





# Abhinav Malhotra

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INFORMATION	Delaware Energy Institute 221 Academy Street, 250G University of Delaware Newark, DE 19716 USA	 +1 (404) 528-8789  E-mail: <a href="mailto:me@abhinavm.com">me @ abhinavm.com</a>  Github: <a href="#">ABMalhotra</a>  Scholar: <a href="https://bit.ly/AMPapers">bit.ly/AMPapers</a>
EDUCATION	<b>Georgia Institute of Technology (Georgia Tech), Atlanta</b> Ph.D., Chemical Engineering with Minor in Computational Science M.S., Chemical Engineering <b>Indian Institute of Technology (IIT), Roorkee</b> M.Tech., Hydrocarbon Engineering B.Tech., Chemical Engineering	Aug, 2019 July, 2018 June, 2013 May, 2012
RESEARCH EXPERIENCE	<b>Delaware Energy Institute, University of Delaware</b> <i>Post-Doctoral Researcher</i> Research Theme: “Harnessing Microwave Photons for Chemical Transformations” <u>Advisor:</u> Dr. Dionisios G. Vlachos <ul style="list-style-type: none"><li>• Creating multiphysics <i>computational models</i> combining electromagnetics, thermal and momentum transport and reaction engineering to develop sustainable manufacturing.</li><li>• Developed process models to understand experimentally reported improved selectivity of alkane dehydrogenation under microwave heating.</li></ul> <b>Georgia Institute of Technology</b> <i>Graduate Research Assistant</i> Dissertation: “Exploring Thermal Transport in Semiconductor Nanostructures” <u>Advisor:</u> Dr. Martin Maldovan <ul style="list-style-type: none"><li>• Developed simulation toolset to predict thermal properties of different nanostructure geometries.</li><li>• Implemented fundamental phonon physics numerically to develop space-discrete models to evaluate role of morphologies and surfaces in heat conduction.</li><li>• Authored 10 peer reviewed articles (8 first-authored) in international scientific journals.</li><li>• Developed a multi-year research collaboration between three research groups on campus.</li></ul>	Sep, 2019 –          Aug, 2014 - Aug, 2019
PROFESSIONAL EXPERIENCE	ITC Ltd., Haridwar, India <i>Assistant Manager</i> Managed the production lines of carton packaging unit, including inventory, scheduling, crewing and skill development of >30 employees, to achieve production targets of \$1.2M/yr.	June, 2013 - Jan, 2014
SERVICE & LEADERSHIP	<i>Reviewer Panel</i> , President Undergraduate Research Award proposals at Georgia Tech. <i>Elected Representative</i> of Graduate Students to Georgia Tech Student Government. <i>Treasurer</i> , Association of Chemical Engineering Graduate Students of Georgia Tech. <i>Chair</i> , Hospitality Committee, ChBE Graduate Research Symposium at Georgia Tech. <i>Co-Convenor Events</i> , Co-led a team of >300 volunteers at IIT Roorkee.	2019 2017 2016 2015 2013

AWARDS AND HONORS	Travel Award, Machine Learning in Science and Engineering Symposium, Atlanta	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 core courses), Georgia Tech	2015
	Ministry of Human Resources Development Fellowship (100% funded masters), India	2012-13
	Dr. B.R. Varshney Award (for top chemical engineering undergraduate), IIT Roorkee	2011
	Imperial College India Foundation Fellowship ( $\sim 1/\text{yr}$ )*	2014

