

## Narrative Vitae of

**GANG CHEN**

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**Gang Chen** is currently Carl Richard Soderberg Professor of Power Engineering of the Department of Mechanical Engineering at Massachusetts Institute of Technology (MIT). He attended Xiangfan No. 5 High School in China from 1978-1980. He received his bachelor and master degrees from the Power Engineering Department, Huazhong Institute of Technology (now Huazhong University of Science and Technology or HUST in short), China, in 1984 and 1987, respectively. He stayed at HUST as a lecturer from 1987-1989. In 1988, he was interviewed by Professor Chang-Lin Tien as a Ph.D. candidate to receive a fellowship from the K.C. Wong Education Foundation in Hong Kong. He joined Professor Tien's group first at UC Irvine in 1989 and then at UC Berkeley in 1990 when Professor Tien moved back to Berkeley as its Chancellor. He obtained his PhD degree from the Mechanical Engineering Department, UC Berkeley, in 1993, under Tien's supervision. He was an assistant professor at Duke University from 1993 to 1997, a tenured associate professor at University of California at Los Angeles, from 1997 to 2001. He joined MIT in 2001 as a tenured associate professor, and was promoted to full professor in 2004. He was named a Warren Faculty Scholar at Duke University (1996-1997), and was the first holder of the Warren and Towneley Rohsenow Professorship at MIT (2006-2009) before assuming the Soderberg Professorship from MIT School of Engineering in 2009. He served as the Department Head of the Department of Mechanical Engineering from July 2013 to June 2018. The MIT Department of Mechanical Engineering ranked No. 1 in both its undergraduate and graduate programs in most reputable rankings.

Professor Chen's research interests center on nanoscale transport and energy conversion phenomena, and their applications in energy storage, conversion, and utilization. He has made important contributions to the understanding of heat conduction in nanostructures such as ballistic and coherent heat conduction in quantum wells and superlattices via both modeling and experimental studies. He and his collaborators invented ways to extract phonon mean free path distributions in solids by exploiting ballistic phonon transport processes and advanced first principles simulation tools to compute phonon thermal conductivity. His group, working with collaborators, discovered Anderson localization in heat conduction and phonon hydrodynamics in graphite. He and his collaborators exploited the unique nanoscale heat conduction physics to advance the field of thermoelectric materials and their applications in solar thermal and waste heat recovery. He and his collaborators also discovered a few materials with thermal conductivity just below diamond. His group demonstrated that polymer nanofibers can be more thermally

conductive than most metals, and explained mechanisms why additives to liquids might significantly improve their thermal conductivity. In addition to nanoscale heat conduction and nanostructured thermoelectrics, Professor Chen's group also advanced the field of thermal radiation, including developing a method to measure radiation heat transfer between two surfaces down to nanometer separations and first experimental demonstration that radiative heat transfer at such small spacings can exceed the prediction of the Planck blackbody radiation law by three orders of magnitude, photon trapping in solar photovoltaic cells, solar thermal and solar steam generation. By exploring micro/nanoscale transport phenomena, Professor Chen's group is advancing a wide range of technologies such as thermoelectric cooling and power generation, solar thermal and solar photovoltaics, desalination, and thermal interface materials. Two of Professor Chen's inventions were selected by Scientific American as one of the annual top ten world changing ideas: one on directional solvent extraction technology for desalination and waste water treatment (2012) and one on using batteries to convert thermal energy into electricity (2014). Professor Chen authored a book entitled "Nanoscale Energy Transfer and Conversion: a parallel treatment of electrons, molecules, phonons, and photons"---the first textbook in the field and his lectures in videos are freely available online via the MIT Open Courseware program. He has published ~400 technical articles, 24 book chapters, and over 450 invited talks all over the world. According to Clarivate Analytics, he is among the world's most cited researchers in the physics and materials categories. Professor Chen has supervised ~80 M.S. and Ph.D. students thesis and over 60 post-docs and visiting scholars. More than 40 of his PhD students and post-docs are in academia. He has over 50 granted and pending patents, and cofounded several companies.

Professor Chen has done extensive service both within and outside MIT. He served as the Head of the MIT Mechanical Engineering Department and the director of the MIT Pappalardo Micro/Nano Engineering Laboratory. He served as the head of the Micro/Nano Engineering Area of the MIT Mechanical Engineering Department from 2005-2009 and from 2010 to 2012, served as a member of the Mechanical Engineering Department Council. He chaired the advisory board of the ASME Nanotechnology Institute from 2005-2008, and served on the advisory board of several other organizations. He is serving (or served) on the editorial/advisory board of seven journals. He led the first US Department of Defense Multidisciplinary University Research Initiative (MURI) on thermoelectric materials. He directed "Solid-State Solar-Thermal Energy Conversion Center (S3TEC)", an Energy Frontier Research Center funded by the US Department of Energy. He currently co-directs the Centers for Mechanical Research and Education at SUSTech and MIT.

Chen is a recipient of a K.C. Wong Education Foundation fellowship and a John Simon Guggenheim Foundation fellowship. He received an NSF Young Investigator Award, an R&D 100 award, a Heat Transfer Memorial Award from American Society of Mechanical Engineers, an Erigen Mededal from the Society of Engineering Science, a Nukiyama Memorial Award from the Japan Heat Transfer Society, a World Technology Award in Energy, and the MIT Capers and Marion McDonald Award for Excellence in Mentoring and Advising. He is a fellow of American Academy of Arts and Sciences, American Association for the Advancement of Science, American Physical Society, and American Society of Mechanical Engineers. He is an academician of Academia Sinica and a member of the US National Academy of Engineering.

# Curriculum Vitae

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### **Research Interests:**

Experimental, theoretical, and numerical study of fundamental thermal energy conversion and transport mechanisms at micro- and nanometer scales, with applications to thermoelectrics, photovoltaics, thermophotovoltaics, microelectronics and photonics; thermal and electrochemical energy storage, nanoengineered materials with high and low thermal conductivities; thermal interface materials; ultrafast transport processes; thermal radiation and electromagnetic metamaterials; nanofabrication; desalination and waste water treatment.

### **Education:**

University of California, Berkeley, Mechanical Engineering, Ph.D. 1993

Dual Minors in Thermodynamics and Electrical Engineering.

Thesis Advisor: NEC Distinguished Professor and Chancellor: Chang-Lin Tien.

Thesis Title: "Thermal Phenomena in Optical and Optoelectronic Thin Film Devices."

Huazhong University of Science and Technology, Power Engineering, Master Degree, 1987

Master Thesis Advisor: Professor and Chairman S. M. Cheng. Thesis Title:

"Heat Transfer and Fluid Flow around Droplet-Shaped Cylinders."

Huazhong University of Science and Technology, Power Engineering, Bachelor Degree, 1984

### **Professional Experience:**

7/04-present Professor, Mechanical Engineering Department, MIT.

9/18- Director, MIT Center, Centers for Mechanical Engineering Research and Education at SUSTech and MIT

7/13-6/18 Head, Mechanical Engineering Department, MIT

7/09-1/2019 Director, Solid-State Solar-Thermal Energy Conversion Center, an Energy Frontier Research Center Funded by US Department of Energy

7/01-6/04 Associate Professor, Mechanical Engineering Department, Massachusetts Institute of Technology.

11/96-6/01 Associate Professor, Mechanical and Aerospace Engineering Department, University of California at Los Angeles.

9/93-6/97 Assistant Professor, Department of Mechanical Engineering and Materials Science, Duke University.

7/93-8/93 Research Assistant Professor, Duke University.  
 6/93 Visiting Postdoctoral Research Engineer, University of California, Berkeley.  
 6/90-5/93 Graduate Student Research Assistant, University of California, Berkeley.  
 10/89-5/90 Graduate Student Research Assistant, University of California, Irvine.  
 5/87 - 9/89 Lecturer, Huazhong University of Science and Technology, China.

### **Awards and Honors:**

1/2019 TOAF Distinguished Lecture, RISUD, Hongkong Poly University  
 10/2018 Clarivate Analytics Highly Cited Researcher (physics and materials categories)  
 10/2018 Honorary Professor, Tsinghua University  
 10/2018 Distinguished Lecture, SUSTech  
 10/2018 Aurel Stodola Medal and Lecture, ETH  
 9/2018 CaseWestern Distinguished Seminar  
 9/2018 Byron Short Lecture, UT Austin  
 4/2018 Fellow, American Academy of Arts and Sciences  
 10/2017 Toderi-Callinan Lecture, Department of Mechanical Engineering, University of Pennsylvania  
 9/2017 Clarivate Analytics Highly Cited Researcher (physics category).  
 5/2017 C2C Award (Committed to Caring), MIT ODGE  
 1/2017 Distinguished Seminar, Hong Kong Polytechnique University  
 11/2016 Distinguished Colloquium, U. Chicago, Institute of Molecular Engineering  
 10/2016 Eringen Medal, Society of Engineering Science  
 Eringen Medal Symposium in Honor of Gang Chen, Society of Engineering Science, 53<sup>rd</sup> Annual Technical Meeting, Oct. 205, 2016  
 9/2016 Thomas Reuters Highly Cited Researcher (physics category).  
 8/2016 Distinguished Lecture, U. Virginia, Department of Mechanical Engineering  
 8/2016 Alwin Schaller Lecture, Department of Mechanical Engineering, UIUC  
 5/2016 David Goodwin Memorial Lecture, Caltech.  
 4/2016 Leaders in Engineering Lecture, RPI MANE.  
 3/2016 Distinguished Seminar, Department of Mechanical Engineering, Northeastern University  
 11/2015 World Technology Award in Energy  
 7/2015 William Mong Distinguished Lecture, University of Hong Kong.  
 1/2015 Institute of Advanced Studies Distinguished Seminar, Hong Kong University of Science and Technology.  
 12/2014 Batteries that Capture Low-Grade Waste Heat named by Scientific America Magazine as one of 10 World Changing Ideas.  
 7/2014 Academician, Academia Sinica, Taiwan  
 Citation: "For pioneering contributions in understanding heat transport and energy conversion mechanisms at micro- and nanometer scales; experimental demonstration of enhanced near-field thermal radiation heat transfer beyond the Planck law by three orders of magnitude; leading to significant advances in energy related materials and technology."  
 7/2014 Outstanding Alumni Award, Huazhong University of Science and Technology  
 5/2014 Nukiyama Memorial Award, Heat Transfer Society of Japan  
 5/2014 Penner Lecture, Department of Mechanical Engineering, UCSD.

- 1/2014 Distinguished Lecture, ME8888 Seminar, Ohio State University
- 4/2013 75<sup>th</sup> Anniversary Medal of the ASME Heat Transfer Division, for Service to the heat transfer community and contributions to the field
- 3/2013 George Persall Lecture, Duke University.
- 11/2012 Directional Solvent Extraction Technology Named by Scientific America Magazine as one of 10 World Changing Ideas.
- 11/2012 Fellow, American Physical Society  
Citation: "For pioneering contributions to the understanding of heat transfer at nanoscale and to the development of thermoelectric energy conversion technologies."
- 11/2012 Hawkins Lecture, Purdue University
- 9/2012 Springer Professor, UC Berkeley
- 7/2012 Guest Professor, Tsinghua University
- 6/2012 Distinguished Seminar, U. Toronto Mechanical Engineering Department.
- 11/2011 Distinguished Lecture, CMU Mechanical Engineering Department.
- 6/2011 Honorary Professor, Hubei University of Arts and Science, China
- 5/2011 Capers and Marion McDonald Award for Excellences in Mentoring and Advising, MIT School of Engineering.
- 2011 Distinguished Lecture, University of Connecticut, School of Engineering.
- 2010 JALA Ten 2010. Top ten breakthroughs listed by Journal of Association for Laboratory Automation.
- 2010 Honorary Professor, Shanghai University
- 2010 Member, National Academy of Engineering  
Citation: For contributions to heat transfer at the nanoscale and to thermoelectric energy conversion technology.
- 2009 AAAS Fellow  
Citation: For advances in understanding heat transfer at the nanoscale and in developing thermal energy technology.
- 2009 Carl Richard Soderberg Professor of Power Engineering, MIT School of Engineering
- 2009 Director, Solid-State Solar-Thermal Energy Conversion Center (S<sup>3</sup>TEC Center), Funded by the DOE Energy Frontier Research Center Program
- 2009 Dusenberre Distinguished Lecture, Penn State University, College Station.
- 2008 R&D 100 Award for High Performance Thermoelectric Materials
- 2008 ASME Heat Transfer Memorial Award, Science Category.  
Citation: For seminal and experimental contributions in the field of transport mechanisms at micro- and nanometer scales, with applications to energy conversion devices, and pioneering work on nanoengineered materials with high and low thermal conductivities.
- 2007 Honorary Professor, Huanan University of Science and Technology, China
- 2007 Guest Professor, Wuhan University of Science and Technology, China
- 2006 Fellow, ASME
- 2006-2009 Warren and Towneley Rohsenow Professorship, MIT
- 2006 Chair, Advisory Board, ASME Nanotechnology Institute

- 2005 Best Paper Award (Research Category), InterPACK'05 (the ASME/Pacific Rim Technical Conference and Exhibition on Integration and Packaging of MEMS, NEMS, and Electronic Systems, July 17-22, San Francisco).
- 2005-2009 Guest Professor, Xian Jiaotong University, China.
- 2004 NASA Space Act Tech Brief Award
- 2003 Organizer of the National Academy of Engineering Frontier of Engineering Symposium.
- 2002-2003 Guggenheim Fellowship.
- 1994-2001 National Science Foundation Young Investigator Award.
- 2000 Asia/Pacific-Who's Who, Vol. 3, p. 357.
- 9/00 Phi Tau Phi Member (honor society of Asian Americans).
- 1999- Guest Professor, Huazhong University of Science and Technology, China.
- 1998 American Men and Women of Science.
- 1998 Marquis Who's Who in Science and Engineering, 4th Edition.
- 1994-1997 Outstanding Reviewer for Journal of Heat Transfer.
- 1996-1997 Warren Faculty Scholar, Duke University.
- 1995, 2002 Invited participant of the NAE First Ann. Symp. Frontiers of Engineering.
- Fall, 92 Arthur Gould Tasheira Scholarship, University of California, Berkeley.
- 10/89-10/92 Scholarship, K.C. Wong Education Foundation, Hong Kong.  
Winter, 90, Fellowship, Dept. Mechanical Engineering, University of California, Irvine.

**Award Won by Students under Chen's Supervision:**

- 2010 Zhiting Tian, 3<sup>rd</sup> Prize, ASME Society Wide Micro/Nano Forum at IMECE, Vancouver, November 2010.
- 2008 HP best student paper award, 1<sup>st</sup> place, for paper presented by Sheng Shen, at International Mechanical Engineering Congress.
- 2008 Best paper award, Julius Springer Forum on Applied Physics 2008 for poster paper presented by Sheng Shen.
- 2012 Winner of the Student Poster Award for Thermoelectric Symposium. B. Liao, M. Zebarjadi, K. Esfarjani and G. Chen, Cloaking core-shell nanoparticles from conducting electrons in solids, poster presentation at Material Research Society Fall Meeting 2012, Boston, MA, Nov. 25-30, 2012 (B9.14).
- 2012 Winner of best poster award in Micro/Nanoscale Heat Transfer. Y. Hu, K. Collins, L. Zeng, M. Luckyanova, G. Chen, "Hybrid Nanostructures for Nanoscale Heat Transfer", IMECE2012-93899, Micro Nano Forum Poster Presentation, Houston, TX, Nov. 9-15, 2012.
- 2013 Zhiting Tian, MIT Graduate Women of Excellence
- 2013 Bolin Liao, 3<sup>rd</sup> Place, MIT ME De Florez Award
- 2013 Maria Luckyanova, winner of students and post-doc competition at 2013 DOE EFRC PI meeting, Washington, DC.
- 2013 Sangyeop Lee, Keivan Esfarjani, Tengfei Luo, Gang Chen, "Resonant Bonding Leads to Low Thermal Conductivity", IMECE2013-67320, ASME International Mechanical Engineering Conference and Exposition, November 15-21, 2013, San Diego, CA (the best poster award in the heat transfer category)

- 2014 Yuan Yang, 2<sup>nd</sup> Prize at Society Wide Micro/Nano Forum, for poster, “A Charging-free Electrochemical System for Low-grade Heat Harvesting” Yuan Yang, Seok Woo Lee, Yi Cui, and Gang Chen, International Mechanical Engineering Conference and Exposition, Montreal, Canada, November 14-20, 2014
- 2015 Yuan Yang received MRS Postdoctoral Award.
- 2016 Bolin Liao received Kavli Postdoc Fellowship and will join Zewail group as a post-doc at Caltech.
- 2018 Jiawei Zhou received Wunsch Foundation Silent Hoist and Crane Award – Outstanding Thesis, Mechanical Engineering Department, MIT, 2018

### **MIT and Department Service:**

- 9/97-8/99 Department Recruitment Committee, UCLA
- 8/97-8/98 Heat Transfer Major Field Chairman, UCLA
- 9/98-8/00 SEAS Executive Committee, UCLA
- 9/99-6/01 Graduate Curriculum Committee, UCLA
- 9/01-6/02 Energy Recruitment Committee, MIT
- 11/01-6/02 Microfluidics Recruitment Committee
- 9/03-8/04 Microtechnology Research Laboratory Processing Technology Committee
- 9/04-1/05 Department Strategic Planning Committee
- 9/04-8/05 Vice President’s Materials Facility Council
- 9/04-9/05 Vice President’s Committee on Materials Research Facilities of the Future
- 9/05-10/09 Area head, nano/micro engineering area of ME department  
ME Department Council Member, also served in same role 9/2011-6/2012
- 5/06-2008- Director, Pappalardo Micro/Nano Engineering Laboratory  
Search Committee Chair, Energy Area.
- 2009-2010 Search committee Chair: Energy
- 2008-2010 Co-Chair, MIT Energy Seminar Series
- 2011-2013 MIT China Council
- 2011-2013 MIT-China Collaboration Proposal Evaluation Committee
- 2011- MIT DOE engagement group
- 2011-2013 Chair, ME Awards committee
- 2011-2013 Member, Dean’s Awards Committee
- 7/2013-6/2018 Department Head, Department of Mechanical Engineering, MIT
- 7/2013-6/2018 Dean’s council, MIT School of Engineering
- 2015 Co-Chair, MIT Department of Nuclear Engineering Department Head Search Committee, 2015
- 2014-2018 MTL policy board
- 2015-2017 Nano.MIT governance board
- 2015- Tata Center Steering Committee
- 2017-2018 MIT China
- 2018- Chair of MIT MechE Space Advisory Committee
- 2018- MIT Center Director, Centers for Mechanical Engineering Research and Education at SUSTech and MIT

**Selected Outside Professional Activities:**

- Member of US-Russia Presidential Bilateral Relation Commission Delegation, Nano Energy Subgroup, Moscow, February 27-March 4, 2011.
- Peer Committee, NAE Section 10, 2015-2018
- Chair, Advisory Board, ASME Nano Institute, Nov., 2005-2008.
- Chair, Nanoscale Phenomena Committee, ASME Nano-Institute, 2003-2005
- ASME Heat Transfer Division Award Committee, 2011-2014
  
- Advisory Board, Physical Science College, Shanghai University of Science and Technology, 2017-
- University of Michigan Department of Mechanical Engineering External Review Committee, November, 2016.
- Stanford Department of Mechanical Engineering Visiting Committee, January, 2016
- Advisory Board member: Boston University Department of Mechanical Engineering 2013-2018
- Advisory Board Member: China Southern University of Science and Technology, 2012
- Advssory Board Member: School of Engineering, Nanjing University, 2012
- Advisory Board, NSF Center of Scalable Integrated Nanomanufacturing, 2005.
- Board of Advisors, Center for Applied Science, Taiwan, 2004-.
  
- Co Editor, Annual Review of Heat Transfer, 2003-.
- Associate Editor-in-Chief: Engineering, 2015-
- Editorial board: Technology, 2013-
- Editorial Board: Nano Energy, 2011-
- Editorial Board, Frontier of Heat and Mass Transfer, 2010-
- Editorial Board, Microscale Thermophysical Engineering, 2004-.
- Editorial Board, Journal of Computational and Theoretical Nanoscience, 2004-.
- Associate Editor, ASME Journal of Heat Transfer, July 2002-June 2005.
  
- Member, US National Academy of Engineering, 2010-
- Academician, Academia Sinica, 2014-
- Fellow, American Academy of Arts and Sciences, 2018-
- Fellow, American Physical Society, 2-12-
- Fellow, American Association for the Advancement of Science, 2009-
- Fellow, American Society of Mechanical Engineers, 2006-
- International Thermoelectrics Society, Member;
- Materials Research Society, Member;
- ASME K-8 and K-16 Committees, Member.



**PUBLICATIONS AND PRESENTATIONS**<http://www.researcherid.com/rid/J-1325-2014><https://scholar.google.com/citations?user=YLB6tnwAAAAJ&hl=en>**Books**

1. G. Chen, *Nanoscale Energy Transfer and Conversion*, Oxford Press, ISBN 019515942X, 2005.
2. V. Prasad, Y. Jaluria, G. Chen, Editors, *In Memory of Chang-Lin Tien, Annual Review of Heat Transfer*, vol. 14, Begell House, 2005.
3. G. Chen, J. Karni, V. Prasad, and Y. Jaluria, Editors, *Solar Thermal Challenges, Annual Review of Heat Transfer, Solar-Thermal Challenge*, vol. 15, 2012.
4. G. Chen, V. Prasad, and Y. Jaluria, Editors, *Annual Review of Heat Transfer*, vol. 16, 2013.
5. G. Chen, V. Prasad, and Y. Jaluria, Editors, *Multiscale Simulation of Phonon and Electron Thermal Transport, Annual Review of Heat Transfer*, vol. 17, 2014.
6. E.N. Wang, G. Chen, V. Prasad, and Y. Jaluria, Editors, *Thermal Management Fundamentals and Technologies, Annual Review of Heat Transfer*, vol. 18, 2015.
7. G. Chen, V. Prasad, and Y. Jaluria, Editors, *Annual Review of Heat Transfer*, vol. 19, 2016.
8. G. Chen, V. Prasad, and Y. Jaluria, Editors, *Annual Review of Heat Transfer*, vol. 20, 2017.

**Invited Book Chapters:**

- IB1. G. Chen, 1996, "Heat Transfer in Micro- and Nanoscale Photonic Devices," *Annual Review of Heat Transfer*, Ed., C.L. Tien, Vol. VII, 1-57.
- IB2. G. Chen, 2001, "Phonon Heat Conduction in Low-Dimensional Structures," **Semiconductors and Semimetals, Recent Trends in Thermoelectric Materials Research III**, Vol. 71, pp. 203-259, Ed. T. Tritt, Academic press, San Diego.
- IB3. G. Chen, B. Yang, and W.L. Liu, 2003, "Engineering Nanostructures for Energy Conversion," in **Heat Transfer and Fluid Flow in Microscale and Nanoscale Structures** Editors: M. Faghri and B. Sunden, pp. 45-92.
- IB4. B. Yang and G. Chen, 2003, "Phonon Heat Conduction in Superlattices," in **Chemistry, Physics, and Materials Science for Thermoelectric Materials: Beyond Bismuth Telluride**, Ed. M.G. Kanatzidis, T.P. Hogan, S.D. Mahanti, pp. 147-167, Kluwer Academic/Plenum Publisher, New York.
- IB5. G. Chen, D. Borca-Tasciuc, R.G. Yang, "Nanoscale Heat Transfer," **Encyclopedia of Nanoscience and Nanotechnology**, H.S. Nalwa, Ed., American Scientific Publishers, Vol. 7, pp. 429-459 (2004).

