

Zhihong Chen

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Updated on April 24, 2017

Education

BS, Physics	June 1998	Fudan University, China
MS, Physics	May 2002	University of Florida
PhD, Physics	Dec. 2003	University of Florida

Professional and Honorary Society Memberships

1. IEEE, 2004 – present, Senior member since 2016
2. American Physical Society, 2002 – present

Honors and Awards

1. Forbes' Top 5 Nanotech Breakthroughs of 2006
2. Winner of the Industry Week's Technologies of the Year, 2006
3. Finalist of World Technology Award, Materials Category, 2006
4. IBM Research Achievement Award, 2006
5. Finalist of *Small Times* Best of Small Tech Awards, in the Category of Researcher of the Year, 2007
6. Intel Early Career Faculty Honor Program Award, 2012
7. Joel and Ruth Spira Excellence in Teaching Award, 2013
8. Excellence in Research Award, Purdue University Award for raising > US\$1M grants, 2013
9. Excellence in Research Award, Purdue University Award for raising > US\$1M grants, 2014
10. Purdue University Faculty Scholar, 2017-2022.

Professional Experience

Mar. 2004 – Mar. 2006	Postdoc Fellow , Nanometer Scale Science and Technology group at IBM T.J. Watson Research Center, Yorktown Heights, NY
Mar. 2006 – July 2008	Research Staff Member , Nanometer Scale Science and Technology group at IBM T.J. Watson Research Center, Yorktown Heights, NY
Aug. 2008 – Aug. 2010	Manager , Carbon Technology Group at IBM T.J. Watson Research Center, Yorktown Heights, NY
Oct. 2010 – April 2017	Associate Professor , School of Electrical and Computer Engineering, Purdue University, W. Lafayette, IN
April 2017 – present	Professor , School of Electrical and Computer Engineering, Purdue University, W. Lafayette, IN

Professional Society Activities

Organization:	American Physical Society
Activity:	Session Chair of Focus Session: Carbon Nanotubes: Mechanical Properties, APS annual meeting, 2005
Organization:	American Physical Society
Activity:	Session Chair of Focus Session: Graphene II, APS annual meeting, 2007
Organization:	Semiconductor Research Corporation (SRC)
Activity:	Member of NMS thrust TAB team on Patterning, 2006-2010
Organization:	International Roadmap for Semiconductors (ITRS)
Activity:	Member of the Emerging Research Materials Group, 2006-2010
Organization:	Device Research Conference (DRC)
Activity:	Technical Program Committee, Rump Session Organizer, 2008-2010
Organization:	IEEE International Electronic Device Meeting (IEDM)
Activity:	Solid State and Nano-electronics Subcommittee Member, Session Chair, 2009-2010
Organization:	BIT's Annual World Congress of Nano-S&T
Activity:	Scientific Advisory Board Member, Session Chair, 2011
Organization:	Materials Research Society

Activity: Session Chair of EE: New Functional Nanocarbon Devices, MRS spring annual meeting, 2012

Organization: Oak Ridge National Laboratory, Center for Nanophase Materials Sciences

Activity: Proposal Review Committee, 2014 – present

Organization: International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication

Activity: Program Committee, 2014 – 2016

Organization: American Physics Society Annual March Meeting

Activity: DMP focus session organizer, 2015 – present

Organization: Emerging Technologies CMOS conference

Activity: 2D Materials session, 2016 – present

Organization: Silicon Nanoelectronics Workshop

Activity: Technical Program Committee, 2016 – present

Organization: Device Research Conference

Activity: Technical Program Committee, 2016 – present

Journal Articles Published / Accepted (Total citation: 10,474, as of 4/24/2017)

