

Benjamin J. Wiley

Professor
Department of Chemistry
Duke University
Box 90354, Durham, NC 27708
Phone: 919-668-3066
benjamin.wiley@duke.edu

EDUCATION

Ph.D. Chemical Engineering, June 2007

University of Washington, Department of Chemical Engineering, Seattle, WA

Dissertation: Synthesis of Silver Nanostructures with Controlled Shapes and Properties

Ph.D. Dissertation Advisor: Younan Xia, Department of Chemistry

B.S. Chemical Engineering, May 2003

University of Minnesota, Department of Chemical Engineering and Materials Science,
Minneapolis, MN

POSITIONS

Professor of Chemistry, Duke University	2020-present
CTO, Sparta Biomedical	2020-present
Associate Professor of Chemistry, Duke University	2016-2020
Associate Professor of Mechanical Engineering and Materials Science, Duke University (secondary appointment)	2016-present
Associate Editor of <i>Nanoscale</i>	2018-present
Associate Editor of <i>Nanoscale Advances</i>	2018-present
Co-Founder of Multi3D, LLC	2016-present
Assistant Professor of Chemistry, Duke University (primary appointment)	2009-2016
Assistant Professor of Mechanical Engineering and Materials Science, Duke University (secondary appointment)	2012-2016
Founder and Chief Scientific Officer of NanoForge, Corp.	2010-2013
Postdoctoral Research Fellow, Harvard University <i>Advisor:</i> George M. Whitesides, Department of Chemistry and Chemical Biology	2007-2009
Graduate Research Fellow, University of Washington <i>Advisor:</i> Younan Xia, Department of Chemistry <i>Dissertation Title:</i> Synthesis of Silver Nanostructures with Controlled Shapes and Properties	2003-2007

Undergraduate Research Assistant, University of Minnesota 2001-2003
Advisors: L. E. Scriven and David J. Norris,
Department of Chemical Engineering and Materials Science

HONORS AND AWARDS

Buck-Whitney Award, Eastern New York ACS Section 2018
Highly Cited Researcher, Thomson Reuters 2018
Beilby Medal, Royal Society of Chemistry 2015
Highly Cited Researcher, Thomson Reuters 2014
NSF CAREER Award 2012
Ralph E. Powe Junior Faculty Enhancement Award 2011
Ruth L. Kirschstein National Research Service Award for Individual
Postdoctoral Fellows, *NIH* 2008-2009
Colloid and Surface Science Division Poster Award, *ACS* 2006
Graduate Student Gold Award, *MRS* 2005
NSF-IGERT Graduate Fellowship, *University of Washington* 2004-2006
Runstad Fellowship, *University of Washington* 2003-2004
NSF-IGERT Early Bird Award in Nanotechnology, *University of Washington* 2003
Roon Award, *Federation of Societies for Coatings Technology* 2003
Iron Range Scholarship, *University of Minnesota* 1999

PEER-REVIEWED PUBLICATIONS

Publications from Independent Career

(Google Scholar: 29092 citations, h-index = 69)

Note: Nine undergraduate co-authors are underlined in ten independent publications.

119. Xu, H.; Wiley, B.J. The Roles of Citrate and Defects in the Anisotropic Growth of Ag Nanostructures. *Chem Mater* 2021, <https://doi.org/10.1021/acs.chemmater.1c02474>.
118. Han, S.; Kim, J.; Lee, Y.; Bang, J.; Kim, C.G.; Choi, J.; Min, J.; Ha, I.; Yoon, Y.; Yun C.H.; Cruz, M.; Wiley, B.J.; Ko, S.H. Transparent Air Filters with Active Thermal Sterilization. *Nano Lett.* 2021, <https://doi.org/10.1021/acs.nanolett.1c02737>.
117. Raciti, D.; Braun, T.; Tackett, B.M.; Xu, H.; Cruz, M.; Wiley, B.J.; Moffat, T.P. High-Aspect-Ratio Ag Nanowire Mat Electrodes for Electrochemical CO Production from CO₂. *ACS Catal.* 2021, 11, 11945.
116. Pietri, T.; Wiley, B.J.; Simonato, J.P. Boron Nitride Nanotubes for Heat Dissipation in Polycaprolactone Composites. *ACS Applied Nano Materials* 2021, 4, 4774.
115. Fichthorn, K.A.; Chen, Z.; Chen, Z.; Rioux, R.M.; Wiley, B.J. Understanding the Solution-Phase Growth of Cu and Ag Nanowires and Nanocubes from First Principles. *Langmuir* 2021, 37, 4419.
114. Kim, M.J.; Cruz, M.A.; Chen, Z.; Xu, H.; Brown, M.; Fichthorn, K.A.; Wiley, B.J. Isotropic Iodide Adsorption Causes Anisotropic Growth of Copper Microplates. *Chem. Mater.* 2020, 33, 881-891.

113. Hou, Y.; Kovács, N.; Xu, H.; Sun, C.; Erni, R.; Rieder, A.; Hu, H.; Kong, Y.; Wiley, B.J.; Vesztergom, S.; Broekmann, P. Limitations of Identical Location SEM as a Method of Degradation Studies on Surfactant Capped Nanoparticle Electrocatalysts. *J. Catal.* 2020, 394, 58.
112. de Jesus Gálvez-Vázquez, M.; Moreno-García, P.; Xu, H.; Hou, Y.; Hu, H.; Zelocualtecatl Montiel, I.; Rudnev, A.V.; Alinejad, S.; Grozovski, V.; Wiley, B.J.; Arenz, M.; Broekmann, P. Environment Matters: CO₂RR Electrocatalyst Performance Testing in a Gas-Fed Zero-Gap Electrolyzer. *ACS Catal.* 2020, 10, 13096.
111. Zhao, J.; Kirillova, A.; Kelly, C.N.; Xu, H.; Koshut, W.J.; Yang, F.; Gall, K.; Wiley, B.J. High-Strength Hydrogel Attachment through Nanofibrous Reinforcement. *Adv. Healthc. Mater.*, 2020, 10, 2001119.
110. Yang, F.; Zhao, J.; Koshut, W. J.; Watt, J.; Riboh, J.; Gall, K.; Wiley, B. J. A Synthetic Hydrogel Composite with the Mechanical Behavior and Durability of Cartilage. *Advanced Functional Materials* 2020, 2003451.
109. Brown, M.; Wiley, B. J. Bromide Causes Facet-Selective Atomic Addition in Gold Nanorod Syntheses. *Chemistry of Materials*, 2020, doi.org/10.1021/acs.chemmater.0c01494.
108. Yang, F.; Kim, M. J.; Brown, M.; Wiley, B. J. Alkaline Water Electrolysis at 25 A cm⁻² with a Microfibrous Flow-through Electrode. *Advanced Energy Materials*, 2020, 2001174.
107. Manning, H.G.; Flowers, P.F.; Cruz, M. A.; Gomes da Rocha, C.; O'Callaghan, C.; Ferreira, M.S.; Wiley, B. J.; Boland, J. J. The Resistance of Cu Nanowire-Nanowire Junctions & Electro-Optical Modeling of Cu Nanowire Networks. *Appl. Phys. Lett.* 2020, 116, 251902.
106. Cardenas, J. A.; Tsang, H.; Tong, H.; Abuzaid, H.; Price, K.; Cruz, M. A.; Wiley, B. J.; Franklin, A. D.; Lazarus, N. Flash Ablation Metallization of Conductive Thermoplastics. *Addit. Manuf.* 2020, 101409.
105. Yurduseven, O.; Ye, S.; Fromenteze, T.; Wiley, B.J.; Smith, D.R. 3D Conductive Polymer Printed Metasurface Antenna for Fresnel Focusing. *Designs*, 2019, 3, 46.
104. Kim, M.J.; Brown, M.; Wiley, B.J. Electrochemical investigations of metal nanostructure growth with single crystals. *Nanoscale*, 2019, 11, 21709-21723.
103. Williams, N.X.; Noyce, S.; Cardenas, J.A.; Catenacci, M.; Wiley, B.J.; Franklin, A.D. Silver nanowire inks for direct-write electronic tattoo applications. *Nanoscale*, 2019, 11, 14294-14302.
102. Lazarus, N.; Bedair, S.S.; Hawasli, S.H.; Kim, M.J.; Wiley, B.J.; Smith, G.L. Selective Electroplating for 3D-Printed Electronics. *Adv. Mater. Technol.*, 1900126
101. Rossman, A.H.; Catenacci, M.; Zhao, C.; Sikaria, D.; Knudsen, J.E.; Dawes, D.; Gehm, M.E.; Samei, E.; Wiley, B.J.; Lo, J.Y. Three-Dimensionally-Printed Anthropomorphic Physical Phantom for Mammography and Digital Breast Tomosynthesis with Custom Materials, Lesions, and Uniform Quality Control Region. *J. Med. Imaging*, 2019, 6, 021604.
100. Kim, M.J.; Seo, Y.; Cruz, M.A.; Wiley, B.J. Metal Nanowire Felt as a Flow-Through Electrode for High-Productivity Electrochemistry. *ACS Nano*, 2019, 13, 6998-7009

