Mechanical Engineering Options Information Session

Early Admissions (First Year Students):

- **Acceptance into MECH is a separate process; your acceptance into an Option will be conditional on you being placed in MECH and successfully completing MECH 2.**

- **This year we are accepting early admissions for all options.**

New for this year:

Everyone must apply to an option, whether it be one of our specialized options or the more broad flex option (previously General).

All current MECH 2s who have not previously applied will need to apply this year.

Options Admissions Biomechanics & Medical Devices

Coordinator/Speaker: Dr. Agnes d’Entremont

Why Biomechanics & Medical Devices?

The Biomechanics & Medical Devices option was created to meet increasing demand for engineers with expertise in this area

Biomechanics & Medical Devices engineering is broad, and includes:

- Medical devices
- Human injury
- Movement analysis
- Medical imaging
- Surgical innovation

Career Paths

- Industry
- Hospitals
- Medical School
- Grad School

Curriculum

MECH 305 Data Analysis & Mech Eng Labs
MECH 325 Machine Design
MECH 328 Mech Eng Design Project
MECH 360 Mechanics of Materials
MECH 368 Eng Measurements & Instrumentation
MECH 375 Heat Transfer
MECH 463 Mechanical Vibrations

MECH 400 Professionalism & Ethics in Engineering
MECH 431 Engineering Economics
MECH 459 Biomedical Capstone Design Project
MECH 439 Biomechanics Research
MECH 466 Automatic Control
BMEG 410 Biomedical Equipment, Physiology, & Anatomy
BMEG 456 Clinical & Industrial Biomedical Engineering
MTRL 495 Biomaterials

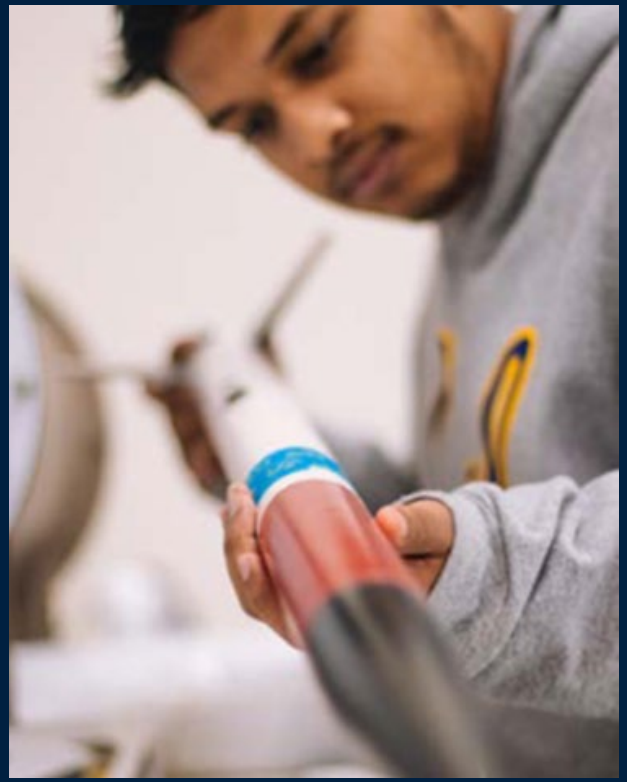
+12 credits of Technical Electives

Of the required 12 credits, students must take 2 of:
MECH 433 Biofluids
MECH 435 Orthopaedic Biomechanics
or MECH 436 Fundamentals of Injury Biomechanics

What do Alumni/ae think?

We asked what part of the option they appreciated the most

- Opportunity to sit in on surgeries
  - Hip, knee replacement
  - Fracture repair
- Labs
  - Anatomy and physiology
  - Human gait
- Tours
  - Hospital equipment
  - Device development
- Opportunity to see UBC research in this field
- Small class sizes in option-specific courses
- Chance to interact with profs in the field



Options Admissions Aerospace

Coordinator/Speaker: Dr. Kendal Bushe

Why Aerospace?

Fundamental concepts like fluid dynamics, solid mechanics and thermodynamics get applied to aerodynamics, propulsion systems, aircraft aerodynamics and structures.

