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Curriculum Vita

John H. Booske

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Contents

I. Contact Information

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II. Academic Degrees

B.S.	Nuclear Engineering	Pennsylvania State University	1980
M.S.	Nuclear Engineering	University of Michigan	1982
Ph.D.	Nuclear Engineering	University of Michigan	1985

III. Professional Positions

2010-present	Director, Wisconsin Collaboratory for Enhanced Learning (WisCEL)
2009–2018	Department Chair, Electrical and Computer Engineering, University of Wisconsin-Madison
9/05–10/05	Senior Research Engineer, L3-Communications Electron Devices, San Carlos, CA
2001 - 2005	Director, University of Wisconsin Interdisciplinary Graduate Materials Science Program
2000-2002	Physicist, Consultant, Northrop Grumman Corporation, Rolling Meadows, IL
1998-present	Professor, Dept. of Electrical and Computer Engineering, University of Wisconsin-Madison
2016-present	Affiliate Faculty Member, Materials Science and Engineering Department
1994-present	Fellow, University of Wisconsin-Madison Teaching Academy
1994-1998	Associate Professor, Electrical and Computer Engineering, University of Wisconsin-Madison
1991-2016	Faculty, Materials Science Program, University of Wisconsin-Madison
1990-1994	Assistant Professor, Electrical and Computer Engineering, University of Wisconsin-Madison
1988-1989	Associate member of Graduate Faculty, University of Maryland
1985-1989	Research Faculty and Assistant Research Scientist, Laboratory for Plasma Research, University of Maryland
1980-1985	Graduate Student, University of Michigan, Ann Arbor, MI

5/80-8/80	Engineer, Magnetic Fusion Energy Division, Lawrence Livermore National Lab
11/79-2/80	Undergraduate Teaching Assistant, Nuclear Engineering, Penn State University
5/79-8/79	Engineer, Magnetic Fusion Energy Division, Lawrence Livermore National Laboratory, Livermore, CA
5/78-8/78	Technical Intern, Nuclear Regulatory Commission, Bethesda, MD

IV. Honors and Awards

- IEEE Plasma Science and Applications Award (2018). Citation: *For seminal contributions to vacuum and micro-electronics, the education of generations of talented students, and leadership in the plasma science community. His pioneering research includes advanced cathodes, sheet electron beams, microwave and millimeter-wave sources and interaction with materials*.
- Harvey Spangler Award for Technology Enhanced Instruction (UW College of Engineering, 2018).
- UW-Madison University Housing's Honored Instructor Award (2017)
- **Vilas Distinguished Achievement Professor** (2015)
- **IEEE Educational Activities Board Major Educational Innovation Award**.(2014)
- Invited Faculty Speaker, UW-Madison Chancellor's Convocation, "Excellence = Best Effort Combined with Relationship," August 29, 2014 (http://www.news.wisc.edu/23074), (http://youtu.be/RsMwgsxfKjQ, starts at 51:08.).
- UW-Madison Teaching and Learning Innovation Award (w/ S. Mason, D. Helman, C. Kruse, 2014)
- University of Michigan, College of Engineering Alumni Merit Award (2012)
- Plenary Speaker at the IEEE International Vacuum Electronics Conference (Bangalor, IN, 2011)
- Elected **Fellow of the American Physical Society** (2011).
- 2011 Physics in Medicine and Biology Citations Prize and *Rotblat Medal*: Journal Pub [99]
- **Duane H. and Dorothy M. Bluemke Professor** (2007).
- 2009-10 Committee on Institutional Cooperation (CIC) Academic Leadership Program (ALP) Fellow
- Co-winner (w/ Adam Hahn) of UW-Hilldale Faculty-Undergraduate Research Fellowship (2009).
- Co-winner (w/ Kaytlyn Beres) of UW-Hilldale Faculty-Undergraduate Research Fellowship (2009).
- Third highest cited paper in *Phys Med Biology* during 2007-2008**,** journal pub [96].

- Top 30 best pub in 2007 in *Phys Med Biol* (#7 of 550), journal pub [96]
- Top 30 best pub in 2007 in *Phys Med Biol* (#22 of 550), journal pub [99]
- Robert's Prize Finalist, in *Phys. Med. Biol.* (2007) (in top 10 of 550 papers as rated by reviewers)
- Elected **Fellow of the Institute of Electrical and Electronics Engineers** (IEEE) (2007)
- Plenary Speaker at the Annual Meeting of the American Physical Society's Division of Plasma Physics, Orlando, FL, Nov. 2007
- Elected Honorary Member, Eta Kappa Nu Electrical and Computer Engineering Honor Society, UW-Madison (Theta) Chapter (2006), for "outstanding achievements in teaching ECE students at the University of Wisconsin-Madison."
- University of Wisconsin Vilas Faculty Research Associate Award (2004-2006)
- UW-Madison Polygon Engineering Student Council ECE Outstanding Instructor (00-01)
- Benjamin Smith Reynolds Award for Excellence in Teaching Engineers (UW 2000)
- Co-winner (w/ Dina Hemminger), UW-Hilldale Faculty-Undergraduate Research Fellowship (2000)
- UW-Madison, Polygon Engineering Student Council ECE Outstanding Instructor (99-00)
- UW-Madison, Polygon Engineering Student Council ECE Outstanding Instructor (98-99)
- Manheim Township High School Distinguished Alumni Award (1998)
- UW-Madison, Polygon Engineering Student Council ECE Outstanding Instructor (95-96)
- UW-Madison IEEE Professor of the Year (95-96)
- UW Chancellor's Distinguished Teaching Award (1995)
- Fellow of the University of Wisconsin-Madison Teaching Academy (1994)
- Co-winner (w/ Jim Anderson) of UW-Hilldale Faculty-Undergraduate Research Fellowship (1994)
- ECE Holdridge Teaching Excellence Award (1994)
- Elected to Senior Membership, IEEE (1993)
- Honorary Member of Kappa Eta Kappa EE Fraternity (UW-Madison chapter, 1993), , for "overall dedication…to the students of EE in ways that work with and for the students".
- UW-Madison IEEE Professor of the Year (91-92)
- U. Wisconsin-Madison Wisconsin Student's Association "Top 100" Educator (1991)
- U.S. National Science Foundation Presidential Young Investigator (1990-1997)
- University of Wisconsin Grainger Fellow (1990)
- DOE Magnetic Fusion Energy Technology Fellow (UM '81-'85)
- Horace Rackham Fellow (UM '80-'81)
- Tau Beta Pi Outstanding Engineer Scholar (PSU '80)
- B.S. with Highest Honors (PSU '80)

- National Merit Scholar (PSU '76-'80)
- Mortar Board, Alpha Nu Sigma, Tau Beta Pi, Pi Mu Epsilo, Phi Kappa Phi (PSU, 1978-80)

Awards to Student Mentees

- Finalist for Best Student Paper Award, T. Rowe, IEEE International Conference on Vacuum Electronics (2017), talk [417].
- Invited Talk, Amin Momeni, 2016 International Workshop on Antenna Technology (iWAT 2016), invited talk [39].
- Outstanding Poster Award, Ryan Jacobs, 20th Int'l Conf Solid State Ionics (2015), talk [405].
- Session Keynote Talk, Ryan Jacobs, IEEE Int'l Vacuum Electronics Conf (2015), talk [402]
- Finalist, Best Student Paper Award, Matt Kirley, IEEE Int'l Vacuum Electronics Conf (2014), talk [397]
- Finalist, Best Student Paper Award, Matt Kirley, IEEE Int'l Vacuum Electronics Conf (2013), talk [381]
- Best student paper award, Ben Yang, IEEE Int'l Conference on Plasma Science, 2011, talk [355]
- Curtis Carl Johnson Memorial Best Student Talk Award (2010), talk [342]
- 3 students (of only 12 out of 300) selected to present at UW-System's "Posters in the Rotunda" May 5, 2010, talk [331]
- Curtis Carl Johnson Memorial Best Student Poster Award (2nd place), talk [304]
- Curtis Carl Johnson Memorial Best Student Platform Presentation Award (3nd place) talk [303]
- Best Student Paper Award, IEEE Int'l Vacuum Electronics Conference (2008), talk [310]
- Finalist, Best Student Paper Award, IEEE Int'l Vacuum Electronics Conf (2008), talk [305]
- Finalist, Best Student Paper Award, IEEE Int'l Vacuum Electronics Conf (2008), talk [309]
- Finalist, Best Student Paper, IEEE Int'l Vacuum Electronics Conf (2006) talk [277]
- Finalist, Best Student Paper, IEEE Int'l Vacuum Electronics Conf (2006), talk [278]
- Session Keynote Talk, Paul Larsen, IEEE Intl'l Vacuum Electronics conf, Invited talk [25]

V. Research Scholarship

a. Books or Book Chapters or Articles in Books

1. "Plasma Implantation," J.H. Booske, R.J. Matyi, and J.R. Conrad, book chapter, *Wiley Encyclopedia of Electrical and Electronics Engineering*, Ed. J.G. Webster, Vol. 16, pp. 520 - 527 (John Wiley and Sons, N.Y., 1999)

2. "Ionised Physical Vapour Deposition of Copper," Y. Andrew, J.H. Booske, and A.E. Wendt, Invited Review Article in *Recent Research Developments in Vac. Sci. and Technol.* , Vol. 2, pp. 133-147 (Transworld Research Network, India, 2000).

3. "Microwave and Radio Frequency Applications," *Proc. 3rd World Congress on Microwave and Radio Frequency Applications*, D.C. Folz, J.H. Booske, D.E. Clark, J.F. Gerling, Eds., (Amer. Ceramic Soc., Westerville, OH, 2003).

4. "Modern Microwave and Millimeter Wave Power Electronics," R.J. Barker, J.H. Booske, N.C. Luhmann, and G.S. Nusinovich, Eds. (JHB also principal author of Chapters 1: "Introduction and Overview," and 4: "Traveling Wave Tubes (TWTs)" and co-author of Chapters 9: "How to achieve linearity" and Chapter 15: "Emerging trends and future possibilities".). (IEEE Press and Wiley, 2005).

b. Journal Publications (Peer-refereed)

1. "Experiments on Whistler Mode ECRH Plasma Startup and Heating in an Axisymmetric Magnetic Mirror," J.H. Booske, W.D. Getty, R.M. Gilgenbach, and R.A. Jong, *Phys. Fluids* **28** , 3116 (1985).

2. "Extended Frequency Compensation of a Diamagnetic Loop," J. H. Booske, W. D. Getty, and R. M. Gilgenbach, *Plasma Physics and Controlled Fusion* **28**, 1449 (1986).

3. "X-ray Measurements During Whistler Mode Electron Cyclotron Resonance Plasma Startup and Heating in an Axisymmetric Magnetic Mirror," J. H. Booske, W. D. Getty, R. M. Gilgenbach, T. P. Goodman, E. J. Pitcher, and R. A. Jong, *IEEE Trans. Plasma Sci.* **14**, 592 (1986).

4. "Frequency Compensation of a Diamagnetic Loop Using a Digital Data Acquisition System," J. H. Booske, M. J. McCarrick, S. R. Douglass, J. A. Paquette, R. F. Ellis, and W. D. Getty, *J. Phys.* **E 20**, 627 (1987).

5. "Observations of the Dependence of Unstable Drift Cyclotron Loss Cone Mode Characteristics on Plasma Density," M. J. McCarrick, J. H. Booske, and R. F. Ellis, *Phys. Fluids* **30**, 614 (1987).

6. "Optimizing Hot Ion Production from a Gas-Injected Washer Gun," M. J. McCarrick, R. F. Ellis, J. H. Booske, and M. Koepke, *J. Appl. Phys.* **61**, 1747 (1987).

7. "A Broadband Calibration for Magnetic Probes for Use in the Maryland Spheromak," R. S. Shaw, J. H. Booske, and M. J. McCarrick, *Rev. Sci. Instrum.* **58**, 1204 (1987).

8. "Detailed Measurements of Anisotropic Mirror Plasma Ion Energy Distributions During Drift Cyclotron Loss Cone Instability," J. H. Booske, M. J. McCarrick, R. F. Ellis, and J. A. Paquette, *Phys. Fluids* **31**, 410 (1988).

9. "Modeling of an Electron Cyclotron Resonance Heated Mirror Plasma for Highly Charged Ion and Soft X-ray Sources," J.H. Booske, F. Aldabe, R. F. Ellis, and W. D. Getty, *J. Appl. Phys.* **64**, 1055 (1988).

10. "Propagation of Wiggler Focused Relativistic Sheet Electron Beams," J. H. Booske, W. W. Destler, Z. Segalov, D. J. Radack, E. T. Rosenbury, J. Rodgers, T. M. Antonsen, Jr., V. L. Granatstein, and I. D. Mayergoyz , *J. Appl. Phys.* **64**, 6 (1988).

11. "Near-Millimeter Free Electron Lasers With Small Period Wigglers and Sheet Electron Beams," V. L. Granatstein, T. M. Antonsen, Jr., J. H. Booske, W. W. Destler, P. E. Latham, B. Levush, I. D. Mayergoyz, D. J. Radack, Z. Segalov, and A. Serbeto, *Nucl. Instr. and Meth*. **A272**, 110 (1988).

12. "Nonlinear Analyses for Short Period Wiggler Free Electron Laser Oscillators," J. H. Booske, A. Serbeto, T. M. Antonsen, Jr., and B. Levush , *J. Appl. Phys.* **65**, 1453 (1989).

13. "Free Electron Laser with Small Period Wiggler and Sheet Electron Beam: A Study of the Feasibility of Operation at 300 GHz with 1 MW CW Output Power," J.H. Booske, V.L. Granatstein, T.M. Antonsen, Jr., W.W. Destler, J. Finn, P.E. Latham, B. Levush, I.D. Mayergoyz, D. Radack, J. Rodgers, M.E. Read, and A. Linz, *Nucl. Instr. and Meth.* **A285**, 92-96 (1989).

14. "Wiggler Focused Relativistic Sheet Beam Propagation in a Planar Free Electron Laser Configuration," D.J. Radack, J.H. Booske, Y. Carmel, and W.W. Destler, *Appl. Phys. Lett.* **55**, 2069 (1989).

15. "Design of High Average Power, Near-Millimeter Free Electron Laser Oscillators Using Short-Period Wigglers and Sheet Electron Beams," J.H. Booske, D.J. Radack, T.M. Antonsen, Jr., S. Bidwell, Y. Carmel, W.W. Destler, H.P. Freund, V.L. Granatstein, P.E. Latham, B.Levush, I.D. Mayergoyz, and A. Serbeto, *IEEE Trans. Plasma Sci.: Third Special Issue on High Power Microwave Generation,* **18**, 399 (1990).

16. "High Average Power CW FELs for Application to Plasma Heating: Designs and Experiments," J.H. Booske, V.L. Granatstein, D.J. Radack, T.M. Antonsen, Jr., S. Bidwell, Y. Carmel, W.W. Destler, P.E. Latham, B. Levush, I.D. Mayergoyz, and Z.X. Zhang, *Nucl. Instr. Meth. Phys Res.* **A296**, 791-796 (1990).

17. "Final Design and Cold Tests for a Harmonic Ubitron Amplifier Experiment," H. Bluem, R.H. Jackson, D.E. Pershing, J.H. Booske, and V.L. Granatstein, *Nucl. Instr. Meth. Phys. Res.* **A296**, 37-40 (1990).

18. "Universal Efficiency and Gain Computations for High-Gain Free Electron Laser Amplifiers," J.H. Booske, S.W. Bidwell, B. Levush, T.M. Antonsen, Jr., and V.L. Granatstein, *J. Appl. Phys.* **69**, 7503-7509 (1991).

19. "A High-Average-Power Tapered FEL Amplifier at Submillimeter Frequencies Using Sheet Electron Beams and Short-Period Wigglers," S.W. Bidwell, D.J. Radack, T.M. Antonsen,Jr., J.H. Booske, Y.Carmel, W.W. Destler, V.L. Granatstein, B. Levush, P.E. Latham, I.D. Mayergoyz, and Z.X. Zhang, *Nucl. Instr. Meth. Phys. Res.* **A304**, 187-191 (1991).

20. "Design of Ergodic Electromagnetic Cavities," J.H. Booske and B. Meng, *Microwave and Optical Technol. Lett.* **4**, 446-451 (1991).

21. "Linear Analysis of Sheet Beam Planar Grating and Dielectric Cerenkov Maser Amplifiers," J.Joe, S.F. Chang, J.E. Scharer, and J.H. Booske, *Microwave and Optical Technol. Lett.* **4**, 443-446 (1991).

22. "Mechanisms for Nonthermal Effects on Ionic Mobility During Microwave Processing of Crystalline Solids," J.H. Booske, R.F. Cooper, and I. Dobson, *J. Mater. Res.* **7**, 495-501 (1992).

23. "Wave Dispersion, Growth Rates and Mode Converter Analysis for a Sheet Beam Hybrid-Mode Cerenkov Amplifier," S.F. Chang, J.E. Scharer, and J.H. Booske, *IEEE Trans. Plasma Science*, **20** (3), 293-304 (1992).

24. "Transverse Mode Interference in Systems with Discrete Energy Levels: Application to Waveguide Filters," P.E. Latham, J.M. Finn, and J.H. Booske, *Int. J. Electronics* **72**, 273-304 (1992).

25. "Stability and Confinement of Nonrelativistic Sheet Electron Beams with Periodic Cusped Magnetic Focusing," J.H. Booske, B.D. McVey, and T.M. Antonsen, Jr., *J. Appl. Phys.* **73**, 4140-4155 (1993).

26. "Periodic Focusing and Ponderomotive Stabilization of Sheet Electron Beams," J.H. Booske, A.H. Kumbasar, and M.A. Basten, *Phys. Rev. Lett.* **71** (24), 3979-3982 (1993).

27. "Design of an Inductive Plethysmograph for Ventilation Measurement," K.P. Cohen, D. Panescu, J.H. Booske, J.G. Webster, and W.J. Tompkins, *Physiological Measurement* **15**, 217-229 (1994).

28. "Analysis of Rectangular Waveguide-Gratings for Amplifier Applications," B.D. McVey, M.A. Basten, J.H. Booske, J. Joe, and J.E. Scharer, *IEEE Trans Microwave Theory and Techniques* **42** [6], 995-1003 (1994).

29. "Wave Dispersion and Growth Analysis of Low-Voltage Grating Cerenkov Amplifiers," J. Joe, J. Scharer, J. Booske, and B. McVey, *Phys. Plasmas* **1**(1), 176-188 (1994).

30. "Magnetic Quadrupole Formation of Elliptical Sheet Electron Beams for High-Power Microwave Devices", M.A. Basten, J.H. Booske, and J. Anderson, *IEEE Trans. Plasma Sci.*, *5th Special Issue on High Power Microwave Generation* **22** [5], 960-966 (1994).

31. "Periodic Magnetic Focusing of Sheet Electron Beams," J.H. Booske, M.A. Basten, A.H. Kumbasar, T.M. Antonsen, S.W. Bidwell, Y. Carmel, W.W. Destler, V.L. Granatstein and D.J. Radack, **invited paper** *Phys. of Plasmas* **1**[5], 1714-1720 (1994).

32. " Low Energy Separation by Implantation of Oxygen Structures via Plasma Source Ion Implantation," L. Zhang, J.L. Shohet, D. Dallmann, R. Speth, J.H. Booske, K. Shenai, M.J. Goeckner, P. Rissman, J.B. Kruger, J.E. Turner, E. Perez-Albuerne, S. Lee, and N. Meyyappan, *Appl. Phys. Lett.* **65**[8] , 1-3 (1994).

33. "Plasma-Immersed Oxygen Ion Implantation of Iron-Doped Glass for Nonmetallic Magnetic Hard Disks," L. Zhang, J.H. Booske, R.F. Cooper, J.L. Shohet, J.R. Jacobs, F.S.B. Anderson, M.J. Goeckner, E.B. Wickesberg, and G. Was, *J. Vac. Sci. Technol.* **B12**[6], 3342-3346 (1994).

34. "A System to Measure Complex Permittivity of Low Loss Ceramics at Microwave Frequencies and Over Large Temperature Ranges," B. Meng, J.H. Booske, and R.F. Cooper, *Rev. Sci. Instrum.* **66** [2], 1068-1071 (1995).

35. "Extended Cavity Perturbation Technique to Determine the Complex Permittivity of Dielectric Materials," B. Meng, J.H. Booske, and R.F. Cooper, *IEEE Trans. Micr. Thy. and Techniques* **43**, 2633-2636 (1995).

36. "Anti-Corrosive Surface Modification of 6061T Aluminum Using Plasma Source Ion Implantation," L. Zhang, J.H. Booske, and J.L. Shohet, *Materials Letters* **22**, 29-33 (1995).

37. "X-ray Imaging During Plasma-Source Ion Implantation," M. Piper, J.L. Shohet, J.H. Booske, K.H. Chew, L. Zhang, P. Sandstrom, and J. Jacobs, *Plasma Chemistry and Plasma Processing* **16**[1], (1995).

38. "Microwave Field Enhancement of Charge Transport in Sodium Chloride," S.A. Freeman, J.H. Booske, and R.F. Cooper, *Phys. Rev. Lett.* **74** [11], 2042-2045 (1995).

39. "Ion Beam Modification of Metal-Polymer Interfaces for Improved Adhesion," B.A. Ratchev, G.S. Was, and J.H. Booske, *Nucl. Instrum. and Meth.* **B 106** [1-4], 68-73 (1995).

40. "A Novel Method for Measuring Intense Microwave Radiation Effects on Ionic Transport in Ceramic Materials," S.A. Freeman, J.H. Booske, and R.F. Cooper, *Rev. Sci. Instrum.* **66** [6], 3606-3609 (1995).

41. "Microwave Absorption in Insulating Dielectric Ionic Crystals Including the Role of Point Defects," B. Meng, B. Klein, J. Booske, and R. Cooper, *Phys. Rev.**B*** **53** [19], 12,777-12,785 (1996).

42. "Dynamics of Microwave-Induced Ionic Currents in Ceramic Materials," V.E. Semenov, K.I. Rybakov, S.A. Freeman, J.H. Booske, and R.F. Cooper, *Phys. Rev. B*, **55** [6], 3559 - 3567 (1997).

43. "Nitrogen Plasma Source Ion Implantation for Corrosion Protection of Aluminum 6061-T4," J.H. Booske, L. Zhang, K. Mente, C. Baum, and J.L. Shohet, *J. Mater. Res.*, **12** [5], 1356-1366 (1997).

44. "Experimental and Theoretical Investigations of a Rectangular Grating Structure for Low-Voltage Traveling Wave Tube Amplifiers," J. Joe, J.E. Scharer, J.H. Booske, L.J. Louis, and M.A. Basten, *Phys. Plasmas* **4** [7], 2707-2715 (1997).

45. "Microwave Enhanced Reaction Kinetics in Ceramics," J.H. Booske, R.F. Cooper, and S.A. Freeman, *Materials Research Innovations* **1** [2], 77-84 (1997).

46. "A Cost Model of Commercial Plasma Source Ion Implantation for Corrosion Protection of Multiple Objects via Batch Processing," T.S. Ebert, R. Stewart, F. Sainfort, and J.H. Booske, *Surface and Coatings Technology* **102** [1-2], 8-18 (1998).

47. "Recoil Implantation of Boron into Silicon for Ultra-shallow Junction Formation: Modeling, Fabrication, and Characterization," H.L. Liu, S.S. Gearhart, J.H. Booske, and W. Wang, J. Vac. Sci. Technol. **B16** [1], 415-419 (1997).

