# Abhinav Malhotra

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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**

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

**Indian Institute of Technology Roorkee**

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| 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.
- <u>Collaborations:</u> 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

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| 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. [UNDERGRADUATE RESEARCH] *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)

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| 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.