Michael Sobrepera

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Profile

Graduate student with a strong robotics, biomedical engineering, and computer science educational background complemented by work experience involving product development and manufacturing as well as research experience in robotics and perception. Effective at combining creative thinking with logical design ideas to develop solutions to challenging and novel problems. Excellent verbal and written skills with a detail-oriented approach for completing projects and assignments. Thoroughly enjoys learning and applying new skills and talents to problems while pushing technical boundaries.

Education

University of Pennsylvania; Philadelphia, PA (Aug 2016 – present)
- Doctor of Philosophy in Mechanical Engineering; GPA: 3.50
    - Member of Rehabilitation Robotics Laboratory. Affiliated with General Robotics, Automation, Sensing, & Perception Laboratory (GRASP lab).

Georgia Institute of Technology; Atlanta, GA (Aug 2012 – Dec 2015)
- Bachelor of Science in Biomedical Engineering; GPA: 3.35
    - Minor in Computer Science – Focus on Intelligence

Auburn University Honors College; Auburn, AL (Aug 2011 – May 2012)
- Pursued Bachelor of Science in Chemical Engineering; GPA: 3.90

Skills

Technology
- Programs: GIMP, HSMWorks, Inkscape, Microsoft Office Suite, MS Visio, SolidWorks, CLion, PyCharm, OnShape
- Languages: C++, Python, MATLAB, Mathematica, JavaScript, Arduino, KRL, LaTeX

Product Development/Manufacturing
- Traditional Machining: manual mill, manual lathe, CNC lathe, 3 axis CNC mill, manual drill press, deburring techniques, finishing tools
- Rapid Prototyping: FDM printers, RTV molding
- Product Design: design for manufacture, technical drawing, GD&T, design for injection molding, design for thermoforming, design for use
- Manufacturing: SCARA robotics, tooling design, automation design, KRC2 and KRC4 based robots

Research Experience

University of Pennsylvania, Rehabilitation Robotics Laboratory; Philadelphia, PA (Aug 2016 – present)
- Position: Graduate Researcher (Aug 2016 – present)
- Working under Michelle Johnson to develop an affordable social robot to aid in remote, semi-autonomous, and fully autonomous assessment and treatment of typically developing pediatric patients as a tool to expand the reach of clinicians. Particularly interested in the interaction between patients and robots as well as methods for understanding patient state.

Georgia Institute of Technology, IRIM Technology Transition Laboratory; Atlanta, GA (Aug 2015 – June 2016)
- Position: Undergraduate Researcher (Aug 2015 – Dec 2015), Research Technician II (Dec 2015 – present)
- Worked under Henrik Christensen and Larry Sweet to advance technologies in the visual servoing space, explicitly focused on potential industry applications. Utilized heavy industrial robots while developing perception, calibration, and control systems in C++ and Python. Principle researcher on Edge Based Tracking project for PSA Peugeot Citroën, the development of a video based real time edge based tracker for manufacturing applications.

Work Experience

Eli Lilly and Company; Indianapolis, IN (May 2015 – Aug 2015)
- Position: Automation Intern
- Responsibilities:
    - Evaluated options for offline software/hardware/operator in the loop plant simulations for the purposes of process validation, control code development, pre-FAT control system checkout, operator training, and process improvement, with a specific focus on Emerson DeltaV and Rockwell interoperability.
    - Reported on findings in both a technical paper and presentation.

Georgia Institute of Technology, TEP Machine Shop; Atlanta, GA (Aug 2014 – May 2015)
- Position: Machine Shop Supervisor

- Responsibilities: Maintained equipment, trained shop users, guided Masters in Biomedical Innovation and Development (MBID) students in design and prototyping of medical devices, supported the Cardiovascular Fluid Mechanics (CFM) Lab and the Tissue Mechanics Lab.

Unilife Corporation; York/King of Prussia, PA (Jan 2014 – Jul 2014)
- Position: Product Development Engineering CO-OP
- Responsibilities:
  - Developed procedure for rapidly testing design iterations using a hand powered injection molding machine.
  - Analyzed and modified product components and assemblies to improve final product outcomes, including problem assessment, design changes, prototype production, prototype testing, and submittal for final design review.
  - Designed, installed, and programmed automation tooling for the testing, manufacturing, and finishing of injectable drug delivery devices, including applications in micro injection molding, gluing, and small scale vacuum stoppering.
  - Independently developed and sourced custom product packaging materials from a foreign supplier.
  - Independently developed and sourced custom thermoformed components from a domestic supplier.
  - Sourced majority of custom components for pilot production (30 ppm) line, including BOM generation, drawing organization, RFQs, quote selection, and vendor relations.
  - Designed and sourced safety/airflow enclosures for pilot production line.
  - Supported team in other projects.

