

# Nickolas P. Demas

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## EDUCATION

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Ph.D. Mechanical Engineering,	MIT	(2019)	
Business ( <i>Minor</i> )			
S.M. Mechanical Engineering,	MIT	(2015)	
B.S. Mechanical Engineering,	Yale College	(2013)	<i>Magna Cum Laude</i>

## EXPERIENCE

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*Founder & Principal, Demas Consulting, LLC (formerly NPD Consulting) (2011-Present)*  
Providing technical hands-on and analytical expertise to companies in the greater Boston area.

*Founder, Swift-Strap LLC (2013-Present)*  
Managing a talented team of five individuals and currently securing worldwide distribution channels for the Thor TQ, a revolutionary fast-application tourniquet for military and civilian use. Invented core technologies for enhanced strap tightening in single-handed applications. Concurrently developing three other products to leverage the same core technologies. Coordinating all company efforts, including operations, engineering, R&D, legal, marketing, graphic/web/industrial design, fundraising, and accounting.

*Postdoctoral Associate, MIT Bioinstrumentation Lab (2019-Present)*  
Expanding on research presented in my Ph.D. thesis, focusing on advanced acoustic measurement techniques for gas detection.

*Ph.D. Candidate Research Assistant to Professor I.W. Hunter, MIT Bioinstrumentation Lab (2015-2019)*  
Developed new sensors for biomedical applications, environmental monitoring, and industry. Examples include innovative acoustic measurement techniques for gas monitoring and a device and algorithms for quantification of the human auditory system using bio-potential signals.

*Masters Candidate Research Assistant to Professor I.W. Hunter, MIT Bioinstrumentation Lab (2013-2015)*  
Invented a contact force sensor for needle free drug delivery. Tested numerous prototypes. Built sensor for clinical trials. Supported human subject trials on pain perception.

*Plant Engineering Consultant, NEXT Medical Products (2013)*  
Increased uptime between scheduled manufacturing-line maintenance shutdowns from 90 minutes to over 7,000 minutes. Designed floor plan and workflow layout in new production plant for efficient manufacturing, packaging, and warehouse storage. Provided cost-saving insight, production optimization, and safety recommendations.

*R&D Engineering Intern, Oil & Gas and Power Generation, GE Research (formerly Global Research) (2012)*  
Formulated preliminary plans for a new Electric Submersible Pump (ESP) test facility. Performed experiments to improve electrical connectors subjected to severe environments. Prepared MATLAB analysis programs.

*Founder, Mechanical Engineering Lead, 3Derm (2010-2011)*  
Created the world's first stereoscopic dermatoscope. Performed pilot study to determine the diagnostic potential of the device. Created prototype analysis software to measure changes in skin lesions over time. Fabricated numerous prototypes and mockups. Technology has since captured over \$3M in venture capital investment.

*Research Assistant* to Professor P.L. Tipton, ATLAS Upgrade Effort, Yale Physics Department (2011)

Researched and developed next-generation sensor support apparatus for the ATLAS detector at the LHC at CERN. Performed finite element analysis, vibration analysis, and thermal analysis of proposed mechanical structures and cooling systems. Conducted materials testing on carbon fiber foams. Utilized additive manufacturing techniques for rapid prototyping.

*R&D Engineering Intern, Cryomech, Inc.* (2010)

Designed and implemented cryogenic refrigerator vibration testing software. Tested Cryomech refrigerators and related devices. Validated and documented vibration specifications. Built apparatuses and drafted technical schematics.

## PAPERS

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**Demas, N.P.**, Hunter, I.W. “An Electronic Force Sensor for Medical Jet Injection”.

ASME. *J. Med. Devices*. 2019;13(2) doi:10.1115/1.4043196.

## PRESENTATIONS

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Massachusetts Life Sciences Initiative. “Isolating Rare Whole Cells from Blood Samples for Non-invasive Prenatal Diagnostics and In Vitro Cancer Drug Testing”. Cambridge, MA. June 2019.