99. Kim, M.J.; Cruz, M.A.; Yang, F.; Wiley, B.J. Accelerating electrochemistry with Metal Nanowires. *Curr. Opin. Electrochem.*, 2019, 16, 19-27.
98. Kim, M.J.; Cruz, M.A.; Ye, S.; Gray, A.L.; Smith, G.L.; Lazarus, N.; Walker, C.; Sigmarsson, H.H.; Wiley, B.J. One-Step Electrodeposition of Copper on Conductive 3D Printed Objects. *Addit. Manuf.*, 2019, 27, 318-326.
97. Huo, D.; Kim, M.J.; Lyu, Z.; Shi, Y.; Wiley, B.J.*; Xia, Y.* One-Dimensional Metal Nanostructures: From Colloidal Syntheses to Applications. *Chem. Rev.*, 2019, 119, 8972–9073. *co-corresponding authors.
96. Kim, M.J.; Alvarez, S.; Chen, Z.; Fichthorn, K.A.; Wiley, B.J. Single-Crystal Electrochemistry Reveals Why Metal Nanowires Grow. *J. Am. Chem. Soc.*, 2018, 140, 14740-14746.
95. Cardenas, J.A.; Upshaw, S.; Williams, N.X.; Catenacci, M.J.; Wiley, B.J.; Franklin, A.D. Impact of Morphology on Printed Contact Performance in Carbon Nanotube Thin-Film Transistors. *Adv. Funct. Mater.*, 2019, 29, 1805727.
94. Reyes, C.; Somogyi, R.; Niu, S.; Cruz, M.A.; Yang, F., Catenacci, M.J.; Rhodes, C.P.; Wiley, B.J. Three-Dimensional Printing of a Complete Lithium Ion Battery with Fused Filament Fabrication. *ACS Appl. Energy Mater.*, 2018, 1, 5268-5279.
93. Manning, H.G.; Niosi, F.; Gomes da Rocha, C.; Bellew, A.T.; O’Callaghan, C.; Biswas, S.; Flowers, P.F.; Wiley, B.J.; Holmes, J.D.; Ferreira, M.S.; Boland, J.J. Emergence of Winner-Takes-All Connectivity Paths in Random Nanowire Networks. *Nat. Commun.*, 2018, 9, 3929.
92. Reyes, C.; Fu, L.; Suthanthiraraj, P.P.A.; Owens, C.E.; Shields, W.; Lopez, G.P.; Charbonneau, P.; Wiley, B.J. The Limits of Primary Radiation Forces in Bulk Acoustic Standing Waves for Concentrating Nanoparticles. *Part. Part. Syst. Charact.*, 2018, 35, 1700470.
91. Kim, M.J.; Alvarez, S.; Tianyu, Y.; Tadepalli, V.; Fichthorn, K. A.; Wiley, B.J. Modulating the Growth Rate, Aspect Ratio, and Yield of Copper Nanowires with Alkylamines. *Chem. Mater.*, 2018, 30, 2809-2818.
90. Cardenas, J.A.; Catenacci, M.J.; Andrews, J.B.; Williams, N.X.; Wiley, B.J.; Franklin, A.D. In-Place Printing of Carbon Nanotube Transistors at Low Temperature. *ACS Appl. Nano Mater.*, 2018, 1, 1863-1869.
89. Catenacci, M.J.; Reyes, C.; Cruz, M.A.; Wiley, B.J. Stretchable Conductive Composites from Cu–Ag Nanowire Felt. *ACS Nano*, 2018, 12, 3689-3698.
88. Cruz, M.A.; Ye, S.; Kim, M.J.; Reyes, C.; Yang, F.; Flowers, P.F.; Wiley, B.J. Multigram Synthesis of Cu–Ag Core–Shell Nanowires Enables the Production of a Highly Conductive Polymer Filament for 3D Printing Electronics. *Part. Part. Syst. Char.*, 2018, 35, 1700385.
87. Yurduseven, O.; Flowers, P.; Ye, S.; Marks, D. L.; Gollub, J. N.; Fromenteze, T.; Wiley, B. J.; Smith, D. R. Computational Microwave Imaging using 3D Printed Conductive Polymer Frequency-Diverse Metasurface Antennas. *IET Micro Antenna P.*, 2017, 11, 1962-1969.
86. Flowers, P.F.; Reyes, C.; Ye, S.; Kim, M.J.; Wiley, B.J. 3D Printing Electronic Components and Circuits with Conductive Thermoplastic Filament. *Addit. Manuf.*, 2017, 18, 156-163.

85. Xie, Y.; Ye, S.; Reyes, C.; Sithikong, P.; Popa, B.-I.; Wiley, B.J.; Cummer, S.A. Microwave Metamaterials Made by Fused Deposition 3D Printing of a Highly Conductive Copper-Based Filament. *Appl. Phys. Lett.*, 2017, *110*, 181903.
84. Yang, F.; Tadepalli, V.; Wiley, B.J. 3D Printing of a Double Network Hydrogel with a Compression Strength and Elastic Modulus Greater than those of Cartilage. *ACS Biomater. Sci. Eng.*, 2017, *3*, 863–869.
83. Catenacci, M.J.; Flowers, P.F.; Cao, C.; Andrews, J.B.; Franklin, A.D.; Wiley, B.J. Fully Printed Memristors from Cu–SiO₂ Core–Shell Nanowire Composites. *J. Electron. Mater.*, 2017, *7*, 4596-4603.
82. Stewart, I.E.; Kim, M.J.; Wiley, B.J. Effect of Morphology on the Electrical Resistivity of Silver Nanostructure Films. *ACS Appl. Mater. Interfaces*, 2017, *9*, 1870-1876.
81. Kim, M.J.; Flowers, P.F.; Stewart, I.E.; Ye, S.; Baek, S.; Kim, J.J.; Wiley, B.J. Ethylenediamine Promotes Cu Nanowire Growth by Inhibiting Oxidation of Cu (111). *J. Am. Chem. Soc.* 2017, *39*, 277-284.
80. Ye, S.; Stewart, I.E.; Chen, Z.; Li, B.; Rathmell, A.R.; Wiley, B.J. How Copper Nanowires Grow and How To Control Their Properties. *Acc. Chem. Res.* 2016, *49*, 442-451.
79. Flowers, P.F.; Catenacci, M.J.; Wiley, B.J. High-speed, Solution-Coatable Memory Based on Cu–SiO₂ Core–Shell nanowires. *Nanoscale Horiz.*, 2016, *1*, 313-316.
78. Zhang, J.; Wang, Q.; Zhang, X.; Wang, J.; Guo, M.; Wiley, B.J.; Li, C.; Hu, C. Carbamide Promoted Polyol Synthesis and Transmittance Properties of Silver Nanocubes. *Inorg. Chem. Front.*, 2016, *3*, 547-555.
77. Stewart, I.E.; Ye, S.; Chen, Z.; Flowers, P.F.; Wiley, B.J. Synthesis of Cu-Ag, Cu-Au, and Cu-Pt Core-Shell Nanowires and Their Use in Transparent Conducting Films. *Chem. Mater.*, 2015, *27*, 7788-7794.
76. Prasai, B.; Wilson, A.R.; Wiley, B.J.; Ren, Y.; Petkov, V. On the Road to Metallic Nanoparticles by Rational Design: Bridging the Gap between Atomic-Level Theoretical Modeling and Reality by Total Scattering Experiments. *Nanoscale*, 2015, *7*, 17902-17922.
75. Li, B.; Ye, S.; Stewart, I.E.; Wiley, B.J. Synthesis and Purification of Silver Nanowires To Make Conducting Films with a Transmittance of 99%. *Nano Lett.*, 2015, *7*, 6722-6726.
74. Borchert, J.W.; Stewart, I.E.; Ye, S.; Rathmell, A.R.; Wiley, B.J.; Winey, K.I. Effects of Length Dispersity and Film Fabrication on the Sheet Resistance of Copper Nanowire Transparent Conductors. *Nanoscale*, 2015, *7*, 14496-14504.
73. Ye, Y.; Pham, A.T.; Cruz, D.; Reyes, C.; Wiley, B.J.; Lopez, G.P.; Yellen, B.B. Assembly of Colloidal Molecules, Polymers, and Crystals in Acoustic and Magnetic Fields. *Adv. Mater.*, 2015, *27*, 4725-4731.
72. Alvarez, S.; Ye, S.; Flowers, P.F.; Wiley, B.J. Photocatalytic Growth of Copper Nanowires from Cu₂O Seeds. *Chem. Mater.*, 2015, *27*, 570-573.
71. Du, J.; Chen, Z.; Ye, S.; Wiley, B.J.; Meyer, T.J. Copper as a Robust and Transparent Electrocatalyst for Water Oxidation. *Angew. Chem. Int. Ed.*, 2015, *54*, 2073-2078.

70. Ye, S.; Rathmell, A.R.; Chen, Z.; Stewart, I.E.; Wiley, B.J. Metal Nanowire Networks: The Next Generation of Transparent Conductors. *Adv. Mater.*, 2014, 26, 6670-6687.
69. Chen, Z.; Ye, S.; Stewart, I.E.; Wiley, B.J. Copper Nanowire Networks with Transparent Oxide Shells That Prevent Oxidation without Reducing Transmittance. *ACS Nano*, 2014, 8, 9673-9679.
68. Ye, S.; Chen, Z.; Ha, Y.-C.; Wiley, B.J. Real-Time Visualization of Diffusion-Controlled Nanowire Growth in Solution. *Nano Lett.*, 2014, 14, 4671-4676.
67. Long, R.; Zhou, S.; Wiley, B.J.; Xiong, Y. Oxidative Etching for Controlled Synthesis of Metal Nanocrystals: Atomic Addition and Subtraction. *Chem. Soc. Rev.*, 2014, 43, 6288-6310.
66. Stewart, I.E.; Rathmell, A.R.; Yan, L.; Ye, S.; Flowers, P.F.; You, W. Wiley, B.J. Solution-Processed Copper-Nickel Nanowire Anodes for Organic Solar Cells. *Nanoscale*, 2014, 6, 5980-5988.
65. Chen, Z.; Ye, S.; Wilson, A.R.; Ha, Y.-C.; Wiley, B.J. Optically Transparent Hydrogen Evolution Catalysts made from Networks of Copper-Platinum Core-Shell Nanowires. *Energy Environ. Sci.*, 2014, 7, 1461-1467.
64. Ye, S.; Rathmell, A.R.; Ha, Y.-C.; Wilson, A.R.; Wiley, B.J. The Role of Cuprous Oxide Seeds in the One-Pot and Seeded Synthesis of Copper Nanowires. *Small*, 2014, 10, 1771-1778.
63. Ye, S.; Rathmell, A.R.; Stewart, I.E.; Ha, Y.-C.; Wilson, A.R.; Chen, Z.; Wiley, B.J. A Rapid Synthesis of High Aspect Ratio Copper Nanowires for High-Performance Transparent Conducting Films. *Chem. Commun.*, 2014, 50, 2562-2564. *Cover Article*.
62. Lassiter, J.B.; McGuire, F.; Mock, J.J.; Ciraci, C.; Hill, R.T.; Wiley, B.J. Chilkoti, A. Smith, D. R. Plasmonic Waveguide Modes of Film-Coupled Metallic Nanocubes. *Nano Lett.*, 2013, 13, 5866-5872.
61. Chen, Z.; Rathmell, A.R.; Ye, S.; Wilson, A.R.; Wiley, B.J. Optically Transparent Water Oxidation Catalysts Based on Copper Nanowires. *Angew. Chem. Int. Ed.*, 2013, 52, 13708-13711. *Highlighted in C&EN*.
60. Mutiso, R.M.; Sherrott, M.C.; Rathmell, A.R.; Wiley, B.J.; Winey K.I. Integrating Simulations and Experiments to Predict Sheet Resistance and Optical Transmittance in Nanowire Films for Transparent Conductors. *ACS Nano*, 2013, 7, 7654-7663.
59. Wilson, A.R.; Sun, K.; Chi, M.; White, R.M.; LeBeau, J.M.; Lamb, H.H.; Wiley, B.J. From Core-Shell to Alloys: The Preparation and Characterization of Solution-Synthesized AuPd Nanoparticle Catalysts. *J. Phys. Chem C.*, 2013, 117, 17557-17566.
58. Wu, J.; Zang, J.; Rathmell, A.R.; Zhao, X.; Wiley, B.J. Reversible Sliding in Networks of Nanowires. *Nano Lett.*, 2013, 13, 2381.
57. Moreau, A.; Ciraci, C.; Mock, J.J.; Hill, R.T.; Wang, Q.; Wiley, B.J.; Chilkoti, A.; Smith, D.R. Controlled-Reflectance Surfaces with Film-Coupled Colloidal Nanoantennas. *Nature*, 2012, 492, 86-89.