48. "Magnetic Field Enhanced Argon Plasma for Ionized Magnetron Sputtering of Copper," W. Wang, J. Foster, A.E. Wendt, J.H. Booske, T. Onuoha, P.W. Sandstrom, H. Liu, S.S. Gearhart, and N. Hershkowitz, *Appl. Phys. Lett.* **71** [12], 1622-1624 (1997).

49. "Ultra-shallow p^+/n junctions formed by recoil implantation," H.L. Liu, S.S. Gearhart, J.H. Booske, and W. Wang, *J. Electronic Materials* **27**[9], 1027 – 1029 (1998).

50. "TiN Prepared by Plasma Source Ion Implantation of Nitrogen into Ti as a Diffusion Barrier for Si/Cu Metallization," W. Wang, J.H. Booske, H. Liu, and S.S. Gearhart, J.L. Shohet, S. Bedell and W. Lanford, *J. Mater. Res.* **13** [3], 726-730 (1998).

51. "Modeling and Numerical Simulations of Microwave-Induced Ionic Transport," S.A. Freeman, J.H. Booske, and R.F. Cooper, *J. Appl. Phys.*, **83** [11], 5761-5772 (1998).

52. "Collective single pass gain in a tunable rectangular grating amplifier," L.J. Louis, J.E. Scharer, and J.H. Booske, *Phys. Plasmas* **5** [7], 2797-2805 (1998).

53. "Modification of Bearing Steel Surface by Nitrogen Plasma Source Ion Implantation for Corrosion Protection," W. Wang, J.H. Booske, C. Baum, C. Clothier, N. Zjaba, and L. Zhang, *Surface Coatings and Technology* **111** (1), 97-102 (1999).

54. "Antenna Sputtering in an Internal Inductively Coupled Plasma for Ionized Physical Vapor Deposition" J. Foster, W. Wang, A.E. Wendt, and J. Booske, *J. Vac. Sci. and Tech.* **B16**(2), 532-535 (1998).

55. "Microwave Ponderomotive Forces in Solid State Ionic Plasmas," J.H. Booske, R.F. Cooper, S.A. Freeman, K. Rybakov, and V. Semenov, **invited paper**, *Phys Plasmas* **5** [5], 1664-1670 (1998).

56. "Determination of Metal Vapor Ion Concentration in an Argon/Copper Plasma for Ionized Physical Vapor Deposition," J.E. Foster, A.E. Wendt, W.W. Wang, J.H. Booske, *J. Vac. Sci. Technol.* **A16**(4), 2198-2203 (1998).

57. "Gridless ionized metal flux fraction measurement tool for use in ionized physical vapor deposition studies," T. G. Snodgrass, J. H. Booske, W. Wang, A. E. Wendt, J. L. Shohet, *Rev. Sci. Instrum.* **70** (2), 1525-1529 (1999).

58. "Demonstration via Simulation of Stable Confinement of Sheet Electron Beams using Periodic Magnetic Focusing," J.H. Booske and M.A. Basten, IEEE Trans. Plasma Sci., **27** (1), 134-135 (1999).

59. "Study of an internal rf argon plasma and Cu ionization ion ionized sputtering of Cu by using Langmuir probe, optical emission spectroscopy and biased microbalance," W. Wang, J. Foster, T. Snodgrass, A.E. Wendt, and J.H. Booske, *J. Appl. Phys.* **85**(11), 7556-7561 (1999).

60. "Two-plane focusing of high-space-charge sheet electron beams using periodically-cusped magnetic fields", M.A. Basten and J.H. Booske, J. Appl. Phys. **85** (9), 6313-6322 (1999).

61. "Measurement of Electron Energy Distribution Function in an Argon/Copper Plasma for Ionized Physical Vapor Deposition," Z.C. Lu, J.E. Foster, T.G. Snodgrass, J.H. Booske, and A.E. Wendt, J. Vac. Sci. Technol. A **17** (3), 840-844 (1999).

62. "Visualization of Plasma Source Ion Implantation for Arrays of Multiple Targets," E.R. Keiter, J.H. Booske, and W.N.G. Hitchon, IEEE Trans. Plasma Sci. **27**(1), 86-87 (1999).

63. "Recoil implantation method for ultra-shallow p^+/n junction formation," H.L. Liu, S.S. Gearhart, J.H. Booske, and R.F. Cooper, J. Appl. Phys. **87** (4), 1957-1962 (2000).

64. "An investigation of the effects of iron in p^+n silicon diodes for simulated plasma source ion implantation studies," K.M. Brown, J.L. Shohet, J.H. Booske, S.S. Gearhart, H.L. Liu, T.G. Snodgrass, and R.R. Speth, IEEE Trans Semiconductor Manuf., **12**, (4), 452-456 (1999).

65. "Reduction of Effects of Rarefaction in Ionised Physical Vapour Deposition Discharges," Y.Andrew, J.H. Booske, S. Lu, T.G. Snodgrass, and A.E. Wendt, Plasma Sources Sci. and Technol. **9**, 562-567 (2000).

66. "Absolute densities of long-lived species in an ionized physical vapor deposition copper-argon plasma," Y. Andrew, I. Abraham, J.H. Booske, Z.C. Lu, A.E. Wendt, J. Appl. Phys. **88** (6), 3208-3219, 2000.

67. "Direct Si-Si Bonding by Electromagnetic Induction Heating," Keith Thompson, Yogesh B. Gianchandani, John Booske, Reid Cooper, J. MicroElectroMechanical Systems Vol. 11, No. 4, 285-292 (2002).

68. "Electromagnetic Annealing for the 100 nm Technology Node," K. Thompson, J.H. Booske, Y.B. Gianchandani, and R.F. Cooper, IEEE Elec. Dev. Lett., **23** [3], 127 – 129 (2002).

69. "The Multifrequency Spectral Eulerian (MUSE) Model of a Traveling Wave Tube," J.G. Wöhlbier, J.H. Booske, I. Dobson, IEEE Trans. Plasma Science, **30** [3],1063-1075 (2002).

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c. Invited Talks at Conferences

(Presenting author underlined)

1. "Near-Millimeter Free Electron Lasers with Small Period Wigglers and Sheet Electron Beams," V. L. Granatstein, T. M. Antonsen, Jr., D. Bengtson, H. Bluem, J. H. Booske, W. W. Destler, J. M. Finn, P. E. Latham, B. Levush, I. D. Mayergoyz, E. Ott, D. J. Radack, E. T. Rosenbury, Z. Segalov, and A. Serbeto, Ninth International Free Electron Laser Conference, (Williamsburg, VA, 1987).

2. "Free Electron Laser with Small Period Wiggler and Sheet Electron Beam; A Study of the Feasibility of Operation at 300 GHz with 1 MW CW Output Power," V.L. Granatstein, T.M. Antonsen, Jr., J.H. Booske, W.W. Destler, J. Finn, P.E. Latham, B. Levush, I.D. Mayergoyz, D. Radack, and J. Rodgers, Tenth International Free Electron Laser Conference, (Haifa, Isreal, 1988).

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5. "A Program of High Power Microwave Source Research and Development from 8 GHz to 600 GHz," V.L. Granatstein, T. Antonsen, Jr., S. Bidwell, J. Booske, Y. Carmel, W. W. Destler, R.A. Kehs, P. E. Latham, B. Levush, W.R. Lou, I.D. Mayergoyz, K. Minami, and D.J. Radack, presented at BEAMS '90 International Conference, Novosibirsk, USSR, July 2-5, 1990.

6. "Effects of High Power Microwave Fields on Ionic Transport in Ceramics and Ionic Crystalline Solids," J.H. Booske, R.F. Cooper, S. Freeman, B. Meng, J. Kieffer, and B.J. Reardon, Workshop on Microwave-Absorbing Materials for Accelerators (Newport News, VA, February 22-24, 1993).

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11. **Invited Plenary Lecture**: "Experimental and numerical studies of microwave heating of ceramics", J.H. Booske, Third International Workshop, Strong Microwaves in Plasmas, Russia, August 7-14, 1996; Organized by Institute of Applied Physics, Nizhny Novgorod (supported by Russian Academy of Sciences).

12. "Quantitative Predictive Models for the Magnitude and Frequency and Temperature Dependencies of Microwave Absorption Mechanisms in Insulating Ceramics", J.H. Booske, R.F. Cooper, B.D.B. Klein, and B. Meng, First World Congress on Microwave Processing, Orlando, FL (5-9 Jan. 1997).

13. "Microwave-Enhanced Reaction Kinetics in Ceramics," John H. Booske, Reid F. Cooper, Sam A. Freeman, Kirill Rybakov and Vladimir Semenov, First World Congress on Microwave Processing, Orlando, FL (5-9 Jan. 1997).

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16. "Advanced Interaction Studies of Travelling Wave Amplifiers," L.J. Louis, J.E. Scharer, J.E. Scharer, J.H. Booske, and C. Armstrong, Mini-Conference on Coherent Radiation Generation, 39th Annual Mtg. Amer. Phys. Soc.--Div. Plasma Physics, Pittsburgh, PA, Nov. 17-21 (1997).

17. "Dielectric Characterization of Human Breast Tissue and Breast Cancer Detection Algorithms for Confocal Microwave Imaging," S.C. Hagness, X. Li, K. Leininger, J. Booske, and M. Okoniewski, 2nd World Congress on Microwave and Radio Frequency Processing (Orlando, FL April 2000).

18. "Innovative Vacuum Electronics at the University of Wisconsin," J.H. Booske, **Invited Tutorial Seminar**, Innovative Vacuum Electronics IEEE Mini-Course, (in conjunction with IEEE Pulsed Power and Plasma Science Conference) June 22-23, Rio Hotel and Convention Center, Las Vegas, NV (2001).

19. "THz-Regime Micromachined TWTs", J.H. Booske, **Invited Tutorial Seminar**, Innovative Vacuum Electronics IEEE Mini-Course, (in conjunction with IEEE Pulsed Power and Plasma Science Conference) June 22-23, Rio Hotel and Convention Center, Las Vegas, NV (2001).

20. "How the coupling of microwave and RF energy in materials can affect solid state charge and mass transport and result in unique processing effects," J.H. Booske and R.F. Cooper, 8th International Conference on Microwave and High Frequency Heating, Bayreuth, GE, Sept 3-7, 2001.

21. "New Opportunities in Vacuum Electronics Using Microfabrication Technologies", J.H. Booske, Third IEEE International Vacuum Electronics Conference, April 23-25, 2002, Monterey CA, USA. **Plenary Talk**

22. "Investigations of Folded Waveguide TWT Oscillators for THz Radiation," S. Bhattacharjee, J.H. Booske, C.L. Kory, D.W. van der Weide, S. Limbach, S. Gallagher, A. Stevens, M. Genack, J. Welter, M. Lopez, R.M. Gilgenbach, J. Wöhlbier, R.L. Ives, M.E. Read, R. Divan, D.C. Mancini, 4th IEEE Intl. Vacuum Electronics Conference, Seoul, Korea, May 28-30, 2003.

23. "Microfabricated Vacuum Devices," J.H. Booske, **Invited Tutorial Seminar**, IEEE Mini-Course (held in conjunction with IEEE International Vacuum Electronics Conference), Seoul, National University, Seoul, Korea (2003).

24. "Sensing Volume of Open-Ended Coaxial Probes for Dielectric Characterization of Breast Tissue at Microwave Frequencies," D. Popovic, D. Hagl, C. Beasley, M. Okoniewski, S.C. Hagness, and J.H. Booske, IEEE Antennas and Propagation Society International Symposium, Columbus, OH, June (2003).

25. "Secure Chaos Communitcaions Using Driven Traveling Wave Tube Amplifiers with Delayed Feedback," P.B. Larsen, L.M. Earley, B.E. Carlsten, R.M. Wheat, J.H. Booske, **Keynote Talk**, IEEE International Vacuum Electronics Conference, Monterey, CA, April 25-27 (2006).

26. "Overview of Micro-VEDs," J.H. Booske, Special Technology Area Review (STAR) workshop on Compact THz Sources, hosted by the DoD Advisory Group on Electron Devices (a permanent Task Force of the Defense Science Board), attendance and presentation by invitation only, Arlington, VA, 28 February – 2 March, 2007.

27. "Two-pole Debye Model for Normal Breast Tissue in the Microwave Frequency Range," Mariya Lazebnik, Susan C. Hagness, John H. Booske, and Michal Okoniewski, 23rd Annual Review of Progress in Applied Computational Electromagnetics, Verona, Italy, March 2007.

28. "High Frequency Source Development at Calabazas Creek Research," R. Lawrence Ives, Carol Kory, Michael Read, John Booske, Jeff Neilson, George Collins, Philipp Borchard, **Keynote Talk**, Infrared and Millimeter Waves Conference, Cardiff, UK, Sept 2-7 (2007).

29. "Innovations and fundamental insights of advanced field emission cathodes for high power microwave (HPM) sources**,"** J.H. Booske, X. He, R.L. Miller, D. Morgan, J.E. Scharer, V. Vlahos, R.M. Gilgenbach, N.M. Jordan, Y.Y. Lau, Y. Feng, J. Verboncoeur, **Invited Talk**, IEEE Pulse Power and Plasma Science Conference, June 17-22, Albuquerque, NM (2007).

30. "Innovations and fundamental insights of advanced field emission cathodes for high power microwave sources," J.H. Booske, **invited tutorial lecture**, International Vacuum Nanoelectronics Conference, Chicago, IL, July 8-12 (2007).

31. "Plasma Physics Challenges of MMWave-to-THz and High Power Microwave Generation," J.H. Booske, **Invited Plenary Review Talk**, 49th Annual Meeting, American Physical Society's Division of Plasma Physics, November 12-16, 2007.

32. "Dielectric-Properties Contrast Enhancement for Microwave Breast Cancer Detection: Numerical Investigations of Microbubble Contrast Agents," M. Lazebnik, S.C. Hagness, and J.H. Booske, XXIX General Assembly of the International Union of Radio Science (URSI), Chicago, IL, August 2008.

33. "Characterization of the Dielectric Heating Response of Carbon Nanotubes for Enhancing Microwave Detection and Treatment of Breast Cancer," Alireza Mashal, Earl Zastrow, Pramod Avti, Balaji Sitharaman, John H. Booske, and Susan C. Hagness, 2010 IEEE International Symposium on Antennas and Propagation & CNC-USNC/URSI Radio Science Meeting, July 11-17, Toronto, Ontario, CA (2010).

34. "Vacuum Electronic Sources of High Power Terahertz-Regime Radiation," John H. Booske, **Plenary Talk**, IEEE International Conference on Vacuum Electronics, Bangalore, IN, February 21-25, 2011.

35. "In Vivo Microwave Dielectric Spectroscopy of Breast Tumor Xenografts with Intra-Tumoral Injections of SWCNT Dispersions," F. Gao, S.C. Hagness, J.H. Booske, S. Xie, and B. Sitharamanan, *IEEE International Instrumentation and Measurement Conference* (Minneapolis, MN, May 2013).

36. "Low-Cost Phased-Array Antenna Technology Enabled by Macro-Electro-Mechanical Systems (MÆMS)," M. Gao, S.M.A.M.H. Abadi, J.H. Booske and N. Behdad,, J. H. Booske, and N. Behdad, IEEE AP-S Symposium on Antennas and Propagation and URSI CNC/USNC Joint Meeting, Special Session on Millimeter-Wave Antenna Arrays for 5G Wireless Handheld Devices (Vancouver, British Columbia, Canada, July 19-25, 2015).

37. "The physics of conductivity at terahertz frequencies," M.P. Kirley and J.H. Booske, IEEE International Conference on Vacuum Electronics, (Beijing, China, April 27-29, 2015). **Keynote Talk**

38. "Beam steering in reflectarrays using the Macro-Electro-Mechanical Systems (MAEMS) Concept," S.M.A.M.H. Abadi, J.H. Booske, and N. Behdad, IEEE International Workshop on Antenna Technology (Hilton Cocoa Beach, FL, Feb 29-Mar 2, 2016).

39. "MÆMS-based affordable phased-array antennas," S.M.A. Momeni Hasan Abadi , J.H. Booske, and N. Behdad, 2016 International Workshop on Antenna Technology (iWAT 2016), Feb 29 – Mar. 2, 2016, Cocoa Beach, FL.

40. T. Rowe, P. Forbes, J.H. Booske, and N. Behdad, "Metamaterial Selection for the Periodic Elements of a Metamaterial Enhanced Resistive Wall Amplifier, *44th Int'l Conf on Plasma Sci*, (Atlantic City, NJ, May 21-25, 2017).

41. H.T. Luyen, Z. Yang, J.H. Booske, and N. Behdad, "Wideband, single-layer reflectarray antennas using polarization rotating unit cell," *2018 Int'l Workshop on Antenna Technol*., (Nanjing, China, March 4-7, 2018).

42. J.P. Verboncoeur, N. Behdad, J.H. Booske, J.C. Dickens, R.M. Gilgenbach, M. Gilmore, N.M. Jordan, R.P. Joshi, Y.Y. Lau, J. Mankowski, D. Morgan, A.A. Neuber, S. Portillo, E. Schamiloglu, P. Zhang, "Multipactor and breakdown susceptibility and mitigation in space-based RF systems," *IEEE International Conference on Plasma Science* (Denver, CO, June 24-28, 2018).

43. J.H. Booske, "A career in electron beams, plasmas and EM fields & waves: Everything I needed to succeed I learned in kindergarten," IEEE Plasma Science and Applications Award Address, *IEEE Int'l Conf Plasma Science* (Denver, CO, June 24-28, 2018). **Plenary Talk**.

d. Refereed and/or Selectively-accepted published Conference Papers

1. "Whistler Mode Startup in the Michigan Mirror Machine," J. Booske, W. D. Getty, R. M. Gilgenbach, T. Goodman, D. Whaley, R. Olivieri, E. Pitcher, L. Simonetti, and R. A. Jong, in *Radiofrequency Plasma Heating*, ed. D. G. Swanson, (American Institute of Physics, New York, 1985), p. 204.

2. "Models of Nonthermal Effects on Ionic Mobility During Microwave Processing of Crystalline Solids," J.H. Booske, R.F. Cooper, I. Dobson, and L. McCaughan, in Microwaves: Theory and Application in Materials Processing*; Ceramics Transactions*, Vol. 21, Eds. D.E. Clark, F.D. Gac, and W.H. Sutton, pp. 185-192 (American Ceramic Society, Westerville, OH, 1991).

3. "Studies of Nonthermal Effects During Intense Microwave Heating of Crystalline Solids," J.H. Booske, R.F. Cooper, I. Dobson, and L. McCaughan, *Microwave Processing of Materials III* , MRS Symposium Series, Vol. **269**, 137-144 (1992).

4. "Studies of Microwave Field Effects on Ion Transport in Ionic Crystalline Solids," S. Freeman, J.H. Booske, R.F. Cooper, B. Meng, J. Kieffer, and B.J. Reardon, *Ceramic Trans.* **36**, 213-220 (1993).

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6. "Microwave Radiation Effects on Ionic Current in Ionic Crystalline Solids," S.Freeman, J. Booske, R. Cooper, and B. Meng, *Mat. Res. Soc. Symp. Proc.* **347**, 479-485 (1994).

7. "Microwave Absorption in NaCl Crystals with Various Controlled Defect Conditions," B. Meng, J. Booske, R. Cooper, and S. Freeman, *Mat. Res. Soc. Symp. Proc.* **347**, 467-472 (1994).

8. "Processing Parameters Influencing the Sintering of Alumina in a Conventional and 14 GHz Microwave Furnace," D.J. Grellinger, J.H. Booske, S.A. Freeman, and R.F. Cooper, *Ceram. Trans.* **59**, 465-472 (1995).

9. "Ionic Transport in Sodium Chloride and Silver Chloride During Microwave Irradiation," S.A. Freeman, J.H. Booske, and R.F. Cooper,*Ceram. Trans.* **59**, 185-192 (1995).

10. "Measurements of the Complex Permittivity of Low Loss Ceramics at Microwave Frequencies and Over Large Temperature Ranges," B. Meng, J. Booske, R. Cooper, and B. Klein, *Ceram. Trans.* **59**, 251-258 (1995).

11. "Microwave Absorption in NaCl Crystals with Various Concentrations of Divalent Impurity Ions," B. Meng, J. Booske, R. Cooper, and B. Klein, *Ceram. Trans.* **59**, 177-184 (1995).

12. "Formation and transport of sheet electron beams and multi-beam configurations for high-power microwave devices," M.A. Basten, J.H. Booske, J. Anderson, and J.E. Scharer, in *Intense Microwave Pulses III, SPIE Proceedings* Vol. **2557** (1995).

13. "Microwave radiation absorption in dielectric ionic crystals due to point and extended defects," B.D. Klein, J.H. Booske, R.F. Cooper, and S.A. Freeman, Materials Research Society Symposium Proceedings **430**, 397-402 (1996).

14. "Statistical Comparative Analyses of Engineering Properties of Microwave and Conventionally Sintered Alumina," K.R. Binger, S.A. Freeman, D.J. Grellinger, R.F. Cooper, and J.H. Booske, Materials Research Society Symposium Proceedings **430**, 453-458 (1996).

15. "Study of microwave-driven currents in ionic crystals," V.E. Semenov, K.I. Rybakov, S.A. Freeman, J.H. Booske, and R.F. Cooper, Materials Research Society Symposium Proceedings **430**, 459-464 (1996).

16. "High-frequency field effects on solid-state diffusion," S.A. Freeman, J.H. Booske, R.F. Cooper, Materials Research Society Symposium Proceedings **430**, 417-422 (1996).

17. "Thermal and nonthermal interactions between microwave fields and ceramics," John H. Booske, Reid F. Cooper, Sam A. Freeman, Binshen Meng, Kirill Rybakov, and Vladimir Semenov, **invited paper**, Proceedings of Selected Papers from the First World Congress on Microwave Processing, 5-9 January, 1997, Orlando, FL, in *Ceram. Trans.* **80**, 143-152 (American Ceramic Society, Westerville, OH, 1997).

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20. "Si-Si Bonding Using RF and Microwave Radiation, " Keith Thompson, Yogesh B. Gianchandani, John Booske, Reid Cooper, Proceedings of the 11th International Conference on Solid-State Sensors and Actuators, 10 June 2001, Munich, Germany.

21. "Temperature measurement in microwave-heated silicon wafers," K. Thompson, J.H. Booske, R.F. Cooper, Y. B. Gianchandani, and S. Ge, Proceedings of Selected papers from the Second World Congress on Microwave and Radio Frequency Processing, April 2000, Orlando FL, in *Ceram. Trans.* **111**, 391-398 (American Ceramic Society, Westerville, OH, 2001).

22. "Microwave-assisted heterogeneous photcatalytic oxidation," S. Kataoka, D.T. Tompkins, M.A. Anderson, M.E. Zorn, W.A. Zeltner, and J.H. Booske, Proceedings of Selected papers from the Second World Congress on Microwave and Radio Frequency Processing, April 2000, Orlando FL, in *Ceram. Trans.* **111**, 225-229 (American Ceramic Society, Westerville, OH, 2001).

