TIE INTERVIEW PRESENTATION

# Keegan May

## Mechatronics Engineering

Texas A&M University

### Graduate Student / Intern Candidate

Specializing in Semiconductor Manufacturing, Robotics & Automation

PREPARED FOR DR. SHANKAR DEVASENATHIPATHY

Director, Failure Analysis & Characterization

keeganmay168@gmail.com (806) 283-3129 Fort Worth, TX

CANDIDATE PROFILE

# About Me

EDUCATION

## Texas A&M University

B.S. Mechatronics Engineering

May 2026

MINOR

**Embedded Systems Programming**

## Focus Areas & Passion

- **Semiconductor Manufacturing**
  Driving innovation in advanced packaging and process integration.
- **Robotics & Automation**
  Applying automated systems to enhance manufacturing scalability.

## Key Strengths

Hands-on Fab Experience: Practical knowledge of CVD, Etch, and Metrology tools.

Process Optimization: Data-driven mindset for improving throughput and yield.

Cross-functional Teamwork: Proven leadership in large engineering organizations.

STRATEGIC ALIGNMENT

# Why TIE?

TARGET IMPACT

## Accelerating Innovation

Combining mechatronics expertise with advanced semiconductor packaging to support TIE's mission.

Failure Analysis | Characterization | Process Integration

## Alignment with Dr. Devasenathipathy

- Through Silicon Vias (TSVs): Strong interest and experience in working on innovative manufacturing processes.
- Optical Diagnostics: Prior research in spectroscopic reflectometry aligns with expertise in optical diagnostics.
- Molecular Pharmacology: Understanding of microfluidics of particles in biological system used in drug-delivery systems.

## Mission & Contribution

- Ecosystem Growth: Excited to innovate traditional semiconductor landscape by exploring new manufacturing processes.
- Automation Mindset: Applying robotics principles to create repeatable, high-quality failure analysis workflows.

PROFESSIONAL EXPERIENCE

# Semiconductor Manufacturing

## Core Competencies

**Failure Analysis**
FIB, Ellipsometry, SEM

**Process Integration**
Yield Improvement, TFF

**Equipment Eng.**
CVD Maintenance, Qual.

Focus: Process Optimization & Reliability

### Process Engineer

FEB 2025 – PRESENT

BrYet Pharmaceuticals | Houston, TX

Developing injectable silicon nanoparticles using semiconductor manufacturing techniques.

Analyzing nanopores on micro-pillar array wafers using Focused-Ion-Beam (FIB) microscopy; providing defect feedback to GlobalFoundries.

Introduced nanoparticle tangential flow filtration (TFF) process, significantly reducing lead time.

### Process Engineer (Biomedical Devices)

SUMMER 2024

Medtronic | Tempe, AZ

Qualified automated semiconductor tools for micro-scale device manufacturing.

Optimized throughput by 4.1% and improved tool capacity by 33% in photoresist strip/etch processes.

Developed non-destructive inspection using spectroscopic ellipsometry to detect contamination.

### Equipment Engineering Technician

SUMMER 2022

Samsung Austin Semiconductors | Austin, TX

Performed tool maintenance and troubleshooting on Chemical Vapor Deposition (CVD) equipment.

Designed digital SOP templates with CAD models to streamline maintenance documentation.

ACADEMIC BACKGROUND

# Research Experience

**Soft Robotics**
Mechanics & FEA

**Nanofabrication**
Thin Films & Metrology

**Process Optimization**
Experimental Analysis

**Technical Leadership**
Training & Safety

MULTIDISCIPLINARY FOCUS

## Research Assistant — SOFT ROBOTICS

FEA & CAD | PID Control

Texas A&M Dept. of Multidisciplinary Engineering

- Designed CAD models and conducted Finite Element Analysis (FEA) to guide design adjustments for parts with variable mechanical properties.
- Implemented PID tuning for IMU sensors to provide robust feedback on real-time 3D kinematics.

