

## PROF. JULIA BRUMAGHIM

### PERSONAL DATA

Associate Professor  
481 Hunter Laboratories  
Department of Chemistry  
Clemson University  
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### EDUCATION

Ph.D., University of Illinois at Urbana-Champaign, 1999, Chemistry; advisor: Prof. Gregory S. Girolami.  
A.B., Harvard University, 1994, Chemistry.

### PROFESSIONAL EXPERIENCE

Clemson University, 2015-present, Professor of Chemistry  
Clemson University, 2009-2015, Associate Professor of Chemistry.  
Clemson University, 2003-2009, Assistant Professor of Chemistry.  
University of California, Berkeley, 2001-2003, Cellular and Molecular Biology Department, Postdoctoral Researcher with Prof. Stuart Linn.  
University of California, Berkeley, 1999-2001, Chemistry Department, NIH Postdoctoral Fellow with Prof. Kenneth N. Raymond.

### HONORS AND AWARDS

ACS PROGRESS/Dreyfus Lectureship Award from the American Chemical Society and the Camille and Henry Dreyfus Foundation (2004-2005).  
CAREER Award from the National Science Foundation (2006-2012).  
Award for the Best Paper from A Young Investigator from the *Journal of Inorganic Biochemistry* and Elsevier Publishers; \$1000 award (2008).  
Rising Star Award from the Women Chemists Committee of the American Chemical Society to recognize “exceptional early to mid-career women chemists across all areas of chemistry on a national level”; \$1000 award (2014).

### MEMBERSHIPS

Member, American Chemical Society, ACS (1999-present).  
Member, Society for Free Radical Biology and Medicine, SFRBM (2003-present).  
Member, Society for Biological Inorganic Chemistry, SBIC (2010-present).  
Member, American Heart Association, AHA (2014-present).

## PROFESSIONAL AND OUTREACH ACTIVITIES

- Co-organizing (with Reza Ghiladi at North Carolina State University) a symposium titled “From Small Molecules to Macromolecules: Bioinorganic Chemistry in the Southeast” for the 69<sup>th</sup> Southeast Regional Meeting of the American Chemical Society (October 2017).
- Invited speaker with a seminar titled “You Are What You Eat: How Antioxidants Prevent Oxidative DNA Damage” for Science on Tap science outreach program sponsored by Clemson University (20 April 2015).
- Organized a two-day symposium with collaborator Prof. Craig Bayse at Old Dominion University on “Biochalcogen Chemistry: The Biological Chemistry of Sulfur, Selenium, and Tellurium” at the 244<sup>th</sup> National Meeting of the American Chemical Society, Philadelphia, PA (August 2012); co-editor of an ACS Symposium Series book based upon this symposium (December 2013).
- As an official Tour Speaker for the American Chemical Society, presented 9 seminars to general and chemistry-related audiences in AK, TX, KS, OK, and SC (2010-present).
- Developed an experiment to extract DNA and examine DNA damage with and without treatment with tea antioxidants for middle and high school teachers and presented it at a professional development workshop at Furman University (Summer 2014-2015).
- As part of an international collaborative research project with Prof. Norah Barba-Behrens (National University of Mexico in Mexico City; UNAM), hosted a graduate student from UNAM in the Brumaghim group (June-July 2014). This collaboration is supported by a National Science Foundation Supplement for International Collaborations and enabled a Brumaghim group graduate student to conduct research at UNAM (July 2015).
- Three-term elected treasurer for the Western Carolinas local section of the American Chemical Society (2006-present), and treasurer and symposium co-chair for the Southeast Regional Meeting of the American Chemical Society (October 2007).
- Guest expert on antioxidants for SC public radio program “Your Day,” (28 April 2009).
- American Heart Association Biotechnology review panelist (October 2009).
- National Institutes of Health National Center for Complementary and Alternative Medicine (NCCAM) review panelist (October 2008 and March 2009) and National Institute of Environmental Health Sciences review panelist (July 2015).
- National Science Foundation Major Research Instrumentation review panelist (May 2008 and April 2011); Chemistry of Life Processes panelist (November 2009 and March 2013); Chemistry Synthesis panelist (February 2013).
- International reviewer for the National Academy of Finland; CDRF Global (for the Science and Technology Center in Kiev, Ukraine), Research Grants Council of Hong Kong, and Czech Science Foundation; 8 proposals (2007-present).
- Proposal reviewer for the National Science Foundation and Alzheimer’s Association, ~16 proposals total (2004-present).
- Peer reviewer for the journals *Journal of the American Chemical Society*, *Inorganic Chemistry*, *Chemical Reviews*, *Journal of Inorganic Biochemistry*, *Free Radical Biology and Medicine*, among others; ~68 manuscripts total (2004-present).

