

Zlatan Akšamija, Associate Professor

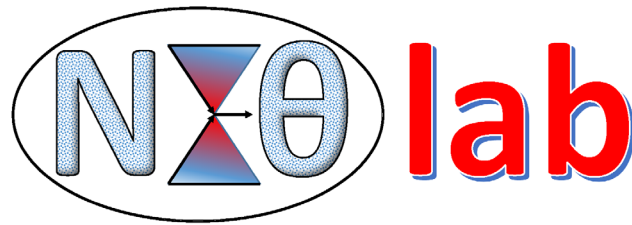
NanoEnergy & Thermophysics (NEΘ) Lab

University of Massachusetts Amherst
201B Marcus Hall, 100 Natural Resources
Amherst, MA 01003-9303

tel. (413) 545-4694

e-mail: zlatana@engin.umass.edu

<http://ece.umass.edu/faculty/zlatan-aksamija>



☐ **Education**

-
- 12/05-10/09 **Ph.D. in Electrical Engineering**, University of Illinois at Urbana-Champaign
w/ Computational Science and Engineering (CSE) Graduate Option
- 08/03-12/05 **M.S. in Electrical Engineering**, University of Illinois at Urbana-Champaign
- 08/99-05/03 **B.S. in Computer Engineering**, University of Illinois at Urbana-Champaign
Highest Honors (Summa Cum Laude), Minor in Mathematics

☐ **Professional Appointments**

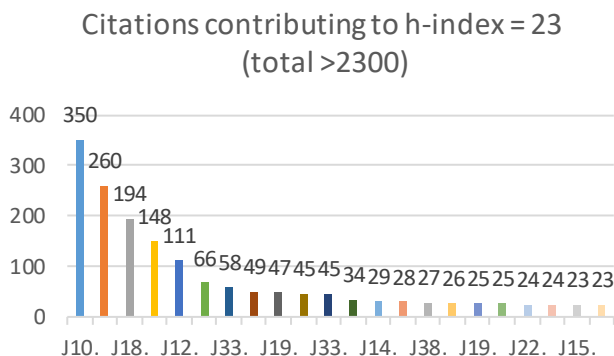
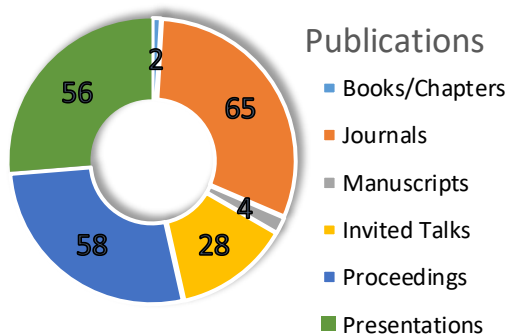
-
- 2019-present **Associate Professor**
- 2013-2019 **Assistant Professor, Department of Electrical and Computer Engineering**
NanoEnergy & Thermophysics (NEΘ) Lab, University of Massachusetts-Amherst
Media: https://eurekalert.org/pub_releases/2019-07/uoma-htc071019.php
<http://www.umass.edu/newsoffice/article/zlatan-aksamija-and-graduate-students>
<https://engineering.umass.edu/news/multi-university-team-receives-2-million-nsf-grant>
<https://www.mghpcc.org/exploring-thermoelectric-behavior-at-the-nanoscale/>
- 2011-2013 **NSF Transformative Computational Science using CyberInfrastructure (CITraCS) Postdoctoral Fellowship**, Project: "*Computational Nanoscience for Energy-Efficient Electronic and Thermoelectric Materials and Devices*"
Mentor: Irena Knezevic, University of Wisconsin-Madison
- 2009-2011 **Computing Innovation Postdoctoral Fellowship (CIFellow), Computing Research Association (CRA)**, Project: "*Nanostructured Semiconductor Thermoelectrics*"
Mentor: Irena Knezevic, University of Wisconsin-Madison
Media: <http://perspective.engr.wisc.edu/2011/10/nanoscale-silicon-a-really-cool-hot-spot/>
- 2005-2009 **Department of Energy Computational Science Graduate Fellow (CSGF)**
ECE Department, University of Illinois at Urbana/Champaign
Dissertation: "*Simulation of Thermal Effects in Semiconductor Materials and Devices*",
Advisor: Umberto Ravaioli, Media: <http://www.ece.illinois.edu/mediacenter/article.asp?id=386>
- Spring '09 **DOE CSGF Practicum**, Argonne National Lab (MCS), Los Alamos National Lab, T-7
Project: "*Parallel Simulation of Carbon Nanotubes*", Supervisor: P. Fischer
- Summer '07 Project: "*Wavelets in Multigrid Algorithms*", Supervisor: B. Philip
- 2004-2005 **Research Assistant**, ECE@University of Illinois at Urbana-Champaign
Thesis: "*Monte Carlo simulation of Joule heating in nanoscale silicon MOSFETs*"
Advisor: Umberto Ravaioli, Computational Electronics, Beckman Institute

☐ **Honors, Fellowships, and Awards**

-
- 2019 Senior Member of the IEEE
- 2017 Instructional Innovation Fellow, INNOVATE@ UMass Amherst
- 2016 Lilly Fellowship for Teaching Excellence, University of Massachusetts Amherst
- 2014 IEEE Nano Conference Best Paper award
- 2012 Postdoctoral Travel Award, AVS Meeting, Electronic Materials & Processing Division
- 2011-2014 CI TraCS Postdoctoral Fellowship, National Science Foundation
- 2009-2011 Computing Innovation Fellowship (CIFellows), Computing Research Association
- 2008 Gregory Stillman Semiconductor Graduate Research Award, University of Illinois
- 2007 First Place Outstanding Paper Award, IEEE Electro/Information Conference
- 1999-2005 James Honors Scholar, George M. Pullman Scholar, Micron Technology Fellowship

☐ **Research Interests:** Computational Nanoscience, Transport in Semiconductor Nanostructures

- R1. **Nanoscale heat transfer:** phonon transport in nanostructures, thermal rectification
 R2. **2D materials:** Graphene, TMDC heterostructures for device and energy applications
 R3. **Thermoelectrics:** semiconductors and organic materials for energy harvesting and cooling
 R5. **Electro-thermal Simulation:** electron-phonon interaction/dissipation in nanoelectronics
 R6. **High-Performance/Parallel computing:** Numerical PDEs, GPGPU/MPI implementations



☐ **Journal Publications** (underline denotes my advisees, * denotes equal contribution)

- J65. M. Upadhyaya, M. Lu-Diaz, S. Samanta, M. Abdullah, K. Dusoe, K. R. Kittilstved, D. Venkataraman, Z. Aksamija, "Raising dielectric permittivity mitigates dopant-induced disorder in conjugated polymers," submitted to **Advanced Science** (2021)
- J64. A. Kommini and Z. Aksamija, "High Thermoelectric Power Factor Near Magic Angle in Twisted Bilayer Graphene," submitted to **Nano Letters** (2021)
- J63. A. K. Majee and Z. Aksamija, "Electronic Transport Across Extended Grain Boundaries in Graphene," submitted to **Nano Express** (2021)
- J62. C. J. Foss and Z. Aksamija, "Thermal boundary conductance of monolayer beyond-graphene two dimensional materials on SiO₂ and GaN," submitted to **Nanotechnology**, Special Issue on 2D materials for microelectronic devices and nanoscale heat dissipation (2021)
- J61. C. J. Foss and Z. Aksamija, "Effects of Alloying on In-plane and Through-plane Phonon Transport in Transition Metal Dichalcogenide Monolayers," **Physical Review Materials**, vol. 4, 124006 (2020). <https://doi.org/10.1103/PhysRevMaterials.4.124006>
- J60. A. Kommini and Z. Aksamija, "Anisotropic Thermoelectric Power Factor of 2D Materials with Periodic Potential Barriers: The Wigner-Rode Formalism," **Physical Review Applied**, vol. 14, 034037 (2020). <https://doi.org/10.1103/PhysRevApplied.14.034037>
- J59. A. K. Majee, C. J. Foss, and Z. Aksamija, "Electrical and electro-thermal properties of few-layered 2D devices," **Journal of Computational Electronics** (2020). <https://doi.org/10.1007/s10825-020-01579-2>
- J58. A. K. Majee, Z. Hemmat, C. J. Foss, A. Salehi-Khojin, and Z. Aksamija, "Current Rerouting Improves Heat Removal in Few Layer WSe₂ Devices," **ACS Applied Materials & Interfaces**, vol. 12, 14323-14330 (2020). <https://doi.org/10.1021/acsami.9b22039>
- J57. A. Kommini and Z. Aksamija, "Materials selection rules for optimum power factor in 2-dimensional thermoelectrics," **Journal of Physics: Materials**, vol. 3, 015005 (2019). <https://doi.org/10.1088/2515-7639/ab4600>
- J56. *C. J. Boyle, *M. Upadhyaya, P. Wang, L. Renna, Lj. Korugic-Karasz, M. Barnes, Z. Aksamija, D. Venkataraman, "Tuning charge transport dynamics via clustering of doping in organic semiconductor thin films," **Nature Communications**, vol. 10, 2827 (2019). <https://doi.org/10.1038/s41467-019-10567-5>
- J55. (invited) A. K. Majee, A. Kommini, and Z. Aksamija, "Electronic and thermoelectric transport properties of 2D and 3D semiconductor heterostructures," **Annalen der Physik (Berlin)**, 1800510 (2019). <https://doi.org/10.1002/andp.201800510>

