Dr. Ryan Ahmed

Email: ryan.ahmed@mcmaster.ca
Lab website: https://artificialintelligence.mcmaster.ca/team/

Research Interests

- Artificial Intelligence, Electric Vehicle Batteries, Smart Mobility

- McMaster Automotive Resource Center and Center for Mechatronics and Hybrid Technologies. Facilities include battery cyclers, environmental chambers, and autonomous vehicles.

- AI Applications to Battery Management Systems, Hybrid AI and Electrochemical Modelling, Thermal Management Systems for EVs, AI Agents for Battery pack management.

- Recent graduates landed jobs as AI and Software engineers at Amazon, Stellantis, Ericsson, and Ford.
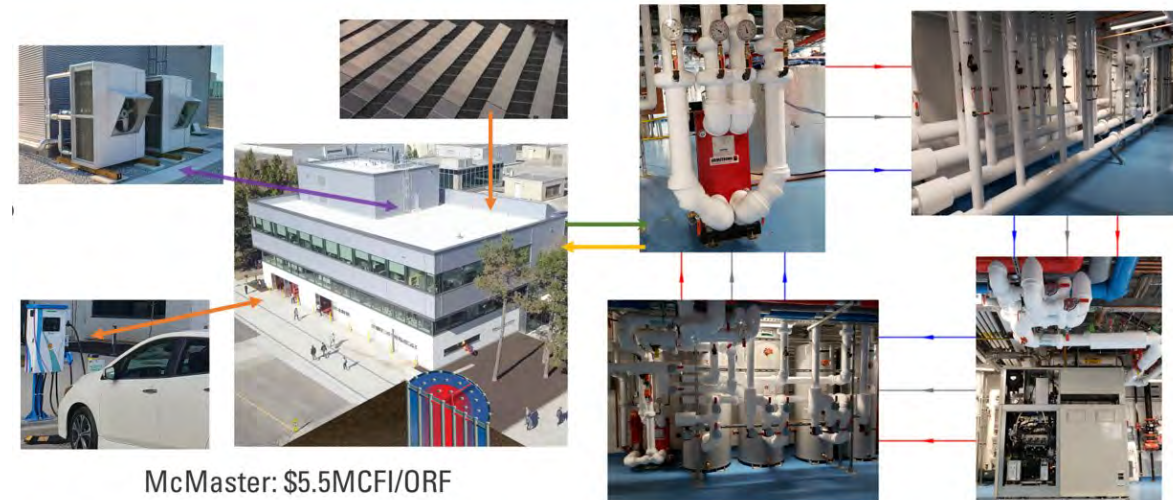
Jim Cotton
cottonjs@mcmaster.ca

Innovation Driven Energy Harvesting Research

- Development of innovative energy harvesting systems in commercial restaurants for high volume manufacturing.

- Development of a Compact Thermal Battery that can store reusable thermal energy

- Decarbonization of Heating Systems & Integrated Community Energy and Harvesting Systems