56. Rathmell, A.R.; Nguyen, M.; Chi, M.; Wiley, B.J. Synthesis of Oxidation-Resistant Cupronickel Nanowires for Transparent Conducting Nanowire Networks. *Nano Lett.*, 2012, 12, 3193-3199.
55. Khalil, K.S.; Sagastegui, A.; Li, Y.; Tahir, M.A.; Socolar, J.E.S; Wiley, B.J.; Yellen, B.B. Binary Colloidal Structures Assembled Through Ising Interactions. *Nat. Commun.*, 2012, 3, 794.
54. Bergin, S.M.; Rathmell, A.R.; Chen, Y.H; Charbonneau, P.; Li, Z.Y.; Wiley, B.J. The Effect of Nanowire Length and Width on the Properties of Transparent Conducting Films. *Nanoscale*, 2012, 4, 1996-2004.
53. Zhu, Y.; Qin, Q.; Xu, F.; Fan, F.; Ding Y.; Zhang, T.; Wiley, B.J.; Wang, Z.L. Size Effects on Elasticity, Yielding, and Fracture of Silver Nanowires: *In Situ* Experiments. *Phys. Rev. B*, 2012, 045443.
52. Yang, L.; Zhang, T.; Zhou, H.; Price, S.C.; Wiley, B.J.; You, W. Solution-Processed Flexible Polymer Solar Cells with Silver Nanowire Electrodes. *ACS Appl. Mater. Interfaces*, 2011, 3, 4075-4084.
51. Rathmell, A.R.; Wiley, B.J. The Synthesis and Coating of Long, Thin Copper Nanowires to make Flexible, Transparent Conducting Films on Plastic Substrates. *Adv. Mater.*, 2011, 23, 4798-4803.
50. Xu, J.; Wilson, A.R.; Rathmell, A.R.; Howe, J.; Chi, M.; Wiley, B.J. Synthesis and Catalytic Properties of Au-Pd Nanoflowers. *ACS Nano*, 2011, 5, 6119-6127.
49. Yang, Y.; Erb, R.M. Wiley, B.J.; Zauscher, S.; Yellen, B.B. Imaginary Magnetic Tweezers for Massively Parallel Surface Adhesion Spectroscopy. *Nano Lett.*, 2011, 11, 1681-1684.
48. Xu, F.; Durham, III, J.W.; Wiley, B.J.; Zhu, Y. Strain-Release Assembly of Nanowires on Stretchable Substrates. *ACS Nano*, 2011, 5, 1556-1563.
47. Wiley, B.J.; Qin, D.; Xia, Y. Nanofabrication at High Throughput and Low Cost. *ACS Nano*, 2010, 4, 3554-3559. (Invited Perspective).
46. Rathmell, A.R.; Bergin, S.M.; Hua, Y.-L.; Li, Z.-Y.; Wiley, B.J. The Growth Mechanism of Copper Nanowires and their Properties in Flexible, Transparent Conducting Films. *Adv. Mater.*, 2010, 22, 3558-3563.

Postdoctoral and Graduate Publications (45)

45. Kubo, M.; Li, X.; Kim, C.; Hashimoto, M.; Wiley, B.J.; Ham, D.; Whitesides, G.M. Stretchable Microfluidic Radiofrequency Antennas. *Adv. Mater.*, 2010, 22, 2749-2752.
44. Martinez, A.W.; Phillips, S.T.; Nie, Z.H.; Cheng, C.M.; Carrilho, E.; Wiley, B.J.; Whitesides, G.M. Programmable Diagnostic Devices Made from Paper and Tape. *Lab Chip*, 2010, 10, 2499-2504.
43. Guo, X.; Qiu, M.; Bao, J.; Wiley, B.J.; Yang, Q.; Zhang, X.; Ma, Y.; Yu, H.; Tong, L. Direct Coupling of Plasmonic and Photonic Nanowires for Hybrid Nanophotonic Components and Circuits. *Nano Lett.*, 2009, 9, 4515-4519.

42. Lipomi, D.J.; Ilievski, F.; Wiley, B.J.; Deotare, P.B.; Loncar, M.; Whitesides, G.M. Integrated Fabrication and Magnetic Positioning of Metallic and Polymeric Nanowires Embedded in Thin Epoxy Slabs. *ACS Nano*, 2009, 3, 3315-3325.
41. Siegel, A.C.; Phillips, S.T.; Wiley, B.J.; Whitesides, G.M. Thin, Lightweight, Foldable Thermochromic Displays on Paper. *Lab Chip*, 2009, 9, 2775-2781.
40. Stan, C.A.; Schneider, G.F.; Shevkoplyas, S.S.; Hashimoto, M.; Ibanescu, M.; Wiley B.J.; Whitesides, G.M. A Microfluidic Apparatus for the Study of Ice Nucleation in Supercooled Water Drops. *Lab Chip*, 2009, 9, 2293-2305.
39. Jones, A.C.; Olmon, R.L.; Skrabalak, S.E.; Wiley, B.J.; Xia Y.; Raschke, M.B. Mid-IR Plasmonics: Near-Field Imaging of Coherent Plasmon Modes of Silver Nanowires. *Nano Lett.*, 2009, 9, 2553-2558.
38. Moran, C.H.; Wainerdi, S.M.; Cherukuri, T.K.; Kittrell, C.; Wiley, B.J.; Nicholas, N.W.; Curley, S.A.; Kanzius, J.S.; Cherukuri, P. Size-Dependent Joule Heating of Gold Nanoparticles Using Capacitively Coupled Radiofrequency Fields. *Nano Res.*, 2009, 2, 400-405.
37. Thomas, S.W.; Chiechi, R.C.; LaFratta, C.N.; Webb, M.R.; Lee, A.; Wiley, B.J.; Zakin, M.R.; Walt, D.R.; Whitesides, G.M. Infochemistry and Infofuses: Chemical Storage and Transfer of Coded Information. *PNAS*, 2009, 106, 9147-9150.
36. Lu, X.; Rycenga, M.; Skrabalak, S.E.; Wiley, B.J.; Xia, Y. Chemical Synthesis of Novel Plasmonic Nanoparticles. *Annu. Rev. Phys. Chem.*, 2009, 60, 167-192.
35. Martinez, A.W.; Phillips, S.T.; Wiley, B.J.; Gupta, M; Whitesides, G.M. FLASH: A Rapid Method for Prototyping Paper-Based Microfluidic Devices. *Lab Chip*, 2008, 8, 2146-2150.
34. Wiley, B.J.; Lipomi, D.J.; Bao, J.; Capasso, F.; Whitesides, G.M. Fabrication of Surface Plasmon Resonators by Nanoskiving Single-Crystalline Gold Microplates. *Nano Lett.*, 2008, 8, 3023-3028.
33. Pyayt, A.L.; Wiley, B.J.; Xia, Y.; Chen, A.; Dalton, L. Integration of Silver Nanowire Plasmonic and Photonic Waveguides. *Nat. Photonics*, 2008, 3, 660-665.
32. Rang, M.; Jones, A.C.; Zhou, F.; Li, Z.-Y.; Wiley, B.J.; Xia, Y.; Raschke, M. B. Optical Near-Field Mapping of Plasmonic Nanoprisms. *Nano. Lett.*, 2008, 8, 3357-3363.
31. Skrabalak, S.E.*; Wiley, B.J.*; Kim, M.H.; Formo, E.; Xia, Y. On the Polyol Synthesis of Silver Nanostructures: Glycolaldehyde as a Reducing Agent. *Nano Lett.*, 2008, 8, 2077-2081. *co-first authors.
30. Kim, M.H.; Lu, X.; Wiley, B.J.; Lee, E.P.; Xia, Y. The Morphological Evolution of Single-Crystal Ag Nanospheres During the Galvanic Replacement Reaction with H₂AuCl₄. *J. Phys. Chem. C*, 2008, 112, 7872-7876.
29. Xiong, Y.; Wiley, B.J.; Xia, Y. Nanocrystals with Unconventional Shapes – A Class of Promising Catalysts. *Angew. Chem. Int. Ed.*, 2007, 46, 7157-7159.
28. Wiley, B.J.; Sun, Y.; Xia, Y. Synthesis of Silver Nanostructures with Controlled Shapes and Properties. *Acc. Chem. Res.*, 2007, 40, 1067-1076.
27. Chen, J.; Wiley, B.J.; Xia, Y. One-Dimensional Nanostructures of Metals: Large-Scale Synthesis and Some Potential Applications. *Langmuir*, 2007, 23, 4120-4129. *Cover Article*.

