

M. Engineer

PhD in Mechanical Engineering
Massachusetts Institute of Technology

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	Massachusetts Institute of Technology	
Sept. 2017	PhD in Mechanical Engineering	GPA: 5.00/5.00
Sept. 2013	MS in Mechanical Engineering	GPA: 5.00/5.00
	University of California, Berkeley	
May 2011	BS in Mechanical Engineering	GPA: 3.97/4.00

CV is well organized with plenty of white space.

Selected Research Projects

Projects organized in chronological order. Each has consistent length, and while not bullets, is short enough to read quickly.

2015 - Present **Solar-Thermal Aerogel Receiver**

I am part of a team developing a novel solar-thermal aerogel receiver, which achieves efficient solar to thermal conversion using transparent silica aerogel. I model system performance using a code which solves the equation of radiative transfer coupled to the heat equation. I am also fabricating and characterizing experimental prototypes of the receiver.

2016 - Present **Determining the Limit of Performance Enhancement via Spectral Selectivity**

I am attempting to determine the limit of performance enhancement possible using spectral selectivity (e.g., in solar thermal systems) for physically realizable surfaces. In this work limits are set by the Kramers-Kronig relations in conjunction with selected physical constraints. I solve the Kramers-Kronig relations numerically to determine achievable surface properties.

2012 – 2015 **Macroscale Optical Cavity for Solar Receivers**

I designed an optical cavity to reduce radiative losses from solar receivers. As part of this project, I programmed a ray tracing code to predict cavity performance and experimentally demonstrated reduced thermal losses from a receiver at elevated temperature. I also used ray tracing to show an improvement in absorption of photovoltaic cells with the cavity.

2011 - 2015 **Solar Thermoelectric Generator (STEG)**

I helped design an improved efficiency STEG using optical concentration and modeled the device efficiency using heat transfer analysis. I tested a prototype STEG with integrated thermal storage.

2010 - 2011 **Energy scavenger from fluid flow**

I helped develop a piezoelectric energy scavenger for use in HVAC ducts. I modeled the fluid dynamics and solid mechanics of the system to optimize design, prototyped a variety of designs and completed performance and fatigue testing on prototypes.

Contribution and impact to each project is clearly stated.

Teaching and Mentoring Experience

2017 – Present **Science Quiz Writer – Brilliant.org**

Title and position are clearly stated

I am developing curriculum for brilliant.org, which provides online STEM education. I am currently creating lessons on renewable energy, designing them to be broadly accessible without sacrificing technical accuracy.

2014 – 2017 **Mentor - MITxplore**

Concrete and quantified description of impact.

As a mentor for MITxplore (mitxplore.org) I worked with about ten 4th – 6th grade students during weekly math outreach sessions. I also developed lessons to make complex math topics accessible and engaging for young students which were used in the sessions. Examples of topics for lessons I developed are maze solving algorithms, the mutilated chessboard problem, and Kobon triangles.

Spring 2016 **Teaching Assistant - 2.55: Advanced Heat and Mass Transfer**

I was a teaching assistant for course 2.55 (graduate level heat transfer) at the Massachusetts Institute of Technology. I organized and led recitation sessions, office hours and exam review sessions for approximately 25 students taking the course. I earned an overall rating of 6.8/7 on my course evaluations as a TA for this course.

Selected Publications

1. K. McEnaney, M. Engineer, D. Kraemer, H. Ghasemi and G. Chen. "Aerogel-based solar thermal receivers." *Nano Energy*, **40**, 180-186, 2017.
2. D. Kraemer, Q. Jie, K. McEnaney, F. Cao, W. Liu, M. Engineer, J. Loomis, Z. Ren and G. Chen. "Concentrating solar thermoelectric generators with a peak efficiency of 7.4%" *Nature Energy*, **1**, 16153, 2016.
3. S.V. Boriskina, M. Engineer, J.K. Tong, W.C. Hsu and G. Chen. "Hybrid Optical-Thermal Antennas for Enhanced Light Focusing and Local Temperature Control." *ACS Photonics*, **3** (9), 1714-1722, 2016.
4. M. Engineer, J. Loomis, B. Bhatia, D.M. Bierman, E.N. Wang and G. Chen. "Concentrating Solar Power." *Chemical Reviews*, **115** (23), 12797-12838, 2015.
5. M. Engineer, W.C. Hsu, S. Yerci, S.V. Boriskina, G. Chen, "Enhanced absorption of thin-film photovoltaic cells using an optical cavity," *Journal of Optics*, **17** (5), 055901, 2015.
6. M. Engineer, D. Kraemer, K. McEnaney, G. Chen, "Optical cavity for improved performance of solar receivers in solar-thermal systems," *Solar Energy*, **108**, 69-79, 2014.
7. M. Engineer, K. McEnaney, G. Chen, "Modeling of thin-film solar thermoelectric generators," *Journal of Applied Physics*, **113** (16), 164504, 2013.
8. M. Engineer, M.R. Cacan, P.M. So, and P.K. Wright, "Vortex shedding induced energy harvesting from piezoelectric materials in heating, ventilation and air conditioning flows," *Smart Materials & Structures*, **21** (4), 045003, 2012.

You can bold your name to make it stand out in the publications.

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