

**ARIZONA STATE UNIVERSITY**  
Ira A. Fulton Schools of Engineering

**GOODNICK, Stephen Marshall**

Professor, School of Electrical Computer and Energy Engineering, Arizona State University

**DEGREES**

- Ph.D., Electrical Engineering, Colorado State University, 1983
- M.S., Electrical Engineering, Colorado State University, 1979
- B.S., Engineering Science, Trinity University, Texas, 1977

**ACADEMIC POSITIONS**

- Deputy Director, ASU Lightworks, 2011-present
- Hans Fischer Senior Fellow, Technical University of Munich Institute for Advanced Study, 2013-16.
- Director of the Arizona Initiative for Renewable Energy, 2007-2010
- Associate Vice President for Research, Arizona State University, 2006-2009
- Director Arizona Institute of Nanoelectronics, 2006-present
- Interim Deputy Dean, Ira A. Fulton School of Engineering, Arizona State University 2005-2006
- Chair and Professor, Department of Electrical Engineering, Arizona State University, Fall 1996-2005
- Visiting Professor, Department of Electronic Engineering, Osaka University, Japan, Aug-Sept. 1995
- Alexander von Humboldt Research Fellow, Technische Universität, München, Germany, 1995
- Professor, Oregon State University, 1993-1996
- Associate Director, NSF/IUCRC Center for the Design of Analog-Digital Integrated Circuits (CDADIC), 1993-1994.
- Associate Professor, Oregon State University, 1990-1993
- Melchor Visiting Chair, University of Notre Dame, Fall 1991
- Assistant Professor, Oregon State University, 1986-1990
- Alexander von Humboldt Research Fellow, Technische Universität, München, Germany, 1986
- Visiting Scientist, Dipartimento di Fisica, Università di Modena, Italy, 1985-1986
- Assistant Professor, Colorado State University, 1984-1985
- Faculty Research Associate, Colorado State University, 1983-1984
- Graduate Research Associate, Colorado State University, 1977-1983

**NON-ACADEMIC POSITIONS**

- Visiting Professional, Solar Energy Research Institute, 5/85-8/85
- Visiting Professional, Sandia National Laboratories, Albuquerque, NM, 9/94-2/95

**FIELDS OF SPECIALIZATION**

Solid State Device Physics, Transport in Nanostructures, Nanoelectronic Devices and Circuits, Computational Electronics, RF and Microwave Devices, Optoelectronic and Energy Conversion Devices.

**HONORS AND AWARDS**

- Arizona State University Top 5 Percent Faculty at the Ira A. Fulton Schools of Engineering, 2016.
- Hans Fischer Senior Fellow, Technical University of Munich Inst. for Advanced Study, 2013-2016.
- IEEE Region 6 Outstanding Educator Award, 2013
- IEEE Phoenix Section Outstanding Faculty Award, "For Exemplary Leadership in Academic Teaching and Research as Well as Outstanding Contributions to IEEE Spanning Three Decades, February 9<sup>th</sup>, 2013.

ASEE ECE Division Meritorious Service Award (2012), 'For meritorious service to engineering education through leadership in the Electrical and Computer Engineering Department Heads Association, through leadership in Eta Kappa Nu, and service to engineering educators through ASEE and other associations.'

Robert M. Janowiak Outstanding Leadership and Service Award, Electrical and Computer Engineering Department Heads Association, 2008.

Fellow, IEEE (2004), 'For contributions to carrier transport fundamentals and semiconductor devices,' IEEE Microwave Theory and Techniques Society, Certificate of Recognition for Contributions as Vice-Chair of the 2001 MTT-S International Microwave Symposium (2002)

IEEE Phoenix Section, Service Award, 2002

Colorado State University College of Engineering Achievement in Academia Award, 1998

College of Engineering Research Award, Oregon State University, 1996

Alexander von Humboldt Research Fellow, Federal Republic of Germany (1986, 1995)

Melchor Visiting Chair, College of Engineering, the University of Notre Dame (1991)

Eta Kappu Nu National Electrical Engineering Honor Society

Blue Key National Honor Fraternity

### **PROFESSIONAL SOCIETIES**

Institute of Electrical and Electronic Engineers, IEEE (m 1987; sm 1990; f 2004)

American Physical Society (member, 1983-present)

Materials Research Society

Optical Society of America

Founding Member, Arizona Arts, Science, and Technology Academy (AASTA), 2004-2008

International Society for Optical Engineering, SPIE

Sigma Xi Scientific Research Society (1980-present)

Electrical and Computer Engineering Department Heads Association (1996-2006)

American Society of Engineering Education (ASEE) (1999-present).

American Association for the Advancement of Science (AAAS) (2001-present)

### **PROFESSIONAL SERVICE**

President, Board of Directors, International Engineering Consortium (IEC), 2009-present.

Member at Large, Board of Governors, Electrical and Computer Engineering Department Heads Association (ECEDHA), 2012-present.

Member, International Scientific Advisory Board for NanoLund, Lund University, Sweden, 2016-present

Past President, IEEE Nanotechnology Council, 2014-2015.

President, IEEE Nanotechnology Council, 2012-2013.

Past President, Eta Kappa Nu, Electrical and Computer Engineering Honor Society Board of Governors, 2013.

President, Eta Kappa Nu, Electrical and Computer Engineering Honor Society Board of Governors, 2011-2012.

Member, IEEE Educational Activities Board, 2011-2013.

Member, IEEE Technical Activities Board, 2012-2013.

President Elect, IEEE Nanotechnology Council, 2011.

Vice-President, Eta Kappa Nu, Electrical and Computer Engineering Honor Society Board of Governors, 2008-2010.

Past President (04-06), Electrical and Computer Engineering Department Heads Association (ECEDHA)

President (03-04), Electrical and Computer Engineering Department Heads Association (ECEDHA)

Vice-President (02-03), Electrical and Computer Engineering Department Heads Association (ECEDHA)

Secretary-Treasurer (01-02), Electrical and Computer Engineering Department Heads Association (ECEDHA)

Board of Directors, International Engineering Consortium (IEC), 2006-present; Executive Committee 2007-present.

Western Regional Director, Eta Kappa Nu, Electrical and Computer Engineering Honor Society Board of Governors, 2004-2006.

External Reviewer, Texas Tech University, Electrical and Computer Engineering Department Program Review, October, 2006.

External Reviewer, Boise State University Electrical and Computer Engineering Department Ph.D. Program, September, 2005.

External Reviewer, Duke University Electrical and Computer Engineering Department Program Review, April 2005.

Advisory Board, Purdue NMI NanoHUB, 2004-2006.

External Advisory Board, Department of Electrical Engineering, SUNY Buffalo, 2004-2008.

IEEE Fellows Committee, 2010-2012.

IEEE MTT Liaison to the IEEE Nanotechnology Council, 2009-2010.

Chair, IEEE Technical Committee on Nanoelectronics, IEEE Nanotechnology Council, 2003-2010.

Nanoengineering Advisory Council, International Engineering Consortium, 2003-2006.

Functional Area Point of Contact, Electronics, Networks and Systems (ENS), Productivity Enhancement and Technology Transfer initiative, DoD High Performance Computing Modernization Program (2003-present).

Electron Device Society Representative, IEEE Waves and Devices Chapter, Phoenix Section, 1998-2008.

Advisory Board, National Science Foundation National Center for Computational Electronics (NCCE), 1988-1998

### **CONFERENCE AND WORKSHOP ORGANIZATION**

Vice-Chair, 2015 IEEE MTT-S International Microwave Symposium, Phoenix, AZ, May 18<sup>th</sup>-21<sup>st</sup>, 2015 (approximately 9,000 attendees).

General Co-Chair, 5<sup>th</sup> International Symposium on Advanced Nanodevices and Nanotechnology (ISANN); Waikoloa, HI, December 2015.

Co-Chair, Nano and Giga Challenges in Electronics and Photonics (NGC2014), Tempe, AZ, March 10-14, 2014.

General Co-Chair, 4<sup>th</sup> International Symposium on Advanced Nanodevices and Nanotechnology (ISANN); Maui, December 2013.

Technical Program Committee, Chair of the Track on Nanoelectronics: Devices – SET, RTD, QD, Molecular, Memristors, 13<sup>th</sup> IEEE Conference on Nanotechnology (IEEE Nano 2012), Beijing, China, August 2013.

US Co-Chair, 2012 Workshop on Innovative Nanoscale Devices and Systems (WINDS), Kohalo HI, Dec. 3-7th, 2012 (~80 attendees)

Co-Chair, Nanotechnology Conference, Barnaul, Russia, Sept. 2012 (300 attendees).

Technical Program Committee, IEEE International Microwave Symposium (IMS 2012), Montreal, CA, 2012 (~10,000 attendees)

Technical Program Committee, Chair of the Track on Nanoelectronics: Devices – SET, RTD, QD, Molecular, Memristors, 12<sup>th</sup> IEEE Conference on Nanotechnology (IEEE Nano 2012), Birmingham, UK, August 2012.

International Advisory Committee, 15<sup>th</sup> International Workshop on Computational Electronics

(IWCE), Madison, WI, May 22, 2012.  
Program Chair, 17<sup>th</sup> International Conference on Electron Dynamics in Semiconductors, Optoelectronics, and Nanostructures (EDISON 17), Santa Barbara, August 2011.  
General Co-Chair, 3<sup>rd</sup> International Symposium on Advanced Nanodevices and Nanotechnology (ISANN); Maui, December 2011.  
Co-Chair, 11<sup>th</sup> IEEE Conference on Nanotechnology, Portland, OR, August 2011.  
General Chair, IEEE Si Nanoelectronics Workshop, Honolulu, June 2010.  
General Co-Chair, 2<sup>nd</sup> International Symposium on Advanced Nanodevices and Nanotechnology (ISANN); Maui, December 2009 (120 attendees).  
Program Chair, Ninth IEEE Conference on Nanotechnology, Genoa, Italy, August 2009 (400 attendees).  
Co-Chair, Nano and Giga Challenges in Electronics and Photonics (NGC2009), McMaster University, Aug, 2009.  
Chair, Advanced Heterostructure Workshop, Kona, HI, Dec 2006; US Co-Chair, 2002, 2004, 2008.  
General Chair, 1<sup>st</sup> International Symposium on Advanced Nanodevices and Nanotechnology (ISANN); Waikoloa, HI, 2007.  
Program Chair, Nano and Giga Challenges in Electronics and Photonics (NGC2007), Tempe, AZ, March 12-16<sup>th</sup>, 2007.  
Co-Chair (with K. Jenkins, K. Connor), NSF Workshop on the Impact of Globalization on Electrical and Computer Engineering Curricula of the Future, National Academy of Engineering, Washington DC, Nov. 2005.  
US General Chair, New Phenomena in Mesoscopic Systems/Surfaces and Interfaces in Mesoscopic Devices; Maui, HI, 2005; US Co-Chair (with D. K. Ferry) 2003, Maui, HI.  
Program Chair, Fourth IEEE Conference on Nanotechnology, Munich, Germany, August 2004.  
Chair, Fourth International Symposium on Nanostructures and Mesoscopic Systems, Tempe, AZ, February 2003.  
Co-Chair (with J. Aylor, K. Jenkins), NSF Workshop on Nano-Engineering Education, Santa Clara Convention Center, January 27-28, 2003.  
Organizer (with W. Porod), Tutorial on Nanoelectronic Circuits and Systems, 2002 IEEE International Symposium on Circuits and Systems, Scottsdale, AZ, June, 2002.  
Organizer (with W. Porod), Special Session: Towards Nanoelectronic Integrated Circuits, 2002 IEEE International Symposium on Circuits and Systems, Scottsdale, AZ, June, 2002.  
Chair, International Conference on Hot Carriers in Semiconductors, Sante Fe, NM, July 2001  
Vice-Chair (with S. El-Ghazaly), 2001 IEEE MTT-S International Microwave Symposium, Phoenix, AZ, May 2001 (approximately 11,000 attendees)  
Co-Chair (with Y.-H. Zhang), SPIE Conference on Materials for High-Speed Detectors, Denver, CO, July 1999.  
Chair, 3<sup>rd</sup> International Workshop on Computational Electronics (IWCE), Portland, OR, May 1994  
Organizing Committee, NSF Workshop on Globalization Effects on ECE Education for the Engineering Profession Workshop, Santa Clara, CA, February, 2008.  
Technical Program Committee 6, Non-Linear Device Modeling, IEEE MTT-S International Microwave Symposium, 2000-2006  
Program Committee, 2005 International Semiconductor Device Research Symposium, Bethesda, MD Dec. 2005.  
Program Committee, SPIE Conference on Nanotechnology II, Seville, Spain, May 2005.  
Program Committee, IEEE CPMT and WAD Workshop on Devices and Packaging for Wireless Communications, Arizona State University, Nov. 2004.  
Program Committee, IEEE CPMT and WAD Workshop on Devices and Packaging for Wireless Communications, Arizona State University, Nov. 2003.

