Tuo Liu

Research Interests: Online Learning, Uncertainty Quantification and Optimization

Thuwal, Saudi Arabia • tuo.liu@kaust.edu.sa • Google Scholar

Education

King Abdullah University of Science and Technology *Thuwal, Saudi Arabia*
PhD in Applied Mathematics *June 2024 – Oct 2028*
- Advisor: Prof. Francesco Orabona *(expected)*

King Abdullah University of Science and Technology *Thuwal, Saudi Arabia*
MS in Applied Mathematics *Aug 2022 – June 2024*
- Thesis: Explicit Runge-Kutta Methods for Quadratic Optimization with Optimal Rates [link]
- Advisor: Prof. David Ketcheson
- GPA: 3.88/4.00

Southern University of Science and Technology (SUSTech) *Shenzhen, China*
BS in Geophysics *Sept 2016 – July 2020*
- Thesis: Imaging the Pacific and Philippine Sea Plates: A Finite Frequency Teleseismic Wave Tomography Model of Japan
- Advisor: Prof. Wei Zhang
- GPA: 3.76/4.00

Publications

A Black-Box Reduction from Regret to Multi-Level Coverage
Tuo Liu, Edgar Dobriban, Francesco Orabona
The Fortieth Annual Conference on Neural Information Processing Systems (NeurIPS 2026) [link]

Online Conformal Prediction via Universal Portfolio Algorithms
Tuo Liu, Edgar Dobriban, Francesco Orabona
The Forty-Third International Conference on Machine Learning (ICML 2026), **Spotlight** (top 2.2%) [link]

Dual Averaging Converges for Nonconvex Smooth Stochastic Optimization
Tuo Liu, El Mehdi Saad, Wojciech Kotłowski, Francesco Orabona
The Twenty-Ninth Annual Conference on Artificial Intelligence and Statistics (AISTATS 2026) [link]

Preprints

Monitoring for Shifts at Unknown Times: Parameter-Free Conditional Conformal Martingales
Tuo Liu, Drew Prinster, Francesco Orabona
In submission [arxiv]

Efficient Multi-Forecast Optimization of Ship Routing
Tuo Liu, Rihab Larayedh, Ibrahim Hoteit, David Ketcheson, George Turkiyyah
In submission [pdf]

Explicit Runge-Kutta Methods for Quadratic Optimization with Optimal Rates
Tuo Liu, David Ketcheson
Preprint [thesis]

Invited Talks

Explicit Runge-Kutta Methods for Quadratic Optimization with Optimal Rates, The 14th American Institute of Mathematical Sciences (AIMS) Conference (2024)

Research Experience

School of Data Science, The Chinese University of Hong Kong, Shenzhen — Shenzhen, China
Research Intern — May 2026 – Aug 2026
- Host: Prof. Junchi Yang
- Research: Efficient algorithms for multi-objective optimization

School of Earth and Space Sciences, Peking University — Beijing, China
Research Intern — Mar 2021 – Aug 2021
- Host: Prof. Xiaodong Song
- Research: Geophysical inverse problems

Berkeley Seismological Laboratory, UC Berkeley — Berkeley, CA, USA
Research Intern — Sept 2019 – Dec 2019
- Host: Prof. Richard Allen
- Research: Seismic traveltime tomography and large-scale sparse inversion

Teaching Experience

King Abdullah University of Science and Technology — Sept 2025 – Dec 2025
Teaching Assistant
CS 333: Online Learning

King Abdullah University of Science and Technology — Feb 2024 – May 2024
Teaching Assistant
AMCS 252: Numerical Analysis of Differential Equations

Southern University of Science and Technology — Dec 2017 – June 2018
Teaching Assistant
MA 103b: Linear Algebra I

Professional Services

AISTATS 2027 — Montreal, Canada
Reviewer — 2026

NeurIPS 2026 — Sydney, Australia
Reviewer — 2026

1st Asia-Pacific Geophysics Student Conference — Hefei, China
Organizing Committee — Nov 2019 – Sept 2020

SEG Student Chapter, SUSTech — Shenzhen, China
President-elect — Apr 2019 – July 2020
Co-founded the certified Chapter of SEG at SUSTech with Prof. Wei Zhang. Initialized the officer elections and established the first organization of officers. Led all regular meetings and managed chapter operations. Coordinated seminars (mostly given by internal faculties) to give career advice on working with geophysics in both academia and industry.

Selected Honors

- SUSTech Department Head Scholarship for Overseas Studies (2019)
- SEG/Schlumberger Scholarship, Society of Exploration Geophysicists (2019)

Skills

Programming: Python and MATLAB (proficient). Fortran, Unix, and Wolfram Mathematica (experienced)

ML Frameworks: JAX, PyTorch

Hobbies: Olympic weightlifting, powerlifting, drumming and cooking