Georgia Institute of Technology, MBID Program; Atlanta, GA (Aug 2013 – Dec 2013)
- Position: Shop Hand
- Responsibilities: Set up new machine shop for MBID program, including ordering, set up, and maintenance of equipment, along with equipment testing to determine further shop needs.

Cobb County School District, Kennesaw Mountain High School; Kennesaw, GA (Jun 2012 – Aug 2012)
- Position: Custodian
- Responsibilities: Cleaned floors, tables, desks, bathrooms, etc., removed trash, stripped floors, waxed floors

Emory-Adventist Hospital Anatomic Pathology Lab; Smyrna, GA (Aug 2010 – Dec 2010)
- Position: Histotechnician, Intern
- Responsibilities: Processed specimens (grossing, embedding, cutting, and staining), researched *H. pylori* (bacteria) community prevalence and incidence.

Metairie Diabetes Metabolic Clinic; Metairie/LaPlace, LA (May 2010 – Jul 2010)
- Position: Medical Assistant, Administrative Assistant
- Responsibilities: Triaged (taking vitals, drawing blood, checking patients' medications), coded for insurance billing, collected payment, answered phones.

Selected Coursework:
- MEAM 520 *(Introduction to Robotics, UPenn)* – An introductory robotics course, focused on robotic arms. Emphasis is placed on manipulator kinematics, path and trajectory planning, joint dynamics and control, sensing and actuation, feedback control, and haptic interfaces.
- ENM 520 *(Principles and Techniques of Applied Math I, UPenn)* – A PhD level course, focused on the study of linear spaces (both finite and infinite dimensional) and of operators defined on such spaces. Focused on mathematical techniques which can be leveraged to solve engineering problems, such as: Fourier series, Green's functions for ordinary and partial differential operators, eigenvalue problems for ordinary differential equations, singular value decomposition of matrices, etc.
- BMED 4803 *(Neurophysiology, GT)* – Covers foundational concepts and the experimental evidence behind those concepts across the field of neurophysiology to a moderate level of detail
- CS 4495 *(Computer Vision, GT)* – An introduction to computer vision including fundamentals of image formation, camera imaging geometry, feature detection and matching, stereo, motion estimation and tracking, image classification and scene understanding.
- BMED 4602 *(Capstone Design, GT)* – Team-oriented design project in biomedical engineering, incorporating engineering standards and realistic design constraints. Includes introduction to relevant regulatory, intellectual property, and business management topics.
- CS 3630 *(Introduction to Perception and Robotics, GT)* – Covers fundamental problems and leading solutions for computer and robot perception and action from the point of view of autonomous robot navigation.
- BMED 3400 *(Introduction to Biomechanics, GT)* – Introduction to mechanics and deformable bodies. Focus on application to biomedical engineering, but comparable to mechanical engineering deformable bodies and mechanics class
- CS 3600 *(Introduction to Artificial Intelligence, GT)* – An introduction to artificial intelligence and machine learning. Topics include intelligent system design methodologies, search and problem solving, supervised and reinforced learning.

- ECE 2026 *(Introduction to Signal Processing, GT)* – Introduction to discrete-time signal processing and linear systems. Sampling theorem, filtering, frequency response, Discrete Fourier Transform, Z-Transform. Laboratory emphasizes computer-based signal processing.
- ECE 3710 *(Circuits and Electronics, GT)* – An introduction to electric circuit elements and electronic devices and a study of circuits containing such devices
- BMED 2300 *(Problems in Biomedical Engineering II, GT)* – Principles of engineering design and manufacturing through problem based learning. Focused on a small group redesign project for the vaginal speculum
- BMED 3300 *(Biotransport, GT)* – Advanced mass transfer, heat transfer, and fluid mechanics along with reaction kinetics. Comparable material to chemical engineering transport classes
- BMED 3100 *(Systems Physiology, GT)* – Introduction to human physiology
- CS 2110 *(Computer Organization and Programming, GT)* – Introduction to computer systems from transistors through C. Emphasis placed on logic circuits/structures, Assembly, and C.
- BMED 2210 *(Conservation Principles in Biomedical Engineering, GT)* – Principles of mass and energy conservation and process analysis
- CS 1371 *(Computing for Engineers, GT)* – Fundamentals of problem solving with computers, focus on logic, using MATLAB
- CS 1331 *(Intro to Object Oriented Programming, GT)* – Fundamentals of Object-Oriented Programming, using Java
- BMED 1300 *(Problems in Biomedical Engineering I, GT)* – Project based, focus on research, experimental design, and systems modeling
- MSE 2001 *(Principles and Applications of Engineering Materials, GT)* – Fundamentals of material design and use, with an emphasis on engineering applications