Yu (Jerry) Shi

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EDUCATION

Stanford University, Stanford, CA — Sept. 2013 – Sept. 2018 (Expected)
Ph.D. in Electrical Engineering
Research advisor: Professor Shanhui Fan
Research concentration: Nanophotonics

Stanford University, Stanford, CA — Sept. 2013 – June 2015
M.S. in Electrical Engineering
Overall GPA: 3.928

The Ohio State University, Columbus, OH — Sept. 2009 – May 2013
B.S. in Electrical and Computer Engineering with a minor in physics
Graduated with *Summa Cum Laude*, Honors in Engineering, and Honors Research Distinction
Overall GPA: 3.991

RESEARCH EXPERIENCE

Graduate Research Assistant, Stanford University — Sept. 2013 – Present
Edward L. Ginzton Laboratory. Advisor: Professor Shanhui Fan

- Nonreciprocal electromagnetics and optical isolation
- Computational electrodynamics: FDFD, FDTD, RCWA
- Photonic design with adjoint variable optimization
- Photon-phonon interactions
- Metamaterials and metasurfaces
- Radiative thermal management

Undergraduate Research Assistant, The Ohio State University — Dec. 2011 – June 2013
Advisor: Professor Betty Lise Anderson

- Phased array antennas
- Optical true-time delay element design

TEACHING EXPERIENCE

Invited Guest Lecturer
Numerical Electromagnetics Workshop (Stanford Optical Society) — May 10, 2018
Advanced Topics in Nano-Optics and Plasmonics (Prof. Jonathan Fan) — May 1, 2017

Graduate Teaching Assistant, Stanford University
EE 236B – Guided Waves. PI: Prof. Shanhui Fan — Jan. 2016 – Mar. 2016

Undergraduate Teaching Assistant, The Ohio State University
Fundamentals of Engineering for Honors Program — Aug. 2012 – May 2013

JOURNAL PUBLICATIONS

1. Cheng Guo, Meng Xiao, Momchil Minkov, **Yu Shi**, and Shanhui Fan
   "Photonic crystal slab Laplace operator for image differentiation," *Optica* **5**, 251-256 (2018).
2. **Yu Shi**, Qian Lin, Momchil Minkov, and Shanhui Fan.
   "Invited Article: Nonreciprocal Optical Dissipation Based on Direction-dependent Rabi Splitting," *IEEE JSTQE, published online* (2018).
3. Jiahui Wang, **Yu Shi**, Tyler Hughes, Zhexin Zhao, and Shanhui Fan.
   "Adjoint-based optimization of active nanophotonic devices," *Optics Express* **26**, 3236-3248 (2018).
4. **Yu Shi**, Wei Li, Aaswath Raman, and Shanhui Fan.
   "Optimization of multi-layer optical films with a memetic algorithm and mixed integer programming," *ACS Photonics* **5**, 684-691 (2018).
5. **Yu Shi**, Seunghoon Han, and Shanhui Fan.
   "Optical circulation and isolation based on indirect photonic transitions of guided resonance modes," *ACS Photonics* **4**, 1639-1645 (2017).
6. Momchil Minkov, **Yu Shi**, and Shanhui Fan.
   "Exact solution to the steady-state dynamics of a periodically modulated resonator," *APL Photonics* **2**, 076101 (2017).
7. Kai Wang, **Yu Shi**, Alexander Solntsev, Shanhui Fan, Audrey Sukhorukov, and Dragomir Neshev.
   "Non-reciprocal geometric phase in nonlinear frequency conversion," *Optics Letters* **42**, 1990-1993 (2017).
8. Wei Li, **Yu Shi**, Kaifeng Chen, Linxiao Zhu, and Shanhui Fan.
   "A Comprehensive Photonic Approach for Solar Cell Cooling," *ACS Photonics* **4**, 774-782 (2017).
9. **Yu Shi**, Alexander Cerjan, and Shanhui Fan.
   "Invited Article: Acousto-optic finite-difference frequency-domain algorithm for first-principles simulations of on-chip acousto-optic devices," *APL Photonics* **2**, 020801 (2017).
10. **Yu Shi**, Wonseok Shin, and Shanhui Fan.
    "Multi-frequency finite-difference frequency-domain algorithm for active nanophotonic device simulations," *Optica* **3**, 1256-1259 (2016).
11. Luqi Yuan, **Yu Shi**, and Shanhui Fan.
    "Photonic gauge potential in a system with a synthetic frequency dimension," *Optics Letters* **41**, 741-744 (2016).
12. **Yu Shi** and Shanhui Fan.
    "Dynamic non-reciprocal meta-surfaces with arbitrary phase reconfigurability based on photonic transition in meta-atoms," *Applied Physics Letters* **108**, 021110 (2016).
13. Saara Khan, Chia-Ming Chang, Zain Zaidi, Wonseok Shin, **Yu Shi**, Audrey Ellerbee Bowden, and Olav Solgaard.
    "Metal-insulator-metal waveguides for particle trapping and separation," *Lab on a Chip* **16**, 2302-2308 (2016).
14. **Yu Shi**, Zongfu Yu, and Shanhui Fan.
    "Limitations of nonlinear optical isolators due to dynamic reciprocity," *Nature Photonics* **9**, 388-392 (2015).
15. Saara Khan, **Yu Shi**, Chia-Ming Chang, Catherine Jan, Shanhui Fan, Audrey K Ellerbee, and Olav Solgaard.