Career options include:

- Aircraft maintenance
- Rocket design
- Propulsion systems design

Curriculum

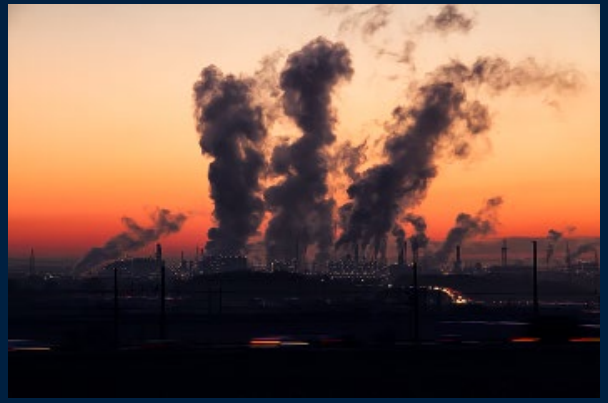
MECH 305 Data Analysis & Mech Eng Labs
MECH 327 Thermodynamics II
MECH 328 Mech Eng Design Project
MECH 359 Computational Methods for Mech Eng
MECH 360 Mechanics of Materials
MECH 368 Eng Measurements & Instrumentation
MECH 375 Heat Transfer
MECH 380 Fluid Dynamics
MECH 426 Mechanical Design
MECH 463 Mechanical Vibrations
MECH 481 Aerodynamics of Aircraft I

MECH 400 Professionalism & Ethics in Engineering
MECH 431 Engineering Economics
MECH 453 Aerospace Capstone Design Project
MECH 462 Finite Element Analysis
MECH 466 Automatic Control
MECH 477 Aerospace Propulsion
MECH 479 Intro to Computational Fluid Dynamics
MECH 484 Aircraft Design: Aerodynamics
MECH 485 Aircraft Design: Structures
MECH 489 Experimental Thermofluids
MTRL 494 Biomaterials

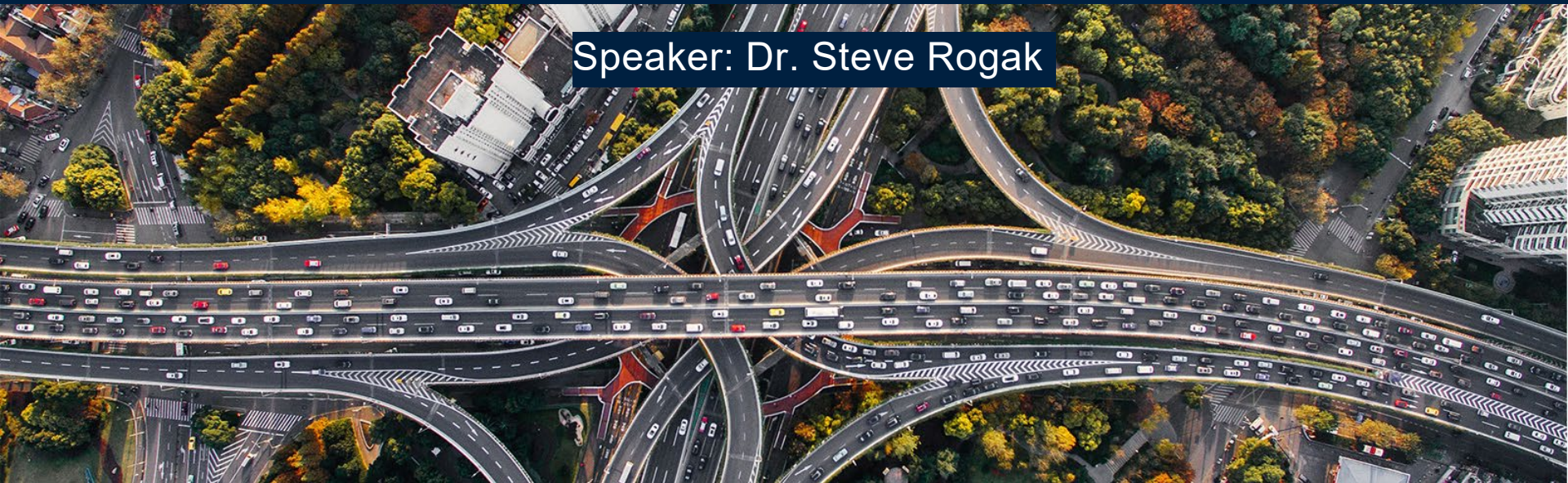
Research in Aerospace

Several MECH faculty members do research related to Aerospace, including (for example):

- **Carl Ollivier-Gooch** (CFD of external flows)
- **Mauricio Ponga** (crack propagation)
- **Rajeev Jaiman** (fluid/structure interactions)
- **Kendal Bushe** (combustion in gas turbines)
- **Srikanth Phani** (lattice structures)



