

Materials Scientist and Engineer with 9+ years of experience in Process Engineering, driving hardware and materials innovations through applied statistics and data-driven optimization.

Education

University of California, Berkeley | GPA: 3.94/4 | Berkeley, CA, USA **August 2016 – May 2017**
Master of Engineering in Materials Science and Engineering | Concentration: Advanced Structural Materials

Indian Institute of Science | GPA: 7.4/8.0 | Bangalore, India **August 2012 – May 2016**
Bachelor of Science in Materials | Awarded *The Institute Medal* for exceptional academic performance

The Pennsylvania State University | GPA: 4/4 | Online **May 2022 – Dec 2023**
Graduate Certificate in Applied Statistics

Work Experience

Fluent Metal | Process Engineering Lead | Cambridge, MA, USA **December 2023 – Present**
Sole Process Engineer at Fluent Metal, a metal additive manufacturing and cladding startup.

- **Process development for molten metal jetting:** Led from-scratch process development for the proprietary molten metal drop-on-demand technology, successfully demonstrating printing capabilities across diverse materials including bronze, copper, stainless steel, silver, and tungsten.
- **Process characterization and optimization:** Designed and executed DOEs under an NSF-SBIR grant to characterize multi-variate behavior; developed an optimization framework comprised of multiple models to achieve targeted drop properties.
- **Performance and throughput scaling:** Optimized process parameters to stabilize printing, enabling continuous generation of tens of thousands of drops (>100x endurance increase) and boosting print frequency by >5x.
- **Documentation, reporting, and data analysis:** Established infrastructure to document experiments, analyzed quantitative, semi-quantitative, and qualitative data, and generated reports for internal and external consumption.
- **Management of co-op/intern:** Managed the co-op/intern hiring process end-to-end (reviewing applications, setting up and conducting virtual and in-person interviews, making and following up on offers), and also managed the hired co-op for six months.

Velo3D | Senior Process Engineer | Campbell, CA, USA **June 2021 – November 2023**
A member of the Process Team at Velo3D, a manufacturer of LPBF metal 3D printers with proprietary SupportFree™ technology.

- **New material and process development:** Developed many core, skin, and low-angle processes for Ni, Fe, Ti, and Al-based materials.
- **Laser stitching:** Developed a novel algorithm to accurately adjust laser position and eliminate stitch lines when multiple lasers are used. This reduced mismatch from >300 μm to <10 μm across the entire build plate, and unlocked some novel applications for customers.
- **Laser process metrology:** Analyzed metrology data generated by the lasing system during printing to monitor defects.
- **Metallurgical testing:** Worked with external labs to coordinate heat treats, comprehensive mechanical testing, and microstructural analysis as part of the material qualification pipeline. Additionally, managed the purchase, operation, maintenance, and calibration of a few pieces of vital internal lab equipment.
- **Powder metallurgy:** Led characterization and qualification for new powders, including chemistry, flowability measurement, PSD, etc.
- **Powder sourcing:** Worked with metal powder vendors, domestic and international, to source specialty powders.
- **Customer escalations:** Swiftly addressed customer concerns by tuning existing processes or developing new ones, as required.

Gantri | Senior Materials Engineer | San Francisco, CA, USA **May 2020 – June 2021**
Sole Materials Engineer at Gantri, a digital manufacturing company using 3D printing to produce designer goods.

- **Process engineering:** Led print process development at the production facility, housing one of the largest fleets of FDM 3D printers at the time. Additionally, worked with vendors to specify and control incoming feedstock, for end-to-end process control.
- **Print farm productivity:** Developed printer and process improvements to lower rejection rate and improve print speed, often over 50%.

Chefman | Product Development Engineer | Mahwah, NJ, USA

Full-time

February 2020 – April 2020

Part-time | Remote

April 2020 – September 2020

The team builds new products while working closely with contract manufacturers in Asia throughout the design process.

- **New product development:** Competitor benchmarking, prototyping, simulation and experimental evaluation of design, and materials selection for structural components and coatings. This includes Design Failure Mode and Effect Analysis (DFMEA).
- **Failure analysis and sustaining engineering:** Work with the Customer Support department to identify top failures on returned malfunctioning products, perform failure analysis, and roll out changes before the next batch is mass-produced.

Desktop Metal | Materials Engineer | Burlington, MA, USA

June 2017 – December 2019

A member of the Materials team at Desktop Metal, a manufacturer of office-friendly metal and composite 3D printers.

- **New alloy development:** Led powder specification, sintering process development, microscopy and microanalysis, and Design-of-Experiments and statistics-backed process qualification for the development of five materials for the Studio System™ (including Stainless Steels, Tool Steels, low-alloy steels, and Ni-based superalloys).
- **Development of materials processing equipment:** Worked closely with the hardware and applied science teams in the development of the Studio System™ furnace, one of the smallest vacuum furnaces capable of sintering stainless steels.
- **Post-processing:** Developed and qualified post-processing techniques such as heat-treatment, case hardening, nitriding, and mechanochemical surface finishing of additively manufactured parts with partner vendors.
- **Material science-based solution development:** Developed the getter system, which provides an atmosphere of required purity and allows sintering of certain sensitive materials on the low-cost Studio System™ furnace (US Patent application US20220065533A1).
- **Select other projects:** Geometry accuracy and compensation (protected by 2 patents), toolpath planning, development of infrastructure to store experimental data (including IoT-based equipment logging).

GE Global Research | Manufacturing and Materials Technologies | Internship | Bangalore, India

May – July 2014

Title: Investigation of recrystallization due to compression straining in Ni-based superalloy GTD 444

- Gained familiarity in Ni-based superalloys, particularly Single Crystal (SX) and Directionally Solidified (DS) superalloys.
- Performed systematic metallographic analysis and analyzed the micrographs using image processing techniques.

Research Experience

(More at shashankhr.com/research)

University of California, Berkeley | Capstone Project | Berkeley, CA, USA

August 2016 – May 2017

Title: Improving Reliability of 3D Printed Materials in Biomedical Applications

- Performed mechanical testing of additively manufactured metal parts in mildly corrosive environments and employed fractographic methods to understand the causes and modes of failure. Results were used to develop guidelines for AM orthopedic implants.

Georgia Tech | Direct Digital Manufacturing Lab | Bachelor's Thesis | Atlanta, GA, USA

May – December 2015

Title: Design-of-Experiment Based Process Optimization for Single-Crystal CMSX-4® Ni-based Superalloy Processed Through Scanning Laser Epitaxy (SLE), a Metal Additive Manufacturing Process

- Setup and independently performed the Scanning Laser Epitaxy (SLE) process, a laser-based powder bed metal additive manufacturing process that can be used to repair damaged tips of single crystal Ni-based superalloy parts, followed by microscopy and analysis.

Publications

Patents and Applications

- Adaptive 3D printing (Pre-print compensation to improve accuracy): US10996652B2 and US11718037B2
- Systems, devices, and methods for purifying atmosphere in a vacuum furnace (Application: US20220065533A1)
- Nanoparticle delivery for controlling metal part density in additive manufacturing (Application: US20180236541A1)
- Systems, devices, and methods for purifying atmosphere in a vacuum furnace (Application: US20250334333A1)
- Metal deposition system (Application: US20250135582A1)

Scientific Journals

- Microstructures and Microhardness Properties of CMSX-4® Additively Fabricated Through Scanning Laser Epitaxy (SLE)
Basak, Amrita, Holenarasipura Raghu, Shashank & Das, Suman, Journal of Materials Engineering and Performance (2017) 26: 5877.