## PUBLICATIONS

### Refereed Journal Publications (\* indicates undergraduate or high school author)

1. Brumaghim, J. L.; Girolami, G. S. "Ring-Opening Metathesis Polymerization of Norbornene by Cp\*<sub>2</sub>Os<sub>2</sub>Br<sub>4</sub> and Related Compounds," *Organometallics* **1999**, *18*, 1923-1929.
2. Brumaghim, J. L.; Priepot, J.\* G.; Girolami, G. S. "Synthesis of Hydride and Alkyl Compounds Containing the Cp\*Os(NO) Fragment. Crystal Structure of [Cp\*Os(μ-NO)]<sub>2</sub>," *Organometallics* **1999**, *18*, 2139-2144.
3. Brumaghim, J. L.; Girolami, G. S. "Synthesis and Reactivity of the Osmium Methylidene Complex [(C<sub>5</sub>Me<sub>5</sub>)Os(dppm)(=CH<sub>2</sub>)] [OTf]," *Chem. Commun.* **1999**, 953-954.
4. Mui, H. D.; Brumaghim, J. L.; Gross, C. L.; Girolami, G. S. "Synthesis of Hydride and Alkyl Compounds Containing the Cp\*Os(η<sup>3</sup>-allyl) Fragment. Crystal Structures of Cp\*Os(η<sup>3</sup>-C<sub>8</sub>H<sub>13</sub>)Br<sub>2</sub> and [Cp\*Os(η<sup>3</sup>-C<sub>4</sub>H<sub>7</sub>)Me(OH<sub>2</sub>)] [BF<sub>4</sub>]," *Organometallics* **1999**, *18*, 3264-3272.
5. Brumaghim, J. L.; Girolami, G. S. "An Unusual Norbornadiene Coupling Product. Synthesis, Characterization, and Structure of the Ruthenocene (C<sub>5</sub>Me<sub>5</sub>)Ru(η<sup>5</sup>-C<sub>5</sub>H<sub>4</sub>C<sub>9</sub>H<sub>11</sub>)," *J. Organomet. Chem.* **1999**, *586*, 258-262.
6. Ziegler, M.; Brumaghim, J. L.; Raymond, K. N. "Stabilization of a Reactive Cationic Species by Supramolecular Encapsulation," *Angew. Chem. Int. Ed. Engl.* **2000**, *39*, 4119-4121.
7. Brumaghim, J. L.; Raymond, K. N. "What Should Be Impossible: Resolution of the Mononuclear Gallium Coordination Complex, Tris(benzohydroxamato)gallium(III)," *J. Am. Chem. Soc.* **2003**, *125*, 12066-12067.
8. Brumaghim, J. L.; Li, Y.; Henle, E.; Linn, S. "Effects of Hydrogen Peroxide upon Nicotinamide Nucleotide Metabolism in *Escherichia coli*: Changes in Enzyme Levels and Nicotinamide Nucleotide Pools and Studies of the Oxidation of NAD(P)H by Fe(III)," *J. Biol. Chem.* **2003**, *278*, 42495-42504.
9. Fiedler, D.; Pagliero, D.; Brumaghim, J. L.; Bergman, R. G.; Raymond, K. N. "Encapsulation of Cationic Ruthenium Complexes into a Chiral Self-Assembled Cage," *Inorg. Chem.* **2004**, *43*, 846-848.
10. Brumaghim, J. L.; Michels, M.; Raymond K. N. "Hydrophobic Chemistry in Aqueous Solution: Stabilization and Stereoselective Encapsulation of Phosphonium Guests in a Supramolecular Host," *Eur. J. Org. Chem.* **2004**, 4552-4559.
11. Brumaghim, J. L.; Michels, M.; Pagliero, D.; Raymond K. N. "Encapsulation and Stabilization of Reactive Aromatic Guests Inside Supramolecular Hosts," *Eur. J. Org. Chem.* **2004**, 5115-5118.
12. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. "The Central Role of Metal Ion Coordination in Selenium Antioxidant Activity," *Inorg. Chem.* **2006**, *45*, 499-501.
13. Brumaghim, J. L. Gross, C. L., Girolami, G. S. "Synthesis, Characterization, and Crystal

- Structures of the Osmium Triflate Complexes  $Cp^*Os(P-P)(OTf)$  and  $[Cp^*Os(P-P)(OH_2)]-[OTf]$ ,” *J. Organomet. Chem.* **2006**, *691*, 3874-3880.
14. Sathyamurthy, R.; Brumaghim, J. L. “Structure of ‘Bis(methoxymagnesium)diselenide’: A Reagent for the Introduction of Selenium into Organic Molecules,” *J. Chem. Cryst.* **2007**, *37*, 109-117.
  15. Gross, C. L.; Brumaghim, J. L.; Girolami, G. S. “Synthesis and Reactivity of the Osmium(III) Pentamethylcyclopentadienyl Complex  $(C_5Me_5)_2Os_2Br_4$ . X-ray Crystal Structures of  $(C_5Me_5)_2Os_2Br_4$ ,  $(C_5Me_5)_2Os_2(\mu-O)Br_4$ , and  $(C_5Me_5)_2Os_2(\mu-NPh)_2Br_2$ ,” *Organometallics* **2007**, *26*, 2258-2265.
  16. Ramoutar, R. R.; Brumaghim, J. L. “Effects of Inorganic Selenium Compounds on Oxidative DNA Damage,” *J. Inorg. Biochem.* **2007**, *101*, 1028-1035.
  17. Ramoutar, R. R.; Brumaghim, J. L. “Investigating the Antioxidant Properties of Oxo-Sulfur Compounds on Metal-Mediated DNA Damage,” *Main Group Chem.* **2007**, *101*, 1028-1035.
  18. Perron, N. R.; Hodges, J. N.\*; Jenkins, M.\*; Brumaghim, J. L. “Predicting How Polyphenol Antioxidants Prevent DNA Damage by Binding to Iron,” *Inorg. Chem.* **2008**, *47*, 6153-6161.
  19. Battin, E. E.; Brumaghim, J. L. “Metal Specificity in DNA Damage Prevention by Sulfur Antioxidants,” *J. Inorg. Biochem.* **2008**, *102*, 2036-2042 (awarded Best Paper by a Young Investigator).
  20. Perron, N. R.; Brumaghim, J. L. “A Review of the Iron-Binding Mechanism for Polyphenol Antioxidant Activity,” *Cell Biochem. Biophys.* **2009**, *53*, 75-100 (invited review).
  21. Battin, E. E.; Lawhon, A.\*; Hamilton, D. H.; Brumaghim, J. L. “Using Proteins in a Bioinorganic Laboratory Experiment: Iron Loading and Removal from Transferrin,” *J. Chem. Ed.* **2009**, *86*, 969-972.
  22. Battin, E. E.; Brumaghim, J. L. “Antioxidant Activity of Sulfur and Selenium: A Review of Reactive Oxygen Species Scavenging, Glutathione Peroxidase, and Metal Binding Antioxidant Mechanisms,” *Cell Biochem. Biophys.* **2009**, *55*, 1-23 (invited review).
  23. Quarles, C. D., Jr.; Brumaghim, J. L.; Marcus, R. K. “Simultaneous Multiple Element Detection by Particle Beam/Hollow Cathode-Optical Emission Spectroscopy as a Tool for Metallomic Studies: Determinations of Metal Binding with Apo-Transferrin,” *Metallomics* **2010**, *2*, 154-161.
  24. Ramoutar, R. R.; Brumaghim, J. L. “A Review of the Antioxidant and Anticancer Properties and Mechanisms of Inorganic Selenium, Oxo-Sulfur, and Oxo-Selenium Compounds,” *Cell Biochem. Biophys.* **2010**, *58*, 1-23.
  25. Kimani, M. M.; Brumaghim, J. L.; VanDerveer, D. “Probing the Antioxidant Action of Selenium and Sulfur Using Cu(I)-Chalcogenone Tris(pyrazolyl)methane and -borate Complexes,” *Inorg. Chem.* **2010**, *49*, 9200-9211.
  26. Perron, N. R.; Wang, H. C.; DeGuire, S. N.\*; Jenkins, M.\*; Lawson, M.\*; Brumaghim, J.