## Undergraduate Researcher — NANOFABRICATION

30+ Trained | RIE Process

AggieFab Nanofabrication Facility

- Performed experimental analysis optimizing etch rate and uniformity of reactive-ion etch (RIE) processes.
- Performed process monitors on etch and metrology equipment ensuring stable baseline performance.
- Developed thin-film models for SiN, $Si_3N_4$, and $SiO_2$.
- Trained 30+ researchers on semiconductor equipment.

## Research Assistant — ADDITIVE MANUFACTURING

Binder Jetting | Composites

Texas A&M Industrial & Systems Engineering

- Developing metal composites using binder jet technology to innovate manufacturing capabilities.
- Analyzing mechanical performance and material properties to characterize composite structural integrity.

LEADERSHIP EXPERIENCE

# Robotics & Automation

CAPTAIN & LEAD

1st Place North America Championship

## Texas A&M Robomasters

Robotics Team Captain

- Led 140+ engineering students across electrical, mechanical, and programming sub-teams.
- Directed design and fabrication of complex robots for international competitions, ensuring system reliability.
- Hosted STEM outreach events and conferences with local K-12 schools to inspire future engineers.

KEY ACHIEVEMENT

**North America Champions**

## Texas Combat Robotics

EVENT COORDINATOR, JUDGE, INSPECTOR

- Coordinated TAMU's largest robotics event featuring BattleBots teams (Riptide, SubZero).
- Organized critical safety inspections, judging protocols, and live broadcasting operations.

## Leadership Competencies

- System Integration
- Project Management
- Technical Mentorship
- Safety Protocols

TECHNICAL PORTFOLIO

# Robotics & Automation Projects

Engineering solutions integrating embedded systems, computer vision, and mechanical design.

## Teleoperated Robot Hand

ESP32 | Flex Sensors | C++

Designed a remotely operated robotic hand controlled by a sensory glove. Implemented sensor fusion algorithms to map human finger flexure to servo actuation for precise, real-time mimicry.

Embedded Systems

## Smart Drone Landing Pad

LiDAR | Computer Vision | Raspberry Pi

Engineered an autonomous landing system with active bed-leveling. Integrated LiDAR for obstacle avoidance and computer vision algorithms for precise color tracking and target alignment.

Machine Vision

## Autonomous Sentry Robot

Mechanical Design | Control Systems

Built a mobile robot featuring a custom suspension drivetrain and a double-flywheel turret. Developed navigation logic for autonomous pathing and object targeting systems for competitive utility.

Mechatronics

\+ Additional Project: Robotic Snake utilizing lateral undulation gait with motion tracking and MATLAB feedback control. </> MATLAB

CORE COMPETENCIES

# Technical Skills Overview

Comprehensive toolkit for
**Engineering & Manufacturing**

## Manufacturing & Fabrication

- **Semiconductor Manufacturing**
- CNC Mill & Lathe
- Additive Manufacturing
- Laser Cutter
- 3D Printing

## Programming & Control

- Python
- C / C++
- Java
- ROS2
- Assembly
- HTML/CSS/JS

## CAD & Mechanical Design

- SolidWorks
- Autodesk Fusion 360
- OnShape
- Autodesk Inventor

## Certifications & Analysis

- **Lean Six Sigma Green Belt**
- Chemical Safety
- Google Data Analytics
- Microsoft Excel
- Harvard CS50

TIE ROLE ALIGNMENT

# Relevant Expertise

CORE DOMAIN

## Semiconductor Engineering

Bridging process reliability with automation efficiency.

KEY TECHNOLOGIES

CVD & Etch | Metrology | FIB Analysis | Robotics

## Process Engineering & Equipment

Experience qualifying and maintaining tools for Chemical Vapor Deposition (CVD), Etch, and Deposition processes.

- Proven ability to develop reusable digital SOP templates with embedded CAD models for maintenance efficiency.

## Failure Analysis & Characterization

Hands-on expertise with FIB (Focused Ion Beam), spectroscopic ellipsometry, and reflectometry for defect detection.

- Skilled in establishing defect inspection processes to reduce film non-uniformity and improve process yield.

