

## **WOUNJHANG PARK**

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### ***EDUCATION***

1. *B.S. in Physics*, Seoul National University, Seoul, Korea (February 1989)
2. *M.S. in Physics*, Dongguk University, Seoul, Korea (August 1991)
3. *Ph.D. in Physics*, Georgia Institute of Technology, Atlanta, GA (June 1997)

### ***PROFESSIONAL EXPERIENCE***

1. *Graduate Teaching Assistant*, Georgia Institute of Technology (1993 - 1994)
2. *Graduate Research Assistant*, Georgia Institute of Technology (1994 - 1997)
3. *Post-doctoral Fellow*, Georgia Tech Research Institute (1997 - 1998)
4. *Research Scientist II*, Georgia Tech Research Institute (1998 - 2001)
5. *Associate Member*, University of Colorado Cancer Center (2005 - 2006)
6. *Assistant Professor*, Department of Electrical & Computer Engineering,  
University of Colorado at Boulder (2001 - 2008)
7. *Full Member*, University of Colorado Cancer Center (2006 - Present)
8. *Associate Professor*, Department of Electrical, Computer & Energy Engineering,  
University of Colorado at Boulder (2008 - 2015)
9. *Program Faculty*, Materials Science & Engineering Program,  
University of Colorado at Boulder (2012 - Present)
10. *Full Professor*, Department of Electrical, Computer & Energy Engineering,  
University of Colorado at Boulder (2015 - Present)
11. *Associate Chair*, Department of Electrical, Computer & Energy Engineering,  
University of Colorado at Boulder (2018 - 2022)
12. *Program Faculty*, Biomedical Engineering Program,  
University of Colorado at Boulder (2020 - Present)

### ***HONORS AND AWARDS***

1. Ruth L. Kirschstein NRSA Senior Fellow in Cancer Nanotechnology Research (2008)
2. Dean's Faculty Fellow (2011)
3. Provost's Faculty Achievement Award (2012)
4. N. Rex Sheppard Faculty Fellow (2015)
5. Highly Contributed Paper Award by *Nano Convergence* (2015)
6. Best Paper Award, Symposium on Luminescent Materials for Photon Upconversion, 2017 Materials Research Society Spring Meeting (2017)
7. Cooper Lecturer, West Virginia University (2019)
8. Fellow, SPIE (International Society of Optics and Photonics) (2021)

## **PUBLICATIONS<sup>†</sup>**

### **Book Chapters**

1. W. Park, “Modeling of photonic crystals”, in *Handbook of Theoretical and Computational Nanotechnology Vol. 7*, ed. by M. Rieth and W. Schommers (American Scientific Publishers, Stevenson Ranch, CA, 2006), pp. 263-327.
2. W. Park, “Negative Refractive Index”, in *Encyclopedia of Materials: Science and Technology*, ed. by K. H. Jürgen Buschow, Robert W. Cahn, Merton C. Flemings, Bernard Ilschner (print), Edward J. Kramer, Subhash Mahajan, and Patrick Veysiere (updates) (Elsevier, Oxford, UK, 2010), pp. 1-6.
3. J. H. Lee, J. Xue, W. Park, and A. Mickelson, “Surface Plasmon Polariton Waveguides In Nonlinear Optical Polymer” in *Organic Thin Films for Photonics Applications*, ed. by W. Herman, S. R. Flom and S. H. Foulger (American Chemical Society, 2010), pp. 67-83.
4. W. Park, A. Das and K. Bae, “Nanophotonics for photon upconversion enhancement” in *Emerging Strategies to Reduce Transmission and Thermalization Losses in Solar Cells - Redefining the Limits of Solar Power Conversion Efficiency*, ed. by J. S. Lissau Herman and M. Madsen (Springer Nature, 2022)., pp. 269-287.

### **Peer-Reviewed Journal<sup>‡</sup>**

1. T. K. Tran, W. Park, J. W. Tomm, B. K. Wagner, S. M. Jacobsen, C. J. Summers, P. N. Yocom, and S. K. McClelland, “Photoluminescence Properties of ZnGa<sub>2</sub>O<sub>4</sub>:Mn Phosphor Powders”, *J. Appl. Phys.* **78**, 5691-5695 (1995) - Conducted photoluminescence spectroscopy and provided key theoretical modeling and analysis.
2. T. Yang, B. K. Wagner, M. Chaichimansour, W. Park, Z. L. Wang, and C. J. Summers, “Molecular Beam Epitaxy Growth of Strontium Thiogallate”, *J. Vac. Sci. & Technol. B* **14**, 2263-2266 (1996) - Conducted photoluminescence spectroscopy.
3. W. Tong, B. K. Wagner, T. K. Tran, W. Ogle, W. Park, and C. J. Summers, “Kinetics of Chemical Beam Epitaxy for High Quality ZnS Film Growth”, *J. Cryst. Growth* **164**, 202-207 (1996) - Conducted photoluminescence spectroscopy.
4. C. J. Summers, W. Tong, T. K. Tran, W. Ogle, W. Park, and B. K. Wagner, “Photoluminescence Properties of ZnS Epilayers Grown by Metalorganic Molecular Beam Epitaxy”, *J. Cryst. Growth* **159**, 64-67 (1996) - Conducted photoluminescence spectroscopy.
5. W. Tong, T. K. Tran, W. Park, B. K. Wagner, and C. J. Summers, “High-Quality ZnS Thin Film Growth for Flat Panel Display”, *J. SID* **4**, 325-329 (1996) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
6. T. Yang, M. Chaichimansour, W. Park, B. K. Wagner, and C. J. Summers, “MBE Growth and Characterization of SrGa<sub>2</sub>S<sub>4</sub>:Ce Blue Phosphor for Thin Film Electroluminescence”, *J. SID* **4**, 311-313 (1996) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
7. T. K. Tran, W. Park, W. Tong, M. M. Kyi, B. K. Wagner, and C. J. Summers, “Photoluminescence Properties of ZnS Epilayers”, *J. Appl. Phys.* **81**, 2803-2809 (1997) - Conducted photoluminescence spectroscopy and provided key theoretical modeling analysis.

