

# PETER GODART

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## EDUCATION

- **MIT**, S.B. in Mechanical and Electrical Engineering, June 2015 (GPA: 4.9/5.0)
- **MIT**, S.M. in Mechanical Engineering, June 2019 (GPA: 5.0/5.0) – Thesis: *Design of an Aluminum-Powered Reverse Osmosis Desalination System for Disaster Relief*
- **MIT**, Ph.D. candidate in Mechanical Engineering, Expected Graduation June 2021 (GPA: 5.0/5.0)

## WORK / RESEARCH EXPERIENCE / PROJECTS

- **Governor's School (Summer 2010)**: Worked in a Rutgers lab to develop technique for sequestering atmospheric CO<sub>2</sub> using nanoparticles and enzymes that convert the greenhouse gas to bicarbonate.
- **Panasonic, Intern (Summer 2011)**: Led a team in the design of an engineering competition for NJ high school students. Created a Mars rover-themed challenge requiring participants to construct, from household items, a robot that could perform a number of Mars operation-related tasks. Built a solution to prove feasibility.
- **MIT Lifelong Kindergarten Group, Research Assistant (Summer 2012)**: Designed/fabricated new circuit boards with Bluetooth wireless and I<sup>2</sup>C network capabilities for a self-documenting construction kit. Wrote software for project using computer vision and "simple machine" models to teach young students about mechanics.
- **MIT 2.00b, "Toy Lab"**: Worked on a team of 5 to design and prototype original toy, BeatBlocks, a set of cubes that emit music samples in response to simple hand gestures.
- **MIT 6.115 (2014)**: Extensive project work with 8051 microcontroller. 2-axis MRI, fluorescent light ballast, motor controller, phase-locked loops, music playback and amplification.
- **Two Bit Circus, R&D Engineer (2014)**: Designed and built STEM-related carnival attractions, including several robotic musical instruments. Extensive rapid prototyping work in metal, wood, plastic, and electronic media.
- **MIT 2.013/2.014, CEO (Fall 2014 - Spring 2015)**: Capstone product development class funded by the US Marines and Lincoln Laboratories. I led a 10-person team to develop a tactical 3kW power generator that reduces the total volume of fuel necessary for a standard Marine mission. We succeeded in developing a novel system that reacts aluminum and water to produce hydrogen and run a fuel cell. The result was a 60% reduction in volume.
- **NASA JPL, Roboticist (August 2015 – August 2017)**: Lead arm analyst and arm system engineer for the Mars Science Laboratory Rover (Curiosity), project manager for development of modular robotics software and novel power systems for a Europa lander, developer for control software subsystem for upcoming Mars 2020 mission.
- **MIT 2.013/2.014, Teaching Assistant / Instructor (Fall 2017 – present)**: Co-instructor for capstone design course for both undergraduate and graduate mechanical engineering students. I devise and plan term projects, lectures, and advise students on technical content. Past successful projects include a carbon neutral cooling system, an aluminum-powered BMW i3, and an autonomous ionosphere mapping ocean platform.
- **MIT PhD Candidate (Spring 2019 – present)**: Conduct research in aluminum-based fuels, sustainable power systems, relief for climate change-related natural disasters, and climate-change adaptation in general. Current projects include fundamental research on aluminum-water reactions, an aluminum debris-powered desalination system, and various devices for cooking and generating electricity using scrap aluminum in the developing world.

## SKILLS / RESEARCH INTERESTS

- **Programs / Programming Languages**: Assembly, C, C++, Python, Go, MATLAB, Linux, SolidWorks, Fusion 360, Eagle, Arduino, Processing, Adobe Creative Suite, Pure Data, Max/MSP, Sibelius
- Real-time robotics control software, mechatronics/mechanical/circuit design, custom microcontrollers, PCB layout and milling, analog filter design, rapid prototyping. Significant experience with laser cutting, 3D printing, water jet cutting, CNC, lathes, mills, MIG/TIG welding, and standard shop tools.
- Thermodynamics, heat transfer, fluid mechanics, desalination, aluminum-water reactions, hydrogen power systems

## AWARDS

- **First Place, Panasonic Creative Design Challenge (2010, 2009, and 2008)**: Challenge to complete complicated tasks with robots made from household items. First out of 60 teams. Received NJ gubernatorial proclamation.
- **Second Place, Panasonic Creative Design Challenge (2011)**: See above for challenge description.
- **MENC Top ranked high school jazz pianist in northeast region encompassing 12 states (2011)**
- **Emerson Fellowship (2011-pres.)**: A fellowship for taking music classes at the New England Conservatory
- **Pi Tau Sigma, MIT (2013-2015)**: Engineering honor society (top 15% of class)
- **MIT Louis Sudler Prize (2015)**: Top prize for excellence in the arts (music)
- **Hertz Fellow Finalist (2018)**

