

Shayan Dodge Nationality: Iranian Date of birth: Jun 1, 1995 Place of Birth: Tehran, Iran      (+39) 346 4770928 dodgeshayan@gmail.com Pisa/Italy www.linkedin.com/in/shayan-dodge-441453204 Shayan Dodge (0000-0002-8323-2290) - My ORCID		
Education		
Ph.D. in Electrical Engineering University of Pisa (DESTEC) Research Focus: Computational and machine learning applications in electrical engineering. Expected graduation year 2027 Pisa, Italy Sep 2024- Present		
M.Sc. in Plasma Physics Shahid Beheshti University (Laser and Plasma Research Institute) Thesis Title: Simulation of Argon Plasma Jet Interaction with Skin by Numerical Method Finite Difference Time Domain (FDTD) method. Thesis grade: Excellent Principal supervisor: Professor. Babak Shokri Overall GPA: 18.27/20 (3.87/4), First-Class Honors Notable selected courses: Electrodynamics (18/20), Numerical Electrodynamics (19/20) Tehran, Iran Sep 2017- Feb 2020		
B.Sc. in Physics Kharazmi University (Department of Physics) Overall GPA: 18.46/20 (3.98/4), First-Class Honors Notable selected courses: Electromagnetics II (19/20), Applied Computer Physics (20/20), Optics (19.25/20), Applied Optics (19.5/20), Spectroscopy (19/20), Modern Physics (19.75/20), Statistical Mechanics (19/20) Tehran, Iran Oct 2013 - Jun 2017		
Professional Experience		
Research Fellow University of Pisa (DESTEC) Application of Machine Learning to Electromagnetism Problems - Forecast of the Effects of Lightning IN Electrical Systems (<u>FELINES</u>) - Stochastic electromagnetic modeling and deep learning for an effective and personalized transcranial magnetic stimulation (<u>STEM-DEEP</u>) Pisa, Italy Jan 2024 - Present		
Research Interest		
Computational Electromagnetics - Computational Methods for Electromagnetics - Finite Difference Time Domain Method (FDTD) - Finite Element Method (FEM) - Numerical Computing with MATLAB, Python and C++ - GPU computing - Plasma Modeling - EM wave plasma interactions - Kinetic theory of discharge	Machine Learning (ML) Artificial Neural Networks (ANN) & Deep Learning (DL) - Machine Learning Applications in Electromagnetics. Physics Informed Neural Network (PINN)	Medical Physics Transcranial Magnetic Stimulation (TMS) - Microwave therapy for cancer (Hyperthermia) - Medical applications of cold plasma

Honors and Awards	
Research Grant: "Application of Machine Learning to Electromagnetism Problems", DESTEC, University of Pisa. 2024 – 2026 Ranked 1st among Plasma Physics graduates at Shahid Beheshti University. 2020 Full tuition-waiving award for M.Sc. program, Shahid Beheshti University. 2017 – 2020 Ranked 1st among all the undergraduates of the Physics Department, Kharazmi University. 2017 Full tuition-waiving award for B.Sc. program, Kharazmi University. 2013 – 2017 Top 1.5% in Iran's BSc National Entrance Exam among 251,000. 2013	
Research Projects	
[1] <u>Forecast of the Effects of Lightning IN Electrical Systems (FELINES)</u> , Financed under the Project PRIN 2022, DESTEC, University of Pisa	Jan 2024 - Present
[2] <u>Stochastic Electromagnetic Modeling and Deep Learning for an Effective and Personalized Transcranial Magnetic Stimulation (STEM-DEEP)</u> , Financed under the Project PRIN 2022, DESTEC, University of Pisa	Jan 2024 - Present
Extracurricular Activity	
Teaching - Teaching Mathematics and Physics to university students (Freelance) 2014 - 2024 - Teaching MATLAB, Python, and C++ Programming languages 2016 - 2024 Physics Association of Kharazmi University 2013 - 2015 - Committee Member of the Physics Association, Kharazmi University.	
Computer Skills	
Programming Languages: Python, C++, MATLAB ML and DL Frameworks: TensorFlow, Keras, PyTorch, scikit-learn, MATLAB Deep Learning Toolbox Data Analysis and Visualization: Pandas, NumPy, Matplotlib, Origin Pro GPU Programming and Parallel Processing: TensorFlow with GPU, MATLAB Parallel Processing Toolbox Version Control: Git, GitHub, Docker Other Tools: Jupyter Notebooks, Anaconda Simulation Software: CST Studio, Mathematica	
Languages	
English (C1) Persian (Native)	
Publications	
Journal Articles [1] Formisano, A., Dodge, S., & Barmada, S. (2025). <u>A Comparison of Machine Learning and Classical Numerical Approaches for the Resolution of Electromagnetics Problems</u>. IET Science, Measurement & Technology, 19(1), e70034. [2] Barmada, S., Dodge, S., & Formisano, A. (2025). <u>Weak Formulation for Physics-Informed Neural Networks in the Resolution of Analysis Problems in Electromagnetics</u>. IEEE Transactions on Magnetics. [3] Cosentino, G., Zaffina, C., Zoccola, C., Fresia, M., Merli, S., Mauramati, S., Bertino, G., Todisco, M., Dodge, S., Barmada, S. and Alfonsi, E. & Tassorelli, C. (2025). <u>Unilateral EMG-Guided Botulinum Toxin for Retrograde Cricopharyngeus Dysfunction: A Prospective Clinical and Neurophysiological Study</u>. Toxins, 17(9), 458.	

