THE UNIVERSITY OF BRITISH COLUMBIA

Materials & Manufacturing Research Institute

Annual Report 2023-2024

Collaborative Expertise for Innovative Solutions

SUMMARY AND HIGHLIGHTS

- New collaborative research initiatives: NSERC CREATE in Product Design for Human Comfort
- Continued management and coordination of established research programs: PacifiCan-funded Accelerating Circular Economy (ACE) Platform; NSERC CREATE in Immersive Technologies (CITech); Circular Economy Seed Funding; Biocomposites Research Network
- Members success: Our members have been recognized through major research grants and industry partnerships, prestigious awards and fellowships, and high-impact publications and global rankings, showcasing their contributions to scientific innovation, and industry collaboration.

Materials and Manufacturing Research Institute (MMRI) is a multidisciplinary, interdepartmental research hub at the University of British Columbia (UBC) fostering collaboration between local, national and international R&D sectors.

Vision

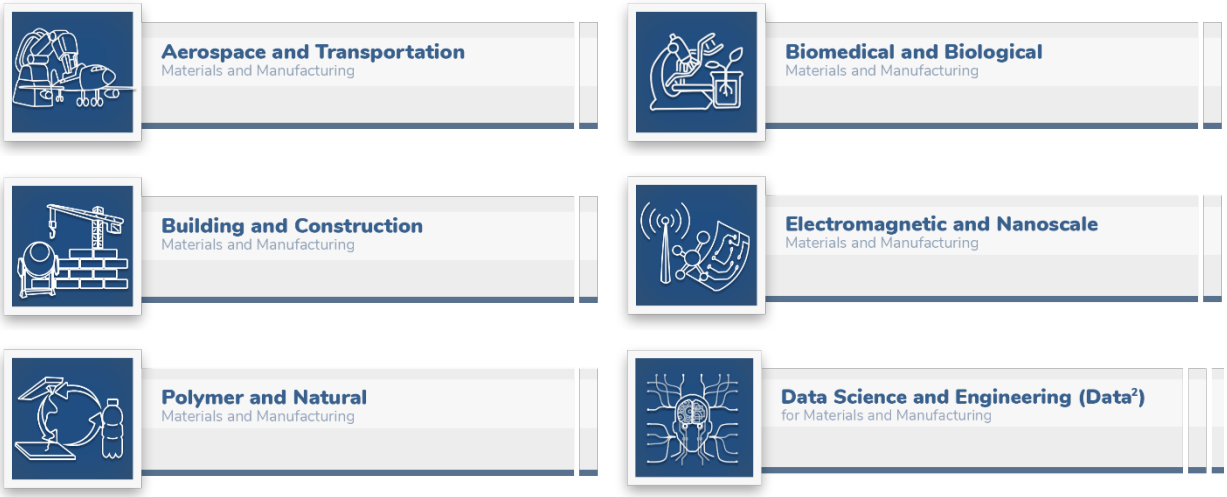
MMRI will be a role model linking basic and applied science and contributing to knowledge advancement in multidisciplinary research areas of advanced materials and manufacturing, through close partnership between UBC faculty and other sectors of academia, industry and government organizations; and by world-class training of students and scientists, and dissemination of high-quality research.

Mission

To build on UBC's existing strengths in materials and manufacturing research and create new opportunities for multidisciplinary research in related emerging areas through shared knowledge and network-based funding.

Operations

Structure: MMRI currently has six research pillars that host researchers from a wide range of disciplines across both campuses of UBC and beyond. These pillars include:



Affiliated Research Clusters and initiatives: MMRI has supported the establishment of the following research clusters and initiatives at UBC since 2018:

- NSERC Create in Product Design for Human Comfort
- Accelerating Circular Economy (ACE) Platform
- NSERC CREATE in Immersive Technologies (CITech)
- Cluster of Research Excellence in Comfort-Enhancing Technologies
- Cluster of Research Excellence in Plastic Recycling
- Cluster for Microplastics, health, and the Environment
- Circular Economy Seed Funding
- Multidisciplinary Undergraduate Research Projects in Health (MURPH)
- Research Cluster in Advancing Multifunctional Dental Biomaterials
- Biocomposites Research Network

Management team: Each MMRI research pillar has one dedicated Lead from the Point Grey campus and one Lead from the Okanagan campus who oversee and coordinate the pillar activities. A Chief Development Officer is also leading Cross-Disciplinary Initiative. The MMRI management team is listed below:

- Director: Dr. Abbas Milani (Engineering, UBCO)

- ATMM Leads:
  - Dr. Rajeev Jaiman (Mechanical Engineering, UBCV)
  - Dr. Mohammad Arjmand (Engineering, UBCO)
- BBMM:
  - Dr. David Liu (Biomedical Engineering, UBCV)
  - Dr. Adriana Manso (Dentistry, UBCV)
  - Dr. Sepideh Pakpour (Engineering, UBCO)
- BCMM:
  - Dr. Joe Dahmen (Architecture, UBCV)
  - Dr. Shahria Alam (Engineering, UBCO)

- ENMM:
  - Dr. Frank Ko (Materials Engineering, UBCV)
  - Dr. Jian Liu (Engineering, UBCO)
- PNMM:
  - Dr. Parisa Mehrkhodavandi (Chemistry, UBCV)
  - Dr. Robert Godin (Chemistry, UBCO)
- DSEMM:
  - Dr. Bhushan Gopaluni (Chemical and Biological Engineering, UBCV)
  - Dr. John Braun (Mathematics, UBCO)

Membership: MMRI continues to integrate new members from academia and industry into its research structure. The Institute currently boasts 101 academic and 80 industry members.

Space/facilities: Since January 2018, the institute has been officially located in EME 2131 on UBC Okanagan campus.

Staff and administration: MMRI research management and coordination activities are carried out by the following team members, who support the institute's operations, strategic initiatives, and collaborative projects.

