Philip Sieg

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Education

University of Pennsylvania *School of Engineering and Applied Science*

- **BSE in Mechanical Engineering**   **2018 - 2022 |** *GPA: 3.97*
- **MSE in Robotics** *Through the GRASP Lab*   ***2021 - 2023*** *| GPA: 3.97*

Relevant Coursework: *Integrated Computer-Aided Design, Mechatronic Systems, Robotics, Mobile Robotics, Feedback Control, Data Driven Modeling, Machine Learning, ML in Robotics, Simulation Modeling, Machine Design and Manufacturing, Product Design, Dynamic Systems, Mechanics of Solids, UAVs, Fluid Dynamics, Heat/Mass Transfer, Statistics, Linear Algebra, PDEs, Engineering Negotiations*

Work Experience

Osaro, *Robotics Hardware Engineer*   **May 2023 – Present**

- Led design of next generation, multi-cup end-of-arm-tool (EOAT)
- Led redesign for company standard, single cup (with tool changer) EOAT
- Led hardware for a multi-sku, tote consolidation project (cell and tool design) for one of largest American retail companies
- Took over as hardware lead for company's first major deployment of a 12-robot kitting system
- Sourced and integrated a new force sensor and IO coupler to improve performance for all Osaro robotic systems
- Integrated and programmed servos used for induction mechanism, deployed at scale for Asian e-commerce client
- Led hardware productization of depalletization vision system

Amazon Robotics, *Hardware Engineering CO-OP, Manipulation EOAT Team*   **Jul 2022 – Dec 2022**

- Led R&D efforts integrating Wireless IO and inductive couplers onto two different EOATs
- Designed a new suction based EOAT that changes its form factor based on package size
- Ran experiments to characterize the benefits of dynamic force sensing and adaptive acceleration
- Designed components for production release that retrofitted a force sensor into the EOAT for ROBIN
- Built a proposal for integrating a force sensor into the Cardinal EOAT
- Designed a toolless, quick release suction cup fastening prototype
- Assumed responsibility for a project that used a mobile robot arm to pick up warehouse debris

Oshkosh Corporation (JLG and Jerr-Dan), *Robotics Intern*   **May 2021 – Aug 2021**

- Wrote programs for ARC welding cells to integrate lower volume, heavy duty wrecker frames into robotic welding pipeline
  - Reduced cycle time from eight hours to two hours while standardizing the process for all Jerr-Dan wrecker frames
- Aided in restoring tube welder acquired from European facility
- Helped troubleshoot and touch up welding programs for AWPs and Telehandlers when supplier issues arose
- Developed and presented proposal for locations of new Bluetooth trackers for frames during fabrication
- Revamped capacity calculator by improving UI and adding additional features for the boom and frame fabrication areas

Research Experience

DAIR Lab, *Undergraduate Research Assistant*   **May 2020 – May 2021**

- Designed, manufactured, and assembled a cart pole (inverted pendulum) with force sensing and adjustable soft walls to create a physical demonstration of a novel contract-aware controller
- Implemented analytical impact models to understand flaws and find potential improvements, leveraging data gathered at Penn and MIT

Bargain Group, *Undergraduate Research Assistant*   **Oct 2019 – May 2020**

- Conducted FEA for a micro-scale thermionic converter to investigate how design changes affected thermal and structural properties

Penn Physics Department, *Intern*   **May 2018 – Jun 2018**

- Scripted, filmed, and edited a three-part video series demonstrating physics phenomena through experiments for the Penn Physics YouTube channel
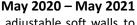
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Extracurricular Experience

Dark Mode *Senior Design Project on Autonomous Driving with an Event-Based Camera*   **Sep 2021 – May 2022**
- Co-Led the planning, controls, and mechanical design portions of the project
- Implemented RRT*, pure pursuit, wall following, and emergency braking in a ROS pipeline as well as retrofitted an RC car to be suitable for autonomous driving with an event-based camera

Machining Lab Assistant *in the Precision Machining Lab (PML)*   **Jan 2020 – May 2021**
- Supervised and instructed students working in the machine shop, managed inventory, and promoted safety

Penn Engineering Council *Academic Mentorship Committee*   **Sep 2019 – May 2020**

Teaching Experience

Head Graduate TA: Integrated Computer-Aided Design, Manufacturing and Analysis *IPD 501*   **Jan 2023 – May 2023**
- Prepared lectures/homework, gave demonstrations on fabrication techniques, trained students how to use HAAS CNC machines, and advised students on project proposals

Graduate TA: Senior Design *MEAM 446*   **Jan 2023 – May 2023**
- Provided feedback and advice on both technical and non-technical aspects of project for three teams I advised

TA: Machine Design and Manufacturing *MEAM 201*   **Sep 2021 – May 2022**
- Ran a weekly lab section in the Machine shop, teaching students how to use the various tools and associated techniques
- Assisted students with DFM, SolidWorks assemblies, engineering drawings, Mastercam programs, and tolerance stack-ups.
- Held office hours to help students with machining and assembly of their Stirling engines

TA: Mechanical Engineering Design Lab *MEAM 247 and 248*   **Aug 2020 – May 2021**
- Ran a weekly virtual lab section, weekly office hours, and helped adapt the standard labs to a virtual environment

Publications

- A. Ardingly et al., "Stabilization of Complementarity Systems via Contact-Aware Controllers." *ArXiv:2008.02104 [Cs]*, June 2021. *arXiv.org*, https://arxiv.org/abs/2008.02104
- M. F. Campbell et al., "Nanostructured Spacers for Thermionic and Thermophotovoltaic Energy Converters," in Journal of Microelectromechanical Systems, Doi: 10.1109/JMEMS.2020.3000422
- P. G. Sieg et al., "A Demonstration of the Infrared Activity of Carbon Dioxide." The Physics Teacher, vol. 57, no. 4, 2019, pp. 246–249, doi:10.1119/1.5095383.

Technical Skills

SolidWorks • Mastercam • CREO • LaTeX
ROS • Motisim • Robo Guide • GD&T
COMSOL Multiphysics • Machine Learning
Python • MATLAB • Simulink • R
JAX •Machining • Rapid Prototyping •
German

Honors and Awards

General | Dean's List All Applicable Years (BSE, MSE)
Summa Cum Laude (BSE, MSE)
2019 | Ruhr Fellowship Recipient
2020 | Tangen Hall Furniture Competition Winner
2021 | UPenn Mechatronics Competition Winner (2021)
Model-Based Optimization for Robotics Best Paper Award Finalist
2022| M&T Summit Integration Lab 1st Place
Frederick Ketterer Award
Berkmann Fund Recipient
IEEE T-RO Best Paper Honorable Mention