26. Xiong, Y.; Cai, H.; Wiley, B.J.; Wang, J.; Kim, M.J.; Xia, Y. Synthesis and Mechanistic Study of Palladium Nanobars and Nanorods. *J. Am. Chem. Soc.*, 2007, *129*, 3665-3675.
25. Wiley, B.J.; Chen, Y.; McLellan, J.M.; Xiong, Y.; Li, Z.-Y.; Ginger, D.; Xia, Y. Synthesis and Optical Properties of Silver Nanobars and Nanorice. *Nano Lett.*, 2007, *7*, 1032-1036.
24. Petrova, H.; Lin, C.-H.; de Liejer, S.; Hu, M.; McLellan, J.M.; Siekkinen, A.R.; Wiley, B.J.; Marquez, M.; Xia, Y.; Sader, J.E.; Hartland, G.V. Time-Resolved Spectroscopy of Silver Nanocubes: Observation and Assignment of Coherently Excited Vibrational Modes. *J. Chem. Phys.*, 2007, *126*, 094709.
23. Fu, E.; Ramsey, S.A.; Chen, J.; Chinowsky, T.M.; Wiley, B.J.; Xia, Y.; Yager, P. Resonance Wavelength-Dependent Signal of Absorptive Particles in Surface Plasmon Resonance-Based Detection. *Sens. Actuators, B*, 2007, *123*, 606-613.
22. Meng, L.; Hong, W.; Nagel, A.; Wiley, B.J.; Scriven, L.; Norris, D. The Role of Thickness Transitions in Convective Assembly. *Nano Lett.*, 2006, *6*, 2249-2253.
21. Wiley, B.J.; Wang, Z.; Wei, J.; Yin, Y.; Cobden, D.; Xia, Y. Synthesis and Electrical Characterization of Silver Nanobeams. *Nano Lett.*, 2006, *6*, 2273-2278.
20. Sanders, A.; Routenberg, D.; Wiley, B.J.; Xia, Y.; Dufresne, E.; Reed, M. Observation of Plasmon Propagation, Redirection, and Fan-Out in Silver Nanowires. *Nano Lett.*, 2006, *6*, 1822-1826.
19. Wiley, B.J.; Im, S.-H.; Li, Z.-Y.; McLellan, J.; Siekkinen, A.; Xia, Y. Maneuvering the Surface Plasmon Resonance of Silver Nanostructures through Shape-Controlled Synthesis. *J. Phys. Chem. B*, 2006, *110*, 15666-15675. *Cover Article*.
18. Wiley, B.J.; Xiong, Y.; Li, Z.-Y.; Xia, Y. Right Bipyramids of Silver: A New Shape Derived from Single Twinned Seeds. *Nano Lett.*, 2006, *6*, 765-768.
17. Zetsu, N.; McLellan, J.M.; Wiley, B.J.; Yin, Y.; Li, Z.-Y.; Xia, Y. Rhodium Multipods: Synthesis, Stability, Surface Plasmonic Properties, and Their Use as Substrates for Surface-Enhanced Raman Scattering. *Angew. Chem. Int. Ed.*, 2006, *45*, 1288-1292.
16. Xiong, Y.; Wiley, B.J.; Chen, J.; Li, Z.-Y.; Xia, Y. Corrosion-Based Synthesis of Single-Crystal Pd Nanoboxes and Nanocages and their Surface Plasmon Properties. *Angew. Chem. Int. Ed.*, 2005, *44*, 7913-7917.
15. Chen, J.; Wiley, B.J.; McLellan, J.; Xiong, Y.; Li, Z.-Y.; Xia, Y. Optical Properties of Pd-Ag and Pt-Ag Nanoboxes Synthesized via Galvanic Replacement Reactions. *Nano Lett.*, 2005, *5*, 2058-2062.
14. Sherry, L.; Chang, S.; Schatz, G.; Van Duyne, R.; Wiley, B.J.; Xia, Y. Localized Surface Plasmon Resonance Spectroscopy of Single Silver Nanocubes. *Nano Lett.*, 2005, *5*, 2034-2038.
13. Wiley, B.J.; Sun, Y.; Xia, Y. Polyol Synthesis of Silver Nanostructures: Control of Product Morphology with Fe(II) or Fe(III) Species. *Langmuir*, 2005, *21*, 8077-8080.
12. Cang, H.; Sun, T.; Chen, J.; Wiley, B.J.; Li, Z.-Y.; Xia, Y. and Li, X. Gold Nanocages as Potential Contrast Agents for Spectroscopic and Conventional Optical Coherence Tomography. *Opt. Lett.*, 2005, *30*, 3048-3050.

11. Lee, Y.-T.; Im, S.-H.; Wiley, B.J.; Xia, Y. Quick Formation of Single-Crystal Nanocubes of Silver through Dual Functions of Hydrogen Gas in Polyol Synthesis. *Chem. Phys. Lett.*, 2005, 441, 479-483.
10. Chen, J.; Wiley, B.J.; Li, Z.; Cang, H.; Campbell, D.; Saeki, F.; Au, L.; Lee, J.; Li, X.; Xia, Y. Gold Nanocages: Engineering the Structure for Biomedical Applications. *Adv. Mater.*, 2005, 17, 2255-2261.
9. Xiong, Y.; Wiley, B.J.; Chen, J.; Xia, Y.; Yin, Y.; Li, Z.-Y. Size-Dependence of Surface Plasmon Resonance and Oxidation for Pd Nanocubes Synthesized via a Seed Etching Process. *Nano Lett.*, 2005, 5, 1237-1242.
8. Wang, Y.; Lee, K.; Shang, H.; Wiley, B.J.; Xia, Y.; Cao, G. Ag-Ag_{0.08}V₂O₅·nH₂O Composite Films as Host Materials for Li-ion Intercalation. *Phys. Stat. Sol. A*, 2005, 202A, R79-R81.
7. Xiong, Y.; Chen, J.; Wiley, B.J.; Xia, Y.; Aloni, S.; Yin, Y. Understanding the Role of Oxidative Etching in the Polyol Synthesis of Palladium Nanoparticles with Uniform Shape and Size. *J. Am. Chem. Soc.*, 2005, 127, 7332-7333.
6. Wiley, B.J.; Sun, Y.; Chen, J.; Cang, H.; Li, Z.-Y.; Li, X.; Xia, Y. Silver and Gold Nanostructures with Well-Controlled Shapes. *MRS Bull.*, 2005, 30, 356-361.
5. Chen, J.; Saeki, F.; Wiley, B.J.; Cang, H.; Cobb, M.J.; Li, Z.-Y.; Au, L.; Zhang, H.; Kimmey, M.; Li, X.; Xia, Y. Gold Nanocages: Bioconjugation and their Potential Use as Optical Imaging Contrast Agents. *Nano Lett.*, 2005, 5, 473-477.
4. Im, S.-H.; Lee, Y.T.; Wiley, B.J.; Xia, Y. Large-Scale Synthesis of Silver Nanocubes: The Role of HCl in Promoting Cube Perfection and Monodispersity. *Angew. Chem. Int. Ed.*, 2005, 44, 2154-2157.
3. Wiley, B.J.; Sun, Y.; Mayers, B.; Xia, Y. Shape-Controlled Synthesis of Metal Nanostructures: The Case of Silver. *Chem. Eur. J.*, 2005, 11, 454-463. *cover article*
2. Wiley, B.J.; Herricks, T.; Sun, Y.; Xia, Y. Polyol Synthesis of Silver Nanoparticles: Use of Chloride and Oxygen to Promote the Formation of Single-Crystal, Truncated Cubes and Tetrahedrons. *Nano Lett.*, 2004, 4, 1733-1739.
1. Sun, Y.; Wiley, B.J.; Li, Z.-Y.; Xia, Y. Synthesis and Optical Properties of Nanorattles and Multiple-Walled Nanoshells/Nanotubes Made of Metal Alloys. *J. Am. Chem. Soc.*, 2004, 126, 9399-9406.

CONFERENCE PROCEEDINGS

1. Tong, H.; Pegues, H.; Yang, F.; Samei, E.; Lo, J. Y.; Wiley, B. J. Controlling the Position-Dependent Contrast of 3D Printed Physical Phantoms with a Single Material. *Proc. of SPIE*, 2019, 10948, 109484Y.
2. Pegues, H.; Knudsen, J.; Tong, H.; Gehm, M. E.; Wiley, B. J.; Samei, E.; Lo, Joseph Y.; Using Inkjet 3D Printing to Create Contrast-Enhanced Textured Physical Phantoms for CT, *Proc. of SPIE*, 2019, 10948, 109484Z.
3. Rossman, A.; Catenacci, M.; Li, A. M.; Sauer, T. J.; Solomon, J.; Gehm, M. E.; Wiley, B. J.; Samei, E.; Lo, J. Y.; 3D Printed Anthropomorphic Physical Phantom for Mammography and

DBT with High Contrast Custom Materials, Lesions and Uniform Chest Wall Region. *Proc. of SPIE*, 2018, 10573, 105730C.

4. Zhao, C.; Solomon, J.; Sturgeon, G. M.; Gehm, M. E; Catenacci, M.; Wiley, B. J; Samei, E.; Lo, J. Y.; Third Generation Anthropomorphic Physical Phantom for Mammography and DBT: Incorporating Voxelized 3D Printing And Uniform Chest Wall QC Region, *Proc. of SPIE*, 2017, 10132, 101321Y.

PATENTS

Patents from Independent Career

1. Wiley, B.; Rathmell, A.; Compositions and Methods for Growing Copper Nanowires. U.S. Pat. Appl. 61/337,241. 2011.
2. Wiley, B.; Synthesis of Cupronickel Nanowires and their Application in Transparent Conducting Films. U.S. Pat. Appl. 61567740. 2011.
3. Wiley, B.; Noble Metal-coated Nanostructures and Related Methods. U.S. Pat. Appl. 15/482,792. 2017.
4. Wiley, B.; Ye, S.; Three-dimensional (3D) Printing and Injection Molding Conductive Filaments and Methods of Producing and Using the Same. U.S. Pat. Appl. 16/126,515. 2018.
5. Wiley, B.; Kim, M.J; High surface area, highly conductive three-dimensional porous electrodes for electrochemical reaction applications. U.S. Pat. Appl. 16/373,466. 2019.
6. Wiley, B.; Yang, F.; Gall, K.; Riboh, J. Triple-network hydrogel implants for repair of cartilage. WO2019094426A1, 2019.

Postdoctoral and Graduate Patents

1. Xia, Y.; Im, S-H.; Lee, Y.-T.; Sun, Y.; Wiley, B. Methods for Production of Silver Nanostructures. U.S. Pat. 9,388,480.
2. Carrilho, E.; Martinez, A.W.; Mirica, K.A.; Phillips, S.T.; Siegel, A.C.; Wiley, B.; Whitesides, G.M. Three-Dimensional Microfluidic Devices. U.S. Pat. 8,628,729.
3. Siegel, A.C.; Phillips, S.T.; Dickey, M.D.; Rozkiewicz, D.; Wiley, B.; Whitesides, G.M.; Martinez, A.G. Paper-Based Microfluidic Systems and Methods of Making the Same are Described. U.S. Pat. 8,921,118.