- Dr. Mahdi Takaffoli, Senior Research Engineer
- Jolene Campbell, Administrative Assistant
- Dr. Bryn Crawford, Research Engineer & Program Manager, PacifiCan-MMRI Advancing Circular Economy (ACE)
- Dr. Kinga Vojnits, Research Associate, Biomedical Research Facilitator
- Dr. Milad Ramezankhani, Data Science and Engineering Research Cluster Coordinator
- Dr. Pradeep Sambyal, Coordinator of Plastic Recycling Research Cluster

> *"The group is always coming up with impactful ideas, suggestions, and participation regarding development, funding opportunities and connecting us to the right pieces to achieve our goal of disrupting climate change through the use of sustainable advanced materials."*
>
> Darrel Fry, CEO of Advanced BioCarbon 3D

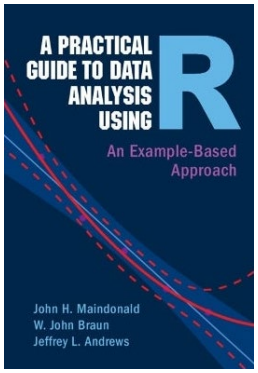
> *"I am grateful for the opportunity to be a graduate research mentor for the MURPH program. Mentoring undergraduate students from a variety of disciplines allows me to not only share my own research experiences but I also learn from the students."*
>
> Natasha Haskey, PhD Candidate in Biology, and MURPH Graduate Mentor

ACADEMIC MEASURES

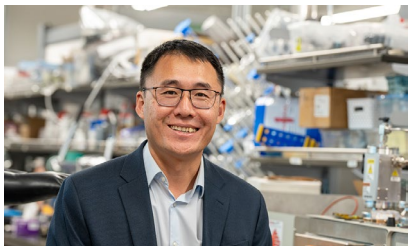
The academic measures reported in this section is based on the information collected from members on their academic records from September 2023 until August 2024. See Appendix I, II, and III for samples of academic records demonstrating the excellence of our members in research and training.

Members Success Stories

- The High Performance Powertrain Materials laboratory , led by Dr. Dimitry Sediako, has been recognized by FortisBC as a preferred research facility for hydrogen research. A major research grant has just been approved at ForticBC.
- A project led by Dr. Qian Chen in collaboration with Dr. Shahria Alam has received funding from UBC Campus as a Living Lab program is set to develop advanced, integrated fire-detection systems using multi-sensor networks for early wildfire detection and hotspots risk assessment. For more information, visit the link here.



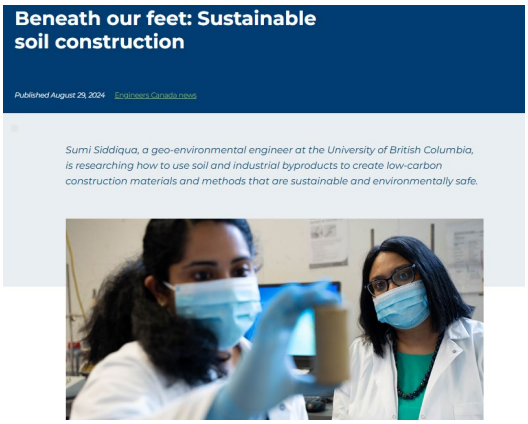
- Dr. John Braun co-authored a book entitled "A Practical Guide to Data Analysis Using R - An Example-Based Approach" published by Cambridge University Press.
- Dr. John Braun has been appointed as the guest editor of the journal Fire.
- Dr. Babak Tosarkani was featured in Global News on "Is the climate crisis outpacing BC's ability
- Dr. Babak Tosarkani was featured in CBC Radio 1 "Supply chain preparedness during wildfire evacuation".to adapt?".

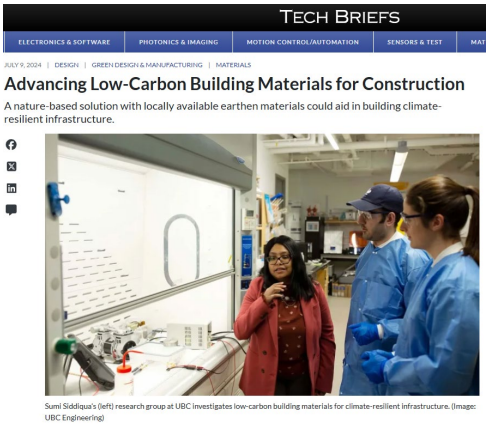


- UBCO Battery Innovation Center led by Dr. Jian Liu received a $2 million investment from British Columbia's Minister of Energy, Mines and Low Carbon Innovation.
- Dr. Bhushan Gopaluni was awarded the Drishti Award for Science and Technology in 2023. Learn more about this award here.

- Dr. Bhushan Gopaluni was elected as a fellow of the Canadian Academy of Engineering (CAE) in 2024.
- Partnership between Dr. Zheng Liu's lab and TerraSense Analytics was featured in UBC Okanagan News. Read the story here.
- Dr. Sumi Siddiqua won Canadian Geotechnical Society's 2024 Geoenvironmental Award.
- Dr. Sumi Siddiqua's research has been featured on Engineers Canada website. This work was related to using soil and industrial byproducts to create low-carbon construction materials and methods that are sustainable and environmentally safe. Read the story here.

- The research undertaken at Advanced Geomaterials Testing Lab led by Dr. Sumi Siddiqua was featured in the Tech Briefs magazine. The story post was entitled "Advancing Low-Carbon Building Materials for Construction". Read the story here.
- Dr. Sumi Siddiqua is interviewed in March, 2024 by CBC Radio One Daybreak South show on Rammed Earth to Build Future Homes.





- Dr. Sepideh Pakpour was awarded the Killam Research Fellowship Award in 2024.
- Dr. Mohammad Arjmand received the 2024 Canadian Society of Chemical Engineering (CSChE) Lectureship Award.
- Dr. Mohammad Arjmand was elected as Member of College of Royal Society of Canada.
- Dr. Mohammad Arjmand was recognized as an Emerging Materials Chemistry Investigator from Canadian Society of Chemistry (CSC).