1. E. Farkas, M.E. Anderson, Z. Chen, A.G. Rinzler, " Length sorting cut single wall carbon nanotubes by high performance liquid chromatography," *Chemical Physics Letters*, Vol. **363**, 2002, p. 111
2. Z. Chen, X. Du, M. Du, D. Rancken, H. Cheng, A.G. Rinzler, " Bulk separative enrichment in metallic or semiconducting single-walled carbon nanotubes," *Nano Letters*, Vol. **3**, 2003, p. 1245
3. Z. Wu, Z. Chen*, X. Du, J. M. Logan, J. Sippel, M. Nikolou, K. Kamaras, J. R. Reynolds, D. B. Tanner, A. F. Hebard, A. G. Rinzler, " Transparent, conductive carbon nanotube films," *Science*, Vol. **305**, 2004, p. 1273 (*equal contribution)
4. K. Lee, Z. Wu, Z. Chen, F. Ren, S.J. Pearton, A.G. Rinzler, " Single wall carbon nanotubes for p-type ohmic contacts to GaN light-emitting diodes," *Nano Letters*, Vol. **4**, 2004, p. 911
5. S. Hershfield, Z. Chen, " Classical magnetoresistance in a curved wire," *J. Appl. Phys.* Vol. **97**, 2005, p. 10M105
6. Z. Chen, J. Appenzeller, J. Knoch, Y.-M. Lin, Ph. Avouris, " The role of metal-nanotube contact in the performance of carbon nanotube field-effect transistors," *Nano Letters*, Vol. **5**, 2005, p. 1497

7. Y.-M. Lin, J. Appenzeller, Z. Chen, Z.-G. Chen, H.-M. Cheng, Ph. Avouris, " High performance dual-gate carbon nanotube FETs with 40-nm gate length," *IEEE Electron Device Letters*, Vol. **26**, 2005, p. 823
8. J. Appenzeller, Y.-M. Lin, J. Knoch, Z. Chen, Ph. Avouris, " Comparing carbon nanotube transistors – the ideal choice: a novel tunneling device design," *IEEE Transaction on Electron Devices*, Vol. **52**, 2005, p. 2568
9. Z. Chen, J. Appenzeller, Y.-M. Lin, J. Sippel-Oakley, A. G. Rinzler, J. Tang, S. J. Wind, P. M. Solomon, Ph. Avouris, " An integrated logic circuit assembled on a single carbon nanotube," *Science*, Vol. **311**, 2006, p. 1735
10. F. Borondics, K. Kamaras, M. Nikolou, D.B. Tanner, Z. Chen, A.G. Rinzler, " Charge dynamics in transparent single-walled carbon nanotube films from optical transmission measurements," *Physical Review B*, Vol. **74**, 2006, p. 045431
11. Y.-M. Lin, J. Appenzeller, J. Knoch, Z. Chen, Ph. Avouris, " Low-frequency current fluctuations in individual semiconducting single-wall carbon nanotubes," *Nano Letters*, Vol. **6**, 2006, p. 930
12. J. Appenzeller, Y.-M. Lin, J. Knoch, Z. Chen, and Ph. Avouris, " 1/f noise in carbon nanotube devices - On the impact of contacts and device geometry," *IEEE Transactions on Nanotechnology*, Vol. **6**, 2007, p. 368
13. Y.-M. Lin, J. Appenzeller, Z. Chen, Ph. Avouris, " Electrical transport and 1/f noise in semiconducting carbon nanotube," *Physica E*, Vol. **37**, 2007, p. 72
14. Z. Chen, Y.-M. Lin, M. J. Rooks, Ph. Avouris, " Graphene nano-ribbon electronics," *Physica E*, Vol. **40**, 2007, p. 228
15. Ph. Avouris, Z. Chen, V. Perebeinos, " Carbon based electronics," *Nature Nanotechnology*, Vol. **2**, 2007, p. 605
16. G. S. Tulevski, J. Hannon, A. Afzali, Z. Chen, Ph. Avouris, and C. R. Kagan, " Chemically assisted directed assembly of carbon nanotubes for the fabrication of large-scale device arrays," *J. Am. Chem. Soc.*, Vol. **129**, 2007, p. 11964
17. Y.-M. Lin, V. Perebeinos, Z. Chen, Ph. Avouris, " Electrical observation of subband formation in graphene nanoribbons," *Phys. Rev. B*, Vol. **78**, 2008, p. 161409
18. R.M. Tromp, A. Afzali, M. Freitag, D. Mitzi, Z. Chen, " Novel strategy for diameter-selective separation and functionalization of single-wall carbon nanotubes," *Nano Letters*, Vol. **8**, 2008, p. 469
19. Z. Chen, D. Farmer, S. Xu, R. Gordon, Ph. Avouris, J. Appenzeller, " Externally assembled gate-all-around carbon nanotube field-effect transistor," *IEEE Electron Device Letters*, Vol. **29**, 2008, p. 183

