). My strategy has been to expand the effort to create the Initiative on Student Recruitment for Research in which the promotional effort is designed to motivate participation in research from all students, in addition to recruitment of students for the graduate programs. The strategy also acknowledges that in order for the effort to be successful, it will require input and participation from other stakeholders in the Faculty, including the Associate Dean of Programs and Planning, the Communications Team, the Advancement Team, the Recruitment Team in Student Services, and the Engineering Employment Office. Thus, the monthly planning meetings for the Initiative involved all the aforementioned stakeholders. Through a number of events in which students have been invited to meet with professors, we interacted with 400 students per year regarding enrolment in our graduate programs.

SERVICE AND PROFESSIONAL ACTIVITIES

National and International Leadership Activities

- Editor-in-Chief, *Journal of Thermal Spray Technology* (2023 – Present)
- Immediate Past President, ASM Thermal Spray Society Board (2020 – 2022)
- Chair, ASM Thermal Spray Society Awards and Nominations Committee (2020 – 2022)
- President, ASM Thermal Spray Society Board (2018 – 2020)
- Co-General Chair, 2022 Canadian Society for Mechanical Engineering International Congress (2018 – 2022)
- Theme Lead and Member, NSERC Green SEAM Strategic Network Scientific Committee (2017 – Present)
- Technical Chair, International Thermal Spray Conference (2018) (Orlando, Florida)
- Vice-President, ASM–Thermal Spray Society (2016 – 2018)
- Chair, ASM Thermal Spray Society Programming Committee (2016 – 2018)
- President, Canadian Cold Spray Alliance (2015 – 2023)

- Chair, Ceramics II Session, International Thermal Spray Conference (2016) (Shanghai, China)
- Lead Editor, *Journal of Thermal Spray Technology* (2016 – 2023)
- Lead Editor, International Thermal Spray Conference (2015)
- Chair, Natural Science and Engineering Research Council (NSERC) Scholarships and Fellowships Selection Committee – Civil and Mechanical Engineering (2014 – 2015)
- Organizer, Industrial Thermal Spraying for the Oil & Gas Industries Seminar (2014 – 2018)
- Chair, ASM Thermal Spray Society Training Committee (2013 – 2015)
- Symposium Chair and Session Chair, Oil & Gas, International Thermal Spray Conference (2012) (Houston, TX, USA).
- Co-editor, International Thermal Spray Conference (2012 – 2013)
- Associate Editor/Guest Editor, *Journal of Thermal Spray Technology* (2011 – 2016)
- Technical Program Chair/General Chair, North American Cold Spray Conference (2011 – 2015).

Service to the Profession and Community

- Member, NSERC – Chairs for Inclusion in Science and Engineering (pilot) Selection Committee, (2023)
- Member, City of Edmonton Mayor's Advisory Council on Business Growth and Opportunities, (2022 – Present)
- University of Alberta Representative, Quantum City Steering Committee, (2022 – Present)
- Member, Neutrons Canada CNI Executive Committee, (2022 – Present)
- Trustee, ASM International Board of Trustees (2022 – Present)
- Member, Advisory Group, RBC Future Launch Scholarship for Black Youth, Royal Bank of Canada-Universities Canada (2021)
- Director, Experiential Learning in Innovation, Technology, and Entrepreneurship (ELITE) Program for Black Youth (2020 – Present)
- Member, Advisory Board, Centre for Innovation in Manufacturing – Technology Access Centre, Red Deer College (2020 – Present)
- Member, ASM Interdisciplinary Collaboration Task Force (2020 – 2021)
- Member, National Research Council Canada, Thermal Spray Surface Engineering and Cold Spray Additive Manufacturing (TSSE-CSAM) Facility Review Team (2020)
- Member, ASM Managing Director Selection Committee (2020 – 2021)
- Member, ASM Sauveur Award Adjudication Committee (2020 – 2023)
- Member, ASM Nominating Committee (2018)
- Member, ASM Diversity and Inclusion Task Force (2018 – 2020)
- Member, *Journal of Thermal Spray Technology* Editorial Committee (2016 – Present)
- Member, Thermal Spray Society Nominations Committee (2014 – 2015)
- Member, International Pressure Equipment Integrity Association Education

- Liaison Sub-committee (2014 – 2015)
- Course Developer and Instructor, ASM Thermal Spraying for the Oil & Gas Industry Course (2013 – 2018)
- Member, NSERC Scholarships and Fellowships Selection Committee – Civil and Mechanical Engineering (2012 – 2014)
- Member, Thermal Spray Training Committee (2012 – 2013)
- Member, ASM Education Committee (2012 – 2015)
- Member, Thermal Spray Society (TSS) Academic Advisory Council and TSS Executive Committee (2011 – Present)
- Member, Technical Committee, ASM Certified Thermal Spray Operator Program (2010 – 2012)
- Lead Subject Matter Expert, ASM Thermal Spray Technology Program (2010 – 2012)
- Keynote Speaker, APEGA Iron Ring Ceremony (2010 – 2011)
- Examiner, APEGA Mechanics of Fluids Exam (2010 – 2013)
- Reviewer for Ceramic Coating Materials, Standard Council of Canada (2009 – 2011)

University/Faculty/Department Service

- Chair, Administrative Board, Kule Institute for Advanced Study, (2023 – Present)
- Lead Research Convenor, President's India Advisory Council, (2023 – Present)
- Vice-President (Research and Innovation) Representative, Dean of Engineering Selection Committee (2023 – Present)
- Chair, University of Alberta Centres and Institutes Committee (2022 – Present)
- Member, Advisory Board, Centre for Criminological Research (2020 – Present)
- Co-Lead, Black Youth Mentorship and Leadership Program (2020 – 2021)
- Member, Grants Adjudication Committee, Li Ka Shing Institute of Virology (2020)
- Lead, Essential Research Action Team, COVID-19 University Research Impact Team (2020 – Present)
- Member, COVID-19 University Research Impact Team (2020 – Present)
- Chair, Special Advisory Group Committee to the Dean of Engineering (2019 – 2021)
- Associate Chair (Research), Department of Mechanical Engineering (2018 – 2021)
- Chair, Physical Planning Committee, Department of Mechanical Engineering (2018 – 2021)
- Chair, Research Planning Committee, Department of Mechanical Engineering (2018 – 2021)
- Member, Safety Committee, Department of Mechanical Engineering (2018 – 2021)

- Academic Staff Representative (at-Large), Department Chair Selection Committee – Panel of Faculty Members, General Faculties Council (2018 – 2021)
 - Chair Review Committee, Department of Laboratory Medicine and Pathology, Faculty of Medicine and Dentistry
 - Chair Selection Committee, Department of Secondary Education, Faculty of Education
 - Chair Selection Committee, Department of Physics, Faculty of Science
- Chair, University Appeal Board, Panel of Chairs (2016 – 2019)
- Member, Dean of Engineering Selection Committee (2015 – 2016)
- 4th Year Undergraduate Program Advisor, Department of Mechanical Engineering (2015 – 2018)
- Member, Academic Planning Committee (APC), Department of Mechanical Engineering (2015 – 2018)
- Lead Liaison (UofA), Canadian Graduate Engineering Consortium (CGEC) (2015 – 2017)
- Member, Association of Academic Staff: University of Alberta Bylaws Drafting Committee (2015 – 2018)
- Reviewer, Natural Sciences and Engineering Grant Assist Program (2014 – 2020)
- Organizer, Codes Course for Students – Engineering and Code Essentials for the Oil & Gas Industry (with the International Pressure Equipment Integrity Association) (2014 – 2019)
- Member, Graduate Program Committee (GPC), Department of Mechanical Engineering (2013 – 2014)
- Member, Selection Committee, Department of Chemical and Materials Engineering (2011 – 2013)
- Member, Vanier Canada Graduate Scholarship Review Committee (2010 - 2011)
- Member, Faculty of Graduate Studies and Research Committee on Graduate Supervision (2010)
- Member, Selection Committee, Department of Mechanical Engineering (2009 - 2011)
- Fellowships Representative, Killam Foundation Committee (2009 – 2010)
- Developer and Co-ordinator, Undergraduate Research Opportunities Program, Department of Mechanical Engineering (2008 – 2011)
- Design Judge, Senior Design Project (MEC E 460) (2007 – 2011)
- Member, Killam Post-graduate Scholarship Award Committee (2007 – 2010)

Professional Affiliations

- Engineering Council of the United Kingdom (2021 – Present)
- Institution of Mechanical Engineers (2021 – Present)
- The Institute of Materials, Minerals and Mining (2019 – Present)

- American Association for the Advancement of Science (2018 – Present)
- California Board for Professional Engineers, Land Surveyors, and Geologists (2018 – Present)
- Canadian Society for Mechanical Engineering (CSME) (2018 – Present; 2003 – 2007)
- ASM International (2011 – Present)
- Thermal Spray Society (TSS) (2011 – Present)
- American Society for Engineering Education (ASEE) (2007 – Present)
- Association of Professional Engineers and Geoscientists of Alberta (APEGA) (2007 – Present)
- Professional Engineers Ontario (PEO) (2004 – 2007)
- American Society of Mechanical Engineers (ASME) (1997 – 2013)

EXTERNAL RESEARCH AND ADVANCEMENT FUNDING, AND BUSINESS DEVELOPMENT STRATEGY

My research program focuses, in part, on analytical modelling, verification of the models that are formulated with experimental data and working to transfer the research knowledge to industry and into the stream of commerce. My funding and business strategies have been to seek government funding to enable the theoretical research that advances knowledge. Funding from government may be used to leverage industry funding with the understanding that both theoretical and applied research will be conducted.

Engaging with industry partners has required a disciplined approach to the request and acquisition of research funding. I developed a system of network building, rapid proposal developments, quotes, job requisitions to students, and organized meetings with clients (with student involvement) to ensure timely performance of the obligations of my research group. In the fourth year of every five-year period since my initial hire in 2007, I develop a five-year research, business, and strategy plan for my research group. As part of the current five-year plan, the research group now collaborates more with national and international researchers, and supports the development of early career tenure-track academic researchers.

The current strategy for sustainability through funding has developed a thrust for diversification of funding sources. This has opened opportunities for funding from philanthropic organizations through advancement efforts to support the coupling of training of personnel from under-represented minority groups with research output in innovation ecosystems. This has allowed the research team to make meaningful contributions to equity, diversity, and inclusion, while advancing its research and innovation priorities.

GOVERNMENT AND UNIVERSITY CASH SUPPORT

Agency	Program	Total Amount (\$)	Year/Duration	Participation
NSERC	Research Tools and Instruments	150,000	Applied for	Co-Applicant (20%)
NSERC	Discovery Grant	1,005,000 (201,000/year)	Applied for	Principal Investigator (100%)
Department of National Defence	Innovation for Defence Excellence and Security (IDEaS)	1,146,740	2024	Principal Investigator (50%)
NSERC	Alliance International Catalyst	25,000	2023 – 2024	Principal Investigator (100%)
Canada First Research Excellence Fund	Future Energy Systems	100,000	2023 – 2025	Principal Investigator (100%)
Innovation, Science and Economic Development	Black Entrepreneurship Knowledge Hub	150,000	2022 – 2025	Principal Investigator (100%)
MITACS + Black Business Ventures Association	Business Strategy Internship	150,000	2022 – 2023	Principal Investigator (50%)
University of Alberta	Science-ELITE PhD Fellowship	200,000	2023 – 2027	Lead and Chair (100%)
Alberta Innovates	NSERC Alliance-Advance	300,000	2022 – 2024	Principal Investigator (35%)
Department of National Defence	Innovation for Defence Excellence and Security (IDEaS)	199,955	2022 – 2023	Principal Investigator (50%)
MITACS + Black Business Ventures Association	Business Strategy Internship	15,000	2022	Principal Investigator (100%)
MITACS + InnoTech Alberta	MITACS Accelerate International	360,000	2021 – 2023	Principal Investigator (70%)

University of Alberta	Engineering-ELITE-IBET PhD Fellowship	520,000	2021 – 2028	Lead and Chair (100%)
MITACS + Springboard Atlantic	MITACS Accelerate Entrepreneur (Rakesh Nair)	15,000	2021	Principal Investigator (100%)
NSERC	Research Tools and Instruments	150,000	2021 – 2022	Co-Applicant (17%)
NSERC (with NOVA)	Alliance	30,000	2021 – 2022	Co-Applicant (80%)
University of Alberta	Matching Funds (Black Youth Skills Training)	15,000	2021 – 2023	Principal Investigator (70%)
Alberta Innovates	Strategic Networking and Development	4,470	2020	Principal Investigator (100%)
MITACS + InnoTech Alberta	MITACS Accelerate	52,500	2019 – 2020	Principal Investigator (50%)
MITACS + InnoTech Alberta	MITACS Accelerate International	57,000	2019 – 2020	Principal Investigator (100%)
NSERC (with Imperial Oil)	Collaborative Research and Development	39,000	2019 – 2023	Principal Investigator (50%)
Alberta Jobs, Economy, and Innovation	Major Innovation Fund Grant	7,141,000	2019 – 2023	Co-Applicant (13%)
Alberta Innovates	Clean Technology Development Program	96,000	2018 – 2021	Principal Investigator (50%)
MITACS + InnoTech Alberta	MITACS Elevate	60,000	2018 – 2019	Principal Investigator (50%)
NSERC + Group Six Technologies	Engage	25,000	2018	Principal Investigator (100%)
NSERC	Discovery Grant	234,000 (39,000/year)	2018 – 2024	Principal Investigator (100%)
NSERC	Research Tools and Instruments	150,000	2018 – 2019	Co-Applicant (17%)