- Dr. Shahria Alam was named a Fellow of the Canadian Society for Civil Engineering (CSCE) in June 2024.
- Dr. Shahria Alam received Sustainability Award 2024's Honorable Mention for the contribution to sustainability in civil engineering, in recognition of the presentation 'Empowering Energy Efficiency: Fusing Indigenous Roof Designs to Contemporary Canadian Homes by Sultana, S.R., Rana, A., Sadiq, R., Hewage, K. and Alam, M.S.', given at the Canadian Society for Civil Engineering's 2024 Annual Conference.

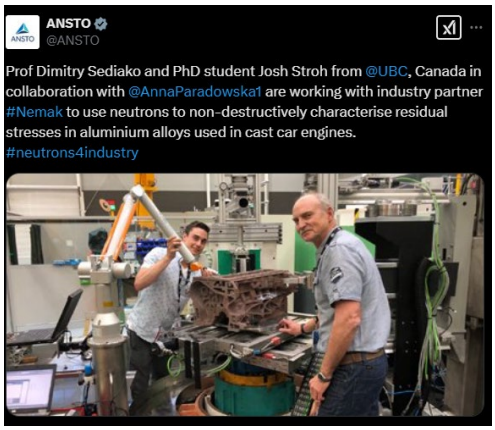
UBCO engineering professor earns recognition from top professional fellowships

Shahria Alam receives distinction from Canadian and American associations

November 28, 2024

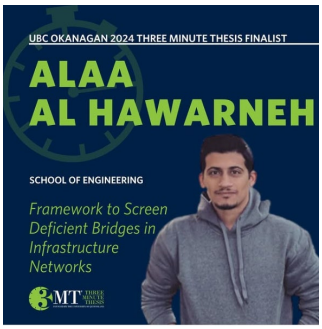
- Several MMRI researchers have been recognized as among the top 2% most cited scientists in 2023. This analysis was released by Elsevier in October 2023 and more details can be found here. Calculations were performed using all Scopus author profiles as of October 1, 2023. The MMRI members appeared in the list include: Dr. Abbas Milani, Dr. Mohammad Arjmand, Dr. Ricardo Carvalho, Dr. Emily Cranston, Dr. Gino DiLabio, Dr. Shahria Alam, Dr. SolomonTesfamariam, and Dr. Michael Deyholos.

HQP Success Stories



- Two graduates of Dr. Sediako's lab has secured advanced research positions at ANSTO, an international nuclear research laboratory in Sydney, Australia. The materials and nuclear research expertise they acquired at Dr. Sediako's lab were the main factors in their employment.
- Nicholas Sabry, a PhD graduate of Dr. Sediako's lab, has founded a startup company, Sabry Engineering. His expertise in materials, solid-state welding, and residual stress characterization has become the backbone of the startup.
- Sina Kianfar, a PhD graduate of Dr. Sediako's lab, has joined Alpine Aerotech (Helicopter Division) as a design engineer, responsible for the airframe design.

- Ladan Tazik, a PhD student under supervision of Dr. John Braun, was the winner of Best Student Presentation Award at Statistical Society of Canada Meetings, St. John's, June, 2024.
- Rakiba Rayhana, a postdoctoral fellow at Dr. Zheng Liu's lab, won an award from IEEE Industrial Electronics Society conference. Her work was entitled "Digital Twin for Industrial Asset Management: A Case Study for Pipeline Maintenance".
- Peter Osei Ohemeng, a PhD student of Dr. Robert Godin, won a best grad student poster award at CSC2024 (Environmental Division), and a UBC Graduate Dean's Thesis Fellowship. His presentation title was Arsenic(III) and (V) Remediation in Water Using a Particulate Photocatalytic Carbon Nitride (CNx) System.
- Sutripto Khasnabis, a PhD student of Dr. Robert Godin, won a best speaker award at the 2024 Research Networking Event of the UBC Cluster of Research Excellence in Solar Energy for Net-Zero.
- Rubaiya Rumman, a PhD student of Dr. Shahria Alam, was awarded the NSERC Canada Graduate Scholarship-Doctoral and also won the UBC Killam Doctoral Prize in 2023.
- Kishoare Tamanna, a PhD student of Dr. Shahria Alam, was awarded the NSERC Postgraduate Scholarship-Doctoral and also received the UBC Killam Doctoral Prize in 2023.



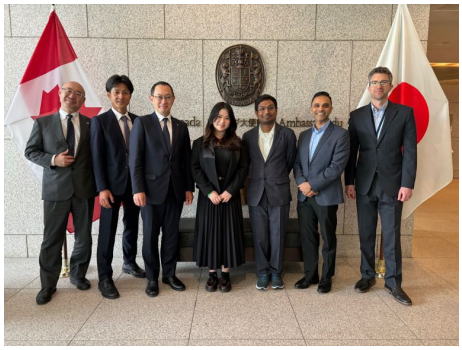
- Alaa Al Hawarneh, a PhD student of Dr. Shahria Alam, won the 1st place at 3MT HEAT, School of Engineering in Feb, 2024. The title of his thesis was "Framework to Screen Deficient Bridges in Infrastructure Networks".
- The paper presented by the students of Dr. Sepideh Pakpour and her collaborators at Collaborative Health Education Symposia in March 2024 in Kelowna received the Best Presentation Award. The presentation title was "Unraveling the interplay of gut microbiome, metabolites, and mucus in luminal cholesterol metabolism" with the co-authors Kazemian, N., Karimianghadim, R., Golzan, S. A., Nitin, Irungu, J. D. W., Coombs, G. B., Low, J., Little, J. P., Zandberg, W. F., Bergstrom, K., Pakpour, S.
- Liang Cao, a PhD graduate of Dr. Bhushan Gopaluni's lab, started a postdoctoral fellowship at MIT.
- Nathan Lawrence, a PhD graduate of Dr. Bhushan Gopaluni's lab, started a postdoctoral fellowship at UC Berkeley.
- Iman Jalilvand, a PhD candidate under the supervision of Dr. Abbas Milani, won the UBC Dean's Award for Knowledge Translation & Entrepreneurship. This annual award recognizes a student who has successfully conveyed research results through venture creation, with the intention of producing a groundbreaking product and developing a business plan to bring it to market.