PRESENTATIONS

Invited Presentations

1. 2020 CINT User Meeting, Los Alamos National Lab Oct., 2020
2. Penn State, University Park, PA Feb., 2020

3. American Chemical Society, NE Region meeting, Saratoga Springs April, 2019
4. American Chemical Society, Orlando, FL April, 2019
5. NSF Workshop on Flexible Hybrid Electronics, San Jose, CA Aug., 2018
6. American Chemical Society, Boston, MA Aug., 2018
7. Electrochemical Society, Seattle, WA May, 2018
8. University of Southampton, UK April, 2018
9. American Chemical Society, San Francisco, CA April, 2017
10. University of Wisconsin, Madison, WI Jan., 2017
11. Beilby Award Lecture, London, England Nov., 2016
12. University of Missouri, Columbia, MO Nov., 2016
13. University of Minnesota, Duluth, MN Sept., 2016
14. Tongji University, Shanghai, China Aug., 2016
15. Nobel Metal Nanoparticles GRC, Mt. Holyoke, MA June, 2016
16. Fall European MRS Meeting, Warsaw, Poland Oct., 2015
17. Stanford University, Materials Science and Engineering May, 2015
18. University of California, Berkeley, Chemistry Apr., 2015
19. North Carolina Central University, Chemistry Oct., 2014
20. Texas State University, Chemistry Oct., 2014
21. University of Washington, Molecular Engineering Oct., 2014
22. University of California, Irvine, Chemistry Oct., 2014
23. Northwestern University, Nanotechnology Seminar Series Sept., 2014
24. North Carolina State University, Mat. Sci. and Eng. Aug., 2014
25. Georgia Institute of Technology, Chemistry Aug., 2014
26. University of Pennsylvania, Material Science Mar., 2014
27. Indiana University, Chemistry Dec., 2013
28. Triangle Soft Matter Workshop, Durham, NC May, 2013
29. SPIE - Defense, Security & Sensing, Baltimore, MD May, 2013
30. Southeast Regional ACS Meeting, Raleigh, NC Nov., 2012
31. Northeast Regional ACS Meeting, Rochester, NY Oct., 2012
32. Cabot Corporation, Billerica, MA Aug., 2012
33. University of North Carolina, Chapel Hill, Student MRS section July, 2012

- | | |
|--|-------------|
| 34. Duke University, Chemistry | Jan., 2012 |
| 35. Southeastern Louisiana University, Chemistry and Physics | Oct., 2011 |
| 36. NovaCentrix, Austin, TX | Sept., 2011 |
| 37. Rambus Inc., Chapel Hill, NC | Aug., 2011 |
| 38. 18th American Conference on Crystal Growth and Epitaxy, Monterey, CA | Aug., 2011 |
| 39. Hong Kong University, Mechanical Engineering | July, 2011 |
| 40. Conference on Materials for Advanced Technologies, Singapore | June, 2011 |
| 41. University of North Carolina, Chapel Hill, Chemistry | Oct., 2010 |
| 42. Colby College | Oct., 2010 |
| 43. International Conference on One-dimensional Nanomaterials, Atlanta, GA | Dec., 2009 |

Contributed Presentations

- | | |
|--|------------|
| 1. Electrochemical Society, Dallas, TX | May, 2019 |
| 2. Material Research Society, Phoenix, AZ | Nov., 2019 |
| 3. Material Research Society, Boston, MA | Nov., 2018 |
| 4. Material Research Society, Boston, MA | Nov., 2017 |
| 5. Electrochemical Society, Washington, DC | Oct., 2017 |
| 6. TechConnect World, Washington, DC | May, 2017 |
| 7. GRC: Noble Metal Nanoparticles | June, 2014 |
| 8. Spring MRS Meeting, San Francisco, CA | Apr., 2014 |
| 9. Spring MRS Meeting, San Francisco, CA | Apr., 2013 |
| 10. Nanotechnology for Defense, Summerlin, NV | Aug., 2012 |
| 11. GRC: Noble Metal Nanoparticles | June, 2012 |
| 12. The Minerals, Metals & Materials Society Annual Meeting, Orlando, FL | Mar., 2012 |
| 13. Flexible Electronics and Displays Conference, Phoenix, AZ | Feb., 2012 |
| 14. Emerging Materials for Thin Film Solar Cells, Santa Barbara, CA | Aug., 2011 |
| 15. Commercialization of Micro-Nano Systems Conference, Greensboro, NC | Aug., 2011 |
| 16. GRC: Chemistry of Supramolecules & Assemblies | June, 2011 |
| 17. Nanotech 2001, Boston, Ma - Novel Nanostructured Coatings | June, 2011 |
| 18. Triangle Soft Matter Workshop, Chapel Hill, NC | May, 2011 |
| 19. Triangle Soft Matter Workshop, Durham, NC | May, 2010 |

PROFESSIONAL ACTIVITIES

- Associate Editor of *Nanoscale*, 2018-Present. Handling >300 Manuscripts per year.
- Associate Editor of *Nanoscale Advances*, 2018-Present
- Advisory Board Member of *Nanoscale Horizons*, 2019-Present
- Symposium Organizer, Surfactant and Additive Effects on Thin Film Deposition and Dissolution and Particle Growth scheduled for the May 10-15, 2020 ECS meeting in Montreal, Canada
- Symposium Organizer, Surfactant and Additive Effects on Thin Film Deposition and Dissolution and Particle Growth, May 13-17, 2018 ECS meeting in Seattle, WA
- Session Chair for Nanomaterials Symposium, Colloids Division, 2019 Spring ACS Meeting
- Session Chair for Nanoscience Program, Inorganic Division, 2010 Fall ACS Meeting
- Society Memberships: American Chemical Society, Materials Research Society, Electrochemical Society
- Proposal Review for NSF Macromolecular, Supramolecular and Nanochemistry
- Proposal Review for NSF Nanomanufacturing
- Proposal Review for NSF Solid State and Materials Chemistry
- Proposal Review for DOE Basic Energy Sciences
- Proposal Review for National Institute for Health Research, United Kingdom
- Proposal Review for ACS Petroleum Research Fund
- Proposal Review for NIH SBIR/STTR Program
- Proposal Review for British Columbia's Natural Resources and Applied Sciences (NRAS) Endowment
- Journal Review for *Science*, *Nature Nanotechnology*, *Angewandte Chemie*, *Nano Letters*, *Journals of the American Chemical Society*, *PNAS*, *Chemical Reviews*, *Advanced Materials*, *Journal of Physical Chemistry*, *Journal of Physical Chemistry C*, *ACS Nano*, *ACS Applied Materials and Interfaces*, *Scientific Reports*, *ACS Catalysis*, *Langmuir*, *Small*, *Nanoscale*, *Chemical Communications*, *Chemistry of Materials*, *Journal of Materials Chemistry*, *Journal of Materials Chemistry C*, *Macromolecules*, *European Journal of Inorganic Chemistry*, *Nanoscale*, *Crystal Growth and Design*, *International Journal of Hyperthermia*, *Chemical Physics Letters*, *Rapid Research Letters*, *Journal of Experimental Nanoscience*, *ACS Applied Polymer Materials*, *Nano Energy*, *Nanoscale Horizons*, *Advanced Materials Interfaces*, *Advanced Theory and Simulations*, *Materials Chemistry Frontiers*, *Materials Horizons*, *Nanoscale Research Letters*, *Additive Manufacturing*

TECHNOLOGY TRANSFER AND COMMERCIALIZATION

- Signed an option and research agreement with Sparta Biosciences in 2018 to commercialize a hydrogel implant for cartilage repair. Rabbit studies are currently underway to determine (1) if implantation of the hydrogel causes any adverse reaction and, (2) does the hydrogel survive and integrate in vivo.
- Co-founded Multi3D LLC in 2016 to license and commercialize Duke IP related to highly conductive polymer filament for 3D printing. This conductive filament is currently being

sold. Multi3D received SBIR grant from the NSF to support development of a more highly conductive filament for printing of RF components.

- Co-founded NanoForge Corp. in 2010 to commercialize copper nanowires. NanoForge succeeded in selling copper nanowires to 50 companies, but ultimately too much additional R&D was needed to bring a high-volume product to market, and NanoForge closed in 2013. The Wiley lab subsequently signed research agreements with EMD and Samsung to further develop the copper nanowire technology.

SERVICE

Duke Chemistry Departmental Service

1. Faculty Search Committee

- 2018 Junior Faculty Search
- Ad Hoc Committee Concerning the Appointment of Professor Matthew L. Becker

2. Faculty Reappointment Committee

- 2018: Assistant Professor Reappointment (Kevin Welsher)
- 2016: Assistant Research Professor Reappointment (Agostino Migliore)
- 2016: Assistant Research Professor Reappointment (Martin Fischer)

3. Chair of Alumni Engagement (2018-Present)

- Initiated visit and lecture from Geoffrey Hird (Ph.D. '01), Executive Director of Pharmaceuticals at Liquidia Technologies.
- Initiated visit and lecture from Ben Maynor (Ph.D. '04), Senior Vice President of Research and Development at Liquidia Technologies.
- Visited with Allen Cato, CEO of Cato Research (Ph.D. '67).
- Assisted graduate students with organization of a career panel in February, 2019.
- Had multiple discussions to coordinate activities with Duke Alumni Affairs (Nicole Kempton), Development (Mike Byerly, Angela Eberts) and Graduate Student Professional Development (Melissa Bostrom).
- Attended the Duke Alumni Affairs winter board meeting dinner February 8th, 2019.
- Attended the Graduate Board of Visitors Dinner, November 29th, 2018.

3. Annual Committee Assignments

- 2018: Chair of Alumni Engagement, Chair of Safety Committee, Member of Infrastructure Committee, Member of Graduate Admissions Committee, Member of Junior Faculty Search Committee, Member of Kevin Welsher Reappointment Committee, Member of Ad Hoc Committee for Appointment of Matthew Becker, Member of Propositional Exam Committee.
- 2017: Chair of Communications, Chair of Hill Lecture Organization, Member of Graduate Admissions Committee, Member of Graduate Recruitment Committee.

- 2016: Chair of Hill Lecture Organization, Member of Reappointment Committee for Agostino Migliore, Member of Reappointment Committee for Martin Fischer, Member of Propositional Exam Committee.
- 2015: Chair of Hill Lecture Organization, Member of Committee for Secondary Appointments.
- 2014: Chair of Hill Lecture Organization, Member of Executive Committee.
- 2013: Chair of Seminar Committee, Member of Graduate Admissions Committee.
- 2012: Chair of Seminar Committee, Member of Graduate Admissions Committee.
- 2011: Chair of Seminar Committee, Member of Graduate Admissions Committee.
- 2010: Chair of Communications, Member of Graduate Admissions Committee.
- 2009: Chair of Communications, Member of Graduate Admissions Committee.