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<sup>†</sup> For articles with multiple authors, the general rule on the order of the authors is as follows. First author made a major contribution, led and coordinated the collaboration and put together the manuscript. Second and third authors made major contributions, played significant roles in the collaboration and wrote portions of the manuscript. Others made substantial but partial contributions and played minor roles in the collaborations. An important exception is the advisor whose students are the leading authors, in which case the advisor also made a major contribution.

<sup>‡</sup> My contribution is briefly described for each article. Authors for whom I was the principal advisor are underlined. Article 35 and later are published after I moved to the University of Colorado.

8. W. Tong, L. Zhang, W. Park, M. Chaichimansour, B. K. Wagner, and C. J. Summers, "Charge Compensation Study of Molecular Beam Epitaxy Grown SrS:Ce", *Appl. Phys. Lett.* **71**, 2268-2270 (1997) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
9. S. Schön, M. Chaichimansour, W. Park, T. Yang, B. K. Wagner, and C. J. Summers, "Homogeneous and  $\delta$ -doped ZnS:Mn Grown by MBE", *J. Cryst. Growth* **175/176**, 598-602 (1997) - Conducted photoluminescence spectroscopy measurements and provided theoretical analysis.
10. W. Tong, T. Yang, W. Park, M. Chaichimansour, B. K. Wagner, and C. J. Summers, "Gas Source MBE Growth of SrS:Ce for Flat Panel Display", *J. Electron. Mater.* **26**, 728-731 (1997) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
11. W. Park, T. C. Jones, W. Tong, S. Schön, M. Chaichimansour, B. K. Wagner, and C. J. Summers, "Luminescence Decay Kinetics in Homogeneously- and Delta-Doped ZnS:Mn", *J. Appl. Phys.* **84**, 6852-6858 (1998) - Conducted extensive photoluminescence spectroscopy and extensive theoretical modeling and analysis.
12. W. Park, T. C. Jones, W. Tong, S. Schön, M. Chaichimansour, B. K. Wagner, and C. J. Summers, "Energy Transfer Processes and Photoluminescence Properties of Homogeneously- and Delta-Doped ZnS:Mn", *J. Cryst. Growth* **184/185**, 1123-1127 (1998) - Conducted extensive photoluminescence spectroscopy and extensive theoretical modeling and analysis.
13. P. D. Rack, M. D. Potter, S. Kurinec, W. Park, J. Penczek, B. K. Wagner, and C. J. Summers, "Luminescence Properties of Thin Film Ta<sub>2</sub>Zn<sub>3</sub>O<sub>8</sub> and Mn<sup>2+</sup> doped Ta<sub>2</sub>Zn<sub>3</sub>O<sub>8</sub>", *J. Appl. Phys.* **84**, 4466-4470 (1998) - Conducted photoluminescence spectroscopy.
14. P. D. Rack, J. S. Lewis, P. H. Holloway, W. Park, B. K. Wagner, C. J. Summers, "Bound Exciton Luminescence in Te-Doped SrS", *J. Appl. Phys.* **84**, 3676-3683 (1998) - Conducted photoluminescence spectroscopy.
15. W. Tong, T. Yang, M. Chaichimansour, W. Park, B. K. Wagner, C. J. Summers, S.-S. Sun, and C. N. King, "Electroluminescent SrS:Ce Thin Films Grown by Gas-Source MBE", *J. SID* **6**, 29-33 (1998) - Conducted photoluminescence spectroscopy.
16. S. Schön, M. Chaichimansour, W. Park, T. Yang, B. K. Wagner, and C. J. Summers, "Improved Photoluminescence Properties of ZnS:Mn due to the  $\delta$ -doping Process", *J. SID* **6**, 67-71 (1998) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
17. W. Park, T. C. Jones, B. K. Wagner and C. J. Summers, "Multilayer Stacked Electroluminescent Devices", *Appl. Phys. Lett.* **74**, 2860-2862 (1999) - Invented new device concept and conducted device modeling.
18. W. Park, T. C. Jones and C. J. Summers, "Optical Properties of SrS:Cu,Ag Two-Component Phosphors for Electroluminescent Devices", *Appl. Phys. Lett.* **74**, 1785-1787 (1999) - Conducted extensive photoluminescence spectroscopy and provided theoretical analysis.
19. T. C. Jones, W. Park, and C. J. Summers, "A Two-Component Phosphor Approach for Engineering Electroluminescent Phosphors", *Appl. Phys. Lett.* **75**, 2398-2400 (1999) - Conducted extensive photoluminescence spectroscopy and provided theoretical analysis.
20. Y. B. Xin, W. Tong, W. Park, M. Chaichimansour, and C. J. Summers, "Annealing Studies of Molecular Beam Epitaxial Grown SrS:Cu Blue Phosphors", *J. Appl. Phys.* **85**, 3999-4002 (1999) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
21. W. Tong, Y. B. Xin, W. Park, and C. J. Summers, "In Situ Annealing Studies of Molecular Beam Epitaxial Growth of SrS:Cu", *Appl. Phys. Lett.* **74**, 1379-1381 (1999) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
22. B. Shen, Y. G. Zhou, Z. Z. Chen, P. Chen, R. Zhang, Y. Shi, Y. D. Zheng, W. Tong, and W. Park, "Growth of Wurtzite GaN Films on  $\alpha$ -Al<sub>2</sub>O<sub>3</sub> Substrates Using Light-Radiation Heating Metal-Organic Chemical Vapor Deposition", *Appl. Phys. A* **68**, 593-596 (1999) - Conducted photoluminescence spectroscopy.