20. M. Freitag, M. Steiner, Y. Martin, V. Perebeinos, Z. Chen, J. C. Tsang, Ph. Avouris, " Energy dissipation in graphene field-effect transistors," *Nano Lett.* Vol. **9**, 2009, p. 1883
21. A. D. Franklin, A. Lin, P. Wong, and Z. Chen, " Current scaling in aligned carbon nanotube array transistors with local bottom gating," *IEEE Electron Device Letters*, Vol. **31**, 2010, p. 644
22. C. Dimitrakopoulos, Y.-M. Lin, A. Grill, D.B. Farmer, M. Freitag, Y. Sun, S.-J. Han, Z. Chen, K. A. Jenkins, Y. Zhu, Z. Liu, T.J. McArdle, J.A. Ott, R. Wisnieff, and Ph. Avouris, " Wafer-scale epitaxial graphene growth on the Si-face of hexagonal SiC (0001) for high frequency transistors," *J. Vac. Sci. & Tech. B*, Vol. **28**, 2010, p. 985
23. A. D. Franklin and Z. Chen, " Length scaling of carbon nanotube transistors," *Nature Nanotechnology*, **5**, 2010, p. 858
24. S. Oida, F.R. McFeely, J.B. Hannon, R.M. Tromp, M. Copel, Z. Chen, Y. Sun, D.B. Farmer, J. Yurkas, " Decoupling graphene from SiC(0001) via oxidation," *Phys. Rev. B*, **82**, 2010, p. 041411
25. S.-J. Han, Z. Chen, A. A. Bol, and Y. Sun, " Channel-length dependent transport behaviors of graphene field-effect transistors," *IEEE Electron Device Letters*, Vol. **32**, 2011, p. 812
26. J. Knoch, Z. Chen, and J. Appenzeller " Properties of metal-graphene contacts," *IEEE Transactions on Nanotechnology*, **11**, 2012, p. 513
27. C.-C. Lin, A.V. Penumatcha, Y. Gao, V. Q. Diep, J. Appenzeller, Z. Chen, "Spin Transfer Torque in a Graphene Lateral Spin Valve Assisted by an External Magnetic Field," *Nano Letters*, **13**, 2013, p. 5177
28. T. Chu, Z. Chen, "Understanding the Electrical Impact of Edge Contacts in Few-Layer Graphene," *ACS Nano*, **8**, 2014, p. 3584
29. C.-C. Lin, Y. Gao, A.V. Penumatcha, V. Q. Diep, J. Appenzeller, Z. Chen, "Improvement of Spin Transfer Torque in Asymmetric Graphene Devices," *ACS Nano*, **8**, 2014, p. 3807
30. Z. Chen, H.-S. Wong, S. Mitra, A. Bol, L. Peng, G. Hills and N. Thissen, "Carbon Nanotube for High-performance Logic," *MRS Bulletin*, **39**, 2014, p. 719
31. S. Chugh, M. Man, Z. Chen, K. Webb, "Ultra-Dark Graphene Stack Metamaterials," *Applied Physics Letters*, **106**, 2015, p. 061102
32. R. Mehta, S. Chugh, Z. Chen, "Enhanced Electrical and Thermal Conduction in Graphene-Encapsulated Copper Nanowires," *Nano Letters*, **15**, 2015, p. 2024