NSERC (with Imperial Oil)	Collaborative Research and Development	50,000	2018 – 2023	Principal Investigator (50%)
Alberta Innovates	Strategic Networking and Development	4,500	2018	Principal Investigator (100%)
NSERC	Connect Level 2	5,000	2018	Principal Investigator (100%)
MITACS	MITACS Accelerate	15,000	2017	Principal Investigator (100%)
NSERC	Strategic Partnership Grants for Networks	5,625,000	2017 – 2022	Co-Applicant (12%)
University of Alberta	Matching Funds (Strategic Network)	105,000	2017 – 2022	Principal Investigator (100%)
NSERC (with FPIInnovations)	Collaborative Research and Development	78,500	2017 – 2019	Principal Investigator (100%)
NSERC	Research Tools and Instruments	149,691	2017 – 2018	Co-Applicant (17%)
NSERC + Endurance	Engage	25,000	2017	Principal Investigator (100%)
NSERC + Polycontrols Technologies	Connect Grant Level 1	2,890	2016 – 2017	Principal Investigator (100%)
NSERC + Schlumberger	Engage	19,575	2015	Principal Investigator (100%)
Alberta Innovates	Surface Technologies and Wear Grant	76,875	2015 - 2016	Principal Investigator (100%)
NSERC + PPM, Ltd.	Engage	25,000	2014	Principal Investigator (100%)
NSERC + PPM, Ltd.	Interaction Grant	4,000	2014	Principal Investigator (100%)
NSERC (with FPIInnovations)	Collaborative Research and Development	88,000	2014 - 2016	Principal Investigator (100%)

NSERC (with Syncrude)	Collaborative Research and Development	193,150	2014 - 2017	Co-Applicant (50%)
NSERC + Cenovus Energy	Engage	25,000	2013	Principal Investigator (100%)
NSERC	Discovery Grant	115,000 (23,000/year)	2013 - 2018	Principal Investigator (100%)
NSERC + Lumiant Corp.	Engage	25,000	2012	Principal Investigator (100%)
NSERC + Perpetual Technologies	Engage	25,000	2012	Principal Investigator (100%)
NSERC + Ulterra	Engage	23,880	2011	Principal Investigator (100%)
Alberta Innovates	NanoTechnology for the Oil Sands Sector	100,000	2011 - 2012	Co-Applicant (50%)
NSERC + CenterLine (Windsor) Ltd.	Engage	23,160	2010 - 2011	Principal Investigator (50%)
NSERC	Collaborative Research and Development	79,900	2009 - 2011	Principal Investigator (100%)
NSERC	Discovery Grant	104,250 (20,850/year)	2008 - 2013	Principal Investigator (100%)
Canada Foundation for Innovation	Leaders Opportunity Fund	133,096	2008	Principal Investigator (100%)
Canada Foundation for Innovation	Infrastructure Operating Fund	58,213	2008 - 2013	Principal Investigator (100%)
Government of Alberta	Small Equipment Grants Program	99,822	2007	Principal Investigator (100%)
University of Alberta – MEC E Department	Matching Funds (SEGP-CFI)	41,150	2007	Principal Investigator (100%)
University of Alberta	Start-up Funds	134,000	2007 - 2012	Principal Investigator (100%)

INDUSTRY CASH SUPPORT

Company	Total Amount (\$)	Type (Cash/In-kind)	Year/Duration	Participation
Imperial Oil	25,000	Cash	2019 – 2023	Principal Investigator (50%)
Imperial Oil	25,000	Cash	2018 – 2019	Principal Investigator (100%)
FPIInnovations (FERIC)	40,000	Cash	2017 – 2019	Principal Investigator (100%)
Imperial Oil	25,000	Cash	2017 – 2019	Principal Investigator (50%)
Syncrude Canada	194,100	Cash	2014 - 2017	Co-Applicant (50%)
FPIInnovations (FERIC)	44,000	Cash	2013 - 2015	Principal Investigator (100%)
Research Service Contracts	235,523	Cash	2009 - Present	Principal Investigator (100%)
FPIInnovations (PAPRICAN)	40,300	Cash	2009 - 2011	Principal Investigator (100%)

ADVANCEMENT

Sponsor	Purpose	Total Amount (\$)	Year/Duration	Participation
RBC Foundation	ELITE Program for Black Youth	450,000	2023 – 2026	Lead
Canada Summer Jobs	ELITE Program for Black Youth	48,300	2023	Lead
Edmonton Regional Innovation Network	ELITE Program for Black Youth Entrepreneurship Design Series	5,000	2023	Lead

International Student Work Experience Program	ELITE Program for Black Youth	24,000	2023	Lead
Stantec	ELITE Program for Black Youth	12,000	2023	Lead
RBC Foundation	ELITE Program for Black Youth	150,000	2022 – 2023	Lead
MITACS Business Strategy Internship	ELITE Program for Black Youth	30,000	2022	Lead
Canada Summer Jobs	ELITE Program for Black Youth	75,600	2022	Lead
International Student Work Experience Program	ELITE Program for Black Youth	24,000	2022	Lead
Alberta Innovates	Institutional Support for Entrepreneurship Education	15,000	2021 – 2022	Lead
Enbridge	ELITE Program for Black Youth	50,000	2021 – 2022	Lead
RBC Foundation	ELITE Program for Black Youth	175,000	2021 – 2022	Lead
Counselling Foundation of Canada	ELITE Program for Black Youth	150,000	2021 – 2023	Lead
Canada Summer Jobs	ELITE Program for Black Youth	97,650	2021	Lead
International Student Work Experience Program	ELITE Program for Black Youth	12,000	2021	Lead
Future Skills Centre	ELITE Program for Black Youth	302,480	2021 – 2023	Lead
RBC Foundation	ELITE Program for Black Youth	200,500	2020 – 2021	Lead

SOME EXTERNAL SOURCE FUNDING INITIATIVES AS ASSOCIATE VICE-PRESIDENT (STRATEGIC RESEARCH INITIATIVES AND PERFORMANCE)

Sponsor	Program	Total Amount (\$)	Year/Duration	Faculty Participation
Alberta Innovates	Ecosystem Development Partnerships Program	1,500,000	Applied for	Science; Engineering
Prairies Economic Development Canada	Regional Innovation Ecosystems – Manufacturing Technology Adoption & Upskilling	1,665,000	Applied for	Engineering; Medicine & Dentistry
Innovation, Science and Economic Development	Semiconductor Challenge Callout	12,000,000	Applied for	Engineering; Medicine & Dentistry; Science
Government of Canada	Incremental Project Grant	3,678,526	2023 – 2024	OVPRI
Private Donation	Quantum Horizons Alberta – Fundamental Quantum Research	6,000,000	2023 – 2028	Science
Government of Alberta	Major Innovation Fund	28,000,000	2023 - 2027	Led by UAlberta, UCalgary; Engineering; Science
Government of Canada	Canada Biomedical Research Fund – PRAIRIE Hub	2,500,000	2023 – 2028	Medicine & Dentistry; Science
Canada First Research Excellence Fund	<i>Bridging Divides</i>	98,643,938	2023 – 2030	Lead by TMU; UAlberta Faculty of Arts; Faculty of Science

Canada First Research Excellence Fund	<i>One Child, Every Child</i>	125,000,000	2023 – 2030	Lead by UCalgary; UAlberta Women and Children's Health Research Institute
Innovation, Science and Economic Development	Black Entrepreneurship Knowledge Hub – Central Regional Hub	5,000,000	2022 – 2025	Lead by Carleton U; Arts; Business; Education; Engineering
Government of Canada	Incremental Project Grant	3,603,621	2022 – 2023	OVPRI

RESEARCH PUBLICATIONS (*The names of each HQP are presented in bold text*)

Submitted Journal Articles

- S3. **Saman Sayahlatifi**, Zahra Zaiemyekheh, Chenwei Shao, André McDonald, James Hogan, “Strain Rate-dependent Behavior of Cold-sprayed Additively Manufactured Al-Al₂O₃ Composites: Micromechanical Modeling and Experimentation”, *Composites Part B*, under review.
- S2. **Adekunle Ogunbadejo**, Maria Ophelia Jarligo, Sanjeev Chandra, André McDonald, “Flame Sprayed NiCoCrAlTaY - TiO₂ Coatings as Structural Health Monitoring Sensors”, *Surf. Coat. Technol.*, under review.
- S1. **Chenwei Shao**, **Saman Sayahlatifi**, Haoyang Li, Yankun Zhu, Zhefeng Zhang, André McDonald, James Hogan, “The High-throughput Design and Manufacturing of Super Strong Nanocrystalline Composites via Cold Spray Additive Manufacturing”, *Additive Manufactur.*, under review.

Peer-Reviewed Journal Articles

- J87. **Payank Patel**, **Rakesh Nair**, **Raunak Supekar**, André McDonald, Richard Chromik, Christian Moreau, Pantcho Stoyanov, “Enhanced wear resistance of AlCoCrFeMo high entropy coatings (HECs) through various thermal spray techniques”, *Surf. Coat. Technol.*, 477, 2024, 130311.
- J86. **Raunak Supekar**, **Rakesh Nair**, André McDonald, Pantcho Stoyanov, “Tribological Response of AlCoCrFeMo High Entropy Alloys Deposited via Flame Spraying and Cold Spraying: A Comparative Evaluation”, *Wear*, 2023, 516-517, 204596.
- J85. **Wania Jibran**, Maria Ophelia Jarligo, Priti Wanjara, Javad Gholipour Baradari, André McDonald, “Localized Surface Modification of High Strength Aluminum Alloys using Cold Spraying and Friction Stir Processing”, *Appl. Ceram.: Struct., Funct. Bioceram.*, 2023, 122, 181.
- J84. **Sanhita Pal**, **Rakesh Bhaskaran Nair**, André McDonald, “Effect of Tungsten and Vanadium Additions on the Dry Abrasive Wear and Solid Particle Erosion of Flame-sprayed AlCoCrFeMo High Entropy Alloy Coatings”, *Int. J. Refract. Met. Hard Mater.*, 2023, 114, 106245.
- J83. **Panteha Fallah**, Sima Alidokht, Phuong Vo, Richard Chromik, André McDonald, Stephen Yue, “Properties of Multilayered Metallic Coatings Deposited on Carbon Fiber-Reinforced Polymers (CFRPs) through Electrochemical and Cold Spray Processes”, *J. Thermal Spray Technol.*, 2023, 32, 234–248.

- J82. **Saman Sayahlatifi, Zahra Zaiemyekheh,** Chenwei Shao, André McDonald, James Hogan, “Micromechanical Damage Analysis of Al-Al₂O₃ Composites via Cold-sprayed Additive Manufacturing”, *Int. J. Mech. Sci.*, 2023, 259, 108573.
- J81. **Sanhita Pal, Rakesh Bhaskaran Nair,** André McDonald, “Towards Understanding the Microstructure and Electrical Resistivity of Thermal-sprayed High Entropy Alloy Coatings”, *J. Mater. Sci.*, 2022, 57, 20928–20944.
- J80. **Hannaneh Manafi Farid,** André McDonald, James David Hogan, “Impact and deposition behavior of Al/B₄C cold-sprayed composite coatings”, *Mater.*, 2023, 16, 2525–2550.
- J79. **Raunak Supekar, Rakesh Nair, Seyyed Morteza Javid, Wandong Wang,** Yu Zou, André McDonald, Javad Mostaghimi, Pantcho Stoyanov, “High Entropy Alloy Coatings Deposited by Thermal Spraying Technologies: A Review on Strengthening Mechanisms, Performance Assessments and Future Prospective Applications”, *Metals*, 2023, 13, 579–617.
- J78. **Rakesh Bhaskaran Nair, Sean Ngan,** André McDonald, “Dry Abrasive Wear and Solid Particle Erosion Assessments of High Entropy Alloy Coatings Developed by Low-pressure Cold Spraying”, *Mater. Today Commun.*, 34, 2023, 105527.
- J77. **Raunak Supekar, Rakesh Nair,** André McDonald, Pantcho Stoyanov, “Sliding Wear Behavior of High Entropy Alloy Coatings Deposited Through Cold Spraying and Flame Spraying: A Comparative Assessment”, *Wear*, 516-517, 2023, 204596.
- J76. **Chenwei Shao,** Haoyang Li, Yankun Zhu, Peng Li, Haoyang Yu, Zhefeng Zhang, Herbert Gleiter, André McDonald, James Hogan, “Nano-additive Manufacturing of Multilevel Strengthened Aluminum Matrix Composites”, *Int. J. Extreme Manuf.*, 5, 2023, 015102.
- J75. **Rakesh Nair, Gopinath Perumal,** André McDonald, “Effect of Microstructure on Wear and Corrosion Performance of Thermally-Sprayed AlCoCrFeMo High Entropy Alloy Coatings”, *Adv. Eng. Mater.*, 24, 2022, 2101713.
- J74. **Ye Tian, Rui Yang, Zhoupeng Gu,** Hang Zhao, Xianqian Wu, **Shahed Taghian Dehaghani,** Hao Chen, Tonghu Xiao, Xiuyong Chen, André McDonald, Hua Li, “Ultrahigh cavitation erosion resistant metal-matrix composites with biomimetic hierarchical structure”, *Compos. B*, 234, 2022, 109730.