Options Admissions
Energy & Environment

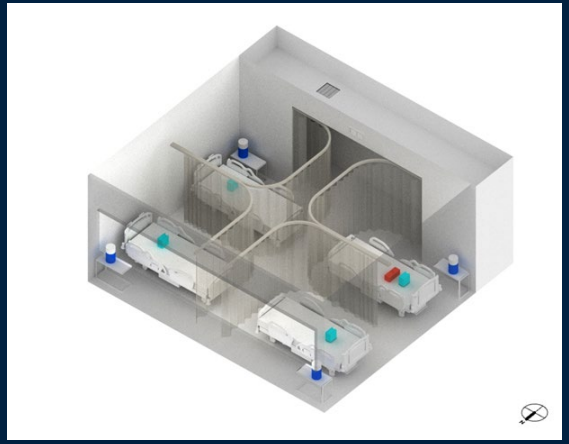


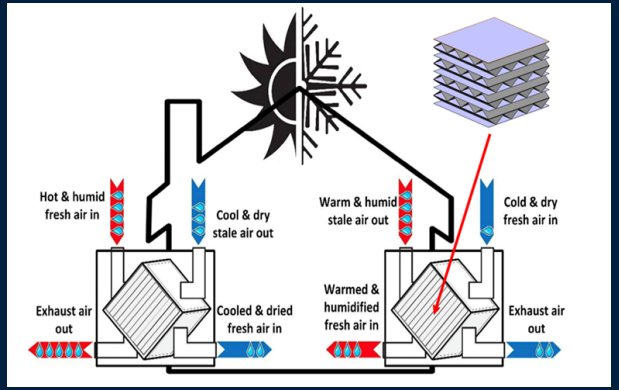
Speaker: Dr. Steve Rogak

Why Energy & Environment?

Analyze and develop energy systems involved in buildings, transportation and industry; while considering climate, health, economic, and political impacts of these systems.

Address engineering problems in a variety of industries by applying theories of thermodynamics, fluid mechanics, life cycle analysis and processes of pollution formation and control.





Curriculum

MECH 305 Data Analysis & Mech Eng Labs

MECH 325 Machine Design

MECH 327 Thermodynamics II

MECH 328 Mech Eng Design Project

MECH 360 Mechanics of Materials

MECH 368 Eng Measurements & Instrumentation

MECH 375 Heat Transfer

MECH 400 Professionalism & Ethics in Engineering

MECH 411 Air Pollution, Technology and Society

MECH 431 Engineering Economics

MECH 456 Energy & Environment Capstone Design Project

MECH 463 Mechanical Vibrations

MECH 466 Automatic Control

MECH 489 Experimental Thermofluids

+15 credits of Technical Electives

Research in Energy & Environment

Several MECH faculty members do research related to Energy & Environment, including (for example):

- **Nima Atabaki** (Heat and Mass Transfer, HVAC)
- **Kendal Bushe** (Turbulent Combustion and Emissions)
- **Amanda Giang** (Environmental Modelling, Air Pollution, Sustainability)
- **Patrick Kirchen** (Combustion Emissions, Transportation)
- **Walter Merida** (Clean Energy Systems)
- **Steve Rogak** (Combustion emissions, Aerosols, Sustainable Buildings)
- **Alex Tavasoli** (Solar energy, Green Chemistry)
- **Naomi Zimmerman** (Air Pollution, Urban Sustainability, Climate Change)

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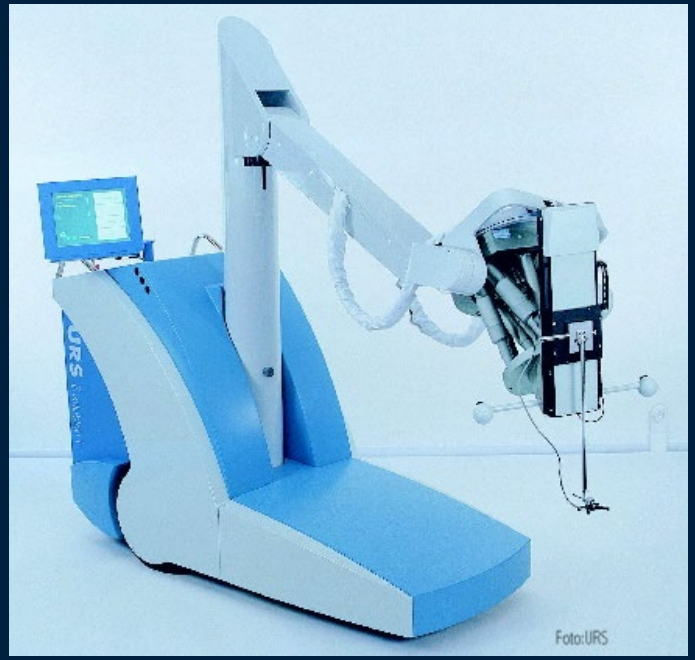
Options Admissions Mechatronics

