

ERIC ISAAC TEITELBAUM

1 Mountain Church Rd, Hopewell, NJ 08525 | eteitelbaum@ailr.com | +1 (609) 408-7786 | skype: eric.teitelbaum

CURRENT

AIL Research Inc., Senior Engineer	October 2019 - Present
Postdoctoral researcher, Princeton University	July 2020 - Present
Adjust Assistant Professor, The Cooper Union	January 2022 - Present
Co-founder Hearth Labs	April 2018
Owner, Teitelbaum Carpentry	2008 - Present

EDUCATION

Dual-Degree Ph.D. Princeton University, School of Architecture and Material Science	May 11, 2020
◦ TRACK:	Energy and Computation; Materials Science
◦ ADVISOR:	Dr. Forrest Meggers
◦ RESEARCH TOPICS:	- Materials for evapo-radiative cooling and desiccant dehumidification. - MRT + IoT sensor development for building thermal performance. - Systems design and characterization for “Expanded Psychrometrics” thermal comfort framework.
M.S.E. Princeton University, School of Engineering and Applied Science	June 2017
◦ DEPARTMENT:	Civil and Environmental Engineering
◦ THESIS:	Expanded Psychrometrics for Novel Integrated Design of Radiant and Passive Building Systems
B.S.E. Princeton University, School of Engineering and Applied Science	June 2014
◦ MAJOR:	Chemical and Biological Engineering
◦ THESIS:	Evaporative Cooling on Building Surfaces through a Microporous Hydrophobic Membrane

TEACHING EXPERIENCE

Adjunct Assistant Professor, The Cooper Union	Jan. 2022 - Present
◦ EVT134	Building Systems, Data science, Bicycle powered heat pump design project, Energy modeling, Emerging technology
Assistant in Instruction (AI), Princeton University	Sept. 2015 - May 2020
◦ ENE202	Designing Sustainable Systems, Laboratory AI, designed lab modules and homework assignments, lead student design project development - Spring 2016, Spring 2020
◦ ENV201	Fundamentals of Environmental Science, 5 precepts weekly - Fall 2015
◦ CEE102	Engineering in the Modern World, Head Laboratory AI - Fall 2016

SELECTED PRESS

1. Title: Cooling off without Air-Conditioning. Washington Post, Sept. 10, 2020.
<https://www.washingtonpost.com/climate-solutions/2020/09/10/radiant-cooling-climate-air-conditioning/>
2. Title: A Better Way to Cool Ourselves. Scientific American, May 26, 2021.
<https://www.scientificamerican.com/article/a-better-way-to-cool-ourselves/>
3. Title: Conditioning People, Not Rooms. ASHRAE Journal, November 2021.

PEER-REVIEWED PUBLICATIONS

2021

1. Aviv, D., Chen, K.W., **Teitelbaum, E.**, Sheppard, D., Pantelic, J., Rysanek, A., and Meggers, F. A Fresh (Air) Look at Ventilation for COVID-19: Estimating the global energy savings potential of coupling natural ventilation with novel radiant cooling strategies. Applied Energy (2021): 116848.

2. **Teitelbaum, E.**, Alsaad, H., Aviv, D., Kim, A., Voelker, C., Meggers, F., Pantelic, J. Addressing a systematic error correcting for free and mixed convection when measuring mean radiant temperature with globe thermometers. *Nature Scientific Reports*, *In review*.
3. Aviv, D., Gros, J., Alsaad, H., **Teitelbaum, E.**, Voelker, C., Pantelic, J., Meggers, F. A Data-Driven Ray Tracing Simulation to Resolve Spatial Variations in Indoor Mean Radiant Temperature with Experimental Validation. *Energy and Buildings* *In review*.
4. **Teitelbaum, E.**, and Meggers, F. Rethinking Radiant Comfort, Chapter 29 of *A Handbook of Resilient Thermal Comfort*, Routledge Publishers.