23. W. Park, B. K. Wagner, G. Russell, K. Yasuda, C. J. Summers, Y. R. Do and H. G. Yang, "Thin SiO<sub>2</sub> Coating on ZnS Phosphors for Improved Low Voltage Cathodoluminescence Properties", *J. Mater. Res.* **15**, 2288-2291 (2000) - Made materials, conducted cathodoluminescence spectroscopy and provided theoretical analysis.
24. W. Park, R.-Y. Lee, C. J. Summers, Y. R. Do and H. G. Yang, "Photoluminescence Properties of Al<sub>3</sub>Gd<sub>4</sub>O<sub>12</sub>:Eu Phosphors", *Mater. Sci. Eng. B* **78**, 28-31 (2000) - Made materials, conducted photoluminescence spectroscopy and provided theoretical analysis.
25. W. Park, K. Yasuda, B. K. Wagner, C. J. Summers, Y. R. Do and H. G. Yang, "Uniform and Continuous Y<sub>2</sub>O<sub>3</sub> Coating on ZnS Phosphors", *Mater. Sci. Eng. B* **76**, 122-126 (2000) - Made materials and conducted cathodoluminescence spectroscopy.
26. W. Park, T. C. Jones, and C. J. Summers, "A Spectroscopic Study on SrS:Cu,Ag Two-Component Electroluminescent Phosphors", *J. Lumin.* **87-89**, 1267-1270 (2000) - Conducted extensive photoluminescence spectroscopy and provided theoretical analysis.
27. W. Park, T. C. Jones, W. Tong, B. K. Wagner, C. J. Summers, and S.-S. Sun, "Luminescent Properties of a New Blue EL Phosphor, SrS:Cu", *J. SID. Suppl.* **1**, 47 (2000) - Conducted extensive photoluminescence spectroscopy and provided theoretical analysis.
28. C. J. Summers, B. K. Wagner, W. Tong, W. Park, Y. B. Xin and M. Chaichimansour, "Recent Progress in the Development of Full Color SrS-Based Electroluminescent Phosphors", *J. Cryst. Growth* **214/215**, 918-925 (2000) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
29. S. W. Lu, B. I. Lee, Z. I. Wang, W. Tong, B. K. Wagner, W. Park and C. J. Summers, "Synthesis and Photoluminescence Enhancement of Mn<sup>2+</sup>-doped ZnS Nanocrystals", *J. Lumin.* **92**, 73-78 (2000) - Conducted photoluminescence spectroscopy.
30. W. Tong, M. Chaichimansour, W. Park, B. K. Wagner, C. J. Summers, S.-S. Sun, C. N. King, W. L. Warren, "Molecular Beam Epitaxy Growth of SrS Blue Electroluminescent Phosphors", *J. SID. Suppl.* **1**, 69 (2000) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
31. Y. B. Xin, W. Tong, Z. L. Wang, W. Park and C. J. Summers, "Oxidation and Diffusion of Cu in SrS:Cu Grown by MBE for Blue Phosphors", *Displays* **21**, 89-92 (2000) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
32. W. Tong, Y. B. Xin, T. C. Jones, W. Park and C. J. Summers, "Codoping Studies of Molecular Beam Epitaxial Growth of SrS:Cu", *Displays* **21**, 83-87 (2000) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
33. P. D. Rack, J. J. Peterson, M. D. Potter and W. Park, "Eu<sup>+3</sup> and Cr<sup>+3</sup> Doping for Red Cathodoluminescence in ZnGa<sub>2</sub>O<sub>4</sub>", *J. Mater. Res.* **16**, 1429-1433 (2001) - Conducted photoluminescence spectroscopy.
34. S. W. Lu, T. Copeland, B. I. Lee, W. Tong, B. K. Wagner, W. Park and F. Zhang, "Synthesis and Luminescence Properties of Mn<sup>2+</sup> doped Zn<sub>2</sub>SiO<sub>4</sub> phosphors by a Hydrothermal Method", *J. Phys. Chem. Solids* **62**, 777-781 (2001) - Conducted photoluminescence spectroscopy.
35. Y. R. Do, D. H. Park, H. G. Yang, W. Park, B. K. Wagner, K. Yasuda and C. J. Summers, "Uniform Nano-Scale SiO<sub>2</sub> Encapsulation of ZnS Phosphors for Improved Aging Properties under Low Voltage Electron Beam Excitation", *J. Electrochem. Soc.* **148**, G548-551 (2001) - Made materials and provided theoretical analysis.
36. W. Park and C. J. Summers, "Extraordinary Refraction and Dispersion in 2D Photonic Crystal Slabs", *Opt. Lett.* **27**, 1387-1389 (2002) - Designed new nanostructure and conducted simulations.
37. W. Park, J. S. King, C. W. Neff, C. Liddell and C. J. Summers, "ZnS-Based Photonic Crystals", *Phys. Stat. Sol. (b)* **229**, 949-960 (2002) - Made materials, conducted simulations and optical characterizations.
38. W. Park, C. J. Summers, Y. R. Do and H. G. Yang, "Photoluminescence Properties of the Red Emitting BaGdB<sub>9</sub>O<sub>16</sub>:Eu Phosphor", *J. Mater. Sci.* **37**, 4041-4045 (2002) - Made materials, conducted photoluminescence spectroscopy and provided theoretical analysis.

