# JACOB GUYMON, MECHANICAL/PRECISION ENGINEER

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## Education

PhD, Mechanical Engineering, North Carolina State University — August 2023
Masters of Business Administration, Weber State University — May 2018
Bachelors of Science, Mechanical Engineering, Utah State University — May 2016
FE, Mechanical Engineering — January 2016
Certificate Machinist Level I, OWATC — August 2016

## Experience

### Staff Research Engineer, Precision Engineering Consortium NCSU — August 2023 –Present

- Develop/design tooling and methods for precision systems.
- Develop/implement precision measurement systems for optics manufacturing.
- Automated lens manufacturing steps.
- Lead/teach graduate students in PEC precision systems and tools.
- Troubleshoot and maintain aging precision equipment.

### Engineer Research Associate, Precision Engineering Consortium NCSU — January 2020–August 2023

- Develop/design tooling and measuring methods for precision Lens polishing.
- Interferometric and optical measurement systems.
- Electrochemical machining.
- Diamond Turning.
- Develop novel polishing toolpathing.

### Mechanical Engineer, Northrop Grumman Corp. — February 2018 –Present

- Dynamics derivation and simulation for complex mechanical systems.
- Blueprint analysis for GD&T and tolerance stack up.
- Develop/design tooling for ICBM Weapon System maintenance and repair.
- Develop/implement plans to maintain and replace antiquated parts.
- Lead/teach other ICBM engineers to design for manufacturability.
- Analyze new and old components for strength and fatigue.
- Stand up Northrup ICBM manufacturing capabilities.

### Mechanical/Process Engineer, JD Machine Corp. — April 2016 -February 2018

- Design and manufacture robust and economically viable workholding solutions for a myriad of sizes and shapes of parts. The workholding fixtures reduce setup and machine time to a fraction of the original level.
- Lead a team of engineers, programmers, and machinists to collaborate and create the best process for the company's most difficult jobs.
- Automate day to day processes and increase the efficiency of the workflow through the system. Program a number of tasks to automatically do the clerical work of three Interns.
- Increase efficiency and reduce costs by creating companywide paperless forms and timekeeping procedures. These paperless programs save hundreds of hours of clerical calculations and data transcription every month.

### Quality Assurance Engineer, JD Machine Corp. — August 2015-April 2016

- Worked with machinists, engineers and Quality Team to facilitate inspection and improve quality.

### CNC Machinist, JD Machine Corp. January 2013-April 2016

- Built parts from a variety of product fields, specializing in Aerospace, Defense and Medical work. Setup machines, programmed fixtures and parts, optimized tool life and dimensional accuracy and worked to improve processes. Worked with team of machinists to fix problems and troubleshoot.

### Engineer, Machinist, Lab Technician, Maxwell Products Inc. Dec 2008 - Nov 2010, Dec 2012

- Engineer, Machinist: designed and built chemical testing equipment and machines to perform ASTM standard tests on asphalt samples.
- Lab Technician: worked with chemical engineers to formulate and test oil and asphalt samples. testing needed to pass specific ASTM specifications.

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## Technical Papers, Projects, and Presentations

### Dissertation.

- Guymon, Jacob P. "Nanometer Level Surface Correction for Fine Optics." North Carolina State University (2023).

### Toolpathing.

- Jacob Guymon, “Novel EEM Toolpathing” ASPE conference presentation October 2022.
- Jacob Guymon, Tyler Young, Ken Garrard, Mark Pankow. “Novel EEM Toolpathing” (Paper in work).

### Precision Lens Correction.

- Jacob Guymon, Tyler Young, Ken Garrard, Mark Pankow, “Corrective Ball EEM Process for Optical Form and Finish” (Paper in work, Abstract submitted to present in ASPE conference this fall).

### Electrochemical Machining.

- Jacob Guymon, Tyler Young, Mark Pankow, “Novel Methods of ECM with EEM for rapid precision optics mold manufacturing” (Paper in work).

### Machine Learning.

- Tyler Young, Jacob Guymon, Mark Pankow, “Lens surface correction path optimization using machine learning”(Paper in work. Abstract submitted to present in ASPE conference this fall).
- Computer Vision algorithm and robot for defect detection in PCBs.

### CA Probe Error Analysis.

- Kaushal Narayan Budanur, Jacob Guymon, Tyler Young, Mark Pankow, “Characterization of Angle of Incidence Errors in Confocal Probe”(Paper in work. Abstract submitted to present in ASPE conference this fall).

### Metal Additive Manufacturing.

- Tim Horn, Criss Rock, Hannah Fletcher, Jacob Guymon, “Miscibility Gap in Metal Additive Manufacturing Copper and Steel”.