MIT de Florez Award Competition. “A Miniature, Broadband Acoustic Spectrometer: Design of a Unified Attenuation Model, Device Development, and Experimental Performance”. Cambridge, MA. April 2019.

MIT IDEAS Global Challenge. “Superior Characterization of the Human Auditory System”. Cambridge, MA. April 2019.

MIT Mechanical Engineering Research Exhibition. “A Contact Force Sensor for Medical Jet Injection”. Cambridge, MA. September 2014.

## PATENT GRANTS

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**Demas, N.P.**, Hunt, A.S., Hamer, T.T., Zayyad, Z., Connor, J.F., Guerrero, J.C., Jain, P. “Compression Device”. US 10,278,708. Published 2019.

**Demas, N.P.**, Hemond, B.D., Nawrot, M.T., Hunter, I.W. “Multi-Directional Low-Displacement Force Sensor”. US 9,724,473. Published 2017.

## PATENT APPLICATIONS

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**Demas, N.P.**, Hunter, I.W. “Rhinometric Sensing and Gas Detection”.

US Provisional Application 62/887,042. 2019.

**Demas, N.P.**, Cheney, C.B., Noh, M., Park, G.H., Singhal, A. “Device and Methods for Determining the Dynamics of Bioelectrical Systems in Animals”. US Application 62/839,350. 2019

**Demas, N.P.**, Hunt, A.S. “Compact Ratcheting Buckle Mechanism” PCT Application PCT/IB2019/050471. 2019.

**Demas, N.P.**, Hunter, I.W. “Acoustic Resonant Cavity Spectrometer”.

US Provisional Application 62/793,054. 2019.

**Demas, N.P.** “Liquid Leak Detector with Plurality of Detection Positions”.

US Application 16/142,385. 2018.

**Demas, N.P.**, Hemond, B.D., Nawrot, M.T., Hunter, I.W. “Multi-Directional Low-Displacement Force Sensor”. EP Application 17738793.3. 2018.

**Demas, N.P.**, Hunt, A.S. “Compression Device”. EP Application 16765747.7. 2017.

**Demas, N.P.**, Hunt, A.S. “Compression Device”. CA Application 2978094. 2017.

**Demas, N.P.**, Hunt, A.S. “Compression Device”. US Application 15/556,115. 2017.

Swart, E.K., Asai, E.M., **Demas, N.P.** “Stereoscopic Plug-And-Play Dermatoscope And Web Interface”.  
US Application US20140088440. 2012.

Swart, E.K., Asai, E.M., **Demas, N.P.** “Stereoscopic Plug-And-Play Dermatoscope And Web Interface”.  
EP Application 2713872 A1. 2012.

## TEACHING

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*Teaching Assistant*, 2.671 Instrumentation and Measurement, MIT Mechanical Engineering Department  
(F14, S15, F15, S16, F16, S17)

Assisted Professors I.W. Hunter and M. Kolle in teaching experimental techniques for observation, measurement, and analysis of physical variables to 1000+ students.

## SERVICE

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*UROP Supervisor*, MIT Bioinstrumentation Laboratory (2017-2019)

Mentor undergraduate researchers. Serve as intellectual guide for undergraduate students in both hard and soft skill acquisition.

*Student Advisory Board Chairman*, Edgerton House, MIT (2016-2019)

Support and advise Edgerton House Association activities. Leading facilities improvement initiatives. Facilitated corporate donations for building improvements.

*Environmental Health & Safety Lab Representative*, MIT Bioinstrumentation Laboratory (2014-2019)

Coordinate lab-specific training for personnel. Organize safety upgrades to machine shop equipment. Improve safety procedures and policies. Perform weekly safety inspections.

*President*, Edgerton House, MIT (2015-2016)

Managed all Edgerton House Association officer activities. Represented residents to the Edgerton House staff and at larger institute meetings.

