Ray Zirui Zhang

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ACADEMIC POSITIONS	**Assistant Professor** Department of Mathematical Science Worcester Polytechnique Institute	Worcester, USA Aug 2025 - Present
	Visiting Assistant Professor Department of Mathematics University of California, Irvine Mentor: John Lowengrub	Irvine, USA July 2022 - June 2025
RESEARCH SUMMARY	My research interests lie in computational mathematics, scientific machine learning, and data science, with applications in biophysics and cancer research.	
EDUCATION	**Ph.D. in Mathematics** University of California, San Diego Advised by Li-Tien Cheng, co-advised by Bo Li.	Sept 2017 – June 2022 San Diego, USA
	M.S. in Computational Science University of California, San Diego	Sept 2017 – June 2019 San Diego, USA
	B.Eng in Civil Engineering University of Hong Kong	Sept 2012 – June 2016 Hong Kong

AWARDS & HONORS	Keynote speaker for the session *Computational Models and Methods for Predicting Cancer Progression and Treatment Response* at WCCM 2024	2024
	UCI Systems Biology Opportunity Award (with Rany Tith and Song Zhu)	2024
	Rising Star speaker at UCI Center for Complex Biological Systems Retreat	2024
	The Data Science Conference 2023 travel grant (NSF)	2023
	Powell Dissertation Award (UCSD)	2022
	Gold Medal of BirdCLEF 2021 – Birdcall Identification (Kaggle)	2021
	James B. Ax Fellowship (UCSD)	2019
	Emerging Engineering Award (Institute of Civil Engineers)	2017
	Soong Ching Ling Scholarship (Soong Ching Ling Foundation)	2012

PUBLICATIONS & PREPRINTS	**Personalized Predictions of Glioblastoma Infiltration: Mathematical Models, Physics-Informed Neural Networks and Multimodal Scans** Ray Zirui Zhang, Ivan Ezhov, Michal Balcerak, Andy Zhu, Benedikt Wiestler, Bjoern Menze, John Lowengrub. *Medical Image Analysis, 2025*

BiLO: Bilevel Local Operator Learning for PDE inverse problems
Ray Zirui Zhang, Xiaohui Xie, John Lowengrub.
Submitted. Preprint on arXiv

Individualizing Glioma Radiotherapy Planning by Optimization of a Data and Physics Informed Discrete Loss
Michal Balcerak, Ivan Ezhov, Petr Karnakov, Sergey Litvinov, Petros Koumoutsakos, Jonas Weidner, Ray Zirui Zhang, John S Lowengrub, Bene Wiestler, Bjoern Menze.
Nature Communications, 2025

A Compact Coupling Interface Method with Second-Order Gradient Approximation for Elliptic Interface Problems
Ray Zirui Zhang, Li-Tien Cheng.
Journal of Scientific Computing, 2024

Binary Level Set method for Variational Implicit Solvation Model
Ray Zirui Zhang, Li-Tien Cheng.
SIAM Journal of Scientific Computing, 2023

Explicit-Solute Implicit-Solvent molecular simulation with Binary level-set, adaptive-mobility, and GPU
Shuang Liu, Ray Zirui Zhang, Li-Tien Cheng, and Bo Li.
Journal of Computational Physics, 2022

Coupling Monte Carlo, Variational Implicit Solvation, and Binary Level-Set for Simulations of Biomolecular Binding
Ray Zirui Zhang, Clarisse G. Ricci, Chao Fan, Li-Tien Cheng, Bo Li, J.Andrew McCammon.
Journal of Chemical Theory and Computation, 2021

Runout Scaling and Deposit Morphology of Rapid Mudflows
Lu Jing, C. Y. Kwok, Y. F. Leung, Ray Zirui Zhang, Lutao Dai.
Journal of Geophysical Research: Earth Surface, 2018

TALKS

Interdisciplinary Center for Quantitative Modeling in Biology, UCR (2025)
The Mathematics of Data, Dynamics, and Life Sciences, UCI (2025)
Center for Computational Mathematics Seminar, UCSD (2025)
Computational and Applied Mathematics Seminar, Arizona State University(2025)
AMS Fall Western Sectional Meeting, UCR (2024)
Computational and Applied Mathematics Colloquium, Penn State (2024)
16th World Congress on Computational Mechanics (WCCM) and 4th Pan American Congress on Computational Mechanics, Vancouver, Canada (2024)
Joint Annual Meeting of the Korean Society for Mathematical Biology and the Society for Mathematical Biology (SMB), Seoul, Korea (2024)

SIAM Conference on Life Science, Portland, OR (2024)

2024 UCI Systems Biology Retreat, Pasadena, CA (2024)

Statistical and Machine Learning Applications in Biomedical Sciences, UCI (2024)

Center for Computational Mathematics Seminar, UCSD (2024)

17th U.S. National Congress on Computational Mechanics, Albuquerque, NM (2023)

The Data Science Conference, University of San Francisco (2023)

Southern California Applied Mathematics Symposium (2023)

UCI Applied Math Seminar (2023)

SIAM Conference on Optimization, Seattle, WA (2023)

Long Feng Science Forum, The Chinese University of Hong Kong, Shenzhen (2023)

Predictive Modeling in Biology and Medicine Conference, UC Riverside (2023)

The International Conference on New Trends in Computational and Data Sciences, Caltech (Poster, 2023)

SIAM Texas Louisiana Section Annual Meeting, University of Houston (2022)

TEACHING	**Instructor, UCI**	Sept 2022 – Present

MATH 9 Intro Programming for Numerical Analysis (FA22, SP23, SP24)

MATH 10 Intro Programming for Data Science (SP24, FA24, SP25)

MATH 199 Undergraduate Supervised Reading and Research

Teaching Assistant, UCSD	Sept 2018 – Jun 2022

MATH 114 Intro Computational Stochastics

MATH 170A Intro Numerical Analysis: Linear Algebra

MATH 170B Intro Numerical Analysis: Approximation and Nonlinear Equations

MATH 170C Intro Numerical Analysis: Ordinary Differential Equations

MATH 174 Numerical Methods and Physical Modeling

MATH 180A Intro Probability

MATH 181A Intro Statistics

MATH 270A Numerical Linear Algebra

MATH 270C Numerical Ordinary Differential Equations

SERVICES	Mentor of Math ExpLR: Summer Research Program for High School Students	2024
	Organizer of Minisymposium *Image-Guided Mathematical Modeling in Clinical and Pre-Clinical Oncology* at SMB annual meeting	2024
	Guest Lecturer of UCI Cancer Systems Biology Short Course	2024
	Reviewer of NeurIPS, ICML, ICLR, TMLR	
	Organizer of 2023 Southern California Applied Mathematics Symposium	2023
	Volunteer tutor at Math Open House	2021
	Volunteer teacher at Nepal Volunteers Council	2013