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24. "RF and Microwave Rapid Magnetic Induction Heating of Silicon Wafers," K. Thompson, J. H. Booske, Y. B. Gianchandani, R. F. Cooper. *Advances in Microwave and Radio Frequency Processing*, M. Willert-Porada, ed. [Proceedings of the 8th International conference on microwave and high frequency heating. Bayreuth, Germany, Sept 3-7, 2001]. **Invited paper.**, (Springer-Verlag, Berlin, 2006), pp.673-680.

25. "How the coupling of microwave and RF energy in materials can affect solid state charge and mass transport and result in unique processing effects," John H. Booske and Reid F. Cooper, *Advances in Microwave and Radio Frequency Processing*, M. Willert-Porada, ed. [Proceedings of the 8th International conference on microwave and high frequency heating. Bayreuth, Germany, Sept 3-7, 2001]. **Invited paper.**, (Springer-Verlag, Berlin, 2006), pp. 461-471.

26. "Electromagnetic Induction Heating for the 70 nm node," K. Thompson, J.H. Booske, R.F. Cooper, Y.B. Gianchandani, in Proc. of the Materials Research Society: Si Front-end Junction formation technologies, vol. 717 pp.C1.3, 2002.

27. "THz radiation using high power, microfabricated, wideband TWTs," C. L. Kory, J. H. Booske, W.-J. Lee, S. Gallagher, D. W. van der Weide, S. Limbach, and S. Bhattacharjee, Proceedings of the 2002 IEEE MTT-S International Microwave Symposium, Seattle, WA, June 2-7, 2002.

28. "Effect of Microwave Radiation on Boron Activation," K. Thompson, J.H. Booske, R.F. Cooper, Y.B. Gianchandani, D.F. Downey, E.A. Arevalo, in Proc. of the 14th Ion Implantation and Technology conference, Taos, NM, Sept. 23-27, 2002, pp. 544-547.

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30. "Millisecond microwave annealing: reaching the 32 nm node," K. Thompson, J.H. Booske, J. Lohr, Y.A. Gorelov, K. Kajiwara, in *Silicon Front-End Junction Formation-Physics and Technology*, *Materials Research Society Symposium Proceedings*, Vol. 810, 209-214 (2004).

31. "Solid phase crystallization of hot-wire CVD amorphous silicon films," D.L. Young, P. Stradins, E. Iwaniczko, B. To, B. Reedy, Y. Yan, H. M. Branz, J. Lohr, M. Alvarez, J. Booske, A. Marconnet, Q. Wang, *Amorphous and Nanocrystalline Silicon Science and Technology, Materials Research Society Symposium Proceedings* Vol. 862, 233-238 (2005).

32. "Synchronization and transition to chaos in a driven traveling wave tube oscillator with delayed feedback," C. Marchewka, P.B. Larsen, S. Bhattacharjee, J.H. Booske, S. Sengele, D. Guskov, V.N. Titov, N.M. Ryskin, Proceedings of the 2006 IEEE Antennas and Propagation Society International Symposium (IEEE Cat. No. 06CH37758C), p. 821.

33. "In Vivo Microwave Dielectric Spectroscopy of Breast Tumor Xenografts with Intra-Tumoral Injections of SWCNT Dispersions," F. Gao, S.C. Hagness, J. Booske, S. X. Xie, B. Sitharaman, Proceedings of the 2013 IEEE Int'l Instrumentation and Measurement Technology Conference, (ISBN 978-1-4673-4621-4), pp. 1441 - 1444 (May 6-9, 2013).

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35. "Functionalized Carbon Nanotube Theranostic Agents for Microwave Diagnostic Imaging and Thermal Therapy of Tumors," F. Gao, S.X. Xie, B. Sitharaman, J.H. Booske, and S.C. Hagness, *European Conference on Antennas and Propagation* (EuCAP), 2013 (The Hague, Netherlands, April 2014). **Invited paper.**

e. Unreviewed Conference Publications

1. "Free Electron Lasers for Space-Based Radar," V. L. Granatstein, T. M. Antonsen, Jr., J. Booske, W. W. Destler, P. E. Latham, B. Levush, I. D. Mayergoyz, D. Radack, and A. Serbeto, Proc. of the Workshop on High Power Microwaves, May 1987, Cambridge, MA.

2. "A Short-Period Wiggler Millimeter-Wave Free Electron Laser for Plasma Heating and Space-Borne Radar", J. H. Booske, T. M. Antonsen, Jr., D. Bengtson, H. Bluem, W. W. Destler, J. M. Finn, V. L. Granatstein, P. E. Latham, B. Levush, I. D. Mayergoyz, D. J. Radack, E. T. Rosenbury, and A. Serbeto, Conference Digest of the Twelfth International Conf. On Infrared and Millimeter Waves (Dec. 1987, Orlando, FL), Ed. R. J. Temkin (IEEE, Inc., N.Y., 1987).

3. "Low-Voltage, Megawatt Free-Electron Lasers at a Frequency Near 300 GHz," J. H. Booske, V. L. Granatstein, T. M. Antonsen, Jr., W. W. Destler B. Levush, I. D. Mayergoyz, D. Radack, J. Rodgers, E. T. Rosenbury, Z. Segalov, and A. Serbeto, Proc. SPIE Symposium on Innovative Science and Technology, Los Angeles, CA.(1988).

4. "Short Period Wiggler Free Electron Laser with a Sheet Electron Beam," J.H. Booske, D.J. Radack, T.M. Antonsen, Jr., W.W. Destler, J.M. Finn, V.L. Granatstein, P.E. Latham, I.D. Mayergoyz, J. Rodgers, E.T. Rosenbury, and Z.X. Zhang, Conference Digest, 13th International Conference on Infrared and Millimeter Waves, Dec. 5-9, Honolulu, Hawaii (1988).

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6. "Workshop Results on Small-Period Wiggler Designs," R.L. Sheffield, J.H. Booske, R.W. Warren, K. Halbach, B. Danly, R. Jackson, P. Walstrom, J. Slater, and A. Toor, Proc. 11th Int Conf. FELs (IEEE, Naples, FL, 1989).

7. "1 MW, Millimeter-Wave FEL Oscillator with Short Period Wiggler," J.H. Booske, T.M. Antonsen, Jr., S. Bidwell, Y. Carmel, W.W. Destler, V.L. Granatstein, P.E. Latham, B. Levush, I.D. Mayergoyz, D.J. Radack, Z.X. Zhang, and H.P. Freund, Conf. Digest of 14th Int. Conf. on Infrared and Millimeter Waves, (IEEE, Wurzburg, Germany, 1989).

8. "A Program of High Power Microwave Source Research and Development From 8 Ghz to 600 GHz," V.L. Granatstein, T. Antonsen, Jr., S. Bidwell, J. Booske, J. Calame, Y. Carmel, W. Destler, P. Latham, W. Lawson, B. Levush, W.R. Lou, W. Main, I. Mayergoyz, K. Minami, D. Radack, M. Reiser, C. Striffler, S. Tantawi, and D. Welsh, paper in the Proceedings of the 8th Int. Conf. High-Power Particle Beams (Beams '90), Novosibirsk, USSR, July 1990.

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18. “Experimental Studies and Sheet Beam Transport for Low-Voltage, Grating TWT Amplifiers,” J.E. Scharer, J.H. Booske, J. Joe, M.A. Basten, L. Louis, J. Anderson, and K. Wagner, , Digest of Extended Abstracts, Vacuum Electronics Annual Review Conference, Madison, WI, June (1995).

19. "Experimental and Numerical Studies of Microwave Heating of Ceramics," J.H. Booske, S.A. Freeman, and R.F. Cooper, *Strong Microwaves in Plasmas*, Ed. A.G. Litvak, Vol. 1, pp. 291-309 (Nizhny Novogorod University Press, Nizhny Novgorod, Russia, 1997).

20. "Effects of High-Power Microwave Radiation on *Sitophilus Zeamais* Motsch. (Coleoptera: Curculionidae) at Different Frequencies," R. Plarre, S.L. Halverson, W.E. Burkholder, T.S. Bigelow, M.E. Misenheimer, J.H. Booske, and E.V. Nordheim, Proceedings of ANPP-Fourth International Conference on Pests in Agriculture, Montpellier 6-8 January, 1997.

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271. "Studies of Persistent Poration Dynamics of Cell Membranes Induced by Electric Pulses," Z. Ji, S.M. Kennedy, J.H. Booske, S.C. Hagness, Bioelectromagnetics Society, Cancun, Mexico, 11-15 June (2006).

272. "Studies of Persistent Poration Dynamics of Cell Membranes Induced by Electric Pulses," Z. Ji, S.M. Kennedy, J. Booske, and S. Hagness, International Conference on Plasma Science, 4-8 June (Traverse City, MI, 2006).

273. "Characterization of Material Performance of Carbon-Based Field Emitters," V. Vlahos, R. Miller, D. Morgan, J. Booske, S. Limbach, J. Jacobs, S. Sengele, and Y.Y. Lau, International Conference on Plasma Science, 4-8 June (Traverse City, MI, 2006).

274. "Microfabrication of Terahertz Regime Folded Waveguide Traveling Wave Tubes," S. Sengele, H. Jiang, J.H. Booske, D.W. van der Weide, S. Limbach, A. Mashal, B. Yang, A. Marconnet, M. He, P. Larsen, International Conference on Plasma Science, 4-8 June (Traverse City, MI, 2006).

275. "High Current Density Advanced Cold Cathode Facility," X. He, V. Vlahos, J. Scharer, J. Booske, N. Jordan, R. Gilgenbach, International Conference on Plasma Science, 4-8 June (Traverse City, MI, 2006).

276. "Beam Generation and Transport for a THz TWT," M. Read, C. Kory, G. Miram, L. Ives, and J. Booske, IEEE International Vacuum Electronics Conference and IEEE International Vacuum Electron Sources Conference, IVEC/IVESC 2006, 25-27 April, (Monterey, CA, 2006).

277. "Work Function of Cathode Emitter Materials Obtained by Ab-Initio Quantum Mechanical Modeling," V. Vlahos, E.F. Holby, A.K. Berta, D.D. Morgan, and J.H. Booske, IEEE

International Vacuum Electronics Conference and IEEE International Vacuum Electron Sources Conference, IVEC/IVESC 2006, 25-27 April, (Monterey, CA, 2006). **Finalist selection for Best Student Paper Award.**

278. "Generation of Terahertz Regime Radiation by Microfabricated Folded Waveguide Traveling Wave Tubes," S. Sengele, H. Jiang, J.H. Booske, D.W. van der Weide, S. Limbach, A. Mashal, B. Yang, A. Marconnet, M. He, P. Larsen, IEEE International Vacuum Electronics Conference and IEEE International Vacuum Electron Sources Conference, IVEC/IVESC 2006, 25-27 April, (Monterey, CA, 2006). **Finalist selection for Best Student Paper Award.**

279. "Overview of W-band Traveling Wave Tube Programs," C. Kory, R.L. Ives, M. Read, J. Booske, H. Jiang, D. van der Weide, S.-J. Ho, S. Sengele, and P. Phillips, IEEE International Vacuum Electronics Conference and IEEE International Vacuum Electron Sources Conference, IVEC/IVESC 2006, 25-27 April, (Monterey, CA, 2006).

280. "High Current Density Advanced Cold Cathode Experiments," X. He, V. Vlahos, J. Scharer, J. Booske, S. Sengele, R. Miller, N. Jordan, R. Gilgenbach, IEEE International Vacuum Electronics Conference and IEEE International Vacuum Electron Sources Conference, IVEC/IVESC 2006, 25-27 April, (Monterey, CA, 2006).

281. "Secure Chaos Communications Using Driven Traveling Wave Tube Amplifiers with Delayed Feedback," P.B. Larsen, L.M. Earley, B.E. Carlsten, R.M. Wheat, J.H. Booske, IEEE International Vacuum Electronics Conference and IEEE International Vacuum Electron Sources Conference, IVEC/IVESC 2006, 25-27 April, (Monterey, CA, 2006). **Session Keynote Talk.**

282. "Investigation of Synchronization and Transition to Chaos in a Driven TWT Delayed Feedback Oscillator," N.M. Ryskin, D.A. Guskov, V.N. Titov, C. Marchewka, P.B. Larsen, S. Sengele, J.H. Booske, S. Bhattacharjee, IEEE International Vacuum Electronics Conference and IEEE International Vacuum Electron Sources Conference, IVEC/IVESC 2006, 25-27 April, (Monterey, CA, 2006).

283. "Low work function HPM graphite cathodes coated with alkali and alkaline-earth elements and compounds," J.H. Booske, V. Vlahos, D.D. Morgan, American Physical Society Division of Plasma Physics 48th Annual Meeting (Philadelphia, PA, Oct 30-Nov 3, 2006).

284. "Synchronization and transition to chaos in a driven traveling wave tube oscillator with delayed feedback," C. Marchewka, P.B. Larsen, S. Bhattacharjee, J.H. Booske, S. Sengele, D. Guskov, V.N. Titov, N.M. Ryskin, 2006 IEEE Antennas and Propagation Society International Symposium, 9-14 July 2006 , Albuquerque, NM.

285. "Experimental measurements of electron emission uniformity from cold cathodes," X. He, V. Vlahos, J. Scharer, J. Booske, S. Sengele, N. Jordan, R. Gilgenbach, American Physical Society Division of Plasma Physics 48th Annual Meeting (Philadelphia, PA, Oct 30-Nov 3, 2006).

286. "Large-scale studies of ultrawideband dielectric properties of normal and malignant breast tissues at microwave frequencies," M. Lazebnik, C. B. Watkins, J. H. Booske, S. C. Hagness, D. Popovic, L. McCartney, M. Okoniewski, M. J. Lindstrom, T. M. Breslin, J. Harter, S. Sewall, W. Temple, D.Mew, A. Magliocco, T. Ogilvie, The 3rd International Conference on

Electromagnetic Near-Field Characterization and Imaging (ICONIC 2007), St. Louis, MO, June 27-29, 2007.

287. "Materials Issues for Terahertz Vacuum Electron RF Sources," R.L. Ives, M. Read, C. Kory, J. Booske. C. Spindt, S. Schwartzkopf, *Symposium CC: Structures Enabling THz Technology,* Spring Meeting, Materials Research Society, San Francisco, CA (April 9-13, 2007).

288. "Material Considerations for the Development of THz Regime Waveguides," S. Sengele, B. Yang, A. Marconnet, N. Dias, H. Jiang, I. Knezevic, J. H. Booske, D. van der Weide, A. Betterman, S. Limbach, N. J. Ferrier, *Symposium CC: Structures Enabling THz Technology,* Spring Meeting, Materials Research Society, San Francisco, CA (April 9-13, 2007).

289. "Measurements and Analysis of Advanced Field Emission Cold Cathodes," X. He, J. Scharer, J. Booske, V. Vlahos, S. Sengele, N. Jordan, R. Gilgenbach, IEEE International Vacuum Electronics Conference, May 15-17, Kitakyushu, Fukuoka, Japan (2007).

290. "Selective Metallization for a W-band Meander Line TWT," Sean Sengele, Hongrui Jiang, John H. Booske, Daniel van der Weide, Alan Bettermann, Carol Kory, Lawrence Ives, IEEE International Vacuum Electronics Conference, May 15-17, Kitakyushu, Fukuoka, Japan (2007).

291. "New Insights in the Modification of the Work Function of Cathode Materials due to Thin Surface Coatings using *Ab-initio* Modelling," Vasilios Vlahos, Dane D. Morgan, and John H. Booske, IEEE International Vacuum Electronics Conference, May 15-17, Kitakyushu, Fukuoka, Japan (2007).

292. "Measurements and Analysis of Advanced Field Emission Cold Cathodes," Xin He, John Scharer, John Booske, Vasilios Vlahos, Sean Sengele, Nick Jordan, Ron Gilgenbach, IEEE Pulse Power and Plasma Science Conference, June 17-22, Albuquerque, NM (2007).

293. "Effective current enhancement vs. aspect ratio for rectangular ridge cathodes," R. Miller, Y.Y. Lau, and J. Booske, IEEE Pulse Power and Plasma Science Conference, June 17-22, Albuquerque, NM (2007).

294. "Experimental and numerical studies of molecular uptake dynamics in HL-60 cells induced by pulsed electric fields," Stephen M. Kennedy, Zhen Ji, John H. Booske, Susan C. Hagness, James C. Weaver, IEEE Pulse Power and Plasma Science Conference, June 17-22, Albuquerque, NM (2007).

295. "Microfabricated THz-regime waveguides," Sean Sengele, Benjamin Yang, Amy Marconnet, Neville Dias, Keely Willis, Hongrui Jiang, Irena Knezevic, John Booske, Susan Hagness, Daniel van der Weide, Nicola Ferrier, Alan Betterman, and Steve Limbach, IEEE Pulse Power and Plasma Science Conference, June 17-22, Albuquerque, NM (2007).

296. "Measurements and Analysis of Advanced Field Emission Cold Cathodes," X. He, J. Scharer, J. Booske, V. Vlahos, S. Sengele, N. Jordan, R. Gilgenbach, Y. Feng, and J. Verboncoeur, International Vacuum Nanoelectronics Conference, Chicago, IL, July 8-12 (2007).

297. "Effective Current Enhancement vs. Aspect Ratio for Rectangular Ridge Cathodes," R. Miller, Y.Y. Lau, and J. Booske, International Vacuum Nanoelectronics Conference, Chicago, IL, July 8-12 (2007).

298. "High Frequency Source Development at Calabazas Creek Research," R. Lawrence Ives, Carol Kory, Michael Read, John Booske, Jeff Neilson, George Collins, Philipp Borchard, Conference Digest Infrared and Millimeter Waves Conference, Cardiff, UK, Sept 2-7 (2007).

299. "The Dielectric Properties of Normal and Malignant Breast Tissue at Microwave Frequencies: Analysis, Conclusions, and Implications from the Wisconsin/Calgary Study," M. Lazebnik, C. B. Watkins, S. C. Hagness, J. H. Booske, D. Popovic, L. McCartney, M. Okoniewski, M. J. Lindstrom, T. M. Breslin, J. Harter, S. Sewall, W. Temple, D. Mew, A. Magliocco, T. Ogilvie, IEEE AP-S International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting, Honolulu, Hawai'i, June 10-15 (2007).

300. "An Experimental Feasibility Study of Microbubbles as a Contrast Agent for Microwave-Induced Thermoacoustic Imaging of Breast Cancer," Alireza Mashal, John H. Booske, and Susan C. Hagness, National Radio Science Meeting, Boulder, CO, (3-6 January, 2008).

301. "Quantification of Electric-Field-Induced Molecular Uptake Kinetics in Human Leukemia Cells and the Regulatory Influence of Electric Field Heterogeneity," Stephen M. Kennedy, Zhen Ji, Jonathan C. Hedstrom, John H. Booske, and Susan C. Hagness, XXIX General Assembly of the International Union of Radio Science (URSI), Chicago, IL, Aug 7-13 (2008).

302. "Dielectric-Properties Contrast Enhancement for Microwave Breast Cancer Detection: Numerical Investigations of Microbubble Contrast Agents," Mariya Lazebnik, Susan C. Hagness, John H. Booske, , XXIX General Assembly of the International Union of Radio Science (URSI), Chicago, IL, Aug 7-13 (2008).

303. "Real-time quantification of electroporative uptake kinetics and electric field heterogeneity effects in cells," S.M. Kennedy, Z. Ji, J. Hedstrom, J.H. Booske, S.C. Hagness, Bioelectromagnetics Society Annual Meeting, San Diego, CA, June 8-12 (2008). **Awarded the Curtis Carl Johnson Memorial Award for Student Platform Presentation (3rd place, $100).**

304. "Development and characterization of the microcuvetted: an exposure device sof real-time observation of electroporative molecular uptake," S.M. Kennedy, Z. Ji, J.H. Booske, and S.C. Hagness, Bioelectromagnetics Society Annual Meeting, San Diego, CA, June 8-12 (2008). **Awarded the Curtis Carl Johnson Memorial Award for Student Poster Presentation (2nd place, $150).**

305. "Potential Use of UNCD Membranes as Broadband Vacuum Windows at W-Band Frequencies," D. M. Springmann*, S. Ho, J. H. Booske, S. M. Drezdzon, J. J. Lipor, D. W. van der Weide, K. Montgomery, IEEE International Vacuum Electronics Conference, Monterey, CA, April 22-24 (2008).

306. "Micromachined Step-Tapered High Frequency Waveguide Inserts and Antennas," Amy M. Marconnet*, Mike He, Sean M. Sengele, Sung-Jin Ho, Hongrui Jiang, Nicola Ferrier, Daniel W. van der Weide, and John H. Booske, IEEE International Vacuum Electronics Conference, Monterey, CA, April 22-24 (2008).

307. "Field Enhancement on Knife-Edge Cathodes," R. Miller, Y.Y. Lau, J. Booske, IEEE International Vacuum Electronics Conference, Monterey, CA, April 22-24 (2008).

308. "Measurements and Analysis of Advanced Field Emission Cold Cathodes," Xin He, John Scharer, John Booske, and Sean Sengele, IEEE International Vacuum Electronics Conference, Monterey, CA, April 22-24 (2008).

309. "A Selectively Metallized, Microfabricated W-band Meander Line TWT Circuit," Sean Sengele, Hongrui Jiang, John H. Booske, Daniel van der Weide, Carol Kory, Lawrence Ives, IEEE International Vacuum Electronics Conference, Monterey, CA, April 22-24 (2008).

310. "An ab-initio Molecular Dynamics Model of the Scandate Cathode," Vasilios Vlahos, Dane Morgan, and John H. Booske, Ladislav Turek, Mark Kirshner, Richard Kowalczyk, and Craig Wilsen, IEEE International Vacuum Electronics Conference, Monterey, CA, April 22-24 (2008).

311. "Design of Overmoded Interaction Circuit for 1 kW, 95 GHz, TWT," C.L. Kory, M. Read, R.L. Ives, J. Booske, P. Borchard, IEEE International Vacuum Electronics Conference, Monterey, CA, April 22-24 (2008).

312. "Design of Electron Guns and Focusing Structures for THz Linear Beam Tubes," M.E. Read, C. Kory, J. Booske, and R. L. Ives, IEEE International Vacuum Electronics Conference, Monterey, CA, April 22-24 (2008).

313. "Material analysis and characterization of cesium iodide (CsI) coated C fibers for field emission applications", V. Vlahos, J.H. Booske, D. Morgan, IEEE International Conference on Plasma Science, Karlsruhe, GE, June 15-19 (2008).

314. "Fundamental electronic properties of materials for terahertz vacuum electron devices," Benjamin B. Yang, Keely J. Willis, Irena Knezevic, Susan C. Hagness, Franco Cerrina, Daniel W. van der Weide, John H. Booske, IEEE International Conference on Plasma Science, Karlsruhe, GE, June 15-19 (2008).

315. "Measurements and analysis of advanced field emission cold cathodes", X. He, N. Sule, J. Scharer, J. Booske, S. Sengele, IEEE International Conference on Plasma Science, Karlsruhe, GE, June 15-19 (2008).

316. "650 GHz Traveling Wave Tube Amplifier," C. Kory, M. Read, J. Booske, R.L. Ives, G. Venkataramanan, D. Marsden, 33rd IRMMW- and 16th THz Electronics Conference, Pasadena, CA, Sept. 15-19 (2008).

317. "Nanoparticle contrast agents for enhanced microwave imaging of breast cancer," X. Li, P. Messersmith, A. Sahankian, J. Gong, S. Hagness, J. Booske, I. Knezevic, M. Lazebnik, and A. Mashal, 5th Era of Hope Meeting, Department of Defense Breast Cancer Research Program, Baltimore, MD, June 25-28 (2008).