- J73. **Zeynab Yousefzadeh, Milad Rezvani Rad**, André McDonald, Shannon Lloyd, "Life Cycle Assessment of a Thermal Sprayed Al_2O_3 -NiCr Resistive Heating Coating for Pipe Freeze Protection", *J. Thermal Spray Technol.*, 31, 2022, 378–395.
- J72. **Mohammad Parsazadeh**, Gary Fisher, André McDonald, James Hogan, "Computational Modelling of the Effect of Microstructure on the Abrasive Wear Resistance of Tungsten-carbide Nickel Composite Coatings under Sub-critical Cyclic Impact Loading", *Ceram. Int.*, 48, 2022, 14338-14348.
- J71. **Panteha Fallah, Rohan Chakrabarty**, Jun Song, André McDonald, Stephen Yue, "Effect of metallic interlayer hardness on deposition efficiency and deformation behavior of copper particles in low-pressure cold spraying", *J. Thermal Spray Technol.*, 31, 2022, 559–573.
- J70. **Arian Enayat**, Mohtada Sadrzadeh, André McDonald, "Fabrication of Joule heating coating layers via flame spraying for membrane distillation", *Surf. Innovations*, 10, 2022, 263-277.
- J69. **Saman Sayahlatifi, Chenwei Shao**, André McDonald, James Hogan, "3D microstructure-based finite element simulation of cold-sprayed Al- Al_2O_3 composite coatings under quasi-static compression and indentation loading", *J. Thermal Spray Technol.*, 31, 2022, 102–118.
- J68. **Ye Tian, Hang Zhao, Rui Yang, Xiaomei Liu**, Xiuyong Chen, André McDonald, Hua Li, "*In-situ* SEM investigation on stress-induced microstructure evolution of austenitic stainless steels subjected to cavitation erosion and cavitation erosion-corrosion", *Mater. Des.*, 213, 2022, 110314.
- J67. **Wania Jibran**, James Hogan, André McDonald, "Influence of Spray Parameters on the Thickness, Hardness, and Porosity of Low-pressure Cold Sprayed WC-Ni Coatings", *Int. J. Adv. Manuf. Technol.*, 116, 2021, 2149 – 2160.
- J66. **Shahed Taghian Dehaghani**, Ali Dolatabadi, André McDonald, "Thermally Sprayed Metal Matrix Composite Coatings as Heating Systems for De-icing of Airfoils", *Appl. Thermal Eng.*, 196, 2021, 117321.
- J65. **Milad Rezvani Rad, Kingsley Ngaokere**, Shannon Lloyd, André McDonald, "Techno-Economic Assessment of Multi-Layered Coating-Based Resistive Heating Systems and Conventional Heat Tracing Cables for Industry Pipes", *J. Thermal Spray Technol.*, 30, 2021, 1393–1409.

- J64. **Sudarshan Devaraj**, André McDonald, Sanjeev Chandra, “Metallization of Porous Polyethylene using a Wire-Arc Spray Process for Heat Transfer Applications”, *J. Thermal Spray Technol.*, 30, 2021, 145 – 156.
- J63. **Mohammad Parsazadeh**, Gary Fisher, André McDonald, James Hogan, “Computational Investigation of the Effect of Microstructure on the Abrasive Wear Resistance of Tungsten-Carbide Nickel Composite Coatings”, *Wear*, 478–479, 2021, 203888.
- J62. **C. W. Shao, C. Lo, K. B. Bhagavathula**, A. G. McDonald, J. D. Hogan, “High Strength Particulate Aluminum Matrix Composite Design: Synergistic Strengthening Strategy”, *Compos. Commun.*, 25, 2021, 100697.
- J61. **Morvarid Mohammadian Bajgiran, Milad Rezvani Rad**, André McDonald, Christian Moreau, “Microstructure, phase and dielectric strength of thermally sprayed alumina layers in coating-based heating systems”, *Int. J. Appl. Ceram. Technol.*, 18, 2021, 1641 – 1656.
- J60. **Mohammad Parsazadeh, Mehtab Malik**, Xili Duan, André McDonald, “Numerical Study on Melting of Phase Change Material in an Enclosure Subject to Neumann Boundary Condition in the Presence of Rayleigh-Bénard Convection”, *Int. J. Heat Mass Transfer*, 171, 2021, 121103.
- J59. **Sadaf Noamani, Shirin Niroomand, Masoud Rastgar**, André McDonald, Mohtada Sadrzadeh, “Development of a Self-sustained Model to Predict the Performance of Direct Contact Membrane Distillation (DCMD)”, *Sep. Purif. Technol.*, 263, 2021, 118407.
- J58. **Hang Zhao, Haijun Zhang**, Xiuyong Chen, André McDonald, Hua Li, “Effect of *Chlorella vulgaris* Biofilm Adhesion on Electrochemical Behaviors of Wire Arc-sprayed Aluminum Coatings”, *J. Thermal Spray Technol.*, 29, 2020, 1991 – 2000.
- J57. **Amirhossein Mahdavi, Aminallah Pourasghar**, Zengtao Chen, André McDonald, “Particle-Substrate Transient Thermal Evolution during Cold Spray Deposition Process: A Hybrid Heat Conduction Analysis”, *J. Thermal Spray Technol.*, 29, 2020, 1609 – 1627.
- J56. **Panteha Fallah**, Sriraman Rajagopalan, André McDonald, Stephen Yue, “Development of Hybrid Metallic Coatings on Carbon Fiber-reinforced Polymers (CFRPs) by Cold Spray Deposition of Copper-assisted Copper Electroplating Process”, *Surf. Coat. Technol.*, 400, 2020, 126231.
- J55. **Xiaoxia Wang, Xin Wang**, Qun Huang, Jiahao Qin, Xinkun Suo, André McDonald, Hua Li, “Dual Antifouling Mechanisms Induced by Cupric Ions

- and Needle-like Alumina in Arc-sprayed Composite Coatings”, *J. Thermal Spray Technol.*, 29, 2020, 1784 – 1791.
- J54. **Sudarshan Devaraj, Bobby Anand, Michael Gibbons**, André McDonald, Sanjeev Chandra, “Thermal Spray Deposition of Aluminum and Zinc Coatings on Thermoplastics”, *Surf. Coat. Technol.*, 399, 2020, 126114.
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Refereed Conference Papers (*The name of the presenter is in italics text*)

- C117. Maria Ophelia Jarligo, ***Mohammad Aatif Qazi***, Jing Liu, André McDonald, “Thermal Stability of Thermal-sprayed AlCoCrFe-M High Entropy Alloy Coatings”, in: International Materials, Applications, and Technologies Conference, September 30 – October 3, 2024 (Cleveland, United States), ASM International, (2024), abstract only.
- C116. ***Asad Asad***, Maria Ophelia Jarligo, André McDonald, Mostafa Yakout, “Additive Fabrication of Lightweight High Entropy Alloys: Microstructural Transformations and Mechanical Performance”, in: International Materials, Applications, and Technologies Conference, September 30 – October 3, 2024 (Cleveland, United States), ASM International, (2024), abstract only.
- C115. ***Mohammad Aatif Qazi***, Maria Ophelia Jarligo, André McDonald, “Zirconium Doping for Improved Performance of Cold-Sprayed High Entropy Alloy Coatings”, in: North American Cold Spray Conference, September 10 – 11, 2024 (Boucherville, Canada), ASM International, (2024), abstract only.
- C114. ***Nashit Jalal***, Maria Ophelia Jarligo, André McDonald, Wylie Stroberg, “Mechanical Behaviour of Cold-sprayed AlCoCrFeMo High-entropy Alloy under Uniaxial Tension using Molecular Dynamics Simulation”, in: North American Cold Spray Conference, September 10 – 11, 2024 (Boucherville, Canada), ASM International, (2024), abstract only.
- C113. ***Saman Sayahlatifi***, Zahra Zaiemyekheh, André McDonald, James Hogan “Microstructure-Informed Data-driven Modeling of Mechanical Behavior of Cold-Sprayed Additively Manufactured Metal-Ceramic Composites”, in: 16th World Congress on Computational Mechanics and 4th Pan American Congress on Computational Mechanics, July 21 – 26, 2024 (Vancouver, Canada), International Association for Computational Mechanics (IACM) and the Canadian Association for Computational Science and Engineering (CACSE), (2024), abstract only.
- C112. ***Faiyaz Bin Naser Chowdhury***, André McDonald, Wylie Stroberg, “Coarse-Grained Molecular Dynamics Model for Multicomponent Alloy Systems using Neural Networks”, in: 16th World Congress on Computational Mechanics and 4th Pan American Congress on Computational Mechanics, July 21 – 26, 2024 (Vancouver, Canada), International Association for Computational Mechanics (IACM) and the Canadian Association for Computational Science and Engineering (CACSE), (2024), abstract only.

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- C109. **Mohammad Aatif Qazi**, Maria Ophelia Jarligo, André McDonald, “Cold Sprayed Al-Based High Entropy Alloy Coatings with Zirconium Dispersoids”, in: 35th Canadian Materials Science Conference, May 22 – 25, 2024 (Edmonton, Canada), The Metallurgy and Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, (2024), abstract only.
- C108. M. Rezvani Rad, **P. Menghesha**, M. O. Jarligo, A. McDonald, “Techno-Economic Assessment of Application of Cold Spraying for Fabrication of Resistive Heating Elements for Prevention of Icing in Steel Pipes”, in: 35th Canadian Materials Science Conference, May 22 – 25, 2024 (Edmonton, Canada), The Metallurgy and Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, (2024), abstract only.
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- T41. **Milad Rezvani Rad, Adrian Lopera-Valle**, André McDonald, “Wear Resistance of Protective Coatings Deposited by TAMU onto AISI 1018 Low Carbon Steel Substrate - Phase 3”, submitted to Cenovus Energy Inc., July 20, 2018.
- T40. **Adrian Lopera-Valle, Milad Rezvani Rad**, André McDonald, “Characterization and Evaluation of Thermal Shock Resistance of Protective Coatings Deposited onto AISI 1018 by Nanoxy - Phase 2”, submitted to Cenovus Energy Inc., March 29, 2018.
- T39. **Amirhossein Mahdavi**, André McDonald, Final Report – “Experimental Study of the Corrosion Resistance of Thermal Diffusion-Coated Steel Surface in Simulated High-Temperature Recovery Boiler Conditions”, submitted to Endurance Technologies Inc., December 15, 2017.
- T38. **Razim Refai, Eder Villa-Coronel**, André McDonald, Progress Report 9 – “Performance Evaluation of Commercially Available Wildland Fire Chemicals using a Custom-Built Thermal Canister”, submitted to FPIInnovations, November 6, 2017. Reviewed and Revised: 4 June 2018.
- T37. **Kevin Hodder**, André McDonald, Final Report – “Material Characterization of the Coatings on Thermal-Sprayed Steel Channels used in WAC Vessel CL1-V-1210A”, submitted to Cenovus Energy Inc., October 19, 2017.
- T36. **Hossein Ashrafizadeh, Milad Rezvani-Rad**, André McDonald, Final Report – “Characterization of Ti-based Coatings Deposited by the Flame Spraying Process”, submitted to Lumiant Corp., July 31, 2017.
- T35. **Razim Refai**, Rex Hsieh, André McDonald, Progress Report 8 – “Performance Evaluation of Wildland Fire Chemicals using a Custom-Built Thermal Canister”, submitted to FPIInnovations, January 3, 2017.
- T34. **Razim Refai**, Rex Hsieh, André McDonald, Progress Report 7 – “Quantification of Relationship between Fuel Load, Coverage Level, and Energy Emitted from Treated Wildland Vegetative Fuels”, submitted to FPIInnovations, October 28, 2016.
- T33. **Roy Lee**, André McDonald, Progress Report 3 – “Comparison of Cold-sprayed B4C + Ni, TiC + Ni, and WC + Ni Metal Matrix Composite Coatings”, submitted to Alberta Innovates – Technology Futures, July 22, 2016.
- T32. **Amirhossein Mahdavi, Daniel Aldrich**, André McDonald, Cagri Ayranci, Progress Report 2 – “Preliminary Findings on Mechanical Properties of

- Bell Industries' Ring Stuffing Box Packings: Tensile & Compression Tests", submitted to Bell Industries, April 30, 2016.
- T31. **Razim Refai, Shammawi Anderson**, André McDonald, Progress Report 6 – "Thermal Cube" Custom-built Heat Flux Sensor: Specifications and Construction", submitted to FPInnovations, February 17, 2016.
- T30. **Roy Lee**, André McDonald, Progress Report 2 – "Analysis of dry abrasion wear resistance in cold-sprayed B₄C + Ni metal matrix composite coatings", submitted to Alberta Innovates – Technology Futures, December 23, 2015.
- T29. **Sayed Hossein Ashrafizadeh, Harpreet Singh**, André McDonald, Progress Report 3 – "Morphology and wear resistance of protective coatings deposited by TAMU onto AISI 1018 low carbon and 4140 low alloy CrMo steel substrates", submitted to Cenovus Energy, December 3, 2015.
- T28. **Sayed Hossein Ashrafizadeh, Razim Refai**, André McDonald, Progress Report 4 – "Evaluation of thermal shock resistance of protective coatings deposited onto AISI 1018 low carbon and 4140 low alloy CrMo steel substrates", submitted to Cenovus Energy, December 2, 2015.
- T27. **Sayed Hossein Ashrafizadeh**, André McDonald, Progress Report 2 – "Morphology and wear resistance of SiC-based coatings deposited onto AISI 1018 low carbon and 4140 stainless steel substrates", submitted to Cenovus Energy, November 6, 2015.
- T26. **Sayed Hossein Ashrafizadeh**, André McDonald, Final Report – "Evaluation of Abrasion and Corrosion Resistance of Low-Pressure Cold-sprayed TiC-Ni-Based MMC Coatings", submitted to Pacific Particulate Materials (PPM) Ltd., November 6, 2015
- T25. **Roy Lee**, André McDonald, Progress Report 1 – "Cold-sprayed boron carbide-nickel metal matrix composite coatings for erosion and abrasion resistance", submitted to Alberta Innovates – Technology Futures, August 24, 2015.
- T24. **Amirhossein Mahdavi**, André McDonald, Cagri Ayranci, Progress Report 1 – "Investigating the effect of temperature on ring stuffing box packings of Bell Industries to account for changing working conditions", submitted to Bell Industries, August 10, 2015.
- T23. **Sayed Hossein Ashrafizadeh**, André McDonald, Progress Report 1 – "Morphology and wear resistance of electroless nickel coatings deposited