- L. "Kinetics of Iron Oxidation upon Polyphenol Binding," *Dalton Trans.* **2010**, 39, 9982-9987.
27. Quarles, C. D.; Brumaghim, J. L.; Marcus, R. K. "Instrumental Comparison of the Determination of Cr<sup>3+</sup> Uptake by Human Transferrin," *Metallomics* **2010**, 2, 792-799 (cover article).
  28. Battin, E. E.; Zimmerman, M. T.; Ramoutar, R. R.; Quarles, C. E.; Brumaghim, J. L. "Preventing Metal-Mediated Oxidative DNA Damage with Selenium Compounds," *Metallomics* **2011**, 3, 503-512.
  29. Perron, N. P.; García, C. R.; Pinzón, J. R.; Chaur, M. N.; Brumaghim, J. L. "Antioxidant and Prooxidant Effects of Polyphenol Compounds on Copper-Mediated DNA Damage," *J. Inorg. Biochem.* **2011**, 105, 735-743.
  30. Kimani, M. M.; Bayse, C. A.; Brumaghim, J. L. "Synthesis, Characterization, and DFT Studies of Thione and Selone Cu(I) Complexes with Variable Coordination Geometries," *Dalton Trans.* **2011**, 40, 3711-3723.
  31. Grimland, J.; Wu, C.; Ramoutar, R. R.; Brumaghim, J. L.; McNeill, J. "Photosensitizer-doped Conjugated Polymer Nanoparticles with High Cross-sections for One- and Two-Photon Excitation," *Nanoscale*, **2011**, 3, 1451-1455.
  32. Kimani, M. M.; VanDerveer, D.; Brumaghim, J. L. "The Diselanylbis(1,3-dimethyl-1*H*-imidazol-3-ium) Dication Stabilized by the Polymeric *catena*-Pentachloridotricuprate(I) Anion," *Acta Crystallogr.* **2011**, C67, m208-m210.
  33. Quarles, C. D.; Marcus, R. K.; Brumaghim, J. L. "Competitive Binding of Fe<sup>3+</sup>, Cr<sup>3+</sup>, and Ni<sup>2+</sup> to Transferrin," *J. Biol. Inorg. Chem.* **2011**, 16, 913-921.
  34. Verdán, A. M.; García, C. R.; Wang, H. C.; Henry, W. P.; Brumaghim, J. L. "Fe(II) Binding of 3-Hydroxychromone, 5-Hydroxychromone, and Sulfonated Morin: Implications for the Antioxidant Activity of Flavonols with Competing Metal Binding Sites," *J. Inorg. Biochem.* **2011**, 105, 1314-1322.
  35. Quarles, C. D.; Marcus, R. K.; Brumaghim, J. L. "Metal Retention in Human Transferrin: Consequences of Solvent Composition in Analytical Sample Preparation Methods," *Metallomics* **2011**, 3, 1027-1034.
  36. Wang, H. C.; Riahi, M.\*; Pothén, J.; Bayse, C. A.; Riggs-Gelasco, P.; Brumaghim, J. L., "Interactions of Cu(I) with Selenium-Containing Amino Acids Determined by NMR, XAS, and DFT Studies," *Inorg. Chem.* **2011**, 50, 10893-10900.
  37. Wang, H. C.; Brumaghim, J. L. "Polyphenol Compounds as Antioxidants for Disease Prevention: Reactive Oxygen Species Scavenging, Enzyme Regulation, and Metal Chelation Mechanisms in *E. coli* and Human Cells," In *Oxidative Stress: Diagnostics, Prevention, and Therapy*; Andreescu, S.; Hepel, M., eds.; ACS Symposium Series; American Chemical Society: Washington, DC, 2011, pp. 99-175 (DOI: 10.1021/bk-2011-1083.ch005).
  38. Kimani, M. M.; Wang, H. C.; Brumaghim, J. L. "Investigating the Coordination, Electrochemistry, and Cu(II) Reduction Kinetics of Biologically Relevant Selone and