318. "Nanostructural evolution during emission from CsI coated carbon fiber cathodes," L. Drummy, D. Kiptak, R. Vaia, V. Vlahos, J. Booske, D. Morgan, and D. Shiffler, 2008 Materials Research Society Fall Meeting, paper JJ5.51, December 1-5, Boston, MA (2008).

319. "Multiplication of field enhancement factors on field-emission cathodes," R. Miller, Y.Y. Lau, J. Booske, 50th Annual Meeting of the American Physical Society's Division of Plasma Physics, paper TO3-4, Dallas, TX, Nov. 17-21 (2008).

320. "Surface and bulk characteristics of cesium iodide (CsI) coated carbon (C) fibers for high power microwave (HPM) field emission cathodes," V. Vlahos, D. Morgan, J.H. Booske, D. Shiffler, 50th Annual Meeting of the American Physical Society's Division of Plasma Physics, paper TO3-5, Dallas, TX, Nov. 17-21 (2008).

321. "Measurement and analysis of advanced cold field emitting cathodes," N. Sule, J. Scharer, J. Booske, S. Sengele, V. Vlahos, IEEE International Vacuum Electronics Conference, Rome, Italy, April 28-30, 2009.

322. "Surface chemical analysis of cesium-iodide (CsI) coated carbon (C) fibers and thin films for field emission applications," V. Vlahos, D. Morgan, J.H. Booske, D. Shiffler, IEEE International Vacuum Electronics Conference, Rome, Italy, April 28-30, 2009.

323. "Measurement and analysis of advanced field emission cold cathodes," N. Sule, J. Scharer, J.H. Booske, V. Vlahos, S. Sengele, 36th IEEE International Conference on Plasma Science, San Diego, CA, May 31-June 5, 2009.

324. "Step tuning characteristics of traveling wave tube regenerative-feedback oscillators," P. Gao, J.H. Booske, 36th IEEE International Conference on Plasma Science, San Diego, CA, May 31-June 5, 2009.

325. "A locally constrained surface tention model based on cortical anchoring predicts stable electropore development," S.M. Kennedy, Z. Ji, N. B. Rockweiler, A.R. Hahn, J.H. Booske, and S.C. Hagness, Joint Meeting of The Bioelectromagnetics Society and the European BioElectromagnetics Association, June 14-19, Davos Switzerland (2009).

326. "Dielectric characterization of carbon nanotube contrast agents for microwave breast cancer detection," A. Mashal, B. Sitharaman, J.H. Booske, S.C. Hagness, IEEE Int'l Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting, Charleston, SC, June 1-5 (2009).

327. "Ab initio modeling of Ba-O-Sc on W cathode materials," V. Vlahos, D. Morgan, J. Booske, Materials Science and Technology 2009 Conference, Symposium on Discovery and Optimization of Materials through Computational Design, Pittsburgh, PA, Oct. 25-29, 2009.

328. "The influence of electric field exposure time and scale on electrically mediated gene and drug delivery," Kaytlyn A. Beres, Samantha J. Kamin, Adam R. Hahn, Jonathan C. Hedstrom, Nicole B. Rockweiler, Michael Hitchcock, Stephen M. Kennedy, John H. Booske, Susan C. Hagness, UW-Madison Undergraduate Research Symposium, Madison, WI, April 16, 2009).

329. "Physics of frequency step-tuning in terahertz traveling wave tube regenerative oscillators," J. Booske, P. Gao, 51st Annual Mtg. Amer. Phys. Society Div. Plasma Phys. (Atlanta, GA, Nov. 2-6, 2009).

329. "Waves, Plasmas, Ion Beams and Physics of Mesoscopic Systems," S. Bhattacharjee, J.V. Mathew, I. Dey, H. Amemiya, J.H. Booske, A. Sen, Int'l Symp. On Waves, Coherent Structures, and Turbulence in Plasmas, (Institute for Plasma Research, Gandhinagar, India, Jan. 12-15, 2010).

330. "Use of cationic peptide exposure to create an electroporative response in cell membranes," Adam Hahn, Kaytlyn Beres, Samantha Kamin, Stephen Kennedy, John H. Booske, Susan Hagness, 13th Annual UW-Madison Undergraduate Symposium, Memorial Union Building, University of Wisconsin-Madison, (April 12, 2010).

331. **(invited)** "Use of cationic peptide exposure to create an electroporative response in cell membranes," Adam Hahn, Kaytlyn Beres, Samantha Kamin, Stephen Kennedy, John H. Booske, Susan Hagness, 7th Annual Posters in the Rotunda, Capitol Rotunda, Madison, Wisconsin (May 5, 2010).

332. "Examination of field emission from copper knife edge cathodes with low-work function coatings," Nishant Sule, Matt Kirley, Bozidar Novakovic, John Scharer, Irena Knezevic and John H. Booske, 11th IEEE International Vacuum Electronics Conference, Monterey, CA (May 18-20, 2010).

333. "Distributed Discharge Limiter Studies for X-Band High Power Microwaves," David Holmquist, Matt Kirley, Carson Cook, John Scharer, John Booske, 11th IEEE International Vacuum Electronics Conference, Monterey, CA (May 18-20, 2010).

334. "Ab initio Models of Dispenser B-type, Scandate, and Alloy Cathode Surfaces," Vasilios Vlahos[a,i], Dane Morgan[a,b], and John H. Booske, 11th IEEE International Vacuum Electronics Conference, Monterey, CA (May 18-20, 2010).

335. "Fabrication Techniques for a THz EIK," Richard Dobbs, Albert Roitman, Peter Horoyski, Mark Hyttinen, Dan Sweeney, David Chernin, Monica Blank, N. Scott Barker, John Booske, Edward Wright, Jeff Calame, Cha-Mei Tang, 11th IEEE International Vacuum Electronics Conference, Monterey, CA (May 18-20, 2010).

336. "Transient and Steady State Operation of Traveling Wave Tube Regenerative Oscillators," Peng Gao, John H. Booske, and Zhonghai Yang, 11th IEEE International Vacuum Electronics Conference, Monterey, CA (May 18-20, 2010).

337. "Field emission from low work function cathode coatings," Nishant Sule, Matt Kirley, Bozidar Novakovic, John Scharer, Irena Knezevic and John H. Booske, 37th IEEE International Conference on Plasmas Science, Norfolk, VA, June 20-24 (2010).

338. "Breakdown Limiter Studies for High Power X-Band Microwaves," David Holmquist, Matt Kirley, Carson Cook, John Scharer, and John Booske, 37th IEEE International Conference on Plasmas Science, Norfolk, VA, June 20-24 (2010).

339. "Extended Interaction Klystrons for terahertz power amplifiers," D. Chernin, A. Burke, I. Chernyavskiy, J. Petillo, A.R.P. Horoyski, M. Hyttinen, R. Dobbs, D. Berry, M. Blank, K. Nguyen, V. Jabotinsky, E. Wright, D. Pershing, J. Calame, B. Levush, T. Gaier, A. Skalare, N.S. Barker, R. Weikle, J. Booske, 37th IEEE International Conference on Plasmas Science, Norfolk, VA, June 20-24 (2010).

340. "Cationic Peptide Exposure Induces Electroporation-Like Molecular Uptake in Human Leukemia Cells," Stephen M. Kennedy, Kaytlyn A. Beres, Adam R. Hahn, Samantha J. Kamin, Susan C. Hagness), William L. Murphy and John H. Booske, 2010 IEEE International Symposium on Antennas and Propagation & CNC-USNC/URSI Radio Science Meeting, July 11-17, Toronto, Ontario, CA (2010).

341. "Elicitation of an electroporative response via cationic peptide exposure," Stephen M. Kennedy, Kaytlyn A. Beres, Adam R. Hahn, Samantha J. Kamin, Susan C. Hagness), William L. Murphy and John H. Booske, 32nd Annual Meeting of The Bioelectromagnetics Society, Seoul, Korea, June 13-18, (2010).

342. "A Locally Constrained Surface Tension Model Based on Plasmalemmal-Cortical Anchoring Predicts Stable Electropore Development," Stephen M. Kennedy, Zhen Ji, Nicole B. Rockweiler, Adam R. Hahn, John H. Booske, and Susan C. Hagness, 32nd Annual Meeting of The Bioelectromagnetics Society, Seoul, Korea, June 13-18, (2010). **Won the Curtis Carl Johnson Memorial Award for best student presentation.**

343. "Extended Interaction Klystrons for Terahertz Power Amplifiers," David Chernin, Alex Burke, Igor Chernyavskiy, John Petillo, Richard Dobbs, Albert Roitman, Peter Horoyski, Mark Hyttinen, Dave Berry, Khanh Nguyen, Vadim Jabotinsky, Dean Pershing, Edward Wright, Todd Gaier, Anders Skalare, Monica Blank, Jeffrey Calame, Baruch Levush, N. Scott Barker, Robert Weikle, Jeffrey Neilson, John Booske, *Government Microcircuit Applications & Critical Technology Conference (GOMACTech),* March 22-25, Reno, NV (2010).

344. "Effect of LaB6 films on field emission by knife edge cathodes," M. Kirley, M. Weber, B. Novakovic, N. Sule, J. Scharer, I. Knezevic and J. H. Booske, *52nd Annual Mtg. Amer. Phys. Society Div. Plasma Phys.* (Chicago, IL, Nov. 2-6, 2010).

345. "Distributed discharge limiter studies for x-band high power microwaves," David Holmquist, John Scharer, Matt Kirley, Brian Kupczyk, John Booske, *52nd Annual Mtg. Amer. Phys. Society Div. Plasma Phys.* (Chicago, IL, Nov. 2-6, 2010).

346. "Modeling high-voltage breakdown for single- and multi-stack dielectric insulators," Manuel Aldan, John Verboncoeur, Y.Y. Lau, John Booske, *52nd Annual Mtg. Amer. Phys. Society Div. Plasma Phys.* (Chicago, IL, Nov. 2-6, 2010).

347. "Design and fabrication of terahertz extended interaction klystrons," R. Dobbs, A. Roitman, P. Horoyski, M. Hyttinen, D. Sweeney, B. Steer, K. Nguyen, E. Wright, D. Chernin, A. Burke, J. Calame, B. Levush, N.S. Barker, J. Booske, M. Blank, *2010 35th International Conference on Infrared, Millimeter, and Terahertz Waves* (IRMMW-THz, Rome, Sept 5-10, 2010), Conference Guide, TU-F2.1

348. "Characterizing electronic properties of low and high conductivity materials in the THz regime," B.B. Yang, S.L. Katz, K.J. Willis, I. Knezevic, S.C. Hagness, J.H. Booske, *2010 35th International Conference on Infrared, Millimeter, and Terahertz Waves* (IRMMW-THz, Rome, Sept 5-10, 2010), Conference Guide, Mo-P.36

349. "Characterization of Electromagnetic Losses in the Terahertz Regime Due to Atmospheric Water Content," M. J. Weber, B. B. Yang, S. L. Katz, J. H. Booske, *USNC-URSI National Radio Science Meeting* (Boulder, CO, January 5-8, 2011) paper F2-9

350. "Experimental Characterization of Doped Silicon Conductivity in the Terahertz Regime with a High-Q Quasioptical Resonator," B. B. Yang, S. L. Katz, K. J. Willis, I. Knezevic, S. C. Hagness, and J.H. Booske, *USNC-URSI National Radio Science Meeting* (Boulder, CO, January 5-8, 2011) paper A4-1

351. "Examination of Field Emission from Lanthanum Hexaboride Coated Knife Edge Cathodes," M. Kirley, B.Novakovic, M. Weber, N. Sule, J. Scharer, I. Knezevic and J. H. Booske, *IEEE International Vacuum Electronics Conference*, (Bangalore, India, Feb 21-24, 2011).

352. "Investigation of the Attenuating Effects of Atmospheric Water Content at 400 GHz," M. J. Weber, B. B. Yang, S. L. Katz, J. H. Booske, *IEEE International Vacuum Electronics Conference*, (Bangalore, India, Feb 21-24, 2011).

353. "Measurement of surface roughness effects on conductivity in the terahertz regime with a high-Q quasioptical resonator," B.B. Yang, S.L. Katz, J.H. Booske, *IEEE International Vacuum Electronics Conference*, (Bangalore, India, Feb 21-24, 2011).

354. "Experimental results of feedback attenuation in traveling wave tube regenerative oscillators," Peng Gao, J.H. Booske, *IEEE International Vacuum Electronics Conference*, (Bangalore, India, Feb 21-24, 2011).

355. "Rapid formation of distributed plasma discharges using X-band microwaves," D. Holmquist, X. Xiang, B. Kupczyk, J. Booske, J. Scharer, IEEE Int'l Conf. Plasma Sci., Chicago, IL, June 26-30, (2011), paper IP1G-40.

356. "Development of a 670 GHz Extended Interaction Klystron Amplifier, "D. Chernin, R. Dobbs, M. Hyttinen, A. Roitman, D. Berry, M. Blank, K. Nguyen, V. Jabotinsky, E. Sright, D. Pershing, J. Calame, B. Levush, J. Neilson, F. Maiwald, N.S. Barker, R. Weikle, J. Booske, IEEE Int'l Conf. Plasma Sci., Chicago, IL, June 26-30, (2011), paper IO2B-2.

357. "Measurement of Surface Roughness Effects on Conductivity in the Terahertz Regime, with a High-Q Quasioptical Resonator," B.B. Yang and J.H. Booske, IEEE Int'l Conf. Plasma Sci., Chicago, IL, June 26-30, (2011), paper IO2B-4. **Best student paper award.**

358. "Examination of Electromagnetic Attenuation Induced by Atmospheric Water Content on Terahertz Radiation," M.J. Weber, B.B. Yang, S.L. Katz, and J.H. Booske, IEEE Int'l Conf. Plasma Sci., Chicago, IL, June 26-30, (2011), paper IO2B-7.

359. "Study of the Effect of Nanofabricated Surface Roughness on Conductivity in the Terahertz Regime with a High-Q Resonator," Benjamin Yang, Matthew Kirley, John Booske, 36th Int'l Conf. Infrared, Millimeter and Terahertz Waves, paper M2C.3 (Houston, TX, Oct 2-7, 2011).

360. "Analysis of Atmospheric Attenuation due to Water Content at 400 and 650 GHz," Marcus Weber; Benjamin Yang; Mark Kulie; Ralf Bennartz; John Booske, 36th Int'l Conf. Infrared, Millimeter and Terahertz Waves, paper M3B.3 (Houston, TX, Oct 2-7, 2011).

361. "Fabrication and Test of Terahertz Extended Interaction Klystrons," Richard Dobbs, Mark Hyttinen, Brian Steer, Khanh Nguyen, Edward Wright, David Chernin, Jeffrey Calame, Baruch

Levush, Scott Barker, John Booske, Monica Blank, Frank Maiwald, 36th Int'l Conf. Infrared, Millimeter and Terahertz Waves, paper Tu3B.2 (Houston, TX, Oct 2-7, 2011).

362. "Measurements of Near Terahertz Conductivity of Doped Silicon using a High Quality Factor Resonant Cavity," Matthew Kirley; Benjamin Yang; Keely Willis; Marcus Weber; Nishant Sule; Susan Hagness; Irena Knezevic; John Booske, 36th Int'l Conf. Infrared, Millimeter and Terahertz Waves, paper W5.20 (Houston, TX, Oct 2-7, 2011).

363. "Effect of Surface Roughness on Metallic Conductivity in the Terahertz Regime," M. Kirley, B.B. Yang, J.H. Booske, 53rd Annual Mtg American Phys. Soc. Div. Plasma Physics, paper T07.3 (Salt Lake City, Utah, (Nov. 14-18, 2011).

364. "Evaluation of Breakdown Delay in High Power Microwave Dielectric Barrier Discharges," B. Kupczyk, X. Xiang, M. Kirley, J. Scharer, J. Booske, 53rd Annual Mtg American Phys. Soc. Div. Plasma Physics, paper YP9.11 (Salt Lake City, Utah, (Nov. 14-18, 2011).

365. "Rapid Formation of Distributed Plasma Discharges using X-Band Microwaves," X. Xiang, B. Kupczyk, J. Booske, J. Scharer, 53rd Annual Mtg American Phys. Soc. Div. Plasma Physics, paper YP9.12 (Salt Lake City, Utah, (Nov. 14-18, 2011).

366. "*Ab initio* Model of Intrinsic Defects in Sc_2O_3 for Thermionic Cathode Systems ," Ryan Jacobs, Dane Morgan, and John Booske, 13th IEEE International Vacuum Electronics Conference and 9th International Vacuum Electron Sources Conference (co-located), Monterey, CA (April 24-26, 2012).

367. "Study of the Effect of Surface Roughness and Skin Depth on the Conductivity of Metals at 650 GHz," Matt Kirley and John H. Booske, 13th IEEE International Vacuum Electronics Conference and 9th International Vacuum Electron Sources Conference (co-located), Monterey, CA (April 24-26, 2012).

368. "Electromagnetic Attenuation due to Water Vapor Measured at 400 GHz," Marcus J. Weber, Benjamin B. Yang, Matt Kirley, Mark S. Kulie, Ralf Bennartz, and John H. Booske, 13th IEEE International Vacuum Electronics Conference and 9th International Vacuum Electron Sources Conference (co-located), Monterey, CA (April 24-26, 2012).

369. "Advances in fabrication error analysis for a mm-wave ring-bar TWT circuit," S. Sengele, M. Barsanti, T. Hargreaves, C. Armstrong, J.H. Booske, Y.Y. Lau, 13th IEEE International Vacuum Electronics Conference and 9th International Vacuum Electron Sources Conference (co-located), Monterey, CA (April 24-26, 2012).

370. "Terahertz conductivity of rough metallic surfaces," M.P. Kirley, N. Carlsson, B.B. Yang, J.H. Booske, abstract 3P-44, IEEE International Conference on Plasma Science, Edinburgh, UK (July 8-12, 2012).

371. "Characterization of breakdown delay and memory effects in high power microwave dielectric window discharges," B. Kupczyk, X. Xiang, J. Scharer, J. Booske, abstract 2B-6, IEEE International Conference on Plasma Science, Edinburgh, UK (July 8-12, 2012).

372. "Reduced conductivity of nanorough surfaces at 650 GHz," M. P. Kirley, N. Carlsson, Benjamin B. Yang, and J. H. Booske, 54th Annual Meeting of the APS Division of Plasma Physics, Providence, RI, (October 29-November 2, 2012).

373. "Rapid formation of distributed plasma discharges using X-band microwaves," X. Xiang, B. Kupczyk, J. Booske, J. Scharer, 54th Annual Meeting of the APS Division of Plasma Physics, Providence, RI, (October 29-November 2, 2012).

374. "Reduced breakdown delay via memory and penning effects in high power microwave dielectric window discharges," B. Kupczyk, X. Xiang, J. Scharer, and J. Booske, 54th Annual Meeting of the APS Division of Plasma Physics, Providence, RI, (October 29-November 2, 2012).

375. "AFOSR-funded research at University of Wisconsin-Madison," John. Booske, Susan Hagness, Irena Knezevic, Dane Morgan, John Scharer, Nils Carlsson, David Holmgren, Ryan Jacobs, Sarah Katz, Matt Kirley, Brian Kupczyk, Marcus Weber, Xun Xiang, Ben Yang, AFOSR Workshop, San Antonio, Texas, January 16, 2012.

376. "Measurement of the Intrinsic Conductivity of Copper at Near-THz Frequencies," M.P. Kirley and J.H. Booske, 2013 USNC-URSI National Radio Science Meeting (Boulder, CO, Jan 9-12, 2013).

377. "In Vivo Microwave Dielectric Spectroscopy of Breast Tumor Xenografts with Intra-Tumoral Injections of SWCNT Dispersions," F. Gao, S.C. Hagness, J. Booske, S. X. Xie, B. Sitharaman, 2013 IEEE Int'l Instrumentation and Measurement Technology Conference, (Minneapolis, MN, May 6-9, 2013).

378. "Single-walled carbon nanotubes as microwave theranostic agents for breast cancer," S.X. Xie, F. Gao, J.H. Booske, S.C. Hagness, B. Sitharaman, New York Academy of Sciences Conference on Nanotechnologies in Cancer Diagnosis, Therapy, and Prevention (Memorial Sloan-Kettering Cancer Center, New York City, NY, June 11-13, 2013).

379. Microwave dielectric spectroscopy of single-walled carbon nanotubes in breast cancer xenografts," S.X. Xie, F. Gao, J.H. Booske, S.C. Hagness, B. Sitharaman, International Translational Nanomedicine Conference (ITNANO) 2013 (Boston, MA, July 26-28, 2013).

380. "In Vivo Microwave Dielectric Spectroscopy of Breast Tumor Xenografts with SWCNT Injections," S. X. Xie, F. Gao, J. H. Booske, S. C. Hagness, and B. Sitharaman, Biomedical Engineering Society Annual Meeting, Seattle, WA, Sept. 2013.

381. "Surface resistance of copper from 400 to 850 GHz," M.P. Kirley and J.H. Booske, 14th IEEE Int'l Conference on Vacuum Electronics (IVEC) (Paris, France, May 21-23, 2013). **Selected as finalist for Best Student Paper Award.**

382. "Emission energy barriers of scandate surfaces with adsorbed Ba and Ba-O using Density Functional Theory," R.M. Jacobs, D. Morgan, J.H. Booske, 14th IEEE Int'l Conference on Vacuum Electronics (IVEC) (Paris, France, May 21-23, 2013).

383. "Increased surface resistance of rough copper surfaces in the terahertz regime," M.P. Kirley and J.H. Booske, IEEE Pulsed Power and Plasma Science (PPPS) Conference, (San Francisco, CA, June 16-21, 2013).

384. "Rapid Formation of Distributed Plasma Discharges Using X-Band Microwaves," X.Xiang, B. Kupczyk, J. Booske, J. Scharer, IEEE Pulsed Power and Plasma Science (PPPS) Conference, (San Francisco, CA, June 16-21, 2013).

385. "Reduced Breakdown Delay in High Power Microwave Dielectric Window Discharges," B. Kupczyk, C.H. Liu, X. Xiang, J. Scharer, N. Behdad, J. Booske, IEEE Pulsed Power and Plasma Science (PPPS) Conference, (San Francisco, CA, June 16-21, 2013).

386. "Rapid X-Band Microwave Breakdown in Ne," J. Scharer, X. Xiang, B. Kupczyk, J. Booske, IEEE Pulsed Power and Plasma Science (PPPS) Conference, (San Francisco, CA, June 16-21, 2013).

387. "Reduced Conductivity of Copper Between 400 and 850 GHz," M.P. Kirley and J.H. Booske, 55th Annual Meeting of the American Physical Society Division of Plasma Physics (Denver, CO, November 11-15, 2013).

388. "Reduced Breakdown Delay in High Power Microwave Dielectric Window Discharges via Penning-Like Mixtures and Patterned Metallizations," J. Booske, B. Kupczyk, A. Garcia, C.-H. Liu, X. Xiang, N. Behdad, J. Scharer, 55th Annual Meeting of the American Physical Society Division of Plasma Physics (Denver, CO, November 11-15, 2013).

389. "Rapid Formation of Distributed Plasma Discharges using X-Band Microwaves," X. Xiang, B. Kupczyk, J. Booske, J. Scharer, 55th Annual Meeting of the American Physical Society Division of Plasma Physics (Denver, CO, November 11-15, 2013).