## Automation Mindset & Leadership

Standardized procedures and trained 30+ researchers on critical metrology and fabrication equipment.

- Optimization-focused approach: Demonstrated capacity improvements (+33%) through data-driven workflow adjustments.

STRATEGIC FIT

# What I Bring to TIE

Aligning robotics precision with advanced semiconductor packaging.

### Semiconductor Processing

Aligned with optical diagnostics (FIB, Ellipsometry) for failure analysis objectives. Deep interest in innovative manufacturing process.

### Multidisciplinary Experiences

Experience working on robotics and automation projects in cross-functional environments. Knowledge about material science, mechanical design, electronics, programming, machine learning and AI.

TAILORED CONTRIBUTION FOR

**Dr. Devasenathipathy's Team**

## Measurable Impact

**+4.1%**

**FACILITY THROUGHPUT**

Optimized photoresist strip processes at Medtronic

**+33%**

**TOOL CAPACITY**

Improved dry etch efficiency via process qualification

**140+**

**Engineering Students Led**

Captain of Robomasters; complex systems integration

**30+**

**Researchers Trained**

AggieFab Nanofabrication Facility equipment training

## Operational Excellence Core Competencies

- **Process Characterization**
  Thin-film models (SiN, $SiO_2$)
- **Technical Communication**
  Authored qualification reports
- **Equipment Maintenance**
  CVD troubleshooting & SOPs
- **Automation Integration**
  Robotics applied to manufacturing

# Thank You

I appreciate the opportunity to discuss how my background in semiconductor manufacturing and automation can contribute to TIE's mission.

**Q&A Session** Next Steps


## Keegan May

Mechatronics Engineering Candidate

*"Passionate about advancing semiconductor manufacturing through robotics and automation."*

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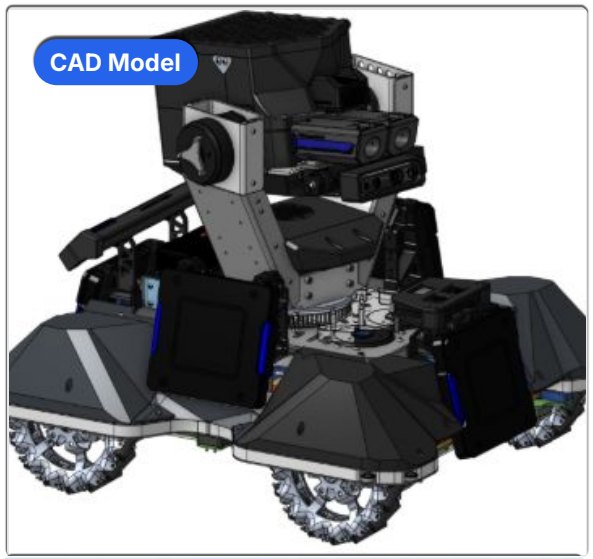
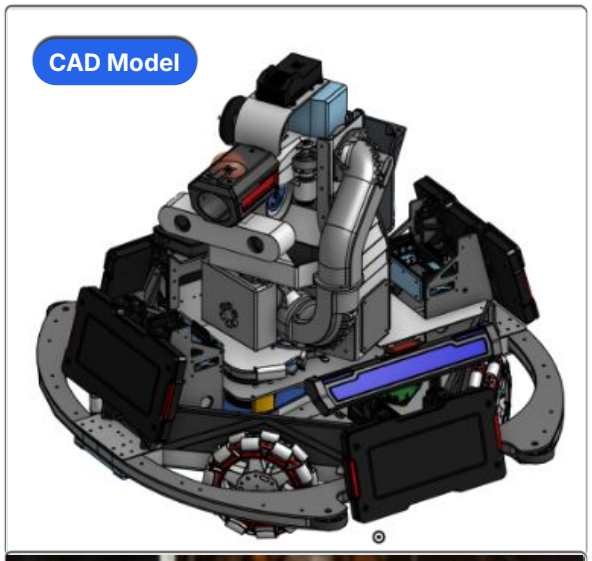
**LOCATION**
Fort Worth, Texas