Program Committee, IEEE CPMT and WAD First Annual Workshop on RF Devices and Packaging for Wireless Communications, Arizona State University, Nov. 2002.

Program Committee, Third International Symposium on Nanostructures and Mesoscopic Systems, Santa Fe, NM, May 1996

Program Committee, Int. Conf. on Hot Carriers in Semiconductors, Kyoto, Japan, July 1999

Program Committee, 6<sup>th</sup> Int. Workshop on Computational Electronics, Osaka, Japan, October, 1998

Program Committee, Workshop on Surfaces and Interfaces in Mesoscopic Devices, Kona, HI, December, 1997

Program Committee, 5<sup>th</sup> Int. Workshop on Computational Electronics, Notre Dame, IN, May 1997

Program Committee, Advanced Heterostructure Workshop, Kamuela, HI, December 1996

Program Committee, 4<sup>th</sup> Int. Workshop on Computational Electronics, Tempe, AZ, October 1995

Program Committee, Workshop on Surfaces and Interfaces in Mesoscopic Devices, Kona, HI, April 1994

Advisory Committee, Third International Symposium on New Phenomena in Mesoscopic Structures, Maui, HI, December 1995

International Advisory Committee, Int. Conf. on Hot Carriers in Semiconductors, 1993-present

Advisory Committee, 2<sup>nd</sup> Int. Workshop on Computational Electronics, Leeds, England, August 1993

Advisory Committee, 1<sup>st</sup> International Workshop on Computational Electronics, Urbana, IL, May 1992

Advisory Committee, Workshop on Computational Electronics, Urbana, IL, May 1991

Advisory Committee, Workshop on Computational Electronics, Urbana, IL, May 1990

## **EDITORIAL AND REVIEW SERVICE**

Editor in Chief, The Journal of Computational Electronics, Springer-Verlag; 2016-present.

Guest Editor (with A. di Carlo, G. di Marco, M. Pagliaro, and S. M. Pietruszko), special issue on “Thin Film Photovoltaics,” International Journal of Photoenergy, 2010.

Report Coordinator (with C. C. Liu), Agents of Change: Achieving Diversity in Electrical and Computer Engineering Research and Education, NSF Workshop, June, 2003.

Guest Editor, IEEE Transactions on Education, special issue on “Vision of ECE Education in 2013 and Beyond,” Vol. 46(4), 2003.

Associate Editor, and Editorial Board Member, Journal of Computational Electronics, Device and Circuit Interactions, 2001-2015.

Editor (with J. Bird and D. K. Ferry) Proceedings of the 12<sup>th</sup> International Conference on Nonequilibrium Carrier Dynamics in Semiconductors, Special Issue of Physica B, 2002.

Guest Editor (with A. Csurgay and W. Porod), Special Issue: Nanoelectronic Circuits, International Journal of Circuit Theory and Applications, Vols. 28 (6), 29(1) 2000-2001.

Editor, Proceedings of the 4<sup>th</sup> International Workshop on Computational Electronics, Oregon State University Press 1994.

Referee for Technical Journals: Review approximately 15 journal articles per year for *Journal of Applied Physics*, *Applied Physics Letters*, *Physical Review*, *Physical Review Letters*, *Physica Status Solidi*, *IEEE Trans. Education*, *IEEE, Trans. Elec. Devices*, *Electron Device Letters*, *J. Cond. Matt. Phys*, *J. Physics* and *Thin Solid Films*, etc.

## **UNIVERSITY SERVICE**

*Arizona State University*

Deputy Director, ASU Lightworks, 2010-present

Associate Vice President for Research, Arizona State University, 7/2006-2009

Interim Deputy Dean, Ira A. Fulton School of Engineering- 6/2005-6/2006

Director of Nanoelectronics, Fulton School of Engineering- 2006-2009

University Administrative Council, 2005-2008

Deans Advisory Council- FSE external advisory group, 1996-2006

Deans Administrative Council- 1996-2006

Faculty Representative, Federal Demonstration Partnership, 2009-2011.

Chair, Fulton Engineering Energy Search Committee, 2009-2010.

Chair, International Programs Committee-Coordinates international programs in FSE, 2003-2008

Chair, High Performance Computing Initiative- Initial proposal for Fulton high performance computing initiative in FSE, 2003-2004.

NCA Human Resources Committee- University accreditation subcommittee, 2000-2001

Academic Chairs and Directors Council (ACDC)- Part of leadership development program at ASU, representing all Academic Chairs and Research Center Directors, 1996-2005

-ACDC Steering Committee member- 2000-2005

-ACDC Steering Committee Chair- 2001-2003. Specific programming overseen included:

- ACDC/AADC (Academic Associate Deans Council) annual retreats in August, 2001-2003
- Response to 9/11- Special panel meeting organized to inform administrators of emergency response plans, disaster resources, counseling, etc. (Oct. 2001)
- First New and Continuing Department Chairs Workshop- workshop organized to provide first time chairs with information on leadership skills, university resources, faculty development, etc. (Jan. 2003)
- Workshops on Academic Leadership
- Meeting with President on changes to Promotion and Tenure at ASU (April 2003)
- Diversity training for Chairs and Directors
- Distance education
- Teaching assessment

Chair, Search Committee for the Lead Development Officer in FSE, 2004

Chair, Search Committee for Chair of the Department of Mechanical and Aerospace Engineering, 2000-2001

Chair, Search Committee for the Associate Dean for Planning and Administration, 1998-1999.

Chair, Search Committee for the Associate Dean of Research, 1999-2000

Faculty Advisor, Eta Kappa Nu (HKN), Electrical Engineering Honor Society 2003-present.

Member, ABET Accreditation Committee, EE Department

#### *Oregon State University*

Chair, ECE Department Faculty Search Committee (1993-1996)

ECE Department Promotion and Tenure Committee (1994-1995)

Department Advisory Committee (1991-1992)

Undergraduate Committee

Graduate Committee

Eta Kappa Nu Advisor

## **PUBLICATIONS**

### **Books**

1. D. K. Ferry and S. M. Goodnick, *Transport in Nanostructures*, Cambridge University Press, (Cambridge, U.K., 512 pages) 1997.
2. D. Vasileska and S. M. Goodnick, *Computational Electronics*, Synthesis Lectures on Computational Electromagnetics #6, (Morgan & Claypool Publishers, 208 pages) 2006.
3. D. K. Ferry, S. M. Goodnick, and J. Bird, *Transport in Nanostructures*, 2<sup>nd</sup> Ed., Cambridge University Press, (Cambridge, U.K., 650 pages) 2009.

4. D. Vasileska, S. M. Goodnick, and G. Klimeck, *Computational Electronics: Semi-Classical and Quantum Device Modeling and Simulation*, (Taylor and Francis, UK, 600 pages) 2010.
5. *Nanoscale materials and devices for electronics, photonics and solar energy* (A. Korin, S. M. Goodnick, and R. Nemanich, eds. Aug 26 2015 Springer International Publishing. 274 pages).

### Book Chapters

1. S.M. Goodnick and D.K. Ferry, "III-V Inversion-Layer Transport," (with D.K. Ferry), in *Physics and Chemistry of III-V Compound Semiconductor Interfaces*, (C.W. Wilmsen, Ed.), Plenum Publishing Corp., pp. 283-326, 1986.
2. S.M. Goodnick and P. Lugli, "Monte Carlo Study of Hot Electron Transport in GaAs-AlGaAs Quantum Wells," in *High-Speed Electronics*, (B. Kallack and H. Beneking, eds.), Springer-Verlag, pp. 116-119, 1986.
3. S.M. Goodnick, "Structure of the Si/Oxide Interface," in *Properties of Silicon, EMIS Datareviews Series 4*, Institute of Electrical Engineers, pp. 647-649, 1988.
4. S.M. Goodnick, "Monte-Carlo Simulation of Femtosecond Carrier Relaxation in Semiconductor Quantum Wells," in *Spectroscopy of Semiconductor Microstructures*, (G. Fasol, A. Fasolino, and Paolo Lugli, Eds.), NATO ASI Series B: Physics, Vol. 206, Plenum Press, New York, pp. 561-585, 1990.
5. U.A. Ranawake, P.M. Lenders, and S.M. Goodnick, "Parallelization of Monte Carlo Algorithms in Semiconductor Device Physics on Hypercube Multiprocessors," in *Computational Electronics*, Kluwer Academic Publishers, pp. 137-141, 1991.
6. A. Weisshaar, J. Lary, S.M. Goodnick, and V.K. Tripathi, "Negative Differential Resistance in a Double-Constriction Quantum Wire Structure," in *Granular Nanoelectornics*, (D.K. Ferry, J.R. Barker, and C. Jacoboni, Eds.), NATO ASI Series B: Physics, Vol. 251, Plenum Press, New York, pp. 543-547, 1991.
7. S.M. Goodnick and P. Lugli, "Hot Carrier Relaxation in Quasi-2D Systems," in *Hot Carriers in Semiconductor Microstructures: Physics and Applications*, (J. Shah, Ed.), Academic Press Inc., pp. 191-234, 1992.
8. W. Yindepol, A. Chin, A. Weisshaar, S.M. Goodnick, J.C. Wu, and M.N. Wybourne, "Interference Phenomena Due to Bend Discontinuities in Point Contact Structures," in *Nanostructures: Physics and Fabrication* (W.P. Kirk and M.A. Reed, Eds.), pp. 139-149, 1992.
9. A. Ecker, S.M. Goodnick, C. Berven, and M.N. Wybourne, "Nonequilibrium Phenomena in Split Gate Quantum Waveguides," in *Quantum Transport in Ultrasmall Devices*, (D.K. Ferry, H.L. Grubin, C. Jacoboni, and A.-P. Jauho, Eds.), Plenum Press, NATO ASI Series B: Physics, Vol. 342, pp. 505-508, 1995.
6. D. K. Ferry and S. M. Goodnick, "Ensemble Monte Carlo Simulations of Ultrafast Phenomena in Semiconductors," in *Ultrafast Phenomena in Semiconductors* (Kong-Thon Tsen, Ed.), Springer-Verlag, New York, pp. 307-352, 2001.
7. S. M. Goodnick and D. Vasileska, "Computational Electronics", *Encyclopedia of Materials: Science and Technology*, Vol. 2, Ed. By K. H. J. Buschow, R. W. Cahn, M. C. Flemings, E. J. Kramer and S. Mahajan, Elsevier, New York, 2001.
8. M. Reigrotzki, J. R. Madureira, A. Kuligk, N. Fitzer, R. Redmer, S. M. Goodnick and M. Dür, "Impact Ionization and High Field Effects in Widebandgap Semiconductors," in *Topics in High Field Transport in Semiconductors*, Ed. by K. F. Brennan and P. Paul Ruden (World Scientific, Singapore, 2001) pp. 149-162.
9. D. Vasileska, D. K. Ferry, and S. M. Goodnick "Computational Nanoelectronics," Chapter 125 in the *Handbook of Theoretical and Computational Nanotechnology*, M. Rieth and W. Schommers, Eds., (American Scientific Publishers, 135 pages) 2006.
10. S. M. Goodnick, "Transport in Nanostructures," Chapter 6 in *Nanoelectronics and Photonics:*

*From Atoms to Materials, Devices and Architectures*, A. Korkin and F. Rosei Ed. (Springer Science, New York), 2008.