2020

5. **Teitelbaum, E.**, Meggers, F., Pantelic, J., Chen, K.W., Aviv, D., Bradford, K., Ruefenacht, L., Teitelbaum, M., Rysanek, A. Membrane-assisted radiant cooling for expanding thermal comfort zones globally without air conditioning. *Proceedings of the National Academy of Sciences*, 117 (35) 21162-21169, 2020. DOI: 10.1073/pnas.2001678117
6. Chen, K.W., **Teitelbaum, E.**, Meggers, F., Pantelic, J., Rysanek, A. Exploring membrane-assisted radiant cooling for designing comfortable naturally ventilated spaces in the tropics. *Building Research & Information*, (2020). DOI: 10.1080/09613218.2020.1847025
7. **Teitelbaum, E.**, Chen, K.W., Meggers, F., Houchois, N., Guo, H., Pantelic, J., Rysanek, A., Globe thermometer free convection error potentials. *Nature Scientific Reports* 10, 2652 (2020). <https://doi.org/10.1038/s41598-020-59441-1>
8. **Teitelbaum, E.**, Jayathissa, P., Miller, C., Meggers, F. Design with Comfort: Expanding the psychrometric chart with radiation and convection dimensions, *Energy and Buildings*, 207, 109591, DOI: 10.1016/j.enbuild.2019.07.007

2019

9. Houchois, N., **Teitelbaum, E.**, Chen, K.W., Rucewicz, S., Meggers, F. The SMART sensor: fully characterizing radiant heat transfer in the built environment. *Proceedings of CISBAT 2019*.
10. **Teitelbaum, E.**, Chen, K.W., Meggers, F., Pantelic, J., Aviv, D., Rysanek, A. The Cold Tube: Membrane assisted radiant cooling for condensation-free outdoor comfort in the tropics. *Proceedings of CISBAT 2019*.
11. Guo, H., **Teitelbaum, E.**, Meggers, F. Humidifying Without Adding Humidity: Psychrometric Shifts in Humidity from Air Temperature Setbacks Enabled by Radiant Heating or Cooling, *IBPSA Building Simulation Conference*, 2019.
12. Aviv, D., **Teitelbaum, E.**, Kvochick, T., Meggers, F. MRT Simulation for Asymmetric Radiant Fluxes, *IBPSA Building Simulation Conference*, 2019.
13. Guo, H., Aviv, D., Loyola, M., **Teitelbaum, E.**, Houchois, N., Meggers, F., On the understanding of the mean radiant temperature within both the indoor and outdoor environment, a critical review, *Renewable and Sustainable Energy Reviews*, 117, 109207.
14. **Teitelbaum, E.**, Chen, K.W., Meggers, F., Pantelic, J., Rysanek, A. Black Globe Free Convection Measurement Error Potentials, *Proceedings of SimAUD 2019*.
15. **Teitelbaum, E.**, Rysanek, A., Pantelic, J., Aviv, D., Obelz, S., Buff, A., Luo, Y., Sheppard, D., and Meggers, F. (2019) Revisiting radiant cooling: condensation-free heat rejection using infrared-transparent enclosures of chilled panels, *Architectural Science Review*, 62:2, 152-159, DOI: 10.1080/00038628.2019.1566112

2018

16. **Teitelbaum, E.**, Rysanek, A., Pantelic, J., Aviv, D., Obelz, S., Buff, A., Luo, Y., Poirier, B., Meggers, F. Condensation-free radiant cooling using infrared-transparent enclosures of chilled panels. *Proceedings of the International Building Physics Conference*, 2018.
17. Keeley-LeClaire, T., **Teitelbaum, E.**, Shim, S., Bozlar, M., Stone, H.A., Meggers, F. Extracting Radiant Cooling From Building Exhaust Air Using the Maisotsenko Cycle Principle. *Proceedings of the International Building Physics Conference*, 2018.

18. Bozlar, M., **Teitelbaum, E.**, Meggers, F. Liquid Desiccant-Polymeric Membrane Dehumidification System for Improved Cooling Efficiency in Built Environments. Proceedings of the International Building Physics Conference, 2018.
19. Guo, H., **Teitelbaum, E.**, Houchois, N., Bozlar, M., Meggers, F. (2018). Revisiting the use of globe thermometers to estimate radiant temperature in studies of heating and ventilation. *Energy and Buildings*, 180, 83-94.