33. S. Chugh, R. Mehta, N. Lu, F.D. Dios, M.J. Kim, Z. Chen, "Comparison of Graphene Growth on Arbitrary Non-Catalytic Substrates Using Low-Temperature PECVD," *Carbon*, **93**, 2015, p. 393
34. T. Chu, Z. Chen, "Achieving Large Transport Bandgaps in Bilayer Graphene," *Nano Research*, **8**, 2015, p. 3228
35. A.V. Penumatcha, C.-C. Lin, V.Q. Diep, S. Datta, J. Appenzeller, Z. Chen, "Impact of Scaling on the Dipolar Coupling in Magnet-Insulator-Magnet Structures," *IEEE Trans. Magnetics*, **52**, 2015, p. 3400207
36. A.V. Penumatcha, S.R. Das, Z. Chen, J. Appenzeller, "Spin-torque switching of a Nano-magnet Using Giant Spin Hall Effect," *AIP Advances*, **5**, 2015, p. 107144
37. T. Chu, H. Ilatikhameneh, G. Klimeck, R. Rahman, Z. Chen, "Electrically Tunable Bandgaps in Bilayer MoS₂," *Nano Lett.*, **15**, 2015, p. 8000
38. F. Chen, H. Ilatikhameneh, G. Klimeck, Z. Chen, R. Rahman, "Configurable Electrostatically Doped High Performance Bilayer Graphene Tunnel FET," *IEEE J. EDS*, **4**, 2016, p. 124
39. S. Chugh, R. Mehta, M. Man, Z. Chen, "Optical Relaxation Time Enhancement in Graphene-Passivated Copper Films," *Scientific Reports*, **6**, 2016, p. 30519
40. A.J.M. Mackus, N.F.W. Thissen, J.J.L. Mulders, P.H.F. Trompenaars, Z. Chen, W.M.M. Kessels, A.A. Bol, "Resist-free Fabricated Carbon Nanotube Field-effect Transistors with High-quality Atomic-layer-deposited Platinum Contacts," *APL*, **110**, 2017, p. 013101. DOI: <http://dx.doi.org/10.1063/1.4973359>
41. R. Mehta, S. Chugh, Z. Chen, "Transfer-free Multi-layer Graphene as a Diffusion Barrier," *Nanoscale*, **9**, 2017, p. 1827.

Conference Proceedings and Presentations

1. Z. Chen, Z. C. Wu, J. Sippel and A. G. Rinzler, " Metallic/semiconducting nanotube separation and ultra-thin, transparent nanotube films," *Proceedings of Electric Properties of Synthetic Nanostructures: XVII International Winter School on the Electronic Properties of Novel Materials, American Institute of Physics, 2004, 723, p. 69-74*
2. F. Borondics, K. Kamaras, Z. Chen, A.G. Rinzler, M. Nikolou, D.B. Tanner, " Wide range optical studies on transparent SWNT films," *Proceedings of Electric Properties of Synthetic Nanostructures: XVII International Winter School on the Electronic Properties of Novel Materials, American Institute of Physics, 2004, 723, p. 137-140*