- VanTech Med International Inc., led by Dr. Abbas Milani's lab alumni, presented at the 2024 Collision Conference in Toronto between 17 – 20 June 2024. The event was attended by Co-Founder and CEO Vanessa Lo, a research assistant at Dr. Milani's lab, and Business Development Advisor Dr. Bryn Crawford. The company held an Alpha-stage booth for the start-up, attracting attention from observers, industry practitioners, potential customers, as well as investors. Their Sunny-1 product enjoyed its first public demonstration, with fantastic engagement and feedback received from all parties.

- Niloofar Akbarian, a PhD candidate at Dr. Abbas Milani's lab's won the 1st prize at 2024 Institute of Industrial and Systems Engineers (IISE) Sustainable Development Division Best Student Paper Competition. Her paper was

entitled "Analytic Network Process for Multicriteria Decision-Making in Sustainable Composites Supply Chain Management".

- Ashish Giri, an undergraduate research assistant at Dr. Abbas Miani's lab is the recipient of an internship through DAAD's RISE Germany program for the project titled "Development of sustainable, self-fiber-reinforced composites from biopolymers". He has been selected successfully from a competitive pool of 2365 applicants, with only 320 individuals being accepted for the internship.

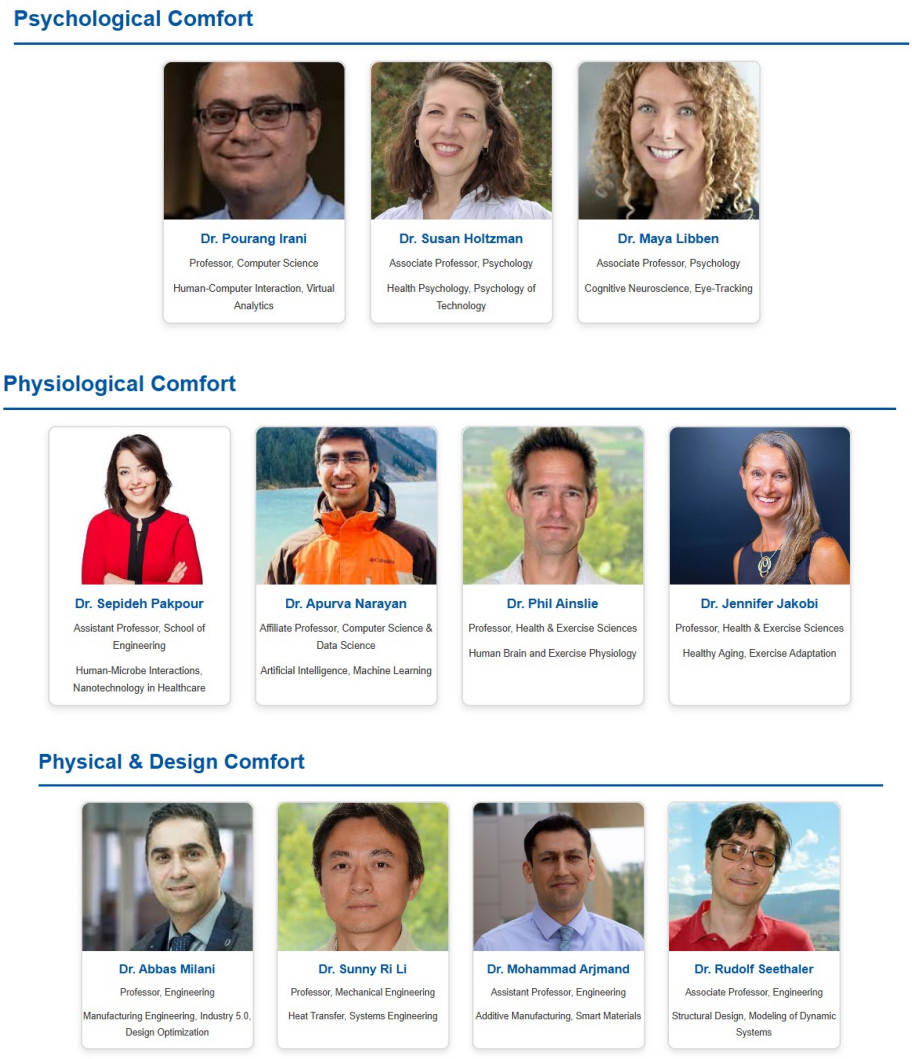


- Vantech, co-founded by Rohith J.K, a PhD student, and Vanessa Lo, a research assistant, at Dr. Abbas Milani's lab recently travelled to Japan to meet with Kawada Technologies and the Canadian embassy to collaborate on the development of one of their product lineups.

ACTIVITIES AND PROJECTS

Collaborative Research Programs

NSERC CREATE in Product Design for Human Comfort (PDHC): This CREATE program was awarded in May 2024 to a team of faculty members, led by Dr. Sepideh Pakpour. PDHC is a highly interdisciplinary research and training program that employs a user-centric approach and integrates concurrent physical, physiological, and psychological aspects of human comfort into engineering product design practices. The team is working towards launching the program in September 2024. To learn more about this initiative, visit the website here.



Accelerating Circular Economy (ACE) Platform: Since its establishment in 2022 through the funding support from Pacific Economic Development Canada (PacifiCan), ACE platform has been actively facilitating provincial-wide circular economy transformations via the multi-disciplinary and multi-sectorial collaborations between MMRI and the broader community. The platform currently has 18 faculty members. The nine core faculty members of ACE are as follows:

Dr. Abbas Milani
Professor
Mechanical Engineering, UBCO

Dr. Mohammad Arjmand
Assistant Professor
Mechanical Engineering, UBCO

Dr. Parisa Mehrkhodavandi
Professor
Department of Chemistry, UBCV

Dr. Sepideh Pakpour
Assistant Professor
Mechanical Engineering, UBCO

Dr. Jian Liu
Associate Professor
Mechanical Engineering, UBCO

Dr. Kasun Hewage
Professor
Civil Engineering, UBCO

Dr. Frank Kou
Professor
Materials Engineering, UBCV

Dr. Joseph Dahmen
Associate Professor
School of Architecture and Landscape Architecture, UBCV