- onto AISI 1018 low carbon and 4140 stainless steel substrates”, submitted to Cenovus Energy, August 6, 2015.
- T22. **Shammawi Anderson**, André McDonald, Progress Report 1 – “Thermal spray deposition for microchannel fabrication”, submitted to Schlumberger Canada, July 29, 2015.
- T21. **Sayed Hossein Ashrafizadeh, Adrian Lopera-Valle, Shamez Walji**, André McDonald, Progress Report 1 – “Deposition and preliminary evaluation of low-pressure cold-sprayed TiC-Ni-based MMC coatings”, submitted to Pacific Particulate Materials (PPM) Ltd., March 9, 2015.
- T20. **Shammawi Anderson**, André McDonald, Progress Report 5 – “Wildland fire chemical treatment – Assessment of fuel ignition time”, submitted to FPInnovations, February 2, 2015.
- T19. **Usama Akram**, André McDonald, Final Report – “Characterization of thermally-sprayed Hastelloy modified-C276 (Thermotec 18997) coatings”, submitted to Norbord Inc., October 7, 2014.
- T18. **Adrian Lopera-Valle**, André McDonald, Final Report – “Characterization and testing of Inconel 686 and Hastelloy C276 coatings”, submitted to Cenovus Energy, October 6, 2014.
- T17. **Sayed Hossein Ashrafizadeh, Usama Akram**, André McDonald, Final Report – “Evaluation of wear and corrosion resistance of low-pressure cold-sprayed WC-Ni based MMC coatings”, submitted to Weatherford Drilling Services and Saturn Machine Works, October 6, 2014.
- T16. **Shammawi Anderson**, André McDonald, Progress Report 4 – “Wildland forest fire chemical treatment – Assessment of fuel ignition time”, submitted to FPInnovations, October 6, 2014.
- T15. **Razim Refai, Shammawi Anderson**, André McDonald, Progress Report 3 – “Error reduction in the heat flux sensor “Thermal Cube” used in forest fires”, submitted to FPInnovations, August 27, 2014.
- T14. **Arunava Majumdar**, André McDonald, Progress Report 1 on “In-situ development of thermitic spray coatings by flame spraying”, submitted to Lumiant Corporation, January 8, 2013.
- T13. André McDonald, **Ben Bscheiden**, Progress Report 3 – “Modeling of solidification in insulated pipes”, submitted to Cenovus Energy, November 13, 2012.

- T12. **Erik Sullivan**, André McDonald, Progress Report 2 – “Mathematical development for energy interaction between wildland/urban interface fires and building structures”, submitted to FPIInnovations, November 6, 2012.
- T11. André McDonald, **Ben Bscheiden**, Progress Report 2 – “Modeling of solidification in pipes: Stefan problem in cylindrical co-ordinates”, submitted to Cenovus Energy, October 11, 2012.
- T10. André McDonald, **Ben Bscheiden**, Progress Report 1 – “Modeling of solidification in pipes”, submitted to Cenovus Energy, September 14, 2012.
- T9. **Erik Sullivan**, André McDonald, Progress Report 1 – “Energy interaction between wildland/urban interface fires and building structures”, submitted to FPIInnovations, August 20, 2012.
- T8. **Natanael Melendez**, André McDonald, Progress Report 2 – “Analysis of mean free path, wear resistance, and adhesion of low-pressure cold-sprayed WC-based metal matrix composite coatings”, submitted to Ulterra L.P., February 20, 2012.
- T7. **Alyssa Frederick**, André McDonald, Progress Report 3 – “Evaluation of nanostructured yttria-stabilized zirconia coatings as environmental barrier coatings for superheater tubes in Kraft recovery boilers”, submitted to FPIInnovations, September 30, 2011.
- T6. **Natanael Melendez**, André McDonald, Progress Report 1 – “Fabrication of nano/conventional WC-12Co + Ni metal matrix composite coatings by cold-gas dynamic spraying”, submitted to Ulterra L.P., September 27, 2011.
- T5. **Kevin Hodder**, Adrian Gerlich, André McDonald, Progress Report 2 – “Preliminary fabrication of Al-Al₂O₃-based metal matrix composite coatings by cold gas dynamic spraying”, submitted to SST CenterLine (Windsor) Ltd., August 12, 2011.
- T4. **Kevin Hodder**, Adrian Gerlich, André McDonald, Progress Report 1 – “Preliminary fabrication of Al-Al₂O₃-based metal matrix composite coatings by cold gas dynamic spraying”, submitted to SST CenterLine (Windsor) Ltd., April 21, 2011.
- T3. **Natanael Melendez**, André McDonald, Progress Report – “Preliminary fabrication of WC-based metal matrix composite coatings by cold gas dynamic spraying”, submitted to Alberta Innovates Technology Futures, March 15, 2011.

- T2. **Shishir Rao**, André McDonald, Progress Report 1 – “Impact of YSZ thickness on average fluid temperature in the superheater”, submitted to FPInnovations, July 23, 2010; revised September 24, 2010.
- T1. **Shishir Rao**, André McDonald, Progress Report 2 – “Corrosion behaviour of YSZ thermal barrier coatings exposed to NaCl salt at 600°C – A Preliminary Study”, submitted to FPInnovations, September 7, 2010.

PRESENTATIONS

Presentations given at Conferences, Workshops, Seminars, or Meetings

- P48. *A. McDonald*, “Next-Generation Thermal-sprayed Coatings for Polymer Composite Structures and Pipes – Deicing and Membranes”, 10th International Conference on Advancements & Futuristic Trends in Mechanical & Materials Engineering, AFTMME-23, Society of Materials and Mechanical Engineers, Punjab, India, October 26 - 28, 2023. (**Invited Speaker**; Oral)
- P47. *A. McDonald*, “Ultra-high Strength High Entropy Alloy Coating for Repair”, 2023 Autonomous Systems Initiative (ASI) Symposium, University of Alberta, Edmonton, AB, September 14 – 15, 2023 (Oral).
- P46. *Nashit Jalal*, Maria Ophelia Jarligo, André McDonald, Wylie Stroberg, “Understanding the effect of Mo Concentration on the Tensile Properties of AlCoCrFeMo High Entropy Alloy Using Atomistic Simulations”, HEA Canada Workshop 2023, University of Toronto, Toronto, ON, August 24 – 25, 2023 (Oral).
- P45. *A. McDonald*, “Wear Mechanisms and Damage of Cold-sprayed Metal Matrix Composite Coatings”, 24th International Conference on the Wear of Materials, Elsevier, Banff, AB, April 17 – 20, 2023. (**Invited Keynote Speaker**; Oral)
- P44. *A. McDonald*, “Advanced Thermal-sprayed Coatings for Reinforced Polymer Composite Structures”, Canadian Black Scientist Network Congress, Virtual, February 1 – 3, 2023. (**Invited Keynote Speaker**; Oral)
- P43. *A. McDonald*, “Advanced Thermal-sprayed Coatings for Reinforced Polymer Composite Structures”, New and Emerging Markets for Thick Films and Coatings: Unconventional Uses of Thermal Spray (NEM-TS 2022), ASM International, New Orleans, LA, September 13 – 14, 2022. (**Invited Speaker**; Oral)

- P42. A. McDonald, "Microstructure-dependency of Mechanical Properties and Failure of Low-Pressure Cold-Sprayed Tungsten Carbide-Nickel Metal Matrix Composite Coatings", 2022 North American Cold Spray Conference, ASM International, New Orleans, LA, September 13 – 14, 2022. (**Invited Speaker**; Oral)
- P41. A. McDonald, "The Experiential Learning in Innovation, Technology, and Entrepreneurship (ELITE) Program for Black Youth: A Novel Academic-Government-Industry-Community Approach to Work-integrated Training in STEM", Canadian Society for Mechanical Engineering Congress, Edmonton, AB, June 7, 2022. (**Invited Speaker**; Oral)
- P40. A. McDonald, "Development and Performance Modeling of Heating Coatings", 2021 Canadian Society for Mechanical Engineering Congress, June 28, 2021, Virtual. (**Invited Keynote Speaker**; Oral)
- P39. A. McDonald, "ASM Workshop on Professional Cultures and Inequality in STEM", Virtual Symposium hosted by the University of Connecticut, April 28, 2021. (**Invited Panelist Speaker**; Oral)
- P38. A. McDonald, "Resiliency of our Black Communities and How We Can Move Forward in a Positive and Inclusive Way", Panel Discussion at the Williams Engineering Canada, Edmonton, Alberta, February 25, 2021. (**Invited Panelist Speaker**; Oral)
- P37. **Milad Rezvani Rad, Morvarid Mohammadian**, Christian Moreau, André McDonald, "Fabrication of Multi-Layered Thermal-Sprayed Coatings as Efficient Electric Resistance Heating Systems to Mitigate Ice Formation and Internal Pressurization in Pipelines", International Pressure Equipment Integrity Association, Banff, AB, February 25 – March 1, 2020. (Oral)
- P36. **P. Fallah, H. Che**, A. McDonald, S. Yue, "Metallization of Carbon Fiber-reinforced Polymers by a Combined Coating Process: Electroplating and Cold Spray", in: *Les Rencontres Internationales de la Projection Thermique (RIPT)*, 9th edition, December 11-13, 2019 (Jülich, Germany), Forschungszentrum Jülich, (2019).
- P35. A. McDonald, "Thermal Spray Research Activities at the University of Alberta – Wear and Corrosion Resistant Coatings", *NACE Edmonton Chapter Monthly Dinner Meeting*, Edmonton, Alberta, September 25, 2019. (**Invited Keynote Speaker**; Oral)
- P34. A. McDonald, "Graduate Student and Fellow Recruitment – Possible Strategies", Association of Canadian Faculties of Dentistry, Panel: Establishing best practices for Dental Schools to create the next

- generation of Clinician Scientists, Association of Canadian Faculties of Dentistry, Vancouver, British Columbia, June 18, 2019. (**Invited Panelist Speaker**; Oral)
- P33. A. McDonald, “Dual-Use Research: Engineering Perspectives”, Symposium at the University of Alberta, *Navigating International Research Opportunities in Times of Global Change*, Panel 3: Dual-use Research, Office of the Vice President (Research and Innovation), University of Alberta, Edmonton, Alberta, May 2, 2019. (**Invited Panelist Speaker**; Oral)
- P32. A. McDonald, “Advanced Thermal-sprayed Coatings for Reinforced Polymer Composite Structures”, *1st Workshop on Thermal Surface Technologies 2019*, Fraunhofer IWS, Dresden, Germany, January 29, 2019. (**Invited Keynote Speaker**; Oral)
- P31. A. McDonald, “Thermal Spray Research Activities at the University of Alberta – Functional and Wear Resistant Coatings”, Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo, P.R. of China, July 23, 2018. (**Invited Keynote Speaker**; Oral)
- P30. **Milad Rezvani Rad**, R. Marsden, A. McDonald, “Testing and analysis of freezing and failure in conventional carbon steel pipes”, International Pressure Equipment Integrity Association, Banff, AB, March 7 – 9, 2018. (Oral)
- P29. A. McDonald, Bertrand Jodoin, Stephen Yue, Richard Chromik, Jun Song, Julio Villafuerte, Éric Irissou, Manuel Martin, “Cold Spray Activities in Canada”, *North American Cold Spray Conference*, Edmonton, AB, November 30 – December 1, 2016. (Keynote Speaker; Oral)
- P28. A. McDonald, “Analysis of thermal spraying in the industries of Western Canada”, *International Thermal Spray Conference*, Long Beach, CA, May 11 – 14, 2015. (Keynote Speaker; Oral)
- P27. A. McDonald, “Functional coatings for damage detection and heating of pipes”, Surface Engineering for the Alberta Energy Industry Seminar, Edmonton, AB, April 23 – 24, 2015. (Oral)
- P26. **Adrian Lopera-Valle**, **P. Riquelme-Caamaño**, R. Marsden, A. McDonald, “Effect of solidification of water on the structural integrity of pressurized pipes”, International Pressure Equipment Integrity Association, Banff, AB, February 17 – 20, 2015. (Oral)
- P25. **Shamez Walji**, **Adrian Lopera-Valle**, Adrian Gerlich, André McDonald, “Microstructure and composition of aluminum coatings with nano-alumina

