

Biographical Sketch - Umberto Ravaioli

2062 Electrical Engineering Building
University of Illinois at Urbana-Champaign
ravaioli @illinois.edu

Education

Ph.D., Electrical Engineering (Solid State Device Simulation), Arizona State University, 1986
Laurea Dr. Phys., Physics (Microwave Plasma Heating), University of Bologna, Italy, 1982
Laurea Dr. Ing., Electronics Engineering (Fiber Optics Measurements), University of Bologna, Italy, 1980

Professional Appointments

Professor, Dept. of Electrical and Computer Engineering, UIUC, 1995-present

Interim Associate Dean of Undergraduate Programs, College of Engineering, UIUC, 2013, 2017
Director for Undergraduate Student Affairs, College of Engineering, UIUC, 2014-2018
Senior Assistant Dean of Undergraduate Programs, College of Engineering, UIUC, 2008-2018
Interim Associate Dean, Academic Affairs, College of Engineering, UIUC, 2007-08
Assistant Dean, Academic Affairs, College of Engineering, UIUC, 2005-2008
Visiting Professor, Rush Medical College, Dept. Molecular Biology & Physiology, 2001-present
Professor, Micro and Nanotechnology Laboratory, UIUC, 2001-present
Senior Research Scientist, National Center for Supercomputing Applications, UIUC, 1996-2003
Professor, Beckman Institute for Advanced Science and Technology, UIUC, 1995-present
Research Professor, Coordinate Science Laboratory, UIUC, 1995-present
Visiting Professor, Dept. of Electronics Engineering, Osaka University, Japan, 1994
Associate Professor, Dept. of Electrical & Computer Engineering, UIUC, 1991-1995
Assistant Professor, Dept. of Electrical & Computer Engineering, UIUC, 1986-1991
Research Assistant, Arizona State University, 1983-1986
Research Fellow, Fondazione U. Bordoni, Roma, Italy, 1982
Plasma Physics Institute C.N.R., Milano (Italy) - Consultant on High Power Microwaves, 1981-1982
Fondazione G. Marconi, Pontecchio Marconi (Italy) - Consultant on Fiber Optics, 1980-1982

Selected Publications

1. D.W. Abueidda, M. Almasri, R. Ammourah, U. Ravaioli, I. Jasiuk, N. Sobh, "Prediction and optimization of mechanical properties of composites using convolutional neural networks," *Composite Structures*, Nov 1 2019, vol. 227, article 111264, (2019).
2. C. Blatti III, A. Emad, M.J. Berry, L. Gatzke, M. Epstein, D. Lanier, P. Rizal, J. Ge, X. Liao, O. Sobh, M. Lambert, C. Post, J. Xiao, P. Groves, A.T. Epstein, X. Chen, S. Srinivasan, E. Lehnert, K.R. Kalari, L. Wang, R.M. Weinshilboum, J.S. Song, C. Victor Jongeneel, J. Han, U. Ravaioli, N. Sobh, C.B. Bushell, S. Sinha, "Knowledge-guided analysis of "omics" data using the KnowEnG cloud platform", *PLOS Biology*, <https://doi.org/10.1371/journal.pbio.3000583>, January 23, 2020.
3. M. Jo, E. Kirkor, S. Sinha, A. Scheeline, P. Martin and U. Ravaioli, "Dynamic Thermal Interface Material (D-TIM) Simulation and Parameter Optimization Using Genetic Algorithm," 20th International Workshop on Computational Nanotechnology, Evanston Illinois, May 20-24, 2019.
4. M.K. Jo and U. Ravaioli, "Geometric property estimation based on raman spectra measurement using machine learning," 13th IEEE Nanotechnology Materials and Devices Conference (NMDC 2018), p. 8605883, Portland, OR, October 14-17, 2018.
5. Dietrich C, Hart J, Raila D, Ravaioli U, Sobh N, Sobh O, Taylor C. InvertNet: a new paradigm for digital access to invertebrate collections. *Zookeys* vol. 209, pp. 165-81, (2012).
6. M. Mohamed, K. Raleva, U. Ravaioli, D. Vasileska, Z. Aksamija, "Phonon Dissipation in Nanostructured Semiconductor Devices," *IEEE Nanotechnology Magazine*. vol. 13, n. 4, p. 6-17, 8734706, (2019).