2017

20. Aviv, D., **Teitelbaum, E.** Thermally Informed Bending: Relating Curvature to Heat Generation through Infrared Sensing. Proceedings of the Design Modelling Symposium Paris, 2017.
21. Pantelic, J., Rysanek, A., Miller, C., Peng, Y., **Teitelbaum, E.**, Meggers, F., Schlueter, A. Comparing the indoor environmental quality of a displacement ventilation and passive chilled beam application to conventional air-conditioning in the Tropics. *Building and Environment*, In review.
22. **Teitelbaum, E.** Expanded Psychrometrics for Novel Integrated Design of Radiant and Passive Building Systems, Masters Thesis in Civil and Environmental Engineering, Princeton University, May 2017
23. Meggers, F., **Teitelbaum, E.**, Pantelic, J. Development of moisture absorber based on hydrophilic membrane mass exchanger and alkoxyated siloxane liquid desiccant. *Energy Procedia*, CISBAT 2017 Conference Proceedings.
24. **Teitelbaum, E.**, Meggers, F. Expanded Psychrometric Landscapes for New Radiant Cooling System Design and Optimization. *Energy Procedia*, CISBAT 2017 Conference Proceedings, 2017.
25. Coleman, J., **Teitelbaum, E.**, Guo, H., Read, J., Meggers, F. Examining Architectural Air and Temperature with Novel Sensing Techniques. *Energy Procedia*, CISBAT 2017 Conference Proceedings.
26. Pantelic, J., **Teitelbaum, E.**, Bozlar, M. Kim, S., Meggers, F. Development of moisture absorber based on hydrophilic membrane mass exchanger and alkoxyated siloxane liquid desiccant. *Energy and Buildings*, 2017.
27. Meggers, F., Guo, H., **Teitelbaum, E.**, Read, J.R., Houchois, N., Aschwanden, G.A. The Thermoheliodome – Indirect Evaporative Cooling by reflected radiant heat exchange maximizing occupant cooling and minimizing convective losses in an outdoor pavilion. *Energy and Buildings*.
28. **Teitelbaum, E.**, Guo, H., Read, J.R., Meggers, F. Mapping Comfort with the SMART (Spherical Motion Average Radiant Temperature) Sensor. *IBPSA Building Simulation Conference*, 2017.
29. **Teitelbaum, E.**, Pantelic, J., Rysanek, A., Meggers, F. Liquid Desiccant Latent Load Handling Simulation for Building HVAC Applications with a DOAS Module. *IBPSA Building Simulation Conference*, 2017.
30. Meggers, F., Aviv, D., Charpentier, V., **Teitelbaum, E.**, Ainslie, A. Co-optimization of solar tracking for shading and photovoltaic energy conversion. *IBPSA Building Simulation Conference*, 2017, In review

2016

31. Meggers, F., Aschwanden, G., **Teitelbaum, E.**, Guo, H., Salazar, L., and Bruelisauer, M. (2016). Urban cooling primary energy reduction potential: System losses caused by microclimates. *Sustainable Cities and Society*, 27, 315-323.
32. **Teitelbaum, E.**, Read, J.R., Meggers, F. (2016) Spherical Motion Average Radiant Temperature Sensor (SMART Sensor) Expanding Boundaries: Systems Thinking in the Built Environment.
33. Pantelic, J., **Teitelbaum, E.**, Meggers, F. (2016) Air Dehumidification with Novel Liquid Desiccant System Expanding Boundaries: Systems Thinking in the Built Environment
34. **Teitelbaum, E.**, Urano, S., Conlan, L., Percival, A., Hinson, J., Meggers, F. (2016) Campus as a Lab: Building- and System-level Air Movement Investigation. *Expanding Boundaries: Systems Thinking in the Built Environment*

2015

35. **Teitelbaum, E.**, Meggers, F., Scherer, G., Ramamurthy, P., Wang, L., and Bou-Zeid, E. (2015). ECCENTRIC Buildings: Evaporative Cooling in Constructed ENvelopes by Transmission and Retention Inside Casings of Buildings. *Energy Procedia*, 78, 1593-1598.