11. D. Vasileska, K. Raleva and S. M. Goodnick, "Monte Carlo Device Simulations," Chapter 15 in *Applications of Monte Carlo Method in Science and Engineering*, Ed. (Shaul Mordechai, Ed., In Tech) ISBN: 978-953-307-691-1, 2011.
12. R. Akis, D. K. Ferry, M. J. Gilbert, and S. M. Goodnick, "Quantum Transport at the Nanoscale," Chapter 5 in the *Handbook of Nanoscience, Engineering, and Technology*, pp. 45-65, 3<sup>rd</sup> Edited by W. A. Goddard III, S. E. Lyshevski, G. J. Iafrate, and D. W. Brenner (CRC Press Taylor and Francis Group, Boca Raton FL) 2012.
13. S. M. Goodnick, N. Faleev, and C. Honsberg, "Nanoscale Photovoltaics and the Terawatt Challenge," in *Nanostructure Science and Technology: Nanoscale Applications for Information and Energy Systems*, pp. 77-117, A. Korkin and D. J. Lockwood Eds. (Springer Science, New York) 2013.
14. K. Raleva, A. R. Shaik, R. Hathwar, A. Laturia, S. S. Qazi, R. Daugherty, D. Vasileska and S. M. Goodnick, "Monte Carlo Device Simulations", in book entitled "Handbook of Optoelectronic Device Modeling and Simulation", Taylor & Francis Books (2017), Editor: Joachim Piprek

#### Technical Journals

1. G. Cheek, N. Inoue, A. Genis, S.M. Goodnick, C. Wilmsen, and J.B. DuBow, "Fabrication and characterization of indium tin oxide (ITO)/polycrystalline silicon solar cells," *Appl. Phys. Lett.* 33, 643 (1978).
2. N. Inoue, S.M. Goodnick, and C.W. Wilmsen, "EBIC and scanning light spot technique for investigating the response of polycrystalline solar cells," *Solar Cells I*, 233 (1979).
3. S.M. Goodnick, J.F. Wager, and C.W. Wilmsen, "Thermal degradation of Indium-Tin-Oxide/p-silicon solar cells," *J. Appl. Phys.* 51, 527-531 (1980).
4. S.M. Goodnick, M. Fathipur, D. Ellsworth, and C.W. Wilmsen, "Effects of a thin SiO<sub>2</sub> layer on the formation of metal-silicon contacts," *J. Vac. Sci. Tech.* 18, 949-954 (1981).
5. J.F. Wager, D.L. Ellsworth, S.M. Goodnick, and C.W. Wilmsen, "Composition and thermal stability of thin native oxides on InP," *J. Vac. Sci. Tech.* 19, 513 (1981).
6. S.M. Goodnick, R. Gann, D.K. Ferry, C.W. Wilmsen, and O.L. Krivanek, "Surface roughness induced scattering and band tailing," *Surf. Sci.* 113, 233-238 (1982).
7. S.M. Goodnick and D.K. Ferry, "Electron transport in inversion and accumulation layers of III-V compounds," *Thin Solid Films* 103, 27-46 (1983).
8. S.M. Goodnick, J.R. Sites, K.S. Yi, D.K. Ferry, and C.W. Wilmsen, "Valley splitting on tilted Si(100) surfaces," *Phys. Lett.* 97A, 111-113 (1983).
9. S.E. Goodnick, W. Porod, R.O. Grondin, S.M. Goodnick, C.W. Wilmsen, and D.K. Ferry, "A Monte Carlo study of Si(111) surface oxidation," *J. Vac. Sci. Tech.* B1, 767-772 (1983).
10. S.M. Goodnick, R. Gann, J.R. Sites, D.K. Ferry, C.W. Wilmsen, D. Fathy and O.L. Krivanek, "Surface roughness scattering at the Si-SiO<sub>2</sub> interface," *J. Vac. Sci. Tech.* B1, 803-808 (1983).
11. S.M. Goodnick, T. Hwang and C.W. Wilmsen, "New model for slow current drift in InP MISFETs," *Appl. Phys. Lett.* 44, 453-455 (1984).
12. K.M. Geib, S.M. Goodnick, D.Y. Lin, R.G. Gann, C.W. Wilmsen, and J.F. Wager, "Influence of interfacial structure on the electronic properties of SiO<sub>2</sub>/InP MISFETs," *J. Vac. Sci. Tech.* B2, 516 (1984).
13. Z. Liliental, O.L. Krivanek, J.F. Wager, and S.M. Goodnick, "The structure of the InP/SiO<sub>2</sub> interface," *Appl. Phys. Lett.* 46, 889-891 (1985).
14. O.L. Krivanek, Z. Liliental, J.F. Wager, R.G. Gann, S.M. Goodnick, and C.W. Wilmsen, "A combined HREM, XPS, and electrical properties study of the InP-SiO<sub>2</sub> interface," *J. Vac. Sci. Tech.* B3, 1081-1086 (1985).



15. S.M. Goodnick, D.K. Ferry, C.W. Wilmsen, Z. Liliental, D. Fathy, and O.L. Krivanek, "Surface roughness at the Si(100)-SiO<sub>2</sub> interface," *Phys Rev. B* **32**, 8171-8186 (1985).
16. P. Lugli and S.M. Goodnick, "Monte Carlo study of hot electrons in quantum wells," *Superlattices and Microstructures* **2**, 335-338 (1986).
17. P. Lugli and S.M. Goodnick, "Non-equilibrium LO phonon effects in GaAs/AlGaAs quantum wells," *Phys. Rev. Lett.* **59**, 716-719 (1987).
18. G.R. Baily, R.E. Owens, C.W. Wilmsen, and S.M. Goodnick, "Two dimensional electron transport in InP surface layers," *J. Vac. Sci. Tech. B* **5**, 976 (1987).
19. S.M. Goodnick and P. Lugli, "Subpicosecond dynamics of electron injection into GaAs/AlGaAs quantum wells," *Appl. Phys. Lett.* **51**, 584-586 (1987).
20. S.M. Goodnick and P. Lugli, "Electron-electron scattering during photoexcitation in quantum wells," *Solid State Electronics* **31**, 463-466 (1988).
21. S.M. Goodnick and P. Lugli, "The effect of electron-electron scattering on nonequilibrium transport in quantum well systems," *Phys. Rev. B* **37**, 2578-2588 (1988).
22. S.M. Goodnick and P. Lugli, "The influence of electron-hole scattering on sub-picosecond carrier relaxation in AlGaAs/GaAs quantum wells," *Phys. Rev. B* **38** (Rapid Communications), 10135-10138 (1988).
23. S.M. Goodnick and P. Lugli, "Monte Carlo simulation of intersubband relaxation in semiconductor quantum wells," *Superlattice and Microstructures* **5**, 561-563 (1989).
24. P. Lugli, P. Bordone, L. Reggiani, M. Rieger, P. Kocevar, and S.M. Goodnick, "Monte Carlo studies of nonequilibrium phonon effects in polar semiconductors and quantum wells, part 1. laser photoexcitation," *Phys. Rev. B* **39**, 7852-7865 (1989).
25. M. Rieger, P. Kocevar, P. Lugli, P. Bordone, L. Reggiani, and S.M. Goodnick, "Monte Carlo studies of nonequilibrium phonon effects in polar semiconductors and quantum wells, part 2. Nonohmic Transport in n-type Gallium Arsenide," *Phys. Rev. B* **39**, 7866-7875 (1989).
26. S.M. Goodnick, J. Lary, R. Owen, O. Sri, and C.W. Wilmsen, "The influence of interfacial roughness on parallel transport at oxide-semiconductor and heterojunction interfaces," *J. Vac. Sci. Tech. B* **7**, 1035-1040 (1989).
27. A. Weisshaar, J. Lary, S.M. Goodnick, and V.K. Tripathi, "Analysis of discontinuities in quantum waveguide structures," *Appl. Phys. Lett.* **55**, 2114-2116 (1989).
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### Patents

1. "Multiterminal Lateral Hot-Electron Transistor," M. N. Wybourne, S. M. Goodnick, D. D. Smith, J. Wu, and C. Bervin, U.S. Patent No. 5,347,141, September 13, 1994.

### Invited Talks

1. S. M. Goodnick, "Electronic Transport in Semiconducting Quantum Levels and Superlattices," presented at the Oregon Materials Science Symposium, Corvallis, April 1987.
2. S. M. Goodnick, "Interface Effects in Semiconductor Devices," presented at the Workshop on Chemical Concepts for Ultrasmall Devices, Boston, October 1987.
3. S. M. Goodnick, "Monte Carlo Particle Simulation of Ultrafast Optical Experiments in Semiconductors," presented at the International Conference on Quantum Electronics and Laser Science, Baltimore, MD, April 1989.
4. S. M. Goodnick, "Monte Carlo Simulation of Femtosecond Carrier Relaxation in Semiconductor Quantum Wells," presented at the NATO Advanced Research Workshop on Spectroscopy of Semiconductor Microstructures, Venice, Italy, May 1989.
5. S. M. Goodnick, "Supercomputer Simulation of Ultra-Fast Phenomena in III-V Semiconductors," presented at the Fourth International Conference on Supercomputing and Third World Supercomputing Exhibition, Santa Clara, CA, May 1989.
6. P. Lugli, P. Bordone, S. Gualdi, and S. M. Goodnick, "Effect of Phonon Confinement in Quantum Well Systems," presented at the SPIE Symposium on Advances in Semiconductors and Superconductors, San Diego, CA, March 1990.
7. S. M. Goodnick, "Monte Carlo Modeling of Ultrafast Phenomena in Semiconductors," Scuola Nazionale del GNSM sul Spettroscopie e Processi Veloci nei Semiconduttori, Castro Marina, Italy, September 1990.
8. W. H. Knox, G. E. Doran, J. Cunningham, and S. M. Goodnick, "Femtosecond Spatiotemporal Field Measurements in GaAs Quantum Wells," presented at the Topical Meeting on Picosecond Electronics and Optoelectronics, Salt Lake City, March 1991.
9. W. Yindeepol, A. Chin, A. Weisshaar, S.M. Goodnick, J.C. Wu, and M.N. Wybourne, "Interference Phenomena Due to Bend Discontinuities in Point Contact Structures," presented at the International Symposium on Nanostructures and Mesoscopic Systems, Santa Fe, NM, May 1991.
10. S. M. Goodnick, "Monte Carlo Studies of Ultrafast Carrier Dynamics," presented at the Seventh

