

## Hanwen Zhang

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| RESEARCH<br>INTERESTS  | Numerical analysis, fast algorithms, computational physics,<br>PDE-constrained optimization   |   |
| EMPLOYMENT             | Gibbs Assistant Professor, Yale University<br>Graduate Research Assistant, Yale University<br>Optical Scientist, Facebook Reality Lab   | 07/2022–<br>09/2017–05/2022<br>06/2021–08/2021  |
| EDUCATION              | Ph.D. , Applied Physics, Yale University<br>B.Sc. , Physics, National University of Singapore<br>B.Eng. , Material Science, National University of Singapore  | 09/2017–05/2022<br>08/2012–05/2017<br>08/2012–05/2017   |
| PUBLICATIONS           | <ol style="list-style-type: none"><li>1. <b>H Zhang</b>. “Constructing optimal Wannier functions via potential theory, Part II: isolated multiband for matrix models.” (To be submitted.)</li><li>2. <b>H Zhang</b>. “A highly accurate procedure for computing globally optimal Wannier functions in one-dimensional crystalline insulators, Part II.” (To be submitted.)</li><li>3. <b>H Zhang</b>. “Constructing optimal Wannier functions via potential theory: isolated single band for matrix models.” <i>Preprint</i> (2025).</li><li>4. A. Gopal, <b>H Zhang</b>. “A highly accurate procedure for computing globally optimal Wannier functions in one-dimensional crystalline insulators.” <i>Advances in Computational Mathematics</i> (2025).</li><li>5. <b>H. Zhang</b>, V. Rokhlin. “Finding roots of complex analytic functions via generalized colleague matrices.” <i>Advances in Computational Mathematics</i> (2024).</li><li>6. W. Xue, <b>H. Zhang</b>, A. Gopal, V. Rokhlin, O. Miller. “Fullwave design of cm-scale cylindrical metasurfaces via fast direct solvers.” <i>Preprint</i> (2023).</li><li>7. <b>H. Zhang</b>, Z. Kuang, S. Puri and O. Miller. “Conservation-law-based global bounds to quantum optimal control.” <i>Physical Review Letters</i> (2021).</li><li>8. <b>H. Zhang</b>, O. Miller. “Quasinormal coupled mode theory.” <i>Preprint</i> (2020).</li><li>9. <b>H. Zhang</b>, C.-W. Hsu, and O. Miller. “Scattering concentration bounds: brightness theorems for waves.” <i>Optica</i> (2019).</li><li>10. Solutions manual to Quantum Mechanics by Julian Schwinger with Berthold-Georg Englert. (To appear.)</li></ol> |   |
| TALKS                  | <ul style="list-style-type: none"><li>• <i>Constructing optimal Wannier functions via potential theory</i>, NYU Courant Institute of Mathematical Sciences (2025)</li><li>• <i>Constructing optimal Wannier functions via potential theory</i>, Flatiron Institute Center for Computational Mathematics (2025)</li><li>• <i>Finding scattering resonances via generalized colleague matrices</i>, SIAM Conference on Computational Science and Engineering (2025)</li><li>• <i>Finding scattering resonances via generalized colleague matrices</i>, UMass Lowell Mathematics &amp; Statistics Colloquium (2024)</li></ul>  |   |

- *An efficient scheme for fullwave inverse design of large-scale metasurfaces*, SPIE (2022)
- *Conservation-law-based global bounds to quantum optimal control*, SUTD Mathematics and Technology Seminar (2021)
- *Brightness theorems for nanophotonics*, CLEO (2019)

#### SERVICE AND OUTREACH

- Organizer – Applied Mathematics Seminar, Yale University, 2023–2024
- Reviewer – Applied and Computational Harmonic Analysis; Journal of Scientific Computing.

#### TEACHING

Yale University, Department of Mathematics

- Instructor – MATH 325 Introduction to Functional Analysis, Spring 2026
- Instructor – MATH 325 Introduction to Functional Analysis, Spring 2025
- Instructor – MATH 246 Ordinary Differential Equations, Fall 2024
- Instructor – MATH 222 Linear Algebra with Applications, Spring 2024
- Instructor – MATH 246 Ordinary Differential Equations, Fall 2023
- Instructor – MATH 222 Linear Algebra with Applications, Spring 2023
- Instructor – MATH 222 Linear Algebra with Applications, Fall 2022

Yale University, Department of Physics

- Teaching assistant – PHYS 502 Electromagnetic Theory I, Spring 2019