Abhinav Malhotra

INFORMATION

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Github Repository
Google Scholar

RESEARCH INTERESTS

Transport Physics: Nanoscale energy transport, Transport in electrocatalysis.
Simulations: Multiscale modeling, Topologically optimized systems, Predictive design.
Data Science: Machine-learning accelerated computational methods.

EDUCATION

Georgia Institute of Technology, Atlanta

Ph.D., Chemical Engineering — Aug, 2019
M.S., Chemical Engineering — July, 2018

Indian Institute of Technology Roorkee

M.Tech., Hydrocarbon Engineering — July, 2013
B.Tech., Chemical Engineering — May, 2012

RESEARCH EXPERIENCE

Georgia Institute of Technology

Graduate Research Assistant — Aug, 2014 - Aug, 2019

Dissertation: "Exploring Thermal Transport in Nanostructured Semiconductors"
Advisor: Dr. Martin Maldovan

- Developed computationally efficient techniques based on fundamental theoretical principles to predict thermal transport properties of semiconductor nanostructures.
- Successfully applied Beckmann-Kirchhoff surface scattering to phonon-structure interactions.
- Identified and elucidated the phonon-coupling mechanism in layered nanomaterials.
- Collaborations: Michael Filler, Shannon Yee (Georgia Tech)

TEACHING EXPERIENCE

Teaching Assistant — Jan, 2015 - Dec, 2016

Assisted in teaching undergraduate and graduate level courses for the Chemical Engineering program. Responsibile for weekly recitations, grading exams, and homework assignments.

- CHBE-3210 Transport Phenomenon II, Spring 2015.
- CHBE-6100 Advanced Thermodynamics, Fall 2016.

Laboratory Instructor

Duties included maintaining lab safety, designing experiments to explain concepts of process control, interactive teaching during lab and grading lab reports.

- CHBE-4400 Process Control Lab, Fall 2015.

AWARDS AND HONORS

Travel Award, Machine Learning in Science and Engineering Symposium	2019
Travel Grant, College of Engineering, Georgia Tech	2018
Travel Grant, Student Government Association, Georgia Tech	2017
Exemplary Academic Achievement Award (4.0 GPA in graduate courses), Georgia Tech	2015
Ministry of Human Resource Development (Government of India) Masters Fellowship	2012-13
Dr. B.R. Varshney Award (top chemical engineering undergraduate), IIT Roorkee	2011
Imperial College India Foundation PhD Fellowship (awarded to 1 applicant/yr), *declined*	2014

Publications

(Total first author publications = 8, online at Google Scholar or `http://bit.ly/AMPapers`)

11. Malhotra, A., and Maldovan, M.; Phononic Pathways towards Rational Design of Nanowire Heat Conduction. [INVITED REVIEW] *Journal of Physics: Condensed Matter*, In Press, (2019).
10. Kothari, K., Malhotra, A., and Maldovan, M.; Cross-Plane Heat Conduction in III-V Semiconductor Superlattices. *Journal of Physics: Condensed Matter* 31, 345301 (2019).
9. Malhotra, A., and Maldovan, M.; Thermal Transport in Semiconductor Nanotubes. *International Journal of Heat and Mass Transfer* 130, 368, (2019).
8. Malhotra, A., Kothari, K., and Maldovan, M.; Cross-Plane Thermal Conduction in Superlattices: Impact of Multiple Length Scales on Phonon Transport. *Journal of Applied Physics* 125, 044304, (2019).
7. Malhotra, A., Kothari, K., and Maldovan, M.; Modulating Thermal Conduction via Phonon Spectral Coupling. *Journal of Applied Physics* 124, 124302, (2018).
6. Kothari, K., Malhotra, A., and Maldovan, M.; Unconventional Thermal Transport in Thin Film-on-Substrate Systems. *Journal of Physics D* 51, 365302, (2018).
5. Malhotra, A., Kothari, K., and Maldovan, M.; Enhancing Thermal Transport in Layered Nanomaterials. *Scientific Reports* 8, 1880, (2018).
4. Malhotra, A., Kothari, K., and Maldovan, M.; Spatial Manipulation of Thermal Flux in Nanoscale Films. *Nanoscale and Microscale Thermophysical Engineering* 21(3), 145, (2017).
3. Malhotra, A., and Maldovan, M.; Surface Scattering Controlled Heat Conduction in Semiconductor Thin Films. *Journal of Applied Physics* 120, 204305, (2016).
2. Malhotra, A., and Maldovan, M.; Impact of Phonon Surface Scattering on Thermal Energy Distribution of Si and SiGe Nanowires. *Scientific Reports* 6, 25818, (2016).
1. Kumar, S., Arya, D., Malhotra, A., Kumar, S. and Kumar, B.; Biodegradation of dual phenolic substrates in simulated wastewater by *Gliomastix indicus* MTCC 3869. *Journal of Environmental Chemical Engineering* 1, 865, (2013).

Oral Presentations

American Physical Society (APS) March Meeting, Boston, USA.	2019
American Institute of Chemical Engineers (AIChE) Annual Conference, Pittsburgh, USA.	2018
American Physical Society (APS) March Meeting, Los Angeles, USA.	2018
American Physical Society (APS) March Meeting, New Orleans, USA.	2018
Georgia Tech ChBE Annual Colloquium, Atlanta, USA.	2017
Materials Research Society (MRS) Fall Meeting, Boston, USA.	2017
Georgia Tech ChBE Graduate Symposium, Atlanta, USA.	2016
Materials Research Society (MRS) Fall Meeting, Boston, USA.	2015

Service

- *Reviewer*, President Undergraduate Research Award proposals at Georgia Tech. 2019
- *Elected Representative* to Georgia Tech Student Government. 2017
- *Treasurer*, Association of Chemical Engineering Graduate Students of Georgia Tech. 2016
- *Chair*, Hospitality Committee, ChBE Graduate Research Symposium at Georgia Tech. 2015

Scientific Memberships

American Institute of Chemical Engineers (AIChE); American Physical Society (APS); Materials Research Society (MRS)

Professional Experience

Jeevomics Pvt. Ltd., New Delhi, India

Research Engineer (Remote) Feb, 2014 - Jan, 2015

Created libraries of potential reaction kinetics and integrated them with in-house machine learning tools to help identify viable drugs for clients.

ITC Ltd., Haridwar, India

Assistant Manager June, 2013 - Jan, 2014

Managed the production lines of carton packaging unit, including machine scheduling, machine crewing and skill development, to achieve production targets exceeding $1.2M/yr.

Relevant Skills

- Languages: FORTRAN, Python, MATLAB, Unix shell scripting, some use of C++, MPI.
- Applications: COMSOL, LaTeX, some use of Mathematica, QuantumEspresso and OpenFOAM.
- Proficiency in Machine Learning Algorithms and Tools in Python and MATLAB.