- J54. C. Henkel, R. Zierold, A. Kommini, C. Thomason, Z. Aksamija, and R. H. Blick, "Resonant Tunneling Induced Enhancement of Electron Field Emission by Ultra-Thin Coatings," **Scientific Reports**, vol. 9, 6840 (2019). <https://doi.org/10.1038/s41598-019-43149-y>
- J53. C. J. Foss and Z. Aksamija, "Quantifying thermal boundary conductance of 2D-3D interfaces", **2D Materials**, vol. 6, 025019 (2019). <https://doi.org/10.1088/2053-1583/ab04bf>
- J52. M. Upadhyaya, C. J. Boyle, D. Venkataraman, and Z. Aksamija, "Thermoelectric Properties of Disordered Organic Materials," **Scientific Reports**, vol. 9, 5820 (2019). <https://doi.org/10.1038/s41598-019-42265-z>
- **Recognition:** top 100 in Materials Science: <https://www.nature.com/collections/ecjehiebic>
- J51. A. Aksamija, Z. Aksamija, D. Brown, C. Counihan, M. Upadhyaya, "Thermoelectric Materials in Facade Systems", **Frontiers in Energy Research**, vol. 7, 6 (2019). <https://doi.org/10.3389/fenrg.2019.00006>
- J50. **(invited)** M. Mohamed, K. Raleva, D. Vasilevska, U. Ravaioli, and Z. Aksamija, "Phonon dynamics and heat transfer in semiconductor devices", **IEEE Nanotechnology Magazine**, special August issue on "Semiconductor Nanotechnology Shaping Our Century," (2019). <https://doi.org/10.1109/MNANO.2019.2916114>
- J49. P. Yasaei, Z. Hemmat, C. J. Foss, J. Li, L. Hong, A. Behranginia, L. Majidi, R. F. Klie, M. Barsoum, Z. Aksamija, A. Salehi-Khojin, "Enhanced Thermal Boundary Conductance in Few-Layer Ti_3C_2 MXene with Encapsulation", **Advanced Materials**, 1801629 (2018). <https://doi.org/10.1002/adma.201801629>
- J48. A. K. Majee and Z. Aksamija, "Dynamical Thermal Conductivity of Graphene in the Hydrodynamic Regime", **Physical Review B**, vol. 98, 024303 (2018). <https://doi.org/10.1103/PhysRevB.98.024303>
- J47. A. Behranginia, Z. Hemmat, A. K. Majee, C. J. Foss, P. Yasaei, Z. Aksamija, and A. Salehi-Khojin, "Power Dissipation of WSe_2 Field Effect Transistors Probed by Low-Frequency Raman Thermometry", **ACS Applied Materials & Interfaces**, vol. 10, 24892–24898 (2018). <https://doi.org/10.1021/acsami.8b04724>
- J46. A. Kommini and Z. Aksamija, "Thermoelectric Properties of Periodic Quantum Structures in the Wigner-Rode Formalism", **Journal of Physics: Condensed Matter**, vol. 30, 044004 (2017). <https://doi.org/10.1088/1361-648X/aaa110>
- J45. A. K. Majee, C. J. Foss, and Z. Aksamija, "Impact of Mismatch Angle on the Conductance of Grain Boundaries and Interfaces in Graphene and MoS_2 ", **Scientific Reports** (Nature), vol. 7, 16597 (2017). <https://doi.org/10.1038/s41598-017-16744-0>
- J44. P. Yasaei, C. J. Foss, K. Karis, A. Behranginia, A. El-Ghandour, A. Fathizadeh, A. K. Majee, C. Foster, F. Khalili-Araghi, Z. Aksamija, A. Salehi-Khojin, "Interfacial Thermal Transport in Monolayer Graphene- and MoS_2 -Based Devices", **Advanced Materials Interfaces**, vol. 4, 1700334 (2017). <https://doi.org/10.1002/admi.201700334>
- J43. G. C. Correa, C. J. Foss and Z. Aksamija, "Interface Thermal Conductance Between van der Waals Monolayers and Amorphous Substrates", **Nanotechnology**, vol. 28, 135402 (2017). <https://doi.org/10.1088/1361-6528/aa5e3d>
- **Paper recognition:** selected for Highlights of 2017 in *Energy at the Nanoscale* <http://iopscience.iop.org/journal/0957-4484/page/Highlights%202017>
- J42. A. Behranginia, P. Yasaei, A. K. Majee, V. K. Sangwan, F. Long, C. J. Foss, T. Foroozan, S. Fuladi, M. R. Hantehzadeh, R. Shahbazian-Yasar, M. C. Hersam, Z. Aksamija, A. Salehi-Khojin, "Direct-Grown Graphene and Molybdenum Disulfide Lateral Heterostructures for Highly-Packed All-Two Dimensional Electronic Circuitry", **Small**, vol. 13, 1604301 (2017). <https://dx.doi.org/10.1002/sml.201604301>
- J41. H. Kim, J. Park, Z. Aksamija, M. Arbulu, and R. H. Blick, "Ultra-nanocrystalline diamond membranes for detection of high-mass proteins", **Physical Review Applied**, vol. 6, 064031 (2016). <https://doi.org/10.1103/PhysRevApplied.6.064031>
- J40. C. J. Foss and Z. Aksamija, "Strain Engineering of the Lattice Thermal Transport in Ultrathin Si and Ge Nanomembranes", **Journal of Applied Physics**, vol. 120, 225104 (2016). <http://dx.doi.org/10.1063/1.4971269>

- J39. M. Upadhyaya, Z. Aksamija, “Non-diffusive Lattice Thermal Transport in Si-Ge Alloy Nanowires”, **Physical Review B**, vol. 94, 174303 (2016). <http://dx.doi.org/10.1103/PhysRevB.94.174303>
- J38. S. N. Khatami and Z. Aksamija, “Lattice Thermal Transport in Binary Si-Sn, Ge-Sn and Ternary Si-Ge-Sn Group IV Alloys”, **Physical Review Applied**, vol. 6, 014015 (2016). <http://dx.doi.org/10.1103/PhysRevApplied.6.014015>
- J37. A. K. Majee and Z. Aksamija, “Length Divergence of the Lattice Thermal Conductivity in Suspended Graphene Ribbons”, **Physical Review B**, vol. 93, 235423 (2016). <http://dx.doi.org/10.1103/PhysRevB.93.235423>
- J36. A. Kommini, Z. Aksamija, “Low-temperature Enhancement of the Thermoelectric Seebeck Coefficient in Gated 2D Semiconductor Nanomembranes”, **Journal of Computational Electronics**, vol. 15, 27-33 (special issue on Electro-thermal and Thermoelectric Phenomena, 2016). <http://dx.doi.org/10.1007/s10825-015-0782-1>
- J35. D. P. Schroeder, Z. Aksamija, A. Rath, P. M. Voyles, M. G. Lagally, and M. A. Eriksson, “Thermal Resistance of Stacked Silicon Nanomembrane Interfaces”, **Physical Review Letters**, vol. 115, 256101(2015). <http://dx.doi.org/10.1103/PhysRevLett.115.256101>
- J34. M. Mohamed, Z. Aksamija, and U. Ravaioli, “Coupled Electron and Thermal Transport Simulation of Self-heating Effects in Junctionless MOSFETs”, **Journal of Physics: Conference Series**, vol. 647, 012026 (2015)
- J33. P. Yasaei, *A. K. Majee, *A. Fathizadeh, *R. Hantizadeh, D. Estrada, C. Foster, Z. Aksamija, F. Khalili, A. Salehi, “Bimodal Phonon Scattering in Graphene Grain Boundaries”, **Nano Letters**, vol. 15, 4532, (2015). <http://dx.doi.org/10.1021/acs.nanolett.5b01100>
 • Press: <http://www.sciencedaily.com/releases/2015/06/150616190726.htm>
- J32. L. N. Maurer, Z. Aksamija, and I. Knezevic, “Phonon Transport in Nanostructures with Rough Correlated Boundaries”, **Applied Physics Letters**, vol. 106, 133108 (2015) <http://dx.doi.org/10.1063/1.4916962>
- J31. M. Upadhyaya, N. S. Khatami, and Z. Aksamija, “Engineering Thermal Transport in SiGe-based Nanostructures for Thermoelectric Applications”, **Journal of Materials Research (special issue on Materials for Thermoelectrics II)**, vol. 30, pp. 2649 (2015). <http://dx.doi.org/10.1557/jmr.2015.202>
- J30. Z. Aksamija, “Lattice Thermal Transport in Si-based Nanocomposites for Thermoelectric Applications”, **Journal of Electronic Materials**, vol. 44, 1644 (2015). <http://dx.doi.org/10.1007/s11664-014-3505-7>
- J29. S. Mei, L. N. Maurer, Z. Aksamija, and I. Knezevic, “Phonon Transport in Micron-sized graphene nanoribbons based on full-dispersion Monte Carlo simulation”, **Journal of Applied Physics**, vol. 116, 164307 (2014). <http://dx.doi.org/10.1063/1.4899235>
- J28. K.-H. Park, Z. Aksamija, M. Mohamed, and U. Ravaioli, “Phonon Scattering due to van der Waals Forces in the Lattice Thermal Conductivity of Bi₂Te₃ Thin Films”, **Journal of Applied Physics**, vol. 117, 015103 (2014). <http://dx.doi.org/10.1063/1.4905294>
- J27. Z. Aksamija and I. Knezevic, “Thermal Transport in Large-area Polycrystalline Graphene”, **Physical Review B**, vol. 90, 035419 (2014). <http://dx.doi.org/10.1103/PhysRevB.90.035419>
- J26. M. Mohamed, Z. Aksamija, W. Vitale, F. Hassan, and U. Ravaioli, “3D Self-Consistent Coupled Electrothermal Study of Self-Heating in SOI Multigate Devices”, **IEEE Transactions on Electron Devices**, vol. 61, 976 (2014). <http://dx.doi.org/10.1109/TED.2014.2306422>

