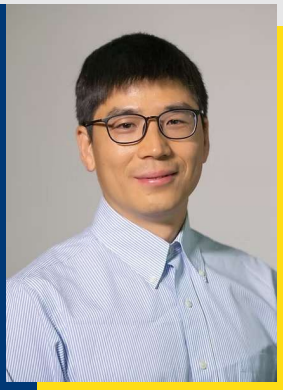
연세대학교 대기과학과/지구환경연구소
BK21 지구대기천문 교육연구단 세미나

Neural Operators in Fluid Dynamics: From Turbulence Parameterization to Data Assimilation

Prof. Heng Xiao

University of Stuttgart



학력

2009 Ph.D., Civil Engineering, Princeton University, USA
2005 M.Sc., Scientific Computing, Royal Institute of Technology (KTH), Sweden
2003 B.Sc., Civil Engineering, Zhejiang University, China

경력

2023–present Professor of Data-Driven Fluid Dynamics, University of Stuttgart, Germany
2020–2022 Associate Professor, Aerospace and Ocean Engineering, Virginia Tech, USA
2013–2020 Assistant Professor, Aerospace and Ocean Engineering, Virginia Tech, USA
2009–2012 Postdoctoral Researcher/Lecturer, ETH Zürich, Switzerland

Abstract

Neural operators are emerging tools that learn mappings between physical fields—such as wind velocity and temperature—directly from simulation or observational data. In this talk, I present how they can be used to model complex, nonlocal processes in turbulent flows and to enable data assimilation by learning mappings between prior and posterior probability distributions. We demonstrate applications in turbulence parameterization using graph neural networks, and in data assimilation using neural operator–based ensemble filters. This approach offers a unified, mesh-independent and sample-efficient framework for learning physical relationships from data.

날짜/시간 09월 10일 수요일 오전 10시
장 소 과학관 B102호

연세대학교 YONSEI UNIVERSITY