7. K.-H. Park, M. Mohamed, Z. Aksamija 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, p. 015103 (2015).
8. M. Mohamed, Z. Aksamija, W. Vitale, F. Hassan, K.-H. Park and U. Ravaioli, "A Conjoined Electron and Thermal Transport Study of Thermal Degradation Induced During Normal Operation of Multigate Transistors," *IEEE Trans. on Electron Devices*, vol. 61, pp. 976-983 (2014).
9. H.-L. Wang, R. Toghraee, D. Papke, X. Cheng, A.A. McCammon, U. Ravaioli, and S. Sine, "Single channel current through nicotinic receptor produced by closure of binding site C-loop," *Biophysical Journal*, vol. 96, p. 3582-3590, 2009.
10. P. Martin, Z. Aksamija, E. Pop and U. Ravaioli, "Impact of Phonon-Surface Roughness Scattering on Thermal Conductivity of Thin Si Nanowires," *Physical Review Letters*, vol. 102, p. 125503 (2009). [Selected as Editor's Suggestion for this issue]
11. M. Sotomayor, T.A. van der Straaten, U. Ravaioli and K. Schulten, "Electrostatic Properties of the Mechanosensitive Channel of Small Conductance MscS," *Biophysical Journal*, vol. 90, pp. 3496-3510, 2006.
12. T.A. van der Straaten, G. Kathawala, A. Trellakis, R.S. Eisenberg and U. Ravaioli, "BioMOCA – a Boltzmann transport Monte Carlo model for ion channel simulation," *Molecular Simulation*, vol. 31, pp. 151-171, 2005.
13. X.-F. Fan, X. Wang, B. Winstead, L.F. Register, U. Ravaioli and S.K. Banerjee, "Monte Carlo simulation of strained-Si MOSFET with full-band structure and quantum correction," *IEEE Transactions on Electron Devices*, vol. 51, pp. 962-970, 2004.
14. B. Winstead and U. Ravaioli, "A quantum correction based on Schrodinger equation applied to Monte Carlo device simulation", *IEEE Transactions on Electron Devices*, vol. 50, pp. 440-446, 2003.
15. G. Kathawala, B. Winstead, and U. Ravaioli, "Monte Carlo simulation of double-gate MOSFETs," *IEEE Transactions on Electron Devices*, vol. 50, pp. 2467-2473, 2003.

Selected Synergistic Activities

1. Co-founder (with K. Hess) - NSF National Center for Computational Electronics, UIUC, 1988-2000.
2. Editorial Board Memberships: *Semiconductor Science and Technology*, 1996-1999; *Journal of Computational Electronics*, 2001- pres.; *Journal of Computational and Theoretical Nanoscience*, 2003-pres.; *International Journal of Numerical Modeling*, 2010-2015.
3. Senior Academic Lead, overseeing the Computational Electronics and Nanoelectronics activities in the DoD Programming Environments and Training (PET) Program, DoD Major Shared Resource Center at the Wright-Patterson AFB Aeronautical Science Center, Dayton, OH, 1996-2001.
4. Organizer or co-organizer of numerous events, including: Summer School on Computational Materials Science, "Introduction to Computational Nanotechnology," UIUC, June 7-18, 2004; Chair of XIV International Conference on Non-equilibrium Carrier Dynamics in Semiconductors (HCIS 14), Chicago, July 25-19, 2005; Organizer, Summer School on Computational Material Science, "Multiscale Theory, Simulation, and Reality at the Nano-Bio Interface," University of Illinois, Urbana, August 1-10, 2007
5. PI – Nanobio Node of the Network for Computational Nanotechnology, 2012-2015
6. Lead for Cyber-infrastructure development – NIH Big Data to Knowledge (BD2K) Center of Excellence "A Knowledge Engine for Genomics (KnowEnG)", 2014-2019
7. Co-Chair, NIH Commons Work Group on Workflow Sharing and Docker Registry, 2016-2017

Selected Awards

- Campus Award for Excellence in Undergraduate Advising, UIUC, 2011
- First Place Outstanding Paper Award: Z. Aksamija and U. Ravaioli, "Joule Heating and Phonon Transport in Nanoscale Silicon MOSFETs," 2007 IEEE International Conference on Electron Information Technology, Chicago, IL, May 17-20, 2007.