Coordinator/Speaker: Dr. Yusuf Altintas

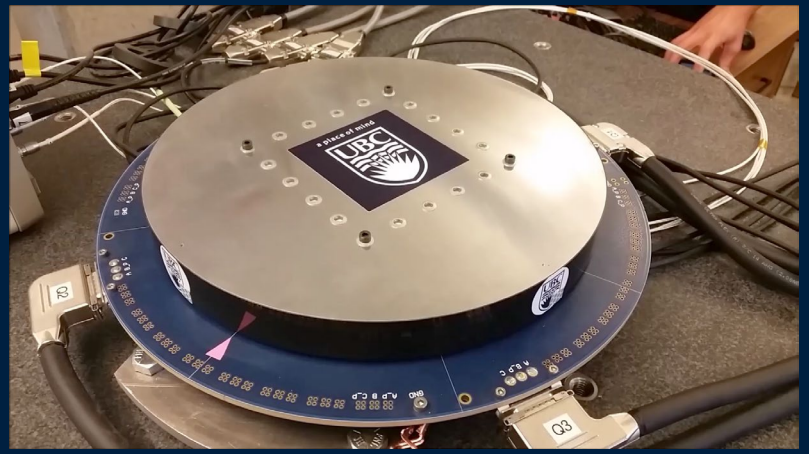
What is Mechatronics?



- The integration of precision mechanical design, electronics, sensors, actuators, controls and real time software engineering knowledge in the creation of a smart product
- Combining the principles of mechanical, computer, electrical, and controls engineering into a unified whole
- A fusion of disciplines that breaks down the artificial barriers between the separate disciplines

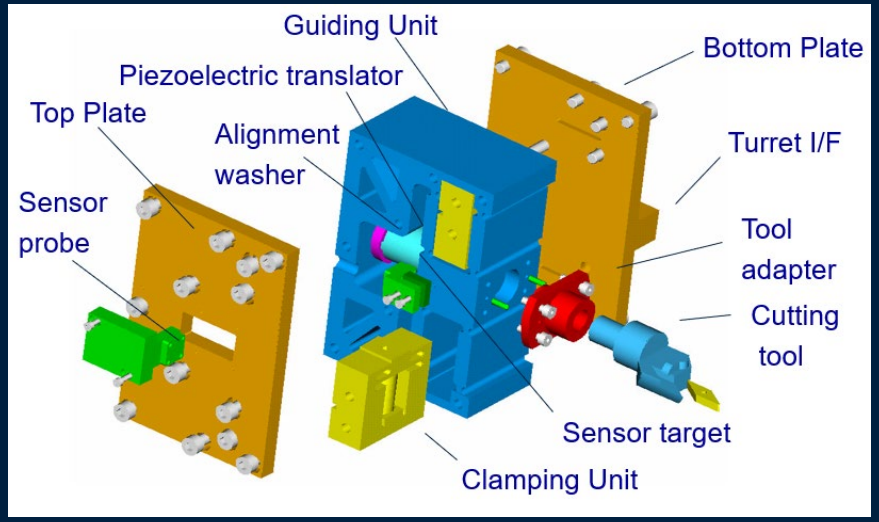
Products Developed by Mechatronics Students

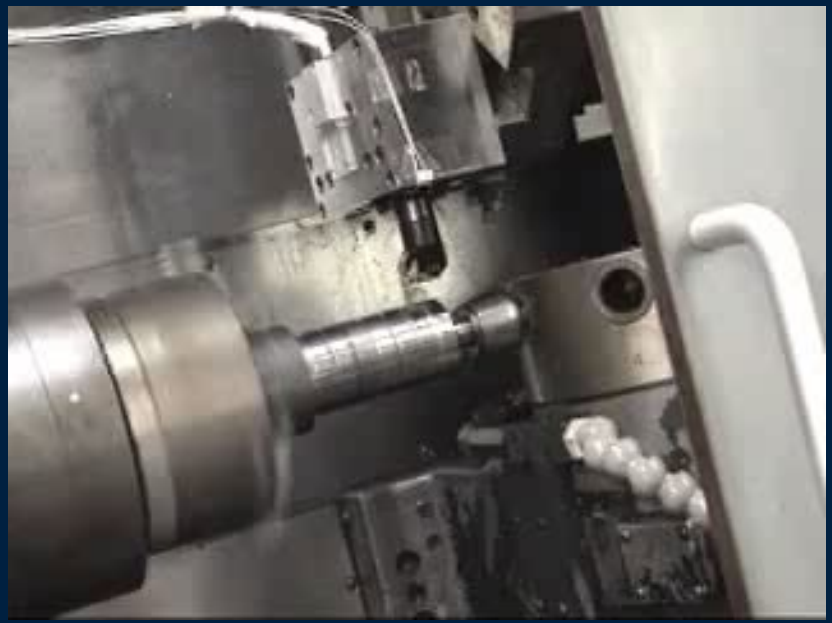
Flying magnetic table



Rotating-flying-singing magnetic table

Example - Design





Curriculum

CPSC 259 Data Structures & Algorithms for Electrical Engineers
ELEC 302 Electronic Circuits for Electromech Design
ELEC 343 Electromechanics
MECH 306 Data Analysis & Mechatronics Labs
MECH 325 Machine Design
MECH 328 Mech Eng Design Project
MECH 360 Mechanics of Material
MECH 375 Heat Transfer
MECH 366 Modeling of Mechatronic Systems
MECH 392 Manufacturing Processes