Prior to joining UMass

- J25. Z. Aksamija and I. Knezevic, “Thermal Conductivity of Si_{1-x}Ge_x/Si_{1-y}Ge_y Superlattices: Competition Between Interfacial and Internal Scattering”, **Physical Review B** 88, 155315 (2013). <http://dx.doi.org/10.1103/PhysRevB.88.155318>
- J24. J. Park, Z. Aksamija, and R. Blick, “Phonon Assisted Field Emission in Silicon Nanomembranes for Time-of-flight Mass Spectroscopy of Proteins”, **Nano Letters**, vol. 13, 2698 (2013). <http://dx.doi.org/10.1021/nl400873m>

- J23. M.-H. Bae, Z. Li, Z. Aksamija, P. Martin, F. Xiong, Z.-Y. Ong, I. Knezevic, and E. Pop, "Ballistic to Diffusive Crossover of Heat Flow in Graphene Ribbons", **Nature Communications**, vol. 4, 1734 (2013). <http://dx.doi.org/10.1038/ncomms2755>
- J22. W. Peng, Z. Aksamija, S. A. Scott, J. J. Endres, D. E. Savage, I. Knezevic, M. A. Eriksson, and M. G. Lagally, "Probing Semiconductor Surface Electronic Structure with Charge Transport in Nanomembranes", **Nature Communications**, vol. 4, 1339 (2013). <http://dx.doi.org/10.1038/ncomms2350>
- J21. Z. Aksamija and I. Knezevic, "Thermal Transport in Graphene Nanoribbons on SiO₂", **Physical Review B**, vol. 86, 165426 (2012). <http://dx.doi.org/10.1103/PhysRevB.86.165426>
- J20. Y. Shi, Z. Aksamija, and I. Knezevic, "Self-Consistent Thermal Simulation of GaAs/Al_{0.45}Ga_{0.55}As Quantum Cascade Lasers", **Journal of Computational Electronics**, vol. 11, 144 (2012).
- J19. C. Ni, Z. Aksamija, J. Y. Murthy, and U. Ravaioli, "Coupled Electro-Thermal Simulation of MOSFETs", **Journal of Computational Electronics**, vol. 11, 93 (2012).
- J18. Z. Aksamija and I. Knezevic, "Lattice Thermal Conductivity of Graphene Nanoribbons: Anisotropy and Edge Roughness Scattering", **Applied Physics Letters**, vol. 98, 141919 (2011). <http://dx.doi.org/10.1063/1.3569721>
- reprinted in *Virtual Journal of Nanoscale Science & Technology (VJNano)*, April 25, 2011
- J17. Z. Aksamija and I. Knezevic, "Anisotropy and Edge Roughness Scattering in the Lattice Thermal Conductivity of Graphene Nanoribbons", **ECS Transactions**, vol. 35, 195 (2011).
- J16. Z. Aksamija and I. Knezevic, "Thermoelectric Properties of Silicon-On-Insulator Nanostructures", **ECS Transactions**, vol. 35 (5), 267 (2011).
- J15. H. J. Ryu, Z. Aksamija, D. M. Paskiewicz, S. A. Scott, M. G. Lagally, I. Knezevic, and M. A. Eriksson, "Quantitative Determination of Contributions to the Thermoelectric Power Factor in Si Nanostructures", **Physical Review Letters**, vol. 105, 256601 (2010). <http://dx.doi.org/10.1103/PhysRevLett.105.256601>
- J14. Z. Aksamija and I. Knezevic, "Thermoelectric Properties of Silicon Nanostructures", **Journal of Computational Electronics**, vol. 9, pp. 173-179 (2010). <https://doi.org/10.1007/s10825-010-0339-2>
- J13. Z. Aksamija and I. Knezevic, "Anisotropy and Boundary Scattering in the Lattice Thermal Conductivity of Ultrathin Silicon Nanomembranes", **Physical Review B**, vol. 82, 045319 (2010). <http://dx.doi.org/10.1103/PhysRevB.82.045319>
- **Paper recognition:** *Virtual Journal of Nanoscale Science & Technology*, August 9, 2010.
- J12. P. Martin, Z. Aksamija, E. Pop, and U. Ravaioli, "Prediction of Reduced Thermal Conductivity in Nano-Engineered Rough Ge and GaAs Nanowires," **Nano Letters**, vol. 10, 1120 (2010). <http://dx.doi.org/10.1021/nl902720v>
- J11. Z. Aksamija, U. Ravaioli, "Anharmonic Decay of g-process Longitudinal Optical Phonons in Silicon", **Applied Physics Letters**, vol. 96, 091911 (2010). <http://dx.doi.org/10.1063/1.3350894>
- J10. P. M. Martin, Z. Aksamija, and E. Pop, "Impact of Phonon Surface Roughness Scattering on Thermal Conductivity of Thin Si Nanowires", **Physical Review Letters**, vol. 102, 125503 (2009). <http://dx.doi.org/10.1103/PhysRevLett.102.125503>
- **Paper recognition: Editor's Suggestion** in *Physical Review Letters* and reprinted in the *Virtual Journal of Nanoscale Science & Technology (VJNano)*, April 13, 2009
- J9. Z. Aksamija and U. Ravaioli, "Energy Conservation in Collisional Broadening Over a Sequence of Scattering Events in Semiclassical Monte Carlo Simulation", **Journal of Applied Physics**, vol. 105, 083722 (2009). <http://dx.doi.org/10.1063/1.3116544>
- J8. Z. Aksamija, U. Ravaioli, "Anharmonic Decay of Non-Equilibrium Phonons in Silicon", **Journal of Physics: Conference Series**, vol. 193, 012033 (2009).
- J7. P. Martin, Z. Aksamija, E. Pop, U. Ravaioli, "Prediction of Reduced Thermal Conductivity in Nano-Engineered Rough Semiconductor Nanowires," **Journal of Physics: Conference Series**, vol. 193, 012010 (2009).

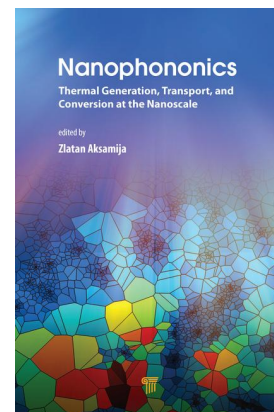
- J6. M. Mohamed, Z. Aksamija, A. Godoy, P. Martin, H.-S. Hahm, W. Lee, K.-I. Lee, and U. Ravaioli, "Size Effects and Performance Assessment in Nanoscale Multigate MOSFET Structures", **Journal of Computational and Theoretical Nanoscience**, vol. 6, pp. 1927-1936 (2009).
- J5. Z. Aksamija and U. Ravaioli, "Efficient Numerical Solution for the 3-D Semiconductor Poisson Equation", **Computer Modeling in Engineering and Sciences**, vol. 37, pp. 45-65 (2009).
- J4. Z. Aksamija and U. Ravaioli, "Boltzmann Transport Simulation of Single-Walled Carbon Nanotubes", **Journal of Computational Electronics**, vol. 7, pp. 315-318 (2008).
- J3. Z. Aksamija and U. Ravaioli, "Emission and Absorption of Phonons in Silicon", **Physica Status Solidi (C)**, vol. 5, pp. 90-93 (2008).
- J2. Z. Aksamija and U. Ravaioli, "Joule Heating and Phonon Transport in Si MOSFETs", **Journal of Computational Electronics**, vol. 5, pp. 431-434 (2006).
- J1. Z. Aksamija and U. Ravaioli, "Meshless Solution of the Semiconductor Poisson Equation", **Journal of Computational Electronics**, vol. 5, pp. 459-462 (2006).

❑ Manuscripts in Preparation

- M2. V. Dusetty and Z. Aksamija, "Improved Thermoelectric Figure-of-Merit in Bulk and Thin-film Group IV Si-Sn Alloys", in preparation (2021)
- M1. A. Kommini and Z. Aksamija, "Phonon-drag Contribution to Thermoelectric Power Factor in Two-dimensional Materials", in preparation (2021)

❑ Books and Book Chapters

- B2. Z. Aksamija, "Nanophononics: Thermal Generation, Transport, and Conversion at the Nanoscale," Pan Stanford Publishing (2017) [publisher link](#)
 • I edited this book and authored 4 of the 8 chapters
- B1. M. Upadhyaya and Z. Aksamija, "Thermal Conductivity of Semiconductor Nanostructures and Alloys" in **Handbook of Materials Modeling**, 2nd Ed., "Applications: Current and Emerging Materials (Volume II)", ed. Davide Donadio, Springer (2018) https://doi.org/10.1007/978-3-319-50257-1_16-1