- Thione Compounds,” *Dalton Trans.* **2012**, *41*, 5248-5259.
39. García, C. R.; Angelé-Martínez, C.; Wilkes, J. A.\*; Wang, H. C.; Battin E. E.; Brumaghim, J. L. “Prevention of Iron- and Copper-Mediated DNA Damage by Catecholamine and Amino Acid Neurotransmitters, L-DOPA, and Curcumin: Metal Binding as a General Antioxidant Mechanism,” *Dalton Trans.* **2012**, *41*, 6458 - 6467.
  40. Underwood, C. C.; Stadelman, B. S.; Sleeper, M. L.\*; Brumaghim, J. L. “Synthesis and Electrochemical Characterization of  $[\text{Ru}(\text{NCCH}_3)_6]^{2+}$ , Tris(acetonitrile) Tris(pyrazolyl)borate, and Tris(acetonitrile) Tris(pyrazolyl)methane Ruthenium(II) Complexes,” *Inorg. Chim. Acta* **2013**, *405*, 470-476.
  41. Stadelman, B. S.; Brumaghim, J. L. “Thione- and Selone-Containing Compounds, Their Late First Row Transition Metal Coordination Chemistry, and Their Biological Potential,” In *Biochalcogen Chemistry: The Biological Chemistry of Sulfur, Selenium, and Tellurium*; Bayse, C. A.; Brumaghim, J. L. Eds.; ACS Symposium Series; American Chemical Society: Washington, DC, 2013, pp. 33-70 (DOI: <http://dx.doi.org/10.1021/ic401366c>).
  42. Kimani, M. M.; Bayse, C. A.; Stadelman, B. S.; Brumaghim, J. L. “Oxidation of Biologically Relevant Chalcogenones and Their Cu(I) Complexes: Insights into Selenium and Sulfur Antioxidant Activity,” *Inorg. Chem.* **2013**, *52*, 11685-11687.
  43. Gross, C. L.; Brumaghim, J. L.; Jefferis, J. M. Dickinson, P. W.; Girolami, G. S.; Gribble, C. W.; Tilley, T. D. “Mono( $\eta^5$ -Pentamethylcyclopentadienyl) Complexes of Osmium,” *Inorg. Synth.* **2014**, *36*, 74-78 (DOI: 10.1002/9781118744994.ch15).
  44. Angelé-Martínez, C.; Goodman, C.; Brumaghim, J. L. “Metal-Mediated DNA Damage and Cell Death: Mechanisms, Detection Methods, and Cellular Consequences,” *Metallomics* **2014**, *6*, 1358-1381 (invited review).
  45. Betanzos-Lara, S.; Chmel, N. P.; Zimmerman, M. T.; Barrón-Sosa, L. R.; Garino, C.; Salassa, L.; Rodger, A.; Brumaghim, J. L.; Gracia-Mora, I.; Barba-Behrens, N. “Redox-Active and DNA-Binding Coordination Complexes of Clotrimazole,” *Dalton Trans.* **2015**, *44*, 3673-3675 (invited paper for a special issue on metal complex binding to nucleic acids).
  46. Zimmerman, M. T.; Bayse, C. A.; Ramoutar, R. R.; Brumaghim, J. L. “Sulfur and Selenium Antioxidants: Challenging Radical Scavenging Mechanisms and Developing Structure-Activity Relationships Based on Metal Binding,” *J. Inorg. Biochem.* **2015**, *145*, 30-40 (invited review).
  47. Kimani, M. M.; Watts, D.; Graham, L. A.; Rabinovich, D.; Yap, G. P. A.; Brumaghim, J. L. “Dinuclear Copper(I) Complexes with *N*-heterocyclic Thione and Selone Ligands: Synthesis, Characterization, and Electrochemical Studies,” *Dalton Trans.* **2015**, *44*, 16313-16324.
  48. McCoy, C. R.; Stadelman, B. S.; Brumaghim, J. L.; Liu, J.-T.; Bain, L. J. “Arsenic and Its Methylated Metabolites Inhibit the Differentiation of Neural Plate Border Specifier Cells,” *Chem. Res. Toxicol.* **2015**, *28*, 1409-1421.
  49. Stadelman, B.S; Kimani, M. M.; Bayse, C. A.; McMillen, C. D.; Brumaghim, J. L. “Synthesis, Characterization, DFT Calculations, and Electrochemical Comparison of Novel Iron(II) Complexes with Thione and Selone Ligands,” *Dalton Trans.* **2016**, *45*, 4697-4711.

50. Summers, J. S.; Hickman, B.; Arrington, M. E.; Stadelman, B. S.; Brumaghim, J. L.; Yost, M. R.; Schmitt, J. D.; Hornby, M.; Sprague, S. "Reaction of Oxidized CuZnSOD with Polyphenols," *Natural Sci.* **2016**, 8, 359-379.
51. Angelé-Martínez, C.; Nguyen, K. V. T.; Ameer, F. S.; Anker, J. N.; Brumaghim, J. L. "Reactive Oxygen Species Generation by Copper(II) Oxide Nanoparticles Determined by DNA Damage Assays and EPR Spectroscopy," *Nanotoxicology*, in press.

### **Books and monographs**

1. *Biochalcogen Chemistry: The Biological Chemistry of Sulfur, Selenium, and Tellurium*; Bayse, C. A.; Brumaghim, J. L. Eds.; ACS Symposium Series; American Chemical Society: Washington, DC, 2013 (DOI: <http://dx.doi.org/10.1021/ic401366c>).

### **Other scholarly publications**

1. Girolami, G. S.; Brumaghim, J. L.; Priepot, J. G.\*; Goveia, J. P. "A Guide to Using the SHELXTL Crystallographic Software Package," 2004, available at <http://chemistry.illinois.edu/about/facilities/x-ray/software/xshellguide.pdf>
2. Brumaghim, J. L. "The Role of Metal Ions in DNA Damage," In *McGraw-Hill Yearbook of Science and Technology*, McGraw-Hill Companies, Inc.: New York, 2010, pp 383-385.