36. Calabrò, E., Aschwanden, G., Houchois, N., **Teitelbaum, E.**, and Meggers, F. (2015, November). Thermoheliiodome Testing: Evaluation Methods For Testing Directed Radiant Heat Reflection. In Proceedings of 6th International Building Physics Conference, IBPC.
37. Read, J. R., Meggers, F., Houchois, N., Aschwanden, G., **Teitelbaum, E.**, Adriaenssens, S., ... and Pantelic, J. (2015). Thermoheliiodome design, optimization and fabrication. *Energy Procedia*, 78, 273-278.
38. Meggers, F., Aschwanden, G., **Teitelbaum, E.**, Guo, H., and Bruelisauer, M. (2015). Urban Cooling Potential: System Losses from Microclimates. *Energy Procedia*, 78, 3072-3077.

2014

39. **Teitelbaum E.** Evaporative Cooling on Building Surfaces through a Microporous Hydrophobic Membrane, Undergraduate Thesis in Chemical Engineering, Princeton University, May 2014

PATENTS

2018

1. **Teitelbaum, E.**, Houchois, N., Meggers, F., Scanning Motion Average Radiant Temperature Sensor Applications. *U.S. Patent Application #18-3445-1* (2018)
2. Keeley-LeClaire, T., **Teitelbaum, E.**, Meggers, F., Stone, H.A., Shim, S., Bozlar, M., Integrated Evaporative-Radiant Cooling Panel, *U.S. Patent Application #18-3475-1* (2018).

2017

3. Meggers, F., **Teitelbaum, E.**, Bozlar, M., Indoor Cooling System Using Hybrid Liquid Desiccant-Mechanical Fan. *U.S. Patent Application #18-3447-1* (2017).
4. **Teitelbaum, E.**, Meggers, F., Rysanek, A. Thermally radiative apparatus negotiating spectral properties to allow reflection and emission, not convection. *U.S. Patent Application #18-3395-1* (2017).
5. Meggers, F., **Teitelbaum, E.**, Ainslie, A., Simultaneous Solar Tracker and Fixed-area Shading System. *U.S. Patent Application #18-3382-1* (2017).
6. **Teitelbaum, E.**, Meggers, F., Houchois, N., Read, J.R. Binocular Vision Occupancy Detection Sensor, *U.S. Patent Application #62/504916* (2017).

2016

7. **Teitelbaum, E.**, Meggers, F., Pantelic, J. System and Method for Dehumidification of Air by Liquid Desiccant across Membrane, *U.S. Patent Application #US16/60110* (2016).

2015

8. **Teitelbaum, E.**, Meggers, F., Read, J.R. Spherical Motion Average Radiant Temperature Sensor (SMART Sensor), *U.S. Patent Application #10718670* (2015).

AWARDS, GRANTS, AND PROPOSALS

Department of Energy Cleantech UP National Finals	June 2018
o PROJECT: SMART Sensor	
o OUTCOME: \$35,000 Building Technologies Office Prize	
Princeton Research Day	May 2018
o PROJECT: ColdTube	
o OUTCOME: Graduate Student Research Impact Award	
Department of Energy Cleantech UP Regional Finals, LaunchR	April 2018
o PROJECT: SMART Sensor	
o OUTCOME: \$15,000 2nd Place Prize	
Princeton Research Day	May 2017
o PROJECT: Campus As Lab Research Poster Presentation	
o OUTCOME: 2 nd Place	

- LBL-sponsored jump! Competition
- PROJECT: SMART Sensor
 - OUTCOME: \$3,000 Award Recipient for SMART Sensor as Best Building Robotics Technology
- Princeton University IP Accelerator Dec. 2016
- TITLE: Spherical Motion Average Radiant Temperature (SMART) Building Sensor and 3D Thermal Imager
 - OUTCOME: Co-authored a proposal and was awarded USD98,000 for 1 year of research and development on our patented sensor
- Princeton University E-Ffiliates Funding Dec. 2016
- TITLE: Reducing Building Energy Demand with Novel Design Integration of Advanced Liquid Desiccant and Nonporous Hydrophilic Membrane
 - OUTCOME: Co-authored a proposal and was awarded USD134,000 for 1 year of research and development
- Michelle Goudie '93 Senior Thesis Award June 2014
- TITLE: Evaporative Cooling on Building Surfaces through a Microporous Hydrophobic Membrane
 - OUTCOME: Awarded by Princeton University Department of Chemical and Biological Engineering for "outstanding accomplishment in the environmental area". Earned "A+" overall.

