

## Julian Corbell Leland

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### Education

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Sept 2015 - Present  
Massachusetts Institute of Technology, Cambridge, MA  
S.M. in Mechanical Engineering (anticipated)  
Cumulative GPA: 5.0

Relevant Coursework: Feedback Control Systems, Precision Product Design, Mechatronics (in process)

Aug 2008- May 2012  
Swarthmore College, Swarthmore, PA  
B.S. in Engineering (mechanical concentration), minor in Public Policy  
Cumulative GPA: 3.60 – Engineering GPA: 3.65

Relevant Coursework:

- Engineering: Senior Design Project (Self-Replicating Milling Machine), Machine Design Independent Study, Operations Research, Control Theory and Design, Advanced Fluid Mechanics, Mechanics of Solids, Thermofluid Mechanics, Embedded Systems Design, Linear Physical Systems Analysis, Experimentation for Engineering Design, Electrical Circuit Analysis, Fundamentals of Digital Systems, Statics and Mechanics.
- Public Policy: Public Policy Thesis, American Foreign Policy, Economic Development, Public Economics, Comparative Politics.

### Research Experience

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Sept 2015 - Present  
Research Assistant  
Mediated Matter Group, MIT Media Lab, Cambridge, MA

Responsibilities: Lead researcher on Digital Construction Platform (DCP) project, developing large-scale micro-macro manipulator arm for construction applications. Administrative responsibilities include definition of project direction & priorities; supervision of other graduate & undergraduate researchers attached to project; and creation/management of relationships with project backers and collaborators, including Google, Altec, Dow Chemical and Autodesk. Technical responsibilities include development of low-level controls architecture for system, and design/integration of supporting electrical and mechanical systems. Successfully demonstrated system capabilities in July 2016 through 3D printing of 50' diameter dome section using spray polyurethane foam. Current work includes refinement of user interface; improvement of control architecture to address flexibility of system links, coupling between micro and macro manipulators, and nonlinear dynamics in hydraulics; and implementation of new material systems.  
Supervisor: Neri Oxman

- Sept 2011-  
May 2012      Researcher  
Engineering for Change, New York, NY  
Responsibilities: Provided research and consulting services to Engineering for Change (E4C), a joint project of ASME and other national engineering societies focused on promoting engineering for the developing world. Part of working group responsible for developing appropriate technology evaluation program at E4C. Contributed series of articles to E4C blog.  
Advisor: Iana Aranda
- May - Aug  
2011      WISE Policy Research Fellow  
American Society of Mechanical Engineers, Washington, DC  
Project Title: Development from the Bottom of the Pyramid: An Analysis of the Development Innovations Ventures Program.  
Responsibilities: Represented American Society of Mechanical Engineers at the WISE (Washington Internship for Students of Engineering) program, in Washington, D.C. Researched and wrote policy recommendation paper focusing on the Development Innovations Ventures program at USAID. Paper provided recommendations for how the DIV program could better serve development community, with particular focus on engineering- and technology-based development projects. Subsequently acted as advisor to WISE research fellows.  
Advisor: Melissa Carl
- May - Aug  
2010      Student Researcher  
National Institute of Standards and Technology, Gaithersburg, MD  
Project Title: Characterization and Compensation of a 3-Axis Micro-Scale Milling Machine  
Responsibilities: Worked to quantify and improve performance of an experimental micro-scale machine tool alongside NIST researchers in Science-Based Manufacturing Group (Engineering Laboratory). Project involved extensive research, modeling (mathematical and CAD), design/fabrication of components and analysis of both machine performance and metrology methods. Successfully improved performance of machine tool to required level (full report available on request).  
Advisor: Ronnie Fesperman, Ph.D.
- May 2009 -  
Jan 2010      Research Assistant  
Swarthmore College, Swarthmore, PA  
Responsibilities: Assisted professor in restoration and modernization of 1886 Clark 10" refractor telescope at Bucknell University, Bucknell, PA. Disassembled, stripped and restored telescope; additionally, helped design, construct and integrate computer control system for telescope and enclosing dome. Special duties included: simulating drive assembly performance in SolidWorks, setting up and maintaining attached computer and control software, machining drive assembly components. Continuing employment until January 2010 – provided technical support for control software as well as calibration assistance on-site at Bucknell.  
Advisor: Frederick Orthlieb, Ph.D.