- Electrohydrodynamics in multi-phase systems

- Advance low carbon Potash drying
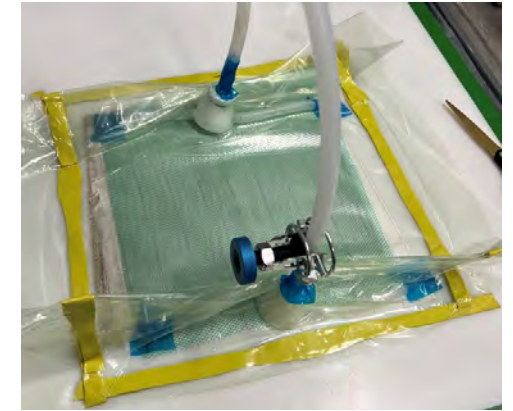

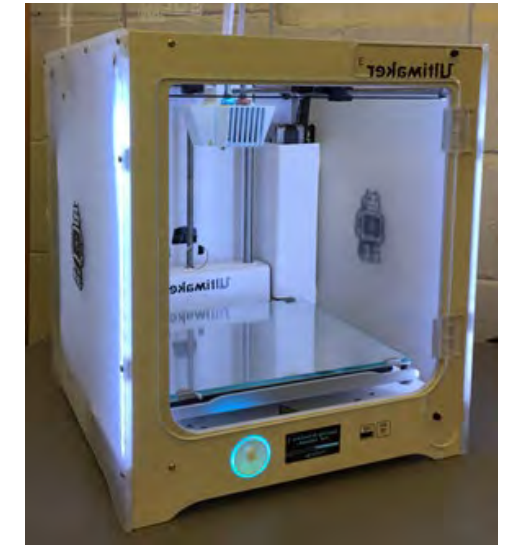A STATE-OF-THE-ART FACILITY

McMaster: $5.5MCFI/ORF
ReFIBES Facility

Duncan Cree
creed1@mcmaster.ca

Research Interests

- Bio-resin epoxy/flax fiber composites, 3D printable filament composites

- Composite vacuum infusion, Ultimaker 3D printer, Filament extruder

- Projects currently recruiting for:

    - Epoxy-flax fiber composites

    - Polylactic acid (PLA) biochar composites

Composite vacuum infusion

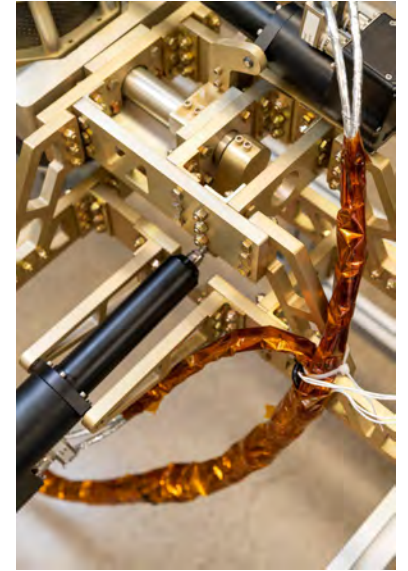Ultimaker 3D printer

Filament extruder

Dr. S. Andrew Gadsden

gadsden@mcmaster.ca
ice.mcmaster.ca

Research Interests

- Our focus is in the areas of control and estimation, AI and machine learning, and engineering systems with cognition

- Actively recruiting MASc & PhD students for the following projects:

  - Adastra (agentic AI and data science)

  - MDA Space (space-based robotics)

  - Canadian government (computer vision, AI, and electronics)

- Starting salaries of PhD graduates from my lab in the last five years range from $105,000 to $160,000 per year

Dr. Mohamed Hamed

hamedm@mcmaster.ca

http://mechfaculty.mcmaster.ca/~hamedm/TPL/home.htm

Research Interests

- Transport Phenomena in Thermal Engineering Systems.

- Material Processing and Characterization Numerical and Experimental facilities.

- Thermal Analysis of Self-Contained Drum Motors.

- Characterization of New Light weight Materials for the Automotive Industry.

- Nuclear, Power Generation, and Thermal Engineering.

Thermal Rating & Digital Twin System of VDG Self Contained Drum Motors
Version 1.1
Release Date: May 3rd, 2023
Developed by: Ahmed M. Teamah
Under-Supervision of: Prof. Mohamed S. Hamed

McMaster University

Contact Info:
teamaha@mcmaster.ca (+1 905 920 6960)
hamedm@mcmaster.ca (+1 905 902 5788)

Parameter	Value	Notes: (Input all values in green background cells and Results are shown below)
Set Desired Units	User Inputs	Input Motor Efficiency →
Drum Diameter [Do] (mm)	215	Drum motor diameter without lagging	Shell Inputs →
Face Width [L] (mm)	625	Total face width of the drum motor model
Belt Linear Speed [Vb] (ft/min)	94	Drum rotational speed or Belt linear speed
Shell Material	User-defined Shell Emissivity =	1
Oil Volume Percentage [OV] (%)	60	Oil Volume Percentage inside the drum motor
Oil Enduratex Type	EP 220	Oil Enduratex used inside the drum motor
Number of Poles for the Electric Motor [n] & Condition	4 - Poles & Sealed	Number of poles inside the electric motor & Its condition if isolated from surrounding oil or exposed to that oil
Electric Motor Casing Outer Diameter [do] (mm)	180	Electric motor casing outer diameter (if not constant insert the smallest diameter of the casing)
Gearbox Type	Internal Gearbox (S2)	Type of Gearbox used inside the drum motor system & Number of Stages
External Cooler Capacity (W)	0.0	External cooler maximum capacity if no cooler please leave the value as zero
Belt Pull [BP] (lbf)	660	Belt Pulling Force considering the force without load (Fo), Force to convey products horizontally (F1) and for incline (F2)
Ambient Temperature [Tamb] (°C)	25	Average ambient temperature of the air surrounding the drum motor
Maximum Temperature [Tmax] (°C)	90	Maximum allowed temperature for the motor
Lagging Thickness [th_lag] (inch)	0.25	Thickness of the lagging material used over the rotating drum	Contact Resistance →
Thermal Conductivity of Lagging [K_lag] (W/m.K)	0.1	Thermal conductivity of the lagging material

