

# Peter M. Pak

Pittsburgh, PA | [in](#) [o](#) [👤](#) [ppak10](#) | [ppak.net](#) | [ppak10@gmail.com](#) | U.S. Citizen

## Education

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### Carnegie Mellon University

Pittsburgh, PA

- Doctor of Philosophy (GPA: 3.88 / 4.00)
- Master of Science in Additive Manufacturing (GPA: 4.00 / 4.00)
- Bachelor of Science in Materials Science and Engineering (GPA: 3.09 / 4.00)
  - └ Minor in Biomedical Engineering

June 2023 – Current  
August 2022 – May 2023  
August 2014 – May 2018

## Publications

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**Peter Pak**, Achuth Chandrasekhar, Amir Barati Farimani. “Agentic Additive Manufacturing Alloy Evaluation” *Additive Manufacturing Letters* (2026)

Ziyue Wang, Yayati Jadhav, **Peter Pak**, Amir Barati Farimani. “Image2Gcode: Image-to-G-code Generation for Additive Manufacturing Using Diffusion-Transformer Model” *arXiv* (2025)

Yayati Jadhav, **Peter Pak**, Amir Barati Farimani. “LLM-3D Print: Large Language Models to Monitor and Control 3D Printing” *Additive Manufacturing* (2025)

**Peter Pak**, Amir Barati Farimani. “AdditiveLLM: Large language models predict defects in metals additive manufacturing” *Additive Manufacturing Letters* (2025)

Francis Ogoke, **Peter Pak**, Alexander Myers, Guadalupe Quirarte, Jack Beuth, Jonathan Malen, Amir Barati Farimani. “Deep learning for melt pool depth contour prediction from surface thermal images via vision transformers” *Additive Manufacturing Letters* (2024)

Abraham George, Yibo Chen, Atharva Dikshit, Selam Gano, **Peter Pak**, Amir Barati Farimani. “BeadSight: An Inexpensive Tactile Sensor Using Hydro-Gel Beads” *IEEE Sensors Journal* (2024)

**Peter Pak**, Francis Ogoke, Andrew Polonsky, Anthony Garland, Dan S Bolintineanu, Dan R Moser, Michael J Heiden, Amir Barati Farimani. “ThermoPore: Predicting Part Porosity Based on Thermal Images Using Deep Learning” *Journal of Additive Manufacturing* (2024)

## Conferences

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**Peter Pak**, Amir Barati Farimani. “finetune.build: A Multi-Agent Platform Enabling Process Control Within Additive Manufacturing” 2025 Annual International Solid Freeform Fabrication Symposium, Austin, TX, August 2025. Conference Presentation

**Peter Pak**, Amir Barati Farimani. “Large Language Model enabled Process Map Discovery Within Additive Manufacturing” 2025 Annual International Solid Freeform Fabrication Symposium, Austin, TX, August 2025. Conference Presentation

**Peter Pak**, Francis Ogoke, Amir Barati Farimani. “Additive Manufacturing Digital Twin (AMDT): Part Level Process Map Characterization Using Physics Based Simulation and Machine Learning” 2025 TMS Annual Meeting & Exhibition, Las Vegas, NV, March 2025.

**Peter Pak**, Francis Ogoke, Achuth Chandrasekhar, Olabode Ajenifujah, Amir Barati Farimani. “Additive Manufacturing User Interface (AMUI): An Intuitive Software Suite for Part Level Process Parameter Selection” 2025 TMS Annual Meeting & Exhibition, Las Vegas, NV, March 2025.

**Peter Pak**, Francis Ogoke, Amir Barati Farimani. “Pre-training Vision Encoders with Thermal Images for in-situ Process Monitoring in Laser Powder Bed Fusion” 2024 Annual International Solid Freeform Fabrication Symposium, Austin, TX, August 2024. Conference Presentation

**Peter Pak**, Francis Ogoke, Andrew Polonsky, Anthony Garland, Dan S Bolintineanu, Dan R Moser, Michael J Heiden, Amir Barati Farimani. “Pyrometry Mapping of Segmented Porosity in Computed Tomography” TMS Specialty Congress, 2<sup>nd</sup> World Congress on Artificial Intelligence in Materials & Manufacturing, Cleveland, OH, June 2024. Conference Presentation

## Research

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### Dr. Amir Barati Farimani's Mechanical and Artificial Intelligence Laboratory August 2022 – Current

- Developed software pipeline for preparing and executing FLOW-3D simulations, enabling automated generation of extensive datasets used to derive parameter dependent process maps in laser powder bed fusion additive manufacturing.
- Designed and developed a full-stack web application to assist non-specialists in selecting optimal parameters through guidance in process map optimization, increasing the overall likelihood of a successful print.
- Adapted a Fuse Deposition Modeling printer with cameras and firmware for dynamic feedback control using large language models to enhance print quality during builds.
- Created porosity quantification and localization machine learning models for laser powder bed fusion to predict *ex-situ* part characteristics given a sequence of thermal images captured with an *in-situ* two color pyrometer.

### Dr. Lisa Porter's Gallium Oxide Research Group May 2016 – August 2018

- Assisted in the development of experimental procedures and desired temperature profiles to epitaxially grow gallium oxide layers.
- Constructed steel support structure to raise and orient tube furnace at 20° incline to adequately coat sapphire substrate with gallium oxide flux mixture.

## Proficient Skills and Technologies

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**Languages:** TypeScript | Python

**Manufacturing Processes:** Fuse Deposition Modeling (FDM) | Selective Laser Sintering (SLS) | Stereolithography (SLA) | Laser Powder Bed Fusion (LPBF) | Computer Numeric Control (CNC)

**Software Tools:** Solidworks | MasterCAM | ImageJ | Docker | Git | Model Context Protocol (MCP)

## Work Experience

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### LOU Technologies

Software Developer

April 2020 – August 2022

- Aided in designing back-end database models and integrating the associated routes with our Dashboard and Chrome extensions.
- Improved accessibility and scalability of codebase through adoption of Docker, TypeScript, Jest and automated testing.
- Built and maintained company npm packages for component exports used in many of our products.

### Modontics

Software Developer

June 2019 – December 2019

- Developed a web platform where orthodontists, dentists, and clients can plan, communicate, and schedule with each other.
- Built an interactive drag and drop editor for orthodontists to indicate where to perform specific procedures on patient.

### Maven Machines

Front-end Developer

October 2018 – April 2019

- Built visualization tools using Google Maps API for interpreting data associated with assets, location and vehicles.
- Developed chat application package allowing dispatchers to engage in direct and group communication with their clients.

## Other

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### Carnegie Mellon Rocket Command

September 2022 – Current

### Tripoli Pittsburgh

Member (Level 1 Certified)

November 2022 – Current

### Boy Scouts of America - Troop 2 Santa Monica

Senior Patrol Leader (Eagle Scout)

September 2008 – August 2014