U.S. Citizen

Phone: (626) 380-6161
E-mail: peter@polidoro.io
Web: https://github.com/peterpolidoro

Peter Polidoro

About Me

I build robotics and automate experiments for the scientists studying animal brains at Janelia Research Campus. Examples of these experiments include odor, alcohol, visual, and audio assays for fruit flies, camera tracking systems for zebrafish and larvae, haptic feedback joysticks for mice, and automated sensor and actuator stations for rats.

I write software and embedded firmware, design and assemble circuit boards and electrical systems, build distributed systems of networked electromechanical devices and sensors, and support and maintain experimental rigs and firmware libraries for a variety of users over years of service.

I enjoy blurring the lines between hardware and software, engineering and science, practice and theory, high-level system architecture and low-level component details. I love reading. I love making things!

I use free and open software and hardware whenever possible and encourage others to do the same. Some of my favorite free software includes Emacs, Guix, Debian, KiCAD, and FreeCAD.

Education

1999 - 2001 **Stanford University** Palo Alto, CA

Master of Science, Systems Engineering

- Concentration: Smart Product Design, Manufacturing, Control Systems

1995 - 1999 **Cornell University** Ithaca, NY

Bachelor of Science, Mechanical Engineering

- Concentration: Mechanical Systems

Work Experience

2012-Present **Janelia Research Campus, Howard Hughes Medical Institute** Ashburn, VA

Senior Robotics and Instrumentation Systems Engineer

- Design and manufacture robotic systems, life science behavioral apparatuses, data acquisition and control systems, and other sophisticated electro-mechanical systems for studying animal brains.
- Write instrument control, machine vision, and other data acquisition software and firmware. Embedded, desktop, and network computer programming and administration. Write documentation as well as hands-on design/build/test .
- Work collaboratively with research scientists to create whatever they need to perform experiments and write papers.

2011-2012 **Janelia, Caltech, Rockefeller University, Pilot Group, IO Rodeo** Pasadena, CA

Engineering Consultant

- Project consultanting for various companies and universities, new product development, embedded programming in C++, Robot Operating System programming in C++ and Python, circuit board design, and mechanical design.

2007-2011 **California Institute of Technology** Pasadena, CA

Scientific Software and Mechanical Engineer (Dickinson Lab)

- Wrote software and designed and built robotic machines for research scientists aimed at understanding the neurobiology and biomechanics of fruit flies, including real-time video tracking of flying and walking animals, real-time control of various actuators including servo-motors and video display systems, and off-line image analysis and machine vision. Constructed a robotic insect wing to study the aerodynamics of insect flight.

2004-2007 **Idealab** Pasadena, CA

Research and Development Prototype Engineer

- Created prototypes of mechanical and electrical devices (including tracking solar concentrators), performed data acquisition experiments, consulted for Idealab operating companies, wrote simulation and control system software.

2001-2004 **Seagull Solutions** Morgan Hill, CA

Mechatronics Engineer

- Designed, built, integrated, and/or fixed many electrical/mechanical/pneumatic/software systems, including servo motor controllers and PLC automation, used to support the hard disk drive manufacturing industry.

Summer 2000 **General Motors** Warren, MI

Research and Development Engineering Intern

- Experimentally studied material property changes on mild steel tubes throughout various stages of a hydroforming manufacturing process.

1997 - 1998 **Cummins Engine Company** Jamestown, NY

Engineering Co-op

- Worked on a manufacturing engineering support team and separately on a performance and product development team solving a variety of mechanical and manufacturing engineering problems and designing machines used to support assembly line production.

Skills

- C++, Python, Robot Operating System (ROS), Kicad, Arduino, GNU/Linux, Emacs, Guix, Zephyr Rtos, C
- Mechanical design and analysis, analog and digital circuit and control systems design, printed circuit board design, PLC and other motion controller programming, machine tool operation and CNC programming
- Embedded, desktop, and networked computer design, construction, and administration

Papers and Patents

- Paper in Nature (2020 October 14): Dense and pleiotropic regulatory information in a developmental enhancer
- Paper in Current Biology (2012 July 24): A Simple Strategy for Detecting Moving Objects during Locomotion Revealed by Animal-Robot Interactions
- Paper in the Journal of Experimental Biology (2010 April 23): A linear systems analysis of the yaw dynamics of a dynamically scaled insect model
- Paper in Metallurgical and Materials Transactions (2004 March 15): Failure in Internally Pressurized Bent Tubes
- U.S. Patent No. 8,122,878 (2012 February 28): Solar concentrator with camera alignment and tracking