## **PRESENTATIONS**

### **Invited Presentations**

1. Brumaghim, J.; Sathyamurthy, R. "Modeling without structure: Taking bioinorganic chemistry out of its comfort zone," 58th Southeast Regional Meeting of the American Chemical Society, Augusta, GA (November 2006).
2. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. "Utopia, Dystopia, and Fruitopia: The Good and the Bad in Sulfur, Selenium, and Fruit Polyphenolic Antioxidants," DNA Damage and Repair Symposium, University of California at Berkeley, Berkeley, CA (10 March 2007).
3. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. "Metal Specificity in DNA Damage Prevention by Polyphenol and Selenium Antioxidants," 59th Southeast Regional Meeting of the American Chemical Society, Greenville, SC (October 2007).
4. Battin, E. E.; Brumaghim, J. L. "Sulfur Antioxidant Activity and Its Implications in Metal-Mediated DNA Damage," 59th Southeast Regional Meeting of the American Chemical Society, Greenville, SC (October 2007).
5. Perron, N. R.; Brumaghim, J. L. "Another Biological Role for Polyphenols: Antioxidant Activity and Metal Coordination," 235th ACS National Meeting, New Orleans, LA (April 2008).
6. Kimani, M. M.; Battin, E. E.; Brumaghim, J. L. "Exploring Selenium Antioxidant Activity Mechanisms through Synthesis of Model Metal Complexes," Inorganic Chemistry Gordon Conference, Biddeford, ME (June 2009).
7. Kimani, M. M.; Underwood, C. C.; Brumaghim, J. L. "Coordination Chemistry Insights

- into the Mechanisms of Sulfur and Selenium Antioxidants,” 238th American Chemical Society National Meeting, Washington, DC (August 2009).
8. Zimmerman, M. T.; Stadelman, B.S.; Kimani, M. M.; Brumaghim, J. L. “DNA Damage Prevention by Multifunctional Selenium Antioxidants,” Metals in Biology Gordon Conference, Ventura, CA (January 2012).
  9. Zimmerman, M. T.; Stadelman, B.S.; Kimani, M. M.; Brumaghim, J. L. “Comparing Sulfur and Selenium Coordination Chemistry and Antioxidant Activity,” 244<sup>th</sup> American Chemical Society National Meeting, Philadelphia, PA (August 2012).
  10. Brumaghim, J. L. “Metals matter: Antioxidant Prevention of DNA Damage and Cell Death,” 247<sup>th</sup> American Chemical Society National Meeting, Dallas TX (March 2014; Rising Star Awards Symposium).
  11. Brumaghim, J. L. “Beyond ORAC: Dietary Polyphenolics as Metal-Binding Antioxidants and Food Preservatives,” 249<sup>th</sup> American Chemical Society National Meeting, Denver, CO (March 2015).

**Scientific Conferences** (\* indicates undergraduate or high school author)

1. Brumaghim, J. L.; Gross, C. L.; Girolami, G. S. “Chemistry of Pentamethylcyclopentadienyl Osmium Complexes,” 215th American Chemical Society National Meeting, Dallas, TX (March 1998).
2. Brumaghim, J. L.; Girolami, G. S. “Formation of Pentamethylcyclopentadienyl Osmium Alkylidene Complexes by Low Temperature Protonation,” 217th American Chemical Society National Meeting, Anaheim, CA (March 1999).
3. Brumaghim, J. L.; Michels, M.; Raymond, K. N. “Hydrophobic Chemistry in Aqueous Solution: Formation and Stabilization of Cationic Guests inside Supramolecular Hosts,” 222nd American Chemical Society National Meeting, Chicago, IL (August 2001).
4. Brumaghim, J. L.; Li, Y.; Henle, E.; Linn, S. “Interaction of Trivalent Metal Ions with NAD(P)H: A Structural Model for Differential Rates of Fe<sup>3+</sup> Reduction by NADH and NADPH,” Metals in Biology Gordon Conference, Ventura, CA (January 2003).
5. Perron, N. R.; Battin, E. E.; Brumaghim, J. L. “Understanding Selenium Antioxidant Activity: The Role of Iron Coordination,” Metals in Biology Gordon Conference, Ventura, CA (January 2005).
6. Battin, E. E.; Ramoutar, R. R.; Perron, N. R.; Brumaghim, J. L. “Metal-Mediated Oxidative DNA Damage: From Free Radicals to Cancer,” South Carolina Alliance for Cancer Chemoprevention Conference, Clemson, SC (May 2005).
7. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “The Role of Metal Coordination in Selenium Antioxidant Activity,” International Conference for Biological Inorganic Chemistry, Ann Arbor, MI (August 2005).
8. Perron, N. R.; Brumaghim, J. L. "Metal Coordination is Required for Selenium Antioxidant Activity," 231st American Chemical Society National Meeting, Atlanta, GA (March 2006).
9. Battin, E. E.; DeGuire, S. M.\*; Brumaghim, J. L. "Biological Sulfur Compounds Inhibit



