Artificial Intelligence, Modeling and Simulation in Engineering

Chair, Department of Mechanical Engineering

Ching-Long Lin

Undergraduate certificate: artificial intelligence, modeling and simulation in engineering

Graduate certificate: artificial intelligence, modeling and simulation in engineering

Faculty: https://engineering.uiowa.edu/me-people

Website: https://engineering.uiowa.edu/mechanical-engineering-undergraduate-program/me-certificates/artificial-intelligence-modeling-and

Artificial intelligence (AI) is a technology that mimics human intelligence to perform complex tasks. Machine learning (ML) is a subfield of AI that uses statistical methods to learn from data without being explicitly programmed. Deep learning (DL) is a main subset of machine learning that uses multi-layered neural networks to learn from data. Modeling and simulation (M&S) in engineering is a field that uses mathematical models as a basis for simulations to generate data analyzed for product and system design. M&S is a knowledge-based approach that develops models to generate data, while ML is a data-based approach that learns from data to generate models.

The AIMS certificate undergraduate program teaches students:

- the importance of uncertainty quantification (UQ) in all methods;
- the various types of combinations of approaches (M&S-assisted ML, ML-assisted M&S, and hybrid); and
- the notion of using hybrid models for the design of intelligent complex machines.

The certificate is administered by the Department of Mechanical Engineering.