4. Ph.D. Dissertation Committee Chair (7)

Aaron Robert Rathmell

Ph.D. received May, 2013

Dissertation: “Metal Nanowires: Synthesis, Processing, and Structure-Property Relationships in the Context of Flexible Transparent Conducting Films.”

Adria Rose Wilson

Ph.D. received May, 2014

Dissertation: “The Synthesis and Characterization of AuPd Nanoparticle Catalysts for Systematically Investigating the Effects of Bimetallic Interactions on Catalytic Performance.”

Ian Edward Stewart

Ph.D. received November, 2016

Dissertation: “The Impact of Morphology and Composition on the Resistivity and Oxidation Resistance of Metal Nanostructure Films.”

Patrick Franklin Flowers

Ph.D. received May, 2017

Dissertation: “Printing Electronic Components from Nanowire-Infused Ink and Highly Conductive Thermoplastic Mediums.”

Samuel Alvarez

Ph.D. received November, 2017

Dissertation: “The Role of Light and Alkylamines in Controlling the Growth of Copper Nanowires.”

Matthew Joseph Catenacci

Ph.D. received March, 2018

Dissertation: “Copper-based Nanowires for Printable Memory and Stretchable Conductors.”

Christopher Reyes

Ph.D. received July, 2018

Dissertation: “3D Printable Lithium Ion Batteries and the Effect of Aspect Ratio of CuAg Nanowires on Graphite Anode Performance.”

Mutya Cruz

Ph.D. received November, 2019

Dissertation: “Synthesis and Applications of Copper Nanowires and Nanoplates.”

Feichen Yang

Ph.D. received June, 2020

Dissertation: “Microfibrous and Nanofibrous Materials for Cartilage Repair and Energy Storage.”

5. Ph.D. Dissertation Committee Service (17)

Hsiangkuo Yuan (Tuan Vo-Dinh, 2012)

Christopher G. Khoury (Tuan Vo-Dinh, 2012)

Jay Simmons Jr. (Jie Liu, 2013)

Yingwen Cheng (Jie Liu, 2013)

Zachary Shane Kean (Stephen Craig, 2014)

Degao Peng (Weitao Yang, 2014)

Robert Harris (Ross Widenhoefer, 2015)

Stephen Ubnoske (Jeffrey Glass, 2016)

Gyeonghee Lee (Jie Liu, 2016)

Jinghua Li (Jie Liu, 2016)

Greg Gossweiler (Stephen Craig, 2016)

Yang Liu (Tuan Vo-Dinh, 2016)

Danielle Gorka (Jie Liu, 2016)

Lin Fu (Patrick Charbonneau, 2017)

Ting Jian (Michael Therien, 2017)

Christine Hyun Jung Kim (Jie Liu, 2018)

Qiwei Han (Jie Liu, 2018)

Spencer Ferguson (Adrienne Stiff-Roberts, 2020)

Jorge Cardenas (Aaron Franklin, 2020)

7. Masters Exam Committee (1)

Yue Cai (Jie Liu, 2013)

8. Preliminary Exam Committee Chair (10)

Huayu Tong

Mutya Cruz

Feichen Yang

Christopher Reyes

Samuel Alvarez

Matthew Joseph Catenacci

Patrick Franklin Flowers
Aaron Robert Rathmell
Ian Edward Stewart
Adria Rose Wilson

9. Preliminary Exam Committee Service (25)

Hsiangkuo Yuan (Tuan VoDinh)
Laura Cleveland (Michael Therien)
Yue Cai (Jie Liu)
Lin Fu (Patrick Charbonneau)
Danielle Gorke (Jie Liu)
Gregory Gossweiler (Stephen Craig)
Qiwei Han (Jie Liu)
Robert Harris (Ross Widenhoefer)
Ting Jiang (Michael Therien)
Zachary Shane Kean (Stephen Craig)
Christopher Khoury (Tuan VoDinh)
Degao Peng (Weitao Yang)
Jay Simmons (Jie Liu)
Yingwen Cheng (Jie Liu)
Christine Hyun Jung Kim (Jie Liu)
Yang Liu (Tuan VoDinh)
Gyeonghee Lee (Jie Liu)
Jinghua Li (Jie Liu)
Stephen Ubnoske (Jeff Glass)
Shi He (Jie Liu)
Jorge Cardenas (Aaron Franklin)
Virginia Ritter (Stephen Craig)
Chih-Hung Ko (Michael Therien)
Dong Ji (Jie Liu)
Liqi Wang (Stephen Craig and Ross Widenhoefer)

10. Propositional Exam Committee Service (37)

Leigh Allen (Dewey McCafferty, 2009)
Joseph Baker (Jiyong Hong, 2009)
Maria Bednar (Dewey McCafferty, 2009)
Meghan Blackledge (Dewey McCafferty, 2009)
Patrick DeArmond (Michael Fitzgerald, 2009)
John Hatcher (Don Coltart, 2009)
Rachel Brooner (Ross Widenhoefer, 2011)
Jason King (Eric Toone, 2011)
Ashley Ramirez (Stephen Craig, 2011)
Jeffrey Rawson (Michael Therien, 2011)
Ian Stanton (Michael Therien, 2011)

Pan Wu (Weitao Yang, 2011)
 David Besse (Katherine Franz, 2013)
 Ariel Geer (Michael Fitzgerald, 2013)
 Zachary Kean (Stephen Craig, 2013)
 Bumki Kim (Jiyong Hong, 2013)
 Megan Lanier (Jiyong Hong, 2013)
 Yang Liu (Tuan VoDinh, 2013)
 Stacey McDonald (Qiu Wang, 2013)
 Kasie Collins (Jennifer West, 2016)
 Paige Daniel (Steven Malcolmson, 2016)
 Christopher Eubanks (Amanda Hargrove, 2016)
 Kacey Hall (Katherine Franz, 2016)
 Qiwei Han (Jie Liu, 2016)
 Brett Hemric (Qiu Wang, 2016)
 Hyun Jun Kim (Jie Liu, 2016)
 Tri Nguyen (Dewey McCafferty, 2016)
 Felix Nwogbo (Dewey McCafferty, 2016)
 Mina Shehata (Jennifer Roizen, 2016)
 Jin Yu (Warren Warren, 2016)
 Lianjun Zheng (David Beratan, 2016)
 John Ganley (Emily Derbyshire, 2018)
 Honglue Shi (Hashim M Al-Hashimi, 2018)
 Maria Moreno (Emily Derbyshire, 2018)
 Aline Juru (Amanda Hargrove, 2018)
 Jacqueline Zaengle (Katherine Franz, 2018)
 Yudi Zhang (Stephen Craig, 2018)

University Service

- 2017-Present: Member of the Faculty Advisory Committee for the Duke University Energy Initiative.
- 2019-Present: Leader of the Providing Clean Fuel for the Developing World: Technology Is Not Enough” Bass Connections project team.
- 2017-2019: Member of the Executive Committee of the Graduate Faculty.
- 2011-2016: Member of NSF Triangle MRSEC
- 2010-2013: Participant in NSF REU Program (PI: Craig)
- 2011: Presentation on Entrepreneurship experience to innovation and entrepreneurship task force.
- 2012: Presentation on Entrepreneurship experience to Trinity Board of Visitors
- Internal Reviewer for ORAU Proposals
- Internal Reviewer for Packard Fellowship Proposals
- Internal Reviewer for Energy Seed Grant Proposals
- Member of MEMS Qualification Exam Committee for Betul Teymur, 2018
- Member of MEMS Qualification Exam Committee for Tyson Lanigan-Atkins, 2018
- Ph.D. Dissertation Committee (Hsiangkuo Yuan, Biomedical Engineering, 2012)
- Ph.D. Dissertation Committee (Christopher G Khoury, Biomedical Engineering, 2012)

- Ph.D. Dissertation Committee (Stephen Ubnoske, ECE, 2016)
- Ph.D. Dissertation Committee (Yang Liu, Biomedical Engineering, 2016)
- Preliminary Exam (Hsiangkuo Yuan, Biomedical Engineering)
- Preliminary Exam (Christopher Khoury, Biomedical Engineering)
- Preliminary Exam (Yang Liu, Biomedical Engineering)
- Preliminary Exam (Stephen Ubnoske, ECE)
- Preliminary Exam (Jorge Cardenas, ECE)

MENTORING ACTIVITIES

Ph.D. Students

1. Aaron Rathmell (2009-2013): Millersville University of Pennsylvania (B.S. in Chemistry); Dissertation: Metal Nanowires: Synthesis, Processing, and Structure-Property Relationships in the Context of Flexible Transparent Conducting Films; Postdoctoral research associate (Merck Group); Current position: Senior Scientist, SI2 Technologies, North Billerica, MA.
2. Adria Wilson (2009-2014, NSF Fellow, AAS Fellow): Drexel University (B.S. in Chemistry); Dissertation: The Synthesis and Characterization of AuPd Nanoparticle Catalysts for Systematically Investigating the Effects of Bimetallic Interactions on Catalytic Performance. AAAS/MRS/TMS Congressional Fellow (U.S. Senate Office of Bernie Sanders); ORISE Fellow (U.S. Department of Energy); Current position: Entrepreneurial Program Lead, Argonne National Laboratory.
3. Ian Stewart (2012-2016): Randolph-Macon College (B.S. in Chemistry); Dissertation: The Impact of Morphology and Composition on the Resistivity and Oxidation Resistance of Metal Nanostructure Films. Postdoctoral Scientist (RTI International); Current position: Research Chemist 1, RTI, International, Durham, NC.
4. Patrick Flowers (2012-2017): Southeastern Louisiana University (B.S. in Chemistry); Dissertation: Printing Electronic Components from Nanowire-Infused Ink and Highly Conductive Thermoplastic Mediums. Current position: Materials Engineer, Made in Space, Inc.
5. Samuel Alvarez (2012-2017): Connecticut College (B.A. in Chemistry); Dissertation: The Role of Light and Alkylamines in Controlling the Growth of Copper Nanowires. Current Position: Process Engineer, Intel Corporation, Rio Rancho, NM.
6. Matthew Catenacci (2013-2018): University of Notre Dame (B.S. in Chemistry); Dissertation: Copper-based Nanowires for Printable Memory and Stretchable Conductors. Current Position: Researcher, Battelle, Panama City, Fl.
7. Christopher Reyes (2014-2019, NSF Fellow): Texas State University, San Marcos (B.S. in Applied Mathematics); Dissertation: 3D Printable Lithium Ion Batteries and the Effect of Aspect Ratio of CuAg Nanowires on Graphite Anode Performance. Current Position: Postdoctoral Research Associate (Z. Cordero, Rice University).
8. Feichen Yang (2015-present): Fudan University (B.S. in Chemistry); Best Presentation in Triangle Soft Matter Workshop, 2017. Marcus Hobbes Fellowship, 2018. "Microfibrous and

Nanofibrous Materials for Cartilage Repair and Energy Storage.” Current Position: Postdoctoral Research Associate (M. Schoenfisch, UNC).