3. J. Knoch, S. Mantl, Y.-M. Lin, Z. Chen, Ph. Avouris, J. Appenzeller, " An extended model for carbon nanotube field-effect transistors," *IEEE Device Research Conference Digest*, 2004, p. 135-136
4. Z. Chen, J. Appenzeller, J. Knoch, Y.-M. Lin, Ph. Avouris, " Impact of the nanotube diameter on the performance of CNFETs," *IEEE Device Research Conference Digest*, 2005, p. 237-238
5. Z. Chen, J. Appenzeller, P. M. Solomon, Y.-M. Lin, Ph. Avouris, " High performance carbon nanotube ring oscillator," *IEEE Device Research Conference Digest*, 2006, p. 171-172
6. Y.-M. Lin, J. Appenzeller, C. C. Tsuei, Z. Chen, Ph. Avouris, " Reduction of 1/f noise in carbon nanotube devices," *IEEE Device Research Conference Digest*, 2006, p. 279-280
7. Z. Chen, J. Appenzeller, P. M. Solomon, Y.-M. Lin, Ph. Avouris, " Gate work function engineering for nano-material based circuits," *IEEE International Solid-State Circuit Conference, Solicited paper*, 2007, p. 68, 3 pages
8. Z. Chen, J. Appenzeller, " Mobility extraction and quantum capacitance impact in high performance graphene field-effect transistor devices," *IEEE IEDM Technical Digest*, 2008, p. 509, 4 pages
9. Z. Chen, J. Appenzeller, " Gate modulation of graphene contacts – on the scaling of graphene FETs," *Digest of symposium on VLSI technology*, 2009, p. 128-129
10. J. Appenzeller, Y. Sui, Z. Chen, " Graphene nano-structures for device applications," *Digest of symposium on VLSI technology*, invited paper, 2009, p. 124-125
11. A. D. Franklin, G. Tulevski, J. B. Hannon, and Z. Chen, " Can carbon nanotube transistors be scaled without performance degradation?" *IEEE IEDM Technical Digest*, 2009, p. 561, 4 pages
12. S.-J. Han, Y. Sun, A. Bol, W. Haensch, and Z. Chen, " Study of channel length scaling in large-scale graphene FETs," *Digest of symposium on VLSI technology*, 2010, p. 231-232
13. Y. Sun, G. Tulevski, S.-j. Han, W. Haensch and Z. Chen, " Improve variability in carbon nanotube FETs by scaling," *IEEE Device Research Conference Digest*, 2010, p. 283-284
14. A. D. Franklin, A. Bol and Z. Chen, " Channel and contact length scaling effects in carbon nanotube transistors," *IEEE Device Research Conference Digest*, 2010, p. 275-276

15. S. -J. Han, J. Chang, A. D. Franklin, A. A. Bol, R. Loesing, D. Guo, G. S. Tulevski, W. Haensch and Z. Chen, " Wafer scale fabrication of carbon nanotube FETs with embedded poly-gates," *IEEE IEDM Technical Digest*, 2010, p. 206, 4 pages
16. Tao Chu and Z. Chen, " Graphene nanomesh contacts and its transport properties," *IEEE Device Research Conference Digest*, 2012, p. 185-186
17. Y. Gao, Y. J. Kubo, C. -C. Lin, Z. Chen, J. Appenzeller, " Optimized spin relaxation length in few layer graphene at room temperature," *IEEE IEDM Technical Digest*, 2012, paper 4.4.1, p. 80, 4 pages
18. T. Chu, Y. Zhao, Z. Chen, "Semiconducting bilayer graphene for device applications," *TechConnect World Conference and Expo Digest: Nanotech*, 2014, Vol. 3, p. 21-24
19. T. Chu, Z. Chen, "Self-aligned edge contacts for 2D layered systems," *The 58th International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication*, 2014, p. 6A-3, 2 pages
20. S. Chugh, M. Man, Z. Chen, K. Webb, "Graphene stacks as the darkest metamaterial," *Conference on Lasers and Electro-Optics: Science and Innovation*, 2014, p. SM3H-3, 2 pages
21. A. Prakash, S. Das, R. Mehta, Z. Chen, J. Appenzeller, "Ionic gated WSe₂ FETs: Towards Transparent Schottky Barriers," *IEEE Device Research Conference*, 2014, p. 129-130
22. R. Mehta, S. Chugh, Z. Chen, "PECVD graphene – a Novel Thermal Interface and Barrier Material for Ultra-scaled Copper Interconnects," *TECHCON*, 2014, p. 3.1, 4 pages
23. S. Chugh, R. Mehta, Z. Chen, "Low Temperature Plasma-Enhanced Chemical Vapor Deposition Growth of Graphene on Arbitrary Non-Catalytic Substrates," *MRS Fall Meeting*, 2014, p. K11.01, 4 pages
24. R. Mehta, S. Chugh, Z. Chen, "Graphene-Encapsulated Copper Nanowires For Improved Thermal Management of Interconnects," *International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK)*, 2015, p. 48359, 2 pages
25. S. Chugh, R. Mehta, Z. Chen, "Direct PECVD Growth of Graphene at Low Temperatures on SiO₂," *TECHCON*, 2015, p. 12.1, 4 pages
26. F. Chen, H. Ilatikhameneh, T. Chu, J. Appenzeller, Z. Chen, G. Klimeck, R. Rahman, "Achieving a Higher ON/OFF Ratio in Bilayer Graphene FET – Strain Engineering," *International Conference on Simulation of Semiconductor Processes and Devices (SISPAD)*, 2015, p. 177-181

