

NEWSLETTER

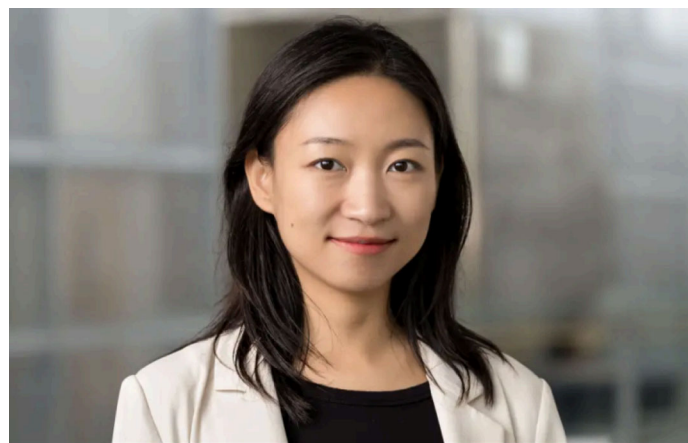


SEPTEMBER 2025

UNIVERSITY OF WISCONSIN-MADISON

Congratulations, Professor Zhou!

Lei Zhou, the Associate Director of WEMPEC, has been honored with the NSF Career Award for her research on the acceleration-bandwidth tradeoff in precision motion systems. Her advances could accelerate high-power-density electric machine construction. Read a feature about Zhou's background and research below.



How did you become interested in engineering, and this field in particular?

My father is a mechanical engineer. He spent his career developing hydraulic equipment for mining sites. I started to hear words about engineering – sealing rings, fasteners – from a very early age, so it was pretty natural for me to go into engineering, because that was something I really enjoyed.

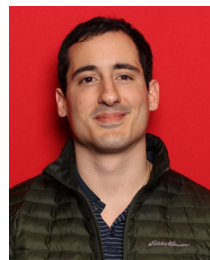
All of my degrees are in mechanical engineering. When I got into grad school, I was interested in electromechanical systems and mechatronics, which are on the boundary of mechanical and electrical engineering. My advisor was an electrical engineer by training, so I learned more about electromagnetics and their engineering applications. At WEMPEC, I'm fortunate to be in both departments.

What is the broader impact of your research?

In integrated circuit manufacturing, the throughput is limited by how fast the motion stage can move. We are trying to do something called over-actuation, basically adding more actuators and sensors, and then smartly introducing structural compliance. We remove some weight from the motion structure, and add back that stiffness by having a high-bandwidth feedback control.

This is a general framework that allows us to make mechatronic systems that are simultaneously lightweight and high-bandwidth. It also applies to large-diameter electric machines such as axial flux motors for fans or power-lifting drones.

**WELCOME, NEW
STUDENTS!**



Ethan Zenker (MS) - Prof. Gupta
Gabriel Twohig (PhD) - Prof. Bulent
Albert Rhee (MS-R) - Prof. Roy
Sangin Bae (PhD) - Prof. Roy

Shalini Manna (PhD) - Prof. Giri
Cameron Little (MS) - Prof. Ludois
Ruben Gasparini (MS) - Prof. Gupta
Shuaihu Wu (PhD) - Prof. Zhou

CHECK OUT THE LATEST WEMPEC NEWS HERE



WEMPEC Orientation and Social

Last week, students across WEMPEC participated in an annual orientation, followed by a social with bowling and pool! Bowling winners received Babcock Dairy gift cards and cookware from Orange Tree Imports.



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