Dr. Cigdem Eskicioglu
Professor
Civil Engineering, UBCO

Major achievements of the ACE platform have been summarized below:

- 55 industry partners engaged on active projects
- >$2M revenue growth of collaborating for-profit companies, due to ACE research projects
- 21 graduated HQP taken circular economy (CE) related industry work positions
- >300 community members involved in CE networking, knowledge transition & training
    - Presented at 10 events hosted by partners (GVCEN, CWMA, VEC, Project Zero, CELC)
    - Presented at 3 conferences (CE Summit, KORE, Zero Waste Conference)
- Hosted 2 circular economy symposia, bringing together industry, government, non-profits & researchers
- Hosted 2-day entrepreneurship event to connect HQP with UBC programs and mentors
    - Translated to supporting 5 student-led ventures
- CE Micro-credential (certificate) course is under development and set to be launched in October 2024.

NSERC CREATE in Immersive Technologies (CITech): This program is continuing to train new graduate students in areas related to VR/AR/MR. The program submitted its first progress report to NSERC in July 2024. To learn more about the program, visit its website here.

Three major achievements of the program so far have been summarized below.

- Development of Three Specialized Courses in Immersive Technologies at UBC Okanagan:
  - Courses: IMTC 505 (Fundamentals of Immersive Technologies), IMTC 506 (User-Centered Immersive Design), and IMTC 507 (Immersive Technology Design Studio).
  - Interdisciplinary Collaboration: Designed with input from computer science, engineering, and arts faculty to ensure a broad and practical approach.

  - Institutional Impact: Approved by the UBC Senate and integrated into the UBC Okanagan curriculum as a lasting educational resource.
  - Growing Demand: Initially for CREATE trainees, but has attracted interest from students across disciplines, highlighting the increasing relevance of immersive technologies.

- Integration of Industry and External Mentorship into Training:
  - Industry Collaboration in Courses:
    - IMTC 506 (User-Centered Immersive Design):
      - External organizations (corporations, government, non-profits) submit project ideas.
      - Student groups develop project plans, conduct research, and produce a Mitacs proposal.
      - Industry partners provide direct mentorship through meetings and ongoing communication.
    - IMTC 507 (Immersive Technology Design Studio):
      - Students work on their own projects while benefiting from guest speaker mentorship.
      - Industry professionals offer insights on the technical, user-centered, and artistic aspects of immersive technologies.

- Mobilizing Digital and Immersive Technology Projects for Societal Impact:
  - Key Community-Focused Projects:
    - Wildfire Preparedness VR Experience
    - Youth Vaping Cessation AR Project
    - RCMP Cadet Training VR Simulation
    - Water Management Awareness Game
    - Brain Injury Rehabilitation Research

What are some top learnings for you thus far?

"Two big things come to mind. Firstly, research is very much a team effort; everyone brings a unique combination of their background, perspective, and skill set. This diversity fosters a rich environment for generating innovative ideas. As such, learning how to be a good collaborator is an essential component of success.

Secondly, it's good to be pushed outside your comfort zone. This point, for me, has probably been the most impactful. I had the opportunity to participate in the Create in Immersive Technologies (CITech) program at UBCO in the fall 2023 term. This program brought together students in Master's and PhD programs across various disciplines, including computer science, engineering, and the health sciences. It challenged us to work together on immersive technology and design thinking projects in small groups and with an industry partner. For me, it was a step in a different direction towards emerging technologies while trying to keep a foothold in nursing to relate what I was learning to the uses for healthcare. The coding and development aspect of the program was new for me and pushed me particularly far outside of my comfort zone to a new way of thinking; I learned a lot about myself and how I approach problem-solving. I also learned a great deal about immersive technologies, which will help inform my future research."

Karlee Fonteyne, Nursing Master's student

Karlee Fonteyne pushes herself out of her comfort zone

Circular Economy Seed Funding: Funded by NRC-IRAP, this program supported 10 university-industry projects relevant to different aspects of the circular economy during the course of 2023-2024. Maximum amount of $10k funding was provided to each academic lab for their industry-based projects.

Biocomposites Research Network: Members of the research network are working together to prepare a book entitled "Biocomposites and the Circular Economy". This book is set to be published by Elsevier in April 2025. The book will include 13 chapters co-authored by several faculty members and their students from UBC, São Paulo State University, Lakehead University, University of Toronto, and Indian Institute of Technology Roorkee.

Goals for next year

- Sustaining the Immersive Technology research and training program beyond CREATE: With NSERC funding set to conclude in 2027, securing the long-term sustainability of the Immersive Technology research and training program is a key priority. To ensure its continued impact, we must explore large-scale industry collaborations, external funding opportunities, and strategic partnerships that align with the program's goals. Strengthening industry engagement will not only provide financial support but also enhance the practical application of immersive technologies, creating lasting value for both academia and industry.

- Continue supporting team-based proposals: We will remain committed to support planning, team building and writing multidisciplinary proposals for different funding programs, such as NFRF, CREATE, and NSERC Alliance.

Contact information

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Appendix I: Academic Metrics

Member Name	Faculty	# of Publications	# of Students Supervised/Co-supervised
Dimitry Sediako	Applied Science	8	5
Qian Chen	Applied Science	2	3
Rudolf Seethaler	Applied Science	4	3
John Braun	Science	6	5
Jian Liu	Applied Science	17	10
Zheng Liu	Applied Science	20	15
Lukas Bichler	Applied Science	14	8
Fatemeh Fard	Science	12	8
Sumi Siddiqua	Applied Science	16	22
Babak Tosarkani	Applied Science	15	10
Sunny Li	Applied Science	1	1
Robert Godin	Science	4	2
Shahria Alam	Applied Science	36	20
Sepideh Pakpour	Applied Science	18	6
Hossein Kazemian	University of Northern BC	20	15
Bhushan Gopaluni	Applied Science	37	16
Mohammad Arjmand	Applied Science	18	17
Parisa Mehrkhodavandi	Science	7	7
Abbas Milani	Applied Science	20	12