Mukesh Jain

E-mail: jainmk@mcmaster.ca

Research Interests:

- Plasticity and fracture of metallic materials
- Computational material science and solid mechanics
- FE modeling of plastic deformation and fracture at multiple length scales
- Novel micro-scale deformation experiments

Equipment and facilities:

- Access to diverse and unique resources of Centre of Automotive materials and Corrosion (CAMC) and Canadian Centre for Electron Microscopy (CCEM) at McMaster related to advanced mechanical testing & microstructural characterization.

Project recently completed:

- Microstructure-based FE modeling of deformation and fracture of aerospace aluminum alloy, AA7075.
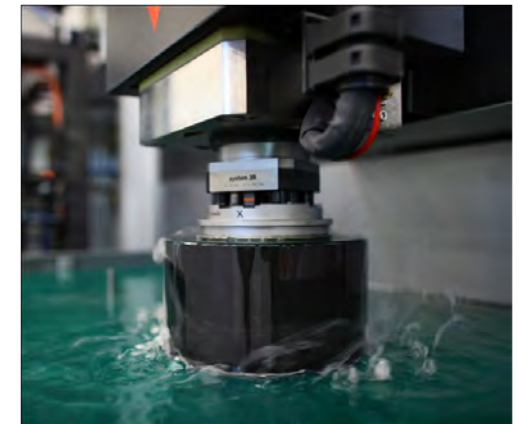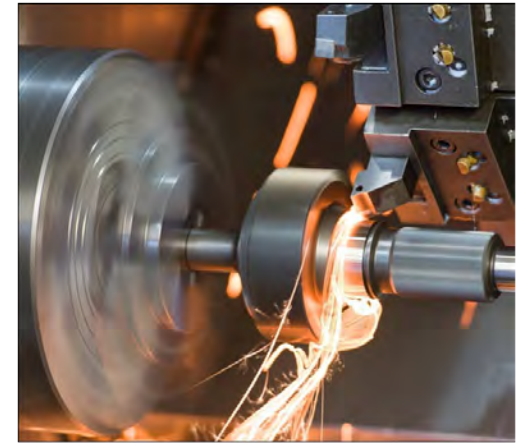
Placements of recent graduates:

- Materials and design analysts in R&D labs of automotive, nuclear and material producers and in national & international research labs & academic institutes.

Phil Koshy

koshy@mcmaster.ca | www.philkoshy.com

- Research on innovative, precision machining processes with an emphasis on jet engine manufacturing

- Relative to group size, graduate students have won a disproportionate number of Best Thesis, Best Seminar Presentation Awards

- 100% of students have co-authored papers in top-tier journals

- Recent graduate students have been absorbed in:
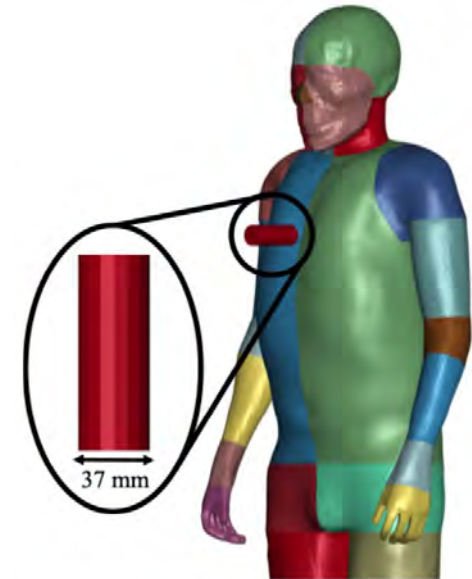 *Pratt & Whitney Canada*, *ATS Automation*, *MDA Space*

