# Peter Godart

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## Education

**Massachusetts Institute of Technology (MIT)**
Ph.D. candidate, Mechanical Engineering, June 2022 (Expected)
(GPA: 5.0/5.0)

S.M., Mechanical Engineering, 2016
Thesis: *Design of an Aluminum-Powered Reverse Osmosis Desalination System for Disaster Relief*
(GPA: 5.0/5.0)

S.B., Mechanical and Electrical Engineering, 2015
(GPA: 4.9/5.0)

## Research

**Mechanical Engineering, MIT**
Ph.D. Candidate (2019-present)

*Aluminum-water reaction mechanisms, fuel from scrap aluminum (including used beverage cans), end-to-end aluminum debris-to-power system analysis.*

S.M. Candidate (2017-2019)

*Aluminum-based fuels, kilowatt-scale power systems powered by recycled aluminum, aluminum-water reaction thermodynamics, aluminum-powered disaster relief (RO desalination and hydrogen-fueled cooking), climate change adaptation.*

**NASA Jet Propulsion Laboratory (JPL)**
Technologist and Project Manager (2015-2017)

*Lead arm analyst and arm system engineer for the Mars Science Laboratory Rover (Curiosity), project manager for development of modular robotics software and a novel aluminum-based power systems for a Europa lander, and developer for control software subsystem for upcoming Mars 2020 mission. I also performed initial concept work for Mars Sample Return mission and designed and built two cyberphysical microgravity simulation test beds.*

## Teaching

**Mechanical Engineering, MIT**
Instructor, 2.013/4 - *Engineering Systems Design and Development* (2019-present)

*Capstone design course for both undergraduate and graduate mechanical engineering students. I work with other instructors to 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 boat.*

TA, 2.013/4 - *Engineering Systems Design and Development* (2017-2019)

*See above description.*

## Outreach

**Space for Action**
Co-director and content creator (2019-present)

*Non-profit organization that curates multidisciplinary media and curricula at the intersection of science, art, and culture, with an emphasis on amplifying BIPOC voices and bringing disparate communities together to make progress on climate justice. For more information, see spaceforaction.org.*

**MIT MOSTEC**
Project Course Instructor - *Thermodynamics and Climate Change* (2020)

*Designed and taught a 6-week online course for high achieving, underserved high school seniors that teaches thermodynamics through a "decolonized" lens, integrating the learning of first principles and their applications directly with topics related to climate change and social justice. Students complete team projects evaluating leading solutions for climate change mitigation.*

## Awards

MIT Keck Travel Award in Thermal Sciences (2019)
MIT Office of Sustainability Incubator Award (2019)
MIT-Lincoln Laboratory Barbara P. James Memorial Award (2015 and 2019)
First Place, Tech Briefs Create the Future Contest (2018)
MIT Louis Sudler Prize for Excellence in Music (2015)
Pi Tau Sigma, MIT (2013-2015)
Second Place, Panasonic Creative Design Challenge (2011)
First Place, Panasonic Creative Design Challenge (2008, 2009, 2010)

## Fellowships

Martin Family Society Fellow for Sustainability (2019)
Hugh Hampton Young Fellow (2019)
J-WAFS Fellow for Water Solutions (2019)
Hertz Fellow Finalist (2018)
MIT Emerson Fellow (2011-present)

## Skills

**Programs/Languages**: Assembly, C, Python, JS, MATLAB, EES, Bash (and all things Unix), SolidWorks, Fusion 360, Eagle, Arduino, Adobe Creative Suite, Pure Data, Max/MSP, Sibelius.

**Analysis**: Thermodynamics, heat transfer, fluid mechanics, thermal and RO desalination, aluminum-water reactions, hydrogen power systems.

**Design/Fabrication**: Real-time robotics control software, mechatronics/mechanical/circuit design, custom microcontrollers, embedded Linux, 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.

# Publications

13. Peter Godart. "Design and Simulation of a Heat-Driven Direct Reverse Osmosis Device for Seawater Desalination Powered by Solar Thermal Energy", *Applied Energy* (accepted).

12. Peter Godart. "Heat-Driven Direct Reverse Osmosis for High-Performance and Robust ad hoc Seawater Desalination", *Desalination*, (accepted).

