

Akanksha Menon, Ph.D.

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RESEARCH INTERESTS

Solid-state energy conversion, heat transfer at the micro/nanoscale, conducting polymers for electronic applications, membrane distillation and solar desalination.

EDUCATION

Lawrence Berkeley National Laboratory (LBNL)

Starting in August 2018

ITRI - Rosenfeld Postdoctoral Fellow

Energy Storage & Distributed Resources; Energy Technologies Area (ETA)

Advisor: Dr. Ravi Prasher

Georgia Institute of Technology

2013 - 2018

Ph.D. in Mechanical Engineering

Thesis: *Development of Organic Thermoelectric Materials and Devices for Energy Harvesting*

Advisor: Prof. Shannon Yee

Cumulative GPA: 3.93/4.0

Texas A&M University at Qatar

2009 - 2013

B.S. in Mechanical Engineering

Thesis: *Optical and Thermal Analysis of a Solar Reactor for Hydrogen Production*

Advisor: Dr. Nesrin Ozalp

Cumulative GPA: 3.8/4.0 (Magna cum laude honors)

RESEARCH EXPERIENCE

Postdoctoral Fellow, LBNL

Starting in August 2018

Project: Photo-thermal Membrane Desalination

- Developed a proposal for a solar desalination system using a MOF-based membrane
- Performed preliminary calculations for the thermal design of a membrane distillation system

Graduate Research Assistant, Georgia Tech

2013 - 2018

Project 1: Design and Modeling of a Radial Thermoelectric Generator

Sponsor: Air Force Office of Scientific Research (AFOSR)

- Developed an analytical thermal model for a radial thermoelectric device cooled by natural convection
- Designed and tested the radial device using polymers for low grade waste heat recovery applications

Project 2: High Performance Conducting Polymers and Composites for Thermoelectric Applications

Sponsor: Cambridge Display Technologies (CDT)

- Synthesized conducting polymers (n-type) and studied film structure-property relationships
- Characterized material properties and designed a four-probe electrical measurement setup

Project 3: Thermo-electrochromic Devices for Food Packaging

Sponsor: Pepsi Co.

- Developed and tested a close-packed thermoelectric device with Hilbert interconnect patterns
- Performed customer discovery on body-powered wearable electronics under the NSF I-Corps program

Undergraduate Research Assistant, Texas A&M at Qatar

2011 - 2013

Project: Hydrogen Production Using Concentrated Solar Power

- Developed heat transfer models for the solar thermal cracking of methane
 - Performed Monte Carlo ray traces for reducing re-radiation losses from the reactor cavity
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FELLOWSHIPS

Energy Technologies Area, Lawrence Berkeley National Laboratory Role: ITRI – Rosenfeld Postdoctoral Fellow for research in the water-energy nexus	2018 - 2020
Center for Science and Technology of Advanced Materials and Interfaces (STAMI), Georgia Tech Role: Graduate Fellow for research in organic electronics	2017 - 2018
Center for Teaching and Learning (CTL), Georgia Tech Role: TA Fellow for training and mentoring new teaching assistants	2017 - 2018
Qatar Research Leadership Program (QRLP), Qatar Foundation Role: Graduate Fellow	2013 - 2018

HONORS AND AWARDS

MRS Graduate Student Silver Award , Materials Research Society (MRS)	2017
Best Poster Award , NextFlex workshop	2017
Environmental Leadership Award , Georgia Tech Earth Day	2017
Innovation Competition Winner , Georgia Tech Venture Lab	2017
Faces of Inclusive Excellence , Institute Diversity	2017
Travel Grant , National Science Foundation	2017
Selected Participant , ARPA-E Innovation Summit	2015 - 2017
Best Poster Award at the Career, Research, Innovation Development Conference	2015 - 2016
Finalist , 3-Minute Thesis (3MT) Competition	2016
Selected Participant , C3E Women in Clean Energy Symposium	2016
Student of the Year , Mechanical Engineering - Texas A&M University at Qatar	2013
ASME Service Award , American Society of Mechanical Engineers (ASME)	2012