APPENDIX A DESIGN & MANUFACTURING

# Robotics Engineering Portfolio

CAD Design • Fabrication • Systems Integration



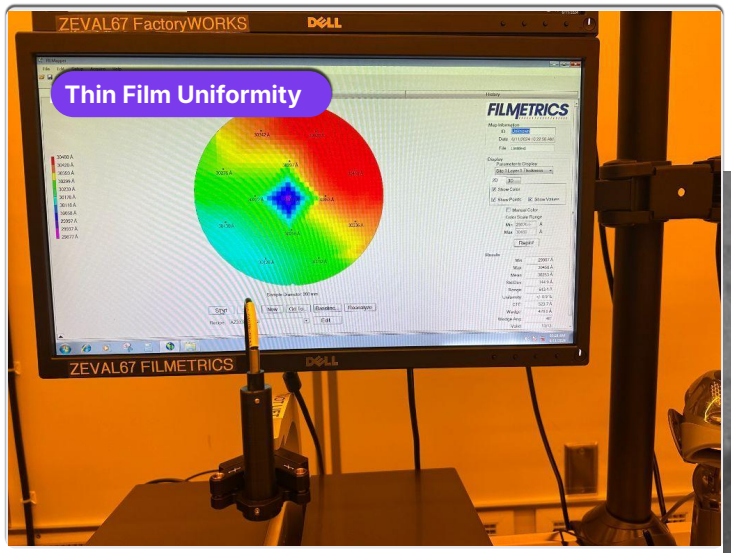





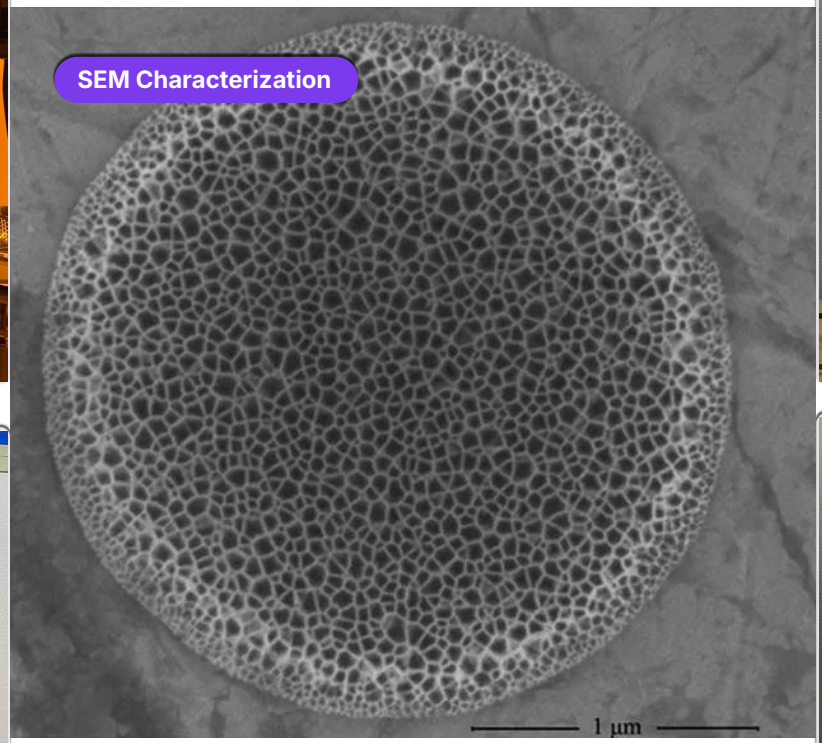

APPENDIX B CHARACTERIZATION & ANALYSIS

# Metrology & Process Monitoring

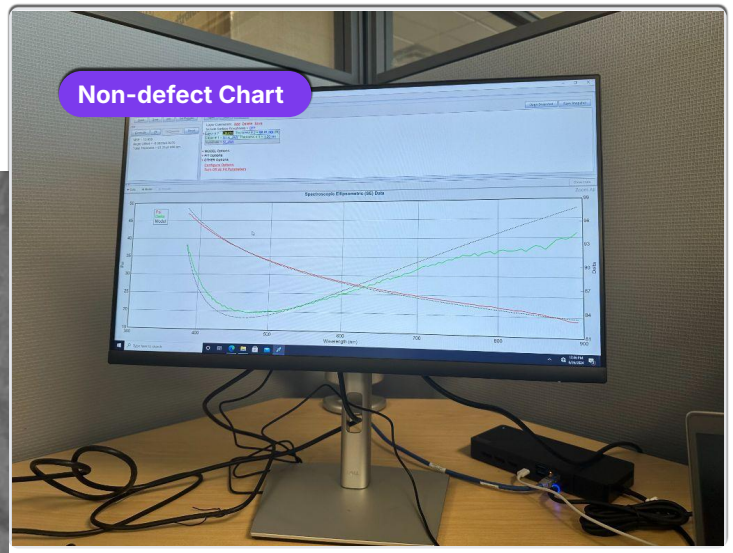