11. Peter Godart and Douglas Hart. "Aluminum-powered climate change resiliency: From aluminum debris to electricity and clean water". In: *Applied Energy* 275 (Oct. 2020), p. 115316. ISSN: 03062619. DOI: 10.1016/j.apenergy.2020.115316. URL: https://linkinghub.elsevier.com/retrieve/pii/S030626192030828X

10. Jason Fischman, Peter Godart, and Douglas Hart. "Hydrogen generation via the reaction of an activated aluminum slurry with water". In: *International Journal of Hydrogen Energy* (May 2020). ISSN: 03603199. DOI: 10.1016/j.ijhydene.2020.04.161. URL: https://linkinghub.elsevier.com/retrieve/pii/S0360319920315640

9. Peter Godart, Jason Fischman, and Douglas Hart. "Kilowatt-Scale Fuel Cell Systems Powered by Recycled Aluminum". In: *Journal of Electrochemical Energy Conversion and Storage* (Mar. 2020), pp. 1–14. ISSN: 2381-6872. DOI: 10.1115/1.4046660. URL: https://asmedigitalcollection.asme.org/electrochemical/article/doi/10.1115/1.4046660/1081620/KilowattScale-Fuel-Cell-Systems-Powered-by

8. Peter Godart, Daysia Douglas, and Douglas Hart. "An Ecosystem for Powering Seawater Desalination with Recycled Aluminum". In: *International Desalination Association World Congress*. Dubai, UAE, 2019, pp. 1–10

7. Peter Godart, Jason Fischman, and Douglas Hart. "High-Power Fuel Cell Systems Fueled by Recycled Aluminum". In: *ASME International Mechanical Engineering Congress & Exposition, IMECE 2019*. 2019, pp. 901–907

6. Peter Godart, Jason Fischman, Kelsey Seto, and Douglas Hart. "Hydrogen production from aluminum-water reactions subject to varied pressures and temperatures". In: *International Journal of Hydrogen Energy* (Apr. 2019). ISSN: 0360-3199. DOI: 10.1016/J.IJHYDENE.2019.03.140. URL: https://www.sciencedirect.com/science/article/pii/S0360319919311486

5. Peter Godart, Peter Vieira, Gene Merewether, and Wyatt Ubellacker. "Auto-generating real-time capable robotics control software for highly reconfigurable robot platforms". In: *IEEE Aerospace Conference Proceedings*. Vol. 2018-March. IEEE Computer Society, June 2018, pp. 1–9. ISBN: 9781538620144. DOI: 10.1109/AERO.2018.8396594

4. P. Godart, J. Gross, R. Mukherjee, and W. Ubellacker. "Generating real-time robotics control software from SysML". in: *IEEE Aerospace Conference Proceedings*. Vol. 2017-June. 2017. DOI: 10.1109/AERO.2017.7943610

3. R. Mukherjee, N. Abcouwer, J. Kim, R. McCormick, P. Godart, and P. Bailey. "Technologies for mars on-orbit robotic sample capture and transfer concept". In: *IEEE Aerospace Conference Proceedings*. 2017. ISBN: 9781509016136. DOI: 10.1109/AERO.2017.7943608

2. S. Brooks, P. Godart, P. Backes, B. Chamberlain-Simon, R. Smith, and S. Karumanchi. "An untethered mobile limb for modular in-space assembly". In: *IEEE Aerospace Conference Proceedings*. Vol. 2016-June. 2016. ISBN: 9781467376761. DOI: 10.1109/AERO.2016.7500878

1. Sawyer Brooks, Peter Godart, Brendan Chamberlain-Simon, Russell Smith, and Paul Backes. "Limboid Reconfigurable Robots for In-Space Assembly - Tech Briefs". In: *NASA Tech Briefs* (June 2016). URL: https://www.techbriefs.com/component/content/article/tb/techbriefs/machinery-and-automation/24808

## Patents

2. Peter Godart, Douglas Hart. *Pressure-driven treatment of fluid.*, US Patent App. No. 16/584,137, filed August 22, 2019.

1. Peter Godart. *Musical instrument recording system.* US10311844B1, 2019.

## Talks

7. American Society of Mechanical Engineers (ASME) International Mechanical Engineering Congress and Exposition (IMECE), November 8, 2019. *High-power fuel cell systems fueled by recycled aluminum.*

6. International Desalination Association World Congress, Dubai, UAE. October 21, 2019. *An ecosystem for powering seawater desalination with recycled aluminum.*

5. Applied Energy MIT A+B Conference, Cambridge, MA. May 24, 2019. *Aluminum-powered climate change resiliency.*

4. MIT Sustainability Connect, Cambridge, MA. May 3, 2019. *Panel on designing the future of sustainability education at MIT.*

3. Polytechnic University of Puerto Rico, San Juan, PR. January 21, 2019. *Aluminum-powered disaster relief.*

2. IEEE Aerospace Conference, 2018. *Auto-generating real-time capable robotics control software for highly reconfigurable robot platforms.*

1. American Helicopter Society, Cambridge, MA. October 25, 2017. *The Power of Soda Cans.*

## Posters

3. World Hydrogen Technologies Convention, Tokyo, Japan. June 4, 2019. *Control of aluminum-water reactions for hydrogen production.*

2. MIT Water Night, Cambridge, MA. February 26, 2019. *Aluminum-powered desalination.* **Best poster award**.

1. MIT Mechanical Engineering Research Exhibition, Cambridge, MA. September 28, 2018. *Powering disaster relief with aluminum.* **Honorable mention**.