

**Environmental Engineering**

**and Earth Sciences**

**EEES Department Seminar**

**Innovative and Translational Research in**

**Sustainable Precision Fermentation Systems**

**Dr. Ke Wang**

Senior Scientist

Amgen Inc.

**Abstract:**

The rapid population growth and contemporary industrialization have exaggerated many challenges in the 21st century such as overexploitation of natural resources, massive waste generation, and their environmental consequences. Meanwhile, the emerging public recognition and pursuit of sustainability are calling for holistic solutions to address current societal challenges and improve resilience to climate change. The underutilized bioresources from food and agriculture, particularly waste streams, contain rich nutrients that are problematic for waste disposal. They have the potential to be transformed into high value-added bioproducts such as biomaterials, novel foods, and biopharmaceutics, which in turn reduce adverse impact to the environment, create opportunities for circular bioeconomy, and promote human health. This seminar will elaborate on my past and current research work through a couple case studies. The first case study will center on the development of precision fermentation systems to produce biodegradable plastics from food waste and cheese side streams. The studies on cell performance and biopolymer synthesis will be demonstrated with both experimental work and AI-assisted metabolic modeling. Additional highlights on translational research including techno-economic modeling and life-cycle analysis will be introduced. The second case study will focus on the expansion of research expertise from the biomaterial-centric into other bioproducts including cell-cultured foods and therapeutic proteins. Next-generation technologies such as perfusion fermentation and automatic miniatured bioreactor systems will be discussed, which advance process throughput and are adaptable to various cell cultures. The talk will conclude with visions and future research plans in three areas: cell factory engineering, advanced bioreaction platform and bioprocess translation.

**About Dr. Wang:**

Dr. Ke Wang is currently a senior scientist at Amgen Inc. leading projects on antibody production, high-throughput biotechnology, and process scaling-up. Prior to this position, she received her Ph.D. degree in Biosystems Engineering from University of California Davis. She is interested in fundamental research on engineering cell factories to produce novel foods and bioproducts with valorization of agri-food bioresources. Her research will also focus on developing advanced bioreaction systems with high-throughput techniques and modelling-aided process optimization. She is very passionate about translational research to navigate biotechnology from both economic and environmental perspectives and advocate sustainable development in the current industries.

**3:30 PM – 4:30 PM**

**Thursday, February 1, 2024**

**Rich Lab Auditorium**

***Attendance is mandatory for graduate students enrolled in***

 ***EES 8610, EES 9610, and GEOL 8610.***

***Refreshments following seminar.***