- Copper-Mediated DNA Damage," 231st American Chemical Society National Meeting, Atlanta, GA (March 2006).
10. Sathyamurthy, R.; Brumaghim, J. L. "Tuning the Redox Potentials of Iron(II)-Solvato Complexes with Trinitrogen Donor ligands," 231st American Chemical Society National Meeting, Atlanta, GA (March 2006).
  11. Ramoutar, R. R.; Brumaghim, J. L. "Inorganic Selenium Compounds: Antioxidants or Pro-oxidants?" 231st American Chemical Society National Meeting, Atlanta, GA (March 2006).
  12. Battin, E. E.; DeGuire, S. M.\*; Brumaghim, J. L. "Sulfur Antioxidants Inhibit DNA Damage by Metal Coordination," South Carolina Alliance for Cancer Chemoprevention, Charleston, SC (March 2006).
  13. Hodges, J. N.\*; Brumaghim, J. L. "Metal Binding by Polyphenols," 58th Southeast Regional Meeting of the American Chemical Society, Augusta, GA (November 2006).
  14. Ramoutar, R. R.; Brumaghim, J. L. "Inorganic Selenium Compounds: Antioxidants or Pro-oxidants?" Society for Free Radicals in Biology and Medicine, Denver, CO (November 2006).
  15. Battin, E. E.; Sathyamurthy, R.; Brumaghim, J. L. "Modeling Antioxidant Inhibition of Metal-Mediated DNA Damage," Metals in Biology Gordon Conference, Ventura, CA (January 2007).
  16. Perron, N. R.; Brumaghim, J. L. "Exploring an Iron Coordination Mechanism for the Antioxidant Activity of Polyphenolic Compounds," NSF Inorganic Workshop, Jackson Hole, WY (June 2007).
  17. Battin, E. E.; Perron, N. R.; Ramoutar, R. R.; Brumaghim, J. L. "Antioxidant Inhibition of DNA Damage through Metal Coordination," 234<sup>th</sup> American Chemical Society National Meeting, Boston, MA (August 2007).
  18. Lawhon, A.\*; Brumaghim, J. L. "Transferrin Lends a Helping Hand in Iron Disease," 59th Southeast Regional Meeting of the American Chemical Society, Greenville, SC (October 2007).
  19. Battin, E. E.; Brumaghim, J. L. "Comparing Sulfur and Selenium Antioxidant Activity: Efficacy and Mechanism," 59th Southeast Regional Meeting of the American Chemical Society, Greenville, SC (October 2007).
  20. Ramoutar, R. R.; Brumaghim, J. L. "Inorganic Selenium Compounds Prevent Copper-Mediated DNA Damage," 59th Southeast Regional Meeting of the American Chemical Society, Greenville, SC (October 2007).
  21. Perron, N. R.; Hodges, J. N.\*; Jenkins, M.\*; Brumaghim, J. L. "Predicting How Polyphenol Antioxidants Prevent DNA Damage by Binding to Iron(II)," 59th Southeast Regional Meeting of the American Chemical Society, Greenville, SC (October 2007).
  22. Perron, N. R.; Hodges, J. N.\*; Jenkins, M.\*; Brumaghim, J. L. "Predicting the Ability of Polyphenolic Antioxidants to Prevent Iron-mediated DNA Damage," Metals in Biology Gordon Conference, Ventura, CA (January 2008).

23. Battin, E. E.; Brumaghim, J. L. "A Comparison of Sulfur and Selenium Antioxidant Activity: Prevention of DNA Damage and Metal Binding," Bioinorganic Chemistry Gordon Graduate Research Seminar, Ventura, CA (January 2008).
24. Sanchez-Santiago, M. del R.\*; Brumaghim, J. L.; Ramoutar, R. R. "Exploring a Metal Binding Mechanism for Sulfoxide Antioxidant Activity," 235th ACS National Meeting, New Orleans, LA (April 2008).
25. Brumaghim, J. L. "Metal Coordination as a Novel Mechanism for DNA Damage Prevention," 60th Southeast Regional Meeting of the American Chemical Society, Nashville, TN (November 2008).
26. Underwood, C. C.; Kimani, M. M.; Giesen, J. A.\*; Sathyamurthy, R.; Brumaghim, J. L. "Comparison of the Electrochemical Properties of Iron and Copper Complexes with Tris(pyrazolyl), Thiolate, and Selenolate Ligands," 60th Southeast Regional Meeting of the American Chemical Society, Nashville, TN (November 2008).
27. Brumaghim, J. L. "Preventing Oxidative DNA Damage: Metal Binding as a Novel Antioxidant Mechanism," South Carolina Center for Botanical Medicine, Columbia, SC (December 2008).
28. Brumaghim, J. L. "Rethinking Antioxidant Inhibition of DNA Damage: A Novel Metal Binding Mechanism," Hollings Cancer Center Spring Symposium, Charleston, SC (March 2009).
29. Wang, H. C.; Brumaghim, J. L. "Polyphenol Antioxidants Inhibit DNA Damage and Promote Cell Survival by Iron Binding," American Chemical Society National Meeting, Washington, DC (August 2009).
30. Riggs-Gelasco, P.; Bayse, C. A.; Brumaghim, J. L. "Structural Characterization of Copper-Selenium Complexes Relevant to the Antioxidant Activity of Selenium," 61st Southeast Regional Meeting of the American Chemical Society, San Juan, Puerto Rico (October 2009).
31. Wang, H. C.; Brumaghim, J. L. "Predictive Model for Cellular Potency of Polyphenol Antioxidants as a Function of Iron Binding," Metals in Biology Gordon Conference, Ventura, CA (January 2010).
32. Verdan, Andrea M.; Brumaghim, Julia L.; Henry, William P. "Antioxidant Activity and Fe(II) Binding Properties of Flavonoids with Competing Metal Binding Sites," American Chemical Society National Meeting, San Francisco, CA (March 2010).
33. Kimani, Martin M.; Brumaghim, Julia L. "Exploring the Differences in Cu(I) Coordination with Heterocyclic Thione and Selenone Ligands," American Chemical Society National Meeting, San Francisco, CA (March 2010).
34. Kimani, Martin M.; Brumaghim, Julia L.; VanDerveer, D. L. "Probing the Antioxidant Mechanisms of Selenium and Sulfur Using Cu(I)-Chalcogenone Tris(pyrazolyl)methane and -borate Complexes," Inorganic Chemistry Gordon Conference, Biddeford, ME (June 2010).
35. Battin, E. E.; Zimmerman, M. T.; Brumaghim, J. L. "The Metals Matter: DNA Damage Prevention By Sulfur And Selenium Antioxidants," Metals in Biology Gordon

