

Steven Lanham

Phone: (801) 678-4509
Email: sjlanham@umich.edu

2234 EECS Building
1301 Beal Ave.
Ann Arbor, MI, 48109

Research Interests

I am interested in code development and using computing to model complex systems. I have expertise in developing and implementing high performance models from first-principles for interacting physical and chemical systems - from computational fluid dynamics, chemical kinetics, and basic electromagnetics. My additional interests include data-driven modeling, machine learning, algorithm development, code optimization, and particle based methods. I have experience using Fortran, C++, Matlab, Python, Visual Basic, R statistical software, and COMSOL.

Education

2016-Present	Ph.D. Candidate in Chemical Engineering GPA: 3.975/4.00 Advisor: Professor Mark J. Kushner <i>Simulation and modeling of low temperature plasma for material processing.</i>	University of Michigan
2015-2019	M.Sc.Eng. Chemical Engineering GPA: 3.975/4.00	University of Michigan
2010-2015	B.Sc. Chemical Engineering GPA: 3.96/4.00 <i>Heritage Scholarship (Full tuition), Outstanding Junior and Outstanding Senior Awards in Chemical Engineering</i>	Brigham Young University

Relevant Experience

2015-Present	Graduate Research Assistant Computational Plasma Science and Engineering Group Advisor: Professor Mark J. Kushner <i>Modeling low temperature plasmas using hybrid techniques to capture physics. Algorithm development for nanoparticle growth in plasmas. Pulsed power to control plasma processes.</i>	University of Michigan
Fall 2019	Graduate Student Instructor Statistical Mechanics and Thermodynamics Advisor: Professor Robert Ziff <i>Student instruction for a graduate level introductory course in statistical mechanics, deriving useful quantities from statistical ensembles.</i>	Dept of Chem Eng, U of M
Winter 2019	Course grader Data Science for Engineers Advisor: Professor Bryan Goldsmith <i>Basic data science techniques at a graduate level, from regression analysis to machine learning.</i>	Dept of Chem Eng, U of M

- 2014-2015 **Undergraduate Research Assistant** **Brigham Young University**
 Catalysis Lab Group
Advisor: Professor William Hecker
Experiments and modeling of the Fischer-Tropsch catalytic process, used to create hydrocarbons from precursor CO and H₂.
- 2014-2015 **Undergraduate Research Assistant** **Brigham Young University**
 Computational Reactive Flows Research Group
Advisor: Professor David Lignell
Data driven modeling for initializing a three-dimensional turbulence model from one-dimensional data.

Publications

Citations: 39, h-index: 3, i10-index: 2

 ORCID: 0000-0001-9715-4134

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| 2020 | C. Qu, S. J. Lanham , S. C. Shannon, S. K. Nam, and M. J. Kushner, 'Power Matching to Pulsed Inductively Coupled Plasmas', <i>J. Appl. Phys.</i> 127 , 133302 (2020).
doi: 10.1063/5.0002522 |
| 2019 | J. Han, P. Pribyl, W. Gekelman, A. Paterson, S. J. Lanham , C. Qu and M. J. Kushner, 'Three-Dimensional Measurements of Plasma Parameters in an Inductively Coupled Plasma Processing Chamber', <i>Physics of Plasmas</i> . 26 , 103503 (2019).
doi: 10.1063/1.5115415 |
| 2018 | C. M. Huard, S. J. Lanham , and M. J. Kushner, 'Consequences of Atomic Layer Etching on Wafer Scale Uniformity in Inductively Coupled Plasma', <i>J. Phys. D.</i> 51 , 155201 (2018).
doi: 10.1088/1361-6463/aab322 |
| 2017 | S. J. Lanham and M. J. Kushner, 'Effects of a Chirped Bias Voltage on Ion Energy Distributions in Inductively Coupled Plasma Reactors', <i>J. Appl. Phys.</i> 122 , 083301 (2017). [Featured on cover of v122, issue 8]
doi: 10.1063/1.4993785 |
| 2016 | K. Keyvanloo, S. J. Lanham , and W. C. Hecker, 'Kinetics of Fischer-Tropsch synthesis on supported cobalt: Effect of Temperature on CO and H ₂ Partial Pressure Dependencies', <i>Catal. Today</i> 270 , 9-18 (2016).
doi: 10.1016/j.cattod.2016.03.019 |

Contributed Presentations

2020	S. J. Lanham , J. Polito, X. Shi, P. Elvati, A. Violi, and M. J. Kushner. ‘Controlling Composition of Particles Grown in Dusty Plasmas’, <i>73rd Gaseous Electronics Conference</i> , Virtual conference, October 2020.
2019	S. J. Lanham , J. Polito, H. Andaraarachchi, Z. Li, Z. Xiong, U. Kortshagen and M. J. Kushner. ‘Kinetic Modeling of Nanoparticle Growth in Low Pressure Dusty Plasmas’, <i>72nd Gaseous Electronics Conference</i> , College Station, TX, October 2019.
2017	S. J. Lanham and Mark J. Kushner. ‘Investigating Mode Transitions in Pulsed Inductively Coupled Plasmas’, <i>64th American Vacuum Society International Symposium</i> , Tampa, FL, November 2017. S. J. Lanham and Mark J. Kushner. ‘Non-idealities in Pulsed Inductively Coupled Plasma Reactors’, <i>23rd International Symposium on Plasma Chemistry</i> , Montreal, Canada, July 2017.
2016	S. J. Lanham and Mark J. Kushner. ‘Customizing ion energy distributions in pulsed plasmas with chirped bias power’, <i>63rd American Vacuum Society International Symposium</i> , Nashville, TN, November 2016. S. J. Lanham and Mark J. Kushner. ‘Customized Bias Frequency Waveforms to Control Ion Energy Distributions in ICP Reactors’, <i>Gordon Research Conference on Plasma Processing Science</i> , Plymouth, New Hampshire, July 2016. S. J. Lanham and Mark J. Kushner. ‘“Chirped Pulsed Bias-Power in Inductively Coupled Plasma”, <i>43rd IEEE International Conference on Plasma Science</i> , Banff, Alberta, Canada, June 2016.

Awards and Professional Societies

Michigan Institute of Plasma Science and Engineering Fellowship 2020

Outstanding Senior Award - BYU Chemical Engineering

Outstanding Junior Award - BYU Chemical Engineering

Tau Beta Pi Honor Society

Phi Kappa Phi Academic Honor Society

Heritage Scholarship - Brigham Young University

Eagle Scout through Boy Scouts of America