\* awarded – respectfully declined

PEER-REVIEWED PUBLICATIONS	† Co-first authored. Citations online at <a href="https://scholar.google.com/citations?hl=en&amp;user=malhotraa">Google Scholar</a> or <a href="http://bit.ly/AMPapers">http://bit.ly/AMPapers</a> .	
	14. † Tütüncüoğlu, G., Malhotra, A., Kommandur, S., Yee, S., Maldovan, M., and Filler, M.; Boundary Scattering Dominates Thermal Conductivity in Diameter-modulated Si Nanowires. [IN PREPARATION]	
	13. † Chen, W., Malhotra, A., and Vlachos, D.G.; A Reactor Configuration for Stable Microwave Heating. [IN PREPARATION]	
	12. Malhotra, A., Chen, W., Goyal H., Plaza-Gonzalez, P., Catala-Civera, J., Santamaria, J., and Vlachos, D.G.; Temperature Homogeneity under Selective and Localized Microwave Heating in Structured Flow Reactors. [TO BE SUBMITTED]	
	11. Malhotra, A., and Maldovan, M.; Phononic Pathways towards Rational Design of Nanowire Heat Conduction. [INVITED REVIEW] <i>Nanotechnology</i> 30, 372002, (2019).	
	10. Kothari, K., Malhotra, A., and Maldovan, M.; Cross-Plane Heat Conduction in III-V Semiconductor Superlattices. <i>Journal of Physics: Condensed Matter</i> 31, 345301, (2019).	
	9. Malhotra, A., and Maldovan, M.; Thermal Transport in Semiconductor Nanotubes. <i>International Journal of Heat and Mass Transfer</i> 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. <i>Journal of Applied Physics</i> 125, 044304, (2019).	
	7. Malhotra, A., Kothari, K., and Maldovan, M.; Modulating Thermal Conduction via Phonon Spectral Coupling. <i>Journal of Applied Physics</i> 124, 124302, (2018).	
	6. Kothari, K., Malhotra, A., and Maldovan, M.; Unconventional Thermal Transport in Thin Film-on-Substrate Systems. <i>Journal of Physics D</i> 51, 365302, (2018).	
	5. Malhotra, A., Kothari, K., and Maldovan, M.; Enhancing Thermal Transport in Layered Nanomaterials. <i>Scientific Reports</i> 8, 1880, (2018).	
	4. Malhotra, A., Kothari, K., and Maldovan, M.; Spatial Manipulation of Thermal Flux in Nanoscale Films. <i>Nanoscale and Microscale Thermophysical Engineering</i> 21(3), 145, (2017).	
	3. Malhotra, A., and Maldovan, M.; Surface Scattering Controlled Heat Conduction in Semiconductor Thin Films. <i>Journal of Applied Physics</i> 120, 204305, (2016).	
	2. Malhotra, A., and Maldovan, M.; Impact of Phonon Surface Scattering on Thermal Energy Distribution of Si and SiGe Nanowires. <i>Scientific Reports</i> 6, 25818, (2016).	
	1. Kumar, S., Arya, D., Malhotra, A., Kumar, S. and Kumar, B.; Biodegradation of dual phenolic substrates in simulated wastewater by <i>Gliomastix indicus</i> MTCC 3869. <i>Journal of Environmental Chemical Engineering</i> 1, 865, (2013).	
OTHER PUBLICATIONS	2. Understanding Indian Premier League with Data Science, <a href="https://medium.com/@malhotraa/understanding-indian-premier-league-with-data-science-1e1e1e1e1e1e">medium.com</a> (Feb 2020).	
	1. Entering the Matrix: ELI5 Introduction to Eigenvalues and Eigenvectors, <a href="https://medium.com/@malhotraa/entering-the-matrix-eli5-introduction-to-eigenvalues-and-eigenvectors-1e1e1e1e1e1e">medium.com</a> (June 2019).	

ORAL PRESENTATIONS	‡ Conducted online.	
	American Institute of Chemical Engineers (AICHE) Annual Conference , San Francisco, USA.‡	2020
	Faculty Seminar, Indian Institute of Technology, Ropar, India.‡	2020
	Sabarmati Seminar, Indian Institute of Technology, Gandhinagar, India. [INVITED]	2019
	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.	2017
	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
SCIENTIFIC MEMBERSHIPS	American Institute of Chemical Engineers (AICHE); American Physical Society (APS); Materials Research Society (MRS)	
OTHER PROJECTS	<i>Master's Project</i>	
	“Oxidative reforming of methane: Thermodynamic and Modeling Study”	
	<ul style="list-style-type: none"> <li>Modeled the thermodynamics of methane to syngas conversion in MATLAB to narrow down the feasible state-space.</li> <li>Solved PDEs for a Ni-based tubular reactor in the feasible state-space to identify optimal operating conditions.</li> </ul>	
	<i>Course: Data Analytics for Chemical Engineers</i>	
	<ul style="list-style-type: none"> <li>Developed supervised machine-learning models to predict bandgaps and formation energies of transparent semiconductors using a DFT generated material database.</li> </ul>	
	<i>Course: Machine Learning for Trading</i>	
	<ul style="list-style-type: none"> <li>Trained a machine-learning based stock trading algorithm on time-series data to optimize performance in a simulated trading scenario.</li> </ul>	
	<i>Course: Artificial Intelligence Systems</i>	
	<ul style="list-style-type: none"> <li>Implemented A* search, Dynamic Bayes Nets and Q-learning in Python to improve the performance of a Pacman AI agent.</li> </ul>	
	<i>Course: Computations in Material Science</i>	
	<ul style="list-style-type: none"> <li>DFT calculations using VASP package to calculate electronic bandgap in graphene with molecules adsorbed.</li> </ul>	
RELEVANT SKILLS	<p>Languages: FORTRAN, Python, MATLAB, Unix shell scripting, some use of C++, MPI.</p> <p>Applications: COMSOL, L<sup>A</sup>T<sub>E</sub>X, some use of Mathematica, QuantumEspresso and OpenFOAM.</p> <p>Proficiency in Machine Learning Algorithms and Tools in Python and MATLAB.</p>	

[Last updated: November 2, 2020]