Optical Diagnostics • FIB Analysis • Process Control

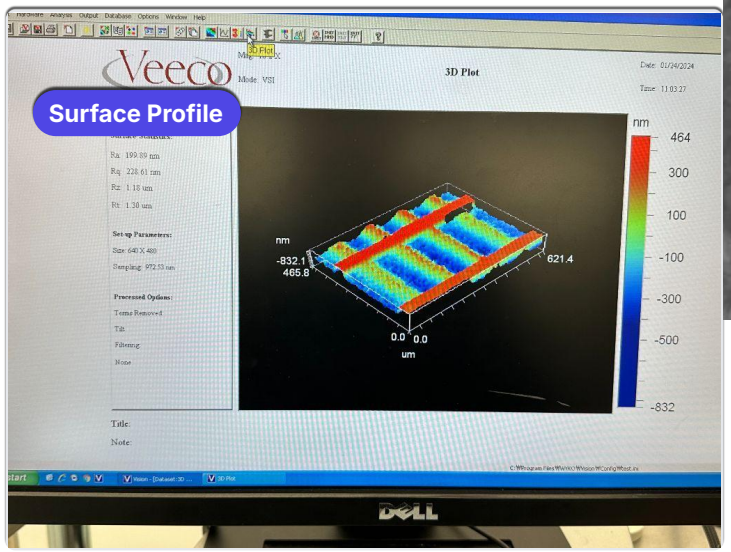


Thin Film Uniformity

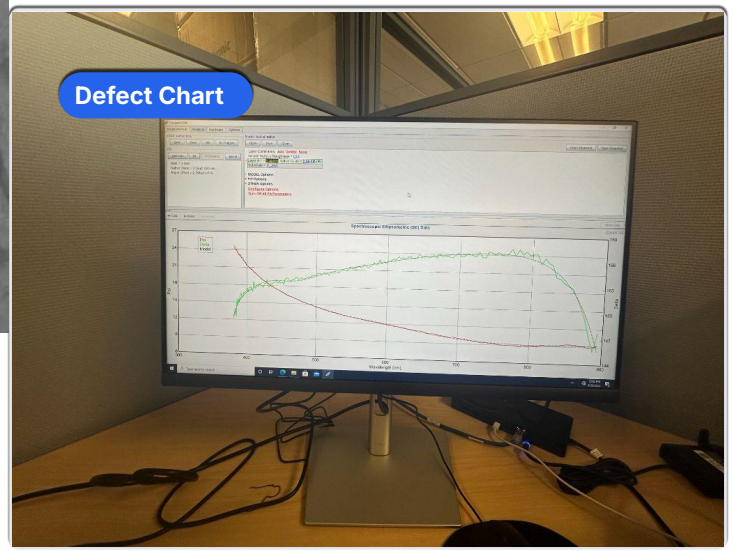


SEM Characterization


Non-defect Chart



Surface Profile


Defect Chart

APPENDIX C PERSONAL & LEADERSHIP

# Professional Gallery

Cleanroom Protocols • Team Leadership • Research