Jake W. Liu

Assistant Professor, Department of Electronic Engineering, National Taipei University of Technology
jwliu@ntut.edu.tw jake-w-liu.github.io GitHub: jake-w-liu
ORCID: 0000-0001-5458-7917
Last updated: August 5, 2026

Profile

Assistant Professor in the Department of Electronic Engineering at National Taipei University of Technology. Research interests span computational electromagnetics, high-frequency asymptotic methods, antenna array calibration and optimization, antenna measurement and near-to-far-field transformation, and light scattering and propagation in random media. Also develops open-source scientific software in Julia and C#, with emphasis on numerical methods and special functions.

Academic Appointments

Department of Electronic Engineering, National Taipei University of Technology Aug. 2025–present
Assistant Professor Taipei, Taiwan

Graduate Institute of Photonics and Optoelectronics, National Taiwan University Aug. 2024–Jul. 2025
Postdoctoral Researcher Taipei, Taiwan

Ohmplus Technology Aug. 2022–Feb. 2024
Co-founder and R&D Engineer

Education

National Taiwan University 2017–2022
Ph.D., Communication Engineering Taipei, Taiwan
Dissertation area: Antenna array calibration algorithms.

National Taiwan University 2013–2017
B.S., Electrical Engineering Taipei, Taiwan

Research Interests

- Computational electromagnetics: FDTD, PSTD, and MoM.
- High-frequency asymptotic techniques: UTD and PO.
- Antenna array calibration and optimization.
- Antenna measurement and near-to-far-field transformation.
- Light scattering and propagation in random media.

Honors and Awards

2023 Chun-Hsiung Chen Scholarship for Electromagnetic Talent Cultivation, First Prize of Graduate Group.
2022 National Invention and Creation Award (NICA), Silver Medal Award.
2017 Taiwan Creative Electromagnetic Implementation Competition (T-CEIC), First Prize.
2017 The Phi Tau Phi Scholastic Honor Society of the Republic of China, Honorary Membership.

Publications

Book

[B1] **Jake W. Liu**. *Lectures on Electromagnetic Theory*. National Taiwan University Press, Jan. 2026. ISBN 978-626-7768-52-5.

Journal Articles

[J1] **Jake W. Liu**. "A differentiable EFIE–MoM framework for surface-impedance inverse design of reactive metasurfaces." *Computer Physics Communications*, vol. 328, p. 110313, Nov. 2026. doi:10.1016/j.cpc.2026.110313.

[J2] **Jake W. Liu**. "UTDKernels.jl: A branch-safe and differentiable Julia library for Kouyoumjian–Pathak wedge diffraction kernels." *SoftwareX*, vol. 35, p. 102815, Sep. 2026. doi:10.1016/j.softx.2026.102815.

[J3] **Jake W. Liu**. "3D radiation pattern reconstruction from reduced far-field sampling via iterative spectral interpolation." *Radioengineering*, vol. 35, no. 3, pp. 365–374, Sep. 2026. doi:10.13164/re.2026.0365.

[J4] **Jake W. Liu**. "FishTank.jl: A model-driven approach to gamified scientific modeling and visualization in Julia." *SoftwareX*, vol. 34, p. 102586, Jun. 2026. doi:10.1016/j.softx.2026.102586.

[J5] **Jake W. Liu**. "Angle-resolved structural coloration modeling in Morpho wing nanostructures with staggered 3D pseudospectral time-domain method." *IEEE Photonics Journal*, vol. 18, no. 2, pp. 1–9, Apr. 2026. doi:10.1109/JPHOT.2026.3671959.

[J6] **Jake W. Liu** and Snow H. Tseng. "Exploring the possibility to focus light through 2-D scattering media with phase only." *Results in Optics*, vol. 23, p. 100990, Feb. 2026. doi:10.1016/j.rio.2026.100990.

[J7] **Jake W. Liu**. "Numerical analysis of large-scale phased array calibration, using a Kronecker product formulation." *Applied Computational Electromagnetics Society Journal (ACES)*, pp. 74–80, Jan. 2026. doi:10.13052/2026.ACES.J.410108.

[J8] **Jake W. Liu**. "Differentiable transfer-matrix method for gradient-based inverse design of multilayer electromagnetic shields." *IEEE Transactions on Electromagnetic Compatibility*, pp. 1–10, 2026. doi:10.1109/TEMC.2026.3692385.