CPEN 312 Digital Systems & Microcomputers
CPEN 333 Software Design for Engineers
MECH 400 Professionalism & Ethics in Engineering
MECH 431 Engineering Economics
MECH 420 Sensors & Actuators
MECH 421 Mechatronics System Instrumentation
MECH 423 Mechatronic Product Design
MECH 463 Mechanical Vibrations
MECH 467 Computer Control of Mechatronics Systems
MECH 458 Mechatronics Capstone Design Project

+ 3 credits of Technical Elective(s)

Options Admissions Naval Architecture & Marine Engineering (NAME)

Coordinator/Speaker: Dr. Mohammed A. Hannan

❑ Why NAME?

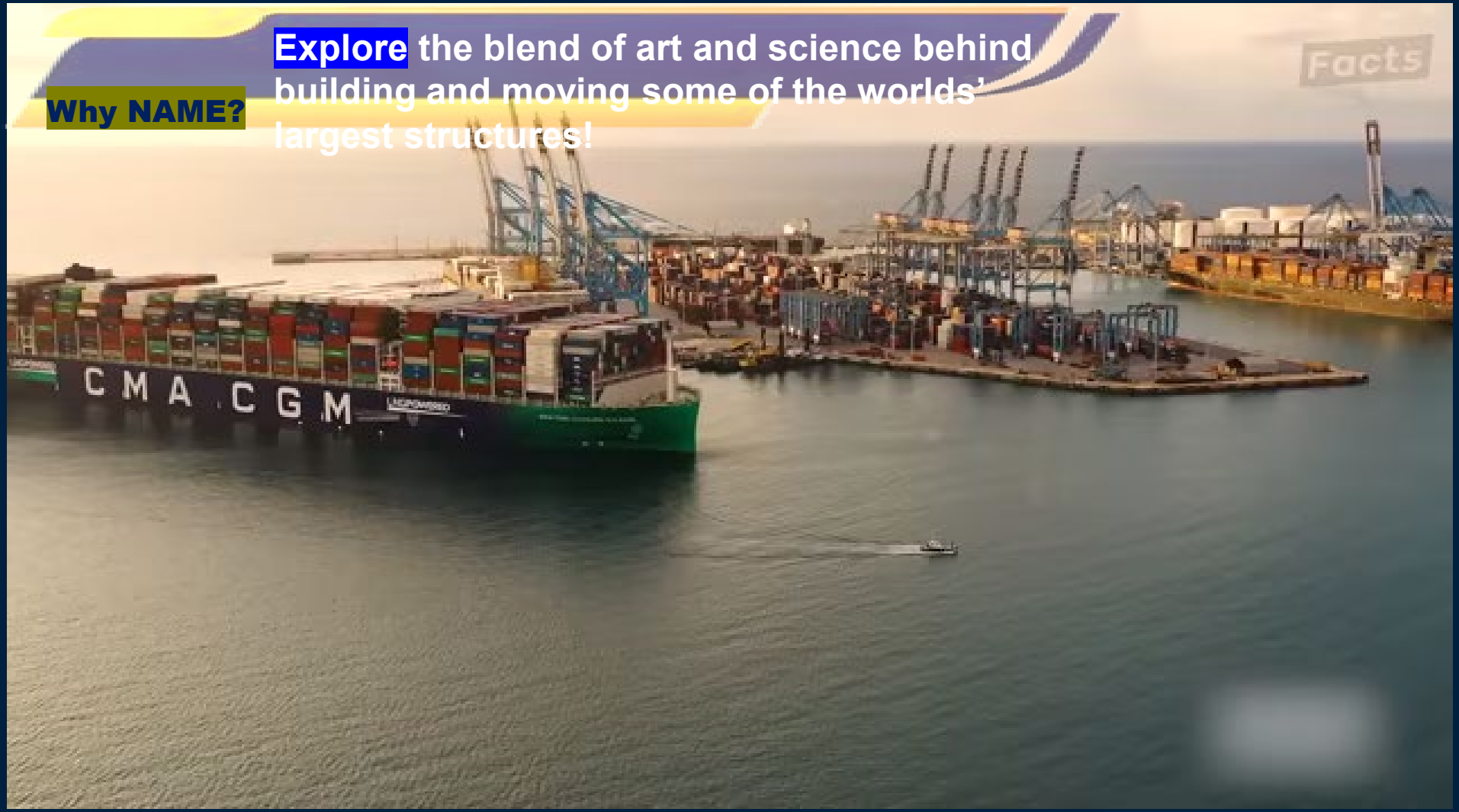
- **Career Advancement: Gain a Competitive Edge**
  - Acquire the skills that will allow you to work immediately after graduation in both a design office and shipyard environment.