- IB6. B. Yang and G. Chen, "Experimental Studies on Thermal Conductivity of Thin Films and Superlattice Materials," in **Thermal Conductivity: Theory, Properties, and Applications**, T.M. Tritt, Ed., Kluwar Press, New York, pp. 167-185 (2004).
- IB7. T. Borca-Tasciuc and G. Chen, "Thin-Film Thermal Conductivity Measurement Techniques," in **Thermal Conductivity: Theory, Properties, and Applications**, T.M. Tritt, Ed., Kluwar Press, New York, pp. 205-238 (2004).
- IB8. M. S. Dresselhaus, G. Dresselhaus, J. Heremans, and G. Chen. "Low Dimensional Thermoelectricity," In CRC Handbook; Molecular and Nano-electronics: Concepts, Challenges, and Designs," edited by Y. Gogotsi, CRC Press, Inc., Boca Raton, Florida, USA, 2005.
- IB9. A. Narayanaswamy and G. Chen, "Direct Computation of Thermal Emission from Nanostructures," Annual Review of Heat Transfer, Vol. 14, pp. 169-196, 2005.
- IB10. C. Dames and G. Chen "Thermal Conductivity of Nanostructured Thermoelectric Materials," CRC Handbook, edited by M. Rowe, pp.42-1 to 42-16, 2006, Taylor and Francis, Boca Raton.
- IB11. S. Shen and G. Chen, Molecular Gas Film Lubrication, Encyclopedia of Tribology, Eds. Q.J. Wang and Y.-W. Chang, pp.2309-2313, 2013, Springer.
- IB12. Q. Hao and G. Chen, "Frequency-Dependent Monte Carlo Simulations of Phonon Transport in Nanostructures," in Applications of Monte Carlo Simulations In Science and Engineering, Shaul Mordechai, Intech, Chap. 29, pp. 707-734, 2011.
- IB13. Daniel Kraemer, Kenneth McEnaney, Zhifeng Ren, and Gang Chen, "Solar Thermoelectric Power Conversion," in CRC Handbook, Ed., D.M. Rowe, Taylor&Francis, Boca Raton, pp. 24-1 to 24-16, 2012.
- IB14. Zhifeng Ren, Gang Chen, and Mildred S. Dresselhaus, "Nanostructured Thermoelectric Materials," in CRC Handbook, Ed., D.M. Rowe, Taylor&Francis, Boca Raton, pp. 1-1 to 1-50, 2012.
- IB15. Kenneth McEnaney, Daniel Kraemer, and Gang Chen, "Direct Heat-to-Electricity Conversion of Solar Energy," Annual Review of Heat Transfer, vol. 15, pp. 179-230, 2012.
- IB16. Gang Chen and Jacob Karni, "Introduction: Challenges and Opportunities in Solar Thermal Technologies," Annual Review of Heat Transfer, vol. 15, pp. 1-6, 2012.
- IB17. Gang Chen, "Probing Nanoscale Heat Transfer," Annual Review of Heat Transfer, vol. 16, pp. 1-6, 2013.
- IB18. Weishu Liu, Zhifeng Ren and Gang Chen, Nanostructured Thermoelectric Materials, In Thermoelectric Nanomaterials, K. Koumoto and T. Mori (eds.) *Thermoelectric Nanomaterials*, Springer Series 1 in Materials Science 182, DOI: 10.1007/978-3-642-37537-8\_11, 2013.
- IB19. G. Chen, "Nanostructured Thermoelectric Energy Scavenging," McGraw-Hill Year Book, 2013.
- IB20. G. Chen, "Multiscale Simulation of Phonon and Electron Thermal Transport," Annual Review of Heat Transfer, Vol. 17, pp.1-8, 2014.

- IB21. Zhiting Tian, Sangyeop Lee and Gang Chen, "A Comprehensive Review of Heat Transfer in Thermoelectric Materials and Devices," Annual Review of Heat Transfer, Vol. 17, pp. 425-483, 2014.
- IB22. Keivan Esfarjani, Jivtresh Garg<sup>+</sup> and Gang Chen "Modeling Heat Conduction from First-Principles," Annual Review of Heat Transfer, Vol. 17, pp. 9-47, 2014.
- IB23. J. Tong, A. Mercedes, Gang Chen, and Svetlana V. Boriskina, "Local field topology behind light localization and metamaterial topological transitions," in Singular and Chiral Nanoplasmonics, p. 259, Ed. S.V. Boriskina, CRC Press, 2015.
- IB24. Sangyeop Lee and Gang Chen, Nanostructured Thermoelectric Materials, in Innovative Thermoelectric Materials: Polymer, Nanostructure and Composite Thermoelectrics; eds. T. Poehler and H. Katz; ISBN: 978-1-78326-605-0.

### **Invited Conference/Workshop Presentations:**

#### Keynotes and Plenary Lectures in Conferences

- IP1. G. Chen, V. Sabastian, S. Zhou, and T. Borca-Tasciuc, 1998, "Phonon Heat Conduction in Nanostructures," Plenary lecture, Eurotherm Conference, 57: Microscale Heat Transfer, Poitiers, France, July 8-10. In Microscale Heat Transfer, ed. J.B. Saulnier, D. Lemonnier, and J.-P. Bardon, pp. 59-72.
- IP2. G. Chen and S. Volz, 1999, "Molecular Dynamic Simulation from Nanoscale to Macroscale," Overview talk, 117<sup>th</sup> Xiangshan Conference: Thermophysics and Heat Transfer in Extreme Cases, conference abstract.
- IP3. G. Chen and T. Zeng, 2000, "Nonequilibrium Phonon and Electron Transport in Thin Films and Superlattices," Keynote address, Proceedings of the International Heat Transfer and Transport Phenomena in Microscale, pp. 1-11, Ed. G.P. Celata, Banff, Canada, October 15-20, 2000.
- IP4. G. Chen, "Engineering Thermophysical Properties of Micro- and Nanostructures," Keynote lecture on France National Heat Transfer Conference, Nantes, France, May 29-31, 2001.
- IP5. G. Chen, B. Yang, W.L. Liu, D. Borca-Tasciuc, D. Song, and A. Jacquot, "Energy Conversion and Transport in Nanostructures," Keynote, presented at International Symposium on Micro/Nanoscale Energy Conversion and Transport, April 14-19, 2002, Antalya, Turkey, extended abstract book, pp. 42-43.
- IP6. G. Chen, A. Narayanaswamy, and C. Dames "Engineering Nanoscale Phonon and Photon Transport for Direct Energy Conversion," Keynote, presented at Eurotherm Seminar No. 75, Reims, France, July 8-12, 2003.
- IP7. G. Chen, "Nanoscale Heat Transfer and Nanostructured Thermoelectrics," presented at 9<sup>th</sup> Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITHERM2004), Las Vegas, June 1-4, 2004, IOTHERM 2004, pp.8-16, lunch speaker.

- IP8. G. Chen, "Integrating Nanoscale Effects into Micro and Macrosystems," Keynote, presented at 2<sup>nd</sup> International Conference on Microchannels and Minichannels, Rochester, NY, June 17-19, 2004.
- IP9. G. Chen, R.G. Yang, A. Narayanaswamy, and X.Y. Chen, "Thermally-Excited Nonequilibrium States between Electrons and Phonons for Energy Conversion," Plenary, International Symposium on Micro/Nanoscale Energy Conversion and Transport, Seoul, Korea, Extended Abstract, pp. 9-11, August 8-13, 2004.
- IP10. G. Chen, "Nanostructures for Direct Thermal to Electric Energy Conversion," Plenary, Proceedings of the First International Forum on Heat Transfer, November 24-26, 2004, Kyoto, Japan, pp. 1-3.
- IP11. G. Chen, "Nanostructures for Macroscale Energy Conversion," Keynote at International Conference on Micro Energy Systems, September 11-14, 2005, Sanya, China.
- IP12. G. Chen, "Nanostructured Thermoelectric Materials and Devices," Plenary, 2006 Taipei International Thermal Management Forum, Taipei, July 11, 2006.
- IP13. G. Chen, "Nanoscale Heat Transfer Effects Enabled Energy Technologies," Plenary, 13<sup>th</sup> International Heat Transfer Conference, Sydney, Australia, August 13-18, 2006.
- IP14. G. Chen, "Energy Nanotechnology," Plenary, 2<sup>do</sup> Taller Nacional Nanotecnologia, October 5-7, 2006, Vina de Mar, Chile.
- IP15. G. Chen, "Energy Technology Breakthroughs Enabled by Nanoscale Effects," Keynote, NSF Nanoscience and Engineering Grantee Conference, December 4-6, 2006, Virginia, VA.
- IP16. G. Chen, "Nanostructures and Their Thermal Properties," Keynote, EuroSimE: Thermal, Mechanical and Multiphysics Simulation and Experiments in Micro-Electronics and Micro-Systems, London, April 15-18, 2007.
- IP17. G. Chen, A. Narayanaswamy, Z. Chen, L. Hu, S. Sheng, and X.Y. Chen, "Radiative Heat Transfer in Nanostructures by Surface Phonon Polaritons," Keynote Lecture at IEEE-Nano2007, The 7<sup>th</sup> IEEE International Conference on Nanotechnology, August 2-5, 2007, Hongkong.
- IP18. G. Chen, "Thermophysical Properties of Nanostructured Materials," Keynote, Proceedings of the 8<sup>th</sup> Aisan Thermophysical Properties Conference, pp. 39-42, August 21-24, 2007, Kyushu University, Fukuoka, Japan.
- IP19. G. Chen, "Thermoelectric Energy Conversion in Nanostructures," Keynote, 1<sup>st</sup> Int. Forum on Advanced Thermoelectric Materials and Devices, Nov. 10-11, 2007, Shanghai, China.
- IP20. G. Chen, "Nanoscale Heat Transfer and Energy Conversion," Keynote, Chinese Annual National Heat and Mass Transfer Conference, Nov. 12-15, 2007, Guangzhou, China.
- IP21. G. Chen, "Thermoelectric Energy Conversion in Nanostructures," Keynote, Key Conference: The Future Prospects for the Compound Semiconductor Industry, March 2-4, 2008, Key West, Florida.

- IP22. G. Chen, "Nanostructured Thermoelectric Materials for Solid-State Cooling," Plenary Talk, Advanced Technology Workshop on Advanced Substrates and Next-Generation Semiconductors, April 30-May 1, 2008, Linthicum Heights, Maryland.
- IP23. Gang Chen, Q. Hao, A. Muto, D. Kramer, H. Lee, and A. Minnich, "Nanostructured Thermoelectric Materials, Devices, and Their Potential Applications," Keynote, Third Energy Nanotechnology International Conference, August 11-13, 2008.
- IP24. G. Chen, "Keys to Success," Dinner Talk, at Chinese in America Thermal Engineering Association (CATEA), Jacksonville, Florida, August 11, 2008.
- IP25. G. Chen, "Nanostructured Thermoelectrics: Materials, Devices, and Applications," Keynote, NanoThailand Symposium, 2008, November 6-8, Bangkok, Thailand.
- IP26. G. Chen, "Micro/Nano Education in Mechanical Engineering," Keynote, Seminar on the Renewal of Mechanical Engineering Higher Education, Bandung, Indonesia, Nov. 8, 2008.
- IP27. G. Chen, "Nanostructured Thermoelectrics: Materials, Devices, and Applications," MIT Energy Initiative Fall Energy Research Conference, MIT, November 13-14, 2008.
- IP28. G. Chen, "Nanostructured Thermoelectric Materials and Applications," Keynote, SMA 10<sup>th</sup> Anniversary Symposium, January 21-22, 2009, Singapore.
- IP29. G. Chen, "Challenges of Peltier Cooling to 10 K," Keynote, Workshop on Recent Advances in Peltier Cooling in the Range Including 10K, Air Force Research Laboratory, Albuquerque, New Mexico, April 22 and 23, 2009.
- IP30. G. Chen, "Nanotechnology for Energy Applications," Keynote 9<sup>th</sup> Emerging Information and Technology Conference, MIT, August 6-7, 2009.
- IP31. Austin Minnich, Baskaran Mudililhan, Qing Hao, Asegun Henry, and Gang Chen, "Multiscale Modeling of Electron and Phonon Transport in Nanocomposite Nanostructures for Thermoelectric Applications," Keynote, Symposium on "Multiphysics Simulations for Solids, IMECE, November 15-19, 2009, Orlando, Florida.
- IP32. G. Chen, "Phonon Transport in Nanostructured Thermoelectric and Heat Transfer Materials" Keynote at ICREA Phonon Engineering Workshop, Sant Feliu de Guixols, Girona, Spain, May 24-27, 2010.
- IP33. Gang Chen, Keivan Esfarjani, Junichiro Shiomi, Tengfei Luo, Zhiting Tian, "Multiscale Modeling of Phonon Transport in Nanostructures," Plenary Lecture at International Mechanical Engineering Congress and Exhibition, IMECE, Vancouver, Canada, November 14-18, 2010.
- IP34. G. Chen, D. Kraemer, A. Muto, K. McEnaney, H.-P. Feng, "Thermoelectric Power Conversion," Keynote Talk (given by student Daniel Kraemer) at Energy Harvesting and Storage, Boston, November 16-17, 2010.
- IP35. G. Chen, "Nanostructured Thermoelectrics: Millie's Legacy and Recent Developments," Keynote at the Symposium: 80<sup>th</sup> Birthday Celebration for Millie Dresselhaus, MIT, December 4, 2010.

- IP36. A. Mavrokefalos, P. Sambegoro, S.E. Han, and G. Chen “Thermal Radiation Transport in Nanostructures,” Keynote speech at Physics of Quantum Electronics, Snowbird, Utah, January 2-6, 2011.
- IP37. G. Chen, “Nurturing Leaders for an Energy Revolution,” Keynote at China 1000 Talent Annual Meeting, Beijing, China, January 15, 2011.
- IP38. G. Chen, “Luck Favors Prepared Minds,” Keynote New England Chinese Professionals New Year Gala and Community Enrichment Forum, Newton, MA, February 13, 2011.
- IP39. G. Chen, “Micro/Nanotechnologies for Energy and Environment,” Keynote at EITC Young Investigator Conference, Plenary Panel Discussion, Harvard University, August 18-19, 2011.
- IP40. G. Chen, “Extraordinary Heat Transfer at Nanoscale” Keynote at The *2nd International Symposium* on Recent Advances in Applied Sciences, Oct. 3-4, 2011, National Dong Hwa University, Taiwan.
- IP41. Jianjian Wang, Ruiting Zheng, Jinwei Gao, and Gang Chen, “Heat Conduction Mechanisms and Applications of Graphite Suspensions,” Plenary at Carbon Nano Materials and Applications Workshop, Rapid City, SD, Oct. 30-Nov. 1, 2011.
- IP42. G. Chen, “Nanoengineered Materials for Thermal Energy Systems,” Plenary Lecture at International Mechanical Engineering Congress and Exhibition, Denver, Colorado, November 11-17, 2011.
- IP43. G. Chen, “Solar Thermoelectric Energy Conversion,” Keynote at 2011 NSF Nanoscale Science and Engineering Grantees Conference, December 5-7, 2011 National Science Foundation, Arlington, VA.
- IP44. G. Chen, “Two Decades of Micro/Nanoscale Thermophysics and Heat Transfer,” Closing remark at 7<sup>th</sup> US-Japan Seminar on Nanoscale Transport Phenomena---Science and Engineering, December 11-14, 2011, Shima, Japan.
- IP45. G. Chen, “Thermoelectric Materials, Transport, and Applications,” Keynote at Physics@FOM, Veldhoven, Netherland, January 17-18, 2012.
- IP46. G. Chen, “Extraordinary Heat Transfer at Nanoscale,” Keynote at ASME 2012 3<sup>rd</sup> Micro/Nanoscale Heat and Mass Transfer International Conference, March 3-6, 2012, Georgia, Atlanta.
- IP47. G. Chen, “Nurturing Leaders for An Energy Revolution,” keynote at Forum on Modern Engineering, Nanjing, China, May 21, 2012.
- IP48. G. Chen, “Thermal Transport and Properties in Nanostructured Materials,” Plenary lecture at 18<sup>th</sup> Symposium on Thermophysical Properties, June 24-29, 2012, Boulder, Colorado.
- IP49. G. Chen, “Nanostructured Materials for Thermoelectric Energy Conversion,” Keynote at International Workshop on Materials Science and Materials Chemistry for Energy. September 17-18, 2012. Beijing University, China.
- IP50. G. Chen, “Heat Conduction in Crystalline Nanostructured Materials,” Keynote at East Lake International Forum on Frontiers of Science and Technology for Outstanding Young Oversea Scholars, Wuhan, October 6-8, 2012.

- IP51. G. Chen, "Nanostructured Materials for Thermoelectric Energy Conversion," Keynote at MIT Materials Day: Materials for Energy Harvesting, October 17, 2012.
- IP52. G. Chen, "From Basic Research to Commercialization," Keynote at The 3<sup>rd</sup> China Jiangsu Conference for International Technology Transfer and Commercialization, Wuxi, China (Jointly sponsored by MIT ILP and Wuxi), November 10, 2012.
- IP53. G. Chen, "Nanoscale Heat Transfer for Energy Applications," Keynote at 3<sup>rd</sup> International Forum on Heat Transfer, Nagasaki, Japan, November 11-15, 2012.
- IP54. G. Chen, "Heat Transfer at Intersections," Keynote Lecture at ASME 2013 Summer Heat Transfer Conference, Minneapolis, MN, July 14-19, 2013.
- IP55. G. Chen, "In Pursuit of the Sun: From Solar Thermoelectrics to Photovoltaics," Plenary Lecture at ASME 2013 7<sup>th</sup> International Conference on Energy Sustainability and ASME 2013 11<sup>th</sup> Fuel Cell Science, Engineering and Technology Conference, Minneapolis, MN, July 14-19, 2013.
- IP56. G. Chen, "Transition from Near-Field Thermal Radiation to Phonon Interfacial Conduction", Plenary Talk, PIERS 2013, Stockholm, August 12-15, 2013.
- IP57. G. Chen, "Heat Transfer at Intersections," Plenary Lecture at the 4<sup>th</sup> International Symposium on Micro and Nano Technology (ISMNT-4), Shanghai, October 8-12, 2013.
- IP58. G. Chen, "MIT Innovation and Entrepreneurship Ecosystem" MIT-CHIEF Dinner Speech, November 16, 2013
- IP59. G. Chen, "From Basic Research to Commercialization and Recent Progress in Renewable Energy Research," Plenary Talk at Jiansu State-Grid, Plenary Lecture, October 11, 2013.
- IP60. G. Chen, "Progress and Challenges in Thermoelectric Transport, Materials, Characterization, and Systems," Plenary Talk at International Conference on Thermoelectrics, Nashville, Tennessee, July 6-10, 2014.
- IP61. G. Chen, "Ballistic, Coherent, Hydrodynamics, and Quantum Heat Conduction," Plenary Talk at 8<sup>th</sup> US-Japan Joint Seminar on Nanoscale Transport Phenomena, Santa Cruz, California, July 13-July 16, 2014.
- IP62. G. Chen, "Heat Transfer at Interfaces," Nukiyama Memorial Award Lecture, International Heat Transfer Conference, Kyoto, Japan, August 10-15, 2014.
- IP63. G. Chen, "Probing and Simulation Phonon and Electron Transport for Thermoelectric Applications," Keynote Lecture, 5<sup>th</sup> International Congress on Ceramics, Beijing, China, August 17-21, 2014.
- IP64. G. Chen, "Thermodynamics and Heat Transfer of Thermal Radiation," Keynote Lecture at OSA Incubator on Fundamental Limit of Optical Energy Conversion, Washington, DC, November 13-14, 2014.
- IP65. G. Chen, "Innovating Thermal Materials, Devices, and Energy Conversion Systems," Plenary Lecture in Heat Transfer, IMECE, 2014, Montreal, Canada, November 14-20, 2014.
- IP66. G. Chen, Dinner Speech, New England Chinese Professionals New Year Gala, Newton, MA, February 21, 2015.

- IP67. G. Chen, "Connecting Conduction with Radiation: from Boltzmann to Maxwell," Symposium Progress on Laser Materials Processing, in Honor of 60<sup>th</sup> Birthday of Professor Grigoropoulos, Berkeley, California, April 11, 2015.
- IP68. Gang Chen, Bolin Liao, Sangyeop Lee, and Jiawei Zhou, "First-Principles Calculations of Electron and Phonon Transport Properties in Single Crystals," Plenary Talk, Advances in Computational Heat Transfer, CHT-15, Rutgers, New Jersey, May 25-29, 2015.
- IP69. Gang Chen, "Thermoelectric Energy Conversion: Materials, Devices, and Systems," Plenary Lecture at: The 15th International Conference on Micro and Nanotechnology for Power Generation and Energy Conversion Applications (PowerMEMS2015), Cambridge, MA, December 1-4, 2015.
- IP70. Gang Chen, "Thermal Energy: A New Look for a Better Future," Keynote at CAST-Boston launching event, Boston, January 31, 2016.
- IP71. Gang Chen, "Education Innovation in the MIT Department of Mechanical Engineering," Keynote Lecture at First China-US Education Summit, China Education 30 Forum, MIT, April 22, 2016.
- IP72. Gang Chen, "Innovations in Energy Utilization: Solar, Thermal, and Water," Keynote at 1000 Talents-Plan Competition, Harvard University, June 6, 2016.
- IP73. Gang Chen, "Innovating Thermal Materials, Devices, and Energy Conversion Systems," Plenary talk at the 9<sup>th</sup> International Symposium on Heat Transfer (ISHT-9), Beijing, China, August 15-19, 2016.
- IP74. Gang Chen, "Phonon Heat Conduction Beyond Fourier Diffusion: Ballistic, Coherent, Localized, Hydrodynamic, and Divergent Modes," Eringen Medal Plenary Talk, Society of Engineering Science, College Park, Maryland, October 2-5, 2016.
- IP75. Gang Chen, "Materials Innovation for Efficient Solar and Thermal Energy Utilization," International Forum on Innovation and Emerging Industries Deployment, October 31-Nov. 2, Shanghai, 2016.
- IP76. Gang Chen, "Introduction to MIT Mechanical Engineering" Geek Park, Beijing, January 14, 2017.
- IP77. Gang Chen, "MIT Innovation Environment and Inventions," IT Summit, Shenzhen, April 1-2, 2017.
- IP78. Gang Chen, "Progress and Challenges in Thermoelectric Transport, Materials, and Systems," STAR Symposium, Shanghai, June 25-26, 2017.
- IP79. Gang Chen, "Use Nanostructures to Tailor Solar and Thermal Radiation," 3<sup>rd</sup> International Workshop on Energy Conversion and Storage, Nanjing, June 27-28, 2017.
- IP80. Gang Chen, "Anderson Localization of Heat Conduction," 9<sup>th</sup> US-Japan Joint Seminar on Nanoscale Transport Phenomena, Tokyo, Japan, July 2-5, 2017.
- IP81. Gang Chen, "Phonon Heat Conduction Beyond Fourier Diffusion: Ballistic, Coherent, Localized, Hydrodynamic, and Divergent Modes" Plenary Lecture, Chinese National Heat and Mass Transfer Annual Meeting, Suzhou, October 28, 2017.



- IP82. Gang Chen, "MIT Innovation and Entrepreneurship Ecosystem," MIT-CHIEF, MIT, November 18, 2017.
- IP83. John Stockholm, Joseph Heremans, Oded Rabin, and Gang Chen, "Nanomaterials in Thermoelectrics" Celebrating our Millie, MIT, Nov. 26, 2017.
- IP84. Gang Chen, "Nurturing Leaders in Future Science and Technology," Wuxi Innovation and Entrepreneurship Forum, August 13, 2018.
- IP85. Gang Chen, "Advanced Materials for Energy and Water Nexus," MIT Wuxi ILP Conference, August 16, 2018.
- IP86. Svetlana Boriskina and Gang Chen, "Using Nanostructures to Tailor Thermal Radiation for Clean Energy and Clean Water Applications," Keynote (given by Boriskina) at SPIE Conference 10759, SPIE Optical Engineering + Applications, "New Concepts in Solar and Thermal Radiation Conversion and Reliability," San Diego, August 19-23, 2018.
- IP87. Gang Chen, "MIT Innovation and Entrepreneurship Environment", Plenary at 2018 Optics Valley Sino-International Entrepreneurs Summit, Wuhan, October 19-20, 2018.
- IP88. Gang Chen, "MIT Innovation and Entrepreneurship Environment", Plenary at 2018 ZGC Forum, Beijing, November 2, 2018.
- IP89. Gang Chen, "Advanced Materials and Systems at the Energy and Water Nexus," MIT ILP Shenzhen Conference, Shenzhen, Jan. 9, 2019.
- IP90. Gang Chen, "Recent Progress in First-Principles Simulation of Thermoelectric Properties," Workshop on Thermoelectric Materials and Commercialization, Shenzhen, Jan. 18-19, 2019.

