

# Carleton University

Department of Mechanical and Aerospace Engineering

Graduate Webinar Series

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## **Real-Time Operator-in-the-Loop Anti-Sway Control for Shipboard Cranes**

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### **Abstract**

Shipboard cranes play an important role in many maritime operations, however unexpected payload sway due to the motion of the ship or external disturbances creates a hazardous environment for deck personnel. To improve deck safety, the current research focuses on the development of an anti-sway control system that provides complete motion compensation for the payload in both the ship deck and ocean coordinate frames and can switch smoothly between each during operation. The system is tested in high-fidelity simulations on high-degree-of-freedom shipboard gantry and knuckle-boom cranes, including consideration of double pendulum effects and wind disturbances. Additionally, the system is tested in a human factors study with a virtual reality simulator to evaluate how effective and intuitive anti-sway control is with an operator-in-the-loop.

### **Bio**

Mr. Iain Martin completed his bachelor's degree in Mechanical Engineering at the University of Alberta and is currently a PhD candidate in the Department of Mechanical and Aerospace Engineering at Carleton University, with a research focus on nonlinear dynamics and control systems.