- **Unleash Your Creativity**
  - NAME is a beautiful **blend of art and science**! We **need creative minds** to tackle the existing and upcoming challenges.

- **Take Pride in Building a Better Future**
  - Make a **positive impact in sustainable design** and operation of world's largest moving structures and most powerful vehicles
    - *Fast ferries, massive ships, offshore wind turbines, underwater vehicles*

Why NAME?

Explore the blend of art and science behind building and moving some of the worlds' largest structures!



❑ You will learn to …

- **Apply** the principles of Mechanical Engineering and Engineering Science in design and analysis of marine systems.
- **Identify** opportunities to optimize ship and other offshore structure design from sustainability point of view.
- **Address** design, construction and maintenance related challenges on wide range of marine vehicles used to exploit the ocean resources.
- **Assess** performance of various ships and offshore platforms from safety and economic perspective.


You will learn ...
The overall process of designing, building and testing Ships and various other offshore structures
WSL
Discovery

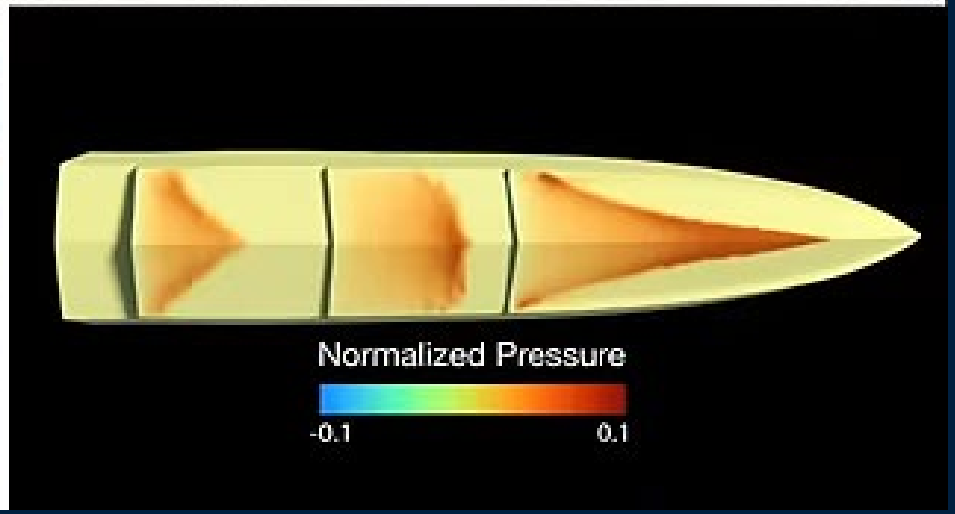
The mystery behind successfully launching a ship

You will uncover ...


You will gain ...
Knowledge of operating complex offshore structures including ships and other platforms
BREAKING NEWS
DESIGNED TO MEET FUTURE TRAINING OBJECTIVES