390. "Investigating the Physics of Microwave Induced Breakdown in Metamaterials with Multi-Resonant Constituting Unit Cells," C.-H. Liu, J. Neher, J. Booske, N. Behdad, 55th Annual Meeting of the American Physical Society Division of Plasma Physics (Denver, CO, November 11-15, 2013).

391. "Rapid X-Band Microwave Breakdown in Ne/Ar," J. Scharer, X. Xiang, B. Kupczyk, J. Booske, 55th Annual Meeting of the American Physical Society Division of Plasma Physics (Denver, CO, November 11-15, 2013).

392. "Reflectivity of Rough Copper Surfaces at Submillimeter Frequencies," M.P. Kirley and J.H. Booske, USNC-URSI Radio Science Meeting (Boulder, CO, Jan. 8-11, 2014).

393. "Functionalized Carbon Nanotube Theranostic Agents for Microwave Diagnostic Imaging and Thermal Therapy of Tumors," F. Gao, S.X. Xie, B. Sitharaman, J.H. Booske and S.C. Hagness, 2014 European Conference on Antennas and Propagation (EuCAP 2014), (Hague, Netherlands, April 6-11, 2014).

394. "Investigating Failure Mechanisms in High-Power Microwave Frequency Selective Surfaces," Chien-Hao Liu, John H. Booske, and Nader Behdad, 2014 IEEE Antennas and Propagation Society International Symposium (Memphis, TN, July 6-12, 2014).

395. "Investigating the Physics of Simultaneous Breakdown Events in Metamaterials with Multi-Resonant Unit Cells," Chien-Hao Liu, Joel Neher, John H. Booske, and Nader Behdad, IEEE International Vacuum Electronics Conference (Monterey, CA, April 22-24, 2014).

396. "Perovskite oxides: New candidate materials for low work function electron emitters," Ryan Jacobs, Dane Morgan, John H. Booske, IEEE International Vacuum Electronics Conference, (Monterey, CA, April 22-24, 2014).

397. "Increased Resistance of Rough Copper Surfaces at Terahertz Frequencies," M. P. Kirley and John. H. Booske, IEEE International Vacuum Electronics Conference, (Monterey, CA, April 22-24, 2014). **Selected as finalist for Best Student Paper Award.**

398. "Investigating failure mechanisms in high-power microwave frequency selective surfaces," C.-H. Liu, J.H. Booske, N. Behdad, IEEE Int'l Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (Memphis, TN, July 6-11, 2014).

399. "Work function physics of 3d transition metal perovskites using Density Functional Theory," R.M Jacobs, J. Booske, and D. Morgan, Materials Science & Technology Conference, (Pittsburgh, PA, October 12-16, 2014).

400. "Clinically relevant carbon nanotube dispersions for microwave hyperthermia," S. Xie, F. Gao, S. Patel, J. Booske, S. Hagness, B. Sitharaman, Biomedical Engineering Society Annual Meeting, (San Antonio, TX, October 22-25, 2014).

401. "Metamaterial-enhanced resistive wall amplifiers," T. Rowe, N. Behdad, and J. Booske, IEEE International Conference on Vacuum Electronics, (Beijing, China, April 27-29, 2015).

402. "Strontium vanadate: an ultra-low work function electron emission material," R.M. Jacobs, D. Morgan, and J.H. Booske, IEEE International Conference on Vacuum Electronics, (Beijing, China, April 27-29, 2015). **Session Keynote.**

403. "The physics of conductivity at terahertz frequencies," M.P. Kirley and J.H. Booske, IEEE International Conference on Vacuum Electronics (Beijing, China, April 27-29, 2015). **Session Keynote**

404. "Exploiting mechanical flexure to design tunable periodic structures," S.M.A.Momeni Hasan Abadi, J.H. Booske and N. Behdad, IEEE AP-S Symposium on Antennas and Propagation and URSI CNC/USNC Joint Meeting, (Vancouver, British Columbia, Canada, July 19-25, 2015).

405. "High-throughput density functional theory screening of perovskite compounds for high oxygen surface-exchange for solid oxide fuel cell cathodes," R.M. Jacobs, J.H. Booske, D. Morgan, 20th International Conference on Solid State Ionics (Keystone, CO, June 14-19, 2015). **Outstanding Poster Award**

406. "Ionomycin-induced changes in transmembrane electric potential alter electroporation outcomes in HL-60 cells," E.J. Aiken, B.G. Kilberg, S.C. Hagness, and J.H. Booske, Annual Meeting Bioelectromagnetics Society, (Pacific Grove, CA, June 14-19, 2015).

407. "Rapid formation of distributed plasma discharges using X-band microwaves," X. Xiang, J. Booske, J. Scharer, Annual Meeting of the American Physical Society Division of Plasma Physics (Savannah, GA, Nov 16-20, 2015).

408. "Theory and Simulation of a Relativistic High Power Microwave Metamaterial-Enhanced Resistive Wall Amplifier," T. Rowe, N. Behdad, and J.H. Booske, IEEE Int'l Conf on Plasma Science (Banff, Alberta, CA, June 19-23, 2016)

409. "Doped strontium vanadate: Computational design of a stable, low work function material," R.M. Jacobs, D. Morgan, and J.H. Booske, IEEE Int'l Vacuum Electronics Conference, (Monterey, CA, April 19-21, 2016).

410. "Metamaterial design for a metamaterial-enhanced resistive wall amplifier," T. Rowe, N. Behdad, J. Booske, IEEE Int'l Vacuum Electronics Conference, (Monterey, CA, April 19-21, 2016).

411. "Surface morphology and field-emitter cathode quality," D. Enderich, J. Booske and N. Behdad, IEEE International Vacuum Nanoelectronics Conference (Vancouver, British Columbia, CA, July 11 – 15, 2016).

412. "Gridded vacuum tube use in transmitting wideband non-foster electrically small antennas," R. Towe, T.Y. Shih, J. Booske, N. Behdad, IEEE Int'l Conf on Plasma Science (Banff, Alberta, CA, June 19-23, 2016)

413. "Experimental Study of Infrared Filters Designed Using Polymer-Based Metallo-Dielectric Periodic Structures," K Mavrakakis, J.H. Booske, and N. Behdad, 2016 IEEE Int'l Symp. Antennas and Propagation and USNC/URSI Radio Sci. Meeting, June 26 – July 1, 2016, Fajardo, Puerto Rico.

414. "High-Throughput Density Functional Theory Screening of Perovskite Compounds for High Oxygen Surface-Exchange for Solid Oxide Fuel Cell Cathodes,"R.M. Jacobs, T. Mayeshiba, J.H. Booske, D. Morgan, Materials Research Society Symposium, talk MD1.12.02 (Phoenix, AZ, Mar 28-Apr 1, 2016).

417. "Inductive Meandered Line Metamaterial for Metamaterial-Enhanced Resistive Wall Amplifiers, T. R. Rowe, P. Forbes, N. Behdad, J.H. Booske, IEEE International Vacuum Elecctronics Conference, (London, UK, April 24-26, 2017). **Keynote talk. Finalist Best Student Paper Award**

418. "High Throughput Computational Screening for Low Work Function Electron Emitters," R.M Jacobs, D. Morgan, J.H. Booske, IEEE International Vacuum Elecctronics Conference, (London, UK, April 24-26, 2017) **Keynote talk**

419. "Toward a Statistical Model of Electron Emission from Tungsten Cathode Surfaces," R.M. Jacobs, D. Morgan, and J.H. Booske, IEEE International Vacuum Elecctronics Conference, (London, UK, April 24-26, 2017)

420. "Field emission electron microscop development and cathode emittance," D. Enderich, J. Booske, N. Behdad, IEEE International Vacuum Nanoelectronics Conference, (Regensburg, GE, July 10-14, 2017).

421. A Haufler, J Booske, SC Hagness, B Tilberg, L Wells-Hansen, R Serres, "Feasibility of efficient and accurate extimation of cranberry crop yield using microwave sensing," Int'l Symp. On Antennas and Propagation & USNC/URSI National Radio Science Meeting, (San Diego, CA, July 9-14, 2017). (abstract proceedings, pp. 375-376).

422. A. Haufler, J. Booske, S. Hagness, B. Tilberg, "An Experimental Pilot Study of Cranberry Crop Yield Estimation using Near-Field Microwave Sensing," Intl'l Symp. Antennas and Propagation & USNC/URSI National Radio Science Meeting (Boston, MA, July 8-13, 2018).

423. N. Strachen, J. Booske, N. Behdad, "Active Broadband Matching for High-Power Transmitting Electrically Small Antennas," Intl'l Symp. Antennas and Propagation & USNC/URSI National Radio Science Meeting (Boston, MA, July 8-13, 2018).

424. N. Strachen, J. Booske, and N. Behdad, "Mechanical Super-Low Frequency (SLF) Transmitter Using Electrically-Modulated Reluctance," Intl'l Symp. Antennas and Propagation & USNC/URSI National Radio Science Meeting (Boston, MA, July 8-13, 2018).

425. K. Mavrakakis, J.H. Booske and N. Behdad, "Ultra-Thin Microwave Transmitarrays Exploiting Polarization-Converting Miniaturized-Element Frequency Selective Surfaces," Intl'l Symp. Antennas and Propagation & USNC/URSI National Radio Science Meeting (Boston, MA, July 8-13, 2018).

426. H. Luyen, J. Booske, and N. Behdad, "Beam steerable reflectarray antennas using electronically-reconfigurable, polarization rotating unit cells," Intl'l Symp. Antennas and Propagation & USNC/URSI National Radio Science Meeting (Boston, MA, July 8-13, 2018).

427. D. Chen, R. Jacobs, V. Vlahos, K. Kensen, D. Morgan, and J. Booske, "Combining Theory and Experiment to Model Electron Emission from Polycrystalline Tungsten Cathode Surfaces," IEEE Int'l Vacuum Electronics Conference, (Monterey, CA, April 24-26, 2018).

428. **Keynote Talk:** R. Jacobs, L. Lin, T. Ma, O. Lu-Steffes, V. Vlahos, D. Morgan, J Booske, "Perovskite Electron Emitters: Computational Prediction and Preliminary Experimental Assessment of Novel Low Work Function Cathodes," IEEE Int'l Vacuum Electronics Conference, (Monterey, CA, April 24-26, 2018).

429. R. Jacobs, D. Morgan, J. Booske, "Work Function and AStability of Adsorbed Ba, O, and Ba-O species on an Array of Tungsten Surfaces," IEEE Int'l Vacuum Electronics Conference, (Monterey, CA, April 24-26, 2018).

430. Z. Duan, Y. Gong, M.A. Shapiro, R.J. Temkin, E. Schamiloglu, N. Behdad, J. H. Booske, B.N. Basu, "Review of Metamaterial-Inspired Vacuum Electron Devices," IEEE Int'l Vacuum Electronics Conference, (Monterey, CA, April 24-26, 2018).

VI. Extramural Research Funding

(Total ~ 25.3 M$)

- "Presidential Young Investigator: Sources and Applications for Short Wavelength Electromagnetic Radiation," PI: J.H. Booske, National Science Foundation (includes 2 REU grant supplements), 9/90 — 3/97, $322,500.

- "Fundamental Studies of Microwave Sintering of Ceramics," PI: J.H. Booske (Co-PI: R.F. Cooper), Electric Power Research Institute, 10/91 — 9/94, $112,950.

- "Low Voltage, Rectangular, Millimeter-Wave Cerenkov Amplifiers," PI/PD: J.H. Booske (Co-PI: J.E. Scharer), Air Force Office of Scientific Research, 10/91 — 9/94, $509,150.

- "Microwave Radiation Effects on Ionic Transport in Ceramic Systems (Graduate Student Researcher Program)" PI: J.H. Booske (Co-PI: R.F. Cooper), NASA, 7/94 — 6/97, $66,000.

- "Low-Voltage, Millimeter-Wave Cerenkov Amplifiers," PI/PD: J.H. Booske (Co-PI: J.E. Scharer), Air Force Office of Scientific Research, 10/94 — 9/96, $212,300.

- "Engineering Research Center For Plasma-Aided Manufacturing," Thrust Area 4 Leader: J.H. Booske (PI: J.L. Shohet,), National Science Foundation, 10/94 — 10/98, $900,000 (approximate total TA4 budget for those 4 years).

- "Microwave-Enhanced Solid State Reactions in Ionic Crystalline Solids," PI: J.H. Booske (Co-PI: R.F. Cooper), National Science Foundation, 9/95 – 8/00, $173,000.

- "High-Perveance Electron Beam and Slow Wave Amplifier Configurations," PI: J.H. Booske (Co-PI: J.E. Scharer), Office of Naval Research, 8/95 – 2/99, $220,000.

- Industrial Grants for microwave amplifier research; PI: J.H. Booske (Co-PI: J.E. Scharer), Northrop-Grumman Corporation, 5/95 — 2006, $35,000 cumulative.

- "Microwave-Enhanced Solid State Reactions," PI: J.H. Booske (Co-PI: R.F. Cooper), Electric Power Research Institute, 9/95 — 9/98, $146,050.

- "Transparent, Impermeable Barrier Films for Polymer Packaging Materials," PI: J.H. Booske (Co-PI: J.L. Shohet), Wisconsin Industrial and Economic Development Research Program, 7/95 — 6/98, $84,400.

- "Compact Millimeter-Wave Amplifiers," PI: J.H. Booske, Argonne National Laboratory, 3/96 — 9/96, $30,000.

- "Characterization of Ionized Physical Vapor Deposition Process," PI: A.E. Wendt, Co-PI: J.H. Booske, Motorola, Inc, 6/98-12/98. $75,500.

- "Innovative Microwave Vacuum Electronics," DoD Multidisciplinary University Research Initiative, UW subcontract (one of 6 universities in the consortium), UC-Davis prime contractor. PI's/Co-Directors: N. Luhmann, Jr. (UC-Davis) and J.H. Booske. UW-share: $848,554, 6/99 – 5/04.

- "Computational Tools for Optimized Design of Advanced TWTs," AFOSR STTR Phase I grant, in partnership with Analex Corporation. PI's: J.H. Booske (for UW) and C.L. Kory (for Analex). Co-investigator: S.H. Hagness. $100,000 (UW-share: $60,000), 9/99 – 8/00.

- "Coupling Photocatalysis with Electromagnetic Energy for the Enhanced Degradation of Organic Contaminants and Airborne Microbes," Co-PI's: D.T. Tompkins, M.A. Anderson, and J.H. Booske, Wisconsin Industrial and Economic Development Research Program, 7/99 – 6/00. 36 K$ ($26,000 from WI&EDR and 10 K$ from Research Products, Inc).

- "Investigations of Advanced, Slow-wave, Microwave Vacuum Electron Devices," AFOSR, In collaboration with University of Michigan; PI: J.H. Booske, Co-PI's: J.E. Scharer, B. VanVeen, S. Hagness, R. Gilgenbach, YY Lau, and M. Brake, 1/00-12/04. $1,589,554.

- "Instrumentation for Advanced, Slow-wave, Microwave Vacuum Electron Device Research and Graduate Education," PI: J.H. Booske, Co-PI's: J.E. Scharer, R. Gilgenbach, YY Lau, and M. Brake, AFOSR and University of Wisconsin, 3/00-1/01. $146,980 ($15,426 UW and $131,554 AFOSR).

- "Computational Tools for Optimized Design of Advanced TWTs," AFOSR STTR Phase II grant, in partnership with Analex Corporation. PI's: J.H. Booske (for UW) and C.L. Kory (for Analex). Co-investigator: D. Van der Weide. $500,000 (UW-share: $300,000), 9/00 – 8/02.

- "Dielectric Characterization of Human Breast Tissue," National Institutes of Health, S. C. Hagness, P.I.; F. Kelcz, J. Booske, K. Gilchrist, M. Lindstrom, UW Co-Investigators; M. Okoniewski, W. Temple, A. Magliocco, Univ. Calgary Co-Investigators; 1/02-12/04; $709,880.

- "Subcellular Responses to Narrowband and Wideband Radiofrequency Radiation," AFOSR (MURI), K. Schoenbach, P.I. (Old Dominion University); J. Booske and S. C. Hagness, UW-Madison Co-Investigators; 5/1/02-12/31/07, UW: $434,560.

- "MEMS-based TWTAs for space applications", AFOSR SBIR Phase I Proposal, L. Ives (PI: Calabazas Creek Research, Inc), Co-PI's: C. Kory (CCR), J. Booske and D. van der Weide, 100 K$ 4/02 – 1/03. UW share: $28,000.

- "Microwave and Radio Frequency Rapid Electromagnetic Induction Heating (EMIH) of Silicon Wafers" National Science Foundation, PI: J. Booske, Co-PI's: R. Cooper and Y. Gianchandani, 4/02 – 3/05, $300,000.

- "MEMS based Traveling Wave Tube Amplifiers for Space Applications," AFOSR SBIR Phase II, Prime Contractor: Calabazas Creek Research, Inc; UW Subcontract: $125,000. 3/03 – 3/05.

- "Copper Folded Waveguide Fabrication for THz Traveling Wave Tubes Using LIGA," Independent Investigator Proposal for xray beamtime at Advanced Light Source, Argonne National Laboratory. Awarded 64 hours, calendar year 2003; nominal value of $100/hour. Booske and van der Weide, co-Pis.

- "High frequency MEMS-based TWTs using Novel Interaction Circuits and Beam Sources," ARO STTR Phase I, Prime Contractor: Calabazas Creek Research, Inc. UW Subcontract: $40,000. 8/03 – 1/04. PI: J. Booske, Co-PI's D. Van der Weide, H. Jiang.

- "MEMS-based TWTAs for space applications", AFOSR SBIR Phase II, Prime contractor: Calabazas Creek Research, Inc, UW subcontract: $125,000, 3/03 – 3/06, (PI: J. Booske, Co-PI's: D. van der Weide, H. Jiang)

- "The Nanophysics of Electron Emission and Breakdown for High Power Microwave Sources", U.S. D.D.R.&E. (through AFOSR), MURI04, $5,100,000; May 2004 – April 2009, PI: J. Booske (UW is prime contractor), Co-PI's: J. Scharer (UW), plus co-PI's from U. Michigan, MIT, UC Berkeley, Texas Tech Univ

- "High frequency MEMS-based TWTs using novel interaction circuits and beam sources," ARO STTR Phase II, Prime contractor: Calabazas Creek Research, Inc, UW subcontract: $285,492; 7/1/04 – 8/31/07 (PI: J. Booske, Co-PI's: D. van der Weide, H. Jiang)

- "Microfabricated Traveling Wave Tubes for High Power Millimeter-Wave and THz-regime Radiation Sources," Air Force Office of Scientific Research, $149,970; 3/05 – 2/06; PI: J.H. Booske; Co-Pis: H. Jiang, D. van der Weide

- "Finite Difference Time Domain Analysis of a GHz TEM Cell," AFOSR, Prime contractor: University of Texas Health Science Center, $13,659; 7/03 – 8/04; PI: S. Hagness, Co-PI: J. Booske.

- "Advanced sample preparation for 3D silicon mapping," Wisconsin Industrial and Economic Development Research Fund, $50,000, 7/03 – 6/04; PI: J. Booske

- "Novel, High Power, W-band, Meander Line TWT," AFOSR STTR Phase I, Prime contractor: Calabazas Creek Research, Inc, UW subcontract: $40,000; 8/15/06 – 5/14/07; PI: J.H. Booske; Co-Pis: H. Jiang, D. van der Weide, G. Venkataraman

- "Meander Line Traveling Wave Tube THz Amplifier," AFOSR STTR Phase II; Prime contractor: Calabazas Creek Research, Inc, UW subcontract: $250,000, 1/07/07 – 1/06/09; PI: J.H. Booske, Co-Pis: G. Venkataramanan, D. van der Weide, H. Jiang.

- "Nanoparticle contrast agents for enhanced microwave imaging of breast cancer," Department of Defense Breast Cancer Research Program, Synergistic Idea Award; Collaboration Grant with Northwestern University; $248,094 (UW total), 9/15/07 – 9/14/09; Pis: S. Hagness (UW) and X. Li (NU); Co-Investigators: J. Booske (UW), I. Knezevic (UW), P. Messersmith (NU), A. Sahakian (NU).

- "Fundamental Studies of Electronic Properties of Materials and Devices for High Power, Compact THz Vacuum Electron Devices", US Air Force Office of Scientific Research, $ 880,000 , 6/1/08 – 9/30/11; PI: J. Booske, Co-Pis: Knezevic, Hagness, Cerrina, van der Weide

- "Modulation of Electroporative Field Thresholds Using Cationic Peptides," Ruth L. Kirchstein National Research Service Predoctoral Fellowship, National Institutes of Health: National Institute of Biomedical Imaging and Bioengineering (NIBIB), $ 54,014, 4/1/08 – 4/1/10, Student: Steve Kennedy, Co-Supervisors: J. Booske, S. Hagness, W. Murphy

- "Terahertz regime surface resistivity measurements and microfabrication guidance for Terahertz HPA Modules Using Extended Interaction Klystrons," DARPA; Prime contractor: SAIC, UW subcontract: $71,753 (Phase I, 1/2009-12/2010)) with options of $90,940 (Phase II, 1/2011-12/2011) and $100,680 (Phase III, 1/2012-12/2012); UW PI: J.H. Booske.

- "DURIP-Signal-Synthesis-and-Acquisition System for Fundamental Studies Advancing High Power, High Frequency Radiation Sources," U.S. Air Force Office of Scientific Research, $ 226,386, 9/30/2011 – 9/30/2012, PI: J.H. Booske

- "Basic Studies of Distributed Discharge Limiters for Counter-HPM," US Air Force Office of Scientific Research, $5,000,000, 3/1/2009-11/30/2013; Consortium grant (UW, TTU, Umich, UC-Berkeley) PI: J.H. Booske, Co-Pis: J.E. Scharer (UW), A. Neuber, J. Dickens (TTU), R.M. Gilgenbach, Y.Y. Lau (U. Mich), R. Temkin (MIT), J. Verboncoeur (UC-Berkeley).

- "Northrop Grumman Corporation Educational Research Gift Program : Vacuum Electronic Devices Research," $28,000, 10/04-open; PI: J.H. Booske

- "L-3 Communications Electron Devices Industrial Affiliates Program Gift", L3 Communications-Electron Devices Division; $130,000, 1/05 – open; PI: J.H. Booske

- "Tumor-Targeting Single-Wall Carbon Nanotubes for Microwave-Based Imaging and Hyperthermia," Department of Defense Breast Cancer Research Program, Collaboration Proposal with SUNY-Stonybrook (SUNY-SB PI: B. Sitharaman); $354,990 (UW Portion), 8/1/2010-8/31/2013, UW Co-Pis: S. Hagness, J. H. Booske

- "Fundamental Materials Studies for Advanced High Power Microwave and Terahertz Vacuum Electronic Radiation Sources," U.S. Air Force Office of Scientific Research, $ 1,050,223, 9/30/2011 – 9/29/2014, PI: J.H. Booske; Co-PI's: S. Hagness, I. Knezevic, D. Morgan

- "Emittance Studies of Novel Cathodes," U.S. Air Force Office of Scientific Research, $62,531, 5/1/2015 - 4/30/2018, PI: J.H. Booske, Co-PI: N. Behdad.

- "Advanced, Ultra-Long-Lifetime Perovskite Electron Emitter Cathodes," Defense Advanced Research Projects Agency (DARPA), $1,268,988, 3/2016 – 3/2020, PI: J.H. Booske, Co-PI: D. Morgan.