39. C. J. Summers, C. W. Neff and W. Park, "Active photonic crystal nano-architectures", *J. Nonlinear Opt. Phys. Mater.* **12**, 587-597 (2003) - Designed new nanostructure and conducted simulations.
40. J. S. King, C. W. Neff, C. J. Summers, W. Park, S. Blomquist, E. Forsythe and D. Morton, "High-filling-fraction inverted ZnS opals fabricated by atomic layer deposition", *Appl. Phys. Lett.* **83**, 2566-2568 (2003) - Conducted simulations.
41. J. Ihanus, M. Ritala, M. Leskelä, E. Soininen, W. Park, A. E. Kaloyeros, W. Harris, K. W. Barth, A. W. Topol, T. Sajavaara, and J. Keinonen, "Blue and green emitting SrS:Cu electroluminescent devices deposited by the atomic layer deposition technique", *J. Appl. Phys.* **94**, 3862-3868 (2003) - Conducted photoluminescence spectroscopy and provided theoretical analysis.
42. W. Park and C. J. Summers, "Optical properties of superlattice photonic crystal waveguides", *Appl. Phys. Lett.* **84**, 2013-2015 (2004) - Designed new nanostructure and conducted simulations.
43. W. Park and J.-B. Lee, "Mechanically tunable photonic crystal structures", *Appl. Phys. Lett.*, **85**, 4845-4847 (2004): *featured on the cover page.* - Invented new device and conducted simulations.
44. E. Schonbrun, M. Tinker, W. Park and J.-B. Lee, "Negative Refraction in a Si-Polymer Photonic Crystal Membrane", *IEEE Photon. Technol. Lett.* **17**, 1196-1198 (2005) - Designed new nanostructure, conducted simulations and optical characterizations.
45. Q. Wu and W. Park, "Broadband sub-wavelength imaging by mechanically tunable photonic crystal", *J. Comput. Theor. Nanosci.* **2**, 202-206 (2005) - Designed new nanostructure and conducted simulations.
46. Q. Wu, E. Schonbrun and W. Park, "Tunable Superlensing by Mechanically Controlled Photonic Crystal", *J. Opt. Soc. Am. B* **23**, 479-484 (2006) - Designed new nanostructure and conducted simulations.
47. M. Tinker, E. Schonbrun, J.-B. Lee, and W. Park, "Process integration and development of inverted photonic crystal arrays", *J. Vac. Sci. Technol. B* **24**, 705-709 (2006) - Designed new nanostructure, conducted simulations and optical characterizations.
48. W. Park and J. Owens, "Future Directions in the Treatment of Oral Cancer", *Otolaryngol. Clinics North Am.* **39**, 381-396 (2006) - provided a review on biomedical applications of photonic nanostructures.
49. E. Schonbrun, T. Yamashita, W. Park and C. J. Summers, "Negative Index Imaging by an Index-Matched Photonic Crystal Slab", *Phys. Rev. B* **73**, 195117-1-6 (2006) - Designed new nanostructure, conducted simulations and optical characterizations.
50. Z. A. Sechrist, B. T. Schwartz, J. H. Lee, J. A. McCormick, R. Piestun, W. Park, and S. M. George, "Modification of Opal Photonic Crystals Using Al<sub>2</sub>O<sub>3</sub> Atomic Layer Deposition", *Chem. Mater.* **18**, 3562-3570 (2006) - Made nanomaterials, conducted simulations and optical characterizations.
51. E. Schonbrun, Q. Wu, W. Park, T. Yamashita, and C. J. Summers, "Polarization Beam Splitter Based on a Photonic Crystal Heterostructure", *Opt. Lett.* **31**, 3104-3106 (2006) - Designed new nanostructure, conducted simulations and optical characterizations.
52. J. H. Lee, Q. Wu and W. Park, "Fabrication and Optical Characterizations of Gold Nanoshell Opal", *J. Mater. Res.* **21**, 3215-3221 (2006) - Made nanomaterials, conducted simulations and optical characterizations.
53. E. Schonbrun, Q. Wu, W. Park, M. Abashin, Y. Fainman, T. Yamashita and C. J. Summers, "Wavefront Evolution of Negatively Refracted Waves in Photonic Crystals", *Appl. Phys. Lett.* **90**, 041113-1-3 (2007) - Designed new nanostructure, conducted simulations and optical characterizations.
54. H.-J. Kim, S. Kim, H. Jeon, J. Ma, S. H. Choi, S. Lee, C. Ko, and W. Park, "Fluorescence amplification using colloidal photonic crystal platform in sensing dye-labeled deoxyribonucleic acids", *Sensors and Actuators B* **124**, 147-152 (2007) - Made nanomaterials, conducted optical characterizations.
55. E. Schonbrun, Q. Wu, W. Park, M. Abashin, Y. Fainman, J. Blair, and C. J. Summers, "Total Internal Reflection Photonic Crystal Prism", *Opt. Express* **15**, 8065-8075 (2007) - Designed new nanostructure, conducted simulations and optical characterizations.
56. Q. Wu, E. Schonbrun, and W. Park, "Image Inversion and Magnification by Negative Index Prisms", *J. Opt. Soc. Am. A* **24**, A45-A51 (2007) - Designed new nanostructure and conducted simulations.