You will develop …

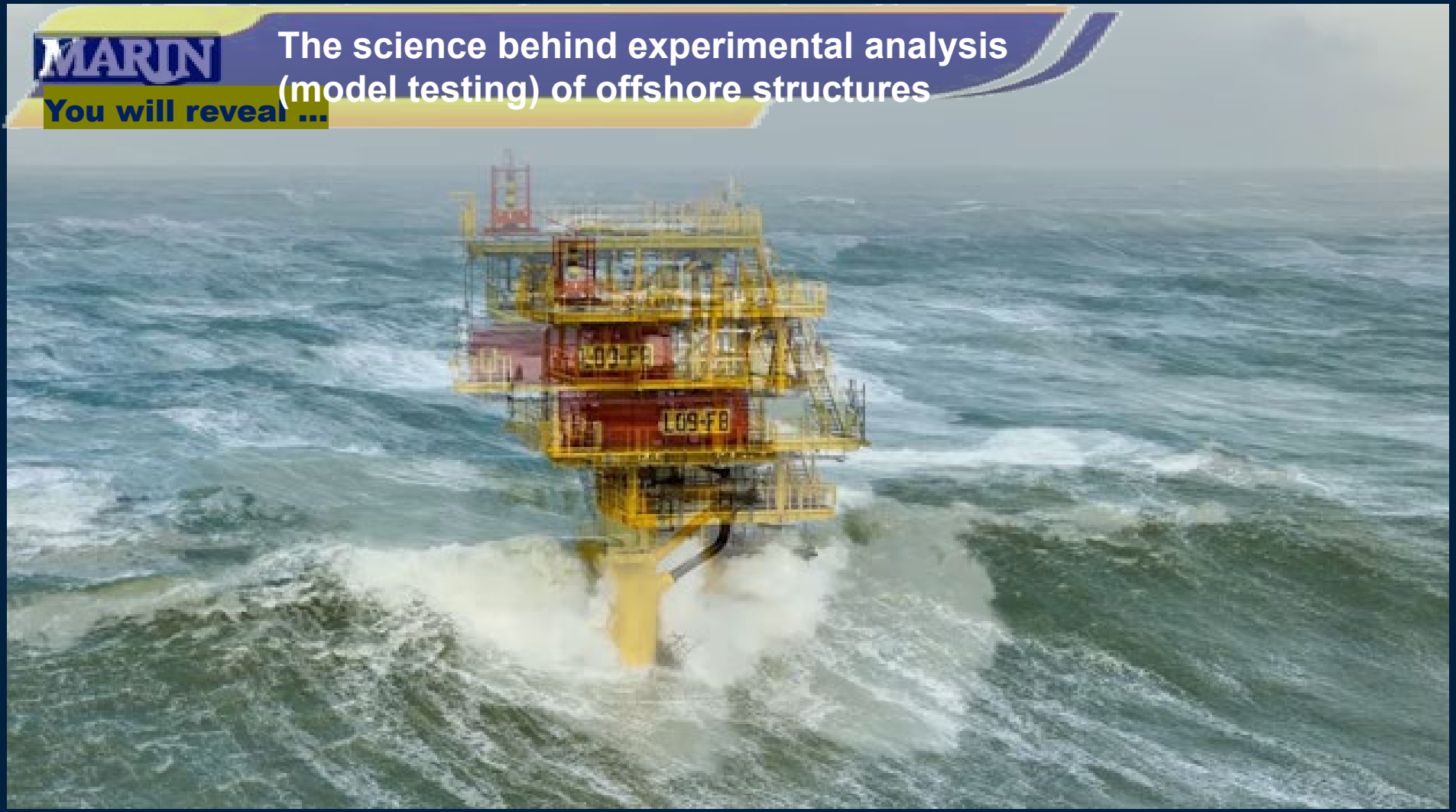
Expertise in computational analysis of ships and other offshore structures interaction with waves



The science behind experimental analysis (model testing) of offshore structures

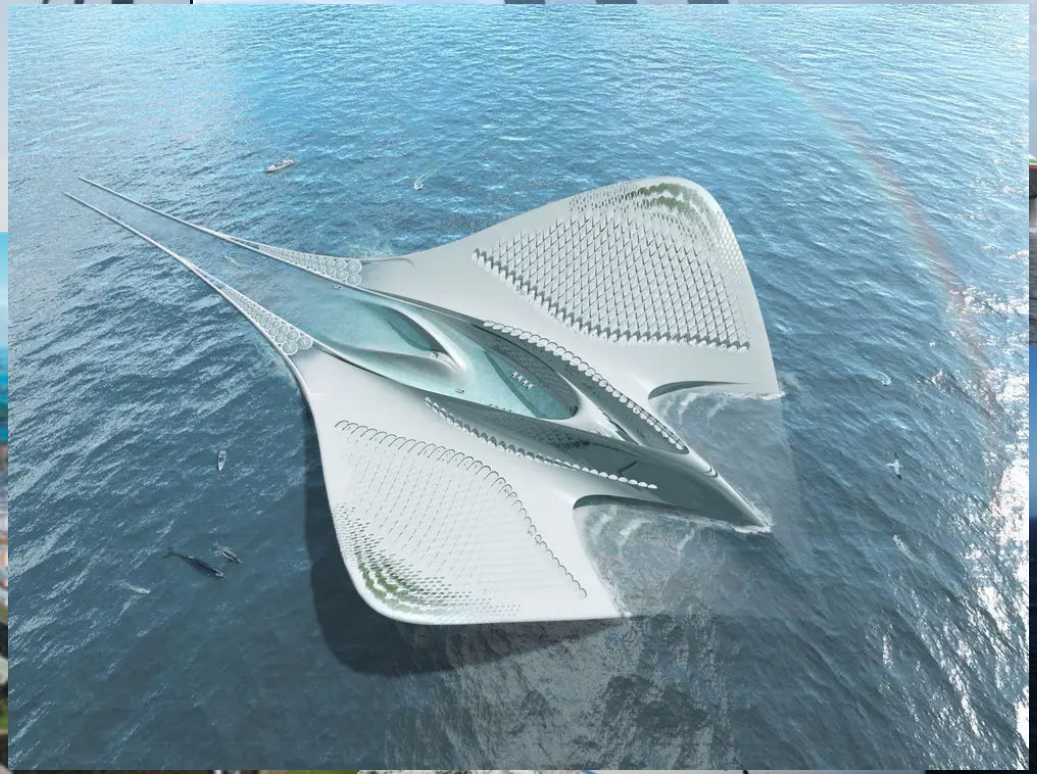
MARIN

You will reveal ...