27. F. Chen, H. Ilatikhameneh, T. Chu, R. Rahman, J. Appenzeller, Z. Chen, G. Klimeck, "Transport Properties of Bilayer Graphene Field Effect Transistor," *TECHCON*, 2015, p. 12.2, 4 pages
28. T. Chu, Z. Chen, "Bandgap Engineering in 2D Layered Materials," *IEEE IEDM Technical Digest*, 2015, p. 707, 4 pages
29. S. Chugh, R. Mehta, Z. Chen, "Reduction in Surface Scattering in Copper by Graphene Deposition," *TECHCON*, Sept. 11-13, 2016, Austin, TX
30. R. Mehta, S. Chugh, Z. Chen, "Graphene For Next Generation Interconnects Applications," *Carbon*, July 10-15, State College, PA, 2016
31. T. Chu, Z. Chen, "Electrically Tunable Bandgaps in 2D Layered Materials," *IEEE EDSSC*, Aug. 3-5, Hong Kong, 2016 (proceeding info will be updated)
32. C. -L. Lo, R. Mehta, S. Chugh, Z. Chen, "Atomically Thin Diffusion Barriers for Ultra-Scaled Cu Interconnects," *Microelectronics Integrity Meeting*, Poster Contest First Place Award, July 25-30, Indianapolis, IN, 2016
33. S. Zhang, C.J. Benjamin, Z. Chen, "Molecular Doping of TMD for TFET Application," *Microelectronics Integrity Meeting*, July 25-30, Indianapolis, IN, 2016
34. P. Debashis, R. Faria, K. Y. Camsari, J. Appenzeller, S. Datta, Z. Chen, "Experimental Demonstration of Nanomagnet Networks as Hardware for Ising Computing," *IEEE International Electron Devices Meeting (IEDM) Proceeding*, paper 34.3 (2016)
35. C. -L. Lo, K.K.H. Smithe, R. Mehta, S. Chugh, E. Pop, Z. Chen, "Atomically Thin Diffusion Barriers for Ultra-Scaled Cu Interconnects Implemented by 2D Materials," *IEEE International Reliability Physics Symposium*, April 2-6, Monterey, CA, 2017
36. C. -L. Lo, S. Zhang, T. Shen, J. Appenzeller, Z. Chen, "BEOL Compatible 2D Layered Materials as Ultra-Thin Diffusion Barriers for Cu Interconnect Technology," *IEEE Device Research Conference*, accepted, 2017
37. C. -S. Pang, H. Ilatikhameneh, Z. Chen, "Gate Tunable 2D WSe₂ Esaki Diode by SiNx Doping," *IEEE Device Research Conference*, accepted, 2017
38. S. N. Zhang, C. J. Benjamin, Z. Chen, "Molecular Doping of Transition Metal Dichalcogenides using Metal Phythalocyanines," *IEEE Device Research Conference*, accepted, 2017