#### Invited Presentations in Conferences

- IP91. G. Chen, S. G., Volz, T. Borca-Tasciuc, T. Zeng, D. Song, K.L. Wang, and M.S. Dresselhaus, 1998, "Phonon Engineering in Superlattices," Invited paper at the MRS Fall Meeting, Boston, Massachusetts, 1998, MRS Proc. Vol. 545, pp. 357-368.
- IP92. G. Chen, 1998, "Heat Conduction in Low-Dimensional Structures," invited paper presented at 5th International Conference on Solid-State and Integrated-Circuit Technology, Beijing, China, October 21-23, Conference Proc., p. 860.
- IP93. G. Chen, T. Zeng, T. Borca-Tasciuc, and D. Song, 1999, "Phonon Engineering in Nanostructures for Solid-State Energy Conversion," invited paper presented at International Union of Materials Research Society-International Conference on Advanced Materials, Beijing, China, June 14-18, 1999.
- IP94. G. Chen, 2000, "Thermal Consideration in Design of Heterostructure Electronic and Photonic Devices," invited presentation at 2000 SPIE Terahertz and Gigahertz Electronics and Photonics Conference, San Diego, July 30-August 4, 2000.
- IP95. G. Chen, B. Yang, W.L. Liu, T. Borca-Tasciuc, D. Song, D. Achimov, M.S. Dresselhaus, J.L. Liu, and K.L. Wang, "Thermoelectric Property Characterization of Low-Dimensional Structures," Invited, Proc. 20<sup>th</sup> International Conference on Thermoelectrics, ICT'01, pp.

- 30-34, Beijing, China, June 8-11, 2001 (IEEE Press, IEEE Cat. No. 01TH8589, Piscataway, NJ).
- IP96. G. Chen, B. Yang, W.L. Liu, and T. Zeng, “Nanoscale Heat Transfer for Energy Conversion Applications,” Invited, International Conference on Energy Conversion and Applications, Wuhan, China, June 17-20, 2001, Conference Proceedings: Energy Conversion and Applications, Vol. 1, pp. 287-296, ed. W. Liu.
- IP97. G. Chen, “Heat Conduction in Low-Dimensional Structures,” Invited, 5<sup>th</sup> Gordon Conference on Photoacoustic and Photothermal Phenomena, Queens College, Oxford, UK, August 19-24, 2001.
- IP98. G. Chen, “Nano-to-Macroscale Energy Transport and Conversion---Bridging the Gaps in Length Scales and Disciplines,” Invited, Proceedings of Colloquium on Micro/Nano Thermal Engineering, pp. 205-232, Ed., S.J. Song, Feb. 17-19, 2002, Seoul National University, Seoul, Korea.
- IP99. G. Chen, “Micro and Nanoscale Heat Transfer---Tien’s Legacy,” presented at Chang-Lin Tien’s retirement ceremony, Berkeley, June 21, 2002.
- IP100. G. Chen and R.G. Yang, “Nano-to-Macroscale Modeling through Approximation,” Invited, presented at International Mechanical Engineering Congress, 2002.
- IP101. G. Chen, “Thermal Design of Photonic Devices,” invited, presented at 1<sup>st</sup> Symposium on Photonics, Networking, and Computing, March 12-13, 2002, Durham, North Carolina (no paper submitted).
- IP102. G. Chen, “Diffusion-Transmission Interface Condition,” invited, presented at 4<sup>th</sup> US-Japan Nanotherm, Berkeley, June 22-26, 2002.
- IP103. G. Chen, “Thermally Engineered Nanostructures for Energy Conversion,” invited, presented at The International Conference on Micro and Nanosystems 2002, Kuming, China, August 11-14, 2002.
- IP104. G. Chen, “Electron and Phonon Transport and Energy Conversion in Nanostructures,” invited, Integrated Nanosystems 2002, Sponsored by ASME Nano-Institute, Berkeley, CA, September 18-20, 2002.
- IP105.** G. Chen and R.G. Yang, “Nano-to-Macroscale Transport Modeling Through Approximation,” invited, November 17-22, 2002, Proceedings of International Mechanical Engineering Congress and Exhibitions (IMECE2002), New Orleans, LA, paper IMECE2002-32120.
- IP106. G. Chen, “Exploring Nanoscale Heat Transfer Effects for Energy Conversion,” invited, presented at MRS Spring Meeting, San Francisco, April 21-25, 2003.
- IP107. G. Chen, “Reducing Phonon Thermal Conductivity Through Nanostructures for Thermoelectric Energy Conversion,” invited, presented at Internal Conference on Thermoelectrics, Heraut, France, August 17-21, 2003.
- IP108. G. Chen, C. Dames, D. Borca-Tasciuc, T. Harris, and D. Song, “Thermal Conductivity of Complex Nanostructures,” invited, presented at International Conferences on Thermal Conductivity, Knoxville, Tennessee, Oct. 26-29, 2003.

- IP109. G. Chen, "Nanostructure-Based Direct Thermal-to-Electric Power Generation Technologies," invited, American Filtration & Separation Society, Diesel and Gas Engine Emission Solution, Oct. 2, 2003.
- IP110. G. Chen, "Basic Heat Transfer Characteristics at Nanoscale," invited, presented at Tutorial on Micro- Nanoscale Heat Transfer, IMECE 2003, Nov. 15-21, 2003.
- IP111. G. Chen, "Thermal Conductivity and Heat Conduction in Nanostructures: Modeling, Experiments, and Applications," invited, Paper No. AIAA-2004-2463; presented at 37<sup>th</sup> AIAA Thermophysics Conference, Portland, Oregon, June 28-July 1, 2004.
- IP112. G. Chen, "Nonequilibrium Electron-Phonon Transport Near Sharp Potential Barriers," invited, International Conference on Thermoelectrics, Adelaide, Australia, July 25-29, 2004.
- IP113. G. Chen, "Nanoscale Heat Transfer and Thermal-Electric Energy Conversion," invited, presented at 13<sup>th</sup> International Conference on Photoacoustic and Photothermal Phenomena, Rio de Janeiro, Brazil, 5-8 July 2004.
- IP114. G. Chen, A. Schmidt, H. Lee, and X. Y. Chen, "Exploring Nanoscale Heat Transfer Effects for Nanomanufacturing," invited, presented at 2<sup>nd</sup> International Symposium on Nanomanufacturing, KAIST, Korea, Nov. 3-5, 2004.
- IP115. G. Chen, L. Hu, A. Narayanaswamy, and Z. Chen, "Nanoscale Thermal Radiation: Fundamental Issues and New Opportunities," invited, Japan-US Joint Seminar, Nanoscale Transport Phenomena, Matsushima, Japan, July 4-7, 2005.
- IP116. A. Henry and G. Chen, "Extracting Phonon Properties from Molecular Dynamics Simulations," invited, Japan-US Joint Seminar, Nanoscale Transport Phenomena, Matsushima, Japan, July 4-7, 2005.
- IP117. J.B. Wang and G. Chen, "Electrothermal Heat Conduction in Nanofluids," invited, Japan-US Joint Seminar, Nanoscale Transport Phenomena, Matsushima, Japan, July 4-7, 2005.
- IP118. G. Chen, R.G. Yang, H. Lee, Q. Hao, M.-S. Jeng, M. Tang, M.S. Dresselhaus, B. Poudel, S. Kumar, D.Z. Wang, Z.F. Ren, P. Gogna, and J.-P. Fleurial, "Design, Modeling, and Synthesis of Nanocomposites for Solid-State Energy Conversion," invited, SPIE's International Symposia on Optics East 2005, Symposium SA119, Symposium SA 111, Nanofabrication: Technologies, Devices, and Applications II, October 23-26, Boston, MA (no paper submitted).
- IP119. G. Chen, C. Dames, S. Chen, J.Y. Huang, and Z.F. Ren, "Thermal and Thermoelectric Characterization of Nanostructures," invited, SPIE's International Symposia on Optics East 2005, Symposium SA119, Nanosensing: Materials and Devices II, on October 23-26, Boston, MA (no paper submitted).
- IP120. G. Chen, "Role of Nanotechnology In Energy," invited, MIT Energy Forum, May 3, 2006.
- IP121. G. Chen, "Thermoelectric Energy Conversion with Nanostructured Materials," invited, MIT Energy Conference, May 13, 2006.
- IP122. G. Chen, "Heat Transport in Superlattices and Nanocomposites for Thermoelectric Applications," invited, International Conferences on Materials and Technologies, Sicily, Italy, June 4-9, 2006.

- IP123. C. Dames, S. Chen, C.T. Harris, J.Y. Huang, Z.F. Ren, M.S. Dresselhaus, and G. Chen, "A Modified High-Resolution TEM for Thermoelectric Property Measurements of Nanowires and Nanotubes," invited, SPIE Optics East, Oct. 2, 2006.
- IP124. G. Chen, "Nanostructured Thermoelectric Materials for Power Generation," invited, MEMS@MIT Fall 2006 Meeting, October 10, 2006, MIT.
- IP125. G. Chen and X.Y. Chen, "Solar to Electric Energy Conversion via Thermoelectric Devices," invited, MRS Fall Meeting, Symposium CC: Solar Energy Conversion, November 27-December 1, 2006, Boston, MA (no paper submitted).
- IP126. G. Chen, A. Henry, and C. Dames, "Thermoelectric Energy Conversion in Nanostructures," invited, International Electron Devices Meeting, San Francisco, December 11-12, 2006, IEDM Technical Digest, pp. 20.1.1-20.1.4, 2006, IEEE Cat. No. 06CH37807.
- IP127. G. Chen, "Thermoelectric Energy Conversion in Nanostructures," invited, 2<sup>nd</sup> Int. Conference on Nano/Micro Engineered and Molecular Systems, Bangkok, Thailand, January 16-19, 2007.
- IP128. G. Chen, L. Hu, Z. Chen, A. Narayanaswamy, and X.Y. Chen, "Thermal radiative transport in nanostructures and its application in energy technology," invited, MRS Spring Meeting, Symposium II: Nanoscale Heat Transport--From Fundamentals to Devices, April 9-13, 2007.
- IP129. G. Chen, "Energy Nanotechnology," invited, The Fourth U.S.-Korea Forum on Nanotechnology: Sustainable Energy, April 26-27, 2007.
- IP130. G. Chen, "Nanoscale Phonon and Phonon-Polariton Heat Transfer and Related Coherence Issues," invited, Thermal Radiation at The Nanoscale: Forces, Heat Transfer, and Coherence (TR07), Les Houches, May 21-25, 2007.
- IP131. G. Chen, "Energy Technology Enabled by Nanoscale Effects," invited, NSF Workshop on Frontiers in Transport Phenomena Research and Education: Energy Systems, Biological Systems, Security, Information Technology and Nanotechnology, University of Connecticut, Storrs, May 17-18, 2007.
- IP132. G. Chen, L. Hu, S. Shen, and A. Narayanaswamy, "Breakdown of Planck's Law at Nanoscale," invited, Presented at 38<sup>th</sup> Physics of Quantum Electronics, Snowbird, Utah, January 6-10, 2008.
- IP133. G. Chen, A. Minnich, H. Lee, Q. Hao, and A. Henry, "Thermoelectric Transport in Nanostructured Bulk Materials," invited, MRS, Spring Meeting, R Symposium San Francisco, March 23-27, 2008.
- IP134. G. Chen, M. Chiesa, A. Muto, D. Kramer, H. Lee, Q. Hao, A. Minnich, X.Y. Chen, and H. Lu, "Potential Applications of Nanostructured Thermoelectric Materials," invited, MRS Spring Meeting, LL Symposium, San Francisco, March 23-27, 2008.
- IP135. G. Chen, S. Shen, L. Hu, and A. Narayanaswamy, "Breakdown of Planck's Blackbody Radiation Law at Nanoscale," invited, 2<sup>nd</sup> Integration and Commercialization of Micro and Nano Systems International Conference and Exhibition, June 3-5, 2008, Clear Water Bay, Hong Kong.

- IP136. G. Chen, “Solar Thermoelectrics and Thermophotovoltaics,” invited, Solar Energy: New Materials and Nanostructured Devices for High Efficiency, Stanford, CA, June 24-25, 2008.
- IP137. S. Shen, L. Hu, X.Y. Chen, A. Narayanaswamy, and G. Chen, “Breakdown of the Planck's blackbody radiation law at nanoscale gaps” Invited poster presented by S. Shen, Julius Springer Forum on Applied Physics 2008, Harvard, 2008. Win best poster award.
- IP138. Vincent Berube, Mildred Dresselhaus, Gang Chen, Costas P. Grigoropoulos, Samuel S. Mao; “Hydrogen storage in nanostructured materials,” Invited poster presented by V. Berube, Julius Springer Forum on Applied Physics 2008, Harvard, 2008.
- IP139. Gang Chen, “Thermoelectric Energy Conversion,” invited, US-China Clean Energy Exchange Conference, October 18, 2008, Chelmsford, MA.
- IP140. G. Chen, A. Minnich, H. Lee, B. Muralidharan, M.S. Dresselhaus, X. W. Wang, G. Joshi, G. H. Zhu, Y. C. Lan, D. Z. Wang, Z.F. Ren, “SiGe Nanocomposites Thermoelectrics: The Knowns and the Unknowns,” invited, APS March Meeting, Pittsburgh, March 16-20, 2009.
- IP141. Gang Chen, A. Minnich, Q. Hao, A. Muto, H. Lee, D. Kramer, M. Tang, M.S. Dresselhaus, Y. Ma, Y.C. Lan, J. Yang, X. Yan, G. Joshi, G. H. Zhu, X. W. Wang, D. Wang, and Z.F. Ren, „“Nanostructured Thermoelectric Materials and Their Potential Applications,” invited, SAE World Congress, Detroit, April 20-23, 2009.
- IP142. Gang Chen, Austin Minnich, Kimberlee Collins, Asegun Henry, Hohyun Lee, Qing Hao, and Mildred S. Dresselhaus, Gaohua Zhu, Yucheng Lan, Xiaowei Wang, Giri Joshi, Dezhi Wang, and Zhifeng Ren, “Phonons: How Long Do They Really Travel,” invited, International Conference on Thermoelectrics, Freiburg, July 27-30, 2009.
- IP143. Gang Chen, “Nanocomposites Thermoelectrics: The Knowns and Unknowns,” invited, Thermoelectric Transport: progress in first principles and other approaches and interplay with experiment, Lausanne, Switzerland, Meeting Dates: July 22, 2009 – July 24, 2009.
- IP144. D. Kramer, A. Muto, H. Lee, Q. Hao, K. McEnaney, G. Chen, Y. Ma, Y.C. Lan, J. Yang, G. Joshi, G. H. Zhu, X. W. Wang, D. Wang, and Z.F. Ren, “Nanostructured Thermoelectric Materials and Their Potential Applications,” invited, Session, Mechanics and Materials in Energy Systems, IMECE, November 15-19, 2009, Orlando, Florida.
- IP145. Gang Chen, “Converting Heat into Electricity Using Solid-State Technology,” invited, Ideastream 2010, April 13, 2010, Boston, MA.
- IP146. Yiqun Zheng, Bhaskaran Muralidharan, Mona Zebarjadi, Zhifeng Ren, Mildred S. Dresselhaus, Gang Chen, “Theoretical Investigation of Size Effects on Electron and Phonon Thermoelectric Transport in Nanostructures,” invited, International Conference on Thermoelectrics, May 30-June 3, 2010, Shanghai, China.
- IP147.** G. Chen, M.S. Dresselhaus, Z.F. Ren, B. Muralidharan, and Y. Q. Zhang, “Nanostructured Thermoelectric Materials and Their Potential Applications,” invited, 5<sup>th</sup> Forum on New Materials, CIMTEC 2010, Montecatini Terme, Italy, June 13-18, 2010.
- IP148. S. Shen, A. Mavrokefalos, P.L. Sambegoro, and G. Chen, “Near Field Heat Transfer Exceeding Planck's Blackbody Radiation Law (and Nanostructured Thermoelectrics),” invited, 2010 Villa Conference on Interaction Among Nanostructures, June 21-25, 2010, Santorini, Greece.

- IP149. G. Chen, “From Basic Research to Commercialization,” invited, The OVC International Optoelectronic Expo & Forum: Chang-Lin Tien International Forum, Wuhan, China, Nov. 2-5, 2010.
- IP150. Austin Minnich, Junichiro Shiomi, Keivan Esfarjani, Zhiting Tian, and Gang Chen, “Experimental and Theoretical Studies on Phonon Mean Free Path in Thermoelectric Materials,” Invited talk at APS March Meeting, March 21-25, 2011, Dallas, Texas.
- IP151. Daniel Kraemer, Bed Poudel, Hsien-Ping Feng, J. Christopher Caylor, Giri Joshi, Bo Yu, Xiao Yan, Yi Ma, Xiaowei Wang, Dezhi Wang, Andrew Muto, Kenneth McEnaney, Matteo Chiesa, Zhifeng Ren, and Gang Chen, “Solar thermoelectric energy conversion”, Invited talk at MRS Spring Meeting, April 25-29, 2011.
- IP152. Gang Chen, Andrew Muto, D. Kramer, Ken McEnaney, H.-P. Feng, W. Liu, Q. Zhang, B. Yu, Zhifeng Ren, “Thermoelectric Energy Conversion Using Nanostructured Materials,” Invited Talk at SPIE Defense, Security, and Sensing, Conference 8035, Energy Harvesting and Storage: Materials, Devices, and Applications II, April 25 – 29, 2011, Orlando, Florida, USA.
- IP153. Sang Eon Han, Anastassios Mavrokefalos, Matthew S. Branham, and Gang Chen, Efficient Light-Trapping Nanostructures in Thin Silicon Solar Cells,” Invited Talk at SPIE Defense, Security, and Sensing, Conference 8031, Micro- and Nanotechnology Sensors, Systems, and Applications III, April 25 – 29, 2011, Orlando, Florida, USA.
- IP154. Gang Chen, “Highly Thermally Conductive Polymers,” Invited talk at Nanotech Conference and Expo, Boston, June 13-16, 2011.
- IP155. Gang Chen, “Challenges and Opportunities in Thermoelectric Energy Conversion,” 220th invited, ECS Meeting and Electrochemical Energy Summit, October 9-14, 2011, Boston, MA.
- IP156. A. Mavrokefalos, P. Sambegoro, G. Chen, “Near-Field Radiation Transfer,” invited talk AVS 58<sup>th</sup> International Symposium and Exhibition, October 30-November 4, 2011, Nashville, TN.
- IP157. A. Mavrokefalos, S.E. Han, S. Yerci, M. Branham, “Efficient Light Trapping in Periodic Nanostructured Thin Crystalline Si Solar Cells,” invited talk, Optical Society of America Topical Meeting on Optical Nanostructures and Advanced Materials for Photovoltaics (PV), November 2-3, 2011, Austin, Texas.
- IP158. Austin Minnich, Keivan Esfarjani, Jivtesh Garg, Tengfei Luo, Kimberlee Collins, Maria Luckyanova, Zhiting Tian, Lingping Zeng, and Gang Chen, “Experimental and Theoretical Studies on Phonon Transport: From Bulk Materials to Nanostructures,” invited talk, MRS Fall Meeting, Boston, W3.1, Symposium W: Phonons in Nanomaterials—Theory, Experiments, and Applications, November 26-30, 2011.
- IP159. M. Zebarjadi and G. Chen, “Recent Advances in Thermoelectrics,” invited talk 2011 IEEE International Electron Devices Meeting, Washington, DC, December 5 - 7, 2011.
- IP160. Jianjian Wang, Ruiting Zheng, Jinwei Gao, and Gang Chen, “Heat Conduction in Nanofluids: Mechanisms and New Phenomena,” invited talk, 7<sup>th</sup> US-Japan Joint *Seminar* on Nanoscale Transport Phenomena, Shima, Japan, December 11-14, 2011.

- IP161. Gang Chen, "Concentrated Solar Thermoelectric Power," invited talk, DOE Sunshot Summit, Denver, Colorado, June 13-14, 2012.
- IP162. Gang Chen, "Nanostructured Materials for Thermoelectric Energy Conversion," invited talk, ACS National Meeting, Philadelphia, August 18-23, 2012.
- IP163. A. Mavrokafelos, S. E. Han, S. Yerci, M. Branham, and G. Chen, "Efficient Light-Trapping in Inverted Nano-Pyramid Thin Crystalline Silicon Films", invited, European Materials Society Conference (E-MRS), Strasbourg, France, May 14-18, 2012 (delivered by Yerci).
- IP164. Gang Chen, "Nanostructured Materials for Thermoelectric Energy Conversion," Invited talk, Orcas 2012, International Conference on Energy Conversion and Storage, Friday Harbor, WA, September 4-6, 2012.
- IP165. Gang Chen, Svetlana V. Boriskina, Matthew Branham, and Selcuk Yerci, "Light Trapping and Thermodynamics of Photovoltaic Cells," invited talk, OSA's 96<sup>th</sup> Annual Meeting, Frontiers in Optics 2012, Laser Science XXVIII, APS/DLS 28<sup>th</sup> Annual Meeting, Rochester, New York, October 14-18, 2012.
- IP166. Gang Chen, "Nanostructure Approach to Thermoelectrics: Materials, Transport, and Devices," invited talk, MRS Fall Meeting, Acta Materialia Award Forum, Boston, November 25-30, 2012.
- IP167. Gang Chen, "Thermoelectric Transport in Bulk and Nanostructured Materials," invited, Gordon Research Conference on Nanomaterials for Applications in Energy Technology, Ventura, California, February 3 to 8 2013.
- IP168. Gang Chen, "Thermal Transport in Soft Matters: Polymers and Nanofluids," invited, MMSD 2013 - Organic Electronics and Transport Phenomena, Max Planck Institute for Polymer Research, Mainz, Germany, June 10, 2013 to June 12, 2013.
- IP169. Gang Chen, "Near-Field Radiation Heat Transfer," invited talk, presented at ASME 2013 Summer Heat Transfer Conference, Minneapolis, MN, July 14-19, 2013.
- IP170. Gang Chen, "Ballistic and Coherent Heat Conduction," invited, CECAM Nanophotonics, Bremen, Germany, August 19-23, 2013.
- IP171. Gang Chen, Yongjie Hu, Maria Luckyannova, Jivtesh Garg, Zhiting Tian, Kimberlee Collins, and Lingping Zeng, "Phonon Heat Conduction at the Nanoscale: From Ballistic to Coherent," IMECE2013-66018, Invited Presentation at ASME 2013 International Mechanical Engineering Congress & Exposition, San Diego, CA, November 15-21, 2013.
- IP172. Gang Chen, "Nonlocal and Coherent Phonon Transport in Bulk Materials and Nanostructures," Invited Presentation, MRS Fall Meeting, Symposium UU, Boston, December 1-6, 2013.
- IP173. Gang Chen, "Nonlocal and Coherent Phonon Transport in Bulk Materials and Nanostructures," Invited Presentation, e-MRS Spring Meeting, Symposium D, Lille, France, May 26-30, 2014.
- IP174. Gang Chen, "The Interdisciplinary Future of Mechanical Engineering," Invited talk at International Conference on Engineering Science and Technology, Sponsored by UNESCO/CAETS/CAE, June 2-3, 2014.