Cheryl Quenneville

quennev@mcmaster.ca
www.macinjurybiomech.com

Research Interests

- Injury biomechanics: defining tissue injury limits

- High-speed impact testing, 'crash test dummy' design

- Sports equipment: e.g. bike helmets, hockey neck guards

- Osteoporosis: machine learning for hip fracture risk

- FE models: explore effect of impact location
  - Air bags, body armour, soccer shin guards

Shakir Salaudeen
Email: salaudes@mcmaster.ca

Research Interests:

- Biomass and waste conversion into high-value bioproducts

- Decarbonization

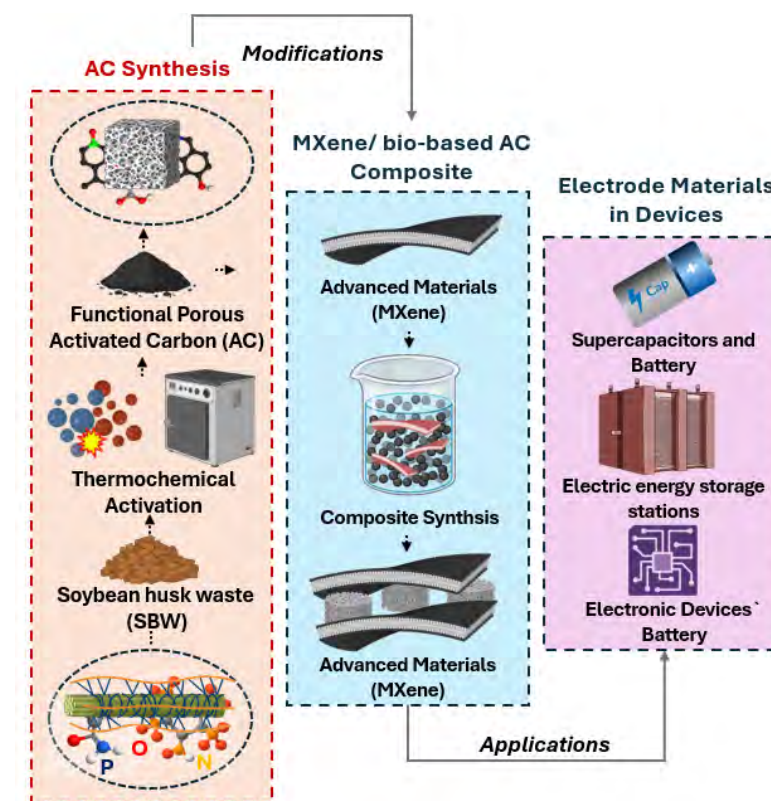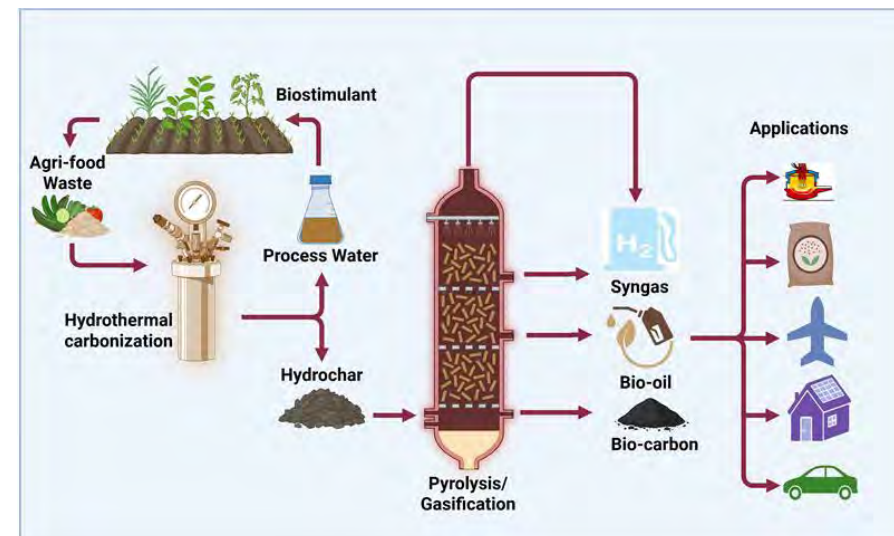- Bioenergy and biofuels