- **First Place, Tech Briefs Create the Future Contest (2018):** aluminum-powered emergency generator
- **MIT Office of Sustainability Incubator Award (2019):** \$50k to develop project class on carbon-neutral cooling
- **MIT Keck Travel Award in Thermal Sciences (2019):** competitive travel grant for MechE grad students
- **Martin Family Society Fellow for Sustainability (2019)**
- **Hugh Hampton Young Fellow (2019)**
- **J-WAFS Fellow for Water Solutions (2019)**
- **MIT-LL Barbara P. James Memorial Award (2015 and 2019):** For excellence in project-based engineering

## PUBLICATIONS

1. S. Brooks, P. Godart, P. Backes, S. B. Chamberlain, R. Smith, and S. Karumanchi, "**An Untethered Mobile Limb for Modular In-Space Assembly**," IEEE Aerospace Conference, 2016.
2. S. Brooks, P. Godart, B. Chamberlain-Simon, R. Smith, and P. Backes, "**Limboïd Reconfigurable Robots for In-Space Assembly**", NASA Tech Briefs, Vol. 40 No. 6, June 2016.
3. P. Godart, J. Gross, and R. Mukherjee, "**Generating Real-Time Robotics Control Software from SysML**," IEEE Aerospace Conference, 2017.
4. R. Mukherjee, N. Abcouwer, J. Kim, R. McCormick, P. Bailey, and P. Godart, "**Technologies for Mars On-Orbit Robotic Sample Capture and Transfer Concept**," IEEE Aerospace Conference, 2017.
5. P. Godart et al, "**Auto-Generating Real-Time Capable Robotics Control Software for Highly Reconfigurable Robot Platforms**," 2018 IEEE Aerospace Conference, 2018.
6. P. Godart et al, "**Hydrogen Production from Aluminum-Water Reactions Subject to Varied Pressures and Temperatures**", International Journal of Hydrogen Energy, 2019, DOI: 10.1016/j.ijhydene.2019.03.140.
7. P. Godart, D. Douglas, D.P. Hart, "**An Ecosystem for Powering Seawater Desalination with Recycled Aluminum**", IDA World Congress, Dubai, UAE, October, 2019. (Accepted for oral presentation)
8. P. Godart, J. Fischman, D.P. Hart, "**High-Power Fuel Cell Systems Fueled by Recycled Aluminum**", Proceedings of the ASME 2019 International Mechanical Engineering Congress and Exposition. Volume 6: Energy. Salt Lake City, Utah, USA. November 11–14, 2019. V006T06A063. ASME. <https://doi.org/10.1115/IMECE2019-10478> (Accepted for oral presentation).

## PATENTS

1. P. Godart, "Musical instrument recording system", US Patent US10311844B1, issued June 4, 2019.
2. P. Godart, D.P. Hart, "Pressure-Driven Treatment of Fluid (HDRO)", US Patent Application No. 16/548,137, filed August 22, 2019.

## SPEAKING ENGAGEMENTS / PRESENTATIONS

1. American Helicopter Society, Cambridge MA, October 25, 2017. "Powering the World with Soda Cans".
2. IEEE Aerospace Conference, 2018. "Auto-Generating Real-Time Capable Robotics Control Software for Highly Reconfigurable Robot Platforms". (Electronic Presentation Hall).
3. MIT Mechanical Engineering Research Exhibition, Cambridge, MA, September 28, 2018. "Powering Disaster Relief with Aluminum" (poster). *Honorable Mention*.
4. Polytechnic University of Puerto Rico, San Juan, PR, January 21, 2019. "Aluminum-Powered Disaster Relief".
5. MIT Water Night, Cambridge, MA, February 26, 2019. "Aluminum-Powered Desalination" (poster). *Best Poster Award*.
6. MIT Sustainability Connect, Cambridge, MA, May 3, 2019. "Designing the future of sustainability education at MIT" (panel participant).
7. Applied Energy A+B Conference, Cambridge, MA, May 24, 2019. "Aluminum-Powered Climate Change Resiliency".
8. World Hydrogen Technologies Convention, Tokyo, Japan, June 4, 2019. "Control of Aluminum-Water Reactions for Hydrogen Production" (poster).
9. International Desalination Association World Congress, Dubai, UAE, October 21, 2019. "An Ecosystem for Powering Seawater Desalination with Recycled Aluminum".