[J9] **Jake W. Liu**. "SpecialFunctions: A C# package of special functions for scientific computing with MATLAB-compatible API." *Journal of Open Source Software*, vol. 10, no. 113, p. 8516, Sep. 2025. doi:10.21105/joss.08516.

[J10] **Jake W. Liu** and Snow H. Tseng. "Near-to-far-field transformation scheme utilizing a modified sinc interpolation method for PSTD simulations." *Optics Express*, vol. 32, no. 26, pp. 47225–47235, Dec. 2024. doi:10.1364/OE.546322.

[J11] **Jake W. Liu**. "Circularly polarized plane wave source implementation in time-domain electromagnetic simulations." *Applied Computational Electromagnetics Society Journal (ACES)*, pp. 1035–1041, Dec. 2024. doi:10.13052/2024.ACES.J.391201.

[J12] **Jake W. Liu**, Yueh-Sheng Hsu, and Snow H. Tseng. "Extracting field information embedded within a coarse pseudospectral time-domain simulation." *IEEE Antennas and Wireless Propagation Letters*, vol. 17, no. 8, pp. 1488–1491, Aug. 2018. doi:10.1109/LAWP.2018.2850775.

[J13] Hsi-Tseng Chou and **Jake W. Liu**. "Synthesis and characteristic evaluation of convex metallic reflectarray antennas to radiate relatively orthogonal multibeams." *IEEE Transactions on Antennas and Propagation*, vol. 66, no. 8, pp. 4008–4016, Aug. 2018. doi:10.1109/TAP.2018.2841422.

Conference Papers

[C1] Pin-Chih Lin and **Jake W. Liu**. "Joint Optimization of Radiation Pattern and EVM for Nonlinear mmWave Phased Arrays." In *2026 International Applied Computational Electromagnetics Society (ACES) Symposium*, Thessaloniki, Greece, May 2026.

[C2] **Jake W. Liu**. "Visualization and modeling utilities in Julia for engineering education and interactive learning." In *2026 IEEE Global Engineering Education Conference (EDUCON)*, pp. 1–4, Apr. 2026. doi:10.1109/educon67543.2026.11574195.

[C3] Sheng-Chun Yao, **Jake W. Liu**, and Snow H. Tseng. "Simulation of constant amplitude light refocusing through scattering media by optical phase conjugation." In *Biomedical Light Scattering XV*, vol. 13320, pp. 61–63, Mar. 2025. doi:10.1117/12.3039886.

[C4] Bryan Chihyuan Chu, **Jake W. Liu**, and Zhao He Lin. "Active phased array antenna optimization and calibration for satellite applications." In *IEICE Technical Report (Web)*, vol. 122, no. 312 (SANE2022 62–87), pp. 50–52, Dec. 2022.

[C5] Hsi-Tseng Chou, **Jake W. Liu**, Teng Chang, and Yi-Sheng Chang. "A design of perodic circuit analog absorber at X-band and its fabrication discrepancy analysis." In *2021 IEEE International Symposium on Radio-Frequency Integration Technology (RFIT)*, pp. 1–3, Aug. 2021. doi:10.1109/RFIT52905.2021.9565252.

[C6] Hsi-Tseng Chou, **Jake W. Liu**, Kun-Ying Lin, and Siddhartha Panigrahi. "Effective modeling of frequency selective surfaces by equivalent dielectric substrates using genetic algorithm for electromagnetic scattering analysis." In *2020 IEEE International Conference on Computational Electromagnetics (ICCEM)*, pp. 103–104, Aug. 2020. doi:10.1109/ICCEM47450.2020.9219428.

[C7] **Jake W. Liu** and Hsi-Tseng Chou. "Antenna radiation field pattern interpolation technique from sparse measurements according to discrete Fourier transform." In *2020 URSI GASS*, pp. 1–4, Aug. 2020.

[C8] Hsi-Tseng Chou, **Jake W. Liu**, and Wen-Jiao Liao. "Fast phased array antenna calibration incorporating with a far-field radiation measurement system." In *2019 13th European Conference on Antennas and Propagation (EuCAP)*, pp. 1–4, Mar. 2019. doi:10.23919/EuCAP.2019.8739999.