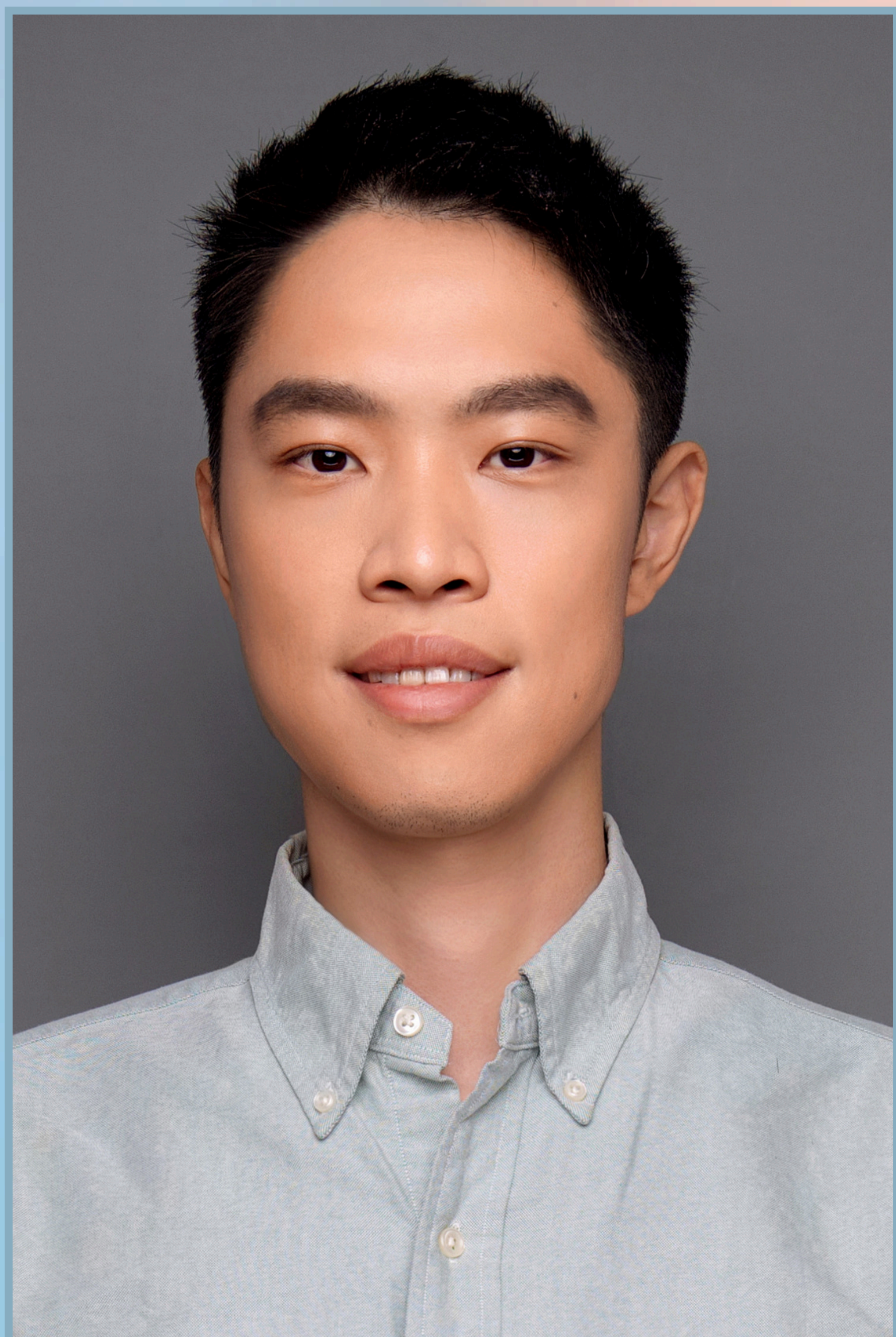# FAU

Friedrich-Alexander-Universität
Research Center for
Mathematics of Data | MoD

FAU MoD Course

Towards a mathematical foundation of Deep Learning: From phenomena to theory

Yaoyu Zhang

SHANGHAI JIAO TONG UNIVERSITY

WWW.MOD.FAU.EU

#FAUMoDCourse

Establishing a mathematical foundation for deep learning is a significant and challenging endeavor in mathematics. Recent theoretical advancements are transforming deep learning from a black box into a more transparent and understandable framework. This course offers an in-depth exploration of these developments, emphasizing a promising phenomenological approach. It is designed for those seeking an intuitive understanding of how neural networks learn from data, as well as an appreciation of their theoretical underpinnings. (...)

Session Titles:
1. Mysteries of Deep Learning
2. Frequency Principle/Spectral Bias
3. Condensation Phenomenon
4. From Condensation to Loss Landscape Analysis
5. From Condensation to Generalization Theory

Overall, this course serves as a gateway to the vibrant field of deep learning theory, inspiring participants to contribute fresh perspectives to its advancement and application.

WHEN
Fri.-Thu. **May 2-8, 2025**
10:00H (Berlin time)

WHERE
On-site / Online

Friedrich-Alexander-Universität
Erlangen-Nürnberg (FAU)
Room **H11**
Felix-Klein building
Cauerstraße 11, 91058
Erlangen. Bavaria, Germany

Live-streaming:
www.fau.tv/fau-mod-livestream-2025

*Check room/day on website