

A close-up photograph of a mechanical device, possibly a sensor or actuator, featuring a bright orange perforated metal frame. Several black cables are connected to the device, with some secured by orange zip ties. A small white label with purple handwritten text is attached to one of the cables. The background is dark and out of focus.

MECH 2050



THE UNIVERSITY OF BRITISH COLUMBIA
Mechanical Engineering

Our Vision:

UBC Mechanical Engineering will be the premier Canadian educational institution for mechanical engineering, and among the top twenty mechanical engineering departments at public institutions worldwide.

Our Mission:

UBC Mechanical Engineering strives to address society's most pressing challenges through our scholarship, teaching, and innovation.

Our Values:

- Student, staff, and faculty growth and well-being;
- Fairness, courtesy and good faith; and
- Passion, authenticity, and integrity.



On Teaching

UBC Mechanical Engineering will be the premier Canadian educational institution for a mechanical engineering education experience, offering **cohort-based, hands-on, in-person, design-focused instruction**.

Mech will become known for best practices in graduate student training and continue to be known for outstanding undergraduate student experience.

Fundamentals are and will be essential to a complete mechanical engineering education, including non-technical essentials such as **ethics, communication, economics, and others**. Mech will lead the country in full integration of **system-thinking approaches** to engineering education and practice, across all degree programs. In each case, flexibility for growth, change, and student choice will be prioritized, as modern and complex engineering analysis and design tools evolve.

Departmental investment in Educational Leadership faculty will allow them to take a **leading role in the development of curricula, andragogy, and best practices** as we transform our teaching.

On Research

Mechanical Engineering research and innovation will play an important role in addressing the large-scale societal 'grand' challenges facing our world. We have identified three key areas where our expertise provides opportunities for significant impact as a focus of our research strategy.

Grand Challenges:

Sustainability: Transitioning to a sustainable economy requires holistic and interconnected innovation throughout our energy, transportation, and manufacturing systems. Over the course of the century, mitigating human impacts on the environment and adapting to climate change, while maintaining the economic vitality of our production systems, will be the central engineering challenge facing humanity.

Health: With an aging population, there are urgent needs to investigate fundamental disease processes and develop accessible healthcare technology for diverse populations. Addressing this grand challenge relies on mechanical engineers to develop biomechanics understanding across multiple scales for precise engineering models of physiology, as well as advanced mechatronics design of diagnostic and remote care technologies.

Autonomous Systems: Autonomous systems will have a profound and disruptive impact across key areas of the economy including manufacturing, transportation and healthcare. Our research will play a key role in developing these systems and navigating the concomitant ethical implications.

In tackling these interdisciplinary challenges, in addition to topical and fundamental mechanical engineering expertise, modern tools for the analysis of complex systems including systems engineering and decision making, data science, artificial intelligence and modern computational and experimental methods will be of increased importance.

As a collective of independent researchers, we pursue individual intellectual interests that align with major challenges facing the world and the tools needed to start tackling those challenges.

On Ways of Working

Advancement of equity, diversity, inclusion and Indigeneity (EDI.I) is intertwined with our mission and value statements. By maintaining and enhancing equity and inclusion, we foster growth and well-being in our community, show fairness and good faith, and ensure the integrity of our relationships with each other, the communities we serve, the lands we occupy, and the peoples who steward them.



Committee Members:

Carl Ollivier-Gooch, Adam Clare, Gwynn Elfring, Graham Hendra, Patrick Kirchen, Jen Pelletier

Subcommittees:

- Skills and Knowledge for Mechanical Engineering: Adrianna Eyking, Christoph Sielmann
- Undergraduate Education: Agnes d'Entremont, Dominic Liao-McPhereson
- Graduate Education: Dana Grecov, Naomi Zimmerman
- Research, Innovation & Impact: Alex Tavasoli, Lyndia Wu
- Ways of Working: Amanda Giang, Sean Buxton

Cover: The Sensing in Biomechanical Processes Lab (SimPL), led by Dr. Lyndia Wu, measures sports brain injury “dose-response” relationships.

Inside: The Lab for Environmental Assessment and Policy (LEAP), led by Dr. Amanda Giang, reimagines how we assess the impacts of technology and policy for planetary health.

Back: The Orthopaedic and Injury Biomechanics Group, including co-PI Dr. Tom Oxland, works on biomechanical performance of orthopaedic implants, neurotrauma to the spinal cord, and spine and hip injury prevention.