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Thursday, March 25, 2021 | 3:00 PM – 4:00 PM

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**“Sensing in a dynamic world: how insects coordinate sensing and movement to orient in flight”**

Presented by [Professor Jean-Michel Mongeau](#)

*Department of Mechanical Engineering, Pennsylvania State University*

Every day we coordinate eye, head and body movements seamlessly to go about our daily activities. Similarly, flying insects coordinate head and body movements to orient in space. A challenge in studying biological movement is that moving sensors are coupled to a moving body. Another challenge is that locomotion is inherently closed-loop: information flows from sensors to the body and vice versa. How should moving sensors be coordinated on a moving body to enable agile movement? In this talk, I will present a framework to quantify how the brain controls movement by integrating experimental and theoretical approaches at the interface of neuroscience, biomechanics and control theory. Emphasizing the sense of vision, I will draw on control tasks in flying insects and describe how active eye movements coordinate and synergize with body movements. I will also discuss novel techniques to study closed-loop behavior in virtual reality. Throughout, I will highlight the interdisciplinary nature of my research program that can inspire the development of more agile insect-scale robots.



**Jean-Michel Mongeau** is an Assistant Professor in the Department of Mechanical Engineering at Penn State University. He directs the Bio-Motion Systems lab which studies the neuro-mechanics and control of aerial and terrestrial locomotion in animals and machines. Dr. Mongeau received a Ph.D. from UC Berkeley in Biophysics and a B.S. in Biomedical Engineering from Northwestern University. He is the recipient of the AFOSR Young Investigator Program (YIP) award and is an Alfred P. Sloan Research Fellow in Neuroscience.

Dr. Mongeau was a NSF IGERT and NSF Graduate Research fellow. Prior to joining Penn State, he was a post-doctoral scholar at UCLA sponsored by HHMI and ARO.