❑ Invited Presentations and Seminars

- I28. "Thermoelectric Transport in Nanostructured Materials: the Wigner-Boltzmann Approach," **International Wigner Workshop**, Seoul, Korea (May 2021).
- I27. **CECAM Workshop** on "Quantum Transport: From Nanoscopic to Microscopic Modelling," ETH Zurich, Switzerland (June 15-18, 2020, postponed to 2021 due to COVID pandemic)
- I26. "Thermal transport in 2D materials from first principles: the role of interface and substrate," **237th ECS Meeting**, Montreal, Canada (May 10-15, 2020)
- I25. "Self-heating in Advanced CMOS-Compatible and 2-dimensional Semiconductor Devices," **SOI Symposium**, 237th ECS Meeting, Montreal, Canada (May 10-15, 2020)
- I24. "Nanophononics: dissipation and thermoelectric energy conversion in nanoscale devices," DESY-PIER graduate student workshop, **University of Hamburg**, Germany (Sept. 24, 2019)
- I23. "Thermal Effects in Semiconductors and Nano-Devices," **International Workshop on Computational Nanotechnology (IWCN)**, Evanston, IL (May 19-24, 2019)
- I22. "Electronic and Thermoelectric Transport in 2-Dimensional Materials and Heterostructures", **IEEE Nanotechnology Materials and Devices Conference (NMDC)**, Portland, OR (Oct. 14-17, 2018)
- I21. "Extrinsic and collective effects on thermal transport in 2D/3D alloys and nanostructures", to be presented at a Special Session on Thermal Effects in the **IEEE Nanotechnology Materials and Devices Conference (NMDC)**, Portland, OR (Oct. 14-17, 2018)
- I20. "Frequency-dependent Thermal Conductivity of Graphene in the Hydrodynamic Regime", with A. K. Majee, **IEEE Nano Conference**, Pittsburgh, PA (July 25-28, 2017). Proceedings paper available at: <https://doi.org/10.1109/NANO.2017.8117364>

- I19. *"Phonon Transport in 2-dimensional Materials and Alloys"*, Tutorial/Workshop at the **IEEE Nano Conference**, Pittsburgh, PA (July 25th, 2017).
- I18. *"Thermal Transport in 2-dimensional Materials"*, Workshop at the **International Institute for Physics**, Federal University of Rio Grande do Norte, Natal, Brazil (November 7th, 2016).
- I17. *"Numerical Simulation of Thermal Transport in Semiconductor Nanostructures"*, High Performance Computing Day at **University of Massachusetts Dartmouth** (May 17th, 2016).
- I16. *"Phonons, Phonons Everywhere: Thermal Transport in Semiconductor Nanostructures"*, EE Graduate Seminar, **University of Notre Dame**, IN (Feb. 20th, 2015).
- I15. *"Phonons, Phonons Everywhere: Thermal Transport in Semiconductor Nanostructures"*, ECE Graduate Seminar, **University of Connecticut** (Sept. 27th, 2014).
- I14. *"Phonons, Phonons Everywhere: Thermal Transport in Semiconductor Nanostructures"*, ECE Graduate Seminar, **University of Illinois at Urbana/Champaign** (Sept. 11th, 2014).
- I13. *"Anisotropic Phonon Transport in SiGe and Graphene Nanostructures"*, S3TEC seminar, **Massachusetts Institute of Technology** (March 4th, 2014).
- I12. *"Thermal Transport in Semiconductor Nanostructures"*, Condensed Matter Physics Seminar, **University of Massachusetts Amherst** (Feb. 27th, 2014).
- I11. *"Semiconductor Nanostructures for Efficient Thermo-electric Energy Conversion"*, Electrical Engineering Seminar, **University of Massachusetts Amherst** (March. 27th, 2013).
- I10. *"Semiconductor Nanostructures for Efficient Thermo-electric Energy Conversion"*, Mechanical Engineering Seminar, **Georgia Institute of Technology**, Atlanta, GA (Feb. 5th, 2013).
- I9. *"Phonon Transport in Silicon and Graphene Nanostructures"*, 14th **International Conference on Phonon Scattering in Condensed Matter**, Ann Arbor, MI (July 8-12, 2012).
- I8. *"Numerical Simulation of Thermal Transport in Nanostructured Semiconductor Devices"*, Invited Workshop at the Phonon School, **International Workshop on Computational Electronics**, Madison, WI (May 22-25, 2012).
- I7. *"Semiconductor Nanostructures for Efficient Thermo-electric Energy Conversion"*, **International Conference on Materials, Energy and Environment (IMCEE)**, Toledo, OH (May 9-11, 2012).
- I6. *"Semiconductor Nanostructures for Efficient Thermo-electric Energy Conversion"*, Mechanical Engineering Seminar, **University of Pennsylvania** (Feb. 6th, 2012).
- I5. *"Thermoelectric Properties of Silicon-On-Insulator (SOI) Nanostructures"*, International Symposium on SOI Technology (ECS-SOI), 219th **Electro-Chemical Society Meeting (ECS-219)**, Montreal, Canada (May 1-6, 2011).
- I4. *"Nanostructured Semiconductor Thermoelectrics"*, Network for Computational Nanotechnology, **University of Illinois at Urbana/Champaign** (December 2, 2010).
- I3. *"Thermoelectric Properties of Semiconductor Nanostructures"*, ECE Departmental Seminar, **University of Illinois at Chicago** (November 5, 2010).
- I2. *"Computational Design of Semiconductor Nanostructures for Optoelectronic, Electronic, and Thermoelectric Applications,"* **IEEE NANO** (www.ieeenano2010.org), Modeling and Simulation Section, Seoul, Korea (August 17-20, 2010).
- I1. *"Detailed Analysis of Electro-thermal Effects in Nanoscale MOSFETs"*, **International Microwave Symposium (IMS'08)**, Atlanta, GA (June 15-20, 2008).

Patents

- R. Blick, J. Rodriguez, H. Kim, Z. Aksamija, W. Hansen, C. Heyn, *"Mass Spectrometer Detector Using Optically Active Membranes"*, **U.S. patent P140174US01**, filed July 30th, 2014
- Z. Aksamija and R. Blick, *"Folded Multi-layered 2-D van der Waals Materials as Efficient Thermoelectric Converters, and Methods Thereof"*, **U.S. patent application UOMA-042US**, filed Oct. 14th, 2016, *Patent Pending*

Grants

- 2019-2022 NSF Award 1902352, **CDS&E**: “Simulation- and Data-driven Search for Cross-dimensional Materials Interfaces to Enhance Heat Transfer,” (PI: Z. Aksamija), 3 years, \$330,000
- 2015-2019 NSF Award 1542864, **EFRI 2-DARE**: *Thermal Transport in 2D Materials for Next-Generation Nanoelectronics: From Fundamentals to Devices*, 4-year \$1,999,966.00 total award (PI: A. Salehi-Khojin, UIC). I am the sole UMass PI, my share \$358,018
- 2017 UMass Instructional Innovation Fellow, \$500
- 2016-2017 Lilly Teaching Fellowship, Center for Teaching and Faculty Development, \$14,000
- 2016- NVIDIA Academic Hardware Grant, 2x Tesla K40 GPGPU cards, \$8,000
- 2015 Flex Grant for Faculty Development, Massachusetts Society of Professors, \$500
- 2015-2016 **XSEDE Allocation** TG-DMR150122, “First principles calculations of electronic and vibrational structure of TMDCs and their alloys” (PI: Z. Aksamija), 50,000 SUs
- 2015-2016 NSF Award 1449418, **CI TraCS Research Starter Grant**, 1 year, \$50,000 award to purchase a computational cluster (PI: Z. Aksamija), installed Jan. ‘16 at the MGHPC
- 2011-2014 NSF Award 1122690, **Transformative Computational Science using Cyber Infrastructure (CI TraCS)**, “Computational nanoscience for energy-efficient electronic and thermoelectric materials and devices,” 3 years, \$240,000 (PI: Z. Aksamija)
- 2009-2011 NSF Award 1019343, Computing Research Association Sub-Award CIF-A-146: **Computing Innovation Postdoctoral Fellowship** (CIFellows) “Nanostructured Semiconductor Thermoelectrics” 2-year, \$247,500 (PI: Z. Aksamija)

☐ Refereed Conferences with Full Proceedings Papers (student advisees underlined)

- C58. A. Aksamija, Z. Aksamija, C. Counihan, D. Brown, and M. Upadhyaya, “Thermoelectric Facades: Simulation of Heating and Cooling Potential for Novel Intelligent Facades,” **Facade Tectonics 2020 World Congress**, Los Angeles, CA (March 25-26, 2020). Full paper: <https://facadetectonics.org/publications/>
- C57. A. Kommini and Z. Aksamija, “Improving thermoelectric power factor in 2D single-layer MoS₂ using periodic potentials”, **IEEE Nano Conference**, Cork, Ireland (July 23-27, 2018), proceedings available through IEEEXplore: <https://doi.org/10.1109/NANO.2018.8626285>
- C56. A. Aksamija, Z. Aksamija, C. Counihan, D. Brown, and M. Upadhyaya, “Experimental Study on Integration of Thermoelectric Materials in Exterior Walls for Heating and Cooling in High-Performance Buildings”, **5th Building Enclosure Science and Technology (BEST5) Conference**, Philadelphia, PA (April 15-18, 2018)
- C55. A. Aksamija, Z. Aksamija, C. Counihan, D. Brown, and M. Upadhyaya, “Thermoelectric Materials in Exterior Walls,” **Facade Tectonics 2018 World Congress**, Los Angeles, CA (March 12-13, 2018). Full paper: <https://facadetectonics.org/publications/> Vol. 1, pg. 171
- C54. A. Kommini and Z. Aksamija, “Thermoelectric Properties of Periodic Quantum Structures in the Wigner-Rode Formalism”, 20th International Conference on **Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures** (EDISON’20), Buffalo, NY (July 16-21, 2017).
- C53. **(invited)** S. Mei, C. I. Foss, L. N. Maurer, O. Jonasson, Z. Aksamija and I. Knezevic, “Boundaries, interfaces, point defects, and strain as impediments to thermal transport in nanostructures”, **IEEE International Reliability Physics Symposium** (IRPS), Monterrey, CA (April 2-6, 2017). Full paper: <http://ieeexplore.ieee.org/document/7936333/>
- C52. A. Kommini and Z. Aksamija, “Low-temperature Enhancement of the Thermoelectric Seebeck Coefficient in Semiconductor Nanoribbons”, **International Workshop on Computational Electronics** (IWCE), Lafayette, IN (Sept. 2nd-Sept. 5th, 2015).
- C51. S. Mei, Z. Aksamija, and I. Knezevic, “Thermal Conductivity Tensor of In_xGa_{1-x}As/In_xAl_{1-x}As Superlattices and Applications to Quantum Cascade Lasers”, **International Workshop on Computational Electronics** (IWCE), Lafayette, IN (Sept. 2nd-Sept. 5th, 2015).
- C50. A. Kommini, G. P. Szakmany, A. O. Orlov, G. H. Bernstein, W. Porod, and Z. Aksamija, “Size Dependence of the Seebeck Coefficient for Single-Metal Thermocouples”, **International Workshop on Computational Electronics** (IWCE), Lafayette, IN (Sept. 2nd-Sept. 5th, 2015).