- after friction stir processing”, *North American Cold Spray Conference*, Bromont, QC, September 16-17, 2014. (Poster)
- P24. **Natanael Melendez, Vinayak Narulkar**, Gary Fisher, *André McDonald*, “Wear rate of WC-based MMC coatings deposited via cold spraying at low pressure”, *North American Cold Spray Conference*, Bromont, QC, September 16-17, 2014. (Oral)
- P23. **Erik Sullivan, A. Palomino**, R. Marsden, A. McDonald, “Freezing of water in small diameter pipes: Equipment integrity for the ice age 2.0”, International Pressure Equipment Integrity Association, Banff, AB, February 19 – 21, 2014. (Oral)
- P22. **G. M. Nelson**, A. G. McDonald, *J. A. Nychka*, “Changing landscape coatings” for bone fixation implants, *TMS 2014 Annual Meeting and Exhibition*, San Diego, CA, February 16 – 20, 2014. (Oral)
- P21. **S. Walji**, A. Gerlich, A. McDonald, “Strengthening aluminum coatings with nano-alumina and friction stir processing”, *Alberta NanoTechnology Symposium*, University of Alberta, Edmonton, AB, February 7, 2014. (Poster)
- P20. **G. M. Nelson**, A. G. McDonald, *J. A. Nychka*, “Particle size effects on the morphology and bioactivity of flame-sprayed titanium alloy-bioactive glass composite coatings”, *TMS 2013 Annual Meeting and Exhibition*, San Antonio, TX, March 3 – 7, 2013. (Oral)
- P19. *R. Marsden, B. Bscheiden*, A. McDonald, “Equipment integrity for the ice age”, International Pressure Equipment Integrity Association, Banff, AB, February 25 – March 1, 2013. (Oral).
- P18. **G. M. Nelson**, *J. A. Nychka*, A. G. McDonald, “Metal matrix-bioactive glass composite coatings via flame spray”, *36th International Conference and Exposition on Advanced Ceramics and Composites*, Daytona Beach, FL, January 22 – 27, 2012. (Oral)
- P17. **Natanael Melendez**, Gary Fisher, André McDonald, “Development of WC-Ni-Cu MMC coatings by low-pressure cold spraying”, *North American Cold Spray Conference*, Windsor, ON, October 25-27, 2011. (Poster)
- P16. **Kevin Hodder**, Adrian Gerlich, André McDonald, “The effect of tool rotation speed on friction stir processing of cold-sprayed aluminum-alumina metal matrix composite coatings”, *North American Cold Spray Conference*, Windsor, ON, October 25-27, 2011. (Poster)

- P15. **Matt Dewar**, *André McDonald*, Adrian Gerlich, “Modeling of interfacial heating during low-pressure cold-gas dynamic spraying”, *North American Cold Spray Conference*, Windsor, ON, October 25-27, 2011. (Oral)
- P14. *Guowen Song*, Tian Tang, André McDonald, **Lidan Song**, **Dan Ding**, “A study on the effect of air gap on comfort properties for fabric systems used in protective clothing”, *8th International Meeting for Manikins and Modeling, Measurement Technology NW*, Vancouver, BC, August 22 – 26, 2010. (Oral)
- P13. **Matt Dewar**, *André McDonald*, Adrian Gerlich, “Interfacial heating during low-pressure cold-gas dynamic spraying of aluminum particles”, *2nd Canadian Cold Spray Conference*, Industrial Materials Institute – National Research Council of Canada, Boucherville, QC, June 2010. (Oral)
- P12. **Nathan Starchuk**, **Jason Luk**, André McDonald, “Thermal-sprayed deposition of yttria-stabilized zirconia for SOFCs”, *20th Canadian Materials Science Conference*, University of Alberta, Edmonton, AB, June 2008. (Oral)
- P11. *André McDonald*, S. Chandra, C. Moreau, “Application of two-color pyrometry during impact and spreading of plasma-sprayed particles”, *56th Canadian Chemical Engineering Conference*, Université de Sherbrooke, Sherbrooke, QC, October 2006. (Oral)

Competitions

- P10. *André McDonald*: “Effect of surface heating on the spreading of plasma-sprayed particles”, *Canadian Society for Mechanical Engineering (CSME) Forum*, Kananaskis, AB, 2006, 1st Place.
- P9. *André McDonald*: “Proposed implications of fluid flow in bone”, *International Congress of the American Society of Mechanical Engineers*, New York, NY, 2001, 3rd Place.

Presentations given at Industrial Seminars

- P8. *André McDonald*, “Thermal spray research activities at the University of Alberta”, Industrial Thermal Spraying for the Oil & Gas Industry Seminar, Alberta Innovates – Technology Futures, Edmonton, AB, March 20, 2014. (Oral)
- P7. **Mohammad Abdelghani**, **Nicolas Huonnic**, Pierre Mertiny, *André McDonald*, “Deposition and characterization of flame-sprayed aluminum on cured glass and basalt fiber-reinforced epoxy tubes”, Surftech Meeting,

- National Research Council Canada – L’institut des matériaux industriels, Boucherville, QC, June 2010. (Oral)
- P6. *André McDonald*, “Projects, equipment, and facilities: The thermal spray shop and lab”, Surfttech Meeting, National Research Council Canada – L’institut des matériaux industriels, Boucherville, QC, June 2009. (Oral)
- P5. **B. Jeffery**, *A. McDonald*, M. Pepler, R. S. Lima, “Bactericidal effects of HVOF-sprayed nanostructured TiO₂ on *Pseudomonas aeruginosa*”, Surfttech Meeting, National Research Council Canada – L’institut des matériaux industriels, Boucherville, QC, June 2009. (Oral)
- P4. *André McDonald*, S. Chandra, C. Moreau, M. Lamontagne, “Fragmentation and splashing of plasma-sprayed nickel on oxidized metals”, Surfttech Meeting, National Research Council Canada – L’institut des matériaux industriels, Boucherville, QC, June 2007. (Oral)
- P3. *André McDonald*, M. Lamontagne, S. Chandra, C. Moreau, “Photographing impact of plasma-sprayed particles on metal substrates”, Surfttech Meeting, National Research Council Canada – L’institut des matériaux industriels, Boucherville, QC, June 2006. (Oral)
- P2. *André McDonald*, M. Raessi, S. Chandra, J. Mostaghimi, M. Lamontagne, C. Moreau, “Fragmentation of Plasma-Sprayed Molybdenum Particles on Glass Surfaces: Analytical and Numerical Models”, Surfttech Meeting, National Research Council Canada – L’institut des matériaux industriels, Boucherville, QC, October 2005. (Oral)
- P1. *André McDonald*, S. Chandra, M. Lamontagne, C. Moreau: “Impact of plasma-sprayed particles on hot and cold glass: Experimental work”, Surfttech Meeting, National Research Council Canada – L’institut des matériaux industriels, Boucherville, QC, May 2005. (Oral)

TRAINING OF HIGHLY QUALIFIED PERSONNEL (HQP)

The training of a diverse cohort of highly qualified personnel (HQP) is paramount in my research program. Our research group is diverse in terms of academic and career level, geography, gender, language, and ideation. I have developed a holistic and organized training program in which each student, fellow, and associate, working in the core area of thermal spraying, is required to complete a two-day formal, practical training course in flame-spraying, air plasma spraying, or cold spraying. The training course covers powder preparation (selection, sieving, mixing), substrate preparation (cutting, grit blasting, thickness measurement with a manual micrometer, mounting), robot programming, deposition, and safety. The program culminates with a final two-hour assessment while the HQP work independently on their projects. Beyond the training, my team and I remain on-call over the tenure of the project for consultations in the laboratory that are specific to the equipment or to their spraying jobs. Senior HQP with sufficient experience assist junior HQP in the group. This type of practical and experiential research training ensures that all HQP, at any level, will develop technical skills that can be easily transferred to industry and will increase their job-readiness. Beyond the research platform, training of HQP is also conducted through the Experiential Learning in Innovation, Technology, and Entrepreneurship (ELITE) Program for Black Youth. The training features development of project management, leadership and negotiation, community engagement, and peer-to-peer mentorship skills. My strategy has proved successful since most of the graduate students and fellows who have completed the program are either employed in academia, private industry, or government, or are pursuing advanced degrees within four months of completion of their programs. Research associates already hold permanent employment when they work with our group.

SUPERVISORY ACTIVITIES

HQP Name (<i>Total = 12</i>)	Year	Co-Supervisor and Affiliation	Role
ELITE Program Associates			
Menna Tegene	2023 – Present	Philomina Okeke-Ihejirika (Women's and Gender Studies)	Black Entrepreneurship Knowledge Hub Program Manager
Kutay Sacak	2023	Sophie Yohani (Education)	Wellness Research Assistant
Evan Essapa	2023	Sophie Yohani (Education)	Assistant Wellness Counsellor Trainee

McKenna Gawalko (Completed)	2022	Sophie Yohani (Education)	Wellness Research Assistant
Madison Dabbs-Petty	2022 – 2023	Sophie Yohani (Education)	Wellness Counselor Trainee
Adiki Puplampu	2022 – Present	None	Communications Coordinator Trainee
Idara Effiom	2022 – Present	None	Program Coordinator
Victor Silva (Completed)	2021	None	Program Coordinator Trainee
Mary Etem Mbiatem (Completed)	2020 – 2021	Sophie Yohani (Education)	Wellness Counselor Trainee
Tom Ndezeki (Completed)	2021	None	Communications Coordinator Trainee
Fatima Karidio	2020 – Present	Sedami Gnidehou (Faculté Saint-Jean)	English-French Translator Trainee
Juan Marin Quintero (Completed)	2020 – 2021	None	Program Coordinator Trainee

HQP Name (Total = 2)	Year	Co-Supervisor and Affiliation	Research Project Title/Area
Research Associates			
Maria Ophelia Jarligo	2022 – Present	None	Thermal Spray Research Manager
Xiuyong Chen	2018 – 2019	Hua Li (Chinese Academy of Sciences)	Flame spray marine antifouling coatings based on resistive heating

HQP Name (Total = 5)	Year	Co-Supervisor and Affiliation	Research Project Title/Area
Postdoctoral Fellows			
Rakesh Nair (Completed)	2020 – 2022	None	Additive friction stir processing of cold-sprayed high entropy alloy coatings
Mohammad Parsazadeh (Completed)	2020 – 2021	James Hogan (Mechanical Engineering)	Fracture analysis of loaded carbide-based overlays and coatings

Milad Rezvani (Completed)	2020	None	Resistive heating coatings in repair solutions
Chenwei Shao (Completed)	2019 – 2021	James Hogan (Mechanical Engineering)	Mechanistic modeling of fracture and wear of metal matrix composite coatings for repair
Amirhossein Mahdavi (Completed)	2018 – 2020	James Hogan (Mechanical Engineering)	Modeling wear performance of carbide-based overlays and coatings. Internships: InnoTech Alberta and Czech Institute of Plasma Physics

HQP Name (Total = 10)	Year	Co-Supervisor and Affiliation	Research Project Title/Area
Doctoral Students			
Hadis Nezhad	2023 – Present	Ehsan Hashemi (Mechanical Engineering)	Cooperative sensing and navigation for autonomous mobile systems
Nashit Jalal	2022 – Present	Wylie Stroberg (Mechanical Engineering)	Molecular dynamic simulation and modelling of high entropy alloy coating properties
Saman Sayahlatifi	2020 – Present	James Hogan (Mechanical Engineering)	Damage modeling of fracture and wear of metal matrix composite coatings
Panteha Fallah (Completed)	2019 – 2022	Steve Yue (McGill)	Development of hybrid cold spray-based coatings
Adekunle Ogunbadejo (Completed)	2019 – 2023	Sanjeev Chandra (Toronto)	Coatings in structure damage detection protocols
Shahed Dehaghani (Completed)	2018 – 2022	Ali Dolatabadi (Concordia)	Performance of coating heating elements for airfoils
Milad Rezvani (Completed)	2016 – 2020	None (Final 2 Years with Christian Moreau, Concordia)	Modelling and testing of freezing damage in pipes; Use of coatings as heat tracers.
Amirhossein Mahdavi (Completed)	2014 – 2018	None	Coating temperature distribution in cold spraying. Internship: NRC Canada
Sayed Ashrafizadeh (Completed)	2012 – 2016	Pierre Mertiny (Mechanical Engineering)	Wear testing and modeling of coated polymeric materials

Raelvim Gonzalez (Completed)	2011 – 2015	Pierre Mertiny (Mechanical Engineering)	Development of structural health monitoring system with thermal spraying; Techno-economic analysis
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HQP Name (Total = 39)	Year	Co-Supervisor and Affiliation	Research Project Title/Area
Master's Students			
Mohammad Qazi	2023 – Present	None	High-strength high entropy alloy coatings for combined wear and heating applications
Faiyaz Bin Naser Chowdhury	2023 – Present	Wiley Stroberg (Mechanical Engineering)	Coarse-grained molecular dynamics simulations of cold-spray deposition of high-entropy alloys
Soroush Maleki (Completed)	2021 – 2023	Ehsan Hashemi (Mechanical Engineering)	Cooperative sensing and navigation for autonomous mobile systems
Sophie Barwick (Completed)	2021 – 2022	Gary Fisher (InnoTech Alberta)	Sustainable materials and manufacturing for resource sector applications
Hannaneh Manafi Farid (Completed)	2020 – 2023	James Hogan (Mechanical Engineering)	Modelling granular behavior of advanced ceramics under dynamic loading
Saddam Hossain (Completed)	2020 – 2023	Jolanta-Ewa Sapielha (Polytechnique)	Development of advanced duplex coating systems
Sanhita Pal (Completed)	2020 – 2022	None	Development of ceramic based coating heating elements
Jackson Kutzner (Withdrawn)	2020 – 2021	None	Development of an in-fire surface fuel consumption instrument
Wania Jibran (Completed)	2019 – 2021	Priti Wanjara (National Research Council)	Development of hybrid cold spray-friction stir processed surfaces
Henriette Stainer (Completed)	2019 – 2020	Gary Fisher (InnoTech Alberta)	Tungsten carbide-based coatings using recycled powders
Manuel Machulla (Completed)	Fall 2019	Stefan Scheitz (Fraunhofer IWS)	Heating coating sensors for airfoil boundary layer separation