PUBLICATIONS AND PRESENTATIONS

Peer-reviewed Journal Articles

- 10) **A. K. Menon**, R. Wolfe, J. R. Reynolds, S. R. Marder and S. K. Yee, “Simultaneous Enhancement in Electrical Conductivity and Thermopower of n-type NiETT/PVDF Composite Films by Annealing,” *Advanced Functional Materials* (accepted), 2018.
- 9) **A. K. Menon**, R. Wolfe, J. R. Reynolds, S. R. Marder and S. K. Yee, “Systematic Power Factor Enhancement in n-Type NiETT/PVDF Composite Films,” *Advanced Functional Materials*, 1801620, 2018.
- 8) K. Gordiz, **A. K. Menon** and S. K. Yee, “Interconnect Patterns for Printed Organic Thermoelectric Devices with Large Fill Factors,” *Journal of Applied Physics*, vol. 122, 2017.
- 7) **A. K. Menon**, O. Meek, A. Eng and S. K. Yee, "Radial thermoelectric generator fabricated from n-and p-type conducting polymers," *Journal of Applied Polymer Science* vol. 134, 2017.
- 6) **A. K. Menon**, E. Uzunlar, R. Wolfe, J. R. Reynolds, S. R. Marder and S. K. Yee, “Metallo-organic n-type thermoelectrics: Emphasizing advances in nickel-ethenetetrathiolates,” *Journal of Applied Polymer Science*, vol. 134, 2017.
- 5) **A. K. Menon** and S. K. Yee, "Design of a Polymer Thermoelectric Generator Using Radial Architecture," *Journal of Applied Physics*, vol. 119, 2016. [[Listed in 2016's most read articles in JAP](#)]
- 4) K. Ankireddy, **A. K. Menon**, B. Iezzi, S. K. Yee, M. Losego and J. Jur, “Electrical Conductivity, Thermal Behavior, and Seebeck Coefficient of Conductive Films for Printed Thermoelectric Energy Harvesting Systems,” *Journal of Electronic Materials*, vol. 45, 2016.

- 3) **A. K. Menon**, A. Farid and N. Ozalp, "A New Solar Reactor Aperture Mechanism Coupled with Heat Exchanger," *Chemical Engineering Transactions*, vol. 35, 2013.
- 2) J. Costandy, **A. K. Menon**, N. El Ghazal, M. T. Mohamed, V. Shilapuram, and N. Ozalp, "Effect of reactor geometry on the temperature distribution of hydrogen producing solar reactors," *International Journal of Hydrogen Energy*, vol. 37, 2012.
- 1) **A. K. Menon** and N. Ozalp, "Optical Analysis of Variable Aperture Mechanism for a Solar Reactor," *International Journal of Mechanical, Aerospace, Industrial, Mechatronic and Manufacturing Engineering*, vol. 5, 2011.

Conference Proceedings and Oral Presentations

- 6) **A. K. Menon**, R. Wolfe, K. Gordiz, H. Elmoughni, J. R. Reynolds and S. K. Yee, "Metallo-Organic Polymers and Devices for Thermoelectric Energy Harvesting," *International Conference on Organic and Hybrid Thermoelectrics* (2018).
- 5) **A. K. Menon**, "Thermal Design of Systems Based on Coordination Polymers: From Thermoelectric Generators to Solar Desalination," *ITRI – Rosenfeld Seminar*, Energy Technologies Area at Lawrence Berkeley National Laboratory (2018).
- 4) **A. K. Menon**, E. Uzunlar, R. Wolfe, C. Buckley, J. R. Reynolds, S. R. Marder and S. K. Yee, "Optimizing the Thermoelectric Properties of n-Type Metallo-Organic Polymers," *2016 MRS Fall Meeting and Exhibit*, Materials Research Society (2016).
- 3) **A. K. Menon** and S. K. Yee, "Design of a High Performance Polymer Thermoelectric Generator Using Radial Architecture," *Proceedings of the ASME 2015 International Mechanical Engineering Congress & Exposition - IMECE*, American Society of Mechanical Engineers (2015).
- 2) A. Saleem, H. Zahreddine, **A. K. Menon**, F. Abdul-Majid and N. Ozalp, "Experimental Testing of Weather Change Adoptable Solar Reactor Mechanism," *ASME 6th International Conference on Energy Sustainability – ESFuelCell*, American Society of Mechanical Engineers (2012).
- 1) S. Usman, A. Saleem, **A. K. Menon**, H. Zahreddine and N. Ozalp, "Experimental testing of a variable aperture concept for solar thermochemical reactors," *Proceedings of the SolarPACES 2012 Conference on Concentrating Solar Power and Chemical Energy Systems*, SolarPACES (2012).