57. E. Schonbrun, Q. Wu, W. Park, M. Abashin, Y. Fainman, T. Yamashita and C. J. Summers, “Imaging the Wavefront Curvature Reversal in Photonic Crystals”, *Optics and Photonics News*, pp. 34, Dec. 2007, Featured in *Optics in 2007*, the annual highlights in optics research selected by the Optical Society of America.
58. W. Park and Q. Wu, “Negative Effective Permeability in Metal Cluster Photonic Crystal”, *Solid State Commun.* **146**, 221 (2008) - Designed new nanostructure and conducted simulations.
59. Y. Cui, Q. Wu, E. Schonbrun, M. Tinker, J.-B. Lee, and W. Park, "Silicon-Based 2D Slab Nano Photonic Crystal TM Polarizer in Telecommunication Wavelength", *IEEE Photon. Technol. Lett.* **20**, 641 (2008) - Designed new nanostructure, conducted simulations and optical characterizations.
60. W. Park and Q. Wu, “Optical Frequency Magnetic Activity in Metal Nanocluster Photonic Crystal”, *J. Comput. Theor. Nanosci.*, **5**, 476 (2008)
61. Q. Wu and W. Park, “Negative index materials based on metal nanoclusters”, *Appl. Phys. Lett.* **92**, 153114 (2008)
62. J. H. Lee and W. Park, “Three Dimensional Metallic Photonic Crystal Based on Self-Assembled Gold Nanoshells”, *Func. Mater. Lett.* **1**, 65 (2008)
63. Q. Wu, J. M. Gibbons and W. Park, “Graded negative index lens by photonic crystals”, *Opt. Express* **16**, 16941 (2008)
64. W. Park and J. Kim, “Negative Index Materials: Optics by Design”, *MRS Bulletin* **33**, 907 (2008)
65. M. A. Weimer, A. W. Weimer, and W. Park, “Theory of conduction in ultrafast metal-insulator varistors”, *J. Appl. Phys.* **104**, 114516 (2008)
66. J. H. Lee, Q. Wu, and W. Park, “Metal nanocluster metamaterial fabricated by the colloidal self-assembly”, *Opt. Lett.* **34**, 443-445 (2009).
67. W. Park and J.-B. Lee, “Mechanically Tunable Photonic Crystals”, *Optics and Photonics News*, Jan. 2009, p. 40.
68. J. H. Lee, J. Blair, V. A. Tamma, Q. Wu, S. J. Rhee, C. J. Summers and W. Park, “Direct visualization of optical frequency invisibility cloak based on silicon nanorod array”, *Optics Express* **17**, 12922-12928 (2009)
69. R. Pratibha, K. Park, I. I. Smalyukh and W. Park, “Tunable optical metamaterial based on liquid crystal-gold nanosphere composite”, *Optics Express* **17**, 19459-19469 (2009)
70. V. A. Tamma, J.-H. Lee, Q. Wu and W. Park, “Visible Frequency Magnetic Activity in Silver Nanocluster Metamaterial”, *Appl. Opt.* **49**, A11–A17 (2010)
71. W. Park, “Controlling the flow of light with silicon nanostructures”, *Laser Phys. Lett.* **7**, 93-103 (2010)
72. R. Pratibha, K. Park, W. Park and I. I. Smalyukh, “Colloidal gold nanoparticle dispersions in smectic liquid crystals and thin nanoparticle-decorated smectic films”, *J. Appl. Phys.* **107**, 063511 (2010)
73. J. Blair, D. Brown, V. A. Tamma, W. Park, and C. J. Summers, “Challenges in the fabrication of an optical frequency ground plane cloak consisting of silicon nanorod arrays”, *J. Vac. Sci. Technol. B.* **28**, 1222-1230 (2010)
74. V. A. Tamma, J. Blair, C. J. Summers and W. Park, “Dispersion characteristics of silicon nanorod based carpet cloaks”, *Optics Express* **18**, 25746-25756 (2010)
75. Y. Cui, V. A. Tamma, J.-B. Lee and W. Park, “Mechanically Tunable Negative Index Lens Based on Silicon Nanorod Array”, *IEEE Photonics Journal* **2**, 1003-1012 (2010)
76. X. Yu, C. J. Summers, and W. Park, “Controlling Energy Transfer Processes and Engineering Luminescence Efficiencies with Low Dimensional Doping”, *J. Appl. Phys.* **111**, 073524 (2012)
77. Y. Cui, J. Zhou, V. A. Tamma, and W. Park, “Mechanical Tuning and Symmetry Lowering of Fano Resonance in Plasmonic Nanostructure”, *ACS Nano* **6**, 2385-2393 (2012)
78. A. Agrawal, W. Park and R. Piestun, “Negative Permeability with Arrays of Aperiodic Silver Nanoclusters”, *Appl. Phys. Lett.* **101**, 083109 (2012)
79. E. F. Dudley and W. Park, “Ultra-Compact High-Speed Electro-Optic Switch Utilizing Hybrid Metal-Silicon Waveguides”, *J. Lightwave Technol.* **30**, 3401-3406 (2012)