- International Conference on Hot Carriers in Semiconductors, Nara, Japan, July 1991.
11. S. M. Goodnick, "Transport in Point Contact Quantum Waveguide Structures," presented at the American Association for the Advancement of Science Symposium on Future Chemistry, February 11-16, 1993.
  12. A. Weisshaar, S. M. Goodnick, and V. K. Tripathi, "Quantum Waveguide Structures and Discontinuities," presented at the 7th International Workshop on Physics of Semiconductor Devices, New Delhi, India, December 1993.
  13. S. M. Goodnick, S. Pennathur and V. K. Tripathi, "3D Monte Carlo Simulation of Microwave and Optoelectronic Devices," presented at the 4th International Symposium on Recent Advances in Microwave Technology, New Delhi, India, December 1993.
  14. S. M. Goodnick, S. S. Pennathur, U. A. Ranawake, P. M. Lenders, and V. K. Tripathi, "Parallel Implementation of Monte Carlo Particle Simulation Coupled to Maxwell's Equations," Workshop on Parallel and Distributed Computing Techniques for Electromagnetic Modeling, Seattle, WA, June 1994.
  15. S. M. Goodnick, S. S. Pennathur, C. Koç, and V.K. Tripathi, "Dynamical Modeling of Terahertz Radiation Generation in Semiconductor Microstructures," presented at the 1995 Progress in Electromagnetics Research Symposium (PIERS), Seattle, WA, July 1995.
  16. I. Lee, S. Pennathur, K. Streicher, T.K. Plant, J.F. Wager, P. Vogl, and S.M. Goodnick, "High-Field Electron Transport of the ZnS Phosphor in AC Thin-Film Electroluminescent Devices," presented at the 22nd International Symposium on Compound Semiconductors, Cheju Island, Korea, August 1995; published in the *Proceedings*, Institute of Physics Conference Series 145, (Ed. By J-C Woo and Y.S. Park, IOP, Philadelphia), pp. 1229-1234, 1996
  17. J.C. Smith, C. Berven, S.M. Goodnick, and M.N. Wybourne, "Nonequilibrium Random Telegraph Switching in Quantum Point Contacts," presented at the Third International Symposium on New Phenomena in Mesoscopic Structures, Maui, HI, December 1995.
  18. M.N. Wybourne, J.C. Smith, C. Berven, and S.M. Goodnick, "Nonequilibrium Random Telegraph Switching in Quantum Point Contacts," presented at the Third International Symposium on Nanostructures and Mesoscopic Systems, Santa Fe, NM, May 1996.
  19. S.M. Goodnick, M. Dur, S.S. Pennathur, "Monte Carlo Simulations of High-Field Transport in Inorganic EL," presented at the 8<sup>th</sup> International Workshop on Electroluminescence, Berlin, Germany, August 1996; published in *Inorganic and Organic Electroluminescence*, (R.H. Mauch and H.E. Gumlich, eds.) Wissenschaft and Technik Verlag, Berlin, pp. 13-19, 1997.
  20. D. K. Ferry and S. M. Goodnick, "Ensemble Monte Carlo Simulations of Ultrafast Phenomena in Semiconductors," plenary talk presented at the SPIE Conference on Ultrafast Phenomena in Semiconductor II, San Jose, January, 1998; published in the *Proceedings of SPIE*, Vol. 3277, pp. 10-17, 1998.
  21. D. K. Ferry and S. M. Goodnick, Monte Carlo Simulations in Optical Devices: Some Successes and Some Problems," invited talk presented at the SPIE Conference on Ultrafast Phenomena in Semiconductor II, San Jose, January, 1998; published in the *Proceedings of SPIE*, Vol. 3283, pp. 366-374, 1998.
  22. S. M. Goodnick, M. Dür, R. Redmer, M. Reigrotzki, and N. Fitzer, Microscopic Modeling of High Field Transport in Wide Bandgap Materials, invited talk presented at the SPIE Conference on Ultrafast Phenomena in Semiconductor II, San Jose, January, 2000; published in the *Proceedings of the SPIE*, Vol. 3940, pp.217-224, 2000.
  23. S. M. Goodnick, "High Field Transport and Electroluminescence in Thin Film Electroluminescent Devices," invited talk at the WE-Hereaus-Stiftung Seminar on High-Field Transport in Semiconductors, Rostock-Warnemuende, Germany, May, 2000.
  24. S. M. Goodnick, "Transport in Semiconductor Quantum Dots," Workshop on Growth, Electronic and Optical Properties of Semiconductor Quantum Structures, Schloss Ringberg, Germany, Feb.

- 2001.
25. S. M. Goodnick, "Full Bandstructure Calculations for Transport in Wide-Band-Gap Semiconductors," invited talk at the Advanced Research Workshop on Quantum Transport in Semiconductors, Maratea, Italy, June 2001.
  26. M. Tomeh, S. Goasguen, S. M. El-Ghazaly and S.M. Goodnick, "A Global Modeling Approach For Semiconductor And Electro-optic Device Simulation;" invited presentation at the ISSSE 2001 Taipei., July 2001.
  27. S. M. Goodnick, "Nonlinear Transport in Semiconductor Nanostructures," invited presentation at the Special Workshop Commemorating Chihiro Hamaguchi, Osaka, Japan, July 2001.
  28. S. El-Ghazaly, S. Goodnick, S. Sebastien, and R. Grondin, "Global Modeling of High-Frequency and High-Speed Circuits: Alternatives and Compromises;" invited presentation at the 31st Proc. European Microwave Conference Workshop on EM Modeling and CAD for Guided Wave Microwave Components and Antennas, London, UK, Sept. 2001.
  29. S. El-Ghazaly, V. Nair, And S. Goodnick, "Recent Trends and Enabling Technologies in RF and Microwave Applications;" invited presentation at the 2001 Asia Pacific Microwave Conference, Dec. 2001.
  30. C. Gerousis, S. M. Goodnick, W. Porod, and A. I. Csurgay, "High-speed and low-power cellular non-linear networks using single-electron tunneling technology," invited presentation in the special session: "Towards Nanoelectronic Integrated Circuits," 2002 IEEE International Symposium on Circuits and Systems, Scottsdale, AZ, June, 2002.
  31. S. M. Goodnick, "Future Nanotechnology Technical Directions," invited panel presentation, NanoEngineeringForum, Boston, MA, June 2003.
  32. S. M. Goodnick and B. Sullivan, "Nanoengineering Education," invited presentation at the NanoEngineeringForum, Boston, MA, June 2003.
  33. S. M. Goodnick, "Nanoelectronics: A Tutorial," half day tutorial presented at the 3<sup>rd</sup> International Conference on Nanotechnology, San Francisco, CA, Aug. 2003.
  34. S. M. Goodnick, "Nanoelectronics: A Tutorial," half day tutorial presented at the 4<sup>th</sup> International Conference on Nanotechnology, Munich, Germany, Aug. 2004.
  35. S. M. Goodnick, "Nanoelectronics: Near-Term and Long-Term Opportunities," invited presentation at the IEEE Biotech Conference as part of the IEEE AdCOM meeting, Nov. 2004 (attended by Presidents or representatives of the IEEE Societies and the IEEE President and President Elect).
  36. S. M. Goodnick, C. Gerousis, R. Archibald, R. A. Kiehl, and F. Hoppenstaedt, "Cellular Single-Electron Transistor Circuits and Architectures," invited presentation at Second Conference on Nanoscale Devices and System Integration (NDSI'05), April 2005.
  37. S. Yamakawa, J. Branlard, M. Saraniti, and S. M. Goodnick, "High Field Transport in GaN and AlGa<sub>N</sub>/GaN Heterojunction Field Effect Transistors," invited presentation at the 14<sup>th</sup> International Conference on Nonequilibrium Carriers in Semiconductors, Chicago IL, July 2005.
  38. Á. I. Csurgay, W. Porod\* and S. M. Goodnick, "The Circuit Paradigm in Nanoelectronics – Field-Coupled and Hybrid Nanoelectronic Circuits," Plenary talk, European Conference on Circuit Theory and Design, ECCTD 2005, Cork, Ireland, Aug. 2005.
  39. S. M. Goodnick and M. Saraniti, "Cellular Monte Carlo simulation of high field transport in semiconductor devices," invited talk, International Workshop on Terahertz Nano Devices, Aizu, Japan, Oct. 16-19<sup>th</sup>, 2006.
  40. S. Yamakawa, M. Saraniti, S. M. Goodnick, "High Field Transport in GaN and AlGa<sub>N</sub>/GaN Heterojunctions," Invited talk at SPIE Photonic West'07 International Symposium on Ultrafast Phenomena in Semiconductors and Nanostructures XI, San Jose, CA, Jan. 2007.
  41. S. M. Goodnick, "Photovoltaics Research in the Arizona Institute for Renewable Energy," invited

- talk, International Symposium on Innovative Solar Cells 2009,” University of Tokyo, Tokyo, Japan, March 2-3, 2009.
42. S. M. Goodnick and C. Honsberg, “Nanostructured & High Efficiency Photovoltaics,” International School on Nanophotonics and Photovoltaics, Maratea, Italy 17-24 September 2009.
  43. S. M. Goodnick and C. Honsberg, “Modeling carrier relaxation in hot carrier solar cells,” invited talk at the SPIE Photonics West 2012, San Jose, CA, January 2012; Published in Proc. SPIE 8256, 82560W (2012).
  44. S. M. Goodnick, “Terahertz Devices and Device Modeling,” Invited talk at the IEEE Phoenix Waves and Devices Chapter 2012 Technical Workshop on Millimeter Wave to Terahertz Devices and Technologies, April 27, 2012, Tempe, Arizona.
  45. S. M. Goodnick, S. Limpert, C. Honsberg and P. Lugli, “Simulation of Carrier Relaxation in Hot Carrier Solar Cells,” invited talk at the 38<sup>th</sup> IEEE Photovoltaics Specialists Conference (PVSC), Austin, TX, June 2012.
  46. D. Guerra, D. K. Ferry, M. Saraniti, and S. M. Goodnick, “Millimeter-wave power amplifier circuit-device simulations through coupled Harmonic Balance-Monte Carlo particle-based device simulator,” invited presentation at the Focus/Special Session on Coupled Multi-Physics Modeling of High-Power & High-Frequency Electronic Devices, at the IEEE MTT-S International Microwave Symposium 2012, 17-22 June 2012.
  47. S. M. Goodnick and C. Honsberg, “Ultrafast Carrier Relaxation in Hot Carrier Solar Cells,” invited talk at the Materials Research Society XXI International Materials Research Congress 2012, Cancun, Mexico, August 12-17<sup>th</sup>, 2012.
  48. S. M. Goodnick, C. Honsberg, and Y. Zou, “Ultrafast Carrier Relaxation Processes in Advanced Concept Solar Cells,” OSA Topical Meeting on Optics for Solar Energy (SOLAR), Tucson AZ, October 2013.
  49. R. Soligo, M. Saraniti, and S. M. Goodnick, “Terahertz devices and device modeling,” invited talk at the SPIE Conference on Micro- and Nanotechnology Sensors, Systems, and Applications VI, May 5<sup>th</sup>, 2014, Baltimore Md.; Proceedings of the SPIE, Int. Soc. Opt. Eng. (USA) 9083, 90830B (13 pp.) (2014); DOI: 10.1117/12.2049599.
  50. S. M. Goodnick, “Pathways to Next Generation Photovoltaics,” invited presentation in the 2014 American Association for the Advancement of Science (AAAS) Annual Meeting in Chicago, special session on *Nanoelectronics for Renewable Energy: How Nanoscale Innovations Address Global Needs*, February 13-17, 2014.
  51. S. M. Goodnick, F. Ponce, W. A. Doolittle, C. B. Honsberg, D. Vasileska, S. Choudhry, Srabanti, C. Arena, and P. Gleckman, “A hybrid concentrating solar thermal/ photovoltaic system using a high temperature III-nitride photovoltaic device,” Optics for Solar Energy, OSE 2014.
  52. S. M. Goodnick, “Nanotechnology Pathways to Next-Generation Photovoltaics,” invited tutorial presentation at the 15th IEEE Conference on Nanotechnology (IEEE Nano 2015), Rome, Italy, August 2015.
  53. S. M. Goodnick, “Pathways to Next-Generation Photovoltaics,” Invited talk presented at the Materials Research Society Symposium, March 28-April 1 2016, Phoenix, AZ.
  54. R. Nemanich, F. Koeck, M. Dutta, S. Chowdhury, R. Hathwar, and S. Goodnick, "High Voltage Epitaxial p-i-n Diodes on (100) and (111) Diamond Substrates," Invited talk presented at the Materials Research Society Symposium, Nov. 28-Dec. 2, 2016, Boston, MA.