ACADEMIC PRESENTATIONS

- ASHRAE Summer Meeting June 2019
- PROJECT: Cold Tube Singapore
 - OUTCOME: Oral presentation of the initial data collected from the ColdTube pavilion
- Symposium on Simulation for Architecture and Urban Design April 2019
- PROJECT: Globe Free Convection Errors
 - OUTCOME: Oral presentation of the initial data collected from the ColdTube pavilion
- International Building Physics Conference 2018 September 2018
- PROJECT: ColdTube and M-Cycle Evapo-Radiative Cooler
 - OUTCOME: Oral presentation of the design and initial data collected from the ColdTube pavilion
- CISBAT 2017 September 2017
- PROJECT: Expanded Psychrometrics
 - OUTCOME: Oral presentation of the the expanded psychrometrics comfort framework
- IBPSA Building Simulation Conference August 2017
- PROJECT: SMART Sensor
 - OUTCOME: Presented Sensor technology for radiant temperature sensing on behalf of CHAOS Lab and Princeton University
- ARPA-E Innovations Summit March 2017
- PROJECT: SMART Sensor
 - OUTCOME: Presented Sensor technology for radiant temperature sensing on behalf of CHAOS Lab and Princeton University
- Sustainable Built Environment Conference June 2016
- PROJECT: Liquid Desiccant Dehumidification
 - OUTCOME: Oral Presentation
- ARPA-E Innovations Summit March 2016
- PROJECT: SMART Sensor
 - OUTCOME: Presented Sensor technology for radiant temperature sensing on behalf of CHAOS Lab and Princeton University
- International Building Physics Conference June 2015

- PROJECT: ECCENTRIC Buildings
- OUTCOME: Oral Presentation

OTHER RELEVANT EXPERIENCE

Princeton Energy and Climate Scholars (Member) May 2018 - May 2020

Hearth Labs Solutions, Inc., Co-Founder April 2018

Project Manager: ETH Zurich July 2018 - March 2019

- Managed the design and construction of a world first membrane-assisted radiant cooling system known as the ‘Cold Tube’
- Conducted thermal comfort study for the novel conditions deployed in the Cold Tube
- Produced several high-level peer-reviewed publications furthering knowledge in thermal comfort and radiant cooling domains

Research Specialist: Princeton University School of Architecture June 2014 - Aug. 2015

- Studied materials processing techniques for porous glass media
- Investigated a feasible adaptation of proposed cooling system as a building facade element
- Refined mathematical models to include non-steady state heat balances (MATLAB)
- Radiant cooling projects and desiccant dehumidification system projects currently underway
- Collaborated with ETH Zurich at the Singapore ETH Center (SEC) in Singapore on sensing technology for buildings in the Tropics

Treehouse Carpenter: Nelson Treehouse and Supply, Seattle, WA Jan. 2013 – June 2013

- Furniture Maker, Carpenter, Editor
- Built furniture and constructed treehouses featured on Animal Planet’s Treehouse Masters series
- Constructed treehouse for Anne Frank Inspire Academy, San Antonio, TX
- Edited Pete Nelson’s latest book, published by Penguin Books

Woodcraft Director; Earth Education Director: YMCA Camp Ockanickon, Medford, NJ Summer 2012 & 2011

- Developed popular Woodcraft curriculum from scratch, teaching campers useful skills while furthering individual growth by encouraging group projects and problem solving
- Managed program budget and developed a sustainable program
- Created engaging programming for a well-respected Earth Education program
- Earned award for outstanding performance

Stewardship Intern: D&R Greenway Landtrust Princeton, NJ Summer 2011 & 2010

- Princeton Environmental Institute (PEI)-funded position
- Produced soil samples, water quality tests, and plant surveys
- Developed and maintained trails and hikes designed to facilitate local environmental enrichment
- Created easement monitoring reports based on extensive local plant knowledge
- Assisted Native Plant Nursery program, both for large, state funded restorations and consumers

SKILLS

- PROGRAMMING LANGUAGES: Python, MATLAB, Arduino, Processing
- CAD SOFTWARE: AutoDesk Fusion360, Rhinoceros, SketchUp
- WORKSHOP: General Woodworking, Carpentry, Construction, Prototyping, Lasercutting, Milling, 3D Printing