Appendix II: Sample Grants

Project Title	Funding Body	Amount	Member(s)
H2lab: a laboratory for investigating hydrogen blending in natural gas from injection to combustion	NSERC-Alliance	$65,000	Dimitry Sediako
Characterization of high-temperature aluminum-based alloys and metal matrix nanocomposites for enhanced energy efficiency in automotive and aerospace applications	Mitacs	$17,000	Dimitry Sediako
Smart fire detection systems to improve wildfire resilience of UBCO campus	UBC-Campus as a Living Lab	$100,000	Qian Chen
Recycling and upcycling of graphite anodes from spent lithium-ion batteries	NSERC Alliance Mission – Critical Mineral Research	$992,000	Jian Liu
UBCO battery innovation centre including solid-state battery technology development.	Innovative Clean Energy (ICE) Fund – Ministry of Energy, Mines and Low Carbon Innovation.	$2M	Jian Liu
Integrated multi-sensing system for road network condition assessment	NSERC-Alliance	$127,500	Zheng Liu
Development of graphitic materials for TRISO fuel applications	Mitacs	$225,000	Lukas Bichler
Upscaling production of bio-mass derived synthetic graphite	BC Ministry of Forests	$135,000	Lukas Bichler
Sustainable chemical processes development of organic photocatalyst materials to broaden the use of sustainable photocatalysis in organic syntheses	NSERC and Deutsche Forschungsgemeinschaft (DFG)	$294,000	Robert Godin
Safeguard aging, deteriorating, and seismically vulnerable bridges in Quebec	NOVA FRQNT/ NSERC	$225,000	Shahria Alam
Advanced data acquisition and feedback control system for resilient infrastructure	NSERC RTI	$148,000	Shahria Alam

Multi-Axial Subassemblage Test System (MAST) to develop resilient and sustainable high-rise buildings	CFI JELF	$1,585,000	Shahria Alam, Solomon Tesfamariam
NSERC Create in product design for human comfort	NSERC CREATE, Mitacs, and UBC	$3,350,000	Sepideh Pakpour, Apurva Narayan, Sunny Li, Mohammad Arjmand, Rudolf Seethaler, Abbas Milani
Development and validation of an analytical method for airborne chromium speciation and field comparison study	WorkSafeBC	$150,000	Hossein Kazemian
Integrated waste management and brownfield reclamation in fort saint john: agricultural valorization of wastewater effluent and biochar application for soil remediation	Mitacs	$270,000	Hossein Kazemian
Production of sustainable bio-based foam beads	NSERC-Alliance	$898,000	Hossein Kazemian
Advanced wearable antennas and absorption-dominant electromagnetic shields	Department of National Defence	$1,000,000	Mohammad Arjmand, Mohammad Zarifi
Flexible nanocomposite films with electromagnetic interference shielding properties	Mitacs	$30,000	Mohammad Arjmand
Advancing sports bra comfort development – phase i: custom test rig design and exploratory analysis	Mitacs	$225,000	Abbas Milani, Mohammad Arjmand, Rudolf Seethaler
Application of the circular economy to demolished or deconstructed multi-family units in Richmond BC - phase i: development of a guided adoption framework	NERC-Mitacs	$360,000	Abbas Milani, Mohammad Arjmand, Shahria Alam, Kasun Hewage, Ahmad Rteil

APPENDIX III: LIST OF SAMPLE PUBLICATIONS

- Walallawita, Rashiga, Matthew C. Hinchliff, Dimitry Sediako, John Quinn, Vincent Chou, Kim Walker, and Matthew Hill. "Evaluating the Effect of Blended and Pure Hydrogen in X60 Pipeline Steel for Low-Pressure Transmission Using Hollow-Specimen Slow-Strain-Rate Tensile Testing." *Metals* 14, no. 10 (2024): 1132.
- Kozakevich, Jordan Roger, Dimitry Sediako, David Weiss, and Sven C. Vogel. "A Quantitative Phase Analysis by Neutron Diffraction of Conventional and Advanced Aluminum Alloys Thermally Conditioned for Elevated-Temperature Applications." *Materials* 17, no. 17 (2024): 4311.
- Sediako, Dimitry G., and Siddharth Banerjee. *Validation of a Two-Parameter Controlled Novel Tribometer for Analysing Durability of Piston Ring-Engine Cylinder Tribo-Pair*. No. 2024-01-2067. SAE Technical Paper, 2024.
- Xueliang Yang, Yenchun Li, Qian Chen. "Automated fire detection and alarm system using edge computing and cloud-based platform". *Journal of Internet of Things*, Volume 28 (2024): 101402.
- Nankali, Mohammad, Mohammad Amin Amindehghan, Seyed Hamed Seyed Alagheband, Abdolsamad Montazeri Shahtoori, Rudolf Seethaler, Nowrouz Mohammad Nouri, and Abbas S. Milani. "Highly Sensitive, Stretchable, and Adjustable Parallel Microgates-Based Strain Sensors." Advanced Materials Technologies (2024): 2400071.
- Ramezankhani, Milad, Mehrtash Harandi, Rudolf Seethaler, and Abbas S. Milani. "Smart manufacturing under limited and heterogeneous data: a sim-to-real transfer learning with convolutional variational autoencoder in thermoforming." *International Journal of Computer Integrated Manufacturing* 37, no. 1-2 (2024): 18-36.
- Millikin, Rhonda L., W. John Braun, Martin E. Alexander, and Shabnam Fani. "The Impact of Fuel Thinning on the Microclimate in Coastal Rainforest Stands of Southwestern British Columbia, Canada." *Fire* 7, no. 8 (2024): 285.
- Chen, Hanxiao, W. John Braun, and Xiaoping Shi. "Iterated Data Sharpening." *Journal of Computational and Graphical Statistics* (2024): 1-40.
- Wu, Zhenrui, Yihu Li, Amardeep Amardeep, Yijia Shao, Yue Zhang, Jian Zou, Liping Wang, ..., Jian Liu. "Unveiling the Mysteries: Acetonitrile's Dance with Weakly-Solvating Electrolytes in Shaping Gas Evolution and Electrochemical Performance of Zinc-ion Batteries." *Angewandte Chemie* 136, no. 19 (2024): e202402206.
- Zhang, Yue, and Jian Liu. "Materials Design and Mechanistic Understanding of Tellurium and Tellurium–Sulfur Cathodes for Rechargeable Batteries." *Accounts of Chemical Research* 57, no. 17 (2024): 2500-2511.
- Mir, Rameez Ahmad, Jia Xu, Li Tao, Evan J. Hansen, Ali Khosrozadeh, Mitchell B. Miller, and Jian Liu. "High-energy Mn2V2O7//C asymmetric supercapacitors in aqueous/organic hybrid electrolytes." *Nano Energy* 133 (2025): 110446.
- Pillari, Lava Kumar, Kyle Lessoway, and Lukas Bichler. "Reciprocating dry sliding friction and wear behavior of B319 aluminum alloy-graphene composites." Tribology International 192 (2024): 109334.
- Prasad, Anil, Jayangani Ranasinghe, Linu Malakkal, Lukas Bichler, Jerzy Szpunar, and Charles Liu. "Spark plasma sintering of fuel meats for U3O8 based dispersion fuels." *Nuclear Engineering and Design* 426 (2024): 113398.
- Pillari, Lava Kumar, Kyle Lessoway, Colin van der Kuur, Anthony Lombardi, Glenn Byczynski, and Lukas Bichler. "Effect of graphene on the microstructure, thermal conductivity, and tribological behavior of cast B319 Al alloy." *Wear* 538 (2024): 205201.
- Saberi, Iman, Fatemeh Fard, and Fuxiang Chen. "Utilization of pre-trained language models for adapter-based knowledge transfer in software engineering." Empirical Software Engineering 29, no. 4 (2024): 94.