Sudarshan Devaraj (Completed)	2019 – 2020	Sanjeev Chandra (Toronto)	Spraying and deposition on treated polymer substrate surfaces
Arian Enayat (Completed)	2019 – 2020	Mohtada Sadrzadeh (Mechanical Engineering)	Development of coatings-based distillation membrane systems
Jacob John (Completed)	2018 – 2020	Hossein Rouhani (Mechanical Engineering)	Intelligent control feedback of resistive heating coatings
Xuerui (Jerry) Han (Completed)	2018 – 2020	Sanjeev Chandra (Toronto)	Coating-based waste heat recovery heat exchangers
Morvarid Mohammadian (Completed)	2018 – 2020	Christian Moreau (Concordia)	Materials comparison of SPS and flame-sprayed coating heating elements
Matthew Young (Withdrawn)	2018 – 2018	None	Development of ceramic coating heating elements
Bobby Anand (Completed)	2017 – 2019	Sanjeev Chandra (Toronto)	Spraying and deposition on treated polymer substrates
Eder Coronel (Completed)	2017 – 2019	None	Analysis of performance of wildfire chemicals by using custom devices
Guriqbal Singh (Completed)	2017 – 2019	James Hogan (Mechanical Engineering)	Mechanical response modelling of cold-sprayed metal matrix composite coatings
Rizwan Al-Rahman (Completed)	2016 – 2020 (Part-time)	Pierre Mertiny (Mechanical Engineering)	Study of impact of coverage level of wildfire chemicals on performance
Razim Refai (Completed)	2015 – 2017	None	Heat transfer and impact of cold-sprayed bulk metallic glasses
Roy Lee (Completed)	2015 – 2016	Gary Fisher (AITF)	Cold-sprayed B ₄ C-based metal matrix composite coatings for oil/gas industry
Hossein Lotfizadeh (Completed)	2014 – 2016	Amit Kumar (Mechanical Engineering)	Techno-economic Analysis of Combo Systems for Residential Applications
Joseph Der (Completed)	2014 – 2016	Larry Kostiuk (Mechanical Engineering)	Analysis of Combo Systems for Residential Applications
Pablo Riquelme Caamaño (Completed)	Fall 2014	None	Solidification of liquids in pipes

Shammawi Anderson (Completed)	2014 – 2015	None	Quantification of performance of wildland fire chemicals
Usama Akram (Completed)	2014 – 2017	Pierre Mertiny (Mechanical Engineering)	Development of wear resistant polymer-filler materials
Adrian Lopera (Completed)	2013 – 2015	None	Analysis of Joule heating of polymers with metal coatings
Erik Sullivan (Completed)	2012 – 2014	None	Quantification of heat transfer from wildland fires to building structures
Vinayak Narulkar (Completed)	2011 – 2013	None	Wear performance of cold-sprayed metal matrix composite coatings
Greg Nelson (Completed)	2011 – 2013	John Nychka (Chemical and Materials Engg.)	Titanium alloy-bioglass composite coatings for dental implants
Natanael Melendez (Completed)	2011 – 2013	None	Cold-sprayed nanostructured WC-based metal matrix composite coatings for oil/gas applications
David Therrien (Completed)	2010 – 2012	Pierre Mertiny (Mechanical Engineering)	Development of a metal-polymer composite heating system
Joshua Monds (M.Eng.) (Completed)	2011 – 2012	None	Heat conduction model to determine total heat fluxes from fires
Daniel Booy (Completed)	2009 – 2011	Mark Ackerman (MEC E)	Temperature distribution around finite earth bore-holes
Linlin Duan (Completed)	2008 – 2011	None	Thermal diffusivity of thermal-sprayed coatings
Navid Pourjavad (Completed)	2008 – 2011	None	Application of thermal-sprayed nanostructured titania in oil sand pipes and equipment
Shishir Rao (Completed)	2008 – 2011	None	Nanostructured YSZ-based thermal barrier coatings for recovery boilers

HQP Name (Total = 43)	Year	Co-Supervisor and Affiliation	Research Project Title/Area
Undergraduates			
Peter Menghesha	2022 – Present	None	Assessment of high entropy alloy coatings

Sean Ngan (Completed)	2022	None	Field testing of coating-based waste heat recovery heat exchangers
Severino Asumu (Completed)	2021	None	High school research trainee – Coatings in damage detection
Anthony Kenyi (Completed)	2020 – 2023	None	High school research trainee
Mehtab Malik (Completed)	2019 – 2020	None	Fabrication of resistive heating coatings for wind turbines
Yujie Lin (Completed)	Summer 2019	Hossein Rouhani (Mechanical Engineering)	Control of heating performance of thermal-sprayed coatings
Sanhita Pal (Completed)	Summer 2019	Mohtada Sadrzadeh (Mechanical Engineering)	Development of thermal-sprayed nanocomposite membranes for wastewater treatment
Akshay Krishnamoorthy (Completed)	Summer 2019	Jocelyn Veilleux (Sherbrooke)	Fabrication of advanced wear resistant hybrid graphene-based coatings for wind turbine blades
Kingsley Ngaokere (Completed)	2018 – 2019	None	Metallization of polymeric structures in hybrid thermal spray-laser cladding
Alan Espinos Chávez (Completed)	Summer 2018	Cagri Ayranci (Mechanical Engineering)	Wear resistant additive manufactured polymer structures for wind turbines
Guriqbal Singh (Completed)	Summer 2016	None	Pressure and temperature measurements of freezing pipes
Harpreet Singh (Completed)	2015 – 2016	None	Use of flame-sprayed coatings in heat tracing for pipes
Satheshkumar Mohankumar (Completed)	Summer 2015	None	Pressure testing and modelling of pipes during liquid freezing and bursting
Shamez Walji (Completed)	2013 - 2015	None	Cold-sprayed + friction stirred Al-Al ₂ O ₃ metal matrix composite coatings based on nano-Al ₂ O ₃
Razim Refai (Completed)	Summer 2014	None	Low-cost heat flux sensors for use in wildland fire events
Alberto Palomino (Completed)	2013 - 2014	Amit Kumar (Mechanical Engineering)	Techno-economic analysis for emissions reduction of Combo residential heating systems
Yibo Zhang (Completed)	Summer 2013	Kajsa Duke (Mechanical Engineering)	Optimization of Ti-alloy/bioglass MMC coatings

Kevin Hodder (Completed)	2011 - 2013	Adrian Gerlich (University of Waterloo)	Cold-sprayed + friction stirred Al-Al ₂ O ₃ metal matrix composite coatings
Carlos Rodriguez (Completed)	Summer 2013	None	Resistive heating of polymers
Kurtis Broda (Completed)	Fall 2012	None	Resistive heating of polymer composite plates with metal coatings
Arunava Majumdar (Completed)	Summer, Fall 2012	None	Model to estimate surface tension of high temperature refractory materials
Erik Sullivan (Completed)	Summer 2012	None	Quantification of heat transfer from wildland fires to buildings
Bo Yang (Completed)	Summer 2012	None	Assessment of energy consumption in a building with geothermal and solar heating
Henry Boyer (Completed)	2011 - 2012	Pierre Mertiny (Mechanical Engineering)	Fabrication of a metal-polymer structural health monitoring system by flame spraying
Alyssa Frederick (Completed)	2011 - 2012	None	<i>E</i> and hardness of nanostructured YSZ-based TBC's exposed to molten salts
Michael Leung (Completed)	2011	None	Nanostructured YSZ-based thermal barrier coatings exposed to molten salts
Mark Dumontier (Completed)	Summer 2011	Jeff Fuller (Alberta Health Services)	Bactericidal activity of cold-sprayed copper oxide-titania-aluminum coatings
Erick Chen (Completed)	Summer 2011	Pierre Mertiny (Mechanical Engineering)	Preliminary development of a conductive polymer liner
Brett Berger (Completed)	2010 - 2011	Adrian Gerlich (University of Waterloo)	Preliminary study of cold-sprayed + friction stirred Al-Al ₂ O ₃ metal matrix composites
Natanael Melendez (Completed)	2010 – 2011	Daniel Mack (IER - Germany)	Thermal cycling of nanostructured yttria-stabilized zirconia
Greg Nelson (Completed)	2009 – 2011	John Nychka (Materials Engg.)	Titanium alloy-bioglass coatings for dental implants
Mohammad Abdelghani (Completed)	2009 – 2010	Pierre Mertiny (Mechanical Engineering)	Fabrication of a metal-polymer structural health monitoring system by flame spraying
Nikolai Kummer (Completed)	2009 – 2010	Pierre Mertiny (Mechanical Engg.)	Metal/polymer composite heating system

Nathan George (Completed)	2009 – 2010	None	Photocatalytic bactericidal activity of flame-sprayed nanostructured titania
Michael Mahon (Completed)	Summer 2009	None	Improvement of bactericidal activity of flame-sprayed nanostructured titania
Nicolas Huonnic (Completed)	Summer 2009	Pierre Mertiny (Mechanical Engineering)	Fabrication of a metal-polymer structural health monitoring system by flame spraying
Matthew Dewar (Completed)	2009 – 2010	Adrian Gerlich (University of Waterloo)	Characterization of coating-substrate interface in cold spraying
Mandy Wan (Completed)	Fall 2008	Rogério Lima (NRC-IMI)	Photocatalytic bactericidal activity of roughened thermal-sprayed nanostructured titania
Bradley Jeffery (Completed)	2008 – 2009	Mark Peppler Rogério Lima (NRC-IMI)	Photocatalytic bactericidal activity of thermal-sprayed nanostructured titania
David Poyaoan (Completed)	2008 – 2009	Weixing Chen (Chemical and Materials Engg.)	Study of the Properties of a Binder Alloy Based on Fe-Al
Linh Lu (Completed)	Summer 2008	Mark Peppler (Medical Micro.)	Bactericidal activity of thermal-sprayed nanostructured titania
Nathan Starchuk (Completed)	2007 – 2009	None	Various projects in SOFCs, nanostructured ceramic coatings
Jason Luk (Completed)	2007 – 2008	Jingli Luo (Chemical Engg.)	Thermal-sprayed YSZ for use as electrolytes in SOFCs

STUDENT AWARDS AND HONORS FOR WORK CONDUCTED WITH DR. ANDRÉ MCDONALD

HQP Name	Awards and Honors (Total = 79)	Organization
Doctoral Students		
Saman Sayahlatifi	Provost's Entrance Award, RR Gilpin Memorial Scholarship, Shell Enhanced Learning Fund Travel Stipend, Sadler Graduate Scholarship in Mechanical Engineering	University of Alberta
	Alberta Innovates Graduate Award	Alberta Innovates

	Alberta Graduate Excellence Scholarship	University of Alberta
Shahed Taghian Dehaghani	Alberta Innovates Graduate Award	Alberta Innovates
	International Thermal Spray Association Graduate Scholarship (2020)	American Welding Society
	Research Poster Competition, 1 st Place	2019 Faculty of Engineering Graduate Research Symposium
	Shell Canada Enhanced Learning Fund Travel Stipend: One for Individual and one for Group for MEGSA	University of Alberta
Amirhossein Mahdavi	Shell Enhanced Learning Fund Travel Stipend, Graduate Student Award, J Gordin Kaplan Graduate Student Award	University of Alberta
Milad Rezvani-Rad	Doctoral Recruitment Scholarship, RR Gilpin Memorial Scholarship, Academic Travel Award, Graduate Student Association Graduate Student Research Assistant Award, J Gordin Kaplan Graduate Student Award, Academic Travel Grant, Shell Enhanced Learning Fund (SELF) award, Sadler Graduate Scholarship in Mechanical Engineering, ASME OMAE Calgary Chapter Graduate Scholarship in Engineering	University of Alberta
	International Thermal Spray Association	American Welding Society

	Graduate Scholarship	
	Student Board Member (2018 – 2020)	ASM Thermal Spray Society
	2019 – 2020 Scholarship Award	Society for Protective Coatings
Raelvim Gonzalez	Conference Travel Stipend	University of Alberta
Sayed Ashrafizadeh	Provost Entrance Award, Sadler Graduate Scholarship, Mary Louise Imrie Graduate Student Award, Donald Lougheed Engineering Graduate Scholarship	University of Alberta
	International Thermal Spray Association Graduate Scholarship (2015)	American Welding Society
Master's Students		
Wania Jibrán	Best Materials Student Paper (2 nd Place)	Conference of Metallurgists 2021
Soroush Maleki	Entrance Award	University of Alberta
Bobby Anand	Green Surface Engineering for Advanced Manufacturing Network Student research poster prize	Concordia University and the Green SEAM Network
Morvarid Bajgiran	Green Surface Engineering for Advanced Manufacturing Network Student research poster prize	Concordia University and the Green SEAM Network
	International Thermal Spray Association Graduate Scholarship	American Welding Society (2019)
Guriqbal Singh	MITACS Globalink Fellowship	MITACS
	Academic Travel Grant, Mary Louise Imrie Graduate Student Award	University of Alberta

Hossein Lotfizadeh	FGSR Travel Award	University of Alberta
Razim Refai	Master's Recruitment Scholarship, J. Gordin Kaplan Graduate Student Award, Graduate Student Award	University of Alberta
	MITACS Globalink Fellowship	MITACS
Joseph Der	Queen Elizabeth II Award, Profiling Alberta's Graduate Student Award	University of Alberta
Roy Lee	Queen Elizabeth II Award, Walter H. Johns Graduate Fellowship, Mary Louise Imrie Graduate Student Award	University of Alberta
	Canada Graduate Scholarship – Master's	NSERC
	Third Place – Young Professionals Presentation Competition	2016 North American Cold Spray Conference
Adrian Lopera-Valle	Best Poster in the Energy and Environment Section (2014)	Graduate Student Research Symposium, University of Alberta
	International Thermal Spray Association Graduate Scholarship	American Welding Society (2014)
Erik Sullivan	Undergraduate Student Research Award (USRA)	NSERC
	Queen Elizabeth II Award (2012, 2013)	University of Alberta
	Conference Travel Stipend	University of Alberta
	Conference Travel Stipend	CANCAM
	Graduate Student Scholarship	Alberta Advanced Education
Greg Nelson	USRA, Canada Graduate Scholarship – Master's	NSERC
	Best Poster in Biomedical Engineering Section (2012, 2013)	Graduate Student Research Symposium, University of Alberta
	Queen Elizabeth II Award	University of Alberta

