

# Daniel Fernández

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## Strengths

<b>Automotive</b>	Autonomous Operation, By-Wire Control, CAN Communication Protocol, OBD-II, Electrical System Design, Wiring Assembly and Routing, Functional Safety (ISO 26262)
<b>Software</b>	PolySync Core, C, C++, Rust, Python, MATLAB, Qt, Bash, Agile/Scrum, Git, Solidworks, Pro/E, ANSYS AQWA, WAMIT, MS Visual Studio, Office Suite, Atlassian Suite, Linux, OS X
<b>Industrial</b>	Lean/6-Sigma Production and Operations, Defect Control, Process Planning, Tool Design, Technical Writing, Ordnance Handling, Employee Training, Silver Solder, Oxy Braze, TIG Welding, CNC Machining, Molybdenum Laser Welding
<b>Academic</b>	Marine Field Robotics, Path Planning under Uncertainty, Water Wave Energy Conversion, Robotic Search, Model Predictive Control, Neural Networks, Genetic Algorithms
<b>Field Work</b>	R/V Elakha (11 Cruises), R/V Oceanus (2), R/V Coral Sea (1), R/V Atlantic Explorer (1)

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## Professional Experience

PolySync

Portland, OR

**Robotics Application Engineer**, Open-Source Car Control Team July 2016 – Present

Developed and productionalizing the OSCC autonomous vehicle platform, which enables acceleration of self-driving applications by controlling existing by-wire actuation systems. A generalist engineer role at the hyperdynamic intersection of safety-critical testing and validation, fault-tolerant systems engineering, and low-level embedded development. Selected Contributions:

- Architected the full OSCC DriveKit system on the 2014-2016 Kia Soul, including Arduino-based control modules, non-native brake actuators, wiring harnesses, and all supporting compute hardware. Developed communication between vehicle OBD-II CAN bus and OSCC control modules. Characterized analog signal ranges between by-wire systems and incorporated ranges into OSCC firmware, all using a man-in-the-middle hardware integration approach with native connectors. Developing similar system architecture on the Kia Soul EV and hybrid Kia Niro.
- Leading all productionalization efforts by supervising in-house builds and compiling customer-built, by-wire kits with an emphasis on as lean a process and BOM as possible. Establishing supply chain of safety-minded, high-quality vendors and providing them with all supporting process documentation.
- As the resident field roboticist, advised and aided a team of self-driving engineers at Self Racing Cars in a joint effort with Udacity. The team designed a simulator to test an end-to-end Neural Net driving application and collected training data at the Thunderhill raceway track using an OSCC car. Methods applied included a Convolutional Neural Network, Recurrent Neural Network, and a PoseNet approach, yielding a total of 800 meters of uninterrupted autonomous driving.
- Maintain OSCC repository in GitHub, resolving customer-raised issues in a timely and thorough manner. Support OSCC customers in-field or remotely with hardware, software, or application issues. Provided field support and sensor troubleshooting for PolySync Core.
- Regularly represent the growing company at trade and auto shows, highlighting the strengths of company products and giving demonstrations of OSCC vehicles, judiciously tailoring the dialogue for technical, non-technical, or government audiences.
- Employ a systematic and cross-functional approach to vehicle development from requirements, architecture, through design and implementation, to testing and quality processes.
- Strict adherent to automotive safety standards; firm detractor of any culture to the contrary

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Oregon State University

Corvallis, OR

**Graduate Research Assistant**, Robotic Decision Making Laboratory Sep 2014 – Sep 2015

Supported marine robotics grants under Dr. Geoffrey Hollinger. Researched methods of supporting marine renewable energy arrays with autonomous robotic vehicles. Aquatic platforms included: SeaBotix vLBV300 ROV, openROV, and Slocum gliders. Selected Contributions:

- Designed a model predictive controller for the laboratory ROV to compensate for water wave forces. The algorithm showed a 74% reduction in position error when compared to traditional feedback control. It was also found resistant to noisy sensor observations of observed wave parameters.
- Supported the W. M. Keck Foundation Award, a cross-disciplinary approach to installing bio-acoustic sensors on Slocum Gliders. RDML focus applied path-planning optimization methods to maximize information gain in tracking macrofauna off the Oregon Coast.
- Built a workflow optimizer for a local industrial partner using robotic decision making techniques. Genetic algorithm yielded a 61% increase in efficiency for the investment casting area.
- Served as openROV team leader, investigated robotic solution potential for ultra-low cost platforms.