80. W. Park, K. Emoto, Y. Jin, A. Shimizu, V. A. Tamma, and W. Zhang, “Cage Molecule Mediated Self-Assembly of Gold Nanoparticles for Optical Metamaterials”, *Optical Materials Express* **3**, 205-215 (2013).
81. V. A. Tamma, Y. Cui and W. Park, “Scattering reduction at optical frequencies using plasmonic nanostructures”, *Optics Express* **21**, 1041-1056 (2013)
82. V. A. Tamma, Y. Cui, J. Zhou and W. Park, “Nanorod orientation dependence of tunable Fano resonance in plasmonic nanorod heptamers”, *Nanoscale* **5**, 1592-1602 (2013)
83. D. Lu, E. Rengnath, Y. Cui, Z. Wang, Y. Ding and W. Park, “Interaction of two plasmon modes in the organic photovoltaic devices with patterned back-electrode”, *Appl. Phys. Lett.* **102**, 241114 (2013)
84. N. Azarova, A. J. Ferguson, J. van de Lagemaat, E. Rengnath, W. Park, J. C. Johnson, “Strong coupling between a molecular charge-transfer exciton and surface plasmons in a nanostructured metal grating”, *J. Phys. Chem. Lett.* **4**, 2658-2663 (2013).
85. S. K. Cho, K. Emoto, L.-J. Su, X. Yang, T. W. Flaig and W. Park, “Functionalized gold nanorods for thermal ablation treatment of bladder cancer”, *J. Biomed. Nanotechnol.* **10**, 1267-1276 (2014)
86. W. Park, “Optical Interactions in Plasmonic Nanostructures”, *Nano Convergence* **1**, 2 (2014)
87. R. McCaffrey, H. Long, W. Park, and W. Zhang, “Template Synthesis of Gold Nanoparticles with an Organic Molecular Cage”, *J. Am. Chem. Soc.* **136**, 1782-1785 (2014)
88. Z. Li, W. Park, G. Zorretto, J. Lemaire, and C. J. Summers, “Synthesis Protocols for Delta-doped NaYF<sub>4</sub>:Yb,Er”, *Chem. Mater.* **26**, 1770-1778 (2014)
89. K. Choi, Y. Cui, V. A. Tamma, W. Park and J.-B. Park, “Air-Suspended Fast Transient Tunable Silicon Photonic Crystal Waveguide”, *IEEE Photon. Technol. Lett.* **26**, 603-605 (2014)
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#### **Other Conference Presentations \*\***

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127. E. Rappeport, C. C. Bagot, A. Das, T. Ba Tis, and W. Park, "Utilizing Upconverting Nanoparticles as Optical pH Sensors", *SPIE Optics + Photonics*, Aug. 24-28, 2020.
128. Bo Xu, B. M. Heffernan, K. Bae, M. Siemens, J. T. Gopinath and W. Park, "Group Theory Guided Symmetry Coupling between Cylindrical Vector Beams and Localized Surface Plasmon Resonances", *Conference on Laser and Electro-Optics (CLEO)*, May 9 - 14, 2021.
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### **COURSES TAUGHT**

1. ECEN 5626 Active Optical Devices (new course)

- Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website ([http://ece.colorado.edu/~wpark/class/Active\\_Opt\\_Dev/](http://ece.colorado.edu/~wpark/class/Active_Opt_Dev/)).
2. ECEN 5015 Crystal Structures & Device Applications (new course)  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website (<http://ece.colorado.edu/~wpark/class/Crystal/>).
  3. ECEN 5005 Crystals, Nanocrystals & Device Applications (new course)  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website (<http://ece.colorado.edu/~wpark/class/Crystal/>).
  4. ECEN 5015 Nanophotonics  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website (<http://ecee.colorado.edu/~wpark/class/nanophotonics/>).
  5. ECEN 5355 Principles of Electronic Devices I  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website (<http://ece.colorado.edu/~wpark/class/ecen5355/>).
  6. ECEN 5385 Optical Properties of Materials  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website ([http://ece.colorado.edu/~wpark/class/Opt\\_Prop/](http://ece.colorado.edu/~wpark/class/Opt_Prop/)).
  7. ECEN 4345 Introduction to Solid State  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website ([http://ece.colorado.edu/~wpark/class/Intro\\_SS/](http://ece.colorado.edu/~wpark/class/Intro_SS/)).
  8. ECEN 3320 Semiconductor Devices  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website ([http://ece.colorado.edu/~wpark/class/Semicon\\_Dev/](http://ece.colorado.edu/~wpark/class/Semicon_Dev/)).
  9. ECEN 3250 Circuits/Electronics 3  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website (<http://ecee.colorado.edu/~wpark/class/ecen3250/>).
  10. ECEN 3400 Electromagnetic Fields and Waves  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website (<http://ecee.colorado.edu/~wpark/class/ecen3400/>).
  11. ECEN 4606 Undergraduate Optics Laboratory  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website (<http://ecee.colorado.edu/~wpark/class/ecen4606/>).
  12. ECEN 5016 Quantum Mechanics  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through the class website (<http://ecee.colorado.edu/~wpark/class/ecen5016/>).
  13. ECEN 4/5915 Foundations of Quantum Engineering  
Complete set of class notes, homework solutions, exam solutions were prepared and made available through Canvas.

### ***INDIVIDUAL STUDENTS MENTORED - UNDERGRADUATE***

1. Benjamin Wolpoff, ECE undergraduate, independent study in Summer 2003.
2. Julie Lam, ECE undergraduate, independent study in Spring 2006.
3. Alex Silva, ECE undergraduate, independent study in Spring 2006.
4. Nancy Kim, MCDB undergraduate, summer research project through the Butcher Genomics-Biotechnology Supplementary Award, Summer 2006.
5. Michael Duckwitz, ECE undergraduate, independent study in Spring 2007.
6. Kai Gellat, ECE undergraduate, undergraduate research assistant in Spring 2007.
7. Amy L. Han, Biochemistry undergraduate, summer research project through the University of Colorado Cancer Center Student Fellowship Program, Summer 2007.  
Continuing as Undergraduate Research Assistant in Fall 2007.