*Facilities Chairman*, Edgerton House, MIT (2014-2015)

Kept inventory on common spaces. Coordinated Edgerton House social events. Organized holiday decorations. Performed regular common area inspections.

## AWARDS, HONORS, & FELLOWSHIPS

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*1st Place in Graduate Science for the de Florez Competition*, MIT MechE Department (2019)

Awarded to students demonstrating outstanding ingenuity and creative judgment in areas that utilize mechanical engineering knowledge or practice.

*Wunsch Foundation Silent Hoist and Crane Award for Outstanding TA*, MIT MechE Department (2017)

Awarded to outstanding teaching assistants.

*1st Place Prize Soldier Design Competition*, MIT Institute for Soldier Nanotechnologies (2014)

Awarded to the top practical, non-weapon product that had the highest potential to help the modern soldier both on and off the battlefield.

*Finalist in Products & Services Track*, MIT \$100K Launch Competition (2014)

Awarded to the best business plan that satisfied pressing consumer and business needs.

*L.C. Lichty & E.O. Waters Senior Prize in Mechanical Engineering*, Yale University (2013)

Awarded to one senior mechanical engineer for high scholarship and original research.

*Tau Beta Pi Honor Society Inductee, Yale University* (2012)

Honors engineering students in American universities who have shown a history of academic achievement as well as a commitment to personal and professional integrity.

*Belle and Carl Morse Junior Prize in Engineering, Yale University* (2012)

Awarded to one student who had completed his or her junior year and, by outstanding scholarship and participation in extracurricular activities within the applied sciences and engineering, had demonstrated leadership among fellow students.

*PanHellenic Scholar, PanHellenic Scholarship Foundation* (2012)

Awarded to outstanding undergraduate students of Hellenic descent who were selected based, first and foremost, on academic merit, and include a Scholarship Award and induction to the PanHellenic Honors Society, as distinguished lifetime members.

*1st Place Undergraduate Collegiate Inventors Competition, Invent Now, Inc.* (2011)

Awarded to undergraduate students for their innovations, discoveries, and research.

*2nd Place Prize for Primary Healthcare, CIMIT* (2011)

Annual national competition between undergraduate and graduate students designed to encourage development of creative technological innovations with great potential to catalyze and support improved delivery of care at the frontlines of medicine.

*3rd Place Wyss Award for Translational Research, Wyss Institute for Biologically Inspired Engineering* (2011)

Awarded for translational engineering projects with the potential to make a transformative impact on healthcare safety, quality, effectiveness, accessibility and affordability.

*GM Scholar, Yale University* (2011)

Awarded based on past and present academic achievements, extracurricular activities, financial need and for the recipient's promise as a member of the Yale community.

## ENGINEERING SKILLS

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Skilled with pen-and-paper design as well as various CAD packages (solid modeling, FEA, CFD, circuit design). Software coding experience with LabVIEW, C++, C, HTML, CSS, JavaScript, Fortran, and VB. Knowledgeable with signal processing and data analysis. Manufacturing coding experience with MAZATROL and G-Code. Aptitude with technical drawings & basic GD&T knowledge. Proficient at free-hand drawing. Fluency in MS Office, LaTeX.

## FABRICATION SKILLS

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Extensive manufacturing experience. Proficiency with manual and automated machining processes. Hands-on machining knowledge with HAAS VF-0E CNC Machining Center, MAZAK Super Quick Turn 15MS Turning Center, and TROTEC Laser Cutter among many others. Proficient with stick and MIG welding. 3D printing familiarity with FDM and SLA processes. Furniture making experience.

## BUSINESS SKILLS

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Experience in developing and protecting IP, particularly related to technical patents. Good communicator and aptitude with negotiations. Fundamental knowledge in financial management. Completed coursework in managerial finance, negotiation, strategy, and legal tools and frameworks at MIT Sloan as part of the Ph.D. Minor in Business.

## LANGUAGES

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English (native), Modern Greek (intermediate), Japanese (basic), French (basic)