Yadi Cao

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BIO

Yadi Cao is a Ph.D. candidate in the Computer Science department at UCLA co-advised by Professors Demetri Terzopoulos and Chenfanfu Jiang. His work during graduate studies focuses on numerical solutions and machine learning approaches to Partial Differential Equations (PDEs), particularly for computational solid and fluid dynamics. Yadi is seeking Post-Doc positions, with a keen interest in scientific machine learning for surrogate multi-physics or chemistry systems, inverse problems, and control designs. He especially strives to bridge the gap between computational methods and modern machine learning, proposing solutions for real-world-scale scientific and engineering problems.

EDUCATION

2021–Now PhD Candidate, Computer Science, University of California, Los Angeles

Thesis prospectus: Advancing Physics Based Simulations: Integrating Conventional and Machine Learning Approaches for Enhanced Computational Efficiency.

Advisors: Demetri Terzopoulos (Computer Science), and Chenfanfu Jiang (Applied Math).

Committee: Shaowu Pan (Mechanical and Aerospace Engineering), Aditya Grover (Computer Science), and Quanquan Gu (Computer Science).

2016–2018 MASc, Mechanical Engineering, University of British Columbia

Thesis: Analytical and numerical study of plug flow inside round/concentric microchannels.

Advisors: Sunny Ri Li (Mechanical Engineering).

Committee: Joshua Brinkerhof (Mechanical Engineering), Clarie Yu Yan (Mechanical Engineering), and Kenneth Chau (Mechanical Engineering).

2012–2016 BEng, University of Science and Technology of China

Thesis: Experimental and numerical study of the film cooling on aircraft turbine cascade.

PUBLICATIONS

MACHINE LEARNING FOR PREDICTIN PHYSICAL SYSTEMS

2023 Huang, Z, Zhao, W, Gao, J, Hu, Z, Luo, X, **Cao, Y**, Chen, Y, Sun, Y, Wang, W. TANGO: Time-Reversal Latent GraphODE for Multi-Agent Dynamical Systems. **Best Paper Award**. *DLDE workshop on Neural Information Processing Systems (NIPS).*

2023 **Cao, Y**, Chai, M, Li, M, Jiang, C. Efficient Learning of Mesh-Based Physical Simulation with Bi-Stride Multi-Scale Graph Neural Network. *International Conference on Machine Learning (ICML).*

2022 Li, X, **Cao, Y**, Li, M, Yang, Y, Zhang, X, Schroeder, C, Jiang, C. PlasticityNet: Learning to Simulate Metal, Sand, and Snow for Optimization Time Integration. *Conference on Neural Information Processing Systems (NIPS).*

PHYSICS SIMULATION AND ANALYSIS

2023 **Cao, Y**, Zhao, Y, Li, M, Yang, Y, Choo, J, Terzopoulos, D, Jiang, C. Material Point Methods on Unstructured Tessellations: A Stable Kernel Approach With Continuous Gradient Reconstruction. *Submitted to Computational Mechanics.*

2023 Fang, Y, Li, M, **Cao, Y**, Li, X, Wolper, J, Yang, Y, Jiang, C. Augmented Incremental Potential Contact for Sticky Interactions. *IEEE Transactions on Visualization and Computer Graphics (TVCG).*

2022 **Cao, Y**, Chen, Y, Li, M, Yang, Y, Zhang, X, Aanjaneya, M, Jiang, C. An Efficient B-Spline Lagrangian/Eulerian Method for Compressible Flow, Shock Waves, and Fracturing Solids. *ACM Transactions On Graphics (presented at SIGGRAPH).*

2019 **Cao, Y**, Gao, X, Li, R. A Liquid Plug Moving in an Annular Pipe: Heat Transfer Analysis. *International Journal of Heat and Mass Transfer.*

2018 **Cao, Y**, Li, R. A Liquid Plug Moving in an Annular Pipe: Flow Analysis. **Editor' s Pick**. *Physics of Fluids.*

2017 **Cao, Y**, Li, R. Liquid Plug in Gas Flow in Annular Channel. *3rd Conference for American Society of Thermal and Fluids Engineers.*

TEACHING

2024 W Teaching Fellow, Operating Systems Principles (CS 111), UCLA

2023 F Teaching Fellow, Operating Systems Principles (CS 111), UCLA

2023 Su Teaching Associate, Introduction to Algorithms and Complexity (CS 180), UCLA

2023 S Teaching Associate, Operating Systems Principles (CS 111), UCLA

2023 W Teaching Assistant, Operating Systems Principles (CS 111), UCLA

2022 F Teaching Assistant, Operating Systems Principles (CS 111), UCLA

2020 F Teaching Assistant, Advanced Physics Engines 2020: A Hands-on Tutorial (GAMES 201)

2018 S Teaching Assistant, Heat Transfer Applications (ENGR385), UBC

2018 W Lab Assistant, Measurement Principles in Thermal li2022plasticitynetFluids (ENGR479), UBC

2017 F Teaching Assistant, Matter and Energy (APSC182), UBC

2016 F Teaching Assistant, Matter and Energy (APSC182), UBC

2016 S Assistant Lecturer, Introduction to C Programming Language, USTC

SERVICES

REVIEWER

2024 International Conference on Machine Learning (ICML)

2024 International Conference on Learning Representations (ICLR)

2023 Neural Information Processing Systems (NIPS)

2018–2023 Physics of Fluids (POF)

2022 Pacific Graphics (PG)

VOLUNTEER

2023 Symposium on Computer Animation (SCA)

INDUSTRY EXPERIENCES

2021–Now **Student Researcher**
Google LLC
Efficient few-shot learning with Gaussian Splatting for parametric digital human hand modeling, supervised by **Dr. Chai, Menglei**.

2022 **Researcher Intern**
Snap Inc
A robust, simple, and non-parametric pooling strategy for building multi-level GNNs for predicting mesh-based physical simulation, supervised by **Dr. Chai, Menglei**.

2021 **SDE Intern (remote)**
Taichi Graphics
HtoTi: A portable Houdini plug-in for the Taichi-Element (a high performance MPM solver), cooperated with **Dr. Yuanming Hu**, Dr. Tiantian Liu, and Yidong Ma.

2019–2020 **CAE Software Research Developer**
shonCloud Tech/shonDynamics
Algorithm and CAE software developing for FEM heat transfer with multibody thermal contact, fluid-heat transfer conjugate, and fluid-solid coupling.

AWARDS & HONORS

2022 Non-residential Tuition Grant, University of California, Los Angeles.

2021 University Fellowship, University of California, Los Angeles.

2017–2018 University of British Columbia Graduate Fellowship.

2017 Funding for Exchange Research to Summer Institute in Taiwan, NSERC.

2017 USTC Alumni Fellowship of B.C. Canada.

2015 Bronze Prize, Zhongwei-cup Energy & Environment Protection contest, USTC.

2014 Outstanding Student Leader of the School, USTC.

2013–2014 Silver Prize, National Outstanding Undergraduate Scholarship (top 10%), USTC

LANGUAGES & SKILLS

Chinese	Native
English	TOFEL: 110 (R30 L30 S25 W25) obtained in 2019
	IELTS: CEFR Level C1 (proficient) obtained in 2015
Japanese	Basic Oral & Listenning
Coding	C++, Pytorch, Python, MATHEMATICA, MATLAB
Interests	Chatting, Education and, Aquatic sports