Joseph G. Tylka, Ph.D.

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Education

Princeton University — Princeton, NJ
Doctor of Philosophy (Ph.D.) in Mechanical and Aerospace Engineering — 2012–2019
Master of Arts (M.A.) in Mechanical and Aerospace Engineering

University of Maryland — College Park, MD
Bachelor of Science (B.S.) in Physics with a minor in Philosophy, *cum laude* — 2008–2012

Experience

Siemens Technology — Princeton, NJ
Principal Key Expert, Architecture & Engineering of Intelligent Systems — 2023–present
Senior Key Expert, Edge Computing Architectures & Applications — 2022–2023
Research Scientist, Technology Field: Future of Automation — 2019–2022

Princeton University — Princeton, NJ
Doctoral Candidate, 3D Audio and Applied Acoustics Laboratory — 2012–2019
Assistant in Instruction, Department of Mechanical and Aerospace Engineering — 2014–2017

University of Maryland — College Park, MD
Undergraduate Research Assistant, Cosmic Ray Laboratory — 2009–2012
Teaching Assistant, Department of Physics — Fall 2011

Technical Skills

Development: Python, C/C++, MATLAB, HTML/CSS/JS || Docker, Bash, Git, GitLab CI/CD, Linux, Flask, gRPC
Analytical: software architecture, signal processing, machine learning, algorithms, modeling, data analysis & visualization
Communication: customer workshops, stakeholder presentations, journal articles, conferences, technical reports, patents

Selected Projects

Industrial Operations X — Siemens Digital Industries
Role: *Portfolio & Solution Architect* — 2024–present
Contributions: architecture blueprints, portfolio analysis, requirements engineering, stakeholder management, customer workshops

Industrial Edge App Development for AI Vision, Audio, & LoRaWAN — Siemens Digital Industries
Role: *Product & Platform Architect* — 2022–present
Contributions: software architecture, design, programming, testing, CI/CD pipelines, open-source clearing, documentation

Building Automation Protocol Connectivity Framework — Siemens Smart Infrastructure
Role: *Lead Software Architect* — 2022–2023
Contributions: software architecture, stakeholder management, programming, CI/CD pipelines, developer documentation

Virtual Navigation of 3D Sound Fields — Sony Corporation of America
Role: *Doctoral Candidate* — 2015–2019
Contributions: research questions, experimental design, algorithms, programming, machining, data collection & analysis, publications

Selected Publications

[1] C. Cho, S. Kelley, J. G. Tylka, M. He, N. N. Nandola, and C. D. Rahn. Improving Nonuniform Utilization of Li-Ion Pouch Cells Using Tapered Electrodes Through Calendering. In *49th Design Automation Conference (DAC)*, August 2023. V03AT03A032.

[2] T. Cui, J. Claus, J. Tylka, L. Wang, G. A. Quiros Araya, P. Eisen, and A. Oliveira Da Silva. Automated acoustic anomaly detection feature deployed on a programmable logic controller, Mar. 9, 2023. WO Patent Application WO2023033791A1.

[3] A. Breu, J. Tylka, B. Erol, P. Gregor, and D. Trinko. System and method for automatically orienting product containers, Jan. 12, 2023. WO Patent Application WO2023282938A1.

[4] J. Tylka. Adaptive tuning of physics-based digital twins, Dec. 1, 2022. WO Patent Application WO2022250669A1.

[5] J. Tylka, A. Martinez Canedo, S. Srivastava, K. Goyal, and A. Breu. System and method to automatically generate and optimize recycling process plans for integration into a manufacturing design process, Mar. 10, 2022. WO Patent Application WO2022051236A1.

[6] E. Y. Choueiri and J. Tylka. System and Method for Virtual Navigation of Sound Fields through Interpolation of Signals from an Array of Microphone Assemblies, June 8, 2021. US Patent 11,032,663.

[7] J. Luo, M. Kang, E. Bisse, M. Veldink, D. Okunev, S. Kolb, J. G. Tylka, and A. Canedo. A Quad-Redundant PLC Architecture for Cyber-Resilient Industrial Control Systems. *IEEE Embedded Systems Letters*, page 4, 2020.

[8] J. G. Tylka, B. B. Boren, and E. Y. Choueiri. A Generalized Method for Fractional-Octave Smoothing of Transfer Functions that Preserves Log-Frequency Symmetry. *The Journal of the Audio Engineering Society*, 65(3):239–245, March 2017.