#### Conference Publications and Presentations

1. S. M. Goodnick, N. Inoue, and C. W. Wilmsen, “EBIC and Scanning Light Spot Technique for Investigating the Response of Polycrystalline Solar Cells,” presented at the SERI Workshop on Polycrystalline Thin Film Solar Cells, Arlington, VA, June 1979.
2. S. M. Goodnick, J.F. Wager, and C.W. Wilmsen, “Degradation of ITO/p-Si Solar Cells,”

- presented at the 14th IEEE Photovoltaics Specialists Conference, San Diego, CA, January 1980.
3. S. M. Goodnick, R. Gann, D. K. Ferry, C.W. Wilmsen, and O.L. Krivanek, "Surface Roughness Induced Scattering and Band Tailing," presented at the Fourth International Conference on Electronic Properties of Two-Dimensional Systems, New London, NH, August 1981.
  4. S.M. Goodnick, R. Gann, D.K. Ferry, C.W. Wilmsen, and O.L. Krivanek, "Surface Roughness Scattering in the Inversion Layer of n-Channel Si MOSFETS," presented at the American Physical Society Meeting, Dallas, TX, March 1982.
  5. K.S. Yi, S.M. Goodnick, and D.K. Ferry, "The Many-Body Effects on Subband Structure of n-Type Surface Space Charge Layers in (100) InP," presented at the American Physical Society Meeting, Los Angeles, CA, March 1983.
  6. S.E. Goodnick, W. Porod, R.O. Grondin, S.M. Goodnick, C.W. Wilmsen, and D.K. Ferry, "A Monte Carlo Study of Si(111) Surface Oxidation," presented at the 10th Annual Conference on the Physics and Chemistry of Semiconductor Interfaces, Santa Fe, NM, January 1983.
  7. S.M. Goodnick, R. Gann, J.R. Sites, D.K. Ferry, C.W. Wilmsen, D. Fathy and O.L. Krivanek, "Surface Roughness Scattering at the Si-SiO<sub>2</sub> Interface," presented at the 10th Annual Conference on the Physics and Chemistry of Semiconductor Interfaces, Santa Fe, NM, January 1983.
  8. R.O. Grondin, P. Lugli, S.M. Goodnick, and D.K. Ferry, "Electron Transport in Submicron Devices," presented at the Meeting of the Metallurgical Society of the AIME, Philadelphia, PA, October 1983.
  9. K.M. Geib, S.M. Goodnick, D.Y. Lin, R.G. Gann, C.W. Wilmsen, and J.F. Wager, "The Influence of Interfacial Structure on the Electronic Properties of SiO<sub>2</sub>/InP MISFETs," presented at the 11th Annual Conference on the Physics and Chemistry of Semiconductor Interfaces, Pinehurst, NC, January 1984.
  10. D.Y. Lin, R.G. Gann, K.M. Geib, S.M. Goodnick, and C.W. Wilmsen, "The Influence of Oxide Traps on Drift in SiO<sub>2</sub>/InP MOSFETs," presented at the Workshop on Dielectric Systems for the III-V Compounds-1984, San Diego, CA, June 1984.
  11. S.M. Goodnick, Z. Liliental, O.L. Krivanek, and C.W. Wilmsen, "Surface Roughness of Si(100)/SiO<sub>2</sub> Interface versus Carrier Mobility," presented at the 1984 Materials Research Society Meeting, Boston, MA, November 1984.
  12. P. Lugli, L. Reggiani, C. Jacoboni, and S.M. Goodnick, "Studio Monte Carlo di Elettroni Caldi in Strutture "quantum well"," presented at the Microelectronics Conference, Genoa, Italy, June 1986 (in Italian).
  13. S.M. Goodnick and P. Lugli, "The Role of Hot-Phonons on the Energy Relaxation of Photoexcited Electrons in GaAs-GaAlAs Quantum Wells: A Monte Carlo Study," presented at the 18th International Conference on the Physics of Semiconductors, Stockholm, Sweden, August 1986.
  14. S.M. Goodnick and P. Lugli, "Monte Carlo Study of Hot Electron Transport in GaAs-GaAlAs Quantum Wells," presented at the High Speed Electronics Conference, Stockholm, Sweden, August 1986.
  15. P. Lugli, S.M. Goodnick, and F. Koch, "Monte Carlo Study of Hot Electrons in Quantum Wells," presented at the 2nd International Conference on Superlattices, Göteborg, Sweden, August 1986.
  16. G.R. Baily, R.E. Owens, C.W. Wilmsen, and S.M. Goodnick, "Two Dimensional Electron Transport in InP Surface Layers," presented at the 14th Annual Conference on the Physics and Chemistry of Semiconductor Interfaces, Salt Lake City, January 1987.
  17. S.M. Goodnick, "Ballistic Electrons in 2D Systems," presented at the Workshop on Ballistic Electrons, Santa Barbara, March 1987.
  18. S.M. Goodnick, "Electron-Electron Scattering During Photoexcitation in Quantum Wells," presented at the 5th International Conference on Hot Carriers in Semiconductors, Boston, July

- 1987.
19. R. Brunetti and S.M. Goodnick, "A Monte Carlo Analysis of Diffusion-Noise Properties on GaAs/AlGaAs," presented at the ESSDRC Meeting in Bologna, Italy, September 1987.
  20. S.M. Goodnick and P. Lugli, "Monte Carlo Simulation of Subpicosecond Phenomena in Semiconductor Quantum Wells and Superlattices," presented at the SPIE Symposium on Advances in Semiconductors and Superconductors, Newport Beach, CA, March 1988.
  21. P. Lugli and S.M. Goodnick, "Monte Carlo Probe of Ultrafast Phenomena in Polar Semiconductors," presented at the SPIE Symposium on Advances in Semiconductors and Superconductors, Newport Beach, CA, March 1988.
  22. S.M. Goodnick and P. Lugli, "Monte Carlo Simulation of Intersubband Relaxation in Semiconductor Quantum Wells," presented at the 4th International Conference on Superlattices, Microstructures and Microdevices, Trieste, Italy, August 1988.
  23. S.M. Goodnick, J. Lary, R. Owen, O. Sri, and C.W. Wilmsen, "The Influence of Interfacial Roughness on Parallel Transport of Oxide-Semiconductor and Heterojunction Interfaces," presented at the Sixteenth Annual Conference on the Physics and Chemistry of Semiconductor Interfaces, Bozeman, MT, January 1989.
  24. S.M. Goodnick, "Monte Carlo Simulation of Femtosecond Spectroscopy in Semiconductor Heterostructures," presented at the Topical Meeting on Quantum Wells for Optics and Optoelectronics, Salt Lake City, UT, March 1989.
  25. S.M. Goodnick, "Intersubband Relaxations of Electrons and Holes in  $\text{Al}_x\text{Ga}_{1-x}\text{As}/\text{GaAs}$  Quantum Wells During Photoexcitation," presented at the Topical Meeting on Picosecond Electronics and Optoelectronics, Salt Lake City, March 1989.
  26. P. Lugli, P. Bordone, S. Gualdi, P. Poli, and S.M. Goodnick, "Hot Phonons in Quantum Well Systems," presented at the 6th International conference on Hot Carriers in Semiconductors, Scottsdale, AZ, July 1989.
  27. J. Lary, S.M. Goodnick, P. Lugli, D.Y. Oberli, and J. Shah, "Intersubband Relaxation of Hot Carriers in Coupled quantum Wells," presented at the 6th International Conference on Hot Carriers in Semiconductors, Scottsdale, AZ, July 1989.
  28. S.M. Goodnick, P. Lugli, W.H. Knox, and D.S. Chemla, "Monte Carlo Simulation of Femtosecond Spectroscopy in Semiconductor Heterostructures," presented at the 6th International Conference on Hot Carriers in Semiconductors, Scottsdale, AZ, July 1989.
  29. H. Yoo, S.M. Goodnick, J.R. Arthur, and M.A. Reed, "Phonon Assisted Tunneling in Lattice-Matched and Pseudomorphic Resonant Tunneling Diodes," presented at the Tenth Molecular Beam Epitaxy Workshop, Raleigh, NC, September 1989.
  30. H. Yoo, S.M. Goodnick, and J.R. Arthur, "Electric and Magnetic Field Study of Spacer Layer Thickness Effects in AlGaAs/InGaAs Resonant Tunneling Diodes," presented at the SPIE Symposium on Advances in Semiconductors and Superconductors, San Diego, CA, March 1990.
  31. J. Lary, S.M. Goodnick, and P. Lugli, "Intersubband Relaxation of Hot Carriers in Coupled Quantum Wells," presented at the SPIE Symposium on Advances in Semiconductors and Superconductors, San Diego, CA, March 1990.
  32. A. Weisshaar, J. Lary, S.M. Goodnick, and V.K. Tripathi, "Application of a Mode-Matching Technique to Quantum Wire Transitions and Discontinuities," presented at the SPIE Symposium on Advances in Semiconductors and Superconductors, San Diego, CA, March 1990.
  33. A. Weisshaar, J. Lary, S.M. Goodnick, and V.K. Tripathi, "Negative Differential Resistance in a Double-Constriction Quantum Wire Structure," presented at the NATO Advanced Study Institute on Granular Nanoelectronics, Il Ciocco, Italy, July 1990.
  34. H. Yoo, S.M. Goodnick, and J. Arthur, "Transport in  $\text{Al}_x\text{Ga}_{1-x}\text{As}/\text{In}_y\text{Ga}_{1-y}\text{As}$  Resonant Tunneling Diodes with Asymmetric Layers," presented at the 6th International Conference on Molecular Beam Epitaxy, La Jolla, CA, August 1990.