Invited Lectures

1. "Carbon nanotubes – from devices to integrated circuits," Electrical and Computer Engineering Department, Rutgers University, Piscataway, NJ, Feb. 15, 2006.
2. "Carbon nanotubes – from devices to integrated circuits," CNST nanotechnology workshop, UIUC, Urbana, IL, May 4 - 5, 2006
3. "Carbon nanotubes – from devices to integrated circuits," AVS, New England Chapter local symposium, Burlington, MA, May 22, 2006
4. "Carbon nanotube electronics," Electronic Processes in Organic Materials, Gordon Conference, Mount Holyoke College, MA, July 30 - Aug 4, 2006
5. "Gate work function engineering for nanotube based circuits," IEEE International Solid-State Circuit Conference, San Francisco, CA, Feb. 11, 2007
6. "Carbon electronics," Winter School on the Electronic Properties of Novel Electronic Materials, Kirchberg, Austria, March 16, 2007
7. "Carbon electronics development," DARPA carbon electronics for RF applications work shop, Washington DC, April, 2007
8. "Nano-materials for nano-electronics," Electrical Engineering department, Purdue University, West Lafayette, IN, December, 2007
9. "Nano-materials for nano-electronics," The 35th Conference on the Physics and Chemistry of Surfaces and Interfaces, Santa Fe, NM, Jan., 2008
10. "Carbon nano-electronics," Columbia University, New York, NY, April, 2008
11. "Carbon nano-electronics," Notre Dame University, South Bend, IN, May, 2008
12. "Carbon nano-electronics," The 1st FoNE conference, Taromina, Italy, June, 2008
13. "Carbon nano-electronics," Young Engineering Scientist Symposium, Washington, DC, July, 2008
14. "Self-assembly and top-down patterning for nano-electronics," DARPA-ARL-AMRDEC nano-electronics for RF and electronics applications work shop, Adelphi, MD, Aug., 2008
15. "Carbon nano-electronics," The International Symposium on Compound Semiconductors, Rust, Germany, Sept., 2008
16. "Nano-electronics – more than just small," Columbia University, New York, NY, Oct., 2008
17. "Carbon nano-electronics," CSTIC, Shanghai, China, March, 2010

18. "Graphene transport," Rochester Institute of Technology, May, 2010
19. "Scaling in carbon electronics," EIPBN, Anchorage, Alaska, June, 2010
20. "Understanding the transport in graphene field-effect transistors," 457. WE-Heraeus-Seminar on "Graphene Electronics – Material, Physics and Devices", Bonn, Germany, August, 2010
21. "Journey along the carbon road," NASA Goddard Space Flight Center, Greenbelt, MD, August, 2011
22. "Journey along the carbon road," Condense Matter Physics Seminar, Physics Department, Purdue University, Sep. 2, 2011
23. "Understanding the transport in graphene field-effect transistors," BIT's 1st Annual World Congress of Nano-S&T, Dalian, China, October, 2011
24. "Path to High Performance Graphene Devices," Materials Research Society Spring Meeting, San Francisco, CA, April, 2012
25. "Nanowire for interconnects applications," SRC GRC Interconnects Workshop, Stanford University, CA, June 18, 2012
26. "Graphene Platform for Bio-sensing & Neuro-electronic Interface Applications," 10th Annual World Congress of Society for Brain Mapping & Therapeutics, Baltimore, MD, May 14, 2013
27. "The Use of Multi-layer Graphene," 2013 CMOS Emerging Technologies Research Symposium, Whistler, BC, Canada, July 17, 2013
28. "Spin Transfer Torque in Graphene Lateral Spin Valve," Nanoelectronics Research Initiative e-workshop, Nov. 12, 2013
29. "Tunable Bandgap and Edge Contacts in Bilayer Graphene," CIMTEC 6th Forum on New Materials, Montecatini Terme, Italy, June 17, 2014
30. "Spin Transfer Torque in Graphene Lateral Spin Valve," [icps](#), Austin, TX, August 11, 2014
31. "Dipolar Coupling in Scaled Nano-magnets for Spin Logic Applications," Nanoelectronics Research Initiative e-workshop, Oct. 21, 2014
32. "Low Dimensional Materials for Electronic and Spintronic Applications," Open Research Seminar Series, University of Louisville, Louisville, KY, Mar. 30, 2015

