

Ke Chen

- CONTACT INFORMATION** University of Maryland, College Park math.umd.edu/~kechen
Department of Mathematics kechen@umd.edu
4303 Kirwan Hall, College Park, MD 20742 608-422-2234
- EMPLOYMENT** **University of Maryland, College Park, USA**
Brin Postdoc, Department of Mathematics, August 2022 - Present
- University of Texas at Austin, USA**
R.H. Bing Instructor, Department of Mathematics, August 2019 - 2022
- EDUCATION** **University of Wisconsin-Madison, USA**
Ph.D. in Mathematics, August 2019
Advisor: Qin Li
M.S. in Mathematics, May 2016
- Shanghai Jiao Tong University (SJTU), China**
B.A. in Mathematics and Applied Mathematics, May 2015
- HONORS**
- | | |
|------|---|
| 2019 | MMLS Poster Award Finalist , UW-Madison |
| 2019 | Honored Instructor , UW-Madison
<i>Campus-wide teaching award to outstanding TAs</i> |
| 2018 | John. A. Nohel Prize , UW-Madison
<i>Thesis award to the best applied mathematics graduates</i> |
| 2016 | Physical Sciences Award , UW-Madison
<i>Award to new Ph.D students</i> |
| 2013 | Tsung-Dao Lee Undergraduate Research Grant , SJTU |
| 2012 | Meritorious Student Award , SJTU |
- PREPRINT**
- Fast and high-order approximation of parabolic equations using hierarchical direct solvers and implicit Runge-Kutta methods*
(with Daniel Appelö, Tracy Babb and Per-Gunnar Martinsson)
Under revision, Communications on Applied Mathematics and Computation, arXiv 2306.02526
- Pseudo-differential integral autoencoder network for inverse PDE operators*
(with Jasen Lai and Chunmei Wang, arXiv 2310.09856)
- Let data talk: data-regularized operator learning theory for inverse problems*
(with Chunmei Wang and Haizhao Yang, arXiv 2310.09854)
- PUBLICATIONS**
- Deep operator learning lessens the curse of dimensionality for PDEs*
(with Chunmei Wang and Haizhao Yang)
Accepted, Transactions on Machine Learning Research (TMLR), arXiv 2301.12227
- Low-rank approximation for multiscale PDEs*
(with Shi Chen, Qin Li, Jianfeng Lu and Stephen Wright),
Notices of the American Mathematical Society 69.6 (2021).

Tensor-structured sketching for constrained least squares
(with Ruhui Jin),
SIAM Journal on Matrix Analysis and Applications 42.4 (2021): 1703-1731.

A low-rank Schwarz method for radiative transport equation with heterogeneous scattering coefficient
(with Qin Li, Jianfeng Lu and Stephen Wright),
Multiscale Modeling and Simulation 19.2 (2021): 775-801.

Structured random sketching for PDE inverse problems
(with Qin Li, Kit Newton and Stephen Wright),
SIAM Journal on Matrix Analysis and Applications 41.4 (2020): 1742-1770.

Random Sampling and Efficient Algorithms for Multiscale PDEs
(with Qin Li, Jianfeng Lu and Stephen Wright),
SIAM Journal on Scientific Computing 42.5 (2020): A2974-A3005.

Randomized Sampling for Basis Functions Construction in Generalized Finite Element Methods
(with Qin Li, Jianfeng Lu and Stephen Wright),
SIAM-Multiscale Modeling and Simulation 18.2 (2020): 1153-1177.

Schwarz iteration method for elliptic equation with rough media based on random sampling
(with Qin Li and Stephen Wright),
Proceedings of International Consortium of Chinese Mathematics 2019.

Stability of Stationary Inverse Transport Equation in Diffusion Scaling
(with Qin Li and Li Wang),
Inverse Problems 34.2 (2018): 025004.

Stability of Inverse Transport Equation in Diffusion Scaling and Fokker-Planck Limit
(with Qin Li and Li Wang),
SIAM Journal on Applied Mathematics 78.5 (2018): 2626-2647.

Online Learning in Optical Tomography: A Stochastic Approach
(with Qin Li and Jian-Guo Liu),
Inverse Problems 34.7 (2018): 075010.

TALKS AND
PRESENTATIONS

Numerical analysis and PDE seminar, University of Delaware, November 2023

Mentoring in the Mathematical Sciences Workshop, Rice University, November 2023

Numerical analysis seminar (Zoom), North Carolina State University, October 2023

SIAM/Numerical analysis seminar, University of Florida, September 2023

CBMS conference: Deep Learning and Numerical PDEs, Morgan State University, June 2023

The 13th AIMS conference on Dynamical Systems, Differential Equations and Applications, University of North Carolina Wilmington, June 2023

Frontiers in Applied & Computational Mathematics, New Jersey Institute of Technol-

ogy, May 2023

SIAM Southeastern Atlantic Section Annual Meeting (Zoom), Virginia Tech, March 2023

Women in Scientific Computing on Complex Physical and Biological Systems, University of Florida, October 2022

RIT seminar at Department of Mathematics, University of Maryland, College Park, October 2022

Zu Chongzhi seminar at Department of Mathematics (Zoom), Duke Kunshan University, October 2022