**Assistant Glider Tech**, CEOAS Glider Research Group, R/V Elakha July 2014 – June 2015

Supported deployment and retrieval of SeaGlider and Slocum 200m/350m ocean-going gliders for Oregon State College of Earth Ocean, and Atmospheric Sciences. Operations include ballast trimming, battery and hardware replacements, operational code updates, off-site piloting, and on-site handling via OSU support vessel, R/V Elakha, based in Newport, OR.

**Engineering Technician**, O.H. Hinsdale Wave Research Laboratory Summer 2014

Served as engineering liaison for visiting scientists in the tsunami wave basin and long wave flume. Assisted in beach construction, instrument layout, and wavemaker assembly, among other tasks.

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Lockheed Martin Missiles and Fire Control

CA/AL/FL

**Systems Engineer**, Santa Barbara Focalplane, Santa Barbara, CA Feb 2013 – Mar 2014, 2016

Supported SBF External Defense and Joint Strike Fighter Customers in a mechanical and software engineering role. Worked on both development and manufacturing projects and provided solutions for tooling, automation, rework, and technical documentation issues. Selected Contributions:

- Led all productionalization efforts for the MS-177 Project, a high orbit, angled detector assembly with uniquely specific design considerations.
- Designed C++/Qt4 applets as production aids including: epoxy weight/volume convertors, cure time recorders, reminders, and precision measurement calculators for design-driven assembly.
- Justified use of automated "rapid" pump down vacuum baking stations on the JSF dewar assembly, where the large air volume draw was a concern. Along with joint stress analysis, designed resulting procedure, an automated process which aims to realize \$1,800,000 in savings over the contract life.
- Provided mistake-proofing procedures in response to a failed tooling audit. Standardizing SBF tool ordering process and updated 15 year old tool records accordingly.

**Production Support Engineer**, Pike County Operations, Troy, AL June 2010 – May 2012

Supported MFC Troy's Javelin and AGMS programs; responsible for designing and updating visual-based manufacturing and test procedures. Addressed defects qualitatively and implemented mistake-proofing strategies where possible. Interacted with government customer daily.

**Student Technical Specialist**, Ocala Operations, Ocala, FL Summers 2009, 2007

Summer Internships as a manufacturing engineer supporting production and tooling of AGMS and Javelin circuit-card assemblies, sensor groups, and guidance assemblies.

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Doma Ventures, LLC

Miami, FL

**Development Engineer**, South Miami Office

June 2012 – Sep 2013

Supported a startup ecommerce firm as a technical lead. Analyzed product lines for potential failures and gave engineering approval for all product launches. Used CADD skills in a product design role and worked with offshore-based manufacturing facilities to ensure quality. Provided web development support across multiple platforms.

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## Education

Oregon State University – Corvallis, OR

Relevant Coursework

**M.S. Robotics Engineering**, September 2015

Minor in Coastal/Ocean Engineering

Cumulative GPA: 3.7/4.0

Robotic Sequential Decision Making  
Linear Controls, Marine Glider Dynamics  
Wave/Fluid Mechanics, Coastal Hazards  
Coastal Oceanography, ROV Operation

University of Florida – Gainesville, FL

**B.S. Mechanical Engineering**, May 2010

Cumulative GPA: 3.2/4.0

Heat Transfer, Finite Element Method  
Mechanical Vibrations, Solar Utilization  
Computer Aided Draft and Design

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## Research Grants Supported