## Work Experience

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- Oct 2012 -  
June 2015      Mechanical Engineer  
Barrett Technology, Newton, MA  
Responsibilities: Responsible for creating mechanical designs and assemblies for new and existing robotic arm systems, including major roles in development of Proficio rehabilitation robot and Perception Palm sensor suite for BarrettHand robotic manipulator (lead mechanical designer). Also responsible for sourcing of components and suppliers, interfacing with customers, and maintaining tooling and facilities. Provided support to new product concept development, grant-writing and reporting activities; as well as patent research and writing (project lead on provisional and full applications for patent related to Proficio rehabilitation robot). Led and supervised mechanical engineering interns during summer internship periods in 2013 and 2014.  
Supervisor: David Wilkinson
- July 2012 -  
Present        Consulting Engineer  
Self-Employed  
Responsibilities: Provides engineering, design and consulting services to private & corporate clients. Past/current clients include Boston-based startup developing novel adult toy; federal defense contractor developing software-defined radio module for defense product line; enthusiast building German Equatorial mount for 8" refractor telescope; and startup creating modern hookah pipe.
- Sept 2012-  
Oct 2012      Business Development Analyst  
OptaSense, Cambridge, MA  
Responsibilities: Provided market research and business development services to OptaSense, an international distributed acoustic sensors company, in support of the company's entry into the rail market. Identified and interviewed industry experts; prepared reports and helped develop company strategy related to rail market.  
Supervisor: Fred Prahl
- Aug 2010 -  
May 2012     Resident Assistant  
Swarthmore College, Swarthmore, PA  
Responsibilities: Served as resident assistant in mixed sophomore/junior dorm (2010-2011) and mixed junior/senior dorm (2011-2012). Served on RA selection committee for 2012-13 RAs: responsible for hosting information sessions for potential applicants, interviewing applicants, and participating in RA selection deliberations.
- Oct 2008 -  
May 2012     Machine Shop Assistant  
Swarthmore College, Swarthmore, PA  
Responsibilities: Responsibilities include fabrication for college projects, assisting students, and shop upkeep. Consultant for faculty members on projects, primary machinist for those projects – paid outside work.  
Supervisor: Grant Smith
- Sept 2009 -  
Dec 2011     Teaching Assistant  
Swarthmore College, Swarthmore, PA  
Responsibilities: Served as teaching assistant for introductory engineering course for multiple years. Responsibilities include assisting students with assignments, preparing course materials and supporting students during labs. Additionally worked as machine shop TA, providing assistance with student machining projects.

## **Publications and Patents**

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- Apostoleris, H., Leland, J. et. al. (2016) 3D-printed concentrators for tracking-integrated CPV modules. Nonimaging Optics: Efficient Design for Illumination and Solar Concentration XIII. San Diego, CA. 2016. SPIE Optics & Photonics.
- Townsend, et. al. 2014. Multi-active-axis, non-exoskeletal rehabilitation device. U.S. Patent Application 14/500,810, filed 2014-09-29. Patent pending.
- Leland, J. (2012). Design, Construction and Characterization of a Small-Scale, Self-Replicating Machine Tool. IEEE Standards Education Student Application Paper.
- Leland, J. (2012, January 4). Paying for Development Engineering: What the Government Can Learn from the Private Sector. Engineering for Change. Weblog post.
- Leland, J. (2011, October 16). Humanitarian Tech Development Grants Roundup. Engineering for Change. Weblog post.
- Leland, J. (2011). Development from the Bottom of the Pyramid: An Analysis of the Development Innovations Ventures Program. Journal of Engineering and Public Policy, 15

## **Presentations**

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Leland, J. (2012, May). Design and Construction of a Self-Replicating Milling Machine. Final project presentation for Senior Design Project course. Professor: Faruq Siddiqui, Ph.D. Department of Engineering, Swarthmore College.