- "Integrated Models for Design Optimization and Manufacturing Tolerance Analysis for Vacuum Electronic Devices," Defense Advanced Research Projects Agency (DARPA), $2,200,000 (UW subcontract $400,000), 3/2016-3/2020, Project Director D. Chernin (Leidos Corp); UW PI: J.H.Booske, Co-PI: D. Morgan.

- "MÆMS-Enabled Affordable Phased-Array Antenna Technologies," Office of Naval Research (ONR), $1,152,269, 1/2016 – 12/2018, PI: N. Behdad, Co-PI: J.H. Booske.

- "Metamaterial Enhanced Resitive Wall Amplifiers," Air Force Office of Scientific Research (AFOSR), $600,670, 9/2016 – 8/2019, PI: N. Behdad, Co-PI: J. Booske

- "Additive Manufacturing for Microwave Vacuum Electron Device Cost Reduction," Office of Naval Research (ONR) STTR, $29,191 (UW subaward under Disruptive Technology Associates, Ltd), 9/1/2016 – 12/12/2016, PI: N. Behdad, Co-PI: J. Booske.

- "Multipactor and breakdown susceptibility and mitigation in space-based RF Systems," MURI grant, Air Force Office of Scientific Research, $1,503,145 (UW subcontract amount, out of a total $7.5M for entire consortium), 7/1/2017-6/30/2022, UW-Madison PI: J. H. Booske, UW-Madison Co-PIs: N. Behdad and D. Morgan, (other institutions: Michigan State, Univ. of Michigan, Univ. New Mexico, and Texas Tech U.), overall consortium PI: J. Vervoncoeur, Michigan State Univ.

- "Microwave Sensing Technology for Efficient and Accurate Estimation of Cranberry Crop Yield," Wisconsin Cranberry Board and Cranberry Institute, $67,832, 7/17 – 12/18, PI: S. Hagness, Co-PI's: J. Booske, B. Tilberg (Ocean Spray), L. Wells-Hansen (Ocean Spray), Juan Zalapa (Horticulture)

(~26.8 M$)

VII. Teaching

a. Scholarship

i. Articles and Publications

1. "Foundations of Dynamic Physical Systems: complete course notes (de facto textbook) for ECE 520," J.H. Booske , (1995).

2. "Cooperative Learning in an Undergraduate Engineering Course," J.-B. Kim, A.S. Cohen, J.H. Booske, S.J. Derry, Proceedings of the AERA Annual Meeting, (San Diego, April 14, 1998).

3. "Flipped Classroom Teaching," J.H. Booske, lead-off editor's article for special issue of *ECE Source*, the online professional magazine for ECE Department Chairs and Heads; issue editor: J.H. Booske (May 2014) (http://myemail.constantcontact.com/ECE-Source--May-2014.html?soid=1113477036543&aid=DpoAdpm_URo)

4. "ECEDHA 2016 Blended Learning Workshop: Overview and Motivations," J. Booske and E.J. Hagen, article for the *ECE Source*, the online professional magazine for ECE Department Chairs and Heads, published by ECEDHA (ECE Department Heads Association), September Issue, 2016. (http://ecedha.org/ece-media/newsletter/september-2016/blended-learning/)

ii. Invited Talks at Conferences

1. "Blended instruction using online content in the Wisconsin Collaboratory for Enhanced Learning (WisCEL)," John H. Booske, Invited panel member presentation, Online instruction workshop, ECE Department Heads Association Annual Meeting, Orlando, FL, March 22-25, 2013.

2. "Keeping the eye on the ball: ECE education innovation examples and thoughts from UW-Madison," John H. Booske, invited talk, HBCU Experiment-Centric Pedagogy Workshop, Howard University, Washington, DC, July 8-10, 2014.

3. "Blended Learning 2015: What Works, What Doesn't," John H. Booske, Invited lead-off panel speaker and session organizer, ECE Department Heads Association Annual Meeting, Hilton Head, SC, March 13-17, 2015.

4. "Introduction to Active Learning," John H. Booske, Blended Learning Workshop, 2016 ECEDHA Annual Conference, March 18, 2016, La Jolla, CA.

5. "Expectations for Student Learning in ECE," John H Booske and Susan Lord, **Invited plenary** presenters and facilitators, ECE Department Heads Association Annual Meeting and Expo, Miramar Beach, FL, March 17-21, (2017).

6. J.H. Booske, "Teaching Methods for Active Learning," Invited workshop presenter, NSF-funded iREDEFINE workshop for aspiring future faculty, ECEDHA Annual Conference and Expo (Miramar Beach, FL, March 17-18, 2017).

7. J.H. Booske, "Teaching Methods for Active Learning," Invited workshop presenter, NSF-funded iREDEFINE workshop for aspiring future faculty, ECEDHA Annual Conference and Expo (Monterey, CA, March 18-19, 2018).

8. J.H. Booske, "Introduction to Linear Beam Tubes," invited IEEE-sponsored mini-course instructor, April 21, 2018, affiliated with IEEE Int'l Vacuum Electronics Conf (Monterey, CA, April 22-24, 2018).

iii. Conference, Colloquium, and Workshop Presentations

1. "Leading Effective Discussions", Workshop presented at the UW College of Engineering 94-95 Teaching Improvement Program, Jan. 19, Madison, WI (1995)

2. "A Proposal for Peer Review in One Hour a Semester: How Our Department Responded", J. Webster and J. Booske, AAHE All-Project Meeting; From Idea to Prototype: The Peer Review of Teaching, June 23-26 Georgetown University, Washington, DC (1995).

3. "Investigations of Cooperative Learning in Undergraduate Electrical Engineering Education" J.H. Booske, A.E. Wendt, J.L. Shohet, A.S. Cohen, and J.-B. Kim, Conference of the American Society for Engineering Education (ASEE) in Milwaukee, WI (June, 1997).

4. "Different Modes of Student Learning," J.H. Booske, presentation followed by leading discussion at meeting of UW-Madison Teaching Academy, March 7, 1997.

5. "Improving Teaching and Learning," D. Woods and J.H. Booske, 1.5 hour workshop, NSF Engineering Education Scholars Program, UW-Madison, July 6-12, 1997.

6. "The Importance of Collaboration in Teaching and Learning," D. Woods and J.H. Booske, 1.75 hour workshop, D. Woods and J.H. Booske, NSF Engineering Education Scholars Program, UW-Madison, July 6-12, 1997.

7. "Assessment of Student Learning," J.H. Booske and C. Carlson-Dakes, Workshop presentation for UW-College of Engineering Orientation for New TAs, Sas, Uas, and Faculty, 27 August, 1997.

8. "Assessment of Student Learning," J.H. Booske and C. Carlson-Dakes, Workshop presentation for UW-College of Engineering Orientation for New TAs, Sas, Uas, and Faculty, 15 January, 1998.

9. "Cooperative Learning in an Undergraduate Engineering Course," J.-B. Kim, A.S. Cohen, J.H. Booske, S.J. Derry, AERA Annual Meeting, (San Diego, April 14, 1998).

10. "Teaching and Learning Styles," J.H. Booske and C. Carlson-Dakes, Workshop for NSF Engineering Education Scholars Program, July 12-18 (1998).

11. "Teaching and Learning within an Institutional Culture," J.H. Booske and C. Carlson-Dakes, Workshop for NSF Engineering Education Scholars Program, July 12-18 (1998).

12. "Assessment of Student Learning," J.H. Booske and M. Rogers, Workshop for UW-College of Engineering's Orientation for New Engineering Educators, 27 Aug (1998).

13. "Science = Serendipity + Irony+ Pleasure of Discovery (on a good day): An Example in Materials Science," J.H. Booske, Invited Enrichment Lecture, UW-Madison, Chemistry 104, 26 March (1998).

14. "Electricity and Magnetism," annual 1-2 hours of teaching 3-5 grade students in Crestwood Elementary School, Madison, Wi, as part of Friends' Workshop Series (typically in Jan-Feb). (Workshop contributions: 1996, 1997, 1998, 1999)

15. "Teaching and Learning Styles," J.H. Booske, 1999 Science and Engineering Education Scholars Program, (Madison, WI, July 19, 1999)

16. "Teaching and Learning Scholarship within an Institutional Culture," J. Booske and S.S. Courter 1999 Science and Engineering Education Scholars Program, (Madison, WI, July 19, 1999).

17. "Educating Engineers for the New Global Marketplace," J. Booske and G. Johnson, UW-Madison College of Engineering, Teaching Improvement Program Workshop, 13 January, 2005.

18. "Formal Graded Assessment: Focus on Partial Credit", J. Booske, M. Morrow, and J. Wollack, UW-Madison College of Engineering Teaching Improvement Program Workshop, 18 January 2007. (workshop digitally archived at http://mediasite.cae.wisc.edu).

19. "Instructional Innovation in WisCEL: Lessons from the first two years," S. Mason and J.H. Booske, UW-Madison Teaching and Learning Symposium, poster, May 20-21, 2014.

20. See numerous invited seminars and colloquia related to WisCEL and Blended Learning in Section XII, *Invited Colloquia and Seminars* and Section VII.a.ii, *Invited Talks at Conferences*.

iv. Other Archival Scholarship Contributions in Teaching

1. "Celebrating Effective Teaching and Learning: Examples of Teaching and Interviews with Teachers", J. Booske, accessible from UW-Madison Library system, UW Teaching Academy collection (1995).

   Volume 1: Teaching Examples—ECE 320, "Getting started on a Design Project"
   Volume 2: Rationale Interview

   accessible from MadCat

   Call no: LB 2331 C45 1995

2. "ECE 749: Coherent Generation and Charged Particle Beams," J.H. Booske, videotape of course lectures, intended for eventual usage with National Technological University distance learning service, as well as production of web-based course. (1999-2000).

3. In Fall 2005, wrote the equivalent of a textbook for ECE 520: "Foundations of Dynamic Physical Systems", including text, homework problems, solutions, and posted it online for self-paced learning. (see http://courses.engr.wisc.edu/ecow/get/ece/520/booske/).

4. In Fall 2004, updated Spring 2007, placed complete set of course notes and homework sets online for "ECE 749: Coherent Generation and Charged Particle Beams." (see: http://ecow.engr.wisc.edu/cgi-bin/get/ece/749/booske/)

5. ECE 420: Electromagnetic Wave Transmission, experiment in flipped classroom pedagogical methods and instructional format, Spring & Fall, 2007.

6. "Magic of Moving Magnets," J. Booske, UW-Madison, Five Minute Lecture Series: A series of five-minute video lectures from University of Wisconsin-Madison professors giving a brief overview of some of the interesting research and teaching going on here. http://www.youtube.com/uwmadison#p/c/282BE1BDE789E82A/14/pevcjEWSLhk

7. ECE 321: Transmission Lines for Digital Applications; second experiment in flipped classroom pedagogical methods and instructional format. Students performance on was superior to a prior course involving similar content, but taught in conventional lecture/out-of-class manner.

8. ECE 219: Developed completely new 1 credit module course for student mastery of multivariable calculus and vector calculus prior to ECE 220 and 235. Course content developed for instruction with flipped classroom in WisCEL. Taught this course in Fall 2012 for the first time and retaught in subsequent semesters.

v. Other Scholarly, Innovative, or Intellectual Leadership Activities in Teaching

1. Participant "Peer Feedback on Teaching Experiment", (with J. Webster), 1994.

2. Chair, ECE Peer Feedback on Teaching Experiment (Expanded Project), Fall Semester 1995 (with Alvarado, Dobson, DeMarco, Van Veen, and Webster).

3. Experimental implementation of new vehicle for student feedback in undergraduate courses: "Student Board of Directors" (for ECE 220, Fall 1995 semester).

4. Experimental introduction of Small Group Discussion Sessions to ECE 320 and 220, starting in Spring 1994

5. Introduction of Semester Design Projects to ECE 420, ECE 320, ECE 220 starting in Fall 1993.

6. Lead author of ECE procedure for peer review of Assistant Professors' teaching (1996). This procedure was provided, upon request, to Physical Sciences Divisional Committee and the UW Mechanical Engineering Department, and used as the blueprint for all Assistant Professor peer review protocols in Engineering and Physical Sciences departments.

7. PI/PD on Preproposal for NSF Integrative Graduate Education and Research Training (IGERT) Program: "Fundamental Science of Materials and their Applications: Engineering, Biological and Geological" (Co-Pis: R.F. Cooper, R.J. Matyi), Sept, 1997.

8. Co- Taught and helped to develop a pilot Engineering Graduate course on the Teaching of Engineering, EPD 690 (Spring, 1998). Included 2-2.5 hours/week in class, weekly planning sessions with faculty team, and special responsibility for teaching and course-notes development for a 3-week session on Teaching and Learning Styles and Learning Theory.

9. Guest lecture in EPD 690 Spring 1999, "Teaching and Learning Styles".

10. Guest lectures in EPD 690, Spring 2000:

    a. Use of Computer Technologies to address a Spectrum of Learning Styles and Enhance Learning of Engineering

    b. Limitations and Appropriate Usage for Computer Technologies for Quality Learning of Engineering

11. Developed and implemented, collaboratively with Professor Susan Hagness, computer-based quizzing-for-fluency drills. Piloted the concept in ECE 220 and 320. Supported by NSF Foundation Coalition Program, 2000 – 2005.

12. Developed online video lecture and other instructional materials for ECE 220, 320, 321, and 740.

13. Initiated initiative to convert instruction in ECE 230 to blended instruction (collaborating with J. Barner). After preliminary progress, project turned over to M. Morrow.

14. Led development and authorship of two consecutive Madison Initiative for Undergraduates, "Wisconsin Collaboratory for Enhanced Learning (WisCEL)" proposals (2010 and 2011). The first one was successful (2010). The second one was funded but via different sources other than MIU (2011). Ultimately this evolved into the successful Wisconsin Collaboratory for Enhanced Learning (WisCEL, www.wiscel.wisc.edu) . Two efforts involved a total of over 20 co-authors from engineering, mathematics, languages, libraries, and DoIT. Ultimately the facility involved two sites, more than 1 M$ of renovations, and an annual personnel budget of ~ 0.5 – 1.0 M$ and has become a national exemplar facility for innovative teaching and learning. See references and citations:

    (1) http://infocommonsandbeyond.blogspot.com/2012/04/wisconsin-collaboratory-for-enhanced.html
    (2) http://en.wikipedia.org/wiki/WisCEL
    (3) https://blogs.lt.vt.edu/librarylc/2012/02/
    (4) https://twitter.com/dcbphd/status/402890885668409344
    (5) http://www.ecedha.org/conferences/2013-ecedha-annual-conference-and-ecexpo/workshops/online-education-workshop-schedule/online-education-course-delivery
    (6) http://blog.lib.umn.edu/learninglibraries/2012/02/personalized-learning-experiences-at-the-library.html
    (7) http://aprilpierson.blogspot.com/2012/10/learning-technology-development-council.html
    (8) http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=24&ved=0CEEQFjADOBQ&url=http%3A%2F%2Fprovost.unm.edu%2Fbookse-flyer.pdf&ei=LMGcUvXrHuaayQHRnoDADg&usg=AFQjCNHgUr-YA9vRLt6Pnu8q-CbilkeE0w&sig2=7ke73G17F3ubwMABIFieBQ
    (9) http://chronicle.com/article/Diverse-Students-Go-Digital/139645/
    (10) http://www.highbeam.com/doc/1G1-280737600.html
    (11) http://p2pfoundation.net/Flipped_Teaching
    (12) http://www.easc.org/classroom_flipping/classroom_flipping.php
    (13) http://www.youtube.com/watch?v=0Lat0mcQ4A0
    (14) http://j901.blogspot.com/2013/03/spatial-skills-classroom-architectural.html
    (15) http://acrlog.org/2013/04/25/participatory-learning-active-application-reflections-on-the-acrl-conference/
    (16) http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=35&ved=0CEoQFjAEOB4&url=http%3A%2F%2Fwww.asee.org%2Fpublic%2Fconferences%2F20%2Fpapers%2F7423%2Fdownload&ei=McOcUrmVC8XyyAHn64HgCg&usg=AFQjCNHoScJ0VcU8f2Zoyqz3ni7q_jzi3Q&sig2=4K9lbPkOvPN1MddR4ReV4A
    (17) http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=37&ved=0CFoQFjAGOB4&url=http%3A%2F%2Fwww.mty.itesm.mx%2Fei%2Fgedc2012%2FJ

PG_BIG%2Fblended_learning.pdf&ei=McOcUrmVC8XyyAHn64HgCg&usg=AFQjCNFPQisqePFzVB73Q3SP4xRpCcwCMQ&sig2=VCVUoEUuwPyOb3LvWgj_8w
(18) http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=39&ved=0CGsQFjAIOB4&url=http%3A%2F%2Fwww3.uwplatt.edu%2Ffiles%2Fmcic%2FMCICprogram2013.pdf&ei=McOcUrmVC8XyyAHn64HgCg&usg=AFQjCNFzmW2QcIg_IfsLs41v1Ay46uDo7g&sig2=Am3QxqCMG6tYa0_smN1qqQ
(19) http://mipse.umich.edu/about/seminars.htm#fall2012
(20) http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6633064
(21) http://news.ls.wisc.edu/announcements/doing-the-math-department-uses-blended-teaching-approach/
(22) http://learningspacetoolkit.org/space-browser/space-type/wiscel/
(23) https://tle.wisc.edu/solutions/increasing-student-success/new-learning-environment-wiscel
(24) http://edinnovation.wisc.edu/innovations/wiscel-classes-create-unique-learning-commons/
(25) http://www.digplanet.com/wiki/WisCEL
(26) http://allangyorke.com/2012/04/visit-to-the-wiscel-space-at-university-of-wisconsin-madison/
(27) http://www.engr.wisc.edu/Feb27.html
(28) http://www.news.wisc.edu/21723
(29) http://news.unm.edu/news/booske-presents-lecture-on-instruction-innovations
(30) http://host.madison.com/daily-cardinal/news/million-renovations-open-at-college-wendt-libraries/article_68bd88ee-62b3-11e1-93a7-0019bb2963f4.html
(31) http://host.madison.com/news/local/education/university/two-uw-libraries-updated-to-offer-personalized-learning-experiences/article_f68a80d8-619f-11e1-acb9-001871e3ce6c.html
(32) http://en.wikipedia.org/wiki/Flipped_classroom
(33) http://www.doit.wisc.edu/news/blended-learning-adding-value-to-brick-and-mortar/
(34) http://chancellor.wisc.edu/strategicplan/fourth-year-progress-report/undergraduate-experience.html
(35) http://www.cio.wisc.edu/1962.aspx
(36) http://parent.wisc.edu/badger-parent/201302/
(37) http://www.cyclopaedia.info/wiki/WisCEL

b. Courses Taught

ECE 219	Analytical Methods for Electromagnetic Engineering
ECE 220	"Electrodynamics I" (undergraduate electromagnetics--electrostatics, magnetostatics)
ECE 320	"Electrodynamics II" (undergraduate electromagnetics--dynamics)
ECE 321	“Transmission Lines for Digital Applications” (undergraduate EM course for computer engineering majors on transient signal propagation on EM transmission lines)

ECE 325	"Wave Propagating Systems" (undergrad advanced EM: transmission lines, waveguiding and antenna theory; modified to ECE 420: "Electromagnetic Wave Transmission")
ECE 420	"Electromagnetic Wave Transmission" (advanced electromagnetics stressing application to communications: transmission lines, wave optics, dispersion, rf,microwave, and optical waveguides, and intro. to radiation and antennas)
ECE 520	"Foundations of Dynamic Physical Systems" (classical physics, modern physics, and systems theory as foundations of modern engineering systems analysis)
ECE 601	"Numerical Methods for Electromagnetic Engineering Design" (co-taught with Prof's. Hitchon and McLean; project-based course wherein students learn and use numerical methods in engineering analysis of design problems involving electromagnetic phenomena)
ECE 908	"Special Topics: Coherent Generation and Particle Beams" (co-taught with Prof. John E. Scharer; established as permanent course ECE 749: "Coherent Generation and Particle Beams")
ECE 740	“Advanced Electromagnetic Theory” (graduate level course on theory and applications of electromagnetic wave propagation, radiation sources, scattering, guiding, etc.)
ECE 749	“Coherent Generation and Particle Beams” (graduate level course on theory and application of charged particle beam sources of coherent electromagnetic radiation)
EPD 690	Special Topics, “Elements of a Course: The Teaching of Engineering” (4-faculty team-taught graduate course aimed at educating tomorrow’s engineering professoriat, including reviews of teaching and learning theories with emphasis on application to engineering classrooms, career planning for academic engineering careers, development of teaching philosophies)

3. Courses Developed

ECE 749	"Coherent Generation and Particle Beams": Fundamental theory and recent advances charged particle beam sources of coherent electromagnetic radiation. (co-developed with Prof. John Scharer; Redesigned by Booske in Fall 1999)
ECE 520	"Foundations of Dynamic Physical Systems": Modern descriptions of dynamic physical systems, including classical mechanics, variational dynamics, statistical mechanics and thermodynamics, information theory, quantum mechanics, wave theory, and eigenvalue theory, revealing

interrelationships between these theories and establishing their role as the foundation of advanced engineering descriptions in electrophysics, systems, and circuit theories.

ECE 420 "Electromagnetic Wave Transmission": Modification of previous ECE 325 to upgrade treatment level and integrate more optics material alongside the microwave systems, thereby imparting a more universal understanding of EM wave transmission systems.

ECE 601 "Numerical Electromagnetic Field Simulations": co-taught with Dr. Jim McLean; special topics course introducing Numerical techniques for electromagnetic engineering with special emphasis on project work.

EPD 690 "Elements of a Course: The Teaching of Engineering": co-developed and co-taught with Drs. F. Sainfort (IE), M. Corradini (EP), J. Blanchard (EP), and S. Courter (EPD); special topics course graduate course aimed at educating tomorrow's engineering professoriat, including reviews of teaching and learning theories with emphasis on application to engineering classrooms, career planning for academic engineering careers, development of teaching philosophies.

ECE 420 Implemented flipped classroom for innovative teaching of ECE 420, ""Electromagnetic Wave Transmission". In a comparison of homework and exam scores, the students' grades indicated better mastery of the content with the new approach in which in-class-contact time emphasized problem-solving than with conventional in-class-lecture-based approach.