	Graduate Student Scholarship	Alberta Advanced Education
Natanael Melendez	CGS-M	NSERC
	Graduate Student Scholarship	Alberta Advanced Education
Joshua Monds	Churchill Scholarship – Ph.D.	University of Cambridge
Daniel Booy	Queen Elizabeth II Award, Sadler Graduate Scholarship in Mechanical Engineering	University of Alberta
	CGS-M	NSERC
Undergraduate Students		
Peter Menghesha	Schulich Leader Scholarship	Schulich Foundation
Mehtab Malik	Undergraduate Research Opportunities Program Scholarship	RWTH Aachen University
	Undergraduate Student Research Award (USRA)	NSERC
Sean Ngan	Undergraduate Student Research Award (USRA)	NSERC
Shamez Walji	Peter Lougheed Leadership School	University of Alberta
Alberto Palomino	USRA	NSERC
Bo Yang	Student Technical Presentation Competition, 2 nd Place	The Institution of Engineering and Technology
Kevin Hodder	USRA	NSERC
	Student Research Poster Competition, 2 nd Place	2014 North American Cold Spray Conference
Henry Boyer	Best in Track Technical Paper Award for Manufacturing	Composites Conference
	Queen Elizabeth II Award	University of Alberta
David Poyaoan	Undergraduate Student Research Award (USRA)	NSERC
Nathan Starchuk	USRA, Canada Graduate Scholarship – Master's (CGS-M)	NSERC

EXTERNAL ACADEMIC TENURE, PROMOTION, AND RENEWAL EVALUATIONS

- Dr. Nadi Braidy, Université de Sherbrooke, Sherbrooke, Québec. Date: October 14, 2019. (Case for Renewal of Canada Research Chair, Tier 2)
- Dr. Bernadette Quémérais, University of Alberta, Edmonton, Alberta. Date: August 29, 2018. (Case for Tenure)
- Dr. Timothy Eden, The Pennsylvania State University, University Park, Pennsylvania, USA. Date: October 3, 2017. (Case for Promotion)

THESIS REVIEW AND EXAMINATION

External Doctoral Final Examinations

- Musharaf Abbas, *Microstructural characterization of high-velocity oxy-fuel (HVOF) sprayed nickel coatings*, Ph.D. Final Thesis, The University of New South Wales, Sydney, New South Wales, 2021, Date: May 7, 2021, External Examiner.
- Rohan Chakrabarty, *Numerical modeling of metal-matrix composite coating in cold gas dynamic spray process*, Ph.D. Final Thesis, McGill University, Montréal, Québec, 2019, Date: September 20, 2019, External Examiner.
- Michael Laberge, *Modeling the tribomechanical properties of multifunctional thin film coatings*, Ph.D. Final Thesis, École Polytechnique de Montréal, Montréal, Québec, 2019, Date: August 29, 2019, External Examiner.
- Xuan Gao, *Drop impact in spray cooling*, Ph.D. Final Thesis, University of British Columbia (Okanagan), Kelowna, British Columbia, 2017, Date: September 29, 2017, External Examiner.
- Yongang Zhang, *Understanding the formation mechanism of plasma-sprayed Ni and Ni20Cr splats through experimental and numerical study*, Ph.D. Final Thesis, University of Auckland, Auckland, New Zealand, 2017, Date: August 11, 2017, External Examiner.
- Ruben Fernandez Urrutia, *Consolidation of cermet coatings by cold gas dynamic spraying*, Ph.D. Final Thesis, University of Ottawa, Ottawa, Canada, 2017, Date: May 9, 2017, External Examiner.
- Hanqing Che, *Cold spraying onto carbon fibre reinforced polymer for lightning strike protection*, Ph.D. Final Thesis, McGill University, Montréal, Canada, 2016, Date: June 30, 2016, External Examiner.

- Shri.S Karthikeyan, *Experimental investigation on characterization and evaluation of electroless nickel phosphorus composite coating*, Ph.D. Final Thesis, Indian Institute of Technology, Madras, India, 2016, Date: May 17, 2016, External Examiner.
- Sampath Kumar, *Development and characterisation of nanostructured TiAlN, AlCrN, TiAlN/AlCrN, AlCrN/TiAlN and TiNbN-coated carbide cutting tools*, Ph.D. Final Thesis, Anna University, Chennai, India, 2015, Date: March 30, 2015, External Examiner.
- Mohammad Karimi Esfahani, *Advancement of shockwave induced spraying process through the study of gas and particle flow fields*, Ph.D. Final Thesis, University of Windsor, Windsor, Ontario, Canada, 2012, Date: December 10, 2012, External Examiner.
- Dina Goldbaum, *Micromechanical testing of cold-sprayed Ti splats and coatings*, Ph.D. Final Thesis, McGill University, Montréal, Québec, Canada, 2012, Date: May 3, 2012, External Examiner.

Doctoral Final Examinations of Supervised Students

- Adekunle Ogunbadejo, *Thermal sprayed coating as a structural health monitoring sensor for engineering structures*, Ph.D. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2023, Doctoral Final Oral Exam Date: June 8, 2023, Committee Examiner and Supervisor.
- Shahed Taghian Dehaghani, *Thermally sprayed coatings as resistive heating systems for wind turbine blades and airfoils*, Ph.D. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2023, Doctoral Final Oral Exam Date: January 12, 2023, Committee Examiner and Supervisor.
- Panteha Fallah, *Metallization of carbon fiber-reinforced polymers (CFRPs) using cold spray and electrochemical processes*, Ph.D. Final Thesis, McGill University, Montréal, Québec, Canada, 2022, Doctoral Final Oral Exam Date: December 2, 2022, Committee Examiner and Supervisor.
- Milad Rezvani Rad, *Application of thermally-sprayed coatings as heat tracers for carbon steel pipes to mitigate the effect of ice accumulation and freezing damage*, Ph.D. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2020, Doctoral Final Oral Exam Date: January 14, 2020, Committee Examiner and Supervisor.
- Amirhossein Mahdavi, *Semi-empirical analytical determination of the transient thermal evolution within a substrate during low-pressure cold spraying*, Ph.D. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2018,

Doctoral Final Oral Exam Date: May 23, 2018, Committee Examiner and Supervisor.

- Sayed Hossein Ashrafizadeh, *Evaluation and analysis of the erosive performance of flame spray coated polyurethane*, Ph.D. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2016, Doctoral Final Oral Exam Date: July 28, 2016, Committee Examiner and Supervisor.
- Raelvim Gonzalez, *Flame-sprayed Al-12Si coatings as damage detection sensors for fibre-reinforced polymer composites*, Ph.D. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2015, Doctoral Final Oral Exam Date: September 21, 2015, Committee Examiner and Supervisor.

Candidacy Examinations of Supervised Students

- Adekunle Ogunbadejo, *Development of thermally-sprayed coating system as damage detection sensor for engineering structures*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2021, Candidacy Exam Date: January 19, 2021, Committee Examiner and Supervisor.
- Shahed Taghian Dehaghani, *Thermally sprayed metal matrix composite coatings as resistive heating systems for wind turbine blades and airfoils*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2020, Candidacy Exam Date: December 2, 2020, Committee Examiner and Supervisor.
- Milad Rezvani Rad, *Development of a thermal-sprayed coating system to mitigate ice accumulation and freezing damage in carbon steel pipes*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2018, Candidacy Exam Date: June 27, 2018, Committee Examiner and Supervisor.
- Amirhossein Mahdavi, *A semi-empirical analytical and numerical model development to predict the temperature distribution within the substrate and the coating during the cold spray deposition process*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2016, Candidacy Exam Date: November 18, 2016, Committee Examiner and Supervisor.
- Sayed Hossein Ashrafizadeh, *Evaluation and analysis of the wear performance of flame spray-coated PU liners*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2014, Candidacy Exam Date: October 27, 2014, Committee Examiner and Supervisor.
- Raelvim Gonzalez, *Structural health monitoring of fiber-reinforced polymer composites using flame-sprayed coatings for damage detection in mission critical applications*, Ph.D. candidacy exam, University of Alberta, Edmonton,

Alberta, Canada, 2013, Candidacy Exam Date: December 12, 2013, Committee Examiner and supervisor.

Masters Final Examinations of Supervised Students

- Saddam Hossain, *Advanced Duplex Coatings for Wear and Corrosion*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2023, Masters Final Oral Exam Date: August 21, 2023, Committee Examiner and Supervisor.
- Soroush Maleki, *Visual Navigation for Autonomous Material Deposition System Using Remote Sensing*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2023, Masters Final Oral Exam Date: August 17, 2023, Committee Examiner and Supervisor.
- Hannaneh Manafi Farid, *A Numerical Study of Effective Parameters for the Retention of a Boron Carbide Particle in an Aluminum Substrate including a Pore in Al/B₄C Reinforced Particle Aluminum Matrix Composite Coatings*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2023, Masters Final Oral Exam Date: April 24, 2023, Committee Examiner and Supervisor.
- Sanhita Pal, *Development of Multi-Functional Flame Sprayed High Entropy Alloy (HEA) Coatings*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2022, Masters Final Oral Exam Date: August 22, 2022, Committee Examiner and Supervisor.
- Wania Jibran, *Localized Surface Modification of High Strength Aluminum Alloys using Cold Spraying and Friction Stir Processing*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2021, Masters Final Oral Exam Date: June 24, 2021, Committee Examiner and Supervisor.
- Arian Enayat, *Development of Joule Heating Coating Layers for Membrane Distillation Process*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2020, Masters Final Oral Exam Date: November 30, 2020, Committee Examiner and Supervisor.
- Sudarshan Devaraj, *Fabrication of Lightweight Polymer Composite Materials Using Electric Wire-Arc Spraying Process*, M.Sc. Final Thesis, University of Toronto, Toronto, Ontario, Canada, 2020, Masters Final Oral Exam Date: August 26, 2020, Committee Examiner and Supervisor.
- Jerry Han, *Development of Thermal-sprayed Tube and Mesh Heat Exchangers for Waste Heat Recovery*, M.Sc. Final Thesis, University of

Alberta, Edmonton, Alberta, Canada, 2020, Masters Final Oral Exam Date: August 25, 2020, Committee Examiner and Supervisor

- Jacob John, *Temperature Control System Design for Flame-Sprayed Coating Based Heating Systems*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2020, Masters Final Oral Exam Date: May 14, 2020, Committee Examiner and Supervisor.
- Mohammad Rizwan Al-Rahman, *Effect of dispersion process on the thermal and wear properties of graphene nano-platelet filler modified polyurethane*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2020, Masters Final Oral Exam Date: January 23, 2020, Committee Examiner and Supervisor.
- Eder Villa Coronel, *Performance evaluation of siding materials subjected to radiant heat loads: Structural protection in the wildland urban interface*, University of Alberta, Edmonton, Alberta, Canada, 2019, Master's Final Oral Exam Date: August 27, 2019, Committee Examiner and Supervisor.
- Guriqbal Munday Singh, *On the mechanical properties and failure of low-pressure cold-sprayed tungsten carbide-nickel metal matrix composite coatings*, University of Alberta, Edmonton, Alberta, Canada, 2019, Master's Final Oral Exam Date: August 27, 2019, Committee Examiner and Supervisor.
- Usama Akram, *Graphite nanoplatelet (GNP) filler-modified polyurethane (PU) nanocomposites for thermal transport enhancement*, University of Alberta, Edmonton, Alberta, Canada, 2017, Master's Final Oral Exam Date: September 20, 2017, Committee Examiner and Supervisor.
- Razim Refai, *Quantification of performance of wildfire chemicals using a custom-built sensible enthalpy rise calorimeter*, University of Alberta, Edmonton, Alberta, Canada, 2017, Master's Final Oral Exam Date: May 25, 2017, Committee Examiner and Supervisor.
- Yik Tung Roy Lee, *Development of cold-sprayed boron carbide metal matrix composite coatings for wear resistance applications*, University of Alberta, Edmonton, Alberta, Canada, 2016, Master's Final Oral Exam Date: December 9, 2016, Committee Examiner and Supervisor.
- Hossein Lotfizadeh, *Techno-economic analysis of combined solar water heating systems in cold climate regions*, University of Alberta, Edmonton, Alberta, Canada, 2016, Master's Final Oral Exam Date: August 15, 2016, Committee Examiner and Supervisor.

- Joseph Der, *Performance of a combination heating system for residential applications*, University of Alberta, Edmonton, Alberta, Canada, 2016, Master's Final Oral Exam Date: July 18, 2016, Committee Examiner and Supervisor.
- Shammawi Anderson, *Quantification of performance of wildland fire chemicals using custom-built heat flux sensors*, University of Alberta, Edmonton, Alberta, Canada, 2015, Master's Final Oral Exam Date: December 4, 2015, Committee Examiner and Supervisor.
- Adrian Lopera-Valle, *Metallic flame-sprayed coatings as anti-icing and de-icing systems for wind turbines*, University of Alberta, Edmonton, Alberta, Canada, 2015, Master's Final Oral Exam Date: July 21, 2015, Committee Examiner and Supervisor.
- Erik Sullivan, *Measuring energy transfer from wildland forest fires*, University of Alberta, Edmonton, Alberta, Canada, 2014, Master's Final Oral Exam Date: March 11, 2014, Committee Examiner and Supervisor.
- Vinayak Narulkar, *Friction stir processing (FSP) of thermal-sprayed tungsten carbide-nickel (WC-Ni) MMC coating*, University of Alberta, Edmonton, Alberta, Canada, 2013, Master's Final Oral Exam Date: September 24, 2013, Committee Examiner and Supervisor.
- Greg Nelson, *Changing landscape coatings for bioactive bone fixation implants via flame spray deposition*, University of Alberta, Edmonton, Alberta, Canada, 2013, Master's Final Oral Exam Date: July 25, 2013, Committee Examiner and Co-supervisor.
- Natanael Melendez, *Fabrication of WC-based metal matrix composite coatings via low-pressure cold spraying for enhanced surface properties*, University of Alberta, Edmonton, Alberta, Canada, 2013, Master's Final Oral Exam Date: July 8, 2013, Committee Examiner and Supervisor.
- David Therrien, *Heat transfer analysis of flame-sprayed metal-polymer composite structures*, University of Alberta, Edmonton, Alberta, Canada, 2012, Master's Final Oral Exam Date: November 19, 2012, Committee Examiner and Supervisor.
- Linlin Duan, *Thermal diffusivity measurement of thin thermal-sprayed coatings*, University of Alberta, Edmonton, Alberta, Canada, 2011, Master's Final Oral Exam Date: September 6, 2011, Committee Examiner and Supervisor.
- Daniel Booy, *Investigation of solar collector ground energy recharge around vertical borehole heat exchangers in cold-climate conditions*, University of

Alberta, Edmonton, Alberta, Canada, 2011, Master's Final Oral Exam Date: June 2, 2011, Committee Examiner and Co-supervisor.