Leland, J. (2011, December). Finding a Way To Fund: Small-Amount Funding Methodologies for Federal Funding of Development Programs. Poster presented at Swarthmore College Public Policy Thesis Poster Session, Swarthmore, PA.

Leland, J. (2011, August). Development from the Bottom of the Pyramid: An Analysis of the Development Innovations Ventures Program. Presentation at WISE Policy Research Presentation Session, Rayburn House Office Building, Washington, DC.

Leland, J. (2011, April). Affordable Flowmeter for Measurement of Low-Flowrate Suspended-Particulate Flow. Final project presentation for Fluid Mechanics course. Professor: Nelson Macken, Ph.D. Department of Engineering, Swarthmore College.

Leland, J. (2011, April). Thread-Cutting Dynamics Modeling in Simulink. Final project presentation for Control Theory course. Professor: Allan Moser, Ph.D. Department of Engineering, Swarthmore College.

Leland, J. (2010, December). Investigation of Physical Properties of Cyanoacrylate-Sodium Bicarbonate Adhesive Compound. Final project presentation for Mechanics of Solids course. Professor: Faruq Siddiqui, Ph.D. Department of Engineering, Swarthmore College.

Leland, J. (2010, December). Arduino-Based Controller for DJ Software. Final project presentation for Embedded Systems Design course. Professor: Erik Cheever, Ph.D. Department of Engineering, Swarthmore College.

Leland, J. (2010, August). Characterization and Compensation of a 3-Axis Micro-Scale Milling Machine. Presentation at SURF Student Colloquium, Gaithersburg, MD.

## Honors & Awards

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July 2012	Albert Vollmecke Engineering Service Award, Swarthmore College (\$100)
April 2012	Associate Member, Sigma Xi
Feb 2012	Student Application Papers Applying Industry Standards Grant, Institute of Electrical and Electronics Engineers, Standards Education Committee. (\$500)
Jan 2012	Senior Project Grant, American Society of Mechanical Engineers, Philadelphia Chapter. (\$500)
May 2011	Summer Policy Research Grant, Swarthmore College (\$2,250)
May 2010	Summer Undergraduate Research Fellowship (SURF) Grant, National Institute of Standards and Technology (\$4,500)

## Professional Affiliations

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Nov 2009 - present American Society of Mechanical Engineers  
Positions Held: President, Swarthmore Student Chapter  
Accomplishments: Represented ASME at WISE Program, Summer 2011. Funded by ASME to attend ASME Leadership Training Conference (LTC) in New Orleans, Spring 2012. Funded to attend ASME Governmental Relations Inter-Sector Committee on Federal R&D (ISCFRD) meeting in Washington, D.C., in Spring 2012. Featured in September's My Engineer's Notebook column; available at <http://goo.gl/4h9gLy>

## Certifications

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Engineer-In-Training (EIT), Pennsylvania, 2012.

Hand & Power Scraping, King-Way Scraping Consultants, 2016.

## Skills and Interests

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Software:

- CAD Packages: Solidworks (including Simulation and Flow Simulation), Onshape, Autodesk Inventor.
- Programming Languages: Python, MATLAB (including Simulink & Simulink Real-Time), C.
- Other: Arduino IDE, ANSYS, Adobe Creative Suite.

Fabrication: Proficient machinist with 8 years' experience in shop, including teaching/supervisory experience. Specific skills include CNC programming (HSMWorks, Prototrak Conversational, OMAX Layout/Make, others); part inspection/metrology; hand & power scraping.

International Experience: Lived abroad for two years in Italy (Trento and Rome), between 2004-2006. Experienced traveler.

Other Interests/Activities: DIY/maker technology; STEM education and outreach; machine tool restoration; bass guitar; survival skills/outdoorsmanship; rugby.