9. Mutya Cruz (2015-present): Rollins College (B.A. in Chemistry); William Krigbaum Fellowship, 2018.
10. Huayu Tong (2017-present): Nanjing University (B.S. in Chemistry).
11. Jiacheng Zhao (2018-present): Nanjing University (B.S. in Chemistry).
12. Heng Xu (2018-present): Jinlin University (B.S. in Chemistry).

Postdoctoral Research Associates

1. Zuofeng Chen (2012-2014): Xiamen University (B.S. in Chemistry); University of Hong Kong (Ph.D. in Chemistry). Current Position: Professor, Tongji University.
2. Yoon-Cheol Ha (2012-2013): Seoul National University (B.S., M.S. in Mineral and Petroleum Engineering); Seoul National University (Ph.D. in Materials Science and Engineering). Current Position: Principal Researcher, Korea Electrotechnology Research Institute.
3. Shengrong Ye (2012-2017): East China Normal University (B.S. in Chemistry); West Virginia University (Ph.D. in Chemistry). Current Position: CTO of Multi3D LLC.
4. Myung Jun Kim (2016-present): Seoul National University (B.S., Ph.D. in Chemical and Biological Engineering).
5. Micah D. Brown (2018-present): University of Rochester (B.S. in Chemistry); University of North Carolina, Chapel Hill (Ph.D. in Chemistry).

Visiting Scholars:

1. Jiangang Xu (2009-2010; Hunan University of Science and Technology, China)
2. Jingxia Gu (2009-2011; Institute of Chemistry, Chinese Academy of Sciences, Beijing, China)
3. Qiang Wang (2010-2012; Capital Normal University, China)
4. Jianghong Wu (2011-2013; Donghua University, China)
5. Go Kawamura (2013-2014; Toyohashi University of Technology, Japan)
6. Yoon-Cheol Ha (2013-2014; Korea Electrotechnology Research Institute)
7. Bo Li (2014-Present; Donghua University, China)
8. Duan-Jun Cai (2016; Xiamen University)
9. Mun Ho Kim (2019-2020; Pukyong National University)
10. Jean Pierre Simonato (2019-2020, CEA-Grenoble)

Undergraduate Students

1. Prithviraj Singha Roy (Fall 2009)
2. Stephen Bergin (Fall 2009, Spring 2010, 2 publications)
3. Derek Chenet (Summer 2010)
4. Evan Seidel (Spring 2010)
5. Minh Nguyen (Summer 2010, Fall 2010, Spring 2011, 1 publication)
6. Tim Zhang (Summer 2010, Fall 2010, Spring 2011, 2 publications)
7. Kathleen Lan (Spring 2011)
8. Daniel Agocs (Summer 2011 REU)
9. Tori Reynolds (Fall 2011, Spring 2011)
10. Tera Kashgarian (Fall 2011)
11. Roger Chavez (Summer 2012 REU)
12. Abbas Shikari (Summer 2012 REU)
13. Katherine Shirrell (Fall 2012, Spring 2013)
14. Ben Lee (Fall 2012)
15. Aman Kansan (Spring 2013, Fall 2013)
16. Christopher Reyes (Summer 2013 REU)
17. Gabrielle Hodgins (Summer 2013)
18. Lucy Downey (Summer 2013 REU)
19. Vaibhav Tadepalli (Fall 2013-Spring 2017, 2 publications)
20. Kaitlin Hubbard (Fall 2014, Spring 2015)
21. Rita Somogyi (Fall 2015, 1 publication)
22. Dorothy Jones (Fall 2015)
23. Samuel Brougher (Fall 2015)
24. Saumya Sao (Spring 2017)
25. Ana Rivas (Summer 2017)
26. Sarah Fordham (Summer 2017)
27. Kami Pullakhandam (Summer 2019)
28. Kennedy Sun (Summer 2019)
29. Sarabesh Natarajan (Summer 2019)
30. Rebecca Melaku (Summer 2019)

High School Students

1. Selina Boyd (Summer 2010 student from NC Project Seed)
2. Justin Yu (Summer 2011 student from NC School of Science and Mathematics)
3. Kevin Valakuzhy (Summer 2011 student from NC School of Science and Mathematics)
4. Joshua Howell (Summer 2012,2013 student from NC Project Seed)
5. Donathan Bryant (Summer 2014 student from NC Project Seed)
6. Ben Samson (Summer 2015 student from NC Project Seed)
7. Zack Lee (Summer 2016 student from NC School of Science and Mathematics)

Publications Involving Undergraduate Researchers

1. Reyes, C.; **Somogyi, R.**; Niu, S.; Cruz, M.A.; Yang, F., Catenacci, M.J.; Rhodes, C.P.; Wiley, B.J. Three-Dimensional Printing of a Complete Lithium Ion Battery with Fused Filament Fabrication. *ACS Appl. Energy Mater.* 2018, *1*, 5268-5279.
2. Kim, M.J.; Alvarez, S.; Tianyu, Y.; **Tadepalli, V.**; Fichthorn, K. A.; Wiley, B.J. Modulating the Growth Rate, Aspect Ratio, and Yield of Copper Nanowires with Alkylamines. *Chem. Mater.* 2018, *30*, 2809-2818.
3. Yang, F.; **Tadepalli, V.**; Wiley, B.J.; 3D Printing of a Double Network Hydrogel with a Compression Strength and Elastic Modulus Greater than those of Cartilage. *ACS Biomater. Sci. Eng.*, 2017, *3*, 863-869.
4. Mutiso, R. M.; **Sherrott, M.C.**; Rathmell, A.R.; Wiley, B. J.; Winey K. I. Integrating Simulations and Experiments to Predict Sheet Resistance and Optical Transmittance in Nanowire Films for Transparent Conductors. *ACS Nano* 2013, *7*, 7654-7663.
5. Rathmell, A.R.; **Nguyen, M.**; Chi, M.; Wiley. B.J. Synthesis of Oxidation-Resistant Cupronickel Nanowires for Transparent Conducting Nanowire Networks. *Nano Lett.*, 2012, *12*, 3193-3199.
6. **Khalil, K.S.**; Sagastegui, A.; Li, Y.; **Tahir, M.A.**; Socolar, J.E.S; Wiley. B.J.; Yellen, B.B. Binary Colloidal Structures Assembled through Ising Interactions. *Nat. Commun.* 2012, *3*, 794.
7. **Bergin, S.M.**; Rathmell, A.R.; Chen, Y.H; Charbonneau, P.; Li, Z.Y.; Wiley. B.J. The Effect of Nanowire Length and Width on the Properties of Transparent Conducting Films. *Nanoscale* 2012, *4*, 1996-2004.
8. Zhu, Y.; Qin, Q.; Xu, F.; Fan, F.; Ding Y.; **Zhang, T.**; Wiley, B.J.; Wang, Z.L. Size Effects on Elasticity, Yielding, and Fracture of Silver Nanowires: In Situ Experiments. *Phys. Rev. B* 2012, 045443.

9. Yang, L.; **Zhang, T.**; Zhou, H.; Price, S.C.; Wiley, B.J.; You, W. Solution-Processed Flexible Polymer Solar Cells with Silver Nanowire Electrodes. *ACS Appl. Mater. Interfaces* 2011, 3, 4075-4084.
10. Rathmell, A. R.; **Bergin, S. M.**; Hua, Y.-L.; Li, Z.-Y.; Wiley, B. J. The Growth Mechanism of Copper Nanowires and their Properties in Flexible, Transparent Conducting Films. *Adv. Mater.* 2010, 22, 3558-3563.

TEACHING

- 2009 FALL: CHEM 348 Solid-State and Materials Chemistry (8 Students)
- 2010 SPRING: CHEM 32 Modern Applications of Chemical Principles (61 Students)
- 2010 FALL: CHEM 348 Solid-State and Materials Chemistry (5 Students)
- 2011 SPRING: CHEM 32 Modern Applications of Chemical Principles (39 Students)
- 2011 FALL: CHEM 348 Solid-State and Materials Chemistry (3 Students)
- 2012 SPRING: CHEM 32 Modern Applications of Chemical Principles (157 Students), CHEM 168L Physical Chemistry Laboratory (3 Students)
- 2012 FALL: CHEM 548 Solid-State and Materials Chemistry (11 Students)
- 2013 SPRING: CHEM 210 Modern Applications of Chemical Principles (192 Students), CHEM 311L Physical Chemistry Laboratory (4 Students)
- 2013 FALL: CHEM 548 Solid-State and Materials Chemistry (9 Students)
- 2014 SPRING: CHEM 311 Physical Chemistry (8 Students), CHEM 311L Physical Chemistry Laboratory (5 Students)
- 2014 FALL: Junior Faculty Research Leave
- 2015 SPRING: CHEM 311 Physical Chemistry (9 Students)
- 2015 FALL: CHEM 548 Solid-State and Materials Chemistry (12 Students)
- 2016 SPRING: Parental Leave
- 2016 FALL: 2015 FALL: CHEM 548 Solid-State and Materials Chemistry (8 Students)
- 2017 SPRING: CHEM 311 Physical Chemistry (11 Students)
- 2017 FALL: CHEM 548 Solid-State and Materials Chemistry (7 Students)
- 2018 SPRING: CHEM 311 Physical Chemistry (10 Students)
- 2018 FALL: CHEM 548 Solid-State and Materials Chemistry (21 Students)
- 2019 SPRING: CHEM 311 Physical Chemistry (12 Students)
- 2019 FALL: CHEM 548 Solid-State and Materials Chemistry (24 Students)
- 2019 SPRING: CHEM 311 Physical Chemistry (9 Students)

EXTERNAL RESEARCH SUPPORT

Current Research Support

1. National Institutes of Health. 3D Printing of Anatomically Realistic Phantoms for Optimization of Imaging Algorithms. (B.J. Wiley, MPI), Annual Total Costs: \$137,000. Support Period: 15 March 2018 - 29 February 2020.