ECE 219 Analytical Methods for Electromagnetic Engineering. Developed this blended learning instruction course utilizing flipped classroom format from inception. One credit module course ensuring students have mastered the types of vector calculus skills most heavily used in electromagnetics and applied physics aspects of electrical engineering. Taught this course in Fall 2012 for the first time.

d. Student Mentoring

i. Graduate Students Supervised or Co-supervised

(Theses listed for students who completed a degree with me as primary advisor)

Name	Primary Advisor (if other than me)	Project/Thesis Title (MS) or Dissertation Title (Ph.D.)	Year Completed
Binshen Meng		Experimental and Numerical Studies of the Quantum-Classical Transition in a Classically Chaotic System (M.S.)	1992
Binshen Meng		Microwave Absorption in Ionic Ceramics with Variable Point Defect Concentrations (Ph.D.)	1995
Doug Keil	N. Hershkowitz		

Jurianto Joe	J. Scharer		
Sheng Fu Chang	J. Scharer		
Mark Basten		Formation and Transport of High-Perveance Electron Beams for High-Power, High-Frequency Microwave Devices (Ph.D.)	1996
Sam Freeman	(w/ R. Cooper)	Investigations of Non-Thermal Interactions Between Microwave Fields and Ionic Ceramic Materials (Ph.D.)	1996
A. Hakan Kumasar			
Jorge Rodriguez		Design and Development of an Ultra-broadband RF Directional Coupler (M.S.)	1993
Dan Grellinger		Microwave Processing of Ceramic Materials at 14 Ghz (M.S.)	1995
Boris Ratchev		Ion Beam Modification of Metal-Polymer Interfaces for Improved Adhesion (M.S.)	1995
Doug Dallman	K. Shenai		
Eric Wickesberg	J.L. Shohet		
Ben Klein		Modeling of Spontaneous Emission Modification in Microcavity Lasers Using Finite Elements (M.S.)	1995
Augustina Onuoha			
Louis Lazaar	J. Scharer		
Chris Baum	J.L. Shohet		
Tom Snodgrass	J.L. Shohet		
Robert Speth	J.L. Shohet		
Henley Liu	S. Gearhart		
Kim Binger		A Diagnostic for Determining Temperature Profiles in Microwave Sintered Ceramic Materials (M.S.)	1997
Hang Guo			
Mark Converse	(w. S. Hagness)	Investigation of the Mechanisms of Pulse Amplification in Helical Traveling Wave Tubes (Ph.D.)	
John Hickland	(w. R. Cooper)		
Colin Tan	(w. R. Cooper)		
John Wöhlbier	(w. I. Dobson)	Modeling and Analysis of a Traveling Wave Tube Under Multitone Excitation (M.S.)	2000
John Wöhlbier	(w. I. Dobson)	Nonlinear Distortion and Suppression in Traveling Wave Tubes: Insights and Methods (Ph.D.)	2003
Kelly Brown	J.L. Shohet		
Mark McNeely		Evaluation of a Method for Forming Sheet-Electron-Beams from an Initially Round-Electron-Beam using Magnetic Quadrupoles (M.S.)	2001

Shiaoping Ge			
Mike Wirth	J. Scharer		
Keith Thompson	(w/ R. Cooper)	Electromagnetic Fast-Firing for the Rapid Thermal Processing of Silicon	2003
Mike Neumann			
Dina Hagl	S. Hagness		
Antoine Choffrut	B. Van Veen		
Won-Je Lee	(w/ D. van der Weide)	Reentrant Rectangular Cavity Resonator Design for Millimeter Wave and THz regime Klystrons (M.S.)	2003
Cynthia Beasley	S. Hagness		
Sean Gallagher	D. van der Weide		
Aarti Singh	J. Scharer		
C.J. Bonifas	(w/ R. Cooper)	An examination of athermal, photonic effects on boron diffusion and activation during microwave rapid thermal processing	2004
Matt Genack		The Effectts of a Mid-Plane Broad Wall Gap on the Electromagnetic Properties of a Folded Waveguide (M.S.)	2004
Zhen Ji	(w/ S. Hagness)	Biological Cell Membrane Dynamics Induced by Electric Pulses (Ph.D.)	2007
John Welter		Microfabricated High Frequency Traveling Wave Tubes (M.S.)	2004
Kevin McLaughlin		Backward Wave Interactions in a Broadband Traveling Wave Tube (M.S.)	2004
Manuel Alvarez Hildaga		Synthesis of Nanoporous Aluminum Oxide for Implantation Masking on Silicon Substrates for Three Dimensional Diffusion Studies on an Atom Probe (M.S.)	2007
Mariya Lazebnik	S. Hagness		
Alireza Mashal	(w/ S. Hagness)	Towards Microwave-Induced Thermoacoustic Breast Imaging: Experimental Studies of the Thermoacoustic Response of Dielectric Targets in Simple Phantoms (M.S.)	2007
Alireza Mashal	(w/ S. Hagness)	Investigation of Contrast Agents for Microwave Detection and Treatment of Breast Cancer (Ph.D.)	2010
Vasilios Vlahos	(w/ D. Morgan)	Nano-scale investigations of electric-dipole-layer enhanced field and thermionic emission from high current density cathodes (Ph.D.)	2009
Xin He	J. Scharer		
Ryan Miller	(w/ Y.Y. Lau, U Michigan)	Investigations of geometric field enhancement and electron field emission using conformal mapping (Ph.D.)	2009

Sean Sengele		Microfabricated suspended meander line circuit on silicon substrate for w-band traveling wave tubes (M.S.)	2008
Sean Sengele	(w/ C. Armstrong, L3-EDD)	Impact of random fabrication errors on the performance of a contrawound helix slow-wave structure for a millimeter-wave traveling wave tube (Ph.D.)	2012
Stephen Kennedy	(w/ S. Hagness)	A microfabricated exposure cuvette for use in real-time electroporation experiments (M.S.)	2006
Stephen Kennedy	(w/ S. Hagness)	A macro- and molecular-scaled, electrostimulatory approach for regulated drug delivery (Ph.D.)	2010
Benjamin Yang		The Effect of Surface Roughness on the Conductivity of Metals in the Terahertz Regime (Ph.D.)	2011
Keely Willis	I. Knezevic and S. Hagness		
Peng (Kenn) Gao			
Nishant Sule	J. Scharer		
Sarah Katz		Near Terahertz Silicon Conductivity Measurements via High-Q Resonant Cavity (M.S.)	2010
Matt Kirley		Effect of sputtered lanthanum hexaboride film thickness on field emission from metallic knife edge cathodes (M.S.)	2012
Brian Kupczyk		Effect of window charging on X-band, distributed microwave breakdown (M.S.)	2013
Jason Hummelt	J. Scharer		
David Holmquist	J. Scharer		
Matt Kirley		Electrical conductivity at terahertz frequencies (Ph.D.)	2014
Ryan Jacobs	(w/ D. Morgan)	Density functional theory-based modeling of cathode materials for electronic and electrochemical systems (Ph.D.)	2015
Erik Aiken	(w/ S. Hagness)	Enhancements and applications of electroporation (Ph.D.)	Expected 2018
Xun Xiang	(w/ J. Scharer)	Characterization of rapid, high power microwave Penning discharges using optical spectroscopy	Dec 2016
Eric Wagner	(w/ N. Behdad)		
Fuqiang Gao	S. Hagness	Contrast-enhanced microwave detection and treatment of breast cancer (Ph.D.)	2014
D. Enderich	(w/ N. Behdad)	Emittance of field emission electron beams from carbon nanotube rope fibers (Ph.D.)	Expected 2018
Paul Carrigan		Ultrarapid distributed plasma discharges using high power x-band microwaves (Ph.D.)	

Chien Hao Liu	N. Behdad	Investigation of EM wave tunneling phenomenon and the impact of microwave induced breakdown for high-power-microwave (HPM) applications (Ph.D.)	2014
Tyler Rowe	(w/ N. Behdad)	Resistive wall amplifier sources of high power microwave radiation using metamaterials (Ph.D.)	May 2017
Konstantinos Mavrakakis	(w/ N. Behdad)	Metamaterial optics for millimeter-wave and terahertz-regime radiation (Ph.D.)	Expected 2019
Alex Haufler	(w/ S. Hagness)	Microwave imaging for evaluation of cranberry harvest properties (Ph.D)	TBD
Nathan Strachen	(w/ N. Behdad)	Extra Low Frequency Radiation sources and Non-Foster Circuits for ultra broadband impedance matched dipole antennas (Ph.D.)	TBD
Lin Lin	(w/ D. Morgan)	Advanced thermionic cathodes (Ph.D.)	TBD
Dongzheng Chen	(w/ D. Morgan)	Advanced thermionic cathodes (Ph.D.)	TBD
Tianyu Ma	(w/ D. Morgan)	Advanced thermionic cathodes (Ph.D.)	TBD
Wyatt Rufener	(w/ N. Behdad)	Reconfigurable metasurfaces for actively steered reflectarrays (M.S.)	Dec 2017
Patrick Forbes	(w/ N. Behdad)	Oscillation-stablized metamaterial enhanced resistive wall amplifiers	tbd
Stephen Dennison	(w/ N. Behdad)	Helix-based metamaterial-enhanced resistive wall amplifier	TBD
Zhongtang Zhang	(w/ N. Behdad)		TBD
Sasha Siy	(w/ N. Behdad)		
Zhe Yang	(w/ N. Behdad)		
Muhammadiz ?	(w/ N. Behdad)		

ii. Post-doctoral Scholars Supervised or Co-supervised

Lin Zhang
Wei Wang
John Foster (with A. Wendt)
Yasmin Andrew (with A. Wendt)
Kamlesh Jain
Sudeep Bhattacharjee
Ryan Jacobs
Hung Luyen

iii. Undergraduate Independent Study Research Students

Greg Schiller
Dan Grellinger
Akbar Sayeed
Saviz Artang

Wens Gerdyman
Tung Le
Shen Hsiao Tan
Richard Schencker
Ram Jambunathan
Mark Yaklich

Boris Ratchev
Jim Anderson
David Hass
Tom Wadzinski
Jason Corliss
Yu Hin Lam
Phil Normand
Wai-Chun Warren Wu
Jason Carden
John Verberkmoes

Mike Gemelke
Len Rauth
Kervin Kraus
Angela Klawes
Augustina Ohuoha
Mark McNeely
Ryan Thompson
Cubie Harris
Luci Cubbin
Katrina Mente

Nancy Zjaba
Dina Arnott
Steven Hipp
Jim Moeller
Geoff Noakes
Ryan Perkofski
Brian Metrish
Jassem Shahrani
Neil Wagner
Michael Collins

Bonnie (Pui Li) Shum
Min Ki Choi
Ryan Shows
Dina Hagl (w/ S. Hagness)
Emily (Yuet) Ching (w/ S. Hagness)
Chad Marchewka
John Welter
Wyatt Buhr
Saurav Bardhan

Baron Reznik

Kevin McLaughlin
Stephen Kennedy (w/ S. Hagness)
Al Mashal
Paul Larsen
Poliang Lin (w/ S. Hagness)
Amy Marconnet (w/ N. Ferrier)
John Perry
Dan Springmann
Sean Sengele
Mike He

Mike Hitchcock (w/ S. Hagness)
Sam Drezdzon
Xin Zhang
John Jacob (JJ) Lipor
Gabriel Johnson
Jonathan Hedstrom
Rafael Viloria
Nicole Rockweiller (w/ S. Hagness)
Alex Marconnet
Natalie Nelson

Vidhya Madhavan
Eric Meunier
Arjun Dias
Adam Hahn
Kaytlyn Beres
Samantha Kamin
Johnathan Alsop
Yue Weng Mak
Kenton Yeates
Alejandra Lopez

Minglei Huang
Marcus Weber
Adam Frees
Brian Kilberg (w/ S. Hagness)
Adam Peczalski
Nils Carlsson
Da Cao
Mitch Beres (w/ S. Hagness)
Erik Aiken (w/ S. Hagness)
Yixiao Wang

Matthew Jensen
Matthew Vandertie
Joel Neher (w/ N. Behdad)

Abelardo Garcia
Patrick Barrett (w/ H. Jiang)
Kevin Houck
Arjun Seshadri
Siyuan (Richard) Yu
Emily Ayaya
Patrick Forbes

Wyatt Rufener
Tristan Steiner
Tom Schutte
Yi Shen
Ashley Zagaros

VIII. Professional Service

a. State, National, or International

- Referee for *Physical Review Letters, Physics of Plasmas, IEEE Trans. on Electron Devices, Int'l Journal of Electronics, Nuclear Fusion, Journal of Quantum Electronics, Nature, Philosophical Magazine A, Laser and Particle Beams, Physical Review E, J. Vacuum Science and Technology, IEEE Trans. Microwave Theory and Techniques, IEEE Trans. Plasma Science, Journal of Applied Physics, Materials Letters, Applied Physics Letters, Physics Review Special Topics-Accelerators and Beams, Chemical Physics, Chemistry of Materials, Physics in Medicine and Biology, IEEE Spectrum, IEEE Transactions on Terahertz Science and Technology, Journal of Applied Physics*
- Reviewer, grant proposals, U.S.Department of Energy., NSF, US Civilian Research and Defense Foundation, Air Force Office of Scientific Research, Army Research Office
- ExCom member of the Plasma Science and Applications Committee of the IEEE Nuclear and Plasma Sciences Society (1993-1996). Chair of membership subcommittee
- Session Chair and Technical Program Committee member for many scientific and professional conferences, including Electrical and Computer Engineering Department Heads Association (ECEDHA) Annual Conference, ECEDHA Great Lakes Region Annual Meeting, Materials Research Society Annual Meeting, American Ceramic Society Annual Meeting, IEEE Int'l Conf on Plasma Science, IEEE Int'l Vacuum Electronics Conference, Annual Vacuum Electronics Review Conference, World Congress on Microwave and RF Plasma Processing, American Physical Society Division of Plasma Physics Annual Meeting, AMPERE international conference on microwave and high frequency heating, and numerous miscellaneous other workshops and conferences.
- Co-Guest Editor, IEEE Trans. Plasma Science, 8th Special Issue on High Power Microwave Generation (1998-2000)
- Organized IEEE Minicourse, June 22-23, 2001, "Innovative Vacuum Electronics", held in conjunction with IEEE Pulsed Power and Plasma Science Conference, 2001.
- Editor, Proceedings of select papers from the 3rd World Congress on Microwave and RF Processing, Spring 2002, Sydney, Australia
- Chair, External Ten-Year Review Committee, University of Maryland's Electrical and Computer Engineering Department (2010).

- Editorial Committee, ECE Dept Heads Association News magazine, *ECE Source* (2013-14)
- U.S. Naval Research Laboratory External Review Committee: Electronics Science and Technology Division's Science and Technology Program (June 24-26, 2013) and (June 13-15, 2016).
- Regional President, Great Lakes Section, ECE Department Heads Association (2015-present)

b. University/Department

- Member of numerous UW-Madison ECE department committees and service roles, including Graduate Committee, ECE graduate program entrance screening exam (Q1) committee, ECE Strategic Planning Task Force, ECE Salary and Merit Evaluation Committee, UW-Madison ECE Department Tenure, Promotions and Review Committee, ECE ABET 2000 Accreditation Ad Hoc Committee, Faculty Mentor to Assistant Professors (Steve Gearhart, Susan Hagness, Hongrui Jiang), Ad Hoc Workload Committee, ECE Undergraduate Advising Committee, ECE Faculty Liaison for Badger Amateur Radio Society, Faculty Advisor to Eta Kappa Nu (EE Honor Society), ECE Dept faculty search and recruitment committee, ECE Ad Hoc Committee to Examine Departmental Leadership, ECE Budget & Planning & Space Committee, Education Innovation Committee, Peer reviewer for numerous assistant professors' teaching, served on many prelim and dissertation committees
- **Chair** of numerous ECE committees, including, ECE Ad Hoc Committee for Revised Student Teaching Evaluations, ECE Graduate Fellowships and Recruitment committee, ECE Ad Hoc Working Group on Peer Review of Teaching, ECE Ad Hoc Committee for Development of a Peer Teaching Review Process for Assistant Professors, ECE 5-year Strategic Planning Committee (2006-07)
- Member of numerous College of Engineering committees and service roles, including Materials Science Advisory Committee (Mat.Sci. Prog.), Ad Hoc committee on biomaterials in the Materials Science Program, Ad Hoc committee on future of materials at UW-Madison, Member of UW-Madison Teaching Academy (active member 1994-1999), Executive committee of NSF Engineering Researcd Center for Plasma-Aided Manufacturing, Selection committee for Bollinger Outstanding Staff Member Award, Materials Science Program Doctoral Screening Exam Committee Post-tenure Review Committee for Assoc. Dean of Engineering and Professor of Nuclear Engineering, Gregory Moses, UW-Madison College of Engineering Dean Search Committee, CoE Byron Bird Research Excellence Award Selection Committee, Benjamin Smith Reynolds Award Committee (UW CoE), CoE 2010 Roundtable Discussion Group, UW College of Engineering Academic Planning Council, UW College of Engineering Executive Committee, UW-Madison College of Engineering Operating Committee, Materials Science Center Executive Committee, UW-Madison College of Engineering Academic Planning Council, UW-Madison College of Engineering Strategic Planning Committee, UW-Madison College of Engineering Leadership Council
- **Chair** of numerous UW-Madison College of Engineering committees, including UW-Madison Internal 10-Year Review Committee for Mechanical Engineering Department, CoE Byron Bird Research Excellence Award Selection Committee, COE Leadership Council
- Member of numerous UW-Madison campus committees or service roles including Selection Committee on Distinguished Teaching Awards, Physical Sciences divisional subcommittee for 1999 UW-Madison ten-year reaccreditation review, Faculty mentor in the Chancellor's Scholars Program, Graduate School Research Committee (Physical Sciences Division), UW-Madison Permanent PI Status Committee, UW Ten-Year (2009) Reaccreditation Steering

Committee, University Library Committee (2012), UW-Madison DELTA Achievement Gap Study Advisory Board (2011-13), UW-Madison Year of Innovation Steering Committee (2012-13), UW-Madison Provost's Space Use Optimization Study Working Group (2013-14), UW-Madison Provost's Ad Hoc Committee on Student Data Governance (2013-14), UW-Madison Provost's Ad Hoc Committee on Instructional Space Optimization (2014-2015), UW-Madison Provost's Ad Hoc Committee on Learning Space Remodeling (2015-16), UW-Madison Provost's Ad Hoc Committee on Restructuring Cross-Campus Teaching and Learning Initiatives (2015-2016), Executive Council University of Wisconsin-Madison Collaborative for Advancing Teaching and Learning (2016-present), Teaching and Learning Technology Advisory Group (TLTAG, 2015 – present), TLTAG subcommittee on digitally-enhanced testing (2017-2018).

- **Chair** of UW-Madison committees including UW-Madison, Selection Committee on Distinguished Teaching Awards, UW-Madison Permanent PI Committee, UW-Madison Re-Accreditation Self-Study Theme Team, "Preparing Global Citizens and Global Leaders" (co-Chair), UW-Madison working group to establish Wisconsin Collaboratory for Enhanced Learning (WisCEL), including lead author of Madison Initiative for Undergraduates partial-funding proposal
- Workshop leader, NSF-sponsored Engineering Education Scholars Program, UW-Madison (1996-98)
- Director, University of Wisconsin Interdisciplinary Materials Science Program (2001-05)
- Director, Wisconsin Collaboratory for Enhanced Learning (WisCEL) see http://www.wiscel.wisc.edu (2010-present)
- Chair, Electrical and Computer Engineering Department (2009-2018)

IX. Consulting

- The Rubbright Group, Inc., St. Paul, MN. Products for microwave food packaging (1996-7)
- Rath Manufacturing, Janesville, WI. Suspended anvil technology for seamless welded tubing manufacture (1998-2000)
- Outboard Marine Corporation, Waukesha, WI. Magnetic circuit design for fast-actuating engine valve (1998)
- Northrop Grumman Corporation, Electronic Sensors and Systems Sector, Rolling Meadows, IL. Advanced vacuum electronics technology development for microwave, millimeterwave, and submillimeter wave products (2000-01)
- Calabazas Creek Research, Inc. Ultra rapid microwave annealing of silicon semiconductors (2003-4)
- Northrop Grumman Corporation, Rolling Meadows, IL. Design and fabrication of THz regime vacuum electronic radiation sources (2005)
- Teraphysics, Inc., Design advisor for microfabricated submillimeter-wave TWTs (2016).

X. Patents

1. "Multi-moded Ergodic Microwave Cavity Applicator," J.H. Booske, U.S. Patent # 5,250,772. Oct. 5, 1993.

2. "Ultra-Shallow Junction Semiconductor Device Fabrication Method," J.H. Booske and S. Gearhart, U.S. Patent #5,672,541. Sept. 30, 1997.

3. "Method of bonding a stack of layers by electromagnetic induction heating," K.J. Thompson, J.H. Booske, Y.B. Gianchandani, R.F. Cooper, U.S. Patent No. 6,951,798, October 4, 2005.

4. "Tunable Spatial Phase Shifter," N. Behdad, J.H. Booske, Patent US 9640867 B2, May 2, 2017.

5. "Perovskites as ultra-low work function electron emission materials," RM Jacobs, D Morgan, J Booske, US Patent App. 15/372,726 (2017).

6. "Wideband, Polarization Rotating Phased Array," N. Behdad, Z. Yang, Hung Luyen, J. Booske, Invention disclosure submitted to WARF in 2017. WARF accepted to file for a patent. Currently in the process of drafting the patent.

7. "Mechanically based magneto-inductive transmitter with electrically modulated reluctance," N.D. Strachen, N. Behdad, J. Booske, invention disclosure made to WARF (2018).

8. "*In Vivo* gene therapy delivery procedure and device," E.J. Aiken, S.C. Hagness, J.H. Booske, H.W. Sollinger, P.F. Laeseke, T. Alam, invention disclosure made to WARF (2018).

XI. Invited Colloquia and Seminars

1. "Gain Saturation in a TEA CO_2 Laser Amplifier," University of Michigan, Ann Arbor, MI, February 1982.

2. "Experiments on Whistler Mode ECRH Plasma Startup and Heating in an Axisymmetric Magnetic Mirror," University of Maryland, College Park, MD, February 1985.

3. "Whistler Mode Heating and Emission Experiments in an Axisymmetric Mirror," TRW, Redondo Beach, CA, June 1985.

4. "Reconstruction Analyses for Non-Maxwellian Mirror Plasma Diagnostics," Naval Research Laboratory, Washington, D.C. April 17, 1986.

5. "Reconstruction Analyses for Non-Maxwellian Mirror Plasma Diagnostics," Laboratory for Plasma and Fusion Energy Studies, University of Maryland, College Park, MD, May 5, 1986.

6. "Spontaneous Wiggler Emission: A Nonperturbing FEL Beam Diagnostic?," Laboratory for Plasma and Fusion Energy Studies, University of Maryland, College Park, MD, July 16, 1987.

7. "Free Electron Lasers Using Short Period (Electromagnet) Wigglers," West Virginia University, Morgantown, W.VA, January 28, 1988.

8. "Research of Sources and Applications for Electron Cyclotron Resonance Heating (ECRH) of Plasmas," Michigan State University, E. Lansing, May 20, 1988.

9. "Short Period Wiggler Free Electron Lasers: Status of Research at the University of Maryland," Massachussetts Institute of Technology, Cambridge, MA, July 25, 1988.

10. "Millimeter-Wave Short-Period Wiggler Free Electron Lasers for High Power ECRH in Fusion Experiments," University of Washington, Seattle, WA., September 16, 1988.

11. "Feasibility and Applicability of Millimeter-Wave, Short-Period Wiggler, Free Electron Laser Oscillators," Electrophysics Seminar, University of Maryland, College Park, MD., October 7, 1988.

12. "ECRH Mirror Plasmas for Highly Charged Ion and Soft X-Ray Sources," Plasma Physics Seminar, University of Maryland, College Park, MD, November 21, 1988.

13. "Short Period Wiggler Free Electron Lasers as CW Sources for Fusion Plasma ECRH at 300 GHz," Electrical Engineering Departmental Seminar, University of Wisconsin, Madison, WI, April 17, 1989.

14. "Practical Aspects of Constructing, Operating and Diagnosing Experimental Short Period Wiggler Free Electron Laser Oscillators," Special Topics Seminar, University of Wisconsin, Madison, WI, September 21, 1989.