- Navid Pourjavad, *Wear behavior of flame-sprayed nanostructured titania coatings*, University of Alberta, Edmonton, Alberta, Canada, 2011, Master's Final Oral Exam Date: April 18, 2011, Committee Examiner and Supervisor.
- Shishir Rao, *Nanostructured environmental barrier coatings for corrosion resistance in recovery boilers*, University of Alberta, Edmonton, Alberta, Canada, 2011, Master's Final Oral Exam Date: April 7, 2011, Committee Examiner and Supervisor.

University of Alberta Candidacy Examinations

- Dong Zhang, *High-Performance Carbide Design and Discovery by First-Principle and Experimental Methods*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2020, Candidacy Exam Date: November 19, 2020, Committee Examiner.
- Kashif Javed, *Study of the hydro-transport of agricultural biomass residue in vertical and inclined pipelines*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2019, Candidacy Exam Date: September 23, 2019, Committee Chair.
- Brendan Koch, *Fracture and failure mechanics of advanced ceramics*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2019, Candidacy Exam Date: May 6, 2019, Committee Examiner and Supervisory Committee Member.
- Aminallah Pourasghar, *Dual phase lag heat conduction and its effect on non-linear vibration of size dependent micro-beam*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2018, Candidacy Exam Date: September 6, 2018, Committee Chair.
- Hamidreza Ahmadimoghaddamseighalani, *A finite element analysis framework for the multi-physics modeling of binary and ternary filler modified solids*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2017, Candidacy Exam Date: October 25, 2017, Committee Chair.
- Farzan Gholamreza, *Performance of thermal protective clothing upon hot liquid splash*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2015, Candidacy Exam Date: December 7, 2015, Committee Examiner.

- Bashar Younes, *A framework for ageing invoices assessment utilizing lean manufacturing and evolutionary optimization*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2012, Candidacy Exam Date: June 15, 2012, Committee Examiner.
- Amirhossein Biabangard Oskouyi, *Characterization and modeling of nano-platelet based conductive composites for structural health monitoring applications*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2012, Candidacy Exam Date: May 8, 2012, Committee Chair and Examiner.
- Miguel Balzan, *Experimental study about bubbly flows and the flow inside an effervescent atomizer*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2012, Candidacy Exam Date: January 23, 2012, Committee Chair.
- Daniel Romanyk, *The modeling of the midpalatal suture during maxillary expansion and the design of a new appliance*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2011, Candidacy Exam Date: July 6, 2011, Committee Chair.
- Ted Fill, *Periodontal ligament orthodontic simulator adaptor: Experimental and analytical characterization, adaptor design, and development*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2011, Candidacy Exam Date: April 15, 2011, Committee Chair.
- Guihua Zhou, *Cathode catalysts for proton conducting solid oxide fuel cell reactors for conversion of ethane to ethylene*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2011, Candidacy Exam Date: January 26, 2011, Committee Examiner.
- Hossein Izadi, *Fabrication of metal matrix composites by friction stir processing to achieve improved mechanical properties*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2010, Candidacy Exam Date: October 20, 2010, Committee Examiner.
- Xiaoxiong Luo, *Electrically conductive polymer nanocomposites*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2010, Candidacy Exam Date: April 13, 2010, Committee Examiner.
- Reinaldo Chung, *Comprehensive study of the abrasive wear and slurry erosion behavior of an expanded system of high chromium cast iron and modification for enhanced wear resistance*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2009, Candidacy Exam Date: November 27, 2009, Committee Examiner.

- Hao Li, *Carburization behaviour of oxide spinel as protective coatings in hydrocarbon cracking environments*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2009, Candidacy Exam Date: May 25, 2009, Committee Examiner.
- David Allen Ludwick, *The effect of information and computing technology on health care*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2008, Candidacy Exam Date: September 17, 2008, Committee Chair.
- Mohammad Azizur Rahman, *Two-phase flow and microscale droplet atomization of coker feed nozzles*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2008, Candidacy Exam Date: May 15, 2008, Committee Chair and Examiner.
- Nima Shaigan, *Protective-conductive coatings for ferritic stainless steel interconnects used in solid oxide fuel cells*, Ph.D. candidacy exam, University of Alberta, Edmonton, Alberta, Canada, 2007, Candidacy Exam Date: November 21, 2007, Committee Examiner.

University of Alberta Final Examinations

- Amy Huynh, *Parametric analysis for the thermal evaluation of masonry walls*, University of Alberta, Edmonton, Alberta, Canada, 2021, Master's Final Oral Exam Date: August 27, 2021, Committee Examiner.
- Brendan Koch, *On transforming experimental observations of macroscopic mechanical responses into theoretical local microscopic failure responses in advanced ceramics*, Ph.D. Final Exam, University of Alberta, Edmonton, Alberta, Canada, 2021, PhD Final Oral Exam Date: August 16, 2021, Committee Examiner and Supervisory Committee Member.
- Sadaf Noamani, *Development of a Self-sustained Model to Predict the Water Desalination Performance of the Membrane Distillation Process*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2020, Masters Final Oral Exam Date: October 14, 2020, Committee Examiner.
- Shubham Goswami, *Response and Recovery of Turbulent Pipe Flow Past Square Bar Roughness Elements*, M.Sc. Final Thesis, University of Alberta, Edmonton, Alberta, Canada, 2020, Masters Final Oral Exam Date: September 4, 2020, Committee Chair.
- Spandan Thaker, *Development of levelized cost of electricity, life cycle greenhouse gas emissions and net energy ratio of solar-based thermal energy storage systems*, University of Alberta, Edmonton, Alberta, Canada,

2018, Master's Final Oral Exam Date: May 1, 2018, Committee Examiner and Chair.

- Md. Ashker Ibney Rashid, *An investigation of the pressure loss characteristics for highly viscous fluid flow through narrow slots*, University of Alberta, Edmonton, Alberta, Canada, 2016, Master's Final Oral Exam Date: January 7, 2016, Committee Examiner.
- Mohammad Mahmoudi, *Investigation of the velocity field of jets in counter-flow in the vicinity of a solid wall*, University of Alberta, Edmonton, Alberta, Canada, 2015, Ph.D. Final Thesis Exam, Date: April 13, 2015, Committee Chair.
- Tijana Durdevic, *Implementation, integration and auditing of ISO 14001 management systems in Canada*, University of Alberta, Edmonton, Alberta, Canada, 2013, Master's Final Oral Exam Date: October 30, 2013, Committee Chair.
- Bashar Younes, *A framework invoice management in construction*, University of Alberta, Edmonton, Alberta, Canada, 2013, Doctoral Final Oral Exam Date: July 16, 2013, Committee Examiner.
- Jerry Joseph, *Quantification of transport properties in microfluidic porous media*, University of Alberta, Edmonton, Alberta, Canada, 2012, Master's Final Oral Exam Date: September 10, 2012, Committee Chair and Examiner.
- Hao Li, *Stability of Mn-Cr-O spinel and chromium oxide in high temperature ethylene cracking environments*, University of Alberta, Edmonton, Alberta, Canada, 2011, Doctoral Final Oral Exam Date: September 27, 2011, Committee Examiner.
- Mohammad Azizur Rahman, *Scaling of effervescent atomization and industrial two-phase flow*, University of Alberta, Edmonton, Alberta, Canada, 2010, Doctoral Final Oral Exam Date: December 13, 2010, Committee Chair and Examiner.
- Jadid Samad, *Oxidation synthesis and reaction analysis of a new arranged catalyst support*, University of Alberta, Edmonton, Alberta, Canada, 2010, Master's Final Oral Exam Date: August 12, 2010, Committee Examiner.
- Cagri Ayranci, *Predicting the elastic properties of two-dimensionally braided tubular composite structures towards the design of braid-reinforced polymer medical catheters*, University of Alberta, Edmonton, Alberta, Canada, 2010, Doctoral Final Oral Exam Date: April 29, 2010, Committee Chair.

- Dan Ding, *Characterizing the performance of a single-layer fabric system through a heat and mass transfer model*, University of Alberta, Edmonton, Alberta, Canada, 2009, Master's Final Oral Exam Date: December 1, 2009, Committee Examiner.
- Padet Khosathit, *Simulation of the Molecular Interactions for Microcantilever Sensor*, University of Alberta, Edmonton, Alberta, Canada, 2009, Master's Final Oral Exam Date: September 11, 2009, Committee Chair and Examiner.
- Jonathan Fok, *Use of Physiologically based Finite Element Spine Model to Predict Scoliosis Growth due to Asymmetric Loading*, University of Alberta, Edmonton, Alberta, Canada, 2009, Master's Final Oral Exam Date: June 1, 2009, Committee Chair.
- Nima Shaigan, *Protective-conductive coatings for ferritic stainless steel interconnects used in solid oxide fuel cells*, Ph.D. thesis, University of Alberta, Edmonton, Alberta, Canada, 2009, Doctoral Final Oral Exam Date: May 15, 2009, Committee Examiner.
- Daniel Handford, *Direct injection assisted HCCI combustion of natural gas*, University of Alberta, Edmonton, Alberta, Canada, 2008, Master's Final Oral Exam Date: December 19, 2008, Committee Chair.
- Ke Wang, *The effect of solution composition on erosion-corrosion process and correlation between repassivation kinetics and corrosion rate in flowing slurry*, University of Alberta, Edmonton, Alberta, Canada, 2008, Master's Final Oral Exam Date: August 21, 2008, Committee Examiner.
- Andrew Martin, *Enhanced airway deposition of high aspect ratio pharmaceutical aerosols through magnetic field alignment for localized targeting within the lung*, Ph.D. thesis, University of Alberta, Edmonton, Alberta, Canada, 2008, Doctoral Final Oral Exam Date: August 12, 2008, Committee Examiner.
- Alireza Farahani Nia, *The effects of natural convection and wind on water vapour transport from a porous medium: Application to water transport on Mars*, Master's thesis, University of Alberta, Edmonton, Alberta, Canada, 2008, Master's Final Oral Exam Date: August 6, 2008, Committee Chair.
- David Crawford, *Numerical Simulation of Thin Liquid Film Drainage under the Influence of Pressure and Electrical Forcing*, Master's thesis, University of Alberta, Edmonton, Alberta, Canada, 2008, Master's Final Oral Exam Date: March 5, 2008, Committee Chair and Examiner.
- Paitoon Kongsereeparp, *Chemical kinetic based simulation for an HCCI engine and its combustion*, Ph.D. thesis, University of Alberta, Edmonton,

Alberta, Canada, 2008, Doctoral Final Oral Exam Date: January 28, 2008, Committee Examiner.

- Chengye Fan, *Characterization and prediction of delamination in fiber-reinforced composites*, Ph.D. thesis, University of Alberta, Edmonton, Alberta, Canada, 2008, Doctoral Final Oral Exam Date: January 25, 2008, Committee Chair.
- Chidirim Enoch Ejim, *Effect of liquid viscosity, surface tension, and nozzle size on atomization in two-phase nozzles*, Ph.D. thesis, University of Alberta, Edmonton, Alberta, Canada, 2007, Doctoral Final Oral Exam Date: November 6, 2007, Committee Chair.
- Yu Feng, *Conversion of Propane to Propylene in a Proton-Conducting Fuel Cell*, Ph.D. thesis, University of Alberta, Edmonton, Alberta, Canada, 2007, Doctoral Final Oral Exam Date: October 19, 2007, Committee Examiner.
- Joshua Hines, *The combined effect of ceria and chromium on the ductility of NiAl*, Master's thesis, University of Alberta, Edmonton, Alberta, Canada, 2007, Master's Final Oral Exam Date: September 24, 2007, Committee Examiner.
- Cunkui Huang, *Investigation of nanofluidics using molecular dynamics simulation*, Ph.D. thesis, University of Alberta, Edmonton, Alberta, Canada, 2007, Doctoral Final Oral Exam Date: August 14, 2007, Committee Chair and Examiner

Master of Engineering (M.Eng.) Project Review

- Salman Liaqat, Design cooling system load calculations of Sulaiman Alrajhi University, Al Bukairiya, Al Qassim, Saudi Arabia Project, M.Eng. project report, University of Alberta, Edmonton, Alberta, Canada, 2013, Reviewer.
- Joshua Monds, Heat conduction modeling using a Green's function approach for skin temperature measurement in simulated fires, M.Eng. project report, University of Alberta, Edmonton, Alberta, Canada, 2012, Reviewer and Supervisor.
- Greg Altimas, Evaluation of local kinematics of atmospheric vortex flows, M.Eng. project report, University of Alberta, Edmonton, Alberta, Canada, 2007, Reviewer.