XIANJIN YANG

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CURRENT POSITION

California Institute of Technology   *Sep. 2022–Present*

PostDoc Researcher

- Supervisor: Houman Owhadi and Andrew M. Stuart
- Research interests: Mean-Field Games, Partial Differential Equations, Numerical algorithms, Optimization, Gaussian Processes, Inverse Problems, Operator Learning

PREVIOUS POSITION

Tsinghua University & Beijing Institute of Mathematical Sciences and Applications   *Sep. 2020–Jul. 2022*

PostDoc Researcher

- Supervisor: Shiu-Yuen Cheng, Lingyun Qiu

Research interests: Mean-Field Games, Partial Differential Equations, Numerical algorithms, Optimization

EDUCATION

King Abdullah University of Science and Technology, *Saudi Arabia*   *Jul. 2016–Dec. 2020*

Ph.D. of Applied Mathematics

- Supervisor: Diogo A. Gomes
- Research interests: Mean-Field Games, Partial Differential Equations, Numerical algorithms, Optimization

King Abdullah University of Science and Technology, *Saudi Arabia*   *Sep. 2014–Jun. 2016*

- *Master of Applied Mathematics*
- Supervisor: Diogo A. Gomes

Zhejiang University, *Hangzhou*   *Sep. 2011–Jun.2014*

- *Master of Science in Computer Science*
- Supervisors: Hujun Bao and Rui wang
- Research Focus: Computer Graphics, Rendering

Chongqing University, *Chongqing*   *Sep. 2007-Jul. 2011*

- *Bachelor of Software Engineering*
- Recommended for Zhejiang University without the *National Postgraduate Admission Examination*

SELECTED PUBLICATIONS

Aras Bacho, Aleksei G. Sorokin, **Xianjin Yang**, Théo Bourdais, Edoardo Calvello, Matthieu Darcy, Alexander Hsu, Bamdad Hosseini, Houman Owhadi, Operator Learning at Machine Precision, arXiv:2511.19980

Nicholas H. Nelsen, Houman Owhadi, Andrew M. Stuart, **Xianjin Yang**, Zongren Zou, Bilevel optimization for learning hyperparameters: Application to solving PDEs and inverse problems with Gaussian processes, arXiv:2510.05568

X. Yang, J. Zhang. Gaussian Process Policy Iteration with Additive Schwarz Acceleration for Forward and Inverse HJB and Mean Field Game Problems, arXiv:2505.00909

J. Zhang, **X. Yang**, C. Mou, C. Zhou**,** Learning Surrogate Potential Mean Field Games via Gaussian Processes: A Data-Driven Approach to ILL-Posed Inverse Problems**,** Journal of Computational Physics, 543, 114412, 2025.

R. Baptista, E Calvello, M Darcy, H Owhadi, AM Stuart, **X. Yang,** Solving Roughly Forced Nonlinear PDEs via Misspecified Kernel Methods and Neural Networks**,** arXiv: 2501.17110, 2025

T. Bourdais, P. Batlle, X. Yang, R. Baptista, N. Rouquette, H. Owhadi. Codiscovering graphical structure and functional relationships within data: A Gaussian Process framework for connecting dots. Proceedings of the National Academy of Sciences 121 (32), e2403449121. 2024

J. Guo, C. Mou, **X. Yang**, C. Zhou. Decoding Mean Field Games from Population and Environment Observations By Gaussian Processes. Journal of Computational Physics, 2024.

L. M Briceno-Arias, F. J. Silva, **X. Yang**. Forward-backward algorithm for functions with locally Lipschitz gradient: applications to mean field games, Set-Valued and Variational Analysis 32 (2), 1-22, 2024.

X. Yang, H. Owhadi**.** A Mini-Batch Method for Solving Nonlinear PDEs with Gaussian Processes, arXiv:2306.00307, 2023.

R. Meng, **X. Yang**. Sparse Gaussian processes for solving nonlinear PDEs. Journal of Computational Physics, 2023.

C. Mou, **X. Yang**, C. Zhou. Numerical methods for Mean field Games based on Gaussian Processes and Fourier Features. Journal of Computational Physics, 2022.

R. Ferreira, D. Gomes, **X. Yang**. Two-scale homogenization of a stationary mean-field game. ESAIM: Control Optimization and Calculus of Variations, 2020.

D. A. Gomes, **X. Yang**. Hessian Riemannian flows and Newton's method for Effective Hamiltonians and Mather measures. ESAIM: Mathematical Modelling and Numerical Analysis, 2020.

X Yang, E Debonneuil, A Zhavoronkov, B. Mishra. Cancer megafunds with in silico and in vitro validation: Accelerating Cancer Drug Discovery via Financial Engineering without Financial Crisis. Oncotarget, 2016.

R. Wang, **X. Yang**, Y. Yuan, W. Chen, K. Bala, H. Bao, Automatic shader simplification using surface signal approximation. ACM Transactions on Graphics, Proceedings of ACM SIGGRAPH ASIA, 2014.

INVITED TALKS

Gaussian Processes for Solving Functional PDEs: Applications to Functional Renormalization Group Equations

Sep. *2025*

Conference: Scientific Machine Learning: Theory, Algorithms, and Applications, Purdue

Data-Driven Methods for PDE Solutions and Model Discovery March.*2025*
Conference: UQ and Trustworthy AI Algorithms for Complex Systems and Social Good, Chicago

Decoding mean field games from population and environment observations by Gaussian Processes *Oct.2024*
Conference: SIAM MDS 2024 Minisymposium

Decoding mean field games from population and environment observations by Gaussian Processes *Dec.2023*
Conference: Workshop on Scientific Computing and Large Data - Department of Mathematics | University of South Carolina

Numerical methods for Mean field Games based on Gaussian Processes and Fourier Features *Jan. 2022*
Conference: DKU- NUSRI Joint Workshop on Pure and Applied Mathematics 2022

Hessian Riemannian flows and Newton's method for Effective Hamiltonians and Mather measures *Jun. 2020*
Conference: Two-Days online workshop on MFG

Two-scale homogenization of a stationary mean-field game *Jul. 2019*
Conference: 32nd Brazilian Math. Colloquium
Place: IMPA, Rio, Brazil

Hessian Riemannian flows and Newton's method for Effective Hamiltonians and Mather measures *Mar. 2019*
Place: The University of Limoges, France

Hessian Riemannian flows and Newton's method for Effective Hamiltonians and Mather measures *May. 2018*
Place: The University of Padova, Italy

TEACHING EXPERIENCE

Instructor of ACM 270, Partial Differential Equations and Computational Mean Field Games, *Caltech*
Mar. 2024–Jun. 2024

Teaching Assistant of Functional Analysis, *KAUST* *Sep. 2017–Dec. 2017*
Instructor: Diogo A. Gomes

Teaching Assistant of Numerical Analysis of Partial Differential Equations, *KAUST* *Feb. 2016–May. 2016*
Instructor: Matteo Parsani

Teaching Assistant of Numerical Linear Algebra, *KAUST* *Sep. 2015–Dec. 2015*
Instructor: David Ketcheson