SIAM Conference on Mathematics of Data Science, San Diego, September 2022

IMAGE 2022 the International Meeting for Applied Geoscience & Energy, Houston, September 2022

SIAM Annual Meeting, Pittsburgh, Pennsylvania, July 2022

Workshop on Synergies between Data Science and PDE Analysis, University of Bonn, June 2022 (declined)

Workshop on Outstanding Challenges in Computational Methods for Integral Equations, BIRS Oaxaca, May 2022 (declined)

Joint Mathematics Meetings, Seattle, January 2022

International Conference on Spectral and High Order Methods, virtual meetings, July 2021

Workshop on Recent Development in Numerical Kinetic Theory, virtual meetings, June 2021

SIAM-CSE, virtual meetings, March, 2021

SIAM Conference on Imaging Science, virtual Meetings, July, 2020

AMS Sectional Meeting, University of Wisconsin-Madison, September, 2019

Midwest Machine Learning Symposium (Poster), University of Wisconsin-Madison, June, 2019

Applied Kinetic Theory Workshop for Junior Researchers, University of Wisconsin-Madison, April, 2019

SIAM-CSE, Spoken Convention Center, February 2019

Student Seminar at Statistics Department, University of Wisconsin-Madison, February, 2019

The 7th International Young Scholars Forum (Shenzhen), Sun Yat-Sen University, December, 2018

Conference on Fast Direct Solvers, Purdue University, November, 2018

SIAM Central States Conference, Oklahoma University, October, 2018

Kinetic Mini-workshop, University of Wisconsin-Madison, October, 2018

SIAM Chapter Seminar, University of Wisconsin-Madison, September, 2018

The 12th AIMS conference on Dynamical Systems, Differential Equations and Applications, National Taiwan University, July, 2018

Applied Mathematics Seminar, Duke University, June, 2018

Institute for Foundations of Data Science Student Workshop, University of Wisconsin-Madison, April, 2018

TEACHING
EXPERIENCE

Instructor, University of Maryland, College Park:

Fall 2023 Computational Methods

Spring 2023 Calculus III honor

Fall 2022 Applied Probability and Statistics

Instructor, UT-Austin:

Spring 2022 Sequence, Series and Multivariate Calculus

Fall 2021 Sequence, Series and Multivariate Calculus

Spring 2021 Sequence, Series and Multivariate Calculus

Spring 2020 Discrete Mathematics

Fall 2019 Differential and Integral Calculus I

Teaching Assistant, UW-Madison:

Fall 2018 Calculus-Functions of Several Variables

Fall 2017 Calculus-Functions of Several Variables

Spring 2017 Calculus and Analytic Geometry II

Fall 2016 Calculus and Analytic Geometry I

MENTORING
EXPERIENCE

Graduate students co-mentoring

Jasen Lai with Haizhao Yang, Deep learning for inverse problems

Ruhui Jin with Rachel Ward, Randomized sketching for tensorized system

Amit Baht with Chunmei Wang, Generative models for inverse problems

Undergraduate students via Directed Reading Program

2023 Hung Vu

Topics: *Denoising diffusion probabilistic model*

2019 Taijin Chen, Rosalie Cai and Carley Ann Reardon

Topics: *Adaptive stochastic gradient method*

2018 Reng Chiz Der and Junting Wang

Topics: *Randomized matrix factorization*

TRAVEL
AWARDS

2019 *Travel Support for applied inverse problems summer school*, France

2018 *Travel Award for 2nd TRIPODS PI workshop*, UCSC

2018 *Travel Support for IMA workshop*, University of Minnesota

2017 *Travel Award for Math + X Symposium*, Rice University

2017 *Travel Support for Summer School on Mathematical Fluids*, USC

ACADEMIC
SERVICE

Paper refereeing:

SIAM-MMS, SIAM-MAX, Journal of Computational Mathematics, Inverse Problems and Imaging, ICPMS2019, Calcolo, Research in the Mathematical Sciences, Forum of

Mathematics Pi, Analysis and Applications, BIT Numerical Mathematics, Journal of Machine Learning, Journal of Scientific Computing

ACTIVITIES AND
SERVICE

2024 AMS Eastern Sectional Meeting, Special session organizer, Howard Univ
2022 SIAM AN2022, Minisymposium organizer, Pittsburgh, PA
2018 President of SIAM Student Chapter at UW-Madison
2018 Directed Reading Program Mentor for Undergraduate Student
2018 Graduate Peer Mentor in Mathematics Department
2017 Graduate Student PDE seminars, UW-Madison

REFERENCES

Qin Li, PhD Advisor

Department of Mathematics
University of Wisconsin-Madison
qinli@math.wisc.edu

Jianfeng Lu

Department of Mathematics
Duke University
jianfeng@math.duke.edu

Per-Gunnar Martinsson, Postdoc Mentor

Department of Mathematics
University of Texas at Austin
pgm@oden.utexas.edu

Li Wang

Department of Mathematics
University of Minnesota
wang8818@umn.edu

Lawrence C. Washington (Teaching)

Mathematics Department
University of Maryland, College Park
lcw@math.umd.edu

Stephen J Wright

Computer Science Department
University of Wisconsin-Madison
swright@cs.wisc.edu

Haizhao Yang, Postdoc Mentor

Department of Mathematics
University of Maryland, College Park
hzyang@umd.edu