### MALDESI For NCSU METRIC lab.

- Knizner, Kevan; Guymon, Jacob; Garrard, Kenneth; Bouvrée, Guy; Manni, Jeffery; Hauschild, Jan-Peter; Strupat, Kerstin; Fort, Kyle; Earley, Lee; Wouters, Eloy; Pu, Fan; Radosevich, Andrew; Elsen, Nathaniel; Williams, Jon; Pankow, Mark; Muddiman, David, "Next-Generation Infrared Matrix-Assisted Laser Desorption Electrospray Ionization Source for Mass Spectrometry Imaging and High-Throughput Screening" Journal of the American Society for Mass Spectrometry. 2022 Sep 29;33(11):2070-7.
- Alena N Joignant, Hongxia Bai, Jacob P Guymon, Kenneth P Garrard, Mark Pankow, David C Muddiman, “Developing transmission mode for infrared matrix-assisted laser desorption electrospray ionization mass spectrometry imaging” Rapid Communications in Mass Spectrometry 2022/11/30.
- Cristina Arciniega, Jacob Guymon, Jeffrey G. Manni, David C Muddiman, “Quasi-Continuous IR-MALDESI Source Coupled to a Q-TOF Mass Spectrometer for Direct Analysis from Well Plates”, Journal of Mass Spectrometry. Status: Accepted for publication.

### Air Force Projects

- Developed maintenance and repair procedures for high fidelity oil and air shock systems.
- Derived system of EOM for complex 3D dynamic system for analysis and simulation.
- Developed and oversaw manufacturing of tooling for high risk legacy hardware removal and installation.

### Parts Cleaner

- Designed and implemented an air pressure system to clean off parts as they exit the machine where they were cut. The cutting Oil had a high cost and the quantity of parts made traditional cleaning processes economically challenging. Built a system that maintained the cutting Oil inside the machine and saved the machinist time, allowing the machinist to increase efficiency and productivity.

### PCI, Customer Give Back

- Lead a Team of engineers and machinists in a project to reduce costs for one of our customers. found dozens of improvements on many parts and were able to offer a 4% overall cost reduction for all the work we did for that customer.

### HPV Competition

- Lead a team of engineers as the Project Manager to design and manufacture a competitive Human Powered Vehicle (HPV). Implemented the entire engineering process from brainstorming concepts and research to designing and building an optimized HPV for the ASME course. Personally, designed and built "the best tilt steering system" the judges had ever seen. Defined the project timeline and helped the team meet its benchmark goals. Documented the process and project to the specific rules that ASME had defined.

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## Leadership, Teaching and Service

### Senior Design

- Taught the MAE senior design class 2019.

### Engineering Mentoring

- At NGC mentored an intern for two summers.
- At PEC Mentored other graduate students.

### Leader of NPI Fixturing Team

- Help a team of the best engineers and Machinists to design and build the best processes and fixtures for difficult machined parts.

### Project Manager for HPV Team

- Lead a team of eight senior engineering students to work together and exploit each team member's strengths in the process of designing and building a competitive human powered vehicle.

### Chairman of the "Strengthen the Community Committee" JD Machine

- Lead a team of managers, machinists, and quality team members to plan and implement service projects in the community. Organized a donation competition between the machining teams and succeeded in giving many thousands of dollars to a local charity.

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## Software

### SolidWorks

- Proficient after having used SolidWorks for school and work projects for more than 8 years. Mostly fixture design for complicated machine parts. Passed an advanced design SolidWorks class in May 2017. SolidWorks simulation software used for senior project to analyze mechanical wear and strength of materials and simulate airflow over HPV for drag.

### Microsoft Excel VBA

- Proficient programmer with two years of experience writing code and debugging programs to solve a variety of problems. Use VBA to automate clerical tasks and gather data and analyze statistical variation from measurements.

### MATLAB

- Extensive development of custom precision surface data analysis tools.
- Extensive use of MATLAB to analyze ICBM problems.

### LabVIEW

- Used LabVIEW to build and use a heart rate monitor. In conjunction with building a heart rate monitor, coded in LabVIEW to run fast Fourier transform on live heart rate data to clean up signals and successfully monitor heart rate during junior year instrumentation class.

### C++

- Proficient Arduino and other microcontroller programming in C/C++.

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## Membership

### American Society of Precision Engineers

Presented novel toolpathing paper at ASPE conference 2022.

### American Society of Mechanical Engineers

Participated in one of ASME's cornerstone events. The International HPV competition held in San Jose California 2016.

## References

Available upon Request