Unique equipment / facilities:

- Thermal and material characterization tools (TGA, FTIR, GC, MS)
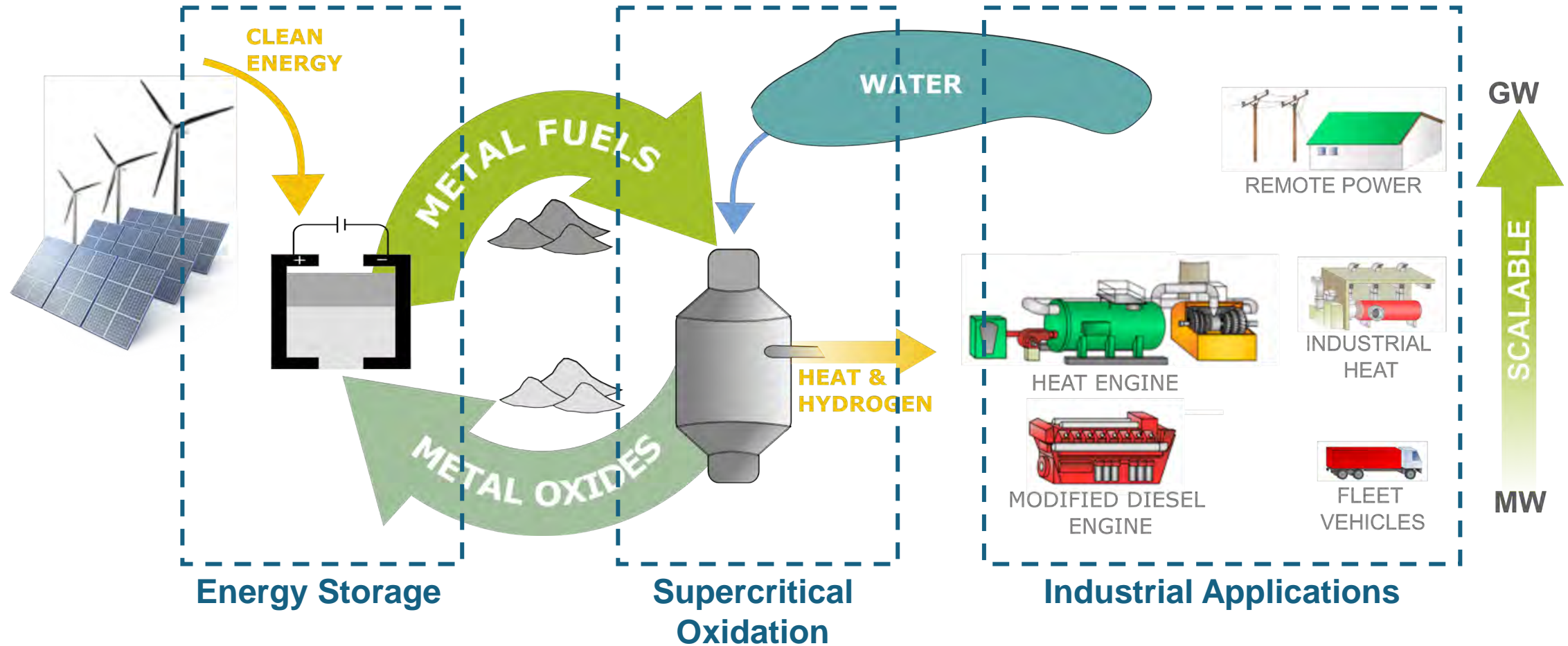
- Spectrophotometer; centrifuge

Ongoing projects:

- Biocarbon for steelmaking; supercapacitors development; hydrogen production

- Application of machine learning for process modeling and optimization

Partners: ArcelorMittal Dofasco, CanmetENERGY, OMAFA, OMNRF.