8. John Gibbons, Engineering Physics undergraduate, Discovery Apprenticeship in AY 07-08. Received Electrical and Engineering Physics Award.
9. Mark Colbenson, Chemical Engineering undergraduate, Discovery Apprenticeship in Fall 2007.
10. Michael Hoerner, NSF REU student in Summer 2010.
11. Jeremy Kunll, Engineering Physics undergraduate, Undergraduate Research Assistant in Fall 2010.
12. Ginny Kim, Integrative Physiology undergraduate, Undergraduate Research Assistant in Spring 2012.
13. Horacio Londono, Undergraduate from Universitat Politècnica de Catalunya, Spring 2013.
14. Caroline Hughes, Engineering Physics undergraduate, Discovery Apprenticeship in AY 13-14.
15. Zijian Wang, ECEE undergraduate, independent study in Fall 2015.
16. Hye Hyun Kim, Chemical Engineering undergraduate, Undergraduate Research Assistant in Spring 2017.
17. Cassidy Allen, Biomedical Engineering undergraduate, Undergraduate Research Assistant in Spring 2022.
18. Cassidy Allen, Biomedical Engineering undergraduate, Discovery Learning Apprenticeship in AY 2022-2023.

#### ***INDIVIDUAL STUDENTS MENTORED - GRADUATE***

1. Ethan Schonbrun, Ph.D. awarded in May 2007.
2. Qi Wu, Ph.D. awarded in Dec. 2008.
3. Jin-Hyoung Lee, Ph.D. awarded in May 2009.
4. Venkata Tamma, Ph.D. awarded in May 2012.
5. Eric Dudley, Ph.D. awarded in May 2013.
6. Dawei Lu, Ph.D. awarded in Dec. 2015.
7. Suehyun Cho, Ph.D. awarded in May 2018.
8. Devin Rourke, Ph.D. awarded in May 2018.
9. Chenchen Mao, Ph.D. awarded in May 2020.
10. Ananda Das, Ph.D. awarded in May 2021.
11. Michael Grayson, Ph.D. awarded in May 2022.
12. Tomoko Borsa, M.S. awarded in May 2003.
13. Joseph Eaton, M.S. awarded in May 2008.
14. Michael Weimer, M.S. awarded in May 2008.
15. Arvinder Chadha, M.S. awarded in Dec. 2008.
16. Kwangbae Park, M.S. awarded in Dec. 2009.
17. Tin-Ei Wang, M.S. awarded in May 2010.
18. Elisabeth Rengnath, M.S. awarded in Aug. 2012.
19. Natalia Azarova, M.S. awarded in Dec. 2012.
20. Akihiro Shimizu, M.S. awarded in May 2013.
21. Marika Meertens, M.S. awarded in May 2013.
22. Connor Wolenski, M.S. awarded in Dec. 2019.
23. Eric Rappeport, Ph.D. candidate in ECEE (Aug. 2018 – Present)
24. Conrad Bagot, Ph.D. candidate in ECEE (Aug. 2018 – Present)
25. Bo Xu, Ph.D. candidate in Physics (Sep. 2019 – Present)
26. Taleb Ba Tis, Ph.D. candidate in MSE (Jan 2020 – Present)
27. Cobi Sabo, Ph.D. candidate in ECEE (Aug. 2021 – Present)
28. Jihye Ahn, Ph.D. candidate in ECE (Oct. 2005 – Dec. 2008), transferred to Penn State.
29. Xi Chen, Ph.D. candidate in ECE (Jan. 2009 – Dec. 2009)

30. Saumil Joshi, Ph.D. candidate in ECE (Jan. 2010 – Dec. 2010)
31. Martin Kronberg, M.S. candidate in ECEE (Aug. 2012 – May 2013)
32. Sabrina David, Ph.D. candidate in MSE (Mar. 2014 – May 2014)
33. Sarah Voeller, M.S. candidate in MSE (Sep. 2015 – May 2016)
34. Izabella Berman, Ph.D. candidate in MSE (Aug. 2016 – Dec. 2016)
35. Charles Mclemore, Ph.D. candidate in Physics (Jun. 2018 – May 2019)
36. Max Colice, Ph.D. candidate in ECE, OSEP<sup>††</sup> lab rotation in Fall 2001.
37. Kaumudi Nivarthi, M.S. candidate in ECE, independent study in Fall 2004.
38. David Goldstein, Ph.D. candidate in Chemistry, OSEP lab rotation in Fall 2004.
39. Hee Jin Kim, Ph.D. candidate from Seoul National University (Seoul, Korea),  
visiting student in Fall 2004.
40. Seyitrizza Tigrek, Ph.D. candidate in ECE, independent study in Fall 2005.
41. Jihye Ahn, M.S. candidate in ECE, independent study in Summer 2006.
42. Shirin Haji, M.S. candidate in ECE, independent study in Summer 2006.
43. Kasia Kobeszko, Ph.D. candidate in Chemistry, OSEP lab rotation in Spring 2007.
44. Kevin Zekis, Ph.D. candidate in ECE, lab rotation in Fall 2008.
45. Suehyun Cho, Ph.D. candidate in ECE, COSI<sup>‡‡</sup> lab rotation in Fall 2010.

#### **POST-DOCTORAL RESEARCHERS MENTORED**

1. Ethan Schonbrun, Jan. 2007 – Mar. 2007.
2. Moon-sup Han, Jul. 2007 – Feb. 2008.
3. Seukjoo Rhee, Jan. 2008 – Aug. 2009.
4. Zhiya Ma, Jan. 2010 – Jul. 2010.
5. Xiaoqiang Yu, Feb. 2010 – Oct. 2011.
6. Kazunori Emoto, Oct. 2010 – Oct. 2012.
7. Jianhong Zhou, Apr. 2011 – Apr. 2012.
8. Yonghao Cui, Mar. 2010 – Jan. 2013.
9. Lichun Wang, Aug. 2012 – Feb. 2013.
10. Sungmo Ahn, Apr. 2013 – Sep. 2015.
11. Byung Jang Jeong, Aug. 2014 – Jul. 2015.
12. Gumin Kang, Jan. 2016 – Jan. 2017.
13. Tian Xu, Jan. 2017 – Jan. 2018.
14. Kyuyoung Bae, Aug. 2017 – Jun. 2021.
15. Michael Grayson, May 2022 – Oct. 2022.