**Department of Energy**: Autonomous Support for Marine Renewable Energy Arrays (\$233,427)

**W.M. Keck Foundation**: Bioacoustic Sensors and Path Planning on Webb Slocum Gliders (\$128,786)

**Office of Naval Research**: Adaptive Decision Making, Autonomous Exploration/Exploitation (\$510,000)

**PCC Structurals, Inc**: Investment Casting Work Schedule Optimization (\$110,000)

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## Publications and Reports

1. **D. Fernández**, G. A. Hollinger, "Model Predictive Control for Underwater Robots in Ocean Waves" In: *IEEE Robotics & Automation Letters*, 2.1:88–95, 2017.
2. **D. Fernández**, G. A. Hollinger, "Model Predictive Control for Underwater Robots in Ocean Waves" In: *Proceedings of the IEEE International Conference of Robotics and Automation (ICRA)*, 2016
3. **D. Fernández**, G. A. Hollinger, "Summary of Autonomous Underwater Path Planning Techniques and Applications", *Department of Energy Internal Circulation*, 2015
4. B. McCay, **D. Fernández**, L. Premuda, "Automated Vacuum Bake Procedure for the JSF Dewar Assembly", *Department of Defense Internal Circulation*, 2013
5. **D. Fernández**, R. Himoto, A. Soto, "Vacuum-Induced Stress Analysis for the JSF Coldfilter/Coldshield Joint Structure", *Lockheed Martin Missiles and Fire Control Internal Circulation*, 2013
6. **D. Fernández**, "A Gage Repeatability and Reproducibility Analysis for the Javelin Forward Environmental Seal", *Lockheed Martin Missiles and Fire Control Internal Circulation*, 2011

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## Organizations and Certifications

University of Michigan MCity TechLab	Member: 2016 - present
Institute of Electrical and Electronics Engineers	Member: 2015 - present
IEEE Robotics and Automation Society	Member: 2015 - present
American Society of Mechanical Engineers	Member: 2011 - present
Oregon State University Robotics Club	Member: 2014 - 2016
National Northwest Marine Renewable Energy Center	Member: 2013 - 2016
Engineers Without Borders	Member: 2007 - 2013
Society of Automotive Engineers	Member: 2007 - 2012
R/V Elakha Sea Safety & Survival Certified	April 2015
First-Aid, and SCUBA Certified, C.P.R. Trained	Various Dates
Languages: English and Spanish fluency, French basic	

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## Conferences, Trade Shows, and Awards

Automated Vehicles Symposium, Attendee, 2017  
Self Racing Cars, Participant (joint with Udacity), 2017  
North American International Auto Show, Exhibitor, 2017  
AutoMobility LA Top Ten Automotive Startups, Winner, 2016  
Los Angeles Auto Show, Exhibitor, 2016  
Automated Vehicles Symposium, Exhibitor, 2016  
IEEE International Conference on Robotics and Automation, Presenter, 2016  
NNMREC Annual Assembly, Presenter, 2015  
IEEE International Conference on Robotics and Automation, Attendee, 2015  
ACM/IEEE International Conference on Human-Robot Interaction, Attendee, 2015  
OWET Ocean Renewable Energy Conference, Attendee, 2014  
Santa Barbara Focalplane Performance Management Team of Year, Dewar Test and Integration, 2013  
Malcolm Baldrige National Quality Award Recipient, 2012  
Pike County Operations Spot Recognition Award, January 2012  
Pike County Operations Employee of the Month, November 2011  
Pike County Operations Performance Management Team of the Year, Javelin, 2011  
Florida Bright Futures Scholarship Recipient, 2005 - 2010  
College Board AP Scholar with Distinction Award, June 2005

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## References

<b>Peter Brink</b>	Senior Software Engineering Manager, nLight (fmr Director of Eng, PolySync) cell: 480.204.4504; email: pete.brink@gmail.com
<b>Geoffrey Hollinger</b>	Assistant Professor of Mechanical Engineering, Robotics, Oregon State University, work: 541.737.5906; cell: 904.993.1584; email: geoff.hollinger@oregonstate.edu
<b>Nathan Äschbacher</b>	Chief Technology Officer, PolySync cell: 509.290.2526 email: naschbacher@polysync.io
<b>Karen Achey</b>	Program Manager, Lockheed Martin MFC Santa Barbara Focalplane work: 805.571.2386; cell: 352.274.5072; email: karen.achey@lmco.com
<b>Lucas Buckland</b>	Open-Source Car Control Team Lead, PolySync work: 888.810.4284; cell: 808.927.7012; email: lbuckland@polysync.io
<b>Steven van Dyk</b>	Process Engineering Manager, Lockheed Martin MFC Santa Barbara Focalplane work: 805.571.2754; cell: 805.450.7186; email: steven.van.dyk@lmco.com

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