

Shuhao Cao

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RESEARCH INTERESTS	Scientific computing and data-driven methods for PDEs including finite element methods, multilevel methods, Transformer neural networks, open-source software packages.	
AWARDS	<ul style="list-style-type: none">◦ NSF Award DMS-2309778. Theory and Applications of Structure-Conforming Deep Operator Learning, Principal Investigator. \$154,781.00, 2023-2026◦ NSF Award DMS-1913080 and DMS-2136075. Novel Virtual Element Methods with Applications in Interface Problems, Principal Investigator. \$153,626.00, 2019-2023	
EXPERIENCE	Assistant Professor, University of Missouri Kansas City Postdoctoral Lecturer, Washington University in St. Louis Visiting Assistant Professor, University of California, Irvine Research Associate, Pennsylvania State University	Aug 2022 to present Sept 2020 to June 2022 July 2017 to May 2020 Aug 2014 to May 2017
EDUCATION	Ph.D., Mathematics, Purdue University	June 2009 – May 2014
RECENT PUBLICATIONS	<ol style="list-style-type: none">[1] X. LIU, B. XU, S. CAO, and L. ZHANG, <i>Mitigating spectral bias for the multiscale operator learning</i>, Journal of Computational Physics 506 (2024), p. 112944, URL: https://www.sciencedirect.com/science/article/pii/S0021999124001931[2] S. CAO and L. QIN, <i>A numerical domain decomposition method for solving elliptic equations on manifolds</i>, SIAM Journal on Scientific Computing 46.1 (2024), A376–A398, arXiv:math.NA/2212.04079[3] R. GUO, S. CAO, and L. CHEN, <i>Transformer Meets Boundary Value Inverse Problems</i>, in: <i>International Conference on Learning Representations (ICLR)</i>, 2023, arXiv:cs.LG/2209.14977, URL: https://openreview.net/forum?id=HnLCZATopvr[4] S. CAO, L. CHEN, and R. GUO, <i>Immersed virtual element methods for electromagnetic interface problems in three dimensions</i>, Mathematical Models and Methods in Applied Sciences 33.03 (2023), pp. 455–503[5] S. CAO, L. CHEN, R. GUO, and F. LIN, <i>Immersed Virtual Element Methods for Elliptic Interface Problems in Two Dimensions</i>, Journal of Scientific Computing 91.1 (2022), pp. 1–41. arXiv:math.NA/2108.00619[6] J. BRANNICK and S. CAO, <i>A Bootstrap Multigrid Eigensolver</i>, SIAM Journal on Matrix Analysis and Applications 43.4 (2022), pp. 1627–1657, arXiv:math.NA/1511.07042[7] S. CAO, <i>Choose a Transformer: Fourier or Galerkin</i>, in: <i>35th Conference on Neural Information Processing Systems (NeurIPS)</i>, 2021, URL: https://openreview.net/forum?id=ssohLcmn4-r[8] S. CAO, L. CHEN, and X. HUANG, <i>Error analysis of a decoupled finite element method for quad-curl problems</i>, Journal of Scientific Computing 90.1 (2021), arXiv:math.NA/2102.03396, URL: https://doi.org/10.1007/s10915-021-01705-7[9] S. CAO, L. CHEN, and R. GUO, <i>A Virtual Finite Element Method for Two Dimensional Maxwell Interface Problems with a Background Unfitted Mesh</i>, Mathematical Models and Methods in Applied Sciences 31.14 (2021), pp. 2907–2936, arXiv:math.NA/2103.04582	