#### **CONFERENCE & PROFESSIONAL SOCIETY ACTIVITIES**

1. Fellow, Society of Photographic Instrument Engineers (SPIE).
2. Senior Member, Optical Society of America.
3. Associate Editor, *Frontiers in Photonics - Optical Nanostructures* (2021 – Present)
4. Editorial Board Member, *Journal of Computational and Theoretical Nanoscience* (2004 - Present)
5. Editorial Board Member, *Nano Convergence* (2013 - Present)
2. Program Committee for Photonics Track, *The 8th Joint Conference on Information Sciences*, Salt Lake City, UT, July 21-26, 2005.

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<sup>††</sup> NSF-funded Integrative Graduate Education, Research and Training (IGERT) program on Optical Science and Engineering.

<sup>‡‡</sup> NSF-funded Integrative Graduate Education, Research and Training (IGERT) program on Computational and Optical Sensing and Imaging.

3. Program Committee for Fundamental Physics of Periodic and Random Media Session, *2007 Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science Conference (CLEO/QELS)*, Baltimore, MD, May 7-11, 2007.
4. Program Committee for the *International Meeting on Information Display* (2008 – 2012)
5. Guest Editor, Special Issue on Negative Index Materials, *MRS Bulletin* Oct. 2008.
6. International Program and Technical Committee for the *OSA Topical Conference on Nanophotonics*, Nanjing, China, May 26-29, 2008.
7. Program Committee, *International Symposium on Electro-Optics and Nonlinear Optics*, Harbin, China, Sep. 2-4, 2014.
8. Co-organizer (with D. Pawlak), A Special Session on the Bottom-up Approach Towards Metamaterials and Plasmonics, *International Conference on Metamaterials, Photonic Crystals and Plasmonics* (2013 - 2015).
9. Program Committee for Nanoengineering: Fabrication, Properties, Optics, and Devices XI, *SPIE Optics + Photonics*, San Diego, CA (2014 - 2019).
10. Conference Co-Chair of Nanoengineering: Fabrication, Properties, Optics, and Thin Films Devices XI, *SPIE Optics + Photonics*, San Diego, CA (2020 - Present).

### **CONSULTING ACTIVITIES**

1. NEC USA, Inc., C & C Research Laboratories, Princeton, NJ (2000)
2. Daejoo Electronic Materials Co., Ltd., Shiheung, Korea (2000 - 2002)
3. Georgia Institute of Technology, Atlanta, GA (2001 - 2003)
4. PhosphorTech Corp., Atlanta, GA (2008 - 2009)
5. Redwave Inc., Glen Ellyn, IL (2013 - 2014)
6. Radanta Corp., Boulder, CO (2021 – Present)

### **OTHER SERVICE ACTIVITIES**

1. Member, Graduate Studies Committee, ECE department (2003 - 2009)
2. Chair, Faculty Search Committee in ECE (2007 - 2008)
3. Member, Optics Faculty Search Committee (Chair: Dana Anderson), 2007-2008
4. Member, Executive Committee, ECEE department (2010 - 2015)
5. Chair, Faculty Search Committee in ECEE (2012 - 2013)
6. Member, Provost's Faculty Achievement Award Committee (2013)
7. Chair, Faculty Search Committee in ECEE (2013 - 2014)
8. Member, Exploratory Committee for Bioengineering Minor (2014)
9. Faculty Advisor, Bioengineering Minor Program (2015 - 2016)
10. Chair, Faculty Search Committee in ECEE (2016 - 2017)
11. Associate Chair, ECEE department (2018 - 2022)
12. Reviewed research proposals for the National Science Foundation, U.S. Civilian Research & Development Foundation, The Implementation Group and Maryland Technology Development Corporation.
13. Reviewed manuscripts for numerous journals including *ACS Nano*, *ACS Applied Materials and Interfaces*, *ACS Photonics*, *Advanced Materials*, *Applied Physics Letters*, *IEEE Photonics Technology Letters*, *Journal of the Electrochemical Society Letters*, *Journal of Optical Society of America B*, *Journal of Selected Topics in Quantum Electronics*, *Journal of the Society for Information Display*, *Journal of Solid State Chemistry*, *Light: Science & Applications*, *Materials Research Bulletin*, *Materials Research Society Symposium Proceeding*, *Nature Communications*, *Nanophotonics*, *Optica*, *Optics Express*, *Optics Letters*, *Optical Materials* and *Physical Review B*.

## ***OUTREACH***

1. Summer course on electromagnetism for 13-17 years old underrepresented students, University of Colorado Boulder, 2019 – Present.
2. Nanotechnology @ Mamie Doud Eisenhower Public Library, An Outreach Program for Children with ages between 9 and 14, Mamie Doud Eisenhower Public Library, Broomfield, CO (2007 - 2015)  
- The 2014 event held on Apr. 5 attracted a total of 58 children and parents.
3. Nanotechnology: The Primer, A Special Lecture for Adults, Mamie Doud Eisenhower Public Library, Broomfield, CO, Apr. 7, 2012.
4. Nanotechnology: the Primer, A Special Lecture for Adults, Aurora Public Library, Aurora, CO, Sep. 9, 2012.
5. Optics at the Nanoscale: From Killing Cancer to Invisibility Cloak, Society for the Advancement of Chicanos and Native Americans (SACNAS) Rocky Mountain Regional Meeting, Denver, CO, Aug. 28, 2009.