- Codabux, Zadia, and Fatemeh H. Fard. "The Software Industry-Academia Collaboration: Novelty and Practice." IEEE Software (2024).
- Hadi, Mohammad A., and Fatemeh H. Fard. "Evaluating pre-trained models for user feedback analysis in software engineering: A study on classification of app-reviews." Empirical Software Engineering 28, no. 4 (2023): 88.
- Narani, Shayan S., and Sumi Siddiqua. "Accelerated carbonation of alkali-activated blended blast furnace slag and wood fly ash: Carbon capture kinetics, chemical and mechanical evolutions." *Construction and Building Materials* 411 (2024): 134570.
- Bhurtel, Akanksha, Emmanuel Salifu, and Sumi Siddiqua. "Composite biomediated engineering approaches for improving problematic soils: Potentials and opportunities." *Science of The Total Environment* (2024): 169808.
- Babalar, Mahmoud, Sumi Siddiqua, and Mahmoud A. Sakr. "A novel polymer coated magnetic activated biochar-zeolite composite for adsorption of polystyrene microplastics: Synthesis, characterization, adsorption and regeneration performance." *Separation and Purification Technology* 331 (2024): 125582.
- Babak Mohamadpour Tosarkani, Saman Hassanzadeh Amin, and Mohsen Roytvand Ghiasvand. "Designing a sustainable plastic bottle reverse logistics network: A data-driven optimization approach." *Expert Systems with Applications* 251 (2024): 123918.
- Yousefi, Samuel, and Babak Mohamadpour Tosarkani. "Enhancing sustainable supply chain readiness to adopt blockchain: A decision support approach for barriers analysis." *Engineering Applications of Artificial Intelligence* 133 (2024): 108151.
- Larizadeh, Razieh, and Babak Mohamadpour Tosarkani. "A novel data-driven rolling horizon production planning approach for the plastic industry under the uncertainty of demand and recycling rate." *Expert Systems with Applications* 263 (2025): 125728.Li, Ruoyao, Md Rashedul Islam, Yakang Xia, Jianxun Huang, Farzan Gholamreza, Patricia I. Dolez, Adrian Lai, Robert Gathercole, and Ri Li. "Heat and moisture transfer through skin-clothing microclimate." *International Journal of Heat and Mass Transfer* 231 (2024): 125867.
- Zhang, Dongyang, Sutripto Khasnabis, Wanlong Wang, Vishal Yeddu, Shahram Moradi, Muhammad Awais, Hai-Dang Nguyen, ..., Robert Godin. "Cadmium-Doping Slows Trap Emptying in Ambient-Air Blade-Coated Formamidinium Lead Iodide Perovskite Solar Cells." *Advanced Energy Materials* 14, no. 17 (2024): 2303858.
- Wang, Qiong, Zhaolin Tang, Roman Herout, Chang Liu, Kai Yu, Dirk Lange, Robert Godin, Jayachandran N. Kizhakkedathu, Tom Troczynski, and Rizhi Wang. "Axial suspension plasma sprayed Ag-TiO2 coating for enhanced photocatalytic and antimicrobial properties." *Surfaces and Interfaces* 45 (2024): 103856.
- Liu, Chang, Stephanie Busse, Jian Liu, and Robert Godin. "Aminosilanized Interface Promotes Electrochemically Stable Carbon Nitride Films with Fewer Trap States on FTO for (Photo) electrochemical Systems." *ACS Applied Materials & Interfaces* 15, no. 40 (2023): 46902-46915.
- Rahmzadeh, Ahmad, and M. Shahria Alam. "Feasibility of using superelastic shape memory alloy in plastic hinge regions of steel bridge columns for seismic applications." *Earthquake Engineering & Structural Dynamics* (2024).
- Rahgozar, Navid, and M. Shahria Alam. "Functional recovery evaluation of hybrid self-centering piston-based braced frames." *Earthquake Engineering & Structural Dynamics* 53, no. 2 (2024): 867-893.
- Zhang, Peng, and M. Shahria Alam. "Accuracy of Buckling Strength Curves Using Direct Strength Method in Estimating Axial Strengths of Cold-Formed Steel Members under Compression: Critical Review." *Journal of Structural Engineering* 149, no. 3 (2023): 04022262.
- Yadegar, Abbas, Sepideh Pakpoor, Fathima F. Ibrahim, Ali Nabavi-Rad, Laura Cook, Jens Walter, Anna M. Seekatz, Karen Wong, Tanya M. Monaghan, and Dina Kao. "Beneficial effects of fecal microbiota transplantation in recurrent Clostridioides difficile infection." *Cell host & microbe* 31, no. 5 (2023): 695-711.