- C49. M. Mohamed, Z. Aksamija, and U. Ravaioli, “*Coupled Electron and Thermal Transport Simulation of Self-heating Effects in Junctionless MOSFETs*”, 19th Conference on **Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures** (EDISON19), Salamanca, Spain (June 29-July 2nd, 2015).
- C48. E. Bury, B. Kaczer, J. Mitard, N. Collaert, S. N. Khatami, Z. Aksamija, D. Vasileska, K. Raleva, L. Witters, G. Hellings, D. Linten, G. Groeseneken, and A. Thean, “*Characterization of Self-Heating in High Mobility Ge FinFET pMOS devices*,” **VLSI Symposium** (Technology Track), Kyoto, Japan (June 16-18, 2015).
- C47. Z. Aksamija, “*Full-band Monte Carlo simulation of Phonon Transport in Semiconductor Nanostructures*”, **Computational Heat Transfer**, Rutgers, NJ (May 25-29, 2015).
- C46. M. Upadhyaya and Z. Aksamija, “*Phonon Transport in SiGe Alloy-based Nanocomposites and Nanowires for Thermoelectric Applications*”, 2014 **Materials Research Society** (MRS) Fall Meeting, Boston, MA (Dec. 6th, 2014). Full paper in **MRS Proceedings**: <https://doi.org/10.1557/opl.2015.270>
- C45. Z. Aksamija, “*Full-band Monte Carlo simulation of Phonon Transport in Semiconductor Nanostructures*”, **IEEE Nano Conference**, Toronto CA (August 18-22, 2014). Full proceedings available at [ieeexplore.com: http://dx.doi.org/10.1109/NANO.2014.6968118](http://dx.doi.org/10.1109/NANO.2014.6968118)
- Paper Recognition: **Best Paper Award** finalist
- C44. Z. Aksamija, “*Phonon Transport in Si-Ge-based Nanocomposites and Nanowires for Thermoelectric Applications*”, **International Thermoelectric Conference** (ITC), Nashville, TN (July 6-10 2014).
- C43. Z. Aksamija, “*Full-band Monte Carlo simulation of Phonon Transport in Semiconductor Nanostructures*”, **International Workshop on Computational Electronics** (IWCE), Paris, France (June 2-8, 2014).
- C42. M. Y. Mohamed, Z. Aksamija, F. Ishmail, and U. Ravaioli, “*Self-heating Effects in Nanowire Depletion Mode Junctionless Transistor*”, **International Workshop on Computational Electronics** (IWCE), Paris, France (June 2-8, 2014).
- C41. K.-h. Park, Z. Aksamija, and U. Ravaioli, “*Improved Accuracy on Empirical Lattice Thermal Conductivity Model of Bi₂Te₃*”, **International Workshop on Computational Electronics** (IWCE), Paris, France (June 2-8, 2014).

Prior to joining UMass

-
- C40. Z. Aksamija and I. Knezevic, “*Thermal Transport in SiGe Alloy-based Nanostructures for Thermoelectric Applications*”, 2013 **International Semiconductor Device Research Symposium** (ISDRS’13), Bethesda, MA (Dec. 10-13, 2013).
- C39. M. Y. Mohamed, Z. Aksamija, F. Ishmail, and U. Ravaioli, “*A Unified Multiphysics Approach to Understanding the Influence of Temperature Variation on the Performance of Junctionless Transistor with Narrow Cross-sections*”, 2013 **International Semiconductor Device Research Symposium** (ISDRS’13), Bethesda, MA (Dec. 10-13 2013).
- C38. K.-h. Park, Z. Aksamija, and U. Ravaioli, “*Phonon Scattering due to van der Waals Forces in the Lattice Thermal Conductivity of Bi₂Te₃ Thin Films*,” 2013 **International Semiconductor Device Research Symposium** (ISDRS’13), Bethesda, MA (Dec. 10-13 2013).
- C37. Z. Aksamija, “*Semiconductor Nanostructures for Efficient Thermoelectric Energy Conversion*”, **American Vacuum Society** (AVS) 59th International Symposium, Tampa, FL (October 28-November 2, 2012).
- C36. Z. Aksamija and I. Knezevic, “*Thermal Transport in Suspended and Supported Graphene Nanoribbons*”, 49th **Annual Technical Meeting of the Society of Engineering Science**, Atlanta, GA (October 10-12, 2012).
- C35. M. Mohamed, Z. Aksamija, W. Vitale, F. Hassan, and U. Ravaioli, “*Interplay Between the Electrical and Thermal Transport of Silicon Nanoscale MOSFETs*”, **International Conference on Simulation of Semiconductor Processes and Devices** (SISPAD’12), Denver, CO (September 2012).
- C34. Z. Aksamija and I. Knezevic, “*Thermal Transport in Suspended and Supported Graphene Nanoribbons*”, **International Conference on Simulation of Semiconductor Processes and Devices** (SISPAD’12), Denver, CO (September 2012).

- C33. Y. B. Shi, Z. Aksamija, and I. Knezevic, "Thermal Simulation of GaAs-based Midinfrared Quantum Cascade Lasers", **NUSOD12** Conference, Shanghai, China (August 2012).
- C32. Z. Aksamija and I. Knezevic, "Reduced Thermal Conductivity in SiGe Alloy-based Superlattices for Thermoelectric Applications", 14th **International Conference on Phonon Scattering in Condensed Matter** (PHONONS 2012), Ann Arbor, MI (July 2012).
- C31. Y. B. Shi, Z. Aksamija, and I. Knezevic, "Thermal Modeling of GaAs/Al_{0.45}Ga_{0.55}As Quantum Cascade Lasers", 15th **International Workshop on Computational Electronics** (IWCE), Madison, WI (May 2012).
- C30. J. Park, H. Shin, H. Kim, Z. Aksamija, and R. Blick, "Phonon assisted field emission from Silicon nanomembrane for time-of-flight mass spectrometry", **American Society for Mass Spectrometry** (ASMS) Meeting, Vancouver, BC (May 2012).
- C29. Z. Aksamija, E. Ramayya, and I. Knezevic, "Modeling of Thermal Conductivity and Thermoelectric Power Factor in Ultrathin SOI Nanomembranes and Silicon Nanowires", **International Semiconductor Research Symposium** (ISDRS), University of Maryland, College Park, MD (Dec. 7-9, 2011)
- C28. Z. Aksamija, E. B. Ramayya, and I. Knezevic, "On-chip Energy Harvesting and Active Cooling Using Silicon-based Nanostructured Thermoelectrics", 2011 **Sub-threshold Microelectronics Conference**, MIT Lincoln Lab, Lexington, MA (September 26-27, 2011).
- C27. Z. Aksamija and I. Knezevic, "Anisotropy of Lattice Thermal Conductivity in Edge-Disordered Graphene Nanoribbons", **IEEE Nano**, Portland, WA (August 15-18, 2011).
- C26. Z. Aksamija and I. Knezevic, "Interface Scattering in the Lattice Thermal Conductivity of Si/SiGe Superlattices", **IEEE Nano**, Portland, WA (August 15-18, 2011).
- C25. M. Mohamed, W. Vitale, Z. Aksamija, F. Ismail, and U. Ravaioli, "Coupled Electro-thermal Modeling of Self-Heating in SOI Nanowire", 17th **International Conference on Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures** (EDISON-17), Santa Barbara, CA (August 8-12, 2011).
- C24. Z. Aksamija, E. B. Ramayya, and I. Knezevic, "Thermal and thermoelectric properties of SOI nanomembranes, Si nanowires, and Si/Ge superlattices", 17th International Conference on **Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures** (EDISON-17), Santa Barbara, CA (August 8-12, 2011).
- C23. Z. Aksamija and I. Knezevic, "Anisotropy and Edge Roughness Scattering in the Lattice Thermal Conductivity of Graphene Nanoribbons", **Electro-Chemical Society Meeting** (ECS-219), Montreal, Canada (May 1-6, 2011).
- C22. Z. Aksamija and I. Knezevic, "Anisotropy and Edge Roughness Scattering in the Lattice Thermal Conductivity of Graphene Nanoribbons", 38th **Conference on the Physics and Chemistry of Surfaces and Interfaces** (PCSI-38), San Diego (January 16-20, 2011).
- C21. Z. Aksamija and I. Knezevic, "Interface Scattering in the Lattice Thermal Conductivity of Si/SiGe Superlattices", 38th **Conference on the Physics and Chemistry of Surfaces and Interfaces** (PCSI-38), San Diego (January 16-20, 2011).
- C20. Z. Aksamija, I. Knezevic, "Phonon Transport and Thermoelectric Properties of Silicon Nanomembranes and Nanoribbons", **International Workshop on Computational Electronics** (IWCE-14), Pisa, Italy (October 27-29, 2010).
- C19. D. Vasileska, K. Raleva, A. Hossain, S. M. Goodnick, Z. Aksamija, and I. Knezevic, "Thermal Modeling of Nanodevices", **International Workshop on Computational Electronics** (IWCE-14), Pisa, Italy (October 27-29, 2010).
- C18. Z. Aksamija and I. Knezevic, "Thermoelectric Properties of Silicon Nanostructures", **IEEE NANO**, Modeling and Simulation Section, Seoul, S. Korea (August 17-20, 2010).
- C17. Z. Aksamija and I. Knezevic, "Thermoelectric Properties of Silicon Nanostructures", **Silicon Nanoelectronics Workshop** (SiNW'10) Honolulu, HI (June 2010).