Poster Presentations

- 6) **A. K. Menon**, K and S. K. Yee, "Understanding Thermally Activated Charge Transport in Thermoelectric Polymers," *The 9th US-Japan Joint Seminar on Nanoscale Transport Phenomena* (2017).
- 5) **A. K. Menon**, K. Gordiz and S. K. Yee, "Novel Architectures and Applications for Polymer-Based Thermoelectric Generators," *2016 MRS Fall Meeting and Exhibit*, Materials Research Society (2016).
- 4) **A. K. Menon**, K and S. K. Yee, "A Radial Thermoelectric Generator Using Conducting Polymers," *International Thermoelectrics Summer School*, Golden, CO, 2016.
- 3) **A. K. Menon**, K and S. K. Yee, "Energy Harvesting Using Printed Plastics" *C3E Women in Clean Energy Symposium*, Palo Alto, CA, 2016.
- 2) **A. K. Menon**, K and S. K. Yee, "Developing High Performance Conducting Polymers," *Center for Nanophase Materials Sciences - User Meeting*, Oak Ridge National Laboratory, TN, 2015.
- 1) **A. K. Menon** and S. K. Yee, "Design of a Polymer-Based Radial Thermoelectric Generator," *APS March Meeting*, American Physical Society (2014).

TEACHING EXPERIENCE

Head Teaching Assistant, Georgia Tech

Spring 2017

Course: Organic Electronics

Responsibilities: Developed and delivered three 80-minute lectures to graduate students on the fundamentals of charge and heat transport, as well as device level semiconductor physics. Designed one homework assignment.

Graduate Teaching Assistant, Georgia Tech

Spring 2017

Course: Energy Systems Design and Analysis

Responsibilities: Developed three 50-minute lectures for senior-level undergraduate students on topics such as thermodynamic analysis of power cycles and leveled cost of electricity calculations. Proctored quizzes and provided feedback on student term projects.

Guest lecturer, Georgia Tech

Spring 2016

Course: Renewable Energy Systems

Responsibilities: Invited to teach one lecture on thermoelectric generators to senior-level undergraduates. Utilized demos to explain the device operation and facilitated small-group discussion sessions.

Undergraduate Teaching Assistant, Texas A&M at Qatar

Spring 2013

Course: Principles of Thermodynamics

Responsibilities: Led recitation sessions to solve problems in thermodynamics

MENTORING EXPERIENCE

- Mentored three undergraduates who were awarded the *President's Undergraduate Research Award* to investigate n-type thermoelectric polymers (2015-2017)
 - Served as a senior capstone mentor for a 12th grade student working on printing conducting polymers on flexible substrates (2017)
 - Led a team of three high school students to the regional semi-finals in the *Siemens Competition* for demonstrating a novel radial thermoelectric generator (2015)
 - Taught semiconductor physics to a 7th grader who attained 2nd honors in the *GA Science Fair* (2014)
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LEADERSHIP EXPERIENCE

Co-President - Energy Club @ Georgia Tech

2015 - 2017

- Planned and executed the Energy Expo with 300 attendees from academia and industry
- Supervised and mentored a five-member team to plan Energy Chats
- Led the fundraising effort for corporate sponsorship and raised \$ 25,000

Membership Chair – Tau Beta Pi (Georgia Alpha Chapter)

2014 - 2015

- Planned the annual initiation banquet for eligible engineering honors students
- Mentored undergraduate students and hosted a workshop on time management

President - American Society of Mechanical Engineers (ASME-Qatar Chapter)

2011 - 2012

- Coordinated with companies for field trips and lecture series
 - Conducted engineering-related events and design competitions
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SERVICE AND OUTREACH

- Participated in outreach events to teach elementary school students about energy 2014 - 2018
 - Participated in service learning project with the *S.O.U.L Foundation* in Uganda, Africa 2012
 - Member of the *Reach Out to Asia* adult literacy program 2011 - 2012
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