- Pakpour, Sepideh, Kinga Vojnits, Sahar Alousi, Muhammad Faizan Khalid, James D. Fowler, Yongliang Wang, Andrea Marie Tan et al. "Magnetic Levitation System Isolates and Purifies Airborne Viruses." *ACS nano* 17, no. 14 (2023): 13393-13407.
- Vojnits, Kinga, Andrés de León, Harneet Rathore, Sophia Liao, Michael Zhao, Julien Gibon, and Sepideh Pakpour. "ROS-dependent degeneration of human neurons induced by environmentally relevant levels of micro-and nanoplastics of diverse shapes and forms." *Journal of Hazardous Materials* 469 (2024): 134017.
- Shah, Aatif Ali, Sunil Walia, and Hossein Kazemian. "Electrolysis for ammonia removal and hydrogen generation in urban wastewater: Innovative approaches to the water crisis." *Journal of Environmental Chemical Engineering* 12, no. 6 (2024): 114420.
- Shah, Aatif Ali, Sunil Walia, and Hossein Kazemian. "Advancements in combined electrocoagulation processes for sustainable wastewater treatment: A comprehensive review of mechanisms, performance, and emerging applications." *Water research* (2024): 121248.
- Bayati, Behrouz, Asma Ghorbani, and Hossein Kazemian. "Phenol removal from aqueous media using BEA zeolite: A molecular simulation study on the effect of zeolite mobile cations." *Microporous and Mesoporous Materials* 364 (2024): 112854.
- Lawrence, Nathan P., Seshu Kumar Damarla, Jong Woo Kim, Aditya Tulsyan, Faraz Amjad, Kai Wang, Benoit Chachuat, Jong Min Lee, Biao Huang, and R. Bhushan Gopaluni. "Machine learning for industrial sensing and control: A survey and practical perspective." *Control Engineering Practice* 145 (2024): 105841.
- Lawrence, Nathan P., Philip D. Loewen, Shuyuan Wang, Michael G. Forbes, and R. Bhushan Gopaluni. "Stabilizing reinforcement learning control: A modular framework for optimizing over all stable behavior." *Automatica* 164 (2024): 111642.
- Yousef, Ibrahim, Aditya Tulsyan, Sirish L. Shah, and R. Bhushan Gopaluni. "Visual analytics for process monitoring: Leveraging time-series imaging for enhanced interpretability." *Journal of Process Control* 132 (2023): 103127.
- Ghaffarkhah, Ahmadreza, Seyyed Alireza Hashemi, Ali Akbar Isari, Mahyar Panahi-Sarmad, Feng Jiang, Thomas P. Russell, Orlando J. Rojas, and Mohammad Arjmand. "Chemistry, applications, and future prospects of structured liquids." *Chemical Society Reviews* (2024).
- Isari, Ali Akbar, Ahmadreza Ghaffarkhah, Seyyed Alireza Hashemi, Stefan Wuttke, and Mohammad Arjmand. "Structural Design for EMI Shielding: From Underlying Mechanisms to Common Pitfalls." *Advanced Materials* 36, no. 24 (2024): 2310683.
- Hashemi, Seyyed Alireza, Ahmadreza Ghaffarkhah, Milad Goodarzi, Amir Nazemi, Gabriel Banvillet, Abbas S. Milani, Masoud Soroush, ..., Mohammad Arjmand. "Liquid-Templating Aerogels." *Advanced Materials* 35, no. 42 (2023): 2302826.
- Jung, Hyuk-Joon, Chatura Goonesinghe, Ziyue Zhang, Joseph Chang, Kudzanai Nyamayaro, Hassan A. Baalbaki, Savvas G. Hatzikiriakos, and Parisa Mehrkhodavandi. "Synthesis of High-Molecular-Weight Poly (ether-alt-ester) by Selective Double Ring-Opening Polymerization of Spiroorthoesters." *ACS Macro Letters* 13, no. 2 (2024): 266-272.
- Goonesinghe, Chatura, Hyuk-Joon Jung, Isaiah O. Betinol, Joshua R. Gaffen, Charley N. Garrard, Joseph Chang, Kimia Hosseini, ..., Parisa Mehrkhodavandi. "Rethinking the Lewis Acidity of Cationic Gallium and Indium Catalysts." *ACS Catalysis* 13, no. 24 (2023): 16148-16157.
- Hosseini, Kimia, Chatura Goonesinghe, Hootan Roshandel, Joseph Chang, Kudzanai Nyamayaro, Hyuk-Joon Jung, Paula L. Diaconescu, and Parisa Mehrkhodavandi. "Mechanistic Insights into Selective Indium-Catalyzed Coupling of Epoxides and Lactones." *ACS Catalysis* 13, no. 20 (2023): 13195-13204.

- Jalilvand, Iman, Jiyoung Jang, Bhushan Gopaluni, and Abbas S. Milani. "VR/MR systems integrated with heat transfer simulation for training of thermoforming: A multicriteria decision-making user study." *Journal of Manufacturing Systems* 72 (2024): 338-359.
- Ramezankhani, Milad, and Abbas S. Milani. "A Sequential Meta-Transfer (SMT) Learning to Combat Complexities of Physics-Informed Neural Networks: Application to Composites Autoclave Processing." *Composites Part B: Engineering* (2024): 111597.
- Akbarian-Saravi, Niloofar, Ibrahim Alper Basar, Olivia Helena Margoto, Nadia Abdollahi G, Bryn Crawford, Benjamin Magel, Mehrdad Gharibnavaz, Cigdem Eskicioglu, and Abbas S. Milani. "Characterization of the Mechanical, Biodegradation, and Morphological Properties of NBR/Biopolymer Blend, Integrated with a Risk Evaluation." *ACS omega* 9, no. 8 (2024): 9256-9268.