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 US — Princeton, NJ
Senior Key Expert, Edge Computing Architectures & Applications — 2022–present
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

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

Audio Connector for Siemens Industrial Edge — Siemens Digital Industries
Role: *Lead Software Developer* — 2022–present
Contributions: software architecture, programming, CI/CD pipelines, open-source software clearing, technical marketing materials

Autonomous Robotic Spraying & Disinfection System — Advanced Robotics for Manufacturing (ARM) Institute
Role: *Principal Investigator* — 2020–2021
Contributions: technical project management, technology development & reusability, stakeholder management & presentations

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

[2] 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.

[3] 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.

[4] 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.

[5] J. G. Tylka and E. Y. Choueiri. Performance of Linear Extrapolation Methods for Virtual Sound Field Navigation. *The Journal of the Audio Engineering Society*, 68(3):138–156, March 2020.

[6] R. Sridhar, J. G. Tylka, and E. Y. Choueiri. Generalized Metrics for Constant Directivity. *The Journal of the Audio Engineering Society*, 67(9):666–678, September 2019.

[7] E. Y. Choueiri, J. Tylka, R. Sridhar, and B. Boren. Method and system for producing low-noise acoustical impulse responses at high sampling rate, May 1, 2018. US Patent 9,959,883.

[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.