15. "Fundamental and Applied Physics Issues in Microwave Sintering of Ceramics," Laboratory for Plasma Research, University of Maryland, College Park, MD, Aug. 20, 1990.

16. "Microwave Sintering of Ceramics," ECE Faculty-Graduate Student Seminar, University of Wisconsin, Madison, WI 53706, October 15, 1990.

17. "The Physics of Microwave Sintering," Nuclear Engineering Dept. Seminar, University of Michigan, Ann Arbor, MI, July 22, 1991.

18. "Nonthermal Effects in Microwave Ceramic Sintering," Materials Science Seminar Series, University of Wisconsin-Madison, Madison, WI, February 6, 1992.

19. "Recent Knowledge Base Advances in Understanding Microwave-Ceramic Interactions," University of Florida, Materials Science Dept. Seminar, Gainesville, FL, October 31, 1994.

20. “A Plasma-Source-Ion-Implantation-Assisted approach to Ultra-Shallow Doping of Silicon Semiconductors,” Michigan State University, Electrical Engineering Departmental Seminar, East Lansing, MI, Sept. 23, 1996.

19. “Wisconsin research activities in microwave power sources and applications”, Cedar Rapids, IA IEEE Chapter Seminar, Cedar Rapids, IA, Aug. 20, 2002.

20. “Innovative Vacuum Electronics Research at the University of Wisconsin,” Northrop Grumman Electron Devices, San Carlos, CA , Aug. 26, 2002.

21. "University of Wisconsin Microwave Vacuum Electronics Research," L-3 Communications Electron Devices, San Carlos, CA, Aug. 25, 2003.

22. "Microfabrication for Vacuum Electronics: The Good, the Bad, and the Ugly," Los Alamos National Laboratory, Los Alamos, NM, Oct. 29, 2003.

23. "Vacuum Electronics Research at the University of Wisconsin: Recent Past, Present, and Near Future," L-3 Communications Electron Devices, San Carlos, CA, Aug. 23, 2004

24. "Modern TWTs and vacuum electronics: These are not your father's vacuum tubes," Michigan State University, Electrical and Computer Engineering Distinguished Seminar Speaker, East Lansing, MI, October 28, 2004.

25. "Chaos Microwave Transmitters for Advanced Communications and Radar," UW-Madison Chaos and Complex Systems Seminar, Sept 7, 2004.

26. "Vacuum Electronics Research at the University of Wisconsin," J.H. Booske, Seminar at L3-Communications, Electron Devices, San Carlos, CA, August 26, 2005.

27. "Microfabrication of miniature components for millimeter wave and terahertz regime vacuum electronic devices," Invited Seminar, U.S. Naval Research Laboratory, Washington, D.C., January 20, 2006.

28. "What's Hot and What's Not: How Microwave Fields Transfer Energy to Materials for Heating and Even Stranger Effects," Seminar, University of Huddersfield, Huddersfield, UK, March 2, 2006.

29. "What's Hot and What's Not: How Microwave Fields Transfer Energy to Materials for Heating and Even Stranger Effects," Seminar, University of Manchester, Manchester, UK, March 6, 2006.

30. "What's Hot and What's Not: How Microwave Fields Transfer Energy to Materials for Heating and Even Stranger Effects," Seminar, University of Central Lancashire, Preston, UK, March 7, 2006.

31. "What's Hot and What's Not: How Microwave Fields Transfer Energy to Materials for Heating and Even Stranger Effects," Seminar, University of Nottingham, March 9, 2006.

32. "What's Hot and What's Not: How Microwave Fields Transfer Energy to Materials for Heating and Even Stranger Effects," Seminar, University of Edinburgh, March 23, 2006.

33. "What's Hot and What's Not: How Microwave Fields Transfer Energy to Materials for Heating and Even Stranger Effects," Seminar, Loughborough, UK, March 29, 2006.

34. "Microwave Effects in Microwave Processing of Materials," Seminar, University of Nottingham, Nottingham, UK, April 3, 2006.

35. "Microwave Effects in Microwave Processing of Materials in the UK," Seminar, Bayreuth Unversity, Bayreuth, GE, April 4, 2006.

36. "Vacuum Electronics Research at the University of Wisconsin," J.H. Booske, Seminar at L3-Communications, Electron Devices, San Carlos, CA, August 21, 2006.

37. "Vacuum Electronics Research at UW-Madison," J.H. Booske, Seminar at L3-Communications, Electron Devices, San Carlos, CA, August 20, 2007.

38. "Plasma Physics Challenges of mmwave – THz and High Power Microwave Generation", J.H. Booske, Plasma Physics Seminar, UW-Madison, Nov. 19, 2007.

39. "Ab-initio modeling of cathode work function modification with thin surface coatings," D. Morgan, V. Vlahos, and J.H. Booske, Air Force Research Laboratory, Wright Patterson Air Force Base, May 29, 2008.

40. "Vacuum Electronics Research at UW-Madison," J.H. Booske, Seminar at L3-Communications, Electron Devices, San Carlos, CA, August, 2008.

41. "Vacuum Electronics Research at UW-Madison," J.H. Booske, Seminar at L3-Communications, Electron Devices, San Carlos, CA, August, 2009.

42. "Vacuum Electronics Research at UW-Madison," J.H. Booske, Seminar at L3-Communications, Electron Devices, San Carlos, CA, August, 2010.

43. "Vacuum Electronics Research at UW-Madison," J.H. Booske, Seminar at L3-Communications, Electron Devices, San Carlos, CA, August 22, 2011.

44. "Learning New and Old Knowledge in the 21st Century," J.H. Booske, ECE department seminar at University of Utah, Salt Lake City, Utah, January 27 2012.

45. "Back to the Future: 21st Century Instruction Innovations in Higher Education," J.H. Booske, University of Michigan, Ann Arbor, MI, October 12, 2012.

46. "Blended Learning (or flipped classroom): Including "How" Examples," J.H. Booske, University of Michigan, Ann Arbor, MI, October 12, 2012.

47. "Back to the Future: 21st Century Instruction Innovations in Higher Education," J.H. Booske, University of New Mexico, Albuquerque, NM, November 26, 2012.

48. "Blended Learning (or flipped classroom): Including "How" Examples," J.H. Booske, University of New Mexico, Albuquerque, NM, November 26, 2012.

49. "Vacuum Electronics Research at the University of Wisconsin," J.H. Booske, L3 Communications, Electron Devices Division, San Carlos, CA, November 2, 2012.

50. "Introduction to Wisconsin Collaboratory for Enhanced Learning," J.H. Booske, presentation to Chancellor/Provost Campus Leadership Council, January 11, 2012.

51. "Wisconsin Collaboratory for Enhanced Learning," J.H. Booske and S. Smith, presentation to Provost's Executive Group, February 15, 2012.

52. "Wisconsin Collaboratory for Enhanced Learning," S. Smith and J.H. Booske, presentation to Instructional Communication Systems, February 21, 2012.

53. "Wisconsin Collaboratory for Enhanced Learning," presentation (and tour) to DEMCO executives (library and educational materials company), C. Kruse, D. Luke, S. Smith, S. Frye, and J.H. Booske, March 23, 2012.

54. "Wisconsin Collaboratory for Enhanced Learning," Showcase 2012, Innovations and Improvements Poster Session, J.H. Booske, S. Smith, M. Morrow, R. Witt, E. Aiken, S. Malekpour, C. Kruse, M. Plesha, S. Fife, C. Carlson-Dakes, D. Moe, March 27, 2012.

55. "Wisconsin Collaboratory for Enhanced Learning," Showcase 2012 Innovations and Improvements Chairs Chat presentation, J.H. Booske, S. Smith, March 27, 2012.

56. "Wisconsin Collaboratory for Enhanced Learning,", S. Smith and J.H. Booske, Flashtalk Session presentation,UW-Madison Year of Innovation Event, March 27, 2012.

57. "Wisconsin Collaboratory for Enhanced Learning," J.H. Booske, presentation and tour, CIC (Committee on Institutional Cooperation) Undergraduate Education Group, April 20, 2012.

58. "Wisconsin Collaboratory for Enhanced Learning," J.H. Booske, College of Engineering Industrial Advisory Board Meeting, April 13, 2012.

59. "Flipped Classroom Instruction," S. Smith and J.H. Booske, DELTA Center for the Integration of Research, Teaching and Learning (CIRTL) Roundtable, April 17, 2012.

60. "Wisconsin Collaboratory for Enhanced Learning," J.H. Booske and S. Smith, DELTA Center for the Integration of Research, Teaching, and Learning (CIRTL) Roundtable, April, 17, 2012.

61. "Blended Learning: 'How' Examples," J.H. Booske, presentation as part of the UW-Madison Provost's Office workshop on "Blended Learning in Engineering: A College-Wide Approach to Educational Innovation," May 10, 2012.

62. "What Working Memory Research tells us about efficient teaching and learning," J.H. Booske, WisCEL Instructor's Workshop, J.H. Booske, May 18, 2012.

63. "Shared best and worst practices from teaching in WisCEL," J.H. Booske, M. Morrow, and S. Malekpour, WisCEL Instructor's Workshop, May 18, 2012.

64. "Wisconsin Collaboratory for Enhanced Learning," S. Smith and J.H. Booske, 2012 Teaching and Learning Symposium, May 24, 2012.

65. "Wisconsin Collaboratory for Enhanced Learning," S. Smith, C. Kruse, D. Helman, and J. Booske, Council of University of Wisconsin Libraries conference 2012, June 4, 2012.

66. "Wisconsin Collaboratory for Enhanced Learning," J. Booske and S. Smith, Facilities Management Conference presentation and tour, June 19, 2012.

67. "Wisconsin Collaboratory for Enhanced Learning," S. Smith and J. Booske, Teaching and Learning in the Animal Sciences Conference, presentation and tour, June 21, 2012.

68. "Wisconsin Collaboratory for Enhanced Learning," J. Booske and S. Smith, 2012 HHMI/NAS Summer Intitute (Institutional Change for Teaching in the Life Sciences), presentation and tour, June 26, 2012.

69. "Wisconsin Collaboratory for Enhanced Learning," S. Smith and J. Booske, overview presentation and tour, University of Surrey-Gildford Deans, June 29, 2012.

70. "Wisconsin Collaboratory for Enhanced Learning," S. Smith and J. Booske, 2012 Faculty Institute on Teaching, overview presentation and tour, August 24, 2012.

71. "Wisconsin Collaboratory for Enhanced Learning," S. Smith and J. Booske, UW-Madison Year of Innovation, Flash Talk Session presentation, October 9, 2012.

72. "Wisconsin Collaboratory for Enhanced Learning (WisCEL): College Instruction for the 21st Century," J.H. Booske, Seminar for 2012 Engineer's Day, October 26, 2012.

73. "Wisconsin Collaboratory for Enhanced Learning (WisCEL): College instruction for the 21st Century," J.H. Booske, presentation to ABET accreditation site visit team, November 12, 2012.

74. "Blended Learning: 'How' Examples", J.H. Booske, part of the "First Hand Experiences in Blended Learning" workshop series (see http://www.engr.wisc.edu/news/archive/2012/Sep04.html), November 14, 2012.

75. "Wisconsin Collaboratory for Enhanced Learning," S. Smith, E. Fahlberg, J. Jura, J. Booske, Active Learning Workshop (WisCEL and School of Nursing), November 30, 2012.

76. "Wisconsin Collaboratory for Enhanced Learning," S. Smith and J. Booske, Library and Information Literacy Instruction Meeting, December 12, 2012.

77. "Wisconsin Collaboratory for Enhanced Learning," J. Booske and S. Smith, overview presentation to University of Wisconsin-Milwaukee Architecture and Planning Office leadership and staff (video conference meeting, Jan 32, 2013.

78. "Blended learning: a brief and practical description," J.H. Booske, overview presentation to EGR advisors in UW-Madison College of Engineering, (UW-Madison, March 6, 2013).

79. "Wisconsin Collaboratory for Enhanced Learning," J.H. Booske, overview presentation and tour, UW-Madison University Library Committee (UW-Madison, April 11, 2013).

80. S. Mason and J.H. Booske "Wisconsin Collaboratory for Enhanced Learning," overview presentation and Q&A session, Letters and Science Board of Visitors, (UW-Madison, April 18, 2013).

81. "Experiencing and Understanding the Student Learning Experience in WisCEL Classrooms Using a Flipped Instructional Model," E. Osthoff, S. Mason, and J. Booske, UW-Madison Annual Teaching and Learning Symposium, May 22-23, 2013.

82. "Vacuum Electronics Research at the University of Wisconsin," J.H. Booske, L3 Communications, Electron Devices Division, San Carlos, CA, August 19, 2013.

83. "Electricity: the touch-free tool," J.H. Booske, SoundWaves event, *Getting the Job Done: Humans and the Tools We Use* (May 10, 2013, Wisconsin Institutes for Discovery) (http://discovery.wisc.edu/home/discovery/recorded-lectures/soundwaves/).

84. "Quality, quantity and diversity of feedback in WisCEL courses enhances relationships and improves learning," J.H. Booske, Teaching and Learning Excellence, UW-Teaching Academy 2013 Fall Kickoff Symposium (UW-Madison, October 4, 2013).

85. "Vacuum Electronics Research at the University of Wisconsin," J.H. Booske, L3 Communications, Electron Devices Division, San Carlos, CA, August 18, 2014.

86. "Vacuum Electronics Research at the University of Wisconsin," J.H. Booske, L3 Communications, Electron Devices Division, San Carlos, CA, August 2015.

87. "Vacuum Electronics Research at the University of Wisconsin," J.H. Booske, L3 Communications, Electron Devices Division, San Carlos, CA, August 2016.

88. "Vacuum Electronics Research at the University of Wisconsin," J.H. Booske, L3 Communications, Electron Devices Division, San Carlos, CA, August 2017.

XII. Principal Accomplishments or Citations

a. Administration

- As ECE Department Chair
  - Led the hiring of 16 new faculty (15 assistant professors and 1 associate professor)
  - Inspired, led and/or facilitated broad engagement of department faculty in education innovation efforts, including blended learning, flipped classroom instruction, and expansion of online learning opportunities for undergraduate summer enrollment access and course-only master's EE degree.
  - Led a major remodeling design and implementation yielding new *active learning* ECE classrooms for theory, instructional laboratory, and senior capstone design courses
  - Oversaw the first major increase in student interest and enrollment demand for ECE since a large drop in 2005.
  - Introduced and established department culture and tradition for annual strategic planning
    - Initiated department-wide 5 year strategic plan development (2014-2015).
    - Initiated and led intentional department-wide strategic planning (2006-2013) that was the first to comprehensively engage all faculty and staff, as well as student and external constituents
  - Led department (faculty and staff) through shared governance decisions on how to allocate or invest department discretionary resources including overhead return funds, intellectual property revenues, etc.

- Led recruitment of exceptional talent in new faculty (13), academic staff (4), and administrative staff (12)
- Led first major revision of undergraduate EE curriculum in 25 years.
- Oversaw new approach to philanthropy development within ECE with significant success
    - First department chair to engage majority (> 80%) of External Advisory Board members in annual philanthropic giving to department
    - Led 4X increase in annual discretionary giving (from ~ 70k$/yr to ~275K$/yr), 3X increase in number of annual donors (from ~175/yr to ~525/yr), and 2X increase in department's endowment (from ~12M$ to ~24M$).
    - Successfully solicited annual giving from Qualcomm, Inc, to support the Qualcomm Innovation Prize Competition (2009-14), after which it was turned over to the College of Engineering
    - Successfully secured two naming gifts (@ $200,000) to two new state-of-the-art active learning classrooms
        - Plexus Active Learning Collaboratory (92 seat active and blended learning facility suitable for conventional as well as instructional laboratory use)
        - Qualcomm Senior Design Labs (two 25+ seat collaborative capstone design course classrooms)
- Provided leadership of ~43 tenured or tenure-track faculty, 6 instructional faculty, 6 administrative staff and ~ 800 undergraduate and ~350 graduate students.

- Director (2010-present), Wisconsin Collaboratory for Enhanced Learning (WisCEL).
    - Campus-wide, national-exemplar, state-of-the-art facility supporting innovative education methods emphasizing practice-intensive, student-centered, small-group-collaborative learning, heavy usage of instructional technologies, and immediate individualized feedback to students.
    - Led conceptualization, design, renovation and development phase involving ~ 2.6M$ initial capital renovation budget and and a highly interdisciplinary, cross-campus team of over 20 persons
    - Worked with Vice Chancellor for Administration and Vice Provost for Teaching and Learning, Library Directors, Deans, Registrar, DoIT, FP&M, etc., and led the renovation (funding, design, logistics, etc) of two initial sites (College Library and Wendt Commons). Renovations completed by November 2011. First full-scale use instruction scheduled began in January 2012. Came in under budget and on time.
    - ~ 1 M$/yr total annual operating budget
    - See partial list of recognitions as a national model for 21st century classrooms and innovative education in Section VII.a.v
    - See http://www.wiscel.wisc.edu/
- Past notable leadership service
    - Chaired the 10-year institutional review of the UW-Madison Mechanical Engineering Department (1998-99)
    - Director of the UW-Madison's Interdisciplinary Materials Science Program (2001-05). Led redesign of curriculum and graduate student evaluation procedures (e.g., qualifiers, prelims, etc), adding flexibility needed for an Interdisplinary Program; improved graduate student recruitment processes, and added faculty in key new areas such as organic and bio-materials, nano-science, and computational materials science.
    - UW-Madison College of Engineering Dean Search Committee (1998-99)
    - Performance Review Committee for UW-Madison's College of Engineering Dean Paul Peercy (2006-07)

- Steering Committee, UW-Madison Institutional 10-year Reaccreditation (2007-2009); Co-Chaired Theme Team 4 of self-study: "Preparing global citizens and leaders of the future"

b. Research

- Citation Statistics (updated October 2017):
  - Web of Knowledge: *h*-index: 31; citations: 4,138, publications: 228, average citations per item: 18.2.
  - Google Scholar: *h*-index: 39; citations: 7511; i10 index: 115
  - Harzing's Publish or Perish: *h*-index: 39; citations: 7,590; papers: 550; average citations per item: 13,8; *g*-index: 80
- Lead scientist on development of a 1 MW average power, 100-300 GHz sheet beam free electron laser for fusion plasma heating
- Invented novel method for stable focusing of low-voltage sheet electron beams enabling high-average-power millimeter-wave amplifier tubes using periodically-cusped magnetic fields.
- Co-discovered, isolated, and characterized a microwave-field-induced driving force that enhances solid state reaction rates during microwave heating by enhancing ionic diffusion in materials. This mechanism leads to accelerated reactions or lower reaction temperatures for microwave versus conventionally-heated materials.
- Co-developed and experimentally verified the first comprehensive, quantitatively-accurate, predictive theory for microwave absorption in ionic crystalline solids, including the effects of point defects. This model provides a first-principles explanation of microwave absorption characteristics that lead to thermal runaway during microwave ceramics processing.
- Directed the development and demonstration of a successful pitting-corrosion-passivation treatment of aluminum alloy 6061 using plasma-source-nitrogen-ion-implantation
- Directed the development and demonstration of a successful corrosion-passivation of bearing steel alloy (52100) using plasma-source-nitrogen-ion-implantation
- Co-invented a hazardous-gas-free, novel process for shallow-junction doping of silicon by boron using recoil ion implantation of a thin sputter-deposited dopant film.
- Directed the development of an improved method for TiN thin film synthesis using plasma source ion implantation as a superior diffusion barrier for copper metallization on silicon.
- Co-directed a research investigation of ionized magnetron sputter deposition (ionized PVD) examining its effectiveness as a method for copper metallization in advanced integrated circuit fabrication.
- Developed the basic physical understanding of nonlinear physics underlying signal distortions in vacuum electronic traveling wave tube amplifiers. The results of this knowledge have been applied in industry to design broadband linear high power microwave amplifiers for advanced communications and electronic warfare applications.
- Co-invented methods of rapid electromagnetic induction heating of silicon for applications in semiconductor annealing and wafer bonding.
- Co-invented micromachined, THz-regime, traveling wave tube amplifiers as 0.001 – 1 W sources of 300 GHz – 1 THz coherent radiation. First prototype using Booske's group's ideas was demonstrated by Northrop Grumman Corporation in 2007.
- Pioneer in the field of "microVEDs" (micro-vacuum-electronic-devices) for high power millimeter-wave and terahertz regime sources

- Co-investigator on a comprehensive and definitive characterization of the microwave properties of human breast tissue relevant to developing low-cost, high-resolution microwave imaging and treatment methods for early stage breast cancer tumors.
- Co-director of the investigation of conducting nanoparticles as contrast agents for microwave detection and treatment of early stage breast cancer tumors.
- Co-director of development of electroporation methods and applications for inducing controlled porosity in biological cell membranes
- Co-invented methods of silicon sample preparation to enable LEAP atom probe microscopy yielding 3D volumetric atom maps of Si microelectronic devices and features.
- Director of Dept of Defense Multidisciplinary University Research Initiative (MURI 2004-2009) multi-university consortium researching field-induced emission of electrons from high voltage cathodes and RF-induced breakdown on air-side of High Power Microwave Source vacuum windows (Participating universities included UW-Madison, UC-Berkeley, MIT, Texas Tech, U Michigan).
- Director of research of advanced, high current density vacuum electronic cathodes for high power microwave sources.
- Led research yielding a comprehensive understanding of surface resistivity of semiconductors and metals at millimeter and THz-regime frequencies, including the effects of surface imperfections (e.g., roughness, grain boundaries, impurities).
- Directed research revealing the mechanism responsible for frequency tuning characteristics of regenerative TWT oscillators for THz frequencies. (2007-2009)
- Director of U.S. Dept of Defense 5-university consortium to research a self-ignited distributed plasma discharge window architecture to counter against High Power Microwave (HPM) electronic attack.
- Co-director of research of metamaterials for high power microwave applications.
- Co-director of research of microwave backscatter method to accurately predict cranberry crop yields
- Co-director of research and development on method to cure inherited metabolic diseases using combined, non-invasive, *in vivo* electroporation and gene therapy.

c. Teaching

- Supervised 105 undergraduate independent study/research students and projects
- Supervised or co-supervised 82 graduate students pursuing research
- Supervised or co-supervised 8 post-doctoral scholars
- Received 17 honors or awards for teaching and education at UW-Madison, (1 national, 7 institutional, 9 from students)
- Participated in landmark AAHE-sponsored institutional study of peer review of teaching. Outcomes included authorship of ECE assistant professor peer review of teaching protocol, subsequently adopted by the UW Physical Sciences Divisional Committee for teaching assessment criteria for tenure evaluation
- Led the conceptualization, organization of funding, design, and operation of Wisconsin Collaboratory for Enhanced Learning (WisCEL).
  - Enhancing learning for > 5000 students, > 40 courses, > 30 instructors, > 15 departments per year, spanning Colleges/Schools of Letters and Science, Engineering, Business, and Agriculture and Life Sciences
  - Typical impact: during AY 2012-13 85% of courses in WisCEL increased student mastery (B grade or better) over conventionally-taught course in previous semesters.

92% of courses in WisCEL showed decreased student failure (D, F, or drop) from conventionally-taught sections taught in prior semesters. Math 112 (pre-calculus) showed remarkable reduction in achievement gap.

- Charter Member, Executive Council of the UW-Madison Teaching and Learning Collaborative (2016-present)
- Leader of active and blended learning advancement in ECE Department Heads Association, organizing conference sessions and workshops (2015 – present)