The objective of this proposal is to develop 3D printing materials and methods enabling the

fabrication of custom, anatomically realistic tissue phantoms for validation of new imaging systems.

2. National Science Foundation 1808108. Discovering the Facet-Selective Chemistry that Drives Anisotropic Growth of Metal Nanostructures. (B.J. Wiley, PI), Annual Total Costs: \$125,000. Support Period: 1 July 2018 – 30 June 2021.

The goal of this project is to pioneer new methods to discover the facet-selective chemistry that enables anisotropic growth of nanostructures with different shapes.

3. ACS Petroleum Research Fund. Exploring the Limits of Electroorganic Synthesis Productivity with Flow-Through Nanowire Electrodes. (B.J. Wiley, PI), Annual Total Costs: \$110,000. Support Period: 1 June 2019 -31 August 2021.

The goal of this study is to explore what factors limit the productivity of flow-through nanowire electrodes across three different classes of electrochemical reactions.

4. Sparta Biopharma. Sparta Biopharma Sponsored Research Agreement. (B.J. Wiley, PI), Annual Total Costs: \$200,000. Support Period: 12 November 2018 – 11 May 2020.

The goal of this study is to validate the properties of a cartilage-equivalent hydrogel.

Completed Research Support

1. ACS Green Chemistry Institute Pharmaceutical Roundtable. C–H/C–H Cross-Coupling Reactions of Aromatic Compounds with Flow-Through Nanowire Electrodes. (B.J. Wiley, PI), Annual Total Costs: \$25,000. Support Period: 31 September 2018 - 28 February 2019.

This project studied the use of flow-through nanowire electrodes to improve the productivity of anodic cross-coupling reactions by 10-100 times.

2. Oceanit Laboratories, Inc. Vulnerability-Reducing Engineered Infrared-Obscurant Load (VEIL). (B.J. Wiley, subcontract), Annual Total Costs: \$100,000. Support Period: 11 November 2017 - 9 October 2018.

The objective of this award was to further develop, scale, and improve the synthesis of copper nanowires with dimensions that make them strong absorbers of infrared light.

3. Oceanit Laboratories, Inc. Development of Metallic Nanostructures for Visible and Infrared Obscurants. (B.J. Wiley, subcontract), Annual Total Costs: \$50,000. Support Period: 1 May 2016 - 30 April 2018.

The objective of this award was to develop and scale the synthesis of copper nanowires with dimensions that make them strong absorbers of infrared light.

4. National Science Foundation 1253534. CAREER: Understanding the Growth Mechanisms and Properties of Metal Nanowires. (B.J. Wiley, PI), Annual Total Costs: \$117,184. Support Period: 1 June 2013 - 31 May 2018.

The objectives of this CAREER proposal were to clarify the processes by which metal nanowires grow in solution, use this understanding to improve synthetic control over metal nanowire dimensions, and study the structure-property relationship of metal nanowires in the context of practical applications.

5. National Science Foundation Materials Research and Engineering Center 1121107. Programmable Assembly of Soft Matter. (G. Lopez, Director; B.J. Wiley, Center Participant and Grantee.), 0% effort, Annual Total Costs (to BJW): \$77,701. Support Period: 15 September 2011 - 14 September 2017.

The goal of this effort was to develop a fundamental understanding of self-assembly of bulk materials from multi-component colloidal suspensions by using directed and programmed interactions.

6. National Science Foundation 1363483. Continuous Acoustic Assembly of Metallic Nanoparticles in Microfluidic Systems. (G. Lopez, PI; B.J. Wiley, co-PI), 8% effort, Annual Total Costs (to BJW), \$54,719. Support Period: 1 July 2014 - 30 June 2017.

This project aimed to use ultrasonic standing waves to direct the assembly of nanoparticles into multipcomponent and multifunctional nanoclusters, nanorods, and nanofilaments.

7. National Science Foundation 1344745. SNM/GOALI: Integration of Organic Solar Cells with Engineered Nanostructures for Scalable Manufacturing of Energy Conversion and Storage Devices. (W. You, PI; B.J. Wiley, co-PI), 8% effort, Annual Total Costs (to BJW), \$89,011. Support Period: 15 September 2013 - 14 September 2017.

The goal of this program was to bring together an interdisciplinary team of university and industry researchers to understand and develop scalable nanomaterial wet-coating processes that enable high-throughput, cost-effective roll-to-roll production of a thin film device that simultaneously harvests and stores solar energy.

8. Samsung. Development of Low-Temperature, Solution-Phase Coating Processes for Reversing and Preventing the Oxidation of Copper Nanowires. (B.J. Wiley, PI), 16% effort, Annual Total Costs: \$100,000. Support Period: 1 August 2014 - 31 July 2015.

To improve the optoelectronic performance and corrosion resistance of copper nanowire films, this project aimed to develop (i) ink formulations that enable the long-term storage of copper nanowires, (ii) low-temperature coatings that prevent oxidation of copper nanowires while minimizing adverse affects to the properties of the film, and (iii) synthesis of copper nanowires in the diameter range of 20 – 30 nm.

9. Charles Weinraub. Development of a Programmable Switching Matrix from Nanowire Networks. (B.J. Wiley, PI), 0% effort, Total Costs: \$20,000. Support Period: 6 January 2014 - 1 April 2014.

The goal of this project was to test the concept of using a network of core-shell nanowires to create a programmable switching matrix.

10. Merck KGaA. Improving the long-term stability and performance of transparent conductive films made of Cu-based Nanowires. (B.J. Wiley, PI). Total Costs: \$132,469. Support Period: 1 October 2013 - 30 September 2014.

The purpose of this project was to enable copper nanowires to be conductive immediately after coating from solution, and to be resistant to corrosion.

11. Korea Electrotechnology Research Institute. Preparation and Characterization of Compound Nanoparticles by Wire Explosion and Their Application in Electrocatalysis. (B.J. Wiley, PI). Total Costs: \$26,250. Support Period: 1 March 2013 - 31 December 2013.

The goal of this project was to study the use of wire explosion to make new nanoparticle compositions for applications in electronics.

12. Rambus. Unrestricted Gift. \$20,000. Date of Gift: 8 March 2012.

13. DARPA SBIR Suncontract from Innovega, Inc. Contact Lens See-Through Head Worn Display. Total Costs: \$24,000. Support Period: 1 April 2012 - 31 March 2013.

The goal of this project was to create a polarizer from magnetically-aligned nanowires.

14. Oak Ridge Associated Universities Ralph E. Powe Junior Faculty Enhancement Award. Visualizing the Anisotropic Assembly of Atoms in Liquid. Total Costs: \$5,000. Support Period: 1 June 2011 - 31 May 2012.

The goal of this project was to obtain preliminary results on the visualization of nanowire growth in solution.

15. Korea Electrotechnology Research Institute. Study on Nanomaterials and Electrodes for Flexible Transparent Batteries. Total Costs: \$11,000. Support Period: 1 April 2012 - 31 December 2012.

The goal of this project was to study the use of copper nanowires as an electrode in batteries.

ALPHABETICAL LIST OF COLLABORATORS WITHIN THE LAST SEVEN YEARS

1. Volker Blum, Department of Mechanical Engineering and Materials Science, Duke University
2. John J. Boland, School of Chemistry, Trinity College Dublin, Ireland

3. Patrick Charbonneau, Department of Chemistry, Duke University
4. Ashutosh Chilkoti, Department of Biomedical Engineering, Duke University
5. Steven Cummer, Department of Electrical and Computer Engineering, Duke University
6. Mauro Ferreira, School of Physics, Trinity College Dublin, Ireland
7. Kristen Fichthorn, Chemical Engineering, Penn State
8. Aaron Franklin, Department of Electrical and Computer Engineering, Duke University
9. Ken Gall, Department of Mechanical Engineering and Materials Science, Duke University
10. Michael Gehm, Department of Electrical and Computer Engineering, Duke University
11. Jeff Glass, Department of Electrical and Computer Engineering, Duke University
12. Nico Hotz, Department of Mechanical Engineering and Materials Science, Duke University
13. Changwen Hu, Department of Chemistry, Beijing Institute of Technology, China
14. Jae Jeong Kim, School of Chemical and Biological Engineering, Seoul National University, South Korea
15. Henry Lamb, Department of Chemical and Biomolecular Engineering, North Carolina State University
16. Nathan Lazarus, Army Research Lab, Adelphi, MD
17. Joseph Lo, Department of Radiology, Duke University
18. Gabriel Lopez, Department of Chemical and Biological Engineering, University of New Mexico
19. Zhi-Yuan Li, Institute of Physics, Chinese Academy of Sciences, China
20. Jie Liu, Department of Chemistry, Duke University
21. T. J. Meyer, Department of Chemistry, University of North Carolina, Chapel Hill
22. Valeri Petkov, Department of Physics, Central Michigan University
23. Jonathan Riboh, Department of Orthopaedic Surgery, Duke University
24. Christopher Rhodes, Department of Chemistry, Texas State University
25. Jennifer Roizen, Department of Chemistry, Duke University
26. Ehsan Samei, Department of Radiology, Duke University
27. Hjalti Sigmarsson, School of Electrical and Computer Engineering, University of Oklahoma
28. David R. Smith, Department of Electrical and Computer Engineering, Duke University
29. Gabriel L. Smith, Army Research Lab, Adelphi, MD
30. Christopher Walker, School of Electrical and Computer Engineering, University of Oklahoma
31. Zhong Lin Wang, School of Material Science and Engineering, Georgia Institute of Technology
32. Karen Winey, Department of Materials Science and Engineering, University of Pennsylvania

33. Younan Xia, Department of Biomedical Engineering, Georgia Institute of Technology
34. Yujie Xiong, University of Science and Technology, China
35. Benjamin Yellen, Department of Mechanical Engineering and Materials Science, Duke University
36. Wei You, Department of Chemistry, University of North Carolina, Chapel Hill
37. Xuanhe Zhao, Department of Mechanical Engineering, Massachusetts Institute of Technology
38. Yong Zhu, Department of Mechanical and Aerospace Engineering, North Carolina State University