- C16. M. Mohamed, H.-S. Hahm, A. Godoy, Z. Aksamija, and U. Ravaioli, "3D Multi Subband Monte Carlo Analysis of SOI Multigate Devices", **Silicon Nanoelectronics Workshop (SiNW'10)**, Honolulu, HI (June 2010).
- C15. M. Mohamed, Z. Aksamija, and U. Ravaioli, "Electro-thermal Study of Nanoscale SOI Multi-gate MOSFETs", **Silicon Nanoelectronics Workshop (SiNW'10)**, Honolulu, HI (June 2010).
- C14. Z. Aksamija and I. Knezevic, "Anisotropy and Boundary Scattering in the Lattice Thermal Conductivity of Silicon-on-Insulator Nanomembranes", 37th Conference on the **Physics and Chemistry of Surfaces and Interfaces (PCSI-37)**, Santa Fe, NM (January 2010).
- C13. Z. Aksamija, H.-J. Ryu, D. M. Paskiewicz, S. A. Scott, M. G. Lagally, M. A. Eriksson, and I. Knezevic, "Hole Thermopower in Gated Silicon Nanoribbons", 37th Conference on the **Physics and Chemistry of Surfaces and Interfaces (PCSI-37)**, Santa Fe (January 2010).
- C12. Z. Aksamija, U. Ravaioli, "Anharmonic Decay of Non-Equilibrium Intervalley Phonons in Silicon," 16th International Conference on **Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures (EDISON16)**, Montpellier, France (August 2009).
- C11. P. Martin, Z. Aksamija, E. Pop, U. Ravaioli, "Prediction of Reduced Thermal Conductivity in Nano-Engineered Rough Semiconductor Nanowires," 16th International Conference on **Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures (EDISON16)**, Montpellier, France (August 2009).
- C10. C. Ni, Z. Aksamija, J. Y. Murthy, and U. Ravaioli, "Coupled Electro-Thermal Simulation of MOSFETs", **Proceedings of the IPACK2009**, presented at the ASME InterPACK, San Francisco, CA (July 2009), proceedings available on ASME Digital Library: www.asme.org
- C9. Z. Aksamija, and U. Ravaioli, "Parallel Implementation of Boltzmann Transport Simulation of Single-Walled Carbon Nanotubes", **International Workshop on Computational Electronics (IWCE)** Beijing, China (May 2009), proceedings available on IEEEXplore.com.
- C8. Z. Aksamija, and U. Ravaioli, "Phonon Emission Spectra in Silicon", **International Semiconductor Device Research Symposium (ISDRS)**, Washington D.C. (Dec. 2007), www.IEEEXplore.com
- C7. Z. Aksamija, and U. Ravaioli, "Boltzmann Transport Simulation of Single-Walled Carbon Nanotubes (SWNT)", **International Workshop on Computational Electronics (IWCE)** Amherst, MA (October 2007), proceedings available on www.iwce.org
- C6. Z. Aksamija, and U. Ravaioli, "Phonon Emission and Absorption in Silicon", **International Workshop on Computational Electronics (IWCE)** Amherst, MA (October 2007), proceedings available on www.iwce.org
- C5. Z. Aksamija, and U. Ravaioli, "Energy Conservation in Collisional Broadening", **Simulation of Semiconductor Processes And Devices (SISPAD)**, Vienna, Austria (September 2007), proceedings available on www.sispad.org
- C4. Z. Aksamija, and U. Ravaioli, "Phonon Emission and Absorption in Silicon", **Hot Carriers in Semiconductors (HCIS'07)**, Osaka, Japan (July 2007).
- C3. Z. Aksamija, and U. Ravaioli, "Self-Heating and Phonon Emission in Si MOSFETs", **Electro-Information Technology (EIT-07)**, Chicago, IL (May 2007), proceedings available on IEEEXplore.com.
- Paper recognition: **Outstanding Paper** and IEEE Region 4 First Place Award
- C2. Z. Aksamija, and U. Ravaioli, "Joule Heating and Phonon Transport in Si MOSFETs", **International Workshop on Computational Electronics (IWCE)** Vienna, Austria (May 2006), proceedings available on www.iwce.org.
- C1. Z. Aksamija, and U. Ravaioli, "Meshless Solution for the 3-D Semiconductor Poisson Equation", **International Workshop on Computational Electronics (IWCE)**, Vienna, Austria (May 2006), proceedings available on www.iwce.org.

☐ **Refereed Conference and Workshop Presentations (Abstract only)**

-
- P56. C. J. Foss and Z. Aksamija, "Thermal boundary conductance of buckled group IV,V, and III-V two-dimensional materials," **American Physical Society (APS)** March Meeting 2021, virtual

- P55. A. Qureshi and Z. Aksamija, "A hybrid model for thermal transport in Si nanostructures from first principles," **American Physical Society (APS)** March Meeting 2021, virtual
- P54. M. Upadhyaya, C. Boyle, M. Lu-Diaz, D. Venkataraman, and Z. Aksamija, "Coulombic Interactions and Charge Transport Dynamics in Organic Thermoelectrics," **Materials Research Society (MRS)** Fall 2020 virtual meeting.
- P53. C. J. Foss, and Z. Aksamija, "Thermal Boundary Conductance of Buckled Group IV, V, and III-V Two-Dimensional Materials," **Materials Research Society (MRS)** Fall 2020 virtual meeting.
- P52. A. K. Majee, C. J. Foss, and Z. Aksamija, "Electron-Phonon Coupling Enhances Thermal Boundary Conductance of 2D-3D Interfaces," **Materials Research Society (MRS)** Fall 2020 virtual meeting.
- P51. M. Upadhyaya, C. Boyle, M. Lu-Diaz, D. Venkataraman, and Z. Aksamija, "Effect of Coulombic Interactions and Dopant Distribution on Charge Transport Dynamics in Polymer Thermoelectrics," **Virtual Conference on Thermoelectrics** (July 21-23, 2020)
- P50. C. J. Foss and Z. Aksamija, "Thermal boundary conductance of beyond graphene two dimensional materials," **American Physical Society (APS)** March Meeting, Denver, CO (March 2-6, 2020).
- P49. M. Upadhyaya, C. Boyle, M. Lu-Diaz, D. Venkataraman, and Z. Aksamija, "Effect of Doping Distribution on Charge Transport Dynamics in Polymer Thermoelectrics," **Materials Research Society (MRS)** Fall Meeting, Boston, MA (Dec. 1-6, 2019).
- P48. M. Lu-Diaz, C. Boyle, M. Upadhyaya, Z. Aksamija, D. Venkataraman, "Effect of Dopant Clustering on Thermoelectric Properties of Polymer Films," **Materials Research Society (MRS)** Fall Meeting, Boston, MA (Dec. 1-6, 2019).
- P47. A. K. Majee and Z. Aksamija, "Joule Heating and Its Impact on Thermal Management in Few-Layer WSe₂," **Materials Research Society (MRS)** Fall Meeting, Boston, MA (Dec. 1-6, 2019).
- P46. A. Kommini and Z. Aksamija, "Wigner-Boltzmann Transport Simulation for Improving the Thermoelectric Power Factor in 2D Materials," 3rd **International Wigner Workshop**, Evanston, IL (May 19-20, 2019).
- P45. C. J. Foss and Z. Aksamija, "Quantifying thermal boundary conductance of 2D-3D interfaces," **American Physical Society (APS)** March Meeting, Boston, MA (March 4-8, 2019).
- P44. A. Kommini and Z. Aksamija, "Materials selection rules for optimum power factor in 2-dimensional thermoelectrics," **American Physical Society (APS)** March Meeting, Boston, MA (March 4-8, 2019).
- P43. M. Upadhyaya and Z. Aksamija, "Effect of Disorder on the Thermoelectric Properties of Semiconducting Polymers," **Materials Research Society (MRS)** Fall Meeting, Boston, MA (Nov. 30-Dec. 4, 2018)
- P42. A. Kommini and Z. Aksamija, "Improving the Thermoelectric Power Factor in 2D Materials Using Periodic Potential Barriers," **Materials Research Society (MRS)** Fall Meeting, Boston, MA (Nov. 30-Dec. 4, 2018)
- P41. M. Upadhyaya and Z. Aksamija, "Thermoelectric Properties of Disordered Organic Polymers," **International Conference on Thermoelectrics (ICT)**, Caen, France (July 2-7, 2018).
- P40. V. Dusetty and Z. Aksamija, "Improved Thermoelectric Figure-of-Merit in Bulk and Nanostructured Si-Sn Alloys," 60th **Electronic Materials Conference (EMC-60)**, University of California, Santa Barbara (Jun. 27-29, 2018).
- P39. C. J. Foss and Z. Aksamija, "Quantifying the thermal boundary conductance of 2D-substrate interfaces", 76th **Device Research Conference (DRC)**, University of California, Santa Barbara (Jun. 24-27, 2018).
- P38. A. K. Majee, C. J. Foss, A. Kommini, and Z. Aksamija "Thermal and Electronic Transport Dynamics at 2D Interfaces", **Gordon Research Conference: Two Dimensional Electronics Beyond Graphene**, Stonehill College, Easton, MA (Jun. 3-8, 2018)
- P37. M. Upadhyaya and Z. Aksamija, "Effects of Disorder on Thermoelectric Properties of Semiconducting Polymers", **High Performance Computing (HPC) Day**, University of Massachusetts Dartmouth (May 18th, 2018)

