

# Yasham Amar Mundada

📞 814-769-0867 | ✉ ypm5149@psu.edu | www.linkedin.com/in/yasham-mundada | 🌐 Portfolio

## Education

### Pennsylvania State University (PSU)

Master of Science - *Additive Manufacturing and Design*, GPA: 3.97/4.0

State College, PA

Aug 2022 - May 2024

Awards: *Academic Excellence Award 2023, Graduate Fellowship and College of Engineering Scholarship*

### Indian Institute of Technology Gandhinagar (IITGn)

Bachelor of Technology (Honours) - *Materials Science and Engineering*

Gandhinagar, India

Jul 2017 - May 2021

## Skills and Certifications

**Design/Modeling:** SOLIDWORKS (3D CAD), nTopology (Topology Optimization), Fusion 360 (Generative Design)

**Analysis:** AVIZO, Materialize Magics, Atlas 3D, Netfabb, COMSOL, PanX, Thermo-Calc, Image-J

**3D Printers:** Prusa, Ender 3D, Form 3, Ultimaker

**Material Characterization:** Optical Microscopy, Microhardness, Rheology, Metallography

**Programming Languages:** Python, MATLAB

**Other Tools:** OpenCV,  $\LaTeX$ , Alteryx, MS-Office (Excel, Word, Powerpoint), Minitab

**Relevant Courses:** Finite Element, Design for Additive Manufacturing (DfAM), Non-Destructive Testing (NDE)

**LinkedIn Certifications:** Introduction to Geometric Dimensioning and Tolerancing, Six Sigma Yellow Belt

## Key Research Projects

### Failure Analysis and Quality Control of Additively Manufactured Samples (Thesis) Oct 2023 - May 2024

- Formulated a new function to predict failure location in laser powder bed fused (LPBF) AlSi10Mg specimens with 81% accuracy using pore features extracted from image processing (OpenCV) of Computed Tomography (XCT) data
- Validated failure locations through fractography study using optical microscopy on tensile-tested samples
- Linked in-situ photodiode signals collected during printing with mechanical properties and failure location, showing potential for quality control without destructive testing

### Direct Ink Writing of Smart Ceramics and Development of Parameter Selection Map Aug 2022 - Sept 2023

- Engineered a custom 3D printer for high-viscosity **ceramics** for electronic applications by modifying Ender 3D
- Conducted printability study using Design of Experiments (DoE) to identify optimal material composition of the ceramic slurry and process parameters for porosity and crack-free prints
- Built a COMSOL simulation model of the DIW process to study the effect of process parameters on deposition
- Crafted high throughput parameter selection framework by fusing simulation data with a Machine Learning-powered Gaussian Process model that achieved >92% prediction accuracy with fewer than 20 data points

### Design of Microstructure Selection Map for LDED of Al-0.5%Sc-0.5%Si Alloy Jan 2020 - May 2021

- Remodeled fusion welding CFD FORTRAN code into a program for directed energy deposition (L-DDED) process to understand key process variables like thermal profile and validated the model with experimental results
- Simulated LDED process of Al-Sc-Si alloy to extract thermal gradient and solidification velocity as input for solidification morphology prediction function
- Developed **Python** algorithm to extract microstructure selection map to predict microstructure for LDED of Al-0.5%Sc-0.5%Si alloy with excellent accuracy for diverse operating parameters

## Professional Experience

### Materials Design Engineer Intern, QuesTek Innovations (Evanston, IL)

June 2023 - August 2023

- Contributed to three projects by NASA, Boston Metals and America Makes in span of 10 weeks
- Proposed heat treatment strategy for Wire-Arc AM of steel by analyzing computed thermal profile
- Performed Additive Manufacturing material cost estimation for a \$ 1.2 million ARPA-E funded proposal
- Assisted in developing a novel ceramic coating for turbine blade coating with Thermo-Calc calculations, achieving 18% better fracture toughness than state-of-the-art coating as determined by Vickers hardness measurement
- Leveraged CALPHAD and QuesTek's ICMD software to identify the 6 best alloys from a comprehensive database for anode materials of the green iron electrolytic extraction process

### Analyst, IQVIA (Pune, India)

June 2021 - May 2022

- Developed over 50 Alteryx workflows for big data analytics to calculate key performance indicators (KPIs) for Aimmune Therapeutics, a Nestle-acquired client
- Visualized the KPI's on the Tableau dashboard and conducted weekly maintenance and quality checks
- Suggested strategies by uncovering insights on target physicians, patient history, marketing impact, and referral patterns, boosting revenue by **13%** annually
- Received *Spotlight Award* for showing strong ownership towards the work and delivering quality client deliverables

**Trainee, CFEES-Defence Research Development Organization (Delhi, India)**

May 2019 - July 2019

- Synthesized an 11% improved breathable hydrophilic polyurethane coating for firefighters' suits by experimenting with reactant compositions and processing conditions
- Assessed tensile strength, tear resistance, breathability of coating by ASTM standards, and thermal properties by interpreting DSC and TGA analysis

**Publications**

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- *Investigation of temperature distribution and solidification morphology in multilayered directed energy deposition of Al-0.5 Sc-0.5 Si alloy. International Journal of Heat and Mass Transfer, 186, p.122492.*
- *Microstructure engineering during directed energy deposition of Al-0.5 Sc-0.5 Si using heated build platform. International Journal of Heat and Mass Transfer, 202, p.123679.*

**Relevant Course Projects**

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**Pixy Stick Container Challenge: Inspired by NASA's Mars Sample Return Mission**

Jan 2024 - May 2024

- Designed 3D printable lightweight, high-impact absorption container to sustain 100 ft fall with DfAM guidelines
- Employed systematic studies from concept generation to testing, including generative design, topology optimization, latticing, build analysis, post-processing, and cost analysis to optimize designs

**3D Reconstruction and Printing of Hip Bone from MRI Data**

Aug 2022 - Dec 2022

- Executed MRI data segmentation of the hip region to accurately isolate the hip bone using 3D Slicer
- Developed a 3D reconstruction of the hip bone, optimizing the mesh surface for accuracy using Meshlab
- Successfully 3D printed the hip bone model, ensuring precise output for practical application in medical industry

**Leadership and Teaching**

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**Teaching Assistant, PSU**

- ME201: Introduction to Thermal Science (300 Students) - (Spring'24 and Fall'23)

**Teaching Assistant, IITGn**

- ES 202: Introduction to Materials Science (180 Students) - (Fall'20)

**Events-Coordinator, Amalthea '18 (Annual Technical Summit), IITGN**

- Coordinated a total of 13 technical events and managed a team comprising of 30 members to conduct the events