- IP175. Gang Chen, “Probing and Simulating Phonon and Electron Transport for Thermoelectric Applications,” Invited talk at Gordon Conference, Ceramics: Solid-State Studies In, Mt. Holyoke, July 20-25, 2014.
- IP176. Matthew Branham, Wei-Chun Hsu, Selcuk Yerci, and Gang Chen, “Thin Film c-Si Solar Cells – Detailed Understanding from Light Trapping to Carriers Collection,” Invited talk at AVS 61th International Symposium and Exhibition, Baltimore, MD, November 9-14, 2014.
- IP177. Bo Qiu, Bolin Liao, Jiawei Zhou and Gang Chen, “First-Principles Calculation of Thermoelectric Properties of Silicon,” Invited talk at MRS Fall Meeting, Boston, MA, November 31-December 5, 2014.
- IP178. Gang Chen, Vazrik Chiloyan, Poetro L. Sambegoro, Jonathan K. Tong, Yi Huang, Wei-Chun Hsu, and Svetlana V. Boriskina, “Thermodynamics and heat transfer of thermal radiation” Invited talk at MRS Spring Meeting, Symposium M, April 5-10, 2015.
- IP179. Gang Chen, “Innovations in Energy Utilization: Solar, Thermal, and Water,” invited talk MIT China Conference, Wuxi, May 23, 2015.
- IP180. Gang Chen, “Simulation of All Thermoelectric Properties of Single Crystalline Materials from First-Principles,” invited talk at International Conference on Thermoelectrics, Dresden, Germany, June 28-July 3, 2015.
- IP181. Gang Chen, Vazrik Chiloyan, Poetro L. Sambegoro, Jonathan K. Tong, Yi Huang, Wei-Chun Hsu, and Svetlana V. Boriskina, “Heat Transfer and Thermodynamics of Thermal Radiation in the Near and Far Fields” Invited talk at PIERS (Progress in Electromagnetics Research Symposium, Prague, July 6-9, 2015.
- IP182. Gang Chen, “Engineering Phonon Heat Conduction in Nanostructures,” Gordon Research Conference on Nano-Mechanical Interfaces, Hong Kong University of Science and Technology, July 19-20, 2015.
- IP183. S. Boriskina, V. Chiloyan, P.L. Sambegoro, J. Tong, Y. Huang, and Gang Chen, “Exploring and Tailoring Near-Field Thermal Radiation at Extreme Separations,” invited presentation at Meta’15, 6<sup>th</sup> International Conference on Metamaterials, Photonic Crystals and Plasmonics, New York, August 4-7, 2015.
- IP184. Gang Chen, “Phonon Heat Conduction in Nanostructures: Ballistic, Coherent, Hydrodynamic, and Divergent Modes,” International Symposium on Clusters and Nanostructures, Richmond, Virginia, October 26-29, 2015.
- IP185. G. Chen, M. Luckyanova, L.P. Zeng, S.Y. Lee, B.L. Liao, J.W. Zhou, V. Chiloyan, and S. Humberman,, “Phonon Transport: Ballistic, Coherent, and Hydrodynamic Regimes,” Phonon Transport, Interactions and Manipulations in Nanoscale Materials and Devices - Fundamentals and Applications II, 2015 MRS Fall Meeting, Boston, MA, November 29-December 4, 2015.
- IP186. Gang Chen, Daniel Kraemer, Lee Weinstein, James Loomis, George Ni, Jonathan Tong, Yi Huang, and Svetlana Boriskina, “Nano-Materials Based Solar-Thermal Technology,” Symposium OO, 2015 MRS Fall Meeting, Boston, MA, November 29-December 4, 2015.
- IP187. Gang Chen, “Phonon Heat Conduction in Nanostructures: Ballistic, Coherent, Localized, and Hydrodynamic Modes,” APS March Meeting, Baltimore, MD, March 14-18, 2016.
- IP188. Wei-Chun Hsu; Matthew Branham; Jonathan Tong; Bolin Liao; Yi Huang; Svetlana V. Boriskina; Gang Chen, “Ultra-Thin Crystalline Silicon Solar Cells and Near-Field



- Thermo-Radiative Cells,” in Symposium NM4: Nanomaterials-Based Solar Energy Conversion, NM4.12.01, MRS Fall Meeting, Nov 27-Dec 2, 2016, Boston, MA (Invited).
- IP189. Gang Chen, Thomas A. Cooper, Lee Weistein, Yanfei Xu, Jonathan K. Tong, Matthew S. Branham, Wei-Chun Hsu, Svetlana V. Boriskina, Using Nanostructures to Tailor Thermal and Solar Radiation, Nanoworld Conference, April 3-5, 2017, Boston, MA (invited).
- IP190. Mingda Li and Gang Chen, “Quantized Dislocation,” 54<sup>th</sup> SES Annual Meeting, Boston, July 25-28, 2017.
- IP191. Gang Chen, “Innovations in Materials and Devices for Efficient Solar and Thermal Energy Utilization,” MIT ILP China Conference, Shanghai, October 25&26, 2017.
- IP192. Jiawei Zhou, Te-Huan Liu, Zhiwei Ding, Qichen Song, Qian Xu and Gang Chen, First-Principles Simulation of Electron and Phonon Scattering and Their Thermoelectric Transport Properties,” MRS Fall Meeting, Symposium ES09: Thermal Energy – Transfer, Conversion, and Storage, ES09-05-01, Boston, November 26 – December 1, 2017.
- IP193. Mingda Li and Gang Chen, “Quantized Dislocations,” MRS Fall Meeting, Symposium Symposium TC07: Design, Control and Advanced Characterization of Functional Defects in Materials, TC0-09-01, Boston, November 26 – December 1, 2017.
- IP194. Jiawei Zhou, Te-Huan Liu, Zhiwei Ding, Qichen Song, Qian Xu and Gang Chen, First-Principles Simulation of Electron and Phonon Scattering and Their Thermoelectric Transport Properties,” MRS Fall Meeting, Symposium EN10: 1, Thermoelectric Materials, Devices, and Applications, Phoenix, AZ, April 2-6, 2018.
- IP195. George Ni, Hadi Zandavi, Thoms Cooper, Svetlana Boriskina, and Gang Chen, “Solar Steam Generation for Low-Cost Desalination, Sterilization, and Cooking,” EN11, Nanomaterials for Energy and Water Nexus, Phoenix, AZ, April 2-6, 2018.
- IP196. Gang Chen, “Phonon Thermal Transport Through Single and Multiple Interfaces,” APL Interfaces in Energy Materials, Cambridge, UK, April 10-12, 2018.
- IP197. Gang Chen, “MIT Innovation and Entrepreneurship Ecosystem,” MIT-CHIEF, Beijing, November 12, 2018.
- IP198. G. Chen, “Millie Dresselhaus’ Legacy and Recent Advances in Thermoelectrics,” APS March Meeting, Session S42: Millie Dresselhaus Legacy in Nanosciences, Boston, MA, March 4-8, 2019.
- IP199. Z.W. Ding, S. Huberman, R. A. Duncan, J.W. Zhou, V. Chiloyan, A. A. Maznev, K.A. Nelson, and G. Chen, “Phonon Hydrodynamics in Graphene and Graphite”, APS March Meeting, Session F44: Manifestations of Phonon Hydrodynamics in Thermal Transport, Boston, MA, March 4-8, 2019.

#### Invited Panelist and Participants

- IP200. G. Chen, 1996, "Thermal Issues in Semiconductor Lasers," Panel presentation at the 1996 International Mechanical Engineering Congress, Atlanta, Georgia, November 17-22.
- IP201. G. Chen, 1998, "Microscale Heat Transfer in Photonic Structures and Devices," Panel Presentation at 1998 IMECE, Anaheim, CA, Nov. 14-20.

- IP202. G. Chen, "Thermoelectric Micro-Coolers and Micro Power Generators," panel presentation (Thermal MEMS Panel) at 1999 National Heat Transfer Conference, Albuquerque, New Mexico, August 15-17, 1999.
- IP203. G. Chen, "Thermophysical Engineering in Nanostructures," round-table discussion, Heat Transfer and Transport Phenomena in Microsystems Conference, Banff, Canada, October 15-20, 2000.
- IP204. G. Chen, "Thermoelectric Micro-Power Generators," Panel on Miniature Energy, Chemical and Biological Systems (session # AES-11, J. Kapat and L. Chou), IMECE2000, at IMECE2000, Orlando, ASME HTD-Vol. 366-2, pp. 245-251.
- IP205. G. Chen, "Teaching Nanoscale Transport at MIT," Panel on Micro/Nanoscale heat transfer education, IMECE'2002.
- IP206. G. Chen, Panel member at MIT Materials Unlimited Seminar, Seminar Speaker Y.-M. Lin on Thermoelectric Materials. 12/16/02
- IP207. G. Chen, "Micro- Nanoscale Heat Transfer Education," presented at Purdue Heat Transfer Celebration, paper in conference proceedings, April 3-5, 2003.
- IP208. G. Chen, "Nanoscale Heat Transfer and Information Technology," presented at Rohsenow Symposium on the Future of Heat Transfer, paper in conference CD-ROM, May 16, 2003.
- IP209. R.G. Yang and G. Chen, "Recent Development In Nanostructured Thermoelectric Materials and Devices," presented at 9<sup>th</sup> Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITHERM2004), Las Vegas, June 1-4, 2004, ITHERM 2004 pp. 731-732.
- IP210. G. Chen, A. Narayanaswamy, and L. Hu, "Thermal Radiation inside and outside Nanostructures," Panel on Fundamental Questions in Multiscale Thermophysics and Transport, IMECE 2004, Anaheim, November 14, 2004 (Chair: van Carey).
- IP211. G. Chen, "Design and Manufacturing of Solid-State Energy Conversion Materials," Panel on Challenges and Opportunities in Electronic/Photonic Materials Manufacturing, ASME Summer Heat Transfer Conference, July 17-22, 2005, San Francisco, CA.
- IP212. G. Chen, "Thermoelectric Materials: From Superlattices to Nanocomposites," Panel on Challenges and Opportunities of Solid-State Technologies for Electronic Cooling and Power, ASME InterPACK'05, July 17-22, 2005, San Francisco, CA.
- IP213. G. Chen, "Nanoscale Thermal Radiation: Fundamental Issues and New Opportunities," presented at IMECE2005, Nov. 6-11, Orlando, FL (Chairs: Z.M. Zhou, P. Meguc).
- IP214. G. Chen, "Engineering Nanocomposites for Thermoelectric Energy Conversion," presented at IMECE2005, Nov. 6-11, Orlando, FL (Chairs: W. Chiu and R. Mahajan).
- IP215. G. Chen, Panelist, Advanced Technology Workshop on Advanced Substrates and Next-Generation Semiconductors, April 30-May 1, 2008, Linthicum Heights, Maryland.
- IP216. Gang Chen, "Inconvenient Truth or Incorrect Conclusion," DOE Thermoelectrics Application Workshop, 9/29-10/1, 2009, Coronado, CA.
- IP217. Gang Chen, Panel on China Energy and Environment Research, MIT student organization, February 18, 2010.

- IP218. Gang Chen, Thermoelectric Energy Conversion, Energy Harvesting for Wireless Sensors, MIT Enterprise Forum, February 22, 2010.
- IP219. Gang Chen, “Nanostructured Materials for Thermoelectric Energy Conversion,” International Mechanical Engineering Congress and Exhibition, IMECE, Panel on NanoEngineering for Energy, Vancouver, Canada, November 14-18, 2010.
- IP220. G. Chen, “Rapid Developing Energy Industry in China and Role of Low-Cost Nanotechnology,” Panel Discussion at Harvard Project for Asia and International Relation Conference, Harvard University, February 13, 2011.
- IP221. G. Chen, “From Basic Research to Commercialization and Thermoelectric Energy Conversion,” MIT-China program, MIT, April 20, 2011.
- IP222. G. Chen, “Concentrated Solar Thermoelectric Generators,” DOE EFRC Summit, Panel on Energy Conservation and Efficiency, May 27, 2011.
- IP223. G. Chen, Panelist, MIT CHIEF Conference, MIT, November 17 and 18, 2012.
- IP224. Gang Chen, “Two Decades of Micro/Nanoscale Thermophysics and Heat Transfer,” presented at ASME 2013 Summer Heat Transfer Conference, Minneapolis, MN, July 14-19, 2013.
- IP225. G. Chen, Panelist on Panel “Commercializing EFRC Research”, 2013 DOE EFRC PI Meeting, Washington, DC, July 18-19, 2013.
- IP226. G. Chen, Panelist on Panel, “Aligning Global Development with Academic Career,” IMECE, 2014, Montreal, Canada, November 14-20, 2014.
- IP227. G. Chen, Panelist on Panel “Solar Thermal”, talk title “Innovation Examples of Solar-Thermal Technologies,” MIT Solar Day, September 10, 2015.
- IP228. G. Chen, Panelist on Panel “Materials”, MIT-CHIEF, November 12, 2016.
- IP229. G. Chen, Panelist on Future of Science Forum, Beijing, Jan. 15, 2017.
- IP230. G. Chen, Presentation at Millie Dresselhaus Memorial Session, 9<sup>th</sup> US-Japan Joint Seminar on Nanoscale Transport Phenomena, Tokyo, Japan, July 2-5, 2017.
- IP231. G. Chen, Chair Panel on “World-Changing Materials”, Future Science Prize, Beijing, October 29, 2017.
- IP232. G. Chen, “Energy Conversion and Thermal Materials Enabled by Nanoscale Transport Physics,” presented at Panel on Nanoscale Heat Transfer, 16<sup>th</sup> International Heat Transfer Conference, Beijing, August 10-15, 2018.
- IP233. G. Chen, panelist on Future Smart Cities, World Forum on Scientific and Technological Innovations, Beijing, August 10-12, 2018.

#### Invited Presentations in Workshops

- IP234. G. Chen, 1995, "Thermal Phenomena at Micron and Nanoscale," NSF/DOE Workshop on Advanced Thermal Manufacturing and Materials Processing, Leesburg, Virginia, May 25-26.

- IP235. G. Chen, 1997, K.L. Wang, and M.S. Dresselhaus, "Quantum Structures for Thermal Management of Microelectronic Devices," DARPA Workshop on Microelectronics Thermal Management, Arlington, December 11-12.
- IP236. G. Chen, 1998 "Towards Phonon Engineering in Microelectronic and Microthermoelectric Devices," invited presentation at the DSRC/DARPA Study: Thermal Management for Compact Systems, Arlington, Virginia, February 5-6.
- IP237. G. Chen, 1998, "Perspective of Thermoelectric Cooling for Internal Cool Electronics," invited presentation at the IEEE Workshop on Internal Cool Electronics, Marriot Hotel, Washington, DC., Oct. 15-16.
- IP238. G. Chen, "Report on the 2<sup>nd</sup> Microtherm Workshop and Tutorial," presented to the DOE Council of Engineering Energy Research, Santa Monica, CA, 1999.
- IP239. G. Chen, "Phonon Engineering in Nanostructures," Office of Naval Research Workshop on Thermally Engineered Materials, Dec. 10, 1999.
- IP240. G. Chen, "Phonon Engineering and Heat Transfer in Nanostructures," Department of Defense Workshop on Applied Physics of Nanostructures and Nanomaterials, Dec. 16-17, 1999.
- IP241. G. Chen, "Engineering Nanostructures for Energy Transport and Conversion," UC Berkeley Nanoengineering Workshop, Berkeley, August 4-5, 2000 (Sponsored by DOE CEER).
- IP242. G. Chen, ARO workshop, invited participant, Nanoscience for Soldiers, Research Triangle Park, NC, Feb. 8-9, 2001.
- IP243. G. Chen, "Nanoscale Engineering of Heat Transfer and Energy Conversion Processes," ONR workshop, Thermal Materials: Processing and Performance, University of Cambridge, UK, May 30-June 1, 2001.
- IP244. G. Chen, "Solid-State Energy Conversion---From Physics to Systems," presented at DARPA/ONR Workshop on Direct Energy Conversion, Alexandria, Dec. 4&5, 2001 (Dr. Pazik and Browning).
- IP245. B. Yang and G. Chen "Phonon Transport in Superlattices," presented at New Thermoelectric Materials Workshop: Chemistry, Physics and Materials Science of Thermoelectric Materials: Beyond Bismuth Telluride, Traverse City, Michigan, August 17-21, 2002.
- IP246. G. Chen, "Nanoscale Heat Transfer for Thermoelectric Energy Conversion," presented at Department of Energy/Electric Power Research Institute (DOE/EPRI) High Efficiency Thermoelectrics Workshop, San Diego, CA, February 17-20, 2004.
- IP247. G. Chen, "Nanoscale Heat Transfer: Enabling Efficient Direct Thermal-to-Electric Energy Conversion," presented at National Nanotechnology Initiative Workshop on "Nanoscience Research Needs for Energy," Arlington, VA, March 16-18, 2004.
- IP248. G. Chen, "Thermal Conductivity and Heat Conduction Mechanisms in Superlattices," Presented at JST-CREST Koumoto Meeting, Fukuoka, Japan, November 26-27, 2004.

- IP249. The Air Force/Army/NSF Joint Workshop on Multifunctional Structures for Energy Harvesting & Storage, Stanford University, December 1-17, 2004 (attending and discussion only).
- IP250. DOE workshop on Solar Energy Utilization, Washington, DC, April 18-21, 2005 (attending and sub-pane chair on Thermal Utilization).
- IP251. G. Chen, "Engineering Phonon Thermal Transport in Nanostructures," Defense Science Research Council Workshop on Nanoscopic Phonon Engineering, Arlington, May 9, 2005.
- IP252. G. Chen, "Nanotechnology for Efficient Energy Utilization," MIT ILP Workshop on Energy Challenge Workshop, Cambridge, MIT, Dec. 6-7, 2005.
- IP253. G. Chen, "Surface Phonon-Polariton Engineering," DARPA Nanoscopic Optical Phonon Engineering, Workshop, December 15, 2005.
- IP254. G. Chen, X.Y. Chen, Z. Chen, L. Hu, A. Narayanaswamy, and R.G. Yang, "Thermally Excited Nonequilibrium States between Electrons and Phonons for Solid-State Energy Conversion," Int. Workshop on Nanoscale Energy Conversion and Information Processing Devices, September 24-26, Nice, France.
- IP255. G. Chen, "Nanostructured Thermoelectric Materials for Power and Cooling," MEMS@MIT Fall 2006 Meeting, MIT, October 10, 2006.
- IP256. G. Chen, "Novel Thermoelectric Materials, Devices, and Systems," DARPA/MTO Components from Thermoelectric Materials Workshop, Arlington, VA, May 16-17, 2007.
- IP257. G. Chen, "Solar to Electric Energy Conversion via Thermoelectric Devices," MIT Space Power Workshop, May 13-16, 2007.
- IP258. G. Chen, "Direct Energy Conversion," GCEP Workshop, MIT, November, 29-30, 2007.
- IP259. Gang Chen, "Thermal Energy Conversion and Storage," NSF Workshop on Thermal and Solar Energy Conversion and Storage.
- IP260. Gang Chen, "Plenty Room at the Bottom---Nanotechnology Development from the Bottom up: Energy Nanotechnology Startup," Panelist at 3<sup>rd</sup> Energy Nanotechnology International Conference, 2008.
- IP261. Gang Chen, "Nanostructured Thermoelectric Materials," Workshop on Recent Advances in Peltier Cooling in the Range Including 10K, Air Force Research Laboratory, Albuquerque, New Mexico, April 22 and 23, 2009.
- IP262. Gang Chen, "Extra-Ordinary Heat Transfer and Energy Conversion," DARPA ECYCLER Workshop, Arlington, April 23-24, 2009.
- IP263. Gang Chen, Mildred S. Dresselhaus, and Zhifeng Ren, "Nanostructured Thermoelectrics: from Basic Physics to Potential Applications," DOE Thermoelectrics Application Workshop, 9/29-10/1, 2009, Coronado, CA.
- IP264. Sheng Shen and Gang Chen, "Extraordinary Heat Transfer and Energy Conversion," DSRC Physics of High Heat Flux Devices and their Applications Workshop, 11/11-12/09, Arlington, VA.
- IP265. Gang Chne, "Nano, Heat, and Energy," MITEI Press Session with ~20 reporters, March 5, 2010, MIT.

- IP266. Gang Chen, Workshop on Computational Materials Science and Chemistry for Innovation, DOE Office of Science, July 26-28, 2010, Bethesda, Maryland.
- IP267. Gang Chen, \$1/W Workshop, EERE&ARPA-E, Washington DC, August 10-11, 2010.
- IP268. Daniel Kraemer, Bed Poudel, Hsien-Ping Feng, J. Christopher Caylor, Bo Yu, Xiao Yan, Yi Ma, Xiaowei Wang, Dezhi Wang, Andrew Muto, Kenneth McEnaney, Qing Hao, Matteo Chiesa, Zhifeng Ren, and Gang Chen, "Solar Thermoelectric Generators with Flat-Panel Thermal Concentration," DOE EERE 2011 Thermoelectrics Application Workshop, San Diego, January 3-6, 2011.
- IP269. G. Chen, "Nano, Heat, and Energy---Nanostructured Thermoelectric Materials," presented as a member of US-Russia Presidential Bilateral Relation Commission Delegation, Moscow, February 27-March 4, 2011.
- IP270. G. Chen, "Thermoelectrics: Kang's Contributions and Recent Developments," K.L. Wang Symposium, UCLA, June 25, 2011.
- IP271. G. Chen, "Progress in Thermoelectric Materials, Devices, and Applications," Advanced Thermoelectric Technology Workshop, Taipei, June 30, 2011.
- IP272. G. Chen, "Phonon Transport Theories and Simulation," invited talk NSF/ONR Workshop on Micro/Nanoscale Heat Transfer, Georgia, Atlanta, March 4, 2012.
- IP273. G. Chen, "Progress from EFRC: Solid-State Solar-Thermal Energy Conversion Center," presented at 3<sup>rd</sup> International Thermoelectrics Application Workshop, Baltimore, March 20-22, 2012.
- IP274. G. Chen, "Opportunities for Thermoelectrics," invited talk at Emerging Ideas for High Efficiency Topping Cycle, Presentation at ARPA-E Workshop, Arlington, Virginia, March 27, 2012.
- IP275. G. Chen, Kavli Prize Week, invitation by Mildred S. Dresselhaus, Oslo, Norway, 9/1-9/5, 2012.
- IP276. G. Chen, "Simulating and Probing Phonon and Electron Transport for Thermoelectric Applications," Materials for Sustainable Energy Future, Workshop IV: Energy Conservation and Waste Heat Recovery, Institute for Pure and Applied Mathematics, UCLA, November 18-22, 2013.
- IP277. G. Chen, "Introduction to MIT MechE," MIT, Cambridge, MIT-TIT 1st Workshop, September, 2014.
- IP278. G. Chen, "Introduction to MIT MechE, Materials and Devices for Thermal Systems," Tokyo Institute of Technology, MIT-TIT 2<sup>nd</sup> Workshop, January 7, 2015.
- IP279. G. Chen, "Understanding and Controlling Thermal Transport," Toyota Workshop: Thermal Management for Future Vehicles, Ann Arbor, Michigan, June 9, 2015.
- IP280. Northeastern Department Head Meeting, August 14-15, 2015, RPI, Troy.
- IP281. G. Chen, "Spectral and Angular Control of Thermal Emission, Absorption and Transmission," Future Directions Workshop for Power and Energy Advances from Photonic Sciences and Applications, Caltech, CA, January 19-20<sup>th</sup> 2016.

- IP282. G. Chen, "System Consideration in Waste Heat Recovery," ARPA-E Workshop on Waste Heat Recovery, San Francisco, CA, December 13-14, 2016.
- IP283. G. Chen, "Solid-State Solar-Thermal Energy Conversion Center," ERFC PI Meeting, Washington, DC, July 25-25, 2017.
- IP284. G. Chen, "Direct Thermal Energy Conversion," HEATER Workshop, LBL, July 31-August 1, 2017.
- IP285. G. Chen, "Connecting Phonon Heat Conduction to Structures," BNL-MIT Workshop, MIT, August 22-23, 2018.

