

Process engineer with 10 years of experience spanning semiconductor cleanroom fabrication, materials characterization, and high-volume industrial manufacturing. Expertise in PVD/CVD thin-film deposition, photolithography, plasma etching, and full process integration from mask design to functional device. Proven track record of DOE-driven yield optimization, SPC implementation, and SOP authorship. Distinctive background in shift operations (steel + gas transmission) brings a production discipline rarely found in R&D engineers.

EXPERIENCE

Postdoctoral Associate — Process Engineer2024 – Present

Florida International University — AMERI | Miami, FL

- Own end-to-end micro-nanofabrication flow: photomask design (LayoutEditor), PVD metallization (Cr/Au, Ag), RIE plasma etch, and functional device characterization.
- Qualified novel E-beam evaporation processes including tool-matching protocols and vendor co-development documentation.
- Established AFM nanoindentation benchmarking protocols adopted as lab standard for cardiac tissue stiffness measurement.
- Maintain Class 100 cleanroom equipment (mask aligner, spin coater, E-beam evaporator, plasma etcher) and enforce safety/yield protocols across team.
- Lead multi-PI NSF CELL-MET cross-functional R&D program spanning materials science, device physics, and biomedical engineering.

Graduate Research Engineer (Ph.D.)2020 – 2024

Florida International University — MSE | Miami, FL

- Developed and optimized thin-film fabrication processes (PVD, CVD, E-beam evaporation) on Si, SiO₂, PDMS, ceramic, and glass substrates; authored SOPs and runcards.
- Developed and optimized photolithography on challenging surfaces (hydrophobic PDMS, proton-conducting ceramics), enabling reliable pattern transfer and achieving first-ever patterned Ag electrodes on BZCYYb4411 via bilayer resist and E-beam evaporation (Materials Advances 2024).
- Designed and fabricated high-precision photomasks using LayoutEditor and Heidelberg µPG101 (405 nm), achieving ~10 µm resolution with <2% dimensional variation for device fabrication.
- Achieved 19.8 kPa⁻¹ piezoresistive sensitivity and 2.85 kPa⁻¹ capacitive sensitivity in first-ever dual-mode pressure sensor (patent pending).
- Designed COMSOL FEA simulation framework establishing design rules for piezoresistive MEMS sensors; published in *Micromachines*.
- Led DOE-driven process optimization and automation, developing LabVIEW-based multi-instrument acquisition systems and improving device yield by ~30% while establishing reproducible SOPs and process control methodologies.

Graduate Teaching Assistant2019 – 2020

Florida International University — Mechanical & Materials Engineering | Miami, FL

- Instructed Intro to Nanofabrication (EGN5013C) and Materials Science Lab — teaching cleanroom protocols, photolithography, and thin-film deposition to graduate cohorts.
- Developed laboratory manuals and grading rubrics for hands-on microfabrication coursework.

Lead Shift Engineer (Mechanical & Operations)2016 – 2019

GTCL / Abul Khair Steel — Bangladesh

- Supervised 15+ technicians in continuous 24/7 operations for national gas transmission grid; reduced unplanned downtime 30% through RCA and predictive maintenance.
- Managed 1600 °C furnace systems in steel plant; implemented RCM strategies cutting equipment downtime 25% and optimizing spare-parts inventory spend.
- Analyzed SCADA operational data to identify gas flow inefficiencies, improving grid pressure stability and distribution efficiency across compressor stations.

PATENTS

- U.S. Patent US12292346B2— Multi-modal pressure sensor
- U.S. Patent 11,737,507 — Intelligent Automated Footwear
- Disclosures — 4 additional pending patents

IMPACT METRICS

2

U.S. Patents

10+

Publications

30%

Downtime cut

FABRICATION

PVD / Sputtering

CVD / PECVD

E-beam Evaporation

RIE / DRIE Etch

Photolithography

Lift-Off

Spin Coating

Mask Design (LayoutEditor)

MEMS Fabrication

Flexible Electronics

CHARACTERIZATION

SEM / EDS

AFM / Nanoindentation

Raman / FTIR

Profilometry

EIS / Potentiostat

PROCESS ENGINEERING

DOE

SPC / JMP / Minitab

Root-Cause Analysis

SOP / Runcard Authorship

Failure Analysis

Yield Optimization

RCM / Preventive Maint.

SOFTWARE & SIMULATION

COMSOL (FEA)

LabVIEW / DAQ

Python / ML

SolidWorks

LayoutEditor

EDUCATION

Ph.D., Materials Science & Engineering2024

Florida International University

B.Sc., Mechanical Engineering2016

Bangladesh Univ. of Engineering & Technology (BUET)

LEADERSHIP

President, ECS Student Chapter @ FIU2021 – 2024

Grew chapter 40% · 30+ members · industry seminar series