

Dr. Folkers E. Rojas, PE

PhD. Mechanical Engineering, MIT
<http://www.MillieRojasEngineering.com>

EDUCATION

Massachusetts Institute of Technology

- PhD in Mechanical Engineering - June 2014
- Master's of Science in Mechanical Engineering – February 2011
- Bachelor of Science in Mechanical Engineering – June 2009
- Bachelor of Science in Nuclear Sciences and Engineering – June 2009
- Minor: Earth Atmosphere, & Planetary Science – June 2009

Expertise:

Expert in an array of Mechanical Engineering fields. Expertise includes: 1) Machine Elements, 2) Manufacturing 3) Measurement/Instrumentation (i.e. Sensors, Electronics, DAQ), 4) Structures, 5) Heat Transfer, 6) Fluid Analysis, 7) Finite Element Analysis, 8) Product Development Process, and 10) Medical Devices. Full product development cycle expertise from design, CAD, machining, and production.

Along with the hardware development, my background also includes: product safety evaluation, assessing compliance with industry regulatory safety standards, establishing safety protocols in machine shops and product assembly lines, cost benefit analysis, root cause analysis (i.e. hardware failure, portable battery fires).

Engineering LICENSES & Review Boards

- Texas Board of Professional Engineers – Since December 2017
- New Hampshire Board of Professional Engineers – Since February 2019
- Arizona Board of Professional Engineers – Since Oct 2024
- Indiana Board of Professional Engineers – Since Feb 2025
- NSF Reviewer, 2023-2025

WORK EXPERIENCE

Millie Rojas Engineering Corporation

Jan. 2020 – Current

- Engineering Services: Reverse Engineering, Prototyping, R&D, Testing, and Analysis
- Legal: Patent Litigation, Civil Litigation, Forensic Engineering Services

Raptors Design, Inc.

June 2014 – Jan. 2024

- CEO & Co-founder
- Oil Field Safety Equipment: HAWK Tool
 - Secured Repsol Foundation Award and Department of Interior Contract
 - Secured Government Research Contract with Bureau Safety Environmental Enforcement (BSEE)
 - Complete product development of HAWK safety tool: design / manufacturing / analysis / testing
 - Successful product testing of 10,000 psi test 11-inch wellbore tests that demonstrates technology at scale.
 - Engage with oil industry stakeholders: NOV, Cameron, Schlumberger, Trendsetter, Transocean, FMC Technologies, Shell, and BP

Massachusetts Institute of Technology: Instructor

February 2019 – Current (Part Time as Requested)

- Instructor 2.70 Fundamentals of Precision Product design with Prof. Alexander Slocum
- Engage with students to design, analyze, and fabricate critical machine elements.
- Convert concepts into viable easily manufactured components and guide students through the use of an array of fabrication equipment including CNC mills, and CNC lathes.
- Spring 2020 – Taught 2.70 Fundamentals of Engineering (FE) course to guide students through the licensure process.

Massachusetts Institute of Technology

TA: 2.75 Precision Machines & Medical Devices

September 2011 – May 2013

- Teacher's assistant helping 2 or 3 teams (4 students per team) of students per term to converge on the design, development, and proof of concept prototype of several medical devices.
- Responsible for helping students through the fundamentals of machine design, product development, design for manufacturing, and product development.

Schlumberger Doll Research

Intern

March 2008 – August 2010

- Design and manufacturing of engineering proof of concept prototype for: 1) downhole well integrity and 2) sand control using expandable structures.
- Co-inventor on an issued patent for sand control, using shape memory alloys structures to reduce sand production.

Jet Propulsion Laboratory

Intern: SWOT Project

June 2009 – August 2009

- Increased efficiency by rapidly converging design concepts into manufacturing drawings for SWOT Dr. Richard Hodges.
- Facilitated the procurement of antenna components by serving as the technical point of contact.
- Responsible for designing and rapid manufacture of prototypes and testing materials for electronic antennas.

Jet Propulsion Laboratory

Intern: Grail Project

June 2008 – August 2008

- Design and fabrication of Kapton sheet retention disk for the GRAIL Ka-band antenna, where the prototype build was delivered 2 months ahead of schedule.
- Designed and fabricated control box housing for electronics boards for the antenna in a quarter of time from the expected delivery period.

Massachusetts Institute of Technology: Undergraduate Research

PERG Lab: CSPonD Project

August 2008 – June 2009

- Responsible for developing a green energy low entropy heat exchanger for large scale manufacturing. The work is part of Prof. Slocum's Laboratory working on a joint collaboration across four departments at MIT. The research requires MatLab models and to support a low entropy generation system that would allow for improvement in the efficiency of the system.

Planetary Astronomy Lab: POETS Project

January 2008 – May 2008

- In charge of designing and manufacturing a filter-wheel/optics enclosure for NASA's InfraRed Telescope Facility (IRTF) in Hawaii. The project is part of the Portable Occultation, Eclipse, Transit System (POETS) installation; this will be first fast transfer CCD camera on a large telescope.

Planetary Astronomy Lab: Wallace Camera Project

June 2006 – Jan 2008

- In charge of evaluating, designing, and manufacturing an optical astronomical camera for the George Wallace Jr., Astrophysical Observatory, under the supervision of Professor James L. Elliot.

Planetary Astronomy Lab: Magic Upgrade

January 2007 – September 2007

- Responsible for evaluation, design, and manufacture of all parts for the upgrade of the MagIC Camera in Chile. The engineering phase of the project was completed ahead of

time. The installation of the instrument of the Baade 6-meter telescope when as planned. The instrument was handed to the science group.