To explore beyond the current frontiers of Naval Architecture

You will be equipped …



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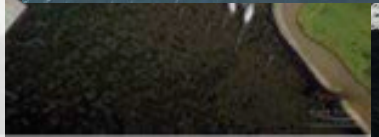


❑ Curriculum Highlights*

MECH 305 Data Analysis & Mech Eng Labs
MECH 325 Machine Design
MECH 327 Thermodynamics II
MECH 328 Mech Eng Design Project
MECH 359 Computational Methods for Mech Eng
MECH 360 Mechanics of Materials
MECH 368 Eng Measurements & Instrumentation
MECH 375 Heat Transfer
MECH 380 Fluid Dynamics

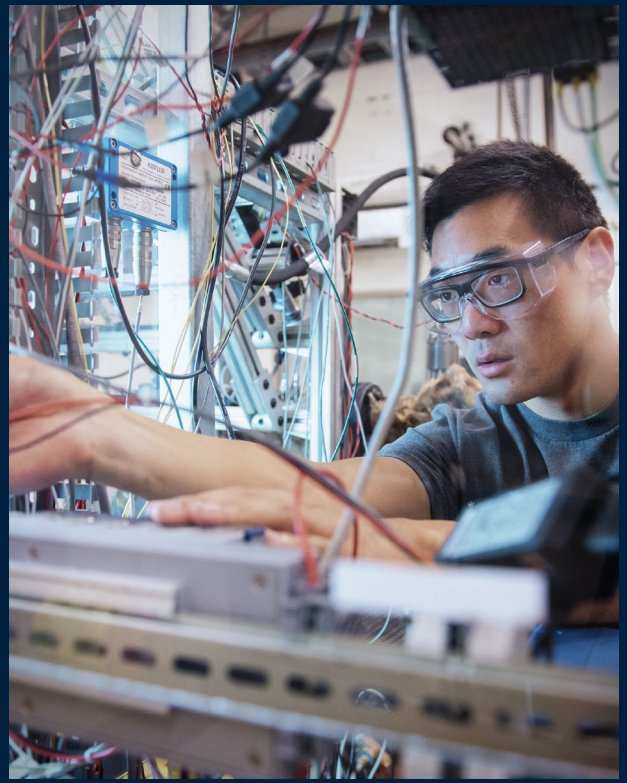
MECH 400 Professionalism & Ethics in Engineering
MECH 431 Engineering Economics
MECH 455 NAME Capstone Design Project
MECH 463 Mechanical Vibrations
MECH 466 Automatic Control
MECH 486 Intro to Ship Design
MECH 488 Intro to Ship Hydrodynamics
CIVL 435 Advanced Structural Analysis

* Plus 9 credits of technical electives, and 6 credits of complementary studies electives.

❑ Career Options

You are expected to find **employment in many sectors within the marine industry and beyond**. A few examples:

- Shipyards
- Engineering and Design Companies
- Classification Societies
- Government Organizations
  - Canadian Coast Guard, Transport Canada, National Research Council, etc.
- Offshore Companies
- Shipping Companies
- Education, Research and Development



Options Admissions Flex

Speaker: Dr. Tony Hodgson

Why Choose the Flex Option?

- Most flexibility and choice:
  - Core of essential courses needed by almost every MECH student
  - 22 credits of technical electives!

- Most popular option
  - Customize your program
  - Explore diverse interests
  - 56% of all current 3rd & 4th year MECH students are in the Flex Option!

Curriculum

CORE:

MECH 305 Data Analysis & Mech Eng Labs
MECH 325 Machine Design
MECH 328 Mech Eng Design Project
MECH 360 Mechanics of Materials
MECH 368 Eng Measurements & Instrumentation
MECH 375 Heat Transfer

MECH 400 Professionalism & Ethics in Engineering
MECH 431 Engineering Economics
MECH 457 Mech Eng Capstone Design Project
MECH 463 Mechanical Vibrations
MECH 466 Automatic Control

+22 credits of Technical Electives

Where Can I Work With Flex?

Flex gives you a solid foundation in core mechanical engineering skills, preparing you for work in a wide range of areas.

Opportunities to be employed in almost every industry: product design, energy, construction, acoustics, consulting, testing, biomedical devices, vehicles, aerospace, and beyond!

Application Package:

- Application form (Qualtrics)
- Statement of Intent (250 words)
- CV or resume
- Transcript (unofficial is fine)
- (Optional) Up to 2 pages of supplemental material
    - May include photos, screenshots, projects, reference letters, media articles, or similar

Submitting your Application:

Due February 29th at 11:59PM (Early Admission)
Or March 31st at 11:59PM (Regular Admission)

- Submit your documents via the Qualtrics form
- Please make sure you are checking the email you provided in your application frequently. Interview times will be communicated by email and a quick response will be required.

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