33. "Low Dimensional Materials for Electronic and Spintronic Applications," University of Texas at Austin, Austin, TX, May 6, 2015
34. "Low Dimensional Materials for Electronic and Spintronic Applications," Harvard University, Cambridge, MA, May 12, 2015
35. "Graphene Based All Spin Logic," Invited Talk at the International Symposium on Physics and Device Applications of 2D Materials, Nanjing University, China, July 12-15, 2015
36. "Improved Electrical and Thermal Performance and Ultra-thin Diffusion Barrier in Copper-Graphene Hybrid Interconnects," Invited Talk at the 32nd Annual Advanced Metallization Conference, Austin, TX, Sept. 9-11, 2015
37. "Bandgap Engineering in 2D Layered Materials," Invited Talk at Steep Transistor Workshop, Notre Dame, IN, Oct. 6, 2015
38. "Field Controlled Bandgaps in 2D Layered Materials," Invited talk at IEDM, Washington DC, Dec. 9, 2015
39. "Graphene for Next Generation Interconnects Applications," Invited talk at Carbon, Penn State University, PA, July 10-15, 2016
40. "Electrically Tunable Bandgaps in 2D Layered Materials," Invited talk at IEEE Interactional Conference on Electron Devices and Solid-State Circuits (EDSSC'16), Hong Kong, Aug. 3-5, 2016
41. "Low Dimensional Materials for Electronic and Spintronic Applications," Invited seminar at Brown University, Oct. 27, 2016
42. "Nanomagnet Networks as Building Blocks for Ising Computing," Invited talk at International Conference on Computer-Aided Design, Austin, TX, Nov. 7-10, 2016

Patents Approved and Patent Applications

1. *Transparent electrodes from single wall carbon nanotubes*, US 7261852, A.G. Rinzler, Z. Chen, issued on Aug 28, 2007
2. *Transparent and electrically conductive single wall carbon nanotube films*, US 7972699, A.G. Rinzler, Z. Chen, issued on July 5, 2011
3. *Local bottom gates for graphene and carbon nanotube devices*, US 8124463, Z. Chen, A.D. Franklin, J.B. Hannon, G.S. Tulevski, issued on Feb. 28, 2012

4. *Ultrathin spacer formation for carbon-based FET*, US 8193032, Z. Chen, D. Guo, S.-J. Han, K. Zhao, issued on June 5, 2012
5. *Vertical stacking of carbon nanotube arrays for current enhancement and control*, US 8288759, Z. Chen, A.D. Franklin, and S.-J. Han, issued on October 16, 2012
6. *Method to improve nucleation of materials on graphene and carbon nanotubes*, US 8895352, K. Babich, A. Callegari, Z. Chen, E. Kiewra, Y. Sun, issued on Nov. 25, 2014
7. *Graphene-encapsulated copper nanowires and method of producing same. US provisional patent: 62/272,376*, Z. Chen, S. Chugh, R. Mehta
8. *Low temperature growth of graphene on arbitrary substrates. US provisional patent: 62/302,361*, Z. Chen, R. Mehta, S. Chugh
9. *Graphene field effect transistors for radiation detection. US 9,508,885 B1*, M. Li, Z. Chen, issued on Nov. 29, 2016

Activities as a Referee

2004 – present

Nature, Science, Nature Nanotechnology, Nano Letters, ACS Nano, IEEE Transactions on Nanotechnology, IEEE Electron Device Letters, IEEE Transactions on Electron Devices, Applied Physics Letter, Thin Solid Films, Journal of Physical Chemistry, Journal of Nanoscience and Nanotechnology, Nanoscale, Advanced Drug Delivery Reviews, Transactions on Microwave Theory and Techniques, Nature Scientific Reports, Nano Research, Nanoscale.

Editorial Positions

1. Editor, IEEE Electron Device Letters, 2012 – present