Planetary Astronomy Lab: Satellite Energy Harvesting

August 2005 – August 2006

- Designing a satellite orbiter that can use interplanetary radiation as an energy source and a shielding mechanism. Supervision was provided by Professor Maria Zuber, Head of the Earth, Atmosphere, and Planetary Sciences department and a leading scientist in Mars exploration.

ACCOMPLISHMENTS

BSEE Contract Award (March 2016)
Repsol Foundation Innovation Award Winner (July 2014)
EUSPEN Challenge 1st Place Winner (July 2013)
CSPonD Masters Thesis (Feb 2011)
WAOcam Bachelor's Thesis (Feb 2009)
MagIC II (Sept 2007)
POETS IRTF Case (May 2008)

SKILLS

- **Certifications:** USPTO registered filler
- **Holistic Skills:** Rapid prototyping, cost analysis, development plan generation, contract negotiation
- **Engineering Software:** ADINA Inc, SolidWorks, ANSYS (Fluid, 1&2 way FSI, temperature, etc.), Labview, Siemens NX, Inventor
- **Engineering Software:** Altium - Circuit Studio
- **Math Packages:** MathCAD, Mathematica, MATLAB, Maple, Python
- **Manufacturing Software:** Omax, MasterCam, GibbsCAM
- **Analysis:** Machine Design, Manufacturing, Structures, Thermal, Electrical, Hydraulic system, Fluidic
- **Languages:** Fluent in Spanish and English. Semi Fluent in Assembly Language.
- **Manufacturing Tools:** CNC Lathe, CNC Mill, CNC Router WaterJet, 3D printing, Drill Press, welding MIG and TIG, and assortment of shop tools. (Over 18 years of experience in machine shop)
- **Website Developer:** HTML, CSS, Javascript, and much more.
- **Other Software:** Wordperfect, MS Office (Word, Excel, Powerpoint), Outlook, FilePro 7, Quicken, Fastrack, and Quickbooks, Dreamweaver CS6, Adobe PhotoShop and Illustrator

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4

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AWARDS

- Repsol Foundation 3rd Convocation Winner with HAWK Project
- European Union Society of Precision Engineering and Nanotechnology Challenge Winner. First Place July 2013
- MIT Spectrum: Real World Learning. Summer 09.
- Gates Millennium Scholar

PUBLICATIONS

- Modular apparatus for testing microfluidic cartridge, useful for point-of-care medical diagnostics and other applications. Galit H. Frydman, Alexander H. Slocum, Folkers E. Rojas. W02024073059A2. Pub. Date Apr. 4, 2024
- Modular Multi-Layer Microfluidic Cartridges, Galit H. Frydman, Alexander H. Slocum, Folkers E. Rojas, W02023018723A1 Patent Pub. Date Feb. 16, 2023
- Gray, L.A., Bisono, A.G., Rojas, F.E., Veroneau, S.S., Slocum, A.H. Caribbean-Wide, Negative Emissions Solution to Sargassum spp. Low-Cost Collection Device and Sustainable Disposal Method, Luke Gray, Andres Leon, Folkers Rojas, Samuel Veroneau, Alexander Slocum. Phycology 2021, 1 pg. 49-75.
- Massaging Device, Alexander H. Slocum, Folkers E. Rojas. US Patent 9,839,575 B2. Pub. Date Dec. 12, 2017.
- A Complementary Safety Tool for Blowout Preventers, Folkers E. Rojas, Alexander H. Slocum. Offshore Technology Conference. 2-5 May 2016.
- Entangled Structures as High Cycle Compression Springs, Folkers E. Rojas, Alexander H. Slocum. Precision Engineering Vol 42 (October 2015) 346-351
- Long Thin Structures for Generating an Entangled Flow Restricting Structure, Folkers E. Rojas, Alexander H. Slocum. US Patent 2013/0299191 A1. Pub. Date Nov. 14, 2013.
- Method and Apparatus for Bringing Under Control an Uncontrolled Flow Through a Flow Device, Alexander H. Slocum, Folkers E. Rojas. US Patent 2013/0299195 A1. Pub. Date Nov. 14, 2013.
- Apparatus and Method for Sand Consolidation, Julio C. Guerrero, Adam Paxson, and Folkers E. Rojas. US Patent 8,789,595 B2. Date of Patent: Jul. 29, 2014.
- Slocum, A.H., D.S. Codd, J. Buongiorno, C. Forsberg, T. McKrell, J.C. Nave, C.N. Papanicolas, A. Ghobeity, C.J. Noone, C. Passerini, F. Rojas, A. Mitsos, "Concentrated Solar Power on Demand", Solar Energy 85 (2011) 1519-1529
- Gulbis et al. First Results from the MIT Optical Rapid Imaging System on the IRTF: a stellar occultation by Pluto and a transit by exoplanet XO-2b. Feb 2011. <http://arxiv.org/abs/1102.5248>

LEADERSHIP ROLES

- Started YouTube Channel Dare2Make: *Art of Machine Design*
- Machine Shop Part time instructor at Edgerton (3 yrs)
- Precision Engineering Research Group Lab Manager and EHS Representative
- TA Precision Machine Design (3yrs) related to Medical Devices & Energy Projects

COMMITTEE ROLES

- **American Society for Precision Engineering (Task Force: Precision Design TLC Member)**
2023 – Current
- **American Petroleum Institute (Task Force: 16K New Technologies)**
2023 – 2024