- P36. C. J. Foss and Z. Aksamija, “Effects of Alloying on In-Plane and Cross-Plane Phonon Transport in Transition Metal Dichalcogenide Monolayers”, **Materials Research Society (MRS) Fall Meeting**, Boston MA (Nov. 27-Dec. 1, 2017).
- P35. A. Kommini and Z. Aksamija, “Improving the Thermoelectric Power Factor of Semiconductor Quantum Structures”, **International Conference on Thermoelectrics (ICT)**, Pasadena, CA (July 31-August 3, 2017).
- P34. A. Kommini and Z. Aksamija, “Towards a Higher Power Factor in 2D Materials: Role of Inelastic Scattering Mechanisms”, **International Conference on Thermoelectrics (ICT)**, Pasadena, CA (July 31-August 3, 2017).
- P33. A. Kommini and Z. Aksamija, “Thermoelectric Properties of Periodic Quantum Structures in the Wigner-Rode Formalism”, **High Performance Computing Day** at University of Massachusetts Dartmouth (May 15th, 2017)
- P32. A. K. Majee and Z. Aksamija, “Dynamical Thermal Conductivity in Single-Crystalline Graphene Ribbons”, **Materials Research Society (MRS) Meeting**, Phoenix, AZ (April 17-21, 2017).
 • Recognition: “**Best Poster**” Award Finalist
- P31. M. Upadhyaya and Z. Aksamija, “Phonon Transport Dynamics in Si-Ge Nanowires and Nanocomposites”, **Materials Research Society (MRS) Meeting**, Phoenix, AZ (April 17-21, 2017).
- P30. M. Upadhyaya and Z. Aksamija, “Super-Diffusive Phonons: A Monte Carlo Study of the Levy Walk Phonon Transport Dynamics in SiGe Alloy Nanowires”, **Electronic Materials Conference**, University of Delaware (June 22-24th, 2016)
- P29. Z. Aksamija and A. K. Majee, “Impact of Mismatch Angle on Electronic and Thermal Transport Across Grain Boundaries and Interfaces in 2-dimensional Materials”, **Gordon Research Conference: Two Dimensional Electronics Beyond Graphene**, Mount Holyoke College, South Hadley, MA (June 5-June 10th, 2016)
- P28. C. J. Foss and Z. Aksamija, “Calculation of lattice vibrations in 2D materials using HPC Accelerated Quantum-Espresso”, **High Performance Computing Day**, University of Massachusetts Dartmouth (May 17th, 2016)
- P27. G. C. Correa and Z. Aksamija, “Flexural Phonon Contribution to Thermal Transport in Graphene Supported on Silicon Dioxide”, **Materials Research Society (MRS) Fall Meeting**, Boston, MA (Nov. 30-Dec. 4, 2015)
- P26. P. Yasaei, A. Fathizadeh*, A. Majee*, D. Estrada, C. Foster, Z. Aksamija, F. Khalili, A. Salehi, “Thermal Transport Across Individual Graphene Grain Boundaries”, **Materials Research Society (MRS) Fall Meeting**, Boston, MA (Nov. 30-Dec. 4, 2015)
- P25. A. Kommini and Z. Aksamija, “Low-temperature Enhancement of the Thermoelectric Seebeck Coefficient in Semiconductor Nanoribbons”, **International Conference on Thermoelectrics (ICT-15)**, Dresden Germany (June 28-July 2nd, 2015)
- P24. A. K. Majee and Z. Aksamija, “Size Divergence of Thermal Conductivity in Graphene”, 2015 **Materials Research Society (MRS) Spring Meeting**, San Francisco, CA (Apr. 7-10, 2015)
- P23. D. P. Schroeder, Z. Aksamija, A. Rath, P. M. Voyles, M. G. Lagally, and M. A. Eriksson, “Thermal Resistance of Mechanically Transferred Single-Crystal Silicon Nanomembrane Interfaces”, 2014 **Materials Research Society (MRS) Fall Meeting**, Boston, MA (Dec. 6th, 2014).
- P22. Z. Aksamija, “Phonon Thermal Transport in SiGe-based Nanocomposites for Thermoelectric Applications”, **American Physical Society March Meeting**, Denver, CO (March 7th, 2014).
- P21. D. P. Schroeder, Z. Aksamija, M. G. Lagally, and M. A. Eriksson, “Measurements of the Interfacial Thermal Resistance Between Silicon Crystals with and without Intervening Molecular Films”, 2013 **Materials Research Society (MRS) Fall Meeting**, Boston, MA (December 2-6, 2013).

Prior to joining UMass

- P20. L. Maurer, Z. Aksamija, E. Ramayya, A. Davoody, and I. Knezevic, “Phonon Surface Scattering in Monte Carlo Simulations” 2013 **American Physical Society (APS) March Meeting**, Baltimore, MD (2013).

- P19. Z. Aksamija and I. Knezevic, "Reduced Thermal Conductivity in SiGe Alloy-based Superlattices for Thermoelectric Applications", 2012 **Materials Research Society** (MRS) Fall Meeting, Boston, MA (November 2012).
- P18. D. P. Schroeder, Z. Aksamija, M. G. Lagally, and M. A. Eriksson, "Thermal Resistance of Transferred Si-nanomembrane Interfaces", 2012 **Materials Research Society** (MRS) Meeting, Boston, MA (November 2012).
- P17. Z. Aksamija and I. Knezevic, "Simulation of Thermal Transport in Semiconductor Nanostructures on Heterogeneous Systems", **XSEDE12 Conference**, Chicago, IL (July 2012).
- P16. Z. Aksamija and I. Knezevic, "Thermal Conductivity in SiGe Alloy-based Superlattices for Thermoelectric Applications", 6th **International Silicon-Germanium Technology and Device Meeting** (ISTDM 2012), Berkeley, CA (June 2012).
- P15. Z. Aksamija and I. Knezevic, "Thermal transport in graphene-based nanostructures", **American Physical Society** (APS) Meeting, Boston, MA (March 2012).
- P14. Z. Aksamija and I. Knezevic, "Thermal Transport in Suspended and Supported Graphene Nanoribbons", Poster Session at the **Expanding Cross-Disciplinary Dialogue in the Postdoctoral Community NSF Workshop**, Washington, DC (April 2012).
- P13. D. P. Schroeder, A. M. Kiefer, D. M. Paskiewicz, Z. Aksamija, I. Knezevic, M. G. Lagally, and M. A. Eriksson, "Phonon Transport across Si Nanomembrane Interfaces: Structure and Thermal Conductivity", **MRS Fall Meeting**, Boston, MA (Nov. 28-Dec. 2, 2011)
- P12. Z. Aksamija and I. Knezevic, "Interface Scattering in the Lattice Thermal Conductivity of Si/SiGe Superlattices", **American Physical Society** (APS) Meeting, Dallas, TX (March 2011).
- P11. Z. Aksamija and I. Knezevic, "Anisotropy and Edge Roughness Scattering in the Lattice Thermal Conductivity of Graphene Nanoribbons", **American Physical Society** (APS) Meeting, Dallas, TX (March 2011).
- P10. Z. Aksamija and I. Knezevic, "Modeling Thermal Conductivity of SOI Nanomembranes", **International Conference on Computational & Experimental Engineering and Sciences** (ICCES'10), Las Vegas, NV (March 2010).
- P9. Z. Aksamija and I. Knezevic, "Anisotropy and Boundary Scattering in the Lattice Thermal Conductivity of Silicon-on-Insulator Nanomembranes", **American Physical Society** (APS) Meeting, Portland, OR (March 2010).
- P8. D. Vasileska, K. Raleva, A. Hossain, S. M. Goodnick, Z. Aksamija and I. Knezevic, "Thermal Modeling of Nanodevices", **Workshop on Emerging Device and Packaging Technologies**, Arizona State University, Tempe, AZ (November 2010).
- P7. Z. Aksamija and U. Ravaioli, "Parallel Simulation of Single-Walled Carbon Nanotubes", **Scientific Discovery through Advanced Computing** (SciDAC), San Diego, CA (June 2009).
- P6. Z. Aksamija and U. Ravaioli, "Parallel Simulation of Single-Walled Carbon Nanotubes", **DOE CSGF Fellows Conference**, Washington, DC (June 2008).
- P5. Z. Aksamija and B. Philip, "Wavelets in Multigrid Algorithms", **Graduate Student Research Symposium**, Los Alamos National Lab, Los Alamos, NM (July 2007).
- P4. Z. Aksamija and U. Ravaioli, "Electron-phonon interaction in semiconductor materials and devices", **Understanding Complex Systems Conference**, Urbana, IL (May 2007).
- P3. Z. Aksamija and U. Ravaioli, "Joule Heating and Phonon Transport in Silicon", **Graduate Research Symposium**, Beckman Institute, Urbana, IL (October 2006).
- P2. Z. Aksamija and U. Ravaioli, "Meshless Methods for Nanoscale Semiconductor Modeling", **CNST Nanotechnology Workshop**, University of Illinois, Urbana, IL (May 2006).
- P1. Z. Aksamija and F. Kamalabadi, "A Multi-Channel De-noising Approach to Tomographic reconstruction", **Undergraduate Research Symposium**, University of Illinois, (May 2003).