#### Invited Tutorials:

- IP286. G. Chen, 1998, "Thermophysics of Solids and Solid-State Devices," Tutorial presented at the 2<sup>nd</sup> Microtherm Workshop and Tutorial, Albuquerque, New Mexico.
- IP287. G. Chen, "Nanostructures and Their Properties," Tutorial given at ITherm 2006, May 30 - June 2, 2006 in San Diego, CA.
- IP288. G. Chen, "Hydrogen Storage," Tutorial given at ASME Energy Nanotechnology International Conference, June 26-28, MIT, 2006.
- IP289. G. Chen, "Thermal Transport in Nanostructures," Tutorial given at EuroSimE: Thermal, Mechanical and Multiphysics Simulation and Experiments in Micro-Electronics and Micro-Systems, London, April 15-18, 2007.
- IP290. G. Chen, "Thermoelectric Energy Conversion" Six Hour Tutorial, European School in Materials Science: Chemistry and Physics of Materials for Energetics, University of Milano-Bicocca, September 14-19, 2009.
- IP291. G. Chen, "Thermal Energy Technology," September, 2013, MITEI China Program.
- IP292. G. Chen, "Thermal Energy Technology," October 31, 2013, MITEI China Program.
- IP293. G. Chen, "Nano-microstructural control of phonon engineering for thermoelectric energy harvesting," Webinar for MRS Bulletin, January 22, 2018 (for March Issue).

#### Program Reviews/Kick-off (started recording 9/2010)

- IP294. G. Chen, "Phonon Transport in Nanostructured Thermoelectric Materials for Cryogenic Cooling" Cryogenic Cooling MURI Kick-off Meeting, Albuquerque, New Mexico, September 1, 2010.
- IP295. G. Chen, "Nanomanufacturing for Energy Systems," At NSF SINAM Site Visit Review, Berkeley, June 9-10, 2011.
- IP296. G. Chen, "Electron and Phonon Thermoelectric Transport in FeSb<sub>2</sub>, Bi, and Bi<sub>2</sub>Te<sub>3</sub>," Cryogenic Cooling MURI Review, Santa Barbara, December 16, 2011.
- IP297. G. Chen, "Overview of S3TEC Activities," EFRC S3TEC Review by DOE, Baltimore, Maryland, Jan. 9, 2012.

- IP298. G. Chen, "Metallic Composites Phase Change Materials for High Temperature Thermal Energy Storage," ARPA-E HEATS Program Annual Review, Arlington, VA, October 23, 2012.
- IP299. G. Chen, "Phonon and Electron Transport in Nanostructured Thermoelectric Materials for Cryogenic Cooling," AFOSR MURI Program Review, Albuquerque, NM, December 17, 2012.
- IP300. G. Chen "Solid-State Solar Thermal Energy Conversion Center," presented at Physical Behavior of Materials PI Meeting, Potomac, April 14-17, 2013.
- IP301. G. Chen et al., "Probing and Engineering Phonons and Electrons Transport In nanostructured thermoelectric materials," 2013 DOE EFRC PI Meeting, Washington, DC, July 18-19, 2013.
- IP302. G. Chen, APRA-E Workshop on Personal Thermal Management Systems, Nov. 12 and 13, 2013.
- IP303. G. Chen, "First Principles Simulation of Phonon and Electron Thermoelectric Transport" 2013 OSU MURI Review, Albuquerque.
- IP304. G. Chen, "Concentrated Solar Thermoelectric Generators," DOE EERE Program Review, Washington, DC, February 18, 2014.
- IP305. G. Chen, "Continuous Processing of High Thermal Conductivity Fibers and Sheets," DOE Polymer Program Review, Washington DC, May 7, 2014.
- IP306. G. Chen, "Thermal and Electrical Regulation of Heat Transfer," AFOSR Project Review, Arlington, Virginia, May 8, 2014.
- IP307. G. Chen, "Concentrated Solar Thermoelectric Generators," DOE EERE Program Review at Sunshot Summit, 2014, Anaheim, May 20.
- IP308. G. Chen, "Full Spectrum Stacked Solar Thermal and PV Receiver," APRA-E FOCUS Project Kickoff Meeting, Denver, June 25, 2014.
- IP309. G. Chen, "Heat Transfer and Thermodynamics of Thermal Radiation," DOE Physical Behavior of Materials Principal Investigators' Meeting, Gaithersburg, MD, March 30 - April 1, 2015.
- IP310. G. Chen, "Probing and Understanding Thermal Transport and Energy Conversion in Nanostructures," Energy Frontier Research Center Principal Investigators' Meeting, Washington, DC, October 26-27, 2015.
- IP311. G. Chen, "ab-Initio Simulation of Thermoelectric Transport," DARPA MATRIX Program Review, Durham, NC, Decmeber 6-8, 2016.
- IP312. G. Chen, "ab-Initio Simulation of Thermoelectric Transport," DARPA MATRIX Program Review, HRL, Malibu, May 2, 2017.
- IP313. Yoichiro Trurimaki, Jonathan K. Tong, Wei-Chun Hsu, Yi Huang, Svetlana V. Boriskina, and Gang Chen, "Spectrally Tunnable Radiation Extratio from Micro and Nanostructures," DoE BES 2017 Physical Behavior of Materials Principal Investigators' Meeting, Gaithersburg, May 2-4, 2017.



- IP314. G. Chen, Battery Thermal Management Research Opportunities, Energy Storage Center Workshop, MIT, March 14, 2018.
- IP315. G. Chen, presentations on theory and experiments, MURI Review at Austin, Texas, April 5, 2018.

#### Invited Speeches at Other Events (Starting Recording Nov. 2015)

- IP316. G. Chen, Remark at Symposium in Honor of Professor Chih-Ming Ho, Honolulu, Hawaii, November 15, 2015.
- IP317. G. Chen, Dinner Speech at Symposium in Honor of Professor Nam Suh, Houston, November 18, 2015.
- IP318. G. Chen, Acceptance speech at World Technology Network Gala Dinner, New York, November 20, 2015.
- IP319. G. Chen, "MIT Innovation and Entrepreneurship Ecosystems," MIT-CHIEF dinner speech, MIT, November 21, 2015.

#### **Journal Publications**

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- J2. H.R. Zhang, G. Chen, and S.Y. Huang, 1992; "Interaction between Film Condensation on One Side of A Vertical Wall and Natural Convection on the Other with Wall Radiation Taken into Account," *Journal of Huazhong University of Science and Technology*, Vol. 20, pp. 41-47 (in Chinese).
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- J5. G. Chen and C.L. Tien, 1992, "Partial Coherence Theory of Thin Film Radiative Properties," *Journal of Heat Transfer*, Vol. 114, pp. 636-643.
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- J14. G. Chen, M. Hadley, and J.S. Smith, 1994, "Pulsed and Continuous Wave Thermal Characteristics of External-Cavity Surface-Emitting Laser Diodes," *Journal of Applied Physics*, Vol. 76, no.6, Sept. 14, pp. 3261-3271.
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- J393. A. Ruiz-Clavijo, Y. Tsurimaki, O. Caballero-Calero, G. Ni, G. Chen, S.V. Boriskina, M.S. Martín-González, "Engineering a full gamut of structural colors in all-dielectric mesoporous network metamaterials" *ACS Photonics*, 5, 2120-2128, 2018.
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- J399. Zhiwei Ding, Jiawei Zhou, Bai Song, Mingda Li, Te-Huan Liu, Gang Chen, Umklapp Scatterings Are Not Necessarily Resistive, *Physical Review B*, 98, 180302, 2018.
- J400. Thomas Cooper, Seyed Hadi Zandavi, George Ni, Svetlana V. Boriskina, Gang Chen, “Contactless steam generation and superheating under one sun illumination,” *Nature Communications*, 9, 5086, 2018.
- J401. Dongwook Lee, Jiawei Zhou, Gang Chen, and Yang Shao-Horn, “Prediction of Enhanced Thermoelectric Properties via Kraut’s Method and 1D Poisson’s Equation at PEDOT:PSS / Undoped Ge Thin Film Bilayered Heterostructures,” *Advanced Electronic Materials*, DOI: 10.1002/aelm.201800624, 2018.
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- J403. M. N. Luckyanova, J. Mendoza, H. Lu, S. Huang, J. Zhou<sup>1</sup>, M. Li, B. J. Kirby, A. J. Grutter, A. A. Puretzky, M. Dresselhaus, A. Gossard, and G. Chen, “Phonon Localization in Heat Conduction,” *Science Advances*, 4, eaat9460, 2018.
- J404. Hangtian Zhu, Jun Mao, Yuwei Li, Jifeng Sun, Yumei Wang, Qing Zhu, Guannan Li, Qichen Song, Jiawei Zhou, Yuhao Fu, Ran He, Tian Tong, Zihang Liu, Wuyang Ren, Li You, Zhiming Wang, Jun Luo, Andrei Sotnikov, Jiming Bao, Kornelius Nielsch, Gang Chen, David Singh, and Zhifeng Ren, “Discovery of TaFeSb-based half-Heuslers with high thermoelectric performance” *Nature Communications*, 10, 270, 2019.

#### **Papers in Magazines (non-peer reviewed)**

- M1. G. Chen, S. Shen, A. Henry, and J. Tong, “Heat Conducting Polymers,” *Materials World*, Vol. 18, pp. 23-25, June, 2010.
- M2. G. Chen, S. Shen, J. Tong, and A. Henry, “Reinventing the Polymer,” *TCE* Vol. 827, pp. 28-29, May, 2010.
- M3. G. Chen, “MIT’s Yoda,” Letter to Editor on Millie Dresselhaus, *MIT Technology Review*, Vol. 116, p.3, July/August 2013.



- M4. Mona Zebarjadi and Gang Chen, Preface to Special Topic: Thermoelectric Materials, APL Materials.

### **Invited Seminars:**

- S1. "Microscale Thermal Phenomena in Optical and Optoelectronic Thin Film Devices," at IBM Amalden, California, January 22, 1993.
- S2. "Thermal Phenomena in Semiconductor Lasers," at University of Virginia at Charlottesville, April 6, 1995.
- S3. "Thermal Issues in VCSELs," at Hewlett-Packard Laboratory, Palo Alto, California, November 15, 1995.
- S4. "Heat Transfer in Nanoscale Devices," at North Carolina A&T State University, February, 9, 1996.
- S5. "Heat Transfer in Superlattices and Nanostructures" at UNC Chapel-Hill, May 29, 1996.
- S6. "Heat Transfer in Superlattices and Nanostructures" at Army Research Office, September 4, 1996.
- S7. "Thermal Conductivity of Superlattices," at Naval Research Laboratory, Washington, October 1, 1996.
- S8. "Heat Transfer in Superlattices and Nanostructures," at Leigh University, November 15, 1996.
- S9. "Micro- and Nanoscale Heat Transfer: From Science to Applications" UNC-Charlotte, March 4, 1997.
- S10. "Thermal Conductivity of Thin Films: Measurement and Modeling" Marlow Industries, Inc., Dallas, November 21, 1997.
- S11. "Phonon Engineering in Micro- and Nanostructures," California Institute of Technology, February 10, 1998.
- S12. "Microscale Heat Transfer and Its Application in Microelectronics Thermal Management," Rockwell Science Center, Thousand Oaks, August 14, 1998.
- S13. "Heat Transfer and Phonon Engineering in Micro- and Nanostructures," Tsinghua University, China, October 20, 1998, Beijing.
- S14. "State-of-the-Art of Thermoelectric Research" Hughes, CA, March 4, 1999.
- S15. "Micro- and Nanoscale Heat Transfer and Energy Conversion," at Mechanical Engineering Department, San Diego State University, April 16, 1999.
- S16. "Micro and Nanoscale Heat Transfer and Thermophysics," Huazhong University of Science and Technology, China, 1999.
- S17. "State-of-the-Art of Thermoelectrics Research," Huazhong University of Science and Technology, China, June 28, 1999.
- S18. "Introduction to Micro-Electro-Mechanical-Systems," Huazhong University of Science and Technology, China, June 29, 1999.

- S19. “Electron-Phonon Engineering for Thermoelectrics Applications” at MITI, Electron-Technical Laboratory (Dr. Ohara), Tsukuba, August 13, 1999.
- S20. “Heat Transfer and Phonon Engineering in Nanostructures for Solid-State Energy Conversion,” at Arizona State University, Mechanical and Aerospace Engineering Department, September 17, 1999.
- S21. “Heat Transfer and Phonon Engineering in Nanostructures for Solid-State Energy Conversion” at University of Minnesota, Mechanical Engineering Dept. (Host Kumar Tamma), September 22, 1999.
- S22. “Modeling and Simulation of Phonon Transport in Nanostructures,” Two hour colloquium at University of Minnesota, Mechanical Engineering Dept. (Host Kumar Tamma), September 23, 1999.
- S23. “Heat Transfer and Phonon Engineering in Nanostructures for Solid-State Energy Conversion,” at Seagate, Minnesota (Host: Edward Murdock), September 23, 1999.
- S24. “Thermal Characterization of Thin Films and Thermal Management of Photonic Devices,” at GenOA, Fremont, CA, Oct. 23, 2000 (Host: A. Verma).
- S25. “State-of-the-Art of Thermoelectrics Research and Potential for Aerospace Applications,” Lockheed Martin Skunk Works, Palmdale, Nov. 29, 2000 (Host: Larry Bloxham).
- S26. “State-of-the-Art of Thermoelectrics Research and Potential for Aerospace Applications,” Lockheed Martin Skunk Works, Palmdale, Feb. 12, 2001 (for program managers).
- S27. “Engineering Nanostructures for Energy Transport and Conversion,” Stanford University, Feb. 14, 2001 (Host: K.E. Goodson).
- S28. “Thermal Issues in VCSELs,” Novalux, Inc, Sunnydale, CA, Feb. 15, 2001 (Host: Robert Martisen).
- S29. “Nanostructures for Solid-State Energy Conversion,” UCLA Department of Materials Science and Engineering Seminar, Feb. 16, 2001 (Host: Ya-Hong Xie).
- S30. “Engineering Nanostructures for Energy Transport and Conversion,” Mechanical Engineering, Carnegie Mellon University, Feb. 28, 2001 (Host: S.C. Yao).
- S31. “Nanoscale Heat Transfer and Its Applications in Energy Conversion and Photonics,” Sandia National Laboratory, March 14, 2001 (Host: C.C. Wong).
- S32. “Nanostructures for Solid-State Energy Conversion,” Materials Science and Engineering Dept., Tsinghua University, June 11, 2001 (Host: Cewen Nan).
- S33. “Nanoscale Heat Transfer and Thermoelectrics Research,” University Wide Nanogroup, Huazhong University of Science and Technology, June 21, 2001 (Host: Prof. Xianliang Yang).
- S34. “Nano and Micro Energy Research,” MEMS Lunch, MIT, September 6 (Host: Professor Martin Smith).
- S35. “Bridging the Gaps between Nano- to Macroscale Transport,” MIT IAP (organized by Sid Yip).

- S36. “Nano-to-Macroscale Energy Transport and Conversion---Bridging the Gaps in Length Scales and Disciplines,” Mechanical Engineering Department, Hong Kong University of Science and Technology, February 21, 2002 (Host: Professor Ping Cheng).
- S37. “Nanoscale Heat Transfer and Energy Conversion---Experimental Approaches,” Mechanical Engineering Department, Hong Kong University of Science and Technology, February 22, 2002 (Host: Professor Ping Cheng).
- S38. “Nano-to-Macroscale Transport: Bridging the Gaps in Length Scales and Disciplines,” MIT Mechanical Engineering Seminar Series, March 15, 2002.
- S39. “Heat Transfer and Energy Conversion in Nanostructures,” Mechanical Engineering Department Seminar, University of Connecticut, October 11, 2002.
- S40. “Introduction to Nanoscale Energy Transport Research,” At IBM Yorktown Heights, Oct. 31, 2002 (host Phaedon Avouris).
- S41. “Nanoscale Heat Transfer for Direct Energy Conversion,” at Mechanical Engineering Department, University of Pennsylvania, January 30, 2003 (Host: H. Bau).
- S42. “Nanoscale Heat Transfer and Nanostructured Thermoelectric Materials---Their Implications for Microelectronics” Intel Corporation, Chandler, Arizona, Feb. 7, 2003 (Hosts: Emery, Chaun Hu).
- S43. “Nanostructured Thermoelectric Materials for Energy Conversion,” Johns Hopkins University, Department of Materials Science, March 26, 2003 (Host: J. Spicer).
- S44. “Heat Conduction in Nanostructures,” Ecole Centrale Paris, July, 2003 (Host: J.-J. Greffet).
- S45. “Introduction to Thermoelectricity and Thermoelectric Energy Conversion,” July, 2003 (Host: J.-J. Greffet).
- S46. “Nanotechnology Enabled Direct Energy Conversion,” Ford Motor Company, Detroit, October 2, 2003.
- S47. “Nanoscale Heat Transfer and Energy Conversion,” Princeton University, Mechanical Engineering Department Seminar, February 21, 2004 (Host: Y. Ju).
- S48. “Nanotechnology: Enabling Efficient Direct Energy Conversion,” Laboratory for Environment and Energy, MIT, February 25, 2004 (Host: David Marks).
- S49. “Nano, Heat, and Energy,” Industrial Technology Research Institute, Energy and Resource Laboratory, July 1, 2004 (Host: S. Chu).
- S50. “Nanotechnology-Enabled Direct Energy Conversion and Thermal Management,” Chinese Academy of Science, July 30, 2004 (Host: Yuelin Wang).
- S51. “Nanoscale Heat Transfer and Energy Conversion,” Northeastern University, Mechanical Engineering Department Seminar, September 17, 2004 (Host: Hameed Metghalchi).
- S52. “Nanoscale Heat Transfer and Energy Conversion,” University of Kentucky, Nanotechnology Certificate Program, October 21, 2004 (Host: Pinar Menguc).
- S53. “Nanoscale Heat Transfer and Energy Conversion,” University of Michigan, Mechanical Engineering Department Seminar, October 22, 2004 (Host: Kevin Pipe).

- S54. “Nanoscale Heat Transfer and Energy Conversion,” Korea Advanced Institute of Science and Technology, November 3, 2004 (Dr. Sung Kim).
- S55. “Nanotechnology Enabled Direct Energy Conversion and Thermal Management,” LG Chemical, Daejeon, Korea, November 4, 2004 (Dr. Gwang Gyu Kim).
- S56. “Nanotechnology Enabled Direct Energy Conversion and Thermal Management,” Komatsu Corporation, Japan, November 22, 2004 (Mr. M. Takashiri).
- S57. “Nanotechnology Enabled Direct Energy Conversion and Thermal Management,” Toyota Corporation, Japan, November 22, 2004 (Dr. Kita).
- S58. “Nanotechnology Enabled Direct Energy Conversion and Thermal Management,” Denso Corporation, November 25, 2004 (Dr. Kinji Hodaira).
- S59. “Nanoscale Heat Transfer and Energy Conversion,” Vanderbilt University Institute of Nanoscience and Nanotechnology, January 19, 2005 (Walker).
- S60. “Nanotechnology-Enabled Direct Energy Conversion,” GE Globe Research Center, February 14, 2005 (Fazila).
- S61. “Nanostructured Thermoelectrics,” Institute of Physics, Chinese Academy of Sciences, March 18, 2005 (Sisheng Xie).
- S62. “Energy, Photonics, and Nanotechnology,” Huazhong University of Science and Technology, March 21, 2005.
- S63. “Energy and Nanotechnology,” Huazhong University of Science and Technology, School of Power Engineering, March 22, 2005.
- S64. “Nanotechnology-Enabled Direct Energy Conversion,” Purdue University, Mechanical Engineering Department, March 25, 2005 (Fisher).
- S65. “Nanotechnology-Enabled Direct Energy Conversion,” University of Austin, Mechanical Engineering Department, April 25, 2005 (Li Shi).
- S66. “Nanoscale Heat Transfer and Energy Conversion,” Worcester Polytechnic Institute, Mechanical Engineering Department, April 27, 2005 (K. Rong).
- S67. “Fundamentals of Nanoscale Heat Transfer,” Xian Jiaotong University, July 11, 2005.
- S68. “Heat Conduction in Nanostructures,” Xian Jiaotong University, July 11, 2005.
- S69. “Nanostructures for Thermoelectric Energy Conversion,” Xian Jiaotong University, July 12, 2005.
- S70. “Nanoscale Thermal Radiation and Thermophotovoltaics,” Xian Jiaotong University, July 12, 2005.
- S71. “Nanoscale Transport in Fluids,” Xian Jiaotong University, July 13, 2005.
- S72. “Nanotechnology: From Optics to Energy,” New England Chinese Information and Network Association (NECINA), December 17, 2005.
- S73. “Nanotechnology Enabled Direct Energy Conversion,” Harvard University, Applied Mechanics Seminar Series, February 22, 2006.

- S74. “So, What Does Nanotechnology Have to Do with Energy,” MIT Micro/Nano Seminar Series, March 6, 2006.
- S75. “Nanoscale Heat Transfer and Energy Conversion,” RPI, Mechanical Engineering Department Seminar, April 14, 2006.
- S76. “So, What Does Nanotechnology Have to Do with Energy,” Columbia University, Mechanical Engineering Department Seminar, April 21, 2006.
- S77. “Nanoscale Heat Transfer and Energy Conversion,” National Cheng-Kung University, Taiwan, July 10, 2006.
- S78. “Nanoscale Heat Transfer and Energy Conversion,” National Tsinghua University, Taiwan, July 12, 2006.
- S79. “Nano, Heat, and Energy,” Taiwan Industrial Research Institute, July 13, 2006.
- S80. “Nanoscale Heat Transfer Enabled Energy Technologies,” CISRO, Sydney, Australia, August 14, 2006.
- S81. “Energy Nanotechnology,” University of New South Wales, Sydney, Australia, August 16, 2006.
- S82. “Energy Nanotechnology,” University of Wollongong, Australia, August 16, 2006.
- S83. “Energy Nanotechnology,” University of South Florida, Physics Department, September 14, 2006.
- S84. “Energy Technologies Enabled by Nanoscale Heat Transfer Effects,” Penn State University, Physics Department, October 24, 2006.
- S85. “Energy and Nanotechnology,” Wuhan University of Science and Technology, January, 6, 2007.
- S86. “Energy and Nanotechnology,” Huanan University of Science and Technology, China, January 15, 2007.
- S87. “Nanoscale Heat Transfer and Energy Conversion,” Hongkong Polytechnic, January 16, 2007.
- S88. “So, What Does Nanotechnology Have to Do with Energy,” CMU Joint Seminar of Nanotechnology Center and Mechanical Engineering Department, March, 2007.
- S89. “Nano, Heat, and Energy,” School of Energy, Zhejiang University, China, August 8, 2007.
- S90. “So, What Does Nanotechnology Have to Do with Energy,” School of Energy, Huazhong University of Science and Technology, China, August 13, 2007.
- S91. “Nano, Heat, and Energy”, Nanyang Technological University (Host Jan Ma), Singapore, Nov. 7, 2007.
- S92. “Nanostructured Thermoelectric Materials,” Materials Program, Harvard University (M. Aziz Host), March 20, 2008.
- S93. “Energy Transport and Conversion in Nanostructures,” Mechanical Engineering Seminar Series, Caltech, April 15, 2008.