35. S.M. Goodnick, J. Lary, and P. Lugli, "Intersubband Relaxation of Hot Carriers in Quantum Well Systems," presented at the 5th International Conference on Superlattices and Microstructures, Berlin, Germany, August 1990.
36. U.A. Ranawake, P.M. Lenders, and S.M. Goodnick, "Parallelization of Monte Carlo Algorithms in Semiconductor Device Physics," presented at Supercomputing '90, New York, November 12-16, 1990.
37. A. Weisshaar, S.M. Goodnick, and V.K. Tripathi, "Model Analysis Applied to Quantum Waveguide Structures and Discontinuities," presented at the Workshop on Granular Electronics, Urbana, IL, May 1991.
38. A. Weisshaar, J. Lary, S.M. Goodnick, and V.K. Tripathi, "Application of Microwave Techniques in the Analysis of Quantum Waveguide Structures and Devices," presented at the IEEE MTT-S International Microwave Symposium, Boston, MA, June 1991. Published in *IEEE MTT-S Intl. Microwave Symposium Digest*, pp. 481-484, 1991.
39. U.A. Ranawake, C. Huster, K. Bhattacharyya, P. Lenders, and S.M. Goodnick, "Effect of Electron-Electron Scattering on the Parallelization of Monte Carlo Algorithms on Multiprocessors," presented at Physics Computing '91 Conference, San Jose, June 10-14, 1991.
40. S. Luo, S.M. Goodnick, and V.K. Tripathi, "An Efficient Network Analog Method for Thermal Modeling of Semiconductor Devices and Packagings," presented at the SBMO International Microwave Conference, Rio de Janeiro, July 1991. Published in conference proceedings.
41. J. Lary and S.M. Goodnick, "Simulation of Electron Transport in High-Lying Superlattice Minibands," presented at the SPIE Symposium on Compound Semiconductor Physics and Devices, Somerset, NJ, 1992. Published in *SPIE Proceedings*, Vol. 1675, 1992.
42. L. Rota, F. Rossi, P. Lugli, E. Molinari, S.M. Goodnick, and W. Porod, "Monte Carlo Simulation of a True Quantum Wire," presented at the SPIE Symposium on Compound Semiconductor Physics and Devices, Somerset, NJ, 1992. Published in *SPIE Proceedings*, Vol. 1676, 1992.
43. J.C. Wu, M.N. Wybourne, A. Weisshaar, and S.M. Goodnick, "Resonance Phenomenon in Double Bend Point Contact Structures," presented at the SPIE Symposium on Compound Semiconductor Physics and Devices, Somerset, NJ, 1992. Published in *SPIE Proceedings*, Vol. 1676, 1992.
44. H.K. Harbury, W. Porod, and S.M. Goodnick, "Lateral p-n Junctions between Quasi Two-Dimensional Electron and Hole Systems at Corrugated GaAs/AlGaAs Interfaces," presented at the 19th Conference on the Physics and Chemistry of Semiconductor Interfaces, Death Valley, CA, January 1992.
45. L. Rota, S.M. Goodnick, W. Porod, F. Rossi, and P. Lugli, "Electron-Electron Interaction in Multisubband Quantum Wires," presented at the APS March meeting, Indianapolis, IN, March 1992.
46. H.K. Harbury, W. Porod, and S.M. Goodnick, "Lateral p-n Junctions between Quasi Two Dimensional Electron and Hole Systems at Corrugated GaAs/AlGaAs Interfaces," presented at the APS March meeting, Indianapolis, IN, March 1992.
47. M. Marconi, C. Menoni, O. Buccafusca, M. Prasat, J. Rocca, M. Hafich, G. Robinson, and S.M. Goodnick, "Photoexcited Carrier Relaxation in InGaP Bulk and InGaP-InAlP Multiple Quantum Wells," presented at the 1992 CLEO, March 1992.
48. H.K. Harbury, W.P. Porod, and S.M. Goodnick, "A Numerical Study of Lateral p-n Junctions between Quasi Two Dimensional Electron and Hole Systems at Corrugated GaAs/AlGaAs Interfaces," presented at the International Workshop on Computational Electronics, Urbana, IL, May 1992.
49. U. Ranawake, C. Huster, P. Lenders, and S.M. Goodnick, "The Three-Dimensional Monte Carlo Simulation of a Semiconductor on a Hypercube Multicomputer," presented at the International Workshop on Computational Electronics, Urbana, IL, May 1992.

50. K. Bhattacharyya, S.M. Goodnick, and J.F. Wager, "Monte-Carlo Simulation of High-Field Electron Transport in Alternating-Current Thin-Film Electroluminescent Devices," presented at the Sixth International Workshop on Electroluminescence, El Paso, TX, May 1992. Published in *Proceedings of the Sixth International Workshop on Electroluminescence*, (V.P. Singh and J.C. McClure, Eds.), Cinco Puntos Press, El Paso, TX, p. 54-59, 1993.
51. M.C. Marconi, C.S. Menoni, O. Buccafusca, M. Prasad, J.J. Rocca, M.J. Hafich, G.Y. Robinson, and S.M. Goodnick, "Photoexcited Carrier Relaxation in InGaP Bulk and InGaP-InAlP Multiple Quantum Wells," presented at the Quantum Electronics and Laser Science Conference, Anaheim, CA, May 1992.
52. A. Weisshaar, S.M. Goodnick, and V.K. Tripathi, "A Rigorous Method of Moments Solution for Curved Waveguide Bends and its Applications," presented at the IEEE International Microwave Symposium, Albuquerque, NM, June 1992. Published in *IEEE MTT-S International Microwave Symposium Digest*, pp. 975-978, 1992.
53. S.M. Goodnick and W. Knox, "Monte Carlo Simulation of Excitonic Photocurrent Transients in GaAs Quantum Wells," presented at the XVIII International Quantum Electronics Conference, Vienna, Austria, June 1992.
54. S.M. Goodnick, A. Weisshaar, J. Wu, M. Wybourne, and C. Berven, "Modeling of Nonequilibrium Transport in Lateral Hot Electron Devices," presented at the American Physical Society March Meeting, Seattle, WA, 1993.
55. C. Berven, J.C. Wu, M.N. Wybourne, S.M. Goodnick, and D.D. Smith, "Negative Differential Conductance Observed in Lateral Double Point Contact Devices," presented at the American Physical Society March Meeting, Seattle, WA, 1993.
56. A. Tomita, J. Shah, J.E. Cunningham, S.M. Goodnick, P. Lugli, and S.L. Chuang, "Hole Relaxation in n-Modulation-Doped Quantum Wells," presented at the American Physical Society March Meeting, Seattle, WA, 1993.
57. S. Pennathur, S.M. Goodnick, and V.K. Tripathi, "Parallelization of Monte Carlo Particle Simulation Coupled with Maxwell's Equations for Microwave/Optoelectronic Devices," presented workshop on Combined Self-Consistent Particle Transport Simulation and Full Wave Dynamic Field Simulation for Monolithic Solid State Device and Circuit Calculations, Microwave Theory and Techniques Symposium, Atlanta, GA, June 1993.
58. S. Pennathur, U.A. Ranawake, V.K. Tripathi, P. Lenders, and S.M. Goodnick, "PMC-3D: A Parallelized 3D Monte Carlo Simulator for Electronic and Electro-Optic Devices," presented at the International Workshop on Computational Electronics, Leeds, England, August 1993.
59. J.C. Wu, M.N. Wybourne, C. Berven, S.M. Goodnick, and D.D. Smith, "Negative Differential Conductance in a Lateral Hot Electron Quantum Dot Device," presented at the 8th International Conference on Hot Carriers in Semiconductors, Oxford, England, August 1993.
60. A. Tomita, J. Shah, J.E. Cunningham, S.M. Goodnick, P. Lugli, and S.L. Chuang, "Femtosecond Hole Relaxation in n-Modulation-Doped Quantum Wells," presented at the 8th International Conference on Hot Carriers in Semiconductors, Oxford, England, August 1993.
61. R.A. Höpfel, R. Rodrigues, Y. Iimura, N. Yasui, Y. Segawa, Y. Aoyagi, and S.M. Goodnick, "Intersubband Relaxation of Hot Excitons in GaAs Quantum Wells," presented at the 8th International Conference on Hot Carriers in Semiconductors, Oxford, England, August 1993.
62. S.M. Goodnick, S. Pennathur, P. Lugli, and M. Gulia, "Monte Carlo Simulation of Intersubband Relaxation in Single and Multiple Quantum Wells," presented at the SPIE OE LASE94 Technical Conference on Ultrafast Phenomena in Semiconductors, Los Angeles, CA, January 1994. Published in *Proceedings of the SPIE*, Vol. 2142, pp. 224-230, 1994.
63. L. Rota and S.M. Goodnick, "Impurity and Surface Roughness Scattering in Quantum Wires," presented at the Workshop on Surfaces and Interfaces in Mesoscopic Devices, Kona, HI, April 1994.

64. C. Berven, M.N. Wybourne, S.M. Goodnick, N. Harff, and D.D. Smith, "Non-Equilibrium Transport in Lateral Double Constriction Devices," presented at the Workshop on Surfaces and Interfaces in Mesoscopic Devices, Kona, HI, April 1994.
65. L. Rota and S.M. Goodnick, "Monte Carlo Study of Ionized Impurity Scattering in Quantum Wires," presented at the 3rd International Workshop on Computational Electronics, Portland, OR, May 1994.
66. S.S. Pennathur, K. Bhattacharrya, J.F. Wager, and S.M. Goodnick, "Fullband Ensemble Monte Carlo Modeling of High-Field Transport in the ZnS Phosphor of AC Thin Film Electroluminescent Devices," presented at the 3rd International Workshop on Computational Electronics, Portland, OR, May 1994.
67. A. Ecker, S.M. Goodnick, C. Berven, and M.N. Wybourne, "Nonequilibrium Phenomena in Split Gate Quantum Waveguides," presented at the NATO ASI on Quantum Transport in Ultrasmall Devices, Il Ciocco, Italy, July 1994.
68. D. Patel, C.S. Menoni, D.W. Schult, T. McMahon, and S.M. Goodnick, "Effect of Pressure on the Output Characteristics of p-GaAs/AlGaAs Heterojunction Field Effect Transistor," presented at the 6th International Conference on High Pressure Semiconductor Physics, Vancouver, Canada, August 1994.
69. S.S. Pennathur and S.M. Goodnick, "Monte Carlo Investigation of Three-Dimensional Effects in Sub-Micron GaAs MESFETs," presented at the 21st International Symposium on Compound Semiconductors, San Diego, CA, September 1994. Published in *Inst. Phys. Conf. Ser. No. 141*, Chap. 7, pp. 793-796, 1995.
70. S.M. Goodnick, A. Weisshaar, A. Ecker, and V.K. Tripathi, "Quantum Waveguide Structures and Devices," presented at the Workshop on Physics and Computation PhysComp'94, Dallas, TX, November 1994. Published in *Proceedings*, pp. 169-176.
71. S.M. Goodnick, "Nonlinear Transport in Quantum Dots and Split Gate Devices," presented at the Advanced Heterostructure Workshop, Kona, HI, December 1994.
72. A.S. Rong, S.M. Goodnick, V.K. Tripathi, H.X. Wang, S.L. Sun, and W.B. Dou, "Slow-Wave Phenomena and Pulse Distortions in Optically Excited Schottky-Contacted Coplanar Waveguide," presented at the 1995 IEEE MTT-S International Microwave Symposium, Orlando, FL, May 16-20, 1995. Published in *1995 IEEE MTT-S International Microwave Symposium Digest*, (L. Kirby, Ed.), IEEE, p. 3 vol. (lxxi+xli+1714), 641-644, vol. 2, 1995.
73. S. Pennathur, I. Lee, K. Streicher, T.K. Plant, J.F. Wager, P. Vogl, and S.M. Goodnick, "Hot Electron Excitation of Luminescent Impurities in AC Thin-Film Electroluminescent (ACTFEL) Devices," presented at the Ninth International Conference on Hot Carriers in Semiconductors, Chicago, August 1995. Published in *Hot Carriers in Semiconductors*, (K. Hess, J.P. Leburton, and U. Ravaioli, Eds.), Plenum Press, New York, pp. 373-376, 1996.
74. M.N. Wybourne, J.C. Smith, C. Berven, and S.M. Goodnick, "Nonequilibrium Transport and Current Instabilities in Quasi-1D Quantum Waveguides," presented at the Ninth International Conference on Hot Carriers in Semiconductors, Chicago, August 1995. Published in *Hot Carriers in Semiconductors*, (K. Hess, J.P. Leburton, and U. Ravaioli, Eds.), Plenum Press, New York, pp. 255-260, 1996.
75. J.C. Smith, C. Berven, M.N. Wybourne, and S.M. Goodnick, "Conductance Instabilities in Quantum Point Contacts," presented at the 11th International Conference on the Electronic Properties of Two-Dimensional Systems (EP2DS), Nottingham, UK, August 1995.
76. S. Pennathur, C.K. Sandalci, C.K. Koç, and S.M. Goodnick, "3D Parallel Monte Carlo Simulation of GaAs MESFETs," presented at the Fourth International Workshop on Computational Electronics, Tempe, AZ, October 1995.
77. N.E. Harff, J.A. Simmons, S.K. Lyo, J.E. Schirber, J.F. Klem, and S.M. Goodnick, "Giant Effective Mass Deviations Near the Magnetic Field-Induced Minigap in Double Quantum