"Optical separation of heterogeneous size distributions of microparticles on silicon nitride strip waveguides," *Optics Express* **23**, 8855-8866 (2015).

16. **Yu Shi** and Betty Lise Anderson.
"Robert cell-based optical delay elements for White cell true-time delay devices," *Journal of Lightwave Technology* **31**, 1006-1014 (2013).

CONFERENCE PRESENTATIONS

1. **Yu Shi**, Wei Li, Aaswath Raman, and Shanhui Fan, "Memetic algorithm optimization for thin-film photonic structures for thermal and energy applications," *CLEO: SF2I.8* (2018).
2. **Yu Shi**, Momchil Minkov, Qian Lin, and Shanhui Fan, "Nonreciprocal optical manipulation using dynamic modulation," *URSI NRSM* (2018).
3. **Yu Shi**, Alexander Cerjan, and Shanhui Fan, "Acousto-optic finite-difference frequency-domain algorithm for first-principles simulations of on-chip acousto-optic devices," *OSA NLO: NM2A.2* (2017).
4. **Yu Shi**, Wonseok Shin, and Shanhui Fan, "Multi-frequency finite-difference frequency-domain algorithm for active nanophotonic device simulations," *CLEO: FTu3H.2* (2017).

HONORS AND AWARDS

- Stanford Graduate Fellowship 2014
- Stanford Enlight Fellowship 2013
- Most Outstanding FEH Undergraduate Teaching Award 2013
- OSU ECE Duhamel Scholarship 2010 – 2012
- OSU Shurtz Award 2010
- OSU International Undergraduate Scholarship 2009

STUDENT MENTORSHIP

Jiahui Wang 2017 – present

- Graduate student in Applied Physics, Stanford University. Mentored her project on adjoint variable optimization of modulated nanophotonic devices and nonreciprocal optical elements, as well as the journal paper write-up of her paper.

Cheng Guo 2017 – present

- Graduate student in Applied Physics, Stanford University. Mentored his project on designing an image differentiator with a photonic crystal slab with eigenmode analysis of photonic structures.

Nathan Zhao 2017 – present

- Graduate student in Applied Physics, Stanford University. Mentored his projects that involve the Schur complement of the FDFD algorithm, as well as the coupled-mode and RCWA analysis of the reflection properties of graphene ribbons.

PROFESSIONAL EXPERIENCE

Journal Review and Service

- Reviewer for *ACS Photonics, Applied Physics Letters, Optics Express, JOSA B, Photonics Technology Letters, Advance Optical Materials, AIP Advances*

Membership

- Optical Society of America, 2017 to present

LEADERSHIP EXPERIENCE

Workshop Coordinator 2017 – 2018
Stanford Research Experiences for Undergraduates Program

Committee Member 2017
Stanford Electrical Engineering Admit Week Panelist

Membership Chair 2014 – 2015
Stanford Optical Society of America