☐ Advising (total 4 PhD, 6 MS) and Mentoring (6 undergraduate)

- Ph.D. Dissertation Supervisor and Doctoral Committee Chair for:

1. Meenakshi Upadhyaya (*entered Fall '14, RQE Summer '17, Proposal May '19, Defended Feb.'21*)
 - First employment: senior engineer at Marvel Semiconductors, Burlington VT
 - 2015 David H. Navon Scholarship, 2019 Outstanding TA
 2. Arnab K. Majee (*entered Fall '16, RQE Fall '18, proposal June'20, Defended Dec.'20*)
 - First employment: postdoctoral researcher at U. New Mexico and Sandia Natl' Lab
 - 2017 David H. Navon Scholarship
 3. Adithya Kommini (*entered Spring '17, RQE May '18, Proposal May '19, Defended Mar.'21*)
 - First employment: SFL Scientific, Boston MA
 - 2017 Outstanding TA award
 4. Cameron Foss (*entered Summer '18, RQE Spring '21*)
 - 2019 David H. Navon Scholarship
- M.S. Thesis Advisor and Committee Chair for:
 1. Aliya Qureshi (*MSEE defended Spring 2020*)
 2. Venkatakrishna Dusetty (*MSEE defended Spring 2020*)
 3. Cameron Foss (*MSEE completed April 2018, currently PhD with me*)
 4. Adithya Kommini (*MSEE completed Fall 2016, currently PhD with me*)
 5. Nazanin Khatami (*MSEE completed Summer 2016, now PhD w/ E. Baker at UMass MIE*)
 6. Arnab Majee (*MSEE completed Summer 2016, currently PhD with me*)
 - Undergraduate Research or Honors Thesis Advisor for
 1. Cameron Foss (*BlueWaters Intern Summer'14 through Spring'15, currently PhD with me*)
 2. Gabriella Correa (*Honors Thesis AY14-15, NSF REU Fall'15, iREU Summer'16, currently PhD student and DOE fellow in MSE at Cornell University*)
 3. Haoxian Lin (*NSF REU summer'17, now PhD student at Boston University*)
 4. Matthew Bolognese (*Honors Thesis Fall'17-Spring'18, now employed at Lincoln Labs*)
 5. Lakshay Gautam (*Physics junior at UIUC, BlueWaters Intern Summer'18—Spring '19*)
 6. Peter Pawelski (*XSEDE EMPOWER intern Summer'19-Spring'20, Senior Honors Thesis*)
 - (13) Doctoral Committee Member for: James Kestyn, Brendan Gavin, Jiajun Shi, Emily Smith (*UMass Chemistry*), Linden Allison (*UMass Chemistry*), Poya Yasaei (*Mech. E. at U. Illinois at Chicago*), Sadid Muneer (*ECE at U. Connecticut*), Kihoon Park (*ECE at U. Illinois Urbana/Champaign*), Zahra Hemmat (*ECE at U. Illinois Chicago*), Michael Lu-Diaz (*UMass Chemistry*), Sylvester Makumi (*Physics, Kenyatta University, Kenya*), Subhayan Sumanta (*UMass Chemistry*), Braegan Spring
 - (5) M.S. Thesis Committee Member for: Braegan Spring, Mark Buckler, Sachin Bhat, Sourabh Kulkarni, Zongya Chen
 - (9) Research Qualifying Exam (RQE) committee for: Hongtao Wang, James Kestin, Sudarshan Srinivasan, Shikang Xu, Jiajun Shi, Mingyu Li, Keqiang Wu, Sachin Bhat, Xiang Li

☐ Teaching and Educational Outreach

- ECE244: “*Modern Physics and Materials for Electrical Engineers*,” required sophomore course
 - SRTI score on Overall Rating: 4.3 (Sp'19)
- ECE609: “*Semiconductor Materials and Devices*,” graduate core PhD course
 - SRTI score on Overall Rating: 4.9 (Sp'16), 4.8 (Sp'17), 4.9 (Sp'18), 4.6 (Sp'19)
- ECE344: “*Semiconductor Materials and Devices*,” required junior course
 - SRTI score on Overall Rating: 3.9 (Fa'15), 4.1 (Fa'16), 4.7 (Fa'17), 5.0 (Fa'18)
- ECE614: “*Computational Electronics*,” (Spring 2015)
- ECE618: “*Fundamentals of Solid-State Electronics*,” (Spring 2014)
- ECE597/697EN: “*NanoEnergy*,” (Fall 2013 and 2014)
 - new special topics course on Energy Transport and Conversion at the Nanoscale
- Summer Engineering Institute (SENGI) workshop on thermoelectric energy for ~60 high school students, July 2017-2019

- Z. Aksamija and U. Ravaioli, "*Boltzmann Transport Simulator for CNTs*," NCN supported NanoHUB.org interactive on-line simulation tool >15,000 simulations, >1000 users, <http://www.nanohub.org/resources/4073>
- Z. Aksamija, "*Parallel Numerical Simulation of Transport in Carbon Nanotubes*", BlueWaters/Shodor Undergraduate Petascale Education Modules (UPEP), <http://www.shodor.org/petascale/materials/UPModules/boltzmannTransport/>

☐ Professional and Honor Societies

- Eta Kappa Nu IEEE National Honor Society (Alpha chapter)
- Tau Beta Pi Engineering National Honor Society
- American Physical Society (APS)
- Institute of Electrical and Electronics Engineers (IEEE)
- Materials Research Society (MRS)
- International Thermoelectric Society (ITS)
- Bosnian-Herzegovinian American Academy of Arts and Sciences (BHAAAS)

☐ Service

- Technical Program Committee, **International Workshop on Computational Nanotechnology**, Seoul, Korea (May 2021)
- Chair of jury, MS student 3MT competition, **BH Foundation** (2021)
- UMass Faculty Senate, Budget Committee member (Fall 2020-present)
- Associate Editor & Technical Program Committee, **IEEE Nano**, Macau, China (July 22-26, 2019)
- Advisory Board, **Journal of Physics: Condensed Matter**
- Screening Committee for the **DOE Computational Science Graduate Fellowship** (2013-present)
- Departmental Ph.D. Poster Session Organizer/Committee (AY2019 and 2020), UMass Amherst
- Track Chair and Associate Editor, 2017 **IEEE Nano** Conference (July 25-28, Pittsburgh, PA).
- ECE Student Advisory Council (ESAC) faculty mentor (2015—current)
- Special Session organizer (8 invited talks on NanoPhonics) at the 2015 **IEEE Nano** Conference (26-30 July Rome, Italy)
- Proposal evaluator/reviewer for:
 1. **NSF** CDS&E program (2020: 5 proposals)
 2. **NSF** Advanced Cyberinfrastructure (2018: 9 proposals)
 3. **NSF** Condensed Matter and Materials Theory (Spring 2015: 3 proposals, Spring 2016: 5 proposals, CAREER 2017: 1 proposal, 2019: 1 proposal, 2020: 2 proposals)
 4. **NSF** Electrical, Communication, and Cyber Systems (2018 panel: 7 proposals)
 5. **Netherlands Organisation for Scientific Research** (NWO) 2018: 1 proposal, 2020: 1 proposal
 6. **Vienna Science and Technology Fund** WWTF (2016: 1 proposal)
 7. **HRZZ** Croatian Science Foundation (2019: 1 proposal)
- Scientific Advisory Board Member, Prospero Biosciences LLC (October 2013—present)
- Departmental Personnel Committee (AY2014 and 2019), University of Massachusetts Amherst
- Departmental Faculty Search Committee (AY2013), University of Massachusetts Amherst
- Departmental Seminar Committee (AY2013), University of Massachusetts Amherst
- Technical Program Committee, 2014 American Society for Engineering Education Northeast Conference (ASEE-NE'14), University of Bridgeport
- Technical Program Committee, 27th Symposium on Microelectronics Technology and Devices
- Guest Editor for the Special Issue of the **Journal of Computational Electronics** on "*Simulation of Thermal, Thermoelectric, and Electro-thermal Phenomena in Nanostructures*"
- Technical Program Committee, 2012 **International Computational Electronics Workshop**

- Co-organizer of the Focus Sessions on Quantum Transport and Computational Electronics at the March 2011 meeting of the **American Physical Society** (APS'11)
- **Reviewer (typically ~25 papers per year):** Science Advances, ACS Nano, Advanced Materials, Nano Letters, Nature Communications, Scientific Reports (Nature), Physical Review Letters, Physical Review B, Physical Review Applied, Applied Physics Letters, IEEE Transactions on Nanotechnology, IEEE Transactions on Electron Devices, Journal of Applied Physics, Journal of Computational Electronics, Journal of Electronic Materials, Physics Letters A, Physical Chemistry Chemical Physics, International Journal of Numerical Modeling in Engineering, AIP Advances (**outstanding reviewer 2015**), Superlattices and Microstructures, Journal of Computational Physics, Materials Science and Engineering B, International Journal of Heat and Mass Transfer, International Journal of Thermal Sciences, Semiconductor Science and Technology, Solid State Electronics, Solid State Communications, Physica Status Solidi, Physica B: Condensed Matter, ACS Applied Materials and Interfaces, Journal of Materials Chemistry C, Journal of Physics: Condensed Matter