- [4] Barmada, S., **Dodge, S.**, Brignone, M., Nicora, M., & Procopio, R. (2025). **Relating transmission line overvoltages and lightning location: a machine learning-based procedure.** **COMPEL**-The international journal for computation and mathematics in electrical and electronic engineering.
- [5] **Dodge, S.**, Barmada, S., & Formisano, A. (2025). **A STracked Adaptive Residual PINN (STAR-PINN) Approach to 2D Time-Domain Magnetic Diffusion in Nonlinear Materials.** **IEEE Access.**
- [6] **Dodge, S.**, Fontana, N., Mognaschi, M. E., Canicattì, E., & Barmada, S. (2025). **A Deep Learning Based Prediction of Specific Absorption Rate Hot-Spots Induced by Broadband Electromagnetic Devices.** **IET Science, Measurement & Technology**, 19(1), e70009.
- [7] **Dodge, S.**, Nicora, M., Barmada, S., Brignone, M., Procopio, R., & Tucci, M. (2025). **A deep learning-based lightning location system.** **Electric Power Systems Research**, 242, 111437.
- [8] Sekehravani, E. A., **Dodge, S.**, Barmada, S., Brignone, M., Formisano, A., Mestriner, D., ... & Procopio, R. (2025). **Preliminary Breakdown Pulses (PBP): A review on available data and models.** **Electric Power Systems Research**, 242, 111463.
- [9] Barmada, S., **Dodge, S.**, Tucci, M., Formisano, A., Di Barba, P., & Mognaschi, M. E. (2024). **A Novel Hybrid Boundary Element–Physics Informed Neural Network Method for Numerical Solutions in Electromagnetics.** **IEEE Access.**
- [10] Niknam, A. R., **Dodge, S.**, Hajian, M., & Ansari, M. A. (2024). **Characterization of microwave heating for hyperthermia cancer treatment.** **Waves in Random and Complex Media**, 34(1), 211-225.
- [11] **Dodge, S.**, Shafiee, M., & Shokri, B. (2022). **Application of GPU-accelerated FDTD method to electromagnetic wave propagation in plasma using MATLAB Parallel Processing Toolbox.** **arXiv preprint arXiv:2211.05647.**

• Conference Papers

- [12] **Dodge, S.**, Shafiee, M., & Shokri, B. (2021). **1-D numerical characterization of the electromagnetic wave propagation in plasma using the kinetic theory of discharge and finite difference time domain method.** **Proceedings of the 8th Conference on Engineering and Physics of Plasma.**
- [13] **Dodge, S.**, Shafiee, M., Akbaripoor, M., & Shokri, B. (2019). **Comparison of electromagnetic wave propagation with 1D-FDTD in the modeled plasma by Maxwellian and Druyvesteyn electron distribution function at the initial moment.** **Proceedings of the 7th Conference on Engineering and Physics of Plasma.**

Peer Review

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| [1] Optics express (1) | 2025 |
| [2] Franklin open (1) | 2025 |
| [3] Physics of plasmas (6) | 2024 - 2025 |
| [4] The Applied Computational Electromagnetics Society (2) | 2022 - 2025 |
| [5] Waves in Random and Complex Media (2) | 2021 |

References

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| Prof. Nunzia Fontana | Department of DESTEC, Pisa University, Pisa, Italy | nunzia.fontana@unipi.it |
| Prof. Sami Barmada | Department of DESTEC, Pisa University, Pisa, Italy | sami.barmada@unipi.it |