

Qi Shutong

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EDUCATION BACKGROUND

University of Toronto (UofT)

Ph.D. Student, Electrical and Computer Engineering

Research topic: Physics-Informed Neural Networks for Electromagnetic and Multiphysics Modeling

Toronto, Canada

Sept.2020 - Now

Beihang University (BUAA)

B.Eng., Electronic and Information Engineering

Excellent Graduate

Beijing, China

Sept.2016 - Jun.2020

RESEARCH EXPERIENCE

University of Toronto, Department of Electrical and Computer Engineering

Research Assistant, Advised by Professor [Costas D. Sarris](#)

Toronto, Canada

Sep.2020 - Now

- Introduced a Finite-Difference Automatic-Differentiation approach for time-domain electromagnetic modeling with unconditionally stable time-stepping.
- Pioneered a novel approach by combining Finite-Difference Time-Domain (FDTD) method and Physics-Informed Neural Network (PINN) for multiphysics simulation.
- Developed a deep neural network to compensate for numerical dispersion errors in the FDTD method for planar microwave circuit modeling.

Beihang University, Department of Electronic and Information Engineering

Research Assistant, Advised by Associate Research Fellow [Qiang Ren](#)

Beijing, China

Sep.2018 - Jun.2020

- Utilized the Finite-Difference Frequency-Domain (FD-FD) method for generating an electromagnetic scattering database.
- Developed a deep neural network (U-net) to accelerate the resolution of 2-D and 3-D electromagnetic scattering problems using the FD-FD approach.

Dartmouth College, Department of Computer Science

Research Assistant, Advised by Assistant Professor [Xing-dong Yang](#)

Hanover, USA

Jun.2019 - Sep.2019

- Conducted antenna radiation pattern simulations for optimizing communication performance.
- Formulated and executed experiments to evaluate the impact of various types of fabrics on the radiation performance of the antennas.

Teaching Experience

University of Toronto

Teaching Assistant

Toronto, Canada

Sep. 2021 - Dec.2023

- ECE 320 *Fields and Waves*
- ECE 221 *Electric and Magnetic Fields*
- ECE 259 *Electromagnetism*

PUBLICATIONS

- **Shutong Qi** and Costas Sarris, "Electromagnetic-Thermal Analysis With FDTD and Physics-Informed Neural Networks," in *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, vol. 8, pp. 49-59, 2023, doi: 10.1109/JMMCT.2023.3236946.
- **Shutong Qi** and Costas Sarris, "Deep Neural Networks for Rapid Simulation of Planar Microwave Circuits Based on their Layouts," in *IEEE Transactions on Microwave Theory and Techniques*, 2022, doi: 10.1109/TMTT.2022.3210229.
- **Shutong Qi**, Yinpeng Wang, Yongzhong Li, Xuan Wu, Qiang Ren and Yi Ren, "2D Electromagnetic Solver Based on Deep Learning Technique," in *IEEE Journal of Multiscale and Multiphysics Computational Technique*, 2020, 5: 83-88.
- **Shutong Qi** and Costas Sarris, "Physics-Informed Neural Networks for Multiphysics Simulations: Application to Coupled Electromagnetic-Thermal Modeling," in *2023 IEEE/MTT-S International Microwave Symposium*, San Diego, CA, USA, 2023, pp. 166-169, doi: 10.1109/IMS37964.2023.10188015.
- **Shutong Qi** and Costas Sarris, "Benchmarking Physics-Informed Neural Networks for Time-Domain Electromagnetic Simulations," in *2023 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (USNC-URSI)*, Portland, OR, USA, 2023, pp. 1619-1620, doi: 10.1109/USNC-URSI52151.2023.10237914.
- **Shutong Qi** and Costas Sarris, "Numerical Dispersion Compensation for FDTD via Deep Learnings," in *2022 IEEE International Symposium on Antennas and Propagation and USNC/URSI Radio Science Meeting*, Denver, CO, USA, 2022, pp. 671-672, doi: 10.1109/AP-S/USNC-URSI47032.2022.9886317.
- Qiang Ren, Yinpeng Wang, Youngzhong Li and **Shutong Qi**, "Sophisticated Electromagnetic Forward Scattering Solver via Deep Learning," in *Springer Singapore Pte. Limited*, 2021.
- Yinpeng Wang, Yongzhogn Li, **Shutong Qi** and Qiang Ren, "Electromagnetic Scattering Solver for Metal Nanostructures via Deep Learning," in *2021 Photonics & Electromagnetics Research Symposium (PIERS)*, 2021, pp. 2419-2424, doi: 10.1109/PIERS53385.2021.9694820.
- Te-yen Wu, **Shutong Qi**, Junchi Chen, Mujie Shang, et al. "Fabriccio: Touchless Gestural Input on Interactive Fabrics," in *CHI '20: Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems April 2020*. Pages 1–14, <https://doi.org/10.1145/3313831.3376681>.
- Yipeng Wang, Yongzhong Li, **Shutong Qi** and Qiang Ren, "Predicting Scattering From Complex Nano-Structures via Deep Learning," in *IEEE Access*, vol. 8, pp. 139983-139993, 2020, doi: 10.1109/ACCESS.2020.3012132.
- Jiang Nan, **Shutong Qi**, Luo Feixiang, Wang Jun and Wang Wenfeng, "ADS-B Message Authentication Using Features of Signal in Transition Regions," in *IEEE International Conference on Signal, Information and Data Processing (ICSIDP)*, 2019, pp. 1-5, doi: 10.1109/ICSIDP47821.2019.9172935.