METAL-WATER REACTIONS FOR HEAT & HYDROGEN PRODUCTION

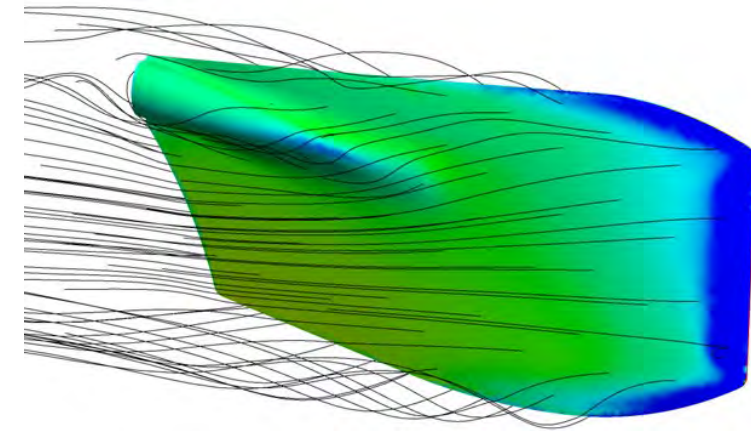Contact: Dr. Trowell trowellk@mcmaster.ca

Dr. Stephen Tullis

stullis@mcmaster.ca

Rowing blade flows and forces with moving blade and boat (including blade bending)

Computational and experimental fluid dynamics

Complex flows with multiple physical and chemical interactions are of particular interest, so although the applications look very diverse, there are underlying similarities in modelling and experimental approaches.
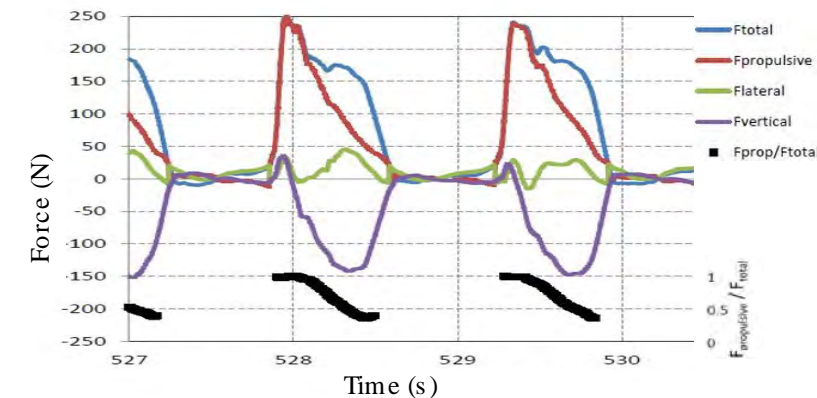
- multiphase metallurgical flows (mainly BOF & EAF steelmaking)

- nuclear heat & fluid flows (e.g. in severe nuclear accidents)

- blade hydrodynamics in rowing, sailing, & sprint canoe/kayak

- wind turbines

Sprint canoe on-water measurement of blade forces

Dr. Stephen Veldhuis

✉ veldhu@mcmaster.ca

💻 https://www.eng.mcmaster.ca/mmri-home/)

What major topics do you research?

- High-performance materials and manufacturing
  - Material Property Assessment
  - CNC machining
- Smart Systems (Industry 4.0)
  - Data-driven productivity, quality, and cost improvement
  - Tooling and process optimization
  - Condition-based monitoring
    - Predictive/prescriptive maintenance
    - Performance assessment
  - sensors, data acquisition, 5G communication, AI and Machine Learning data analytics

Unique equipment / facilities:

- McMaster Manufacturing Research Institute (MMRI)
- Machining Systems Lab
  - Instrumented Industry-scale manufacturing equipment
  - Sensor-integrated systems
- Material Property Assessment Lab
  - Advanced material property assessment instrumentation
  - Surface engineering tools
    - PVD coater

Example project(s) recently completed or currently recruiting for:

- Condition-based monitoring
- Performance assessment
- Sensor integrated process monitoring
  - Vibration, force, acoustic emission and machine vision
- Tooling development
  - Physical Vapour Deposition (PVD)
- Process Optimization strategies

Where recent grads have gotten jobs / industry partners:

- Production engineer at Linamar
- Research engineer at Magna
- Online Monitoring Engineering at Nuclear Promise X
- Turbomachinery Designer at Pratt and Whitney
- Engineering roles at ATS
- Machinability studies with Magellan Aerospace
- Postdoctoral fellows and research staff at MMRI

McMaster Manufacturing Research Institute (MMRI) | McMaster University