- Wells,” presented at 22nd International Conference on the Physics of Semiconductors. Published in *Proceedings*, Vol. 1, pp. 831-834, 1995.
78. S.S. Pennathur and S.M. Goodnick, “Monte Carlo Investigation of Three-Dimensional Effects in Sub-Micron GaAs MESFETs,” presented at Twenty-First International Symposium on Compound Semiconductors. Published in *Proceedings*, (H. Goronkin and U. Mishra, Eds.), pp. 793-796, 1995.
  79. A.S. Rong, S.M. Goodnick, V.K. Tripathi, H.X. Wang, S.L. Sun, and W.B. Dou, “Slow-Wave Phenomena and Pulse Distortions in Optically Excited Schottky-Contacted Coplanar Waveguide,” presented at 1995 IEEE MTT-S International Microwave Symposium. Published in *Proceedings*, (L. Kirby, Ed.), Vol. 2, pp. 641-644, 1995.
  80. N.E. Harff, J.A. Simmons, S.K. Lyo, J.E. Schirber, J.F. Klem, and S.M. Goodnick, “Giant effective mass deviations near the magnetic field-induced minigap in double quantum wells,” *Proceedings of the 22nd International Conference on the Physics of Semiconductors*, vol. 1, pp. 831-4, 1995 (Best poster award).
  81. K. A. Remley, A. Weisshaar, S. M. Goodnick, V. K. Tripathi, and G. A. Koepf, “Far field radiation in sub-picosecond systems,” presented at the 1997 IEEE MTT-S International Microwave Symposium, published in the IEEE MTT-S Digest, Vol. 1, pp. 163-166, 1997.
  82. M. Reigrotzki, N. Fitzner, S. Pennathur, R. Redmer, W. Schattke, and S. M. Goodnick, “Impact ionization in GaAs and ZnS,” presented at the 8th International Workshop on Inorganic and Organic Electroluminescence, Berlin, Germany, Aug. 1996; published in *Inorganic and Organic Electroluminescence*, (R. H. Mauch and H. -E. Gumlich, Eds., Wissenschaft & Technik Verlag; Berlin, Germany) pp. 39-42, 1997.
  83. A. Bandyopadhyay, S. Subramanian, S. Chandrasekhar, and S. M. Goodnick, *1998 IEEE International Reliability Physics Symposium Proceedings, 36th Annual* (IEEE, New York, NY, USA) pp.98-102, 1998.
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- IEEE Int. Microwave Symposium (IMS 2014), Tampa, FL, June 1-6, 2014; IEEE MTT-S International Microwave Symposium Digest, 4 pages; DOI: 10.1109/MWSYM.2014.6848583.
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  202. R. Hathwar, M. Saraniti, and S. M. Goodnick, "Energy Relaxation and Non-linear Transport in InAs Nanowires," Journal of Physics: Conference Series, **647**, n 1, October 13, 2015, 19th International Conference on Electron Dynamics in Semiconductors, Optoelectronics and Nanostructures, EDISON 2015. DOI: 10.1088/1742-6596/647/1/012029.
  203. J.-Y. Choi, N. Vulic, S. M. Goodnick, and C. B. Honsberg, "Enhanced forward scattering and transmitted light diffraction in low aspect-ratio Si nanopillars for high efficiency Si solar cells," Proceedings of the 2015 IEEE 42nd Photovoltaic Specialist Conference (PVSC), pp. 1-5, 2015. DOI: 10.1109/PVSC.2015.7356120.
  204. P. Muralidharan, D. Vasileska, S. M. Goodnick, and S. Bowden, "A kinetic Monte Carlo approach to study transport in amorphous silicon/crystalline silicon HIT cells," Proceedings of the 2015 IEEE 42nd Photovoltaic Specialist Conference (PVSC), pp. 1-4, 2015. DOI:10.1109/PVSC.2015.7356048.
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- of the 2015 IEEE 42nd Photovoltaic Specialist Conference (PVSC), pp. 1-5, 2015. DOI:10.1109/PVSC.2015.7356338.
207. P. Muralidharan, S. Bowden, S. M. Goodnick, and D. Vasileska, "Multiscale modeling of silicon heterojunction solar cells," Proceedings of the 2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC), 5-10 June 2016, Portland, OR, 3547-51, 2016; DOI: 10.1109/PVSC.2016.7750331.
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  209. P. Luppina, S. Bowden, P. Lugli, and S. M. Goodnick, "Modeling of a gallium phosphide/silicon heterojunction solar cells." Proceedings of the 2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC), 5-10 June 2016, Portland, OR, 2467-72, 2016; DOI: 10.1109/PVSC.2016.7750087.
  210. R. Hathwar, M. Saraniti, S. M. Goodnick, "Carrier relaxation and impact ionization in core-shell III-V nanowires," Proceedings of the 16th International Conference on Nanotechnology - IEEE NANO 2016, Sendai Japan, Aug. 22-25, 2016, p 832-835, 2016, DOI: 10.1109/NANO.2016.7751540.
  211. Y. Fang, D. Vasileska, and S. M. Goodnick, "TCAD modeling of InGaN-based high temperature photovoltaic multiple quantum well solar cells," (Best Poster Award) Proceedings of the IMAPS 12th International Conference and Exhibition on Device Packaging, Fountain Hills, AZ, March 15-17, 2016; Publisher: IMAPS-International Microelectronics and Packaging Society, (3 pages) (2016). <https://www.scopus.com/record/display.uri?eid=2-s2.0-84995701356&origin=inward&txGid=3E33D4DBB0A70A7A0D2F21BB5528FC76.wsnAw8kcdt7IPYLO0V48gA%3a2>.
  212. J. J. Williams, H. McFavilen, A. M. Fischer, D. Ding, S. R. Young, E. Vadiie, F. Ponce, C. Arena, C. B. Honsberg, and S. M. Goodnick, "Development of a high-band gap high temperature III-nitride solar cell for integration with concentrated solar power technology," Proceedings of the 2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC), 5-10 June 2016, Portland, OR, 0193-5, 2016; DOI: 10.1109/PVSC.2016.7749576.
  213. P. Muralidharan, S. Bowden, S. M. Goodnick, D. Vasileska, "A multiscale modeling approach to study transport in silicon heterojunction solar cells," Proceedings of the IMAPS 12th Int. Conference and Exhibition on Device Packaging, Fountain Hills, AZ, March 15-17, 2016; Publisher: IMAPS-International Microelectronics and Packaging Society (3 pages) (2016). <https://www.scopus.com/record/display.uri?eid=2-s2.0-84995678156&origin=inward&txGid=3E33D4DBB0A70A7A0D2F21BB5528FC76.wsnAw8kcdt7IPYLO0V48gA%3a7>.

## RESEARCH

### Prior Sponsored Research Grants

- "High Energy Electron Injection Into Semiconductor Superlattices," Office of Naval Research, \$90,000/18 months, July 1, 1987 to December 31, 1988.
- "Simulation and Visualization of Electronic and Molecular Systems," (with H. Jansen, V.K. Tripathi, and J. Van Vechten), Office of Naval Research, \$150,000, equipment grant, November 30, 1988-November 30, 1989.
- "High Energy Electron Injection into Semiconductor Superlattices, Quantum Wells, and Quantum

- Wires,” Office of Naval Research, \$87,156, April 1, 1989 to July 30, 1991.
- “Investigations of Electron Waveguide Structures,” (with M. Wybourne), Tektronix, \$100,000, November 15, 1989 to November 15, 1991.
- NSF-REU Supplements for Carl Huster (1989), Allen Douglas (1990), and Andrew Churchill (1991), and E. Bjornson (1992) \$16,000.
- “InGaAs/GaAs Pseudomorphic HEMTs for High Speed Circuit Applications,” (with D. Allstot and J. Arthur), National Science Foundation, \$340,958, June 1, 1989 to November 30, 1992.
- “Parallelization of Monte Carlo Algorithms in Semiconductor Device Physics,” (with P. Lenders), National Science Foundation, \$229,663, August 15, 1989 to April 1, 1993.
- “Hot Electron Physics of Alternating-Current Thin-Film Electroluminescent Devices,” (with J.F. Wager), Army Research Office, \$325,000, July 15, 1991 to July 15, 1994.
- “Complementary Heterojunction Field Effect Transistors (C-HFETs) for Analog ICs,” CDADIC, \$40,000, February 1992 to July 1993.
- “Quantum Interference Phenomena and Single Electron Charging in Semiconductor Nanostructures,” Sandia National Laboratories/DOE, \$24,806, October 1992 to September 1993.
- “Physics and Device Technology of Single and Few Particle Systems,” (Lead PI, with M.N. Wybourne (UO)), Office of Naval Research DARPA ULTRA Program, \$450,177, April 15, 1993 to February 27, 1996.
- “Phosphor Technology Center of Excellence,” (with J.F. Wager, T.K. Plant, and M.D. Koretsky), DARPA, \$930,000 (OSU Budget), June 1, 1993-May 31, 1996 (Joint center with the Univ. Georgia, Univ. Florida, Penn. State, Georgia Tech., and David Sarnoff Research Center).
- “Complementary Heterojunction Field Effect Transistors (C-HEFTs) for Analog ICs,” (with J. Kenney), CDADIC, \$43,500, August 1993-July 1994.
- “Third International Workshop on Computational Electronics,” NSF, ONR, ARO, OJGSE, \$26,438, February 15, 1994 to February 14, 1995.
- “Hot Electron Physics of ACTFEL Devices: Phase II,” (with J.F. Wager and T.K. Plant), Army Research Office, \$150,000, July 15, 1994-July 15, 1997.
- “Parallelization of Particle Transport Algorithms in Semiconductor Device Physics,” (with C. Koç and V.K. Tripathi), National Science Foundation, \$356,349, March 1, 1994 to Nov. 30<sup>th</sup>, 1998.
- “Physics and Device Technology of Single and Few Particle Systems, Renewal,” (with M.N. Wybourne), ONR, \$150,000, March 1, 1996-October 1, 1999.
- “Physics and Device Technology of Single and Few Particle Systems,” DOD AASERT, \$154,490, July 1, 1996-July 1, 1999.
- “Radiation Physics and Reliability Issues in III-V Compound Semiconductor Nanoscale Heterostructure Devices,” (Lead PI, with S. Subramanian (OSU)), AFOSR, \$352,589, June 1, 1996-May 31, 1999.
- “TFEL Modeling and Characterization,” DARPA, \$120,000, Aug. 4<sup>th</sup>, 1996-Aug. 3<sup>rd</sup>, 1999.
- “Nanoelectronics: Low Power, High Performance Components and Circuits,” (Lead PI with J. Bird, D. K. Ferry, M. Kozicki, T. Thornton, and D. Vasileska; Subcontractors: Univ. California Berkeley, Univ. Illinois, and the Univ. Notre Dame), ONR MURI, \$5,555,000, April 30<sup>th</sup>, 1998-April 29<sup>th</sup>, 2003.
- “Transport in GaN Materials and Devices,” (Lead PI, with D. K. Ferry), ONR, \$450,000, 5/01/99-9/30/02.
- “Full-Band Particle Based Simulation for Three Dimensional Devices,” (Lead PI, with Dragica Vasileska, Marco Saraniti (Illinois Institute of Technology)), NSF, \$389,999, 9/15/99-8/31/02.
- “Program Environment and Training,” Department of Defense, Army, High Performance Computing Modernization Program, \$300,000, 6/1/2003-5/31/2005.
- “Ionic Channels as Natural Nanodevices,” (Lead PI, with Trevor Thornton), Rush Medical (through