- S94. "Engineering Nanoscale Phonon Transport for Largescale Energy Applications," Chemistry Department (Keith Nelson), MIT, April 22, 2008.
- S95. "Heat Conduction and Phonon Engineering in Nanostructures," Tsinghua University, Engineering Mechanics Department (Min Chen), May 26, 2008.
- S96. "So, What Does Energy Have to Do with Nanotechnology," Beijing University Distinguished Seminar Series (Alice Zhang), May 27, 2008.
- S97. "Nanoscale Solar and Thermal Radiation --- Photon Management and Beating Planck's Blackbody Radiation Law," Tsinghua University, Engineering Mechanics Department (Min Chen), May 28, 2008.
- S98. "What Does Energy Have to Do with Nanotechnology," Nanjing University, Physics Department (Yi Shi), May 30, 2008.
- S99. "Thermoelectrics and Thermal Management," Executive Briefing, Japan R&D Mission, ILP, August 28, 2008.
- S100. "Energy Transport and Conversion in Nanostructures," Masdar Institute of Science and Technology, January 15, 2009, Abu Dhabi, UAE.
- S101. "Nano, Heat, and Energy," MIT Microlunch (open to MTL faculty), Feb. 24, 2009.
- S102. "Nanoscale Heat Transfer for Efficient Energy Utilization," Dusenberre Distinguished Lecture, Penn State University, Mechanical Engineering Department, March 3, 2009 (Aman Haque host).
- S103. "Solid-State Solar-Thermal Energy Conversion Center," May 12, 2009, Presentation to DOE Secretary Dr. Steven Chu on MIT Campus.
- S104. "Extraordinary Heat Transfer and Energy Conversion," Lincoln Laboratory, May 18, 2009.
- S105. "Nanoscale Heat Transfer for Efficient Energy Utilization," EHT, Zurich, July 24.
- S106. "Nanoscale Heat Transfer for Efficient Energy Utilization," ITRI, Sinchu, Taiwan, August 14, 2009.
- S107. "Extraordinary Heat Transfer and Energy Conversion," UC Berkeley Campus Wide Nano Seminar, Aug. 28, 2009.
- S108. "DOE EFRC: S<sup>3</sup>TEC Center" to MITEI Advisory Board, Oct.9, MIT.
- S109. "Nano, Heat, and Energy," Information Session for Institute of Physics, CAS, Oct. 18, Boston College, 2009.
- S110. "Nanostructured Heat Transfer and Energy Conversion Materials," Huazhong University of Science and Technology, China, November 17, 2009.
- S111. "My Research Experience and Current Research," Huazhong University of Science and Technology, November 18, 2009.
- S112. "Nanostructured Heat Transfer and Energy Conversion Materials," China University of Geoscience, November 18, 2009.
- S113. "Extraordinary Heat Transfer in Nanostructures," Mechanical Engineering Department, U. Massachusetts Lowell, February 17, 2010.

- S114. “Nanostructured Thermoelectric and Thermal Management Materials and Their Applications,” Schlumberger, Cambridge, March 25, 2010.
- S115. “Exploring Nanoscale Effects for Energy Conversion,” MIT China Energy and Environment Research Seminar Series, April 9, 2010.
- S116. “Solid-State Solar-Thermal Energy Conversion Center,” MIT ME Visiting Committee, April 28, 2010.
- S117. “Nanostructured Heat Transfer and Energy Conversion Materials,” Shanghai University, School of Materials Science and Engineering, May 29, 2010.
- S118. “My Learning and Researching Experience,” Huazhong University of Science and Technology, Scientific Spirit and Practice Seminar Series, June 7, 2010.
- S119. “Extraordinary Heat Transfer and Energy Conversion at Nanoscale,” Sandia National Laboratory, August 30, 2010.
- S120. “Nanoscale Energy Transport and Conversion,” UIUC Mechanical Engineering Seminar Series, September 14, 2010 (Sanjiv Sinha host)
- S121. “Extraordinary Heat Transfer and Energy Conversion,” U. Michigan joint Mechanical Engineering and Materials Science Seminar, September 16, 2010 (Pramod Reddy host).
- S122. “DoE S<sup>3</sup>TEC” report to Mr. Tony Tan, former vice Premier of Singapore, September 30, 2010.
- S123. “Engineering Heat Transfer and Energy Conversion in Nanostructured,” U. Wisconsin, Materials Science Seminar, February 17, 2011.
- S124. “Extraordinary Heat Transfer and Energy Conversion in Nanostructure,” AFOSR Wright Patterson Laboratory, February 18, 2011
- S125. “Extraordinary Heat Transfer and Energy Conversion in Nanostructure,” University of Connecticut, School of Engineering Distinguished Seminar Series (host Baki Cetegen), April 10, 2011.
- S126. “Extraordinary Heat Transfer and Energy Conversion at Nanoscale,” Yuanze University, Fuel Cell Institute (host S.H. Chan), Taiwan, 2011.
- S127. “Lucky Favors Prepared Minds,” Xiangfan College, July 4, 2011.
- S128. “Extraordinary Heat Transfer and Energy Conversion at Nanoscale,” Shanghai Jiaotong University, School of Mechanical Engineering (host: Lisa Xu), July 5, 2011.
- S129. “Solar Thermoelectric Energy Conversion,” DOE EERE (hosted by Dr. Ramesh), Washington DC, August 30, 2011.
- S130. “Nurturing Leaders in Energy Revolution,” Huazhong University of Science and Technology, China, October 7, 2011.
- S131. “Solid-State Solar Thermal Energy Conversion Center,” presentation to Dr. Steve Koonin, Under Secretary, DOE, Oct. 24, 2011.
- S132. “Converting Solar Energy into Electricity: The Third Way,” Science for the Public Lecture, Oct. 25, 2011 ([www.scienceforthepublic.org](http://www.scienceforthepublic.org) )

- S133. “Engineering Heat Conduction in Nanostructured Materials for Energy Systems,” Distinguished Lecture, CMU Mechanical Engineering Department, Nov. 11, 2011.
- S134. “Solar Thermoelectric Energy Conversion,” NREL, Nov. 15, 2011.
- S135. “Thermoelectric Transport, Materials and Systems”, MITEI Report to UTC Visitors, Feb. 13, 2012.
- S136. “Nano, Heat, and Energy,” ILP Northrop Gumman Day at MIT, May 2, 2012.
- S137. “Nanostructured Materials for Thermal Energy Systems,” Huazhong University of Science and Technology, May 23, 2012.
- S138. “Extraordinary Nanoscale Heat Transfer,” Distinguished Seminar, University of Toronto, Mechanical Engineering Department, June 4, 2012.
- S139. “Engineering Energy Conversion and Heat Transfer in Nanostructures,” Tsinghua University, July 5, 2012.
- S140. “Heat and Mass Transfer in Soft Materials,” UC Berkeley, Springer Seminar Series, September 13, 2012
- S141. “Thermoelectric Energy Conversion: Materials, Devices, and Systems,” UC Berkeley, Springer Seminar Series, September 14, 2012.
- S142. “Heat Conduction in Crystalline Nanostructured Materials,” UC Berkeley, Springer Seminar Series, September 15, 2012.
- S143. “Radiation Heat Transfer in Nanostructures,” Beijing University, September 17, 2012.
- S144. “Radiation Heat Transfer in Nanostructures,” UC Berkeley, Springer Seminar Series, September 19, 2012.
- S145. “Light Trapping and Thermodynamics of Photovoltaics,” UC Berkeley, Springer Seminar Series, September 20, 2012.
- S146. “Thermoelectric Energy Conversion: Transport, Materials, and Systems,” Purdue Hawkins Lecture, November 1, 2012.
- S147. “Radiation Heat Transfer in Nanostructures,” Purdue Mechanical Engineering Seminar, November 2, 2012.
- S148. “Thermoelectric Energy Conversion: Materials, Transport, and Devices,” Electrical Engineering Department, UCSB (John Bowers), February 8, 2013.
- S149. “Thermoelectric Energy Conversion: Transport, Materials, and Applications,” Pennergy Seminar, University of Pennsylvania, March 14, 2013.
- S150. “Nanoengineering for Efficient Heat Transfer and Energy Conversion Materials and Systems,” George Persall Lecture, Mechanical Engineering Department, Duke University, March 22, 2013.
- S151. “MIT MechE: Defining Mechanical Engineering for Today and Tomorrow,” MIT MechE Engineering Department,” Talk to Shanghai MIT Club, Shanghai, October 10, 2013.
- S152. “Nanoscale Heat Transfer and Energy Conversion,” Hongkong Polytechnique University, October 14, 2013.



- S153. “Nano, Heat, Energy,” IHI Executive Briefing, MIT ILP (Corey Cheng), December 5, 2013.
- S154. “MIT Innovation and Entrepreneurship Ecosystem,” Xiangyan College (Host President Ruzhu Li), January 11, 2014.
- S155. “Tailoring Solar and Thermal Radiation with Nanostructures for Energy Applications,” UCSB Institute for Energy Efficiency Seminar (Bowers host), January 15, 2014.
- S156. “Extraordinary Heat Transfer at Nanoscale,” OSU Mechanical Engineering Distinguished Speaker, Seminar 8888 (Jos Heremans Host), January 24, 2014.
- S157. “Nanoengineering for Efficient Heat Transfer and Energy Conversion Materials and Systems,” Penner Lecture, Department of Mechanical Engineering, May 11, UC San Diego.
- S158. “Nano, Heat, Energy,” ILP LG Group, 4/23/2014, ILP, MIT.
- S159. “Solar and Thermal Materials, Devices, and Energy Conversion Systems”, Taiwan ITRI Frontier Resear Seminar, July 2, 2014.
- S160. “Nanoengineering for Efficient Heat Transfer and Energy Conversion Materials and Systems,” Georgia Institute of Technology, Mechanical Engineering Department, August 22, 2014.
- S161. “Introduction to MIT MechE, Materials and Devices for Thermal Systems,” Honda, Tokyo, Japan, January 8, 2015.
- S162. “Introduction to MIT MechE, Materials and Devices for Thermal Systems,” Denso, Nagoya, Japan, January 8, 2015.
- S163. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Institute of Advanced Studies Distinguished Seminar, Hong Kong University of Science and Technology, January 12, 2015.
- S164. “Energy Conversion: What is New with Silicon,” MIT MTL Industrial Advisory Board Meeting, January 23, 2015.
- S165. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Northwestern University, ME Department Seminar Series (Distinguished), April 6, 2015.
- S166. “Thermal Technology: from Basic Research to Commercialization,” MITEI Training Class for CNG Group, May 13, 2015.
- S167. “Innovations in Energy Utilization: Solar, Thermal, and Water” GRIMN, Beijing, May 20, 2015.
- S168. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” William Mong Distinguished Lecture, University of Hong Kong University of Science and Technology, July 24, 2015.
- S169. “How to Succeed in Graduate School,” MIT Chinese Students and Scholar Association, September 10, 2015.
- S170. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Distinguished Seminar, Department of Mechanical Engineering, Northeastern, March 25, 2016.

- S171. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Leadership in Engineering Lecture, RPI Department of Mechanical, Aerospace, and Nuclear Engineering, RPI, April 22, 2016.
- S172. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Goodwin Memorial Lecture, Caltech, May 5, 2016.
- S173. “MIT Department of Mechanical Engineering,” Tsinghua University, TEEP (Tsinghua Excellence in Engineering Program), August 15, 2016.
- S174. “MIT Department of Mechanical Engineering,” presentation to Zhongguancun Development Group (CEO), August 15, 2016.
- S175. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Distinguished Seminar, Department of Mechanical and Aerospace Engineering, University of Virginia, August 25, 2016.
- S176. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Alwin Schaller Lecture, Department of Mechanical Engineering, UIUC, August 30, 2016.
- S177. “Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Applied Physics Colloquium, Harvard University, September 2, 2016.
- S178. “Phonon Heat Conduction Beyond Fourier Diffusion: Ballistic, Coherent, Localized, Hydrodynamic and Divergent Modes,” Distinguished Lecture at Institute of Molecular Engineering, U. Chicago, November 3, 2016.
- S179. “Introduction to Mechanical Engineering and Using Nanostructures to Tailor Thermal Radiation,” Distinguished Seminar, Department of Mechanical Engineering, Hongkong Polytechnique University, January 9, 2017.
- S180. “Nanostructures for Solar Applications,” Institute of Thermophysics, Chinese Academy of Sciences, January 16, 2017.
- S181. “Innovations in Materials and Devices for Efficient Solar and Thermal Energy Utilization” Toderi-Callinan Lecture, Department of Mechanical Engineering, University of Pennsylvania, October 3, 2017.
- S182. “MIT Innovation and Entrepreneurship Ecosystem,” Wuhan Institute of New Energy, July 17, 2018.
- S183. “MIT Innovation and Entrepreneurship Ecosystem, and Innovation in Materials and Devices for Efficient Solar and Thermal Energy Utilization,” Huazhong University of Science and Technology, July 18, 2018.
- S184. “Tailoring Photons from Sun and Thermal Sources for Energy and Water Nexus,” UT Austin Byron Short Lecture, Department of Mechanical Engineering, September 14, 2018.
- S185. “Tailoring Photons from Solar and Terrestrial Sources for Energy and Water Nexus,” ETH, Aurel Stodola Lecture, October 9, 2018.
- S186. “Tailoring Photons from Sun and Thermal Sources for Energy and Water Nexus,” SUSTech, October 29, 2018.
- S187. “MIT Innovation and Entrepreneurship Environment,” SUSTech, School of Management lunch talk, October 29, 2018.

- S188. “MIT Educational Environment and Innovations,” SUSTech Distinguished Lecture, October 30, 2018
- S189. “Innovations in Materials and Devices for Efficient Solar and Thermal Energy Utilization” acceptance speech for Tsinghua University Honorary Professor, November 1, 2018.
- S190. “Phonon Heat Conduction Beyond Fourier Law: Ballistic, Coherent, Localized, Hydrodynamic, and Divergent Modes,” SUSTech Department of Physics, November 15, 2018.
- S191. “Electron Transport and Thermoelectric Energy Conversion,” SUSTech Department of Materials Science, November 16, 2018.
- S192. “MIT Educational Environment and Innovations,” Harbin Institute of Technology, Shenzhen Campus, November 19, 2018.
- S193. “Succeeding in Academia,” SUSTech School of Engineering, November 19, 2018.
- S194. “MIT Innovations and Entrepreneurship Ecosystem,” SUSTech, Jan. 14, 2019.
- S195. “Innovations in Thermal Materials and Systems at the Energy and Water Nexus,” Research Institute of Sustainable Urban Development, Hongkong Poly U, Jan. 15, 2019.
- S196. “MIT Innovation and Entrepreneurship Ecosystem,” Hongkong Poly U The Ove Arup Foundation (TOAF) Lecture, Research Institute of Sustainable Urban Development (RISUD) (Host Professor Xiang-Dong Li), Jan. 15, 2019.
- S197. “MIT Innovation and Entrepreneurship Ecosystem and My Research at Energy and Water Nexus,” Tecent, Shenzhen, Jan. 17, 2019.

### **Patents and Disclosures**

#### Allowed Patents:

- PA1. G. Chen, Z.F. Ren, M.S. Dresselhaus, “Nanocomposites with High Thermoelectric Figure of Merits,” MIT Case No. 10563. Patent application filed; full patent application filed Oct. 29, 2004 (Application No. 10/977,363), US Patent Issued. US Patent No. 7,465,871 B2, Date of Patent, Dec. 16, 2008. Exclusively licensed to GMZ Energy. (Chinese Patent Application No. 201110461268.1, European Patent Application No. 05 85 8279.2);  
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- PA4. Z.F. Ren, G. Chen, S. Kumar, and H. Lee, "Thermoelectric Properties by High Temperature Annealing," MIT Case Number 11551. Patent application filed April 7, 2005. US Patent No. 7,591,913, September 22, 2009. Exclusively licensed to GMZ Energy.
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- PA10. Anurag Bajpayee, Daniel Kraemer, Andrew Jerome Muto, Gang Chen, John H. Lienhard, and Borivaje B. Mikic, "Water Desalination Using Directional Solvent Extraction," US Patent 8,119,007 B2, Date of Patent Feb. 21, 2012. (China for PCT/US2010/57448, Chinese Patent Serial No. 2013102300062480); Continuation US Patent No. 9501007, Aug. 6, 2013.
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- PA23. Gang Chen, Xiaoyuan Chen, and Ronggui Yang, “Multistage Thick Film Thermoelectric Devices,” MIT Case 11653, filed May 9, 2005. US Patent No. 9391255, 07/12/2016.
- PA24. Gang Chen, Hadi Ghasemi, Amy Marie Marconnet, George Wei Ni, “Localized Solar Collectors” MIT Case No. 16537, US Provisional patent application, U.S. Provisional

- Application No.: 61/874390, Filing Date: September 6, 2013; US Patent No. 9459024, 10/4/2016.
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- PA27. Seok Woo Lee, Yuan Yang, Hadi Ghasemi, Gang Chen and Yi Cui, "Electrochemical Sysems and Methods for Harversting Heat Energy," MIT Ref. No.: 16329, U.S. Provisional Application No.: 61/864,056, Filing Date: August 9, 2013. Patent Allowed 2016. US Patent No. 9,559, 388, 2017.
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- PA29. Andrej Lenert, David M. Bierman, Walker Chan, Ivan Celanovic, Marin Soljadic, Evelyn Wang, Youngsuk Nam, Kenneth McEnaney, Daniel Kraemer, Gang Chen, "Spectrally-Engineered Area-Optimized Solar Thermal Power Generators," MIT Case No. 16647K, U.S. Provisional Application No.: 61/898083, Filing Date: October 31, 2013. US Patent Allowed 12/20/2017.
- PA30. Feng Cao, Gang Chen, Zhifeng Ren and Tianyi Sun; "Gradient SiNO as Anti-Reflection Layers on Cr-CrNO Cermets Based Solar Selective Coatings" M.I.T. CASE NO. 16219J; US patent No. 9719697, 08/01/2017.
- PA31. Gang Chen, Evelyn Wang, Andrej Lenert, Hadi Ghasemi, Selcuk Yerci, Kenneth McEnaney, Svetlana Boriskina and Sungwoo Yang, Lee Weinstein and David Bierman, "Internally-Heated Thermail and Externally-Cool Photovoltaic Cascade Solar System For The Full Solar Spectrum Utilization" M.I.T. Case No. 16542, U.S. Provisional Application No.: 61/898083, Filing Date: October 31, 2013; allowed July 5, 2018.
- PA32. S. Boriskina, Gang Chen, D. Kraemer, K. McEnanney, and L. Weistein, "Solar Power Conversion System with Directionally-and Spectrally-Selective Properties based on a Reflective Cavity," U.S. Provisional Patent Application No.: 61/697478, September 6, 2012; MIT Case No. 15823K; Patent Application No. 13/972261, Filing Date August 21, 2013. US patent No. 9,917,221, issued 03/13/2018.
- PA33. Qing Jie, Zhifeng Ren, and Gang Chen "Fast Phase Formation of P-Type Filled Skutterudite by Ball-Milling and Hot-Pressing" M.I.T. CASE NO. 16221J, US patent No. 9972760, 05/15/2018.
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- PA35. Zhifeng Ren, Qian Zhang, and Gang Chen "High Performance Thermoelectric Nanostructured SnTe by Resonant Dopant Indium" M.I.T. CASE NO. 16209J; US patent No. 9905744, 02/27/2018
- PA36. Svetlana Boriskina, Gang Chen, Xiaopeng Huang, James Loomis, Jonathan Kien-Kwok Tong and Yanfei Xu, "Infrared Transparent Visible Opaque Fabrics (ITVOF)" M.I.T. CASE NO. 17390; US patent No. 9,951,446; 04/24/2018.

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PA37. G. Chen and Z. F. Ren, “Solar thermoelectric hot water system”, Chinese ZL200880025371.8, issued on February 27, 2013.

PA38. Gang Chen, Xiaoyuan Chen, and Ronggui Yang, “Multistage Thick Film Thermoelectric Devices,” MIT Case 11653, patent application filed May 9, 2005. US Patent Application No. 20080178606, patent allowed, 2016.

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## **EDUCATION CONTRIBUTIONS**

### **Bachelor's Theses**

1. Alinger, Mathew J., "Study of Pool Boiling Phenomena," Department of Mechanical Engineering and Materials Science, Duke University (ME198 Project), December 1994.
2. Benzendahl, Martin, "Thermal Diffusivity Measurement of Diamond Thin Films," Department of Mechanical Engineering and Materials Science, Duke University (Graduate with Distinction Projection), May 1995 (His work won ASME Old Guard Regional Paper Contest Including Three States).
3. Chijioke, Akobuije, D.E., "Thermal Conductivity Measurement of Thin Films," Department of Mechanical Engineering and Materials Science, Duke University (Graduate with Distinction Project), May 1995.
4. Han, Jeffrey, "Thermal Diffusivity Measurement of Al<sub>2</sub>O<sub>3</sub> Nanotemplate," Mechanical and Aerospace Engineering Department, University of California at Los Angeles (NSF Undergraduate Research Experience), May 1999.
5. Balucan, Philip, "Electrochemical Etching Cell," Mechanical and Aerospace Engineering Department, University of California at Los Angeles (NSF Undergraduate Research Experience), May 1999.
6. Tsai, Janet, "Fabrication, Characterization of Nanochannels," Mechanical and Aerospace Engineering Department, University of California at Los Angeles (NSF Undergraduate Research Experience), June 2000.
7. Shaver, Michelle, "Electrochemical Fabrication of Nickel Nanowires," Mechanical and Aerospace Engineering Department, University of California at Los Angeles (NSF Undergraduate Research Experience), June, 2000.
8. Sadeli, David, "Ideal Conditions for Making Nanochannels," Mechanical and Aerospace Engineering Department, University of California at Los Angeles (NSF Undergraduate Research Experience), March, 2001.
9. Fiumara, Jennifer M., "Thermal Conductivity Measurements of Al<sub>2</sub>O<sub>3</sub> Nanotemplate," Mechanical Engineering Department, MIT, Senior Thesis, May, 2002 (her thesis work won Griffith Award).
10. Cisneros, Jose, "Thermal Conductivity Measurements of Thick Diamond Films," Mechanical Engineering Department, MIT, Senior Thesis, May 2002.
11. Bishoff, Adrian N., "A New Approach to the Electronic Pen Idea," Mechanical Engineering Department, MIT, Senior Thesis, May 2003 (this thesis won the 2<sup>nd</sup> Prize of the DeFlorez Design Competition).
12. Barron, Katherine "Experimental Studies of the Thermoelectric Properties Of Microstructured and Nanostructured Lead Salts," Mechanical Engineering Department, February, 2005.



13. Josef Miller, "Methods for Increasing the Thermal Conductivity of Ultra-High Molecular Weight Polyethylene (UHMWPE)," Mechanical Engineering Department, May, 2006 (Winner of Griffith Award).
14. Margaret Gentile, "A Novel Personal Cooling System for Use by Soldiers in Hot Climates," Mechanical Engineering Department, May, 2006.
15. Atiya Hasan, "Solar Thermoelectric Energy Conversion," Mechanical Engineering Department, January, 2007
16. Ray, Katherine Leung, "Photovoltaic Cell Efficiency at Elevated Temperatures", Mechanical Engineering Department, MIT, Senior Thesis, June, 2010.
17. Kevin G. Kleinguetl "Experimentation and Application of Directional Solvent Extraction for Desalination of Seawater and Shale Gas 'Frac' Flowback Water" Mechanical Engineering Department, MIT, May, 2011.
18. Mengyun Zhang, "Design of a DC-DC Passive Boost Converter for Thermoelectric Power Generators," Huazhong University of Science and Technology, June, 2012 (Mengyun did her thesis at MIT as a visiting student).
19. Michael James Fowler, "Construction of Prototype System for Directional Solvent Extraction Desalination," Mechanical Engineering Department, MIT, May, 2012 (Michael was ROTC from Navy).
20. Brian Oldfield, "US Virgin Islands Renewable Energy Future," Mechanical Engineering Department, MIT, May, 2013.

### **Master's Theses**

1. Yu, Xiaoyu, "Measurement of Thermal Diffusivity of Thin Film Structures by Thermal Wave Method," Department of Mechanical Engineering and Materials Science, Duke University, May, 1995.
2. Borca-Tasciuc, Diana, "Synthesis and Thermal Characterization of Anodized Alumina," Mechanical and Aerospace Engineering Department, University of California at Los Angeles, June 2001.
3. Liao, Andrew "A Comparative Analysis of Semiconductor Diode Lasers with and without Integrated Heat Spreaders," Mechanical and Aerospace Engineering Department, University of California at Los Angeles, June 2001 (joined Raytheon).
4. Fu, Jianping "Integrated Electroplated Heat Spreaders for High Power Semiconductor Lasers." Mechanical and Aerospace Engineering Department, University of California at Los Angeles, September, 2002 (Jianping Fu is a faculty member at U. Michigan).
5. Shah, Ashish, "Modeling and Fabrication of High Power Density Micro Thermophotovoltaic Devices," MIT Department of Mechanical Engineering Thesis, December 2003 (joined Applied Materials).