- Conference, Ventura, CA (January 2011).
36. Marcus, R. K.; Quarles, Jr., C. D.; Brumaghim, J. L. "Comparison of Atomic Spectroscopy Methods for Determining Metal Loading Within apo-Transferrin," European Winter Conference on Plasma Spectroschemistry, Zaragoza, Spain, (January-February 2011).
  37. Wang, H.C.; Perron, N. R.; Brumaghim, J. L. "Polyphenol Antioxidants Prevent DNA Damage and Promote Cell Survival Primarily through an Iron-Mediated Pathway," International Conference of Bioinorganic Chemistry, Vancouver, BC, Canada (August 2011).
  38. Wang, H. C.; Brumaghim, J. L. "Inhibitory Effects of Polyphenol Antioxidants on Peroxynitrite-Mediated DNA Damage *in vitro* and in *E. coli*," 63rd Southeast Regional Meeting of the American Chemical Society, Richmond, VA (October 2011).
  39. Wang, H. C.; Riahi, M.\*; Bayse, C. A.; Riggs-Gelasco, P.; Brumaghim, J. L. "Interactions of Cu(I) with Selenium-containing Amino Acids Determined by NMR, XAS, and DFT Studies," 63rd Southeast Regional Meeting of the American Chemical Society, Richmond, VA (October 2011).
  40. Zimmerman, M. T.; Brumaghim, J. L. "Selone and Thione Antioxidants Prevent Iron- and Copper-Mediated DNA Damage," 63rd Southeast Regional Meeting of the American Chemical Society, Richmond, VA (October 2011).
  41. Frost, L. D.; Brumaghim, J. L. "A Lab Exercise in DNA Oxidation and Protection by Antioxidants," Biennial Conference on Chemical Education at Pennsylvania State University, State College, PA (July 2012).
  42. Schmidt, J. D.; Stadelman, B. S.; Brumaghim, J. L.; Summers, J. "Reaction of Oxidized CuZnSOD with Polyphenols," 64th Southeast Regional Meeting of the American Chemical Society, Raleigh, NC (November 2012).
  43. Stadelman, B. S.; Brumaghim, J. L. "Synthesis and Characterization of Iron(II) Thione and Selone Compounds," 245th ACS National Meeting, New Orleans, LA (April 2013).
  44. Zimmerman, M. T.; Brumaghim, J. L. "Multifunctional Sulfur and Selenium Antioxidants: Metal Coordination and Structure Impact Activity," 245th ACS National Meeting, New Orleans, LA (April 2013).
  45. Angele, C.; Brumaghim, J. L. "Polyphenol Prevention of Co<sup>2+</sup>/Ascorbic-Acid-Mediated DNA Damage," 245th ACS National Meeting, New Orleans, LA (April 2013).
  46. Zimmerman, M. T.; Brumaghim, J. L. "Ergothioneine and Methimazole: Investigating Antioxidant Activity and the Effects of Structure on Activity," 65th Southeast Regional Meeting of the American Chemical Society, Atlanta, GA (November 2013).
  47. Coral J., Brumaghim J. L., Klaine S. J. "Fate and toxicity of titanium dioxide in aquatic ecosystems," Annual meeting of the Society of Environmental Toxicology and Chemistry, Nashville, TN (November 2013).
  48. Zimmerman, M. T.; Brumaghim, J. L. "A Structural View of Ergothioneine and Methimazole Antioxidant Activity Based on Iron and Copper Coordination," Metals in Biology Gordon Conference, Ventura, CA (January 2014).

49. Wasilewski, Matthew S.\*; Wetzler, M.; Brumaghim, Julia L. “Versatile Synthesis of Orthogonally Protected Azamacrocyclic Ligands,” 247th ACS National Meeting, Dallas, TX (March 2014).
50. Barba-Behrens, N.; Betanzos-Lara, S.; Alfaro-Fuentes, I.; Castro-Ramírez, R.; Gracia-Mora, I.; Contreras, R.; Flores-Parra, A.; Brumaghim, J. L.; Zimmerman, M. T. “Structural and Electronic Properties of Biologically Active Coordination Compounds of Imidazole Derivatives: Towards Understanding the Role of the Metal Ions,” 12<sup>th</sup> European Conference on Bioinorganic Chemistry (EuroBIC 12), Zurich, Switzerland (August 2014).
51. Kurfman, E. A.\*; Stadelman, B. S.; Brumaghim, J. L.; Wheeler, S. K.; Wheeler, J. F. “Investigating the Activity of Iron and Sulfur/Selenium Compounds as Antioxidants Utilizing Mass Spectrometry,” 66th Southeast Regional Meeting of the American Chemical Society, Nashville, TN (October 2014).
52. Patel, U.; McMillen, C.; Singh, H. B.; Brumaghim, J. L. “Selenaza macrocycles: Variable coordination with Cu(I) and Cu(II),” 66th Southeast Regional Meeting of the American Chemical Society, Nashville, TN (October 2014).
53. Angelé-Martínez, C.; Nguyen, K. V. T.; Anker, J.; Brumaghim, J. L. “CuO-Nanoparticle-Mediated DNA Damage is Not Solely Due to Copper-Generated Hydroxyl Radical,” Metals in Biology Gordon Conference, Ventura, CA (January 2015).
54. Kurfman, E. A.\*; Stadelman, B. S.; Netterville, W. D.; Brumaghim, J. L.; Wheeler, S. K.; Wheeler, J. F. “Analyzing the Antioxidant Activity of Thione and Selenone Compounds Utilizing Mass Spectrometry,” 2015 South Carolina IDeA Network of Biomedical Research Excellence (INBRE) Spring Symposium, University of South Carolina School of Medicine, Columbia, SC (28 February 2015).
55. Kurfman, E. A.\*; Stadelman, B. S.; Brumaghim, J. L.; Wheeler, S.; Wheeler, J. “Investigating the Antioxidant Activity of Sulfur/Selenium Compounds Utilizing Mass Spectrometry, Gel Electrophoresis, and Polymerase Chain Reaction,” 67th Southeast/71st Southwest Joint Regional Meeting of the American Chemical Society, Memphis, TN, (November 2015).
56. Goodman, C.; Brumaghim, J. L. “Understanding the Role of NADH in Cellular Fe<sup>2+</sup> Generation of Hydroxyl Radical and the Effects of Polyphenol Antioxidants,” Bioinorganic Chemistry Gordon Research Symposium, Ventura, CA (January 2016).
57. Murphy, J.; Powell, B.; Brumaghim, J. L. “Stability of Copper(II) Complexes of Sulfur and Selenium Antioxidants,” Bioinorganic Chemistry Gordon Research Symposium, Ventura, CA (January 2016).
58. Gaertner, A. A. E.; Zimmerman, M. T.; Brumaghim, J. L. “What Makes a Multifunctional Thione- and Selenone-Containing Antioxidant Inhibit DNA Damage?,” European Biological Inorganic Chemistry Conference (EuroBIC), Budapest, Hungary (August 2016).
59. Murphy, J. M.; McMillen, C.; Brumaghim, J. L. “Coordination complexes of methimazole with copper: Controlling redox reactions and sulfur extrusion,” 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC

- (October 2016).
60. Kimani, Martin; Zimmerman, Matthew T.; Stadelman, Bradley; Owen, Amanda M.; Bayse, Craig A.; Brumaghim, Julia L. "Metal properties control sulfur and selenium antioxidant activity," 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC (October 2016).
  61. Abbas, M. A.; Brumaghim, J. L. "Synthesis, characterization, and structures of ruthenium(II) and ruthenium(IV) complexes with multiple solvato ligands," 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC (October 2016).
  62. Gaertner, Andrea A.; Gordhan, Heeren M.; Whitehead, Daniel C.; Brumaghim, Julia L. "Quantifiable DNA damage prevention by hydrophobic compounds under biologically relevant conditions: Evaluation of selenium glutathione peroxidase mimics," 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC (October 2016).
  63. Goodman, S.; Brumaghim, J. L. "Understanding antioxidant prevention of iron-mediated cell death in *E. coli*: The role of NADH," 68th Southeastern Regional Meeting of the American Chemical Society, Columbia, SC (October 2016).
  64. Goodman, S.; Brumaghim, J. L. "Understanding cellular mechanisms for prevention of iron-mediated oxidative stress by sulfur and selenium antioxidants," Metals in Biology Gordon Conference, Ventura, CA (January 2017).

#### **University and Government Research Seminars**

1. Perron, N. R.; Battin, E. E.; Brumaghim, J. L. "Iron-Mediated Oxidative DNA Damage: From Free Radicals to Cancer Prevention," University of South Carolina, College of Pharmacy (5 February 2005).
2. Perron, N. R.; Battin, E. E.; Brumaghim, J. L. "Iron-Mediated Oxidative DNA Damage: From Free Radicals to Cancer Prevention," Clemson University, Environmental Toxicology Seminar (15 March 2005).
3. Perron, N. R.; Battin, E. E.; Brumaghim, J. L. "Iron-Mediated Oxidative DNA Damage: From Free Radicals to Cancer Prevention," Iowa State University, Chemistry Department (24 March 2005).
4. Perron, N. R.; Battin, E. E.; Brumaghim, J. L. "Iron-Mediated Oxidative DNA Damage: From Free Radicals to Cancer Prevention," University of Iowa, Department of Chemistry (25 March 2005).
5. Battin, E. E.; Ramoutar, R. R.; Perron, N. R. "Metal-Mediated Oxidative DNA Damage: From Free Radicals to Cancer," University of Oklahoma, Department of Chemistry and Biochemistry (5 May 2005).
6. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. "Antioxidant Mechanisms: Preventing DNA Damage through Metal Binding," Western Michigan University, Chemistry Department (10 September 2007).
7. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. "Antioxidant Mechanisms: Preventing

- DNA Damage through Metal Binding,” Michigan State University, Chemistry Department (11 September 2007).
8. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Antioxidant Mechanisms: Preventing DNA Damage through Metal Binding,” University of Michigan, Chemistry Department (12 September 2007).
  9. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Antioxidant Mechanisms: Preventing DNA Damage through Metal Binding,” Wayne State University, Chemistry Department (13 September 2007).
  10. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Antioxidant Mechanisms: Preventing DNA Damage through Metal Binding,” University of Tennessee at Knoxville, Chemistry Department (15 February 2008).
  11. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Antioxidant Mechanisms: Preventing DNA Damage through Metal Binding,” North Carolina State University, Chemistry Department (25 February 2008).
  12. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Antioxidant Mechanisms: Preventing DNA Damage through Metal Binding,” Duke University, Chemistry Department (26 February 2008).
  13. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Antioxidant Mechanisms: Preventing DNA Damage through Metal Binding,” University of North Carolina at Chapel Hill, Chemistry Department (27 February 2008).
  14. Battin, E. E.; Perron, N. R.; Ramoutar, R. R.; Brumaghim, J. L. “From the Flask to the Cell: Metal Coordination as a Novel and General Mechanism for Antioxidant Activity,” Purdue University, Chemistry Department (16 September 2008).
  15. Battin, E. E.; Perron, N. R.; Ramoutar, R. R.; Brumaghim, J. L. “From the Flask to the Cell: Metal Coordination as a Novel and General Mechanism for Antioxidant Activity,” University of Illinois at Urbana-Champaign, Chemistry Department (18 September 2008).
  16. Battin, E. E.; Perron, N. R.; Ramoutar, R. R.; Brumaghim, J. L. “From the Flask to the Cell: Metal Coordination as a Novel and General Mechanism for Antioxidant Activity,” Clemson University, Chemistry Department (25 September 2008).
  17. Battin, E. E.; Perron, N. R.; Ramoutar, R. R.; Brumaghim, J. L. “From the Flask to the Cell: Metal Coordination as a Novel and General Mechanism for Antioxidant Activity,” University of North Carolina at Charlotte, Chemistry Department (6 October 2008).
  18. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Antioxidant Inhibition of DNA Damage: From Oxygen Radicals to Cancer Prevention,” Clemson University, Biochemistry Department (9 January 2009).
  19. Battin, E. E.; Perron, N. R.; Ramoutar, R. R.; Wang, H. C.; Kimani, M.; Brumaghim, J. L. “Antioxidant