- DARPA MOLDICE Program), \$450,000, 3/01/03-3/31/05.
- Spin Manipulation in Semiconductor Nanostructures,” (Lead PI, with Dragica Vasileska and Jon Bird (SUNY)), NSF Grant ECS-0224163, 10/1/2002-9/30/2007 (with extension)
- “Si Quantum Structures,” (Lead PI, with D. K. Ferry) Intel Research Council, \$450,000, 6/1/04-5/31/07
- “Global Modeling of High Frequency Circuits and Devices,” (Lead PI, with Samir El-Ghazaly, Marco Saraniti, Illinois Institute of Technology), \$360,000, 10/01/01-9/30/05.
- “Program Environment and Training,” Department of Defense, Army, High Performance Computing Modernization Program, \$187,000, 6/1/2005-5/31/2006.
- “High Performance Computing Modernization Program FAPOC KY6,” High Performance Technologies, Inc. (subcontract through the Department of Defense, Army, High Performance Computing Modernization Program), \$184,000, 6/1/2006-5/31/2007.
- “Engineered Bio-Molecular Nano-Devices/Systems”, Electronic Bio Sciences (integrator for DARPA MOLDICE Phase II) (Lead PI, with Trevor Thornton), \$1,720,000, 8/1/05-12/31/07.
- “High Performance Computing Modernization Program FAPOC KY7,” High Performance Technologies, Inc. (subcontract through the Department of Defense, Army, High Performance Computing Modernization Program), \$124,000, 6/1/2007-5/31/2008.
- “Simulation and Modeling of Sub-mm Wave HEMTs: Performance and Noise Properties,” (with David K. Ferry, PI), Army Research Laboratory/DARPA, \$522,347, 3/7/2006 – 9/30/2008.
- “In Situ Real-Time Atomic Scale Nanomaterials Synthesis, Characterization and Modeling for Undergraduate Education,” (Ray Carpenter, lead PI) NSF NUE 2006-2008.
- “Arizona State University Excellence in Engineering Through Diversity Fellowship,” Sandia National Laboratories, \$115,000, 8/2/2002 – 12/31/2008.
- “Paradigms for Parallel Computations,” High Performance Computing Inc.,” (with Daniel Stanzione, PI), \$256,500, 6/5/2007 – 9/4/2008.
- “High Performance Computing Modernization Program FAPOC KY8,” High Performance Technologies, Inc. (subcontract through the Department of Defense, Army, High Performance Computing Modernization Program), \$144,000, 6/1/2008-7/31/2009.
- “DSP Algorithms for Silicon Ion-Channel Sensors,” National Science Foundation (with Andreas Spanias, PI and Trevor Thornton), \$339,000, 8/15/2007 – 7/31/2010.
- “Integrating Energy Sustainability into Engineering Curricula using Cyberinfrastructure,” National Science Foundation (Lead PI, C. B. Honsberg, with S. Bowden and A. Korkin) \$150,000, 9/1/2009-8/31/2011.
- “Particle-based Modeling of GaN HEMT Technology: Scaling for Integration,” DoD DARPA (Lead PI, M. Saraniti) \$312,636, 3/30/2010-8/31/2011.
- “Terahertz Electronics”, DARPA (subcontract through Northrup-Grumman Aerospace Systems)(Lead PI, with D. K. Ferry and M. Saraniti), \$598,114, 6/15/2009-6/15/2012.
- “Modeling Heating Effects in Low-Power Multi-Gate SOI Devices and High-Power GaN HEMTs,” National Science Foundation (Lead PI, D. Vasileska), \$306,184, 8/15/2009-7/31/2012.
- “Multi-Scale Particle-Based Simulation of Disordered/Ordered Interfaces for High Efficiency Solar Cells,” National Science Foundation (Lead PI, C. B. Honsberg, with S. Bowden and M. Saraniti) \$316,000, 9/1/2009-8/31/2012.
- “Science Master’s Program: Solar Energy Engineering & Commercialization,” National Science Foundation (Lead PI P. Phelan, 10 other faculty) \$700,000, 7/1/2010 - 9/30/2013.
- “Particle-based Simulation of Microscopic Thermal Properties of Confined Systems,” DoD DARPA (M. Saraniti, Lead PI) \$695,463, 4/30/2010 - 10/30/2013.
- “Nanowire Specialty Diodes for Integrated Applications,” National Science Foundation, \$336,000, 9/15/2010 - 8/31/2013.

- “Performance Analysis and Transport Physics Modeling of III-V FETs Using Cellular Monte Carlo Simulation,” Intel Corporation (Lead PI, with M. Saraniti) \$480,000, 8/1/2009 - 7/31/2014.
- “Nonlinear Modeling of mm-wave Power Amplifiers through Particle-based Simulations,” DoD Office of Naval Research (Lead PI M. Saraniti) \$485,459.00, 1/1/2013 - 12/31/2015.
- “NSF Engineering Research Center for Quantum Energy and Sustainable Solar Technologies: QESST, Phase I,” National Science Foundation (C. B. Honsberg, Lead PI and Director; Thrust III Co-Lead on Advanced Enablers; 5% recognition; with Cal Tech, MIT, U. Delaware, U. Houston, U. New Mexico, and U. Arizona) \$18,500,000 8/15/2011-7/31/2016.
- “15th IEEE International Conference in Nanotechnology,” Office of Naval Research, \$15,000, 5/1/2015 - 4/30/2016.
- “2015 International Microwave Symposium Educational Initiatives in Phoenix AZ May 18-21, 2015,” National Science Foundation, \$20,000, 3/1/2015 - 2/29/2016.

### **Current Sponsored Research Support**

- “Thin Silicon Solar Cells: A Path to 35% Shockley-Queisser Limits,” DoE EERE Sunshot Program: FPACE II (S. Bowden, Lead PI; with M. Bertoni, Z. Holman, and C. B. Honsberg, ASU; T. Buonassisi, MIT; H. Atwater, Cal Tech; S. Bremner and M. Green, the University of New South Wales, Australia; S. de Wolf, EPFL, Switzerland; 20% recognition) \$3,496,535, 9/30/2013 - 10/31/2016.
- “NSF Engineering Research Center for Quantum Energy and Sustainable Solar Technologies: QESST, Phase II,” National Science Foundation (C. B. Honsberg, Lead PI and Director; Thrust III Co-Lead: Advanced Enablers; 5% recognition; with Cal Tech, MIT, U. Delaware, U. Houston, U. New Mexico, and U. Arizona) \$18,500,000, 8/1/2016-7/31/2021.
- “IGERT: Solar Utilization Network (SUN),” (W. Vermaas, Lead PI; with B. Rittmann, P. Phelan, and D. Guston) \$3,006,642, 7/1/2012 - 6/30/2017.
- “Diamond Power Transistors Enabled by Phosphorus Doped Diamond,” DoE Advanced Research Projects Agency-Energy Switches Program, (R. Nemanich, Lead PI; with S. Chowdhury; 25% recognition) \$2,311,055, 2/20/2014 - 11/30/2017.
- “High Temperature Topping Cells from LED Materials,” DoE Advanced Research Projects Agency-Energy FOCUS Program, (Lead PI, with S. Chowdhury, C. B. Honsberg, and F. Ponce, ASU; C. Arena, SOITEC; W. A. Doolittle, Georgia Institute of Technology) \$3,900,000, 6/1/2014-5/31/2017.

## **GRADUATE STUDENTS**

### **Ph.D. Dissertations Supervised**

1. Hyungmo Yoo, 1990, Ph.D. EE, OSU (co-advised with J. Arthur), “Effect of Structural Parameters on Resonant Tunneling Diode Performance.”
2. Jennifer Lary, 1991, Ph.D. EE, OSU, “Hot Electron Relaxation and Transport in Quantum Wells, and Superlattices.”
3. Andreas Weisshaar, 1991, Ph.D. EE, OSU (co-advised with V. J. Tripathi and R. Englebrecht), “Generalized Mode Matching Analysis of Electromagnetic and Quantum-Waveguide Structures and Discontinuities.”
4. Shankar Pennathur, 1994, Ph.D. EE, OSU, “Monte Carlo Device Modeling Applications on Parallel Computers.”
5. Donald W. Schulte, 1995, Ph.D. EE, OSU (co-advised with J. Arthur), “Growth and Characterization of III-V Compound Semiconductor Materials for use in Novel MODFET Structures and Related Devices.”



6. Nathan Harff, 1997, Ph.D., OSU (co-advised with J. Simmons, Sandia Labs), "Electron Transport in Coupled Double Quantum Wells and Wires."
7. Anasuya E. Krishnaswamy, 1999, Ph.D. EE, OSU, "Nonequilibrium Electron Transport in Quantum Dot and Quantum Point Contact Systems."
8. Allen Gunther, 1999, Ph.D. Physics, OSU, "Transport in Si Quantum Point Contact Structures."
9. Costa Gerousis, 2002, Ph.D. EE, ASU, "Design and Simulation of Cellular Non-Linear Networks using Single-Electron Tunneling Transistor Technology."
10. Shela J. Wigger, 2002, Ph.D. EE, ASU, "Modeling Ultra-Small Semiconductor Devices."
11. Yasser A. Hussein, 2003, Ph.D. EE, ASU, "Electromagnetic-Physics-Based Modeling of Microwave Devices and Circuits."
12. Muhammad Waliullah, 2003, Ph.D. EE, ASU (with S. El-Ghazaly), "Time Domain Analysis of Large-Signal Circuit-Based Fully Distributed Model for High-Frequency Multiple-Fingers FETs."
13. Yong-Hee Park, 2004, Ph.D. EE, ASU (with S. El-Ghazaly), "Novel Lateral RF MEMs Switch and its Application to Multi-Band Microstrip Antennas."
14. Shinya Yamakawa, 2005, Ph.D. EE, ASU, "Transport modeling in GaN materials and devices based on full-band Cellular Monte Carlo simulation."
15. Jason Ayubi-Moak, 2007, Ph.D., EE, ASU, "Global Modeling of Microwave Transistors Using a Full-Band Cellular Monte Carlo/Full-Wave Maxwell Simulator."
16. Himanshu Kothari, 2008, Ph.D. EE, ASU (with J. Bird), "Linear and non-linear conductance of ballistic quantum wires."
17. Taehoon Kim, 2008, Ph.D., EE, ASU (with J. Bird), "Novel hysteretic magneto-resistance in epitaxially grown NiSi<sub>2</sub> nanowires."
18. Adam Burke (with D. K. Ferry), 2009, Ph.D. EE, "Imaging Evidence of Scarred Wave Functions in InAs Open Quantum Dots via Scanning Gate Microscopy."
19. Timothy Day, 2010, Ph.D. EE, ASU, "Electron Transport through Magnetic Quantum Point Contacts."
20. Brian Tierney, 2011, Ph.D. EE, ASU, "Monte Carlo Studies of Electron Transport in Semiconductor Nanostructures."
21. Nishant Chandra, 2014, Ph.D. EE, ASU, "Nanowire Specialty Diodes for Integrated Applications."
22. Raghuraj Hathwar, 2016, Ph.D. EE, ASU, "Full Band Monte Carlo Simulation of Nanowires and Nanowire Field Effect Transistors."
23. Joshua Williams (co-advised with C. Honsberg), 2016, Ph.D. Materials Science and Engineering, ASU, "Engineering III-N Alloys and Devices for Photovoltaic Progress."
24. Natasha Vulic, Ph.D. Electrical Engineering, expected 2017.
25. Yongji Zou, Ph.D. Electrical Engineering, expected 2017.
26. Reza Vetan, Ph.D. Electrical Engineering, expected 2017.
27. Mehdi Saremi, Ph.D. Electrical Engineering, expected 2017.

### **M.S. Theses Supervised**

1. Chujyh Chang, 1989, M.S. EE, OSU, "Modeling and Characterization of HEMT Devices,"
2. Julius Orwa, 1989, M.S. Physics, OSU, "Two Dimensional Electron Transport in Pseudomorphic InGaAs-AlGaAs Heterojunctions."
3. Wipawon Yindeepol, 1989, M.S. EE, OSU, "Fabrication and Characterization of Modulation doped FETs for Quantum Waveguide Structures."
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