6. Cybulski, James S., "Fabrication, Modeling, & Electrical Characterization of Self-Assembling Microscale Rollup Structures," MIT Department of Mechanical Engineering Thesis, June 2004 (joined Intel).
7. Schmidt, Aaron J., "Photothermal Lithography," MIT Department of Mechanical Engineering Thesis, June 2004.
8. Lee, Hohyun, "Thermoelectric Properties of Si-Ge Nanocomposites," MIT Department of Mechanical Engineering Thesis, January, 2005.
9. Asegun Henry, "Molecular Dynamics Analysis of Spectral Characteristics of Phonon Heat Conduction in Silicon," MIT Mechanical Engineering Department Thesis, May, 2006.
10. Jack Ma, "Thermal Conductivity of Fluids Containing Suspension of Nanometer-Size Particles," MIT Department of Mechanical Engineering Thesis, May, 2006.
11. Shane Cunningham, "Determining Thermoelectric Properties of Polymer Fibers, Theory and Measurements," Swiss Federal Institute of Technology Thesis, Zurich, visiting student, September 2006-March 2007.
12. Daniel Kramer, "Research on the Solar Application of Thermoelectric Generators," Swiss Federal Institute of Technology Thesis, Zurich, visiting student, Nov. 2006-May 2007.
13. Erik Skow, "Processing and Thermal Properties of Molecular Oriented Polymers," Mechanical Engineering Department, MIT, May, 2007 (joined Spring 2006 from US Coast Guard).
14. Muto, Andrew, "Device Testing and Characterization of Thermoelectric Nanocomposites," MIT Department of Mechanical Engineering Thesis, May, 2008.
15. Anurag Bajpayee, "Concentration of Cryoprotectant in water-in-oil microdroplets for single cell vitrification," MIT Department of Mechanical Engineering Thesis, 2008 (advisor: Mehmet Toner at Harvard, MIT Host).
16. Minnich, Austin, "Modeling the Thermoelectric Properties of Bulk and Nanocomposite Thermoelectric Materials," MIT Department of Mechanical Engineering Thesis, May 2008.
17. Yanjia Zuo, "Preparation of Silica Aerogels with Improved Mechanical Properties and Extremely Low Thermal Conductivities through Modified Sol-Gel Process," Mechanical Engineering Department, MIT, May 2010 (co-supervised with Dr. Taofang Zeng, joined Xerox).
18. Kimberlee Collins, "Experimental Investigations of Solid-Solid Thermal Interface Conductance," MIT Department of Mechanical Engineering Thesis, May 2010.
19. Mike Kozloski, "Kettlelectric and myGen: Portable, Thermoelectric-Based Power Generation Systems for Off-Grid Home Use and the Village Entrepreneur," MIT Department of Mechanical Engineering Thesis, May 2010 (M.S. student, co-supervised with Amy Smith).
20. Kenneth McEnaney, "Modeling of Solar Thermal Selective Surfaces and Thermoelectric Generators," MIT Department of Mechanical Engineering Thesis, September, 2010.

21. Poetro Lebdo Sambegoro, "Near-field Radiation in Nanoscale Gaps," MIT Department of Mechanical Engineering Thesis, January 2011.
22. Jianjian Wang, "Investigation on the Heat Conduction Mechanisms of Graphite Suspensions," MIT Department of Mechanical Engineering Thesis, February 2011.
23. Stephen Kress, "Droplet Formation in a Binary Water-Fatty Acid System," ETH MS Thesis, visiting student, July 2011, visiting student January to July 2011).
24. Maria Luckyanova, "Detecting Coherent Phonon Wave Effects in Superlattices using Time-Domain Thermoreflectance," MIT Department of Mechanical Engineering Thesis, February, 2012.
25. Wei-Chun Hsu, "Direct and Quantitative Broadband Absorptance Micro/Nano Spectroscopy Using FTIR and Bilayer Cantilever Probes," MIT Department of Mechanical Engineering Thesis, September, 2012.
26. Bolin Liao, "Practical Electron Cloaking in Solids," MIT Department of Mechanical Engineering Thesis, September, 2012.
27. Jonathan Kien-Kwok Tong, "Direct and Quantitative Absorptive Spectroscopy of Nanowires," MIT Department of Mechanical Engineering Thesis, September, 2012.
28. Lingping Zeng, "Experimental and Numerical Investigation of Phonon Mean Free Path Distribution," MIT Department of Mechanical Engineering Thesis, February, 2013.
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30. Jonathan Mendoza, "Nanostructures and Alloys: Multiple Scattering and Nonlinearities in Phonon Transport," MIT Department of Mechanical Engineering Thesis, January, 2014.
31. George Ni, Photoacoustic Measurement of Bandgaps of Thermoelectric Materials," MIT Department of Mechanical Engineering Thesis, May, 2014.
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34. Yi Jenny Wang, Equilibrium Molecular Dynamics Study of Thermal Conductivity in Octane," MIT Department of Mechanical Engineering Thesis, January, 2015.
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36. Lareen Meroueh, "Electrically Charged Thermal Energy Storage Systems for Grid-Level Electricity Storage," MIT Department of Mechanical Engineering Thesis, December, 2017.
37. Qichen Song, "Ab initio study of electron transport in lead telluride," MIT Department of Mechanical Engineering Thesis, January, 2018.
38. Xu, Qian, "First-Principles Study of Phonon Drag Effects in SiGe," MIT Department of Mechanical Engineering Thesis, January, 2019.

Master of Engineering Thesis

1. Jorge Monreal, "Thermoelectrics: Material advancements and market applications," Master of Engineering in Materials Science and Engineering, MIT, July, 2007.

Engineer's Thesis

2. Meyer, Eric, "Nanowire Fabrication," (Diploma Thesis) ENSMA, France, April 1999 to September 1999.
3. Pauwels, Jerome, "Nanowire Manipulation," (Diploma Thesis) ENSMA, France April 2000 to September 2000.
4. Riffau, Mathieu, "3D Microfabrication by Electrodeposition," (Diploma Thesis) ENSMA, France, April 2002 to September 2002.
5. Laroche, Marine, "Two-D Transient Boltzmann Equation Solution Method," (Diploma Thesis) Ecole Centrale de Paris, April 2002 to October 2002 (Marine is now with CNRS).
6. An Li, "First Principle Study of Ternary Skutterudites," EECS, MIT (M. Eng student, directly supervised by Boris Kozinsky from Bosch, my role is thesis reading and discussion a few times).

Doctoral Theses, Supervisor

1. Borca-Tasciuc, Theodorian, "Thermal and Thermoelectric Properties of Superlattices," PhD Thesis, Mechanical and Aerospace Engineering Department, University of California at Los Angeles, May 2000 (now Professor at Rensselaer Polytechnic Institute).
2. Yao, Da-Jeng, "In-Plane MEMS Microcoolers," PhD Thesis, Mechanical and Aerospace Engineering Department, University of California at Los Angeles, May 2001 (co-supervised with C.J. Kim. now Professor at National Tsinghua University, Taiwan).
3. Yang, Bao, "Thermal and Thermoelectric Transport in Superlattices and Quantum Wells," PhD Thesis, Mechanical and Aerospace Engineering Department, University of California at Los Angeles, June 2003 (now professor at the University of Maryland at College Park).
4. Song, David Won-Jun, "Phonon Heat Conduction in Nano and Micro-Porous Thin Films," PhD Thesis, Mechanical and Aerospace Engineering Department, University of California at Los Angeles, June 2003 (David Song joined Intel, Arizona).
5. Liu, Weili, "In-Plane Thermoelectric Properties of Si/Ge Superlattices," PhD Thesis, Mechanical and Aerospace Engineering Department, University of California at Los Angeles, July 2004.
6. Diana Borca-Tasciuc, "Thermophysical Properties of Individual and Ordered Nanowire Composites for Thermoelectric Applications." PhD Thesis, Mechanical and Aerospace Engineering Department, UCLA Spring, 2005 (now an associate professor at RPI).

7. Fardad Hashemi, "Design and Fabrication of Nanotweezers for Nanomanipulation," PhD Thesis, MIT Department of Mechanical Engineering Department, May 2005.
8. Yang, Ronggui, "Nanoscale Heat Conduction with Applications in Nanoelectronics and Thermoelectrics," PhD Thesis, MIT Department of Mechanical Engineering Department, December 2005 (now an professor at U. Colorado).
9. Christopher Dames, "Thermal Properties of Nanowires," PhD Thesis, MIT Department of Mechanical Engineering Department, May, 2006 (now an associate professor at UC Berkeley, ME Department).
10. Arvind Narayanaswamy, "Investigation of Nanoscale Thermal Radiation: Theory and Experiments," PhD Thesis, MIT Department of Mechanical Engineering Department, May, 2007 (now an associate professor at Columbia University, ME Department).
11. Dye-Zone (Zony) A. Chen, "Energy Transmission Through and Along Thin-Films Mediated by Surface Phonon-Polaritons," PhD Thesis, MIT Department of Mechanical Engineering Department, July, 2007 (now at Tyco Electronics)
12. Aaron Schmidt, "Optical Characterization of Thermal Transport from the Nanoscale to the Macroscale," PhD Thesis, MIT Department of Mechanical Engineering Department, May, 2008 (now a research scientist at MIT).
13. Lu Hu, "Photon Management in Thermal and Solar Photovoltaics," PhD Thesis, MIT Department of Mechanical Engineering Department, September 2008, (now at Exxonmobile).
14. Vince Berube, "Thermodynamic Properties of Metal Hydride Nanostructures," PhD Thesis, MIT Physics Department, August 2008 (co-supervised with Mildred S. Dresselhaus, now at McKinsey&Company).
15. Hohyun Lee, "Modeling and Characterization of Thermoelectric Properties of SiGe Nanocomposites," PhD Thesis, MIT Department of Mechanical Engineering Department, May 2009 (now an Associate Professor at Santa Clara University, ME Department).
16. Asegun Seku Famake Henry, "1D-to-3D Transition of Phonon Heat Conduction in Polyethylene Using Molecular Dynamics Simulations," PhD Thesis, MIT Department of Mechanical Engineering Department, May, 2009 (now Associate Professor at MIT, after 6 years at Goergia Tech).
17. Sheng Shen, "Probing Extraordinary Nanoscale Energy Transfer using Bimaterial AFM Cantilevers," PhD Thesis, MIT Department of Mechanical Engineering Department, May 2010 (now an associate professor at CMU).
18. Thomas Harris, "Development of a Nanostructure Thermal Property Measurement Platform Compatible with a Transmission Electron Microscope," PhD Thesis, MIT Department of Mechanical Engineering Department, May 2010 (now a staff member Sandia National Laboratory).
19. Qing Hao, "Nanocomposites as Thermoelectric Materials," PhD Thesis, MIT Department of Mechanical Engineering Department, May 2010 (now Associate professor at U. Arizona, ME Department).

20. Austin Minnich, “Exploring Heat Transfer at the Nanoscale in Thermoelectric Materials,” PhD Thesis, MIT Department of Mechanical Engineering Department, May, 2011 (now professor at Caltech).
21. Andrew Muto, “Thermoelectric Device Characterization and Solar Thermoelectric System Modeling,” PhD Thesis, MIT Department of Mechanical Engineering Department, September 2011 (now at Phononics).
22. Anurag Bajpayee, “Directional Solvent Extraction Desalination,” PhD Thesis, MIT Department of Mechanical Engineering Department, September, 2012 (now CEO of Gradiant Corporation).
23. Zhiting Tian, “Exploring Heat Transfer at the Atomistic Level for Thermal Energy Conversion and Management,” PhD Thesis, MIT Department of Mechanical Engineering Department, May, 2014 (now Assistant Professor at Cornell).
24. Kenneth McEnaney, “Thermoelectrics and Aerogels for Solar Energy Conversion Systems,” PhD Thesis, MIT Department of Mechanical Engineering Department, September, 2014 (now at Creare)
25. Matthew Branham, “Ultrathin Crystalline Silicon Solar Cells Incorporating Advanced Light-Trapping Structures,” PhD Thesis, MIT Department of Mechanical Engineering Department, November, 2014 (joined Giga Factory).
26. Kimberlee Chiyoko Collins, “Studies of Non-diffusive Heat Conduction through Spatially Periodic and Time-harmonic Thermal Excitations,” PhD Thesis, MIT Department of Mechanical Engineering Department, January, 2015 (now staff member at Sandia National Laboratory).
27. Sangyeop Lee, “Transport of Phonons and Electrons in Thermoelectric Materials and Graphene,” PhD Thesis, MIT Department of Mechanical Engineering Department,, June, 2015 (now assistant professor at University of Pittsburgh).
28. Maria Luckyanova, “Observation and Manipulation of the Wave Nature of Phonon Thermal Transport through Superlattices,” PhD Thesis, MIT Department of Mechanical Engineering Department, August, 2015 (now at Apple).
29. Jianjian Wang, “Transport Properties of Graphite-Loaded Composites in Liquid and Solid States,” PhD Thesis, MIT Department of Mechanical Engineering Department, December, 2015 (now at Advanced Cooling Technologies, Maryland).
30. Poetro Lebdo Sambegoro, “Experimental Investigations on the Influence of Curvature and Materials on Near-field Thermal Radiation” PhD Thesis, MIT Department of Mechanical Engineering Department, January 15, 2016 (now Assistant Professor at U. Bandung, Indonesia)
31. Daniel Kramer, “Solar Thermoelectric Power Conversion: Materials Characterization to Device Demonstration” PhD Thesis, MIT Department of Mechanical Engineering Department, January 15 (now at Modern Electron).
32. Bolin Liao, “Nanoscale Electron, Phonon and Spin Transport in Thermoelectric Materials,” PhD Thesis, MIT Department of Mechanical Engineering Department, March 30, 2016 (now assistant professor at UCSB).

33. Jonathan Tong, “Photonic Engineering of Near and Far-Field Radiative Heat Transfer,” PhD Thesis, MIT Department of Mechanical Engineering Department, May 10, 2016 (now at Smith Baluch).
34. Wei-Chun Hsu, “Ultra-Thin Crystalline Silicon Solar Cells and Near-field Thermo-Radiative Cells,” PhD Thesis, MIT Department of Mechanical Engineering Department, May 10, 2016 (joined KLA-Tencor).
35. Lingping Zeng, “Studying Phonon Mean Free Path Distributions At the Nanoscale: Modeling and Experiments,” PhD Thesis, MIT Department of Mechanical Engineering Department, MIT ME Department, June, 2016 (in financial sector).
36. Jonathan M. Mendoza, “Anderson Localization of Thermal Phonons: Anomalous Heat Conduction in Disordered Superlattices,” PhD Thesis, MIT Department of Mechanical Engineering Department, May, 2017 (now at Goldman Sachs).
37. Lee Weistein, “Improving Solar Thermal Receiver Performance via Spectral and Directional Selectivity,” PhD Thesis, MIT Department of Mechanical Engineering Department, Sep. 2017 (now staff at MIT Micro-Master program).
38. George Ni, “Low-Cost High-Performance Solar Vapor Generation,” PhD Thesis, MIT Department of Mechanical Engineering Department, January 2018 (now staff at Lincoln Lab).
39. Vazrik Chiloyan, “Variational Approach to Solving the Phonon Boltzmann Transport Equation for Analyzing Nanoscale Thermal Transport Experiments,” PhD Thesis, MIT Department of Mechanical Engineering Department, January 2018 (now staff at Lincoln Lab).
40. Samuel Huberman, “Phonon Transport at the Nanoscale: From Fourier Diffusion to Phonon Hydrodynamics,” PhD June 2018, thesis January 2019.

### **Current Students:**

1. Yi Huang (B.S. from UCLA, joined Fall 2012)
2. Jiawei Zhou (B.S. from Tsinghua Univ., joined Fall 2013)
3. Qicheng Song (B.S. from HUST, joined Fall 2015)
4. Yoichiro Tsurimaki (BS and MS from Tohoku University, joined Fall 2015)
5. Zhiwei Ding (BS from NUS, MIT MSE Student, fall 2015).
6. Qian Xu (BS from Zhejiang University, Department of Materials Science, joined Fall 2016)
7. Buxuan Li (joined in Fall 2017, BS From Tsinghua Univ).
8. Mohsen Alowayed (joined Fall 2018, BS from MIT)

### **Current Post-Docs and Group Members**

1. Dr. Sveta Boriskina, research scientist at BU and joined as a post-doc in April, 2012, working on near-field, photonics, and PV

2. Dr. Bruno Lorenzi, post-doc supported by Marie Curie fellowship, joined group in September 2017.
3. Ke Chen, post-doc from Zhongshan University, joined group in January 2018.
4. Marcelo Lozano, post-doc funded by MIT-Tecnológico de Monterrey program (managed by Jesus Alamo), started in January 2018.
5. Aaron Schmidt, Research Scientist, started July 2018.
6. Yaodong Tu, post-doc from Shanghai Jiaotong University, started January 2019.

**Post-Doc/Research Scientist/Research Engineers Supervised:**

1. Dr. Ravi Kumar (Ph.D. with Zhoumin Zhang Univ. Florida, post-doc 99-2000 at UCLA).
2. Dr. Sebastian G. Volz (Post-doc From France, ENSMA 97-98, currently at CNRS and Ecole Centrale de Paris France).
3. Dr. Taofang Zeng (Ph.D. from MIT, Post-Doc 97 - June, 2000, visiting assistant professor at MIT since 2007, principal research scientist at MIT since 2010).
4. Dr. Senquan Zhou (Ph.D. from Tsinghua Univ., Post-doc from 97-98 at UCLA, currently in San Jose, CA).
5. Dr. Dekui Qing (Post-doc from 2001-2003 at MIT), worked on metamaterials.
6. Dr. Xiaoyuan Chen, 9/03-09, research scientist, pump-probe, etc., now Director, Chinese Academy of Science, Solar Energy Research and Development Center, Shanghai Advanced Research Institute (chenxy@sari.ac.cn).
7. Dr. Matteo Chiesa, Post-Doc, Ph.D. from Norwegian University of Science and Technology, September 2006-August 2007. Matteo continued as a visiting scholar with the MIT-MASDAR program in lab September 2007 (Matteo joined MASDAR Institute as an assistant professor in Sept., 2008).
8. Dr. Daryoosh Vashaee, Post-Doctorate, Ph.D. from UC Santa Cruz, October, 2006-August 2007 (Daryoosh Vashaee joined U. Okalahoma as an assistant professor in September 2007).
9. Dr. Aaron Schmidt, Post-Doc, Ph.D. in May 2008 jointly between myself and Matteo Chiesa.
10. Dr. Bhaskaran Mulidharan, Post-Doc., May 2008-December 2010, Ph.D. from EE Department, Purdue with S. Datta. Worked on electron transport in thermoelectric materials.
11. Dr. Celine Hin, Ph.D from Institut National Polytechnique Grenoble, post-doc from April 2009, working on DFT and materials diffusion simulation (Celine joined Virginia Tech as an assistant professor in Fall, 2011).
12. Dr. Hsieh-Ping (Tony) Feng (Fong Shaun Ping), Ph.D. from National Tsinghua University, post-doc start May, 2009 (Tony joined Hongkong University as an assistant Professor in Fall, 2011).



13. Dr. Shuo Chen, Ph.D. from BC, post-doc started in July, 2009 (Shuo took another post-doc position at BC in Fall, 2011 and became an assistant professor at U. Houston in 2013).
14. Dr. Nitin Shukla, Ph.D. from Virginia Tech (with Scot Huxtable), post-doc started in July, 2009 (Nitin joined Franhoffer Institute, Cambridge campus in Fall, 2011).
15. Dr. Tengfei Lu, Ph.D. from Michigan State expected in Aug. 2009, post-doc starts in Sept. 1, 2009 (Tengfei took an assistant professor position in Fall, 2011 from Notre Dame University, but extended his stay with my group till end of 2011).
16. Dr. Yann Chalopin, Ph.D. from Ecole Centrale Paris with Sebastian Volz, visiting student/post-doc starts in Sept. 1, 2009 (Yann took a position at Ecole Centrale Paris, hired by CNRS, Sept., 2010).
17. Dr. Yang Nuo, Ph.D. from Singapore National University with Baowen Li, visiting-student/post-doc starts in September 1, 2009. Left Sept., 2010 due to visa issue.
18. Dr. Weitao Dai, Ph.D. from Iowa State University expected Sept., 2009. Post-doc starts on Oct. 1, 2009 (Weitao took second post-doc position at BC in Fall, 2011).
19. Dr. Jae-Sik Jin, Ph.D. from Seoul National University, post-doc starts on Sept. 1, 2009 (Jae-Sik took another post-doc position in Spring, 2011).
20. Dr. Keivan Esfarjani, research scientist, joined Oct. 20, 2009, left August, 2012 to join Rutgers University as a Associate Research Professor, together with his wife Mona, who is to join U. Rutgers in January, 2013.
21. Dr. Mona Zebarjadi, post-doc since Januar, 2010. Joined Rutgers University as an assistant professor in Fall 2012.
22. Dr. Taofang Zeng, principal research scientist, since 2010, left in July, 2012.
23. Dr. Sang Eon Han, Ph.D. from U. Minnesota (Chem Eng.), post-doc from March 2009, working on EM wave simulation. Joined U. New Mexico, Chemical Engineering Department, as an assistant professor in June, 2012.
24. Dr. Anastassis Mavrokefalos, Ph.D. from UT Austin with Li Shi, post-doc from January 2009. Post-doc supported by MIT-Cyprus Institute. Joined University of Houston, ME Department, as an assistant professor in August, 2012.
25. Dr. Brian Burg, from ETH, joined group in October, 2010 (Ph.D. with Dimos Poulikakos). Joined IBM Zurich in August, 2012.
26. Dr. Nagarajan Thoppey, Ph.D. from NC State University, September 2012-May 2013, worked on polymer processing.
27. Dr. Amy Marconnet, Ph.D. from Stanford with Ken Goodson, September 2012. Amy already had a faculty job offer from Purdue and started at Purdue in August 2013.
28. Dr. Jivtesh Garg, joined group in May, 2011 (Ph.D. with Nicola Mazari, joined Oklahoma University as an assistant professor in the summer 2013).
29. Dr. Selcuk Yerci, Ph.D. from BU with Luca Degro, May, 2011 – January 2014, working on PV cells modeling. From 2/1/2014, Assistant Professor at Middle East Technical University, Ankara, Micro and Nanotechnology Programme, Electrical and Electronics Engineering.

30. Dr. Nenad Miljkovic, Ph.D. from MIT with Evelyn Wang, joined group in September, 2013 (had an offer from UIUC), and joined UIUC as an assistant professor in July, 2014.
31. Dr. Hadi Ghasemi, Ph.D. from U. Toronto, joined group as a post-doc around September, 2012, worked on Polymer project and also Solar Steam-Generation, Aerogel. Joined U. Houston as an assistant professor in August 2014 (job offers from U. Houston and U. Conn).
32. Dr. Yongjie Hu, joined group in May, 2011 (Ph.D. with Charlie Lieber), and worked on 1) phonon MFP spectroscopy, 2) battery thermal conductivity, and 3) some device exploration. Accepted assistant professor position from UCLA starting September, 2014.
33. Dr. Xiabo Li, Ph.D. from U. Colorado with Ronggui Yang, Denver, joined April, 2012, working on phase change materials for thermal storage, joined faculty position from Huazhong University of Science and Technology, Fall, 2014.
34. Dr. Bo Qiu, Ph.D. from Purdue with Xiulin Ruan, joined September, 2012, joined Qualcomm in July 2014 (had two faculty position offers, one from University of Illinois at Chicago and the other from U. Alabama, but cannot solve two-body problem, and decided to join Qualcomm). Worked on electron DFT scattering simulation.
35. Dr. Chang-Te Lin, Ph.D. from National Tsinghua University, joined group in September, 2013, joined Chinese Academy of Science in May 2014, Research Fellow (Professor) Ningbo Institute of Material Technology & Engineering, Chinese Academy of Sciences, Ningbo, 315201, China (Cheng-Te Lin [chengte.lin@gmail.com](mailto:chengte.lin@gmail.com)), worked on graphene synthesis.
36. Dr. John Cuffe, Ph.D. from Spain with Clivia Sotomayor Torres, Institute Catalana de Reserca i Estudis Avancats (ICREA), September, 2012-August 2014. Worked on silicon membrane, setting up frequency domain thermoreflectance.
37. Dr. Yuan Yang, Ph.D. from Stanford with Yi Cui, joined July, 2012, working on thermogalvanic cells (joining U. Columbia Applied Physics Department, July, 2015).
38. Dr. Xiaopeng Huang, Ph.D. from U. Iowa with Xinwei Wang, joined September 2012 and ended June 2015. He worked on setting up measurement system for polymer films but did not make too much progress.
39. Dr. James Loomis, Ph.D. from U. Louville, joined August, 2013. Was offered a Senior Lecture (equivalent to Assistant Professor) from U. Auckland and will join the department in August 2015.
40. Dr. Maria Luckyanova, Sept. 1, 2015-February 2016.
41. Dr. Jian Jian Wang, Oct. 1, 2015-March 2016.
42. Dr. Jonathan Mendoza, June 1-Aug. 30, 2017 (as a research engineer).
43. Dr. Lee Weistein, September-October, 2017 (as a research engineering).
44. George Ni, 1/18-4/18 (as a research engineer), joined Lincoln Lab.
45. Dr. Mingda Li, from MIT Ju Li group (I served on his PhD thesis committee), join group in Sept. 2015, joined MIT Nuclear Engineering Department as a faculty on Jan. 2018.
46. Dr. Yanfei Xu, Ph.D. from Tianjin University, joined group in December, 2013 to April 2018. Will join U. Massachusetts Amherst ME Department in Jan. 2019.

47. Vazrik Chiloyan, continue working on his PhD topics as a post-doc 1/18-6/18, joined Lincoln Lab.
48. Seyed Hadi Zandavi, from U. Toronto, joined July 2016 – June 2018. joined Intel.
49. Dr. Thomas Cooper, from ETH, Oct. 2015-June 2018 (initially funded by Switzerland protable fellowship). Joined York University Mech. Department as an assistant Professor in July 2018.
50. Dr. Te-Huan Liu (刘德欢), from National Taiwan University, joined group in January, 2015, joined Huazhong University of Science and Technology as an associate professor.
51. Dr. Bai Song, from UMichigan with Pramod Reddy working on near-field, joined July 2016. Working on pump-probe. Joined Beijing University as an assistant professor.

### Visitors/Other Students Hosted

1. Mr. Liang Zhang (visiting scholar, 95 at Duke University, Chinese Academy).
2. Mr. Alexandre Jacquot, Oct., 2000 – 04/02, visiting Ph.D. student at UCLA from Laboroire de Physique des Materiaux (LPM), Ecole Nationale Superieur des Mines de Nancy. Worked on the fabrication of thermoelectric thin film devices. Now with Fraunhofer Institute, Freiburg, Germany.
3. Professor Koji Miyazaki, 9/00-8/02, visiting scholar from Mechanical Engineering Department, Kyushu Institute of Technology. Worked on microbubble generation and photonic crystals, phonon transport.
4. Professor Min Chen, 03/02-10/02, visiting scholar from Department of Engineering Mechanics, Tsinghua University, worked on molecular dynamics simulation
5. Professor Jing Liu, 03/02 – 6/02, visiting scholar from Chinese Academy of Science, discussion, book reading.
6. Professor Yi Shi, 8/02-11/02, visiting scholar and Chairman of Physics Department, Nanjin University, China. Collaboration on thermoelectric effects.
7. Mr. Masayuki Takashiri, 03/02---9/03, Komatsu Corporation, visiting scientist, working on Si Thin Film Power Generator Fabrication
8. Professor Jinbo Wang, 04/02---6/2004, visiting scholar, Vice Dean, School of Environmental Engineering, Huzahong University of Science and Technology, working on electrostatic cooling and nanofluids.
9. Mr. Jack Chien, 11/02, visiting scholar from Industrial Technology Research Institute, working on measuring thermal conductivity of thin film.
10. Dr. A. Grazov, 8/04-9/04, visiting scientist from Moldova Academy of Science, Institute of Applied Physics, Moldova.
11. Dr. Ming-Shan Jeng, 9/04-4/06, visiting scholar from Industrial Technology Research Institute, Taiwan, worked on phonon transport for thermoelectrics.
12. Mr. Shinichiro Nakamura, visiting scientist from Denso, 8/05-8/07, worked on thermoelectrics.

13. Professor Dongsheng Zhu from Huanan Institute of Technology, Guangzhou, May 2006-Dec. 2006.
14. Professor Yong Tae Kang, School of Mechanical and Industrial System Eng. Kyung Hee, Korea, University, August 2006-August 2007, worked on nanofluids.
15. Dr. Jinwei Gao, visiting student from Huanan University of Science and Technology (September, 2007-December 2009. Half support from China, half by Chen). Jinwei Defended in March 2010, obtaining Ph.D. degree from Huanan University of Science and Technology, and took a faculty position, Huanan Normal University. Worked on nanofluids.
16. Professor Ruiting Zheng, From Beijing Normal University, September 2007- November 2009 (first year support by China, 2<sup>nd</sup> year by Chen). Worked on Nanofluids.
17. Professor Huaxin Chen, From Huazhong University of Science and Technology, Nov., 2008 for about one year, worked on thermoelectric cooling and reading.
18. Mr. Yiqun Zhang, visiting student from Nanjin University, Physics Department (since January 2009 to September 2010. Half support from China, half by G. Chen). Worked on electron thermoelectric transport.
19. Jinwei Gao, "Experimental and Theoretical Investigation of High Thermal Conductivity Micro/Nano Suspension," (visiting student from 9/2007-12/2009 from South China University of Technology, Ph.D. from South China University of Technology, March, 2010 based on his visiting student work. Jinwei Gao is now a Professor at South China Normal University).
20. Christine Junior, visiting Ph.D. student from Institut Für Thermodynamik, Germany, March 2009-December 2009 (Christine is now with Volkswagen).
21. Professor Junichiro Shiomi, Tokyo University, April, 2010 to March 2011.
22. Mr. Takuma Shiga, a visiting student from Jun Shiomi group. December 2010-February 2011.
23. Professor Amador Guzman, Santiago University, July 1, 2011 - December 2011.
24. Miss. Mongyun Zhang, visiting B.S. student from Huazhong University of Science and Technology February, 2012-May, 2012.
25. Mr. Jiawei Zhou, Tingshua University, Dept. Eng. Mech., Undergraduate highly recommended by Min Chen. Worked here for five month on cantilever pump-probe simulation, left November, 2012.
26. Professor Zhichun Liu, associate professor at Huazhong University of Science and Technology, visiting scholar at MIT December 2011-November, 2012. Worked on phonon Monte Carlo simulation.
27. Chia-Chi Chen (Engineering System Division student, joined Fall, 2011, doing a thesis on TE market, but decided to transfer to another group by end of December, 2012).
28. Dr. Kazuki Ihara, NEC, February, 2012-January 2013, working on measuring interfacial resistance between Ag and glass

29. Dr. Maha Khayyat, from Umm Al-Qura University, Ph.D. from U. Cambridge, Cavendish Lab., joined November, 2012 sponsored by MIT-KFUPM collaboration, stayed till May, 2013, but in Saudi most time and did not contribute anything.
30. Mr. Lei Ma, Huazhong University of Science and Technology, visiting Ph.D. student 11/2011-4/2013, worked on nanofluids and phase change materials. Now faculty member in China.
31. Yuan Dong (Ph.D. candidate from Tsinghua University, six Months stay in my lab in 2013, worked on effective media theory).
32. Dr. Marisol Martin Gonzalez, Microelectronics Institute Madrid, Fullbright Scholarship, March-August 2016.
33. Dr. Seong Don Hong, ESEP exchange program, through Natick Army Research Lab, January 2018-November 2018.
34. Hongxia Zeng, visiting PhD student from Huazhong University of Science and Technology, March, 2019.

#### **Undergraduate Students (start recording 2007):**

1. Asegun Henry (African American Heritage, supported by MIT Summer Research Program (MSRP), two summers from MIT in 2002 and 2003, joined group as a M.S. student in 2004). In 2002, worked on thermoelectrics thin film measurement, in 2003, worked on molecular dynamics simulation.
2. Kevin Robinson (summer of 2007, supported by MIR MSRP program, Florida Agricultural & Mechanical University: (FAMU) in Tallahassee, Florida), worked with Shireen on attaching CNT to a sharp tip via electrophoresis.
3. John Uku (summer of 2007 via MIT MSRP program, from Electrical Engineering Department, Morgan State University). Worked on building thermoelectric power generation demonstration system.
4. Jonathan Sue-Ho (summer of 2007, supported by MIT UROP program, MIT ME student). Worked on building thermoelectric cooling demonstration systems.
5. Xin C. Wang (summer, 2008), supervised remotely her summer work in India, simulation.
6. Derek Li (summer, 2008), worked on aluminum anodization for solar selective surfaces (Hu direct supervision).
7. Jonathan Tong (summer, 2008), NSF REU program from UIUC. Worked on polymer fiber pulling under Sheng Shen.
8. Vazrik Chiloyan (summer of 2009 and summer 2010, supported by MIT UROP, MIT ME Student), worked on attaching sphere to nanofiber for emission measurements (Shen direct supervision).
9. Noah S Caplan (summer of 2009, supported by MIT UROP, MIT ME Student), worked on measuring emissivity of solar selective surfaces (Kraemer direct supervision).

10. Katherine Ray (Fall, 2009-Spring 2010) worked on measuring temperature dependence of the efficiency of solar cells (Kraemer direct supervision).
11. Daniel Kubaczyk (Fall, 2009) worked on waste heat recovery from power plant (Muto direct supervision).
12. Kevin G. Kleinguetl, worked on desalination (under Anurag Bajpayee supervision), summer 2010, worked under Daniel Kraemer.
13. Menyun Zhang, "Design of a DC-DC Passive Boost Converter for Thermoelectric Power Generators," HUST, May, 2012.
14. Michael James Fowler, "Construction of Prototype System for Directional Solvent Extraction Desalination," ME B.S. Thesis, May, 2012 (Anurag Bajpayee supervision).
15. Brian Oldfield, "Analysis of Cheap and Clean Electricity Production in the United States Virgin Islands," ME B.S. Thesis, May, 2013.
16. Emerald C. Ferreira-Yang, summer 2011, worked under Tony Feng on supercapacitor energy conversion, summer 2012, funded by MIT UROP, she is working under Matthew Branham on nanogrids for solar cells, also including Fall, 2012; Spring 2013.
17. Mary Munro, junior, summer 2012, funded by MIT UROP, she is working under James Wang on supercapacitor energy conversion.
18. Sterling M. Watson, summer 2012, funded by MITEI, she is working under Matthew Branham on designing a setup for his PV cell characterization.
19. Bethel Tarekegne, from EE Department Benedict College, Columbia, SC, funded through MIT MSRP program, she is working with Bolin to continue DC-DC booster development.
20. Jonathan Rea (ME, male, year 3), worked under Lee Weinstein on spherical solar concentrator in January 2013, and continue to Spring 2013.
21. Feyza Haskaraman, Solar Cell Testing, worked under Mathew Branham, Spring, 2013.
22. Emma Nelson (ME, female, year 2), Spring, 2013, working on peeling Si membranes with Selcuk Yerci and Maha Khayyat.
23. Ronald Heisser (ME, male, 2<sup>nd</sup> year), Error propagation analysis and chromium nitrate testing on time domain thermorefectance system, under Maria Luckyanova, Fall, 2013.
24. Isaac Sosa (ME, male, 3<sup>rd</sup> Year), Measuring Thermal Properties of Aerogels, under Ken McEnanney, Spring, 2014.
25. Tachmajal M. Corrales Sanchez (ME, female, 4<sup>th</sup> year), polymer processing with Yanfei Xu, 2014.
26. Sarah Wakander (ME, female, year 4), Thermal Characterization of Metal/Oxide Heterostructure, Fall 2015 and Spring 2016, under Sam Huberman
27. Nanxi Liu (Year 1, female, 2, Plastics for Thermal Management, Fall, 2016, under Yanfei Xu
28. Marcus Abate (ME, male, year 2), Investigation and Improvements of Thermal Radiative Cells, summer 2017, under Sveta Boriskina

29. Lance Neil (ME, male, African American, year 2), Understanding Thermal Transport in Polymers and Gels, summer 2017, under Laureen Meroueh
30. Isaac Metcalf (male, year 2, MITEI), worked with Tom Cooper to design a compound solar collector. Summer and fall, 2017.

### **Courses Taught:**

1. Microsciences (Half Course Developed and Taught, Winter, 1998),
2. Fluid Mechanics (Spring, 1996, Spring, 1997),
3. Thermodynamics (Fall, 1997),
4. Introduction to Transport Phenomena (Winter, 1999),
5. Microscopic Heat Transfer (Developed and Taught, Fall, 1998),
6. Heat and Mass Transfer (Spring, 1994; Spring, 1995; and Fall, 1995),
7. Radiative Properties and Energy Transfer (Developed and Taught, Fall, 1994),
8. Fundamentals of Thermal Radiation (Fall, 1996),
9. Measurement Techniques in Thermophysics (in Chinese, Spring 1988 and Spring 1989).
10. ME 2.57 Nano-to-Macro Transport Processes, Fall/2002 (developed and taught).
11. ME2.997 Direct Solar/Thermal to Electrical Energy Conversion, Fall/2009.

### **Thesis Committee**

- 1) Vargas, Jose, V.C., "Combined Heat Transfer and Thermodynamics Problems with Applications in Refrigeration." Department of Mechanical Engineering and Materials Science, Duke University, June 1994.
- 2) Shen, Wei-Ning, "Wet Chemistry Applications for Low Dimensional Bismuth-Based Solids." Department of Materials Science and Engineering, University of California at Los Angeles, June 1998.
- 3) Liao, Chieng-Neng, "Thermoelectric characterization of Si Thin Films in SOI Wafers and Thermal Conductivity of Low Dielectric Constant Thin Films." Department of Materials Science and Engineering, University of California at Los Angeles, June 1999.
- 4) Liu, Cheng-Yi (MSE, Ph.D., UCLA, 2000), "Wetting behavior and Electromigration of SnPb Solders as a Function of Composition," Department of Materials Science and Engineering, University of California at Los Angeles, June 2000.
- 5) Chau, Tai Binh, "1.55  $\mu\text{m}$  Wavelength InGaAs/InAlAs/InP Velocity-Matched Distributed Photodectors." Electrical Engineering Department, University of California at Los Angeles, June 2000.
- 6) Chen, George Chung Kit, "Thermal Conductivity Measurements and Modeling of Thin Films," Electrical Engineering Department, Nanyang Technological University, September 2000.

- 7) Ramanujapu, Naresh, "Study of Growth Rate, Departure Frequency and Shape of a Single Bubble During Saturated and Subcooled Nucleate Boiling." Department of Mechanical and Aerospace Engineering, University of California at Los Angeles, June, 2001.
- 8) Johnson, Gregory, "Modeling of Nano-Cluster Nucleation within a Plasma Environment." Department of Mechanical and Aerospace Engineering, University of California at Los Angeles, June 2001.
- 9) Jiang, Shanjuan, "Modular Micromachined Si Heat Removal Phase Change Microjet." Department of Mechanical and Aerospace Engineering, University of California at Los Angeles, June 2001.
- 10) Murthy, Sanjeev Srinivasa, "High-Speed High-Power Photodetectors." Electrical Engineering Department, University of California at Los Angeles, June 2001.
- 11) Saif Islam, "Balanced Photodetectors for RF Photonic Link." Electrical Engineering Department, University of California at Los Angeles, June 2001.
- 12) Per-Der Tseng, Per-Der "SiGe/Si HBT Power Amplifiers for Cellular Dual-Mode CDMA/AMPS and PCS CDMA Handset Applications." Electrical Engineering Department, University of California at Los Angeles, June 2001.
- 13) Lee, Taek Yeong, "Electromigration and Intermetallic Compound Growth in Flip-Chip Joint," Department of Materials Science and Engineering, University of California at Los Angeles, June 2001.
- 14) Lin, Yu-Ming, "Thermoelectric Properties of Nanowires." Physics Department, MIT, June 2003 (M.S. Dresselhaus).
- 15) Pipe, Kevin, "Internally Cooled Photonic Devices," Electrical Engineering Department, MIT, December, 2003 (Rajeev Ram).
- 16) Jacob Eapan, Nanofluids, MIT Nuclear Engineering, Since 12/2004 (Sydney Yip, graduated 2005)
- 17) Xiwen Wang, "Optical Phenomena in Photonic and Polaritonic Crystals," 2005 (Physics Department, Boston College, K. Kempa's student).
- 18) Lowell Baker, "Efficient Simulation of Low-Speed Gas Flow," (advisor: N. Hajicontaninou, graduated 2006)
- 19) Shuo Chen, "Structural and Transport Property Studies Using Transmission Electron Microscope," (Physics Department, Boston College, Zhifeng Ren's student, graduated 2006)
- 20) Guangyong (Bear) Xiong, "Synthesis, Characterization, and Applications of Carbon Nanotubes and Silicon Nanowires," (Zhifeng Ren, Boston College, graduated May 2007).
- 21) Namiko Yamamoto, "Multi-Functional Properties of Hybrid Composites Reinforced with Aligned Carbon Nanotubes," Aerospace Dept, advisor Brian Wardle (since 2007, graduated 2010).
- 22) Tim A. Fofonoff, "Fabrication and Use of Conducting Polymer Linear Actuators," ME, MIT, Ph.D. 2008, Advisor: Ian Hunter (since 2006).



- 23) Yi Ma, “Thermoelectric Properties of P-type Nanostructured Bismuth Antimony Tellurium Bulk Materials,” (with Zhifeng Ren, Boston College, graduated July 2009).
- 24) Xiaowei Wang, “Thermoelectric Properties Studies on Nanostructured N-Type Si-Ge Bulk Materials,” (with Zhifeng Ren, Boston College, graduated July 2009).
- 25) Jian Yang, “THERMOELECTRIC PROPERTIES OF CoSb<sub>3</sub>-BASED SKUTTERUDITES,” BC Physics, Zhifeng Ren’s student, graduated June 2010.
- 26) Xiao Yan, “Thermoelectric Property Studies of Nanostructured Bulk Half-Heuslers and Bismuth Tellurides,” BC Physics, Zhifeng Ren’s student, graduated June, 2010.
- 27) Namiko Yamamoto, “Multi-scale Electrical and Thermal Properties of Aligned Carbon Nanotubes and Their Composites,” Aerospace Eng. Dept., MIT, graduated 2011 (with Brian Wardle).
- 28) Ming Tang, “Characterization and Modeling of Nanocomposite Thermoelectric Materials System Bismuth Antimony Telluride ((Bi<sub>1-y</sub>Sb<sub>1-y</sub>)<sub>2</sub>Te<sub>3</sub>) as a Function of Temperature and Magnetic Field,” Ph.D. thesis, EECS, MIT, August, 2011 ( Advisor: Mildred S. Dresselhaus (on committee since 2007).
- 29) Greg Radtke, ”Efficient Simulation of Molecular Gas Transport for Micro and Nanoscale Applications,” Ph.D. thesis, ME, MIT, 2011 (Nicolas Hajiconstantinou student, on committee since 2009).
- 30) Yong Li, “Multiphase oil transport at complex geometries,” Ph.D. thesis, ME, MIT, 2011, (under Tian Tian’s student, on committeesince 2008).
- 31) Jivtesh Garg, “Thermal conductivity from first-principles in bulk, disorders, and nanostructured materials,” Ph.D. thesis, ME, MIT, 2011 (Served as ME committee chair, advisor: Nicola Mazari, materials dept).
- 32) Reja Amatya, Solar Thermoelectrics for small scale power generation,” Ph.D. thesis, EECS, MIT, 2011 (advisor: Rajeev Ram).
- 33) Satoshi Takahashi, “Design and fabrication of micro- and nano- dielectric structures for imaging and focusing at optical frequencies” Ph.D. thesis, ME, MIT, 2011 (advisor: George Barbastathis)
- 34) Joel Abrahamson, Energy Storage and Generation from Thermopower Waves, Chemical Engineering student (Strano group, 2009-2012). Ph.D. thesis, ChEng, MIT, 2012.
- 35) Yi He, “Dynamics of electrons and excitons in nanoclusters and molecules studied by many-body Green’s function theory” MIT ME Department, 2012, advisor: Taofang Zeng).
- 36) Joseph Sullivan, “Understanding the viability of impurity-band photovoltaics: a case study of S-doped Si” MIT ME Department, 2013 (advisor: Tonio Buonassisi)
- 37) Collin Landon, “A deviational Monte Carlo formulation of ab initio phonon transport and its application to the study of kinetic effects in graphene ribbons,” MIT ME Department, Jan. 2014 (start 2012, advisor: Nicolas Hajiconstantinou).
- 38) Andrej Lenert, “Tuning energy transport in solar thermal systems using nanostructured materials,” Jan., 2014 (Evelyn Wang’s student, started 2012).

- 39) Nenad Miljkovic, “Development and characterization of micro/nano structured surfaces for enhanced condensation,” ME PhD Thesis, 2013 (from 2012, advisor: Evelyn Wang).
- 40) Jeong Yun Kim “Understanding and Designing Carbon-based Thermoelectric Materials with Atomic-Scale Simulations,” MSE PhD Thesis, 2015 (from 2013, advisor: Jeff Grossman).
- 41) Jeffrey K. Eliason, “Optical Transient Grating Measurements of Micro/Nanoscale Thermal Transport and Mechanical Properties,” Chemistry PhD Thesis, 2015 (advisor: Keith Nelson).
- 42) Jean-Philippe Péraud, “Efficient multiscale methods for micro/nanoscale solid state heat transfer” ME PhD, 2015 (advisor: Nicolas Hajiconstantinou, defended around January, 2015).
- 43) Mingda Li, “Investigation of Magnetic Interactions in Topological Insulators,” Nuclear Engineering PhD, 2015 (advisor: Jun Li, defended May, 2015).
- 44) Sayalee Girish Mahajan “Improving Efficiency of 1D Thermopower Wave Devices and Studying 2D Reaction Waves” Chem Eng PhD, July 2015 (advisor: Michael Strano)
- 45) Yangyin Zhu, “Micro and Nanostructures for Two Phase Fluid and Thermal Transport,” ME PhD January, 2017 (advisor: Evelyn Wang, since 2014)
- 46) Kevin Bagnall, “Multiphysics Characterization of GaN HEMTs via micro-Raman Spectroscopy,” ME PhD 1/1/2017 (advisor: Evelyn Wang, since 2014)
- 47) David Bierman, “Full Spectrum Utilization for High-Efficiency Solar Energy Conversion,” ME PhD 1/1/2017 (advisor: Evelyn Wang, since 2015)
- 48) Melanie Tetreault-Friend, Thermal-fluid Characterization and Performance Enhancement of Direct Absorption Melton Salt Solar Receivers,” ME PhD 1/1/2018 (advisor, Alex Slocum student, since 2016).
- 49) Lin Zhao, ME Evelyn Wang student (since 2016)
- 50) Mojtaba Oozroodi, Nicolas Hadjiconstantinou student (since 2017)
- 51) Elise Strobach, ME Evelyn Wang student (since 2017)
- 52) Chris Jacob, ME John Hart student (since 2018)
- 53) Cache Robert Hamilton, Michael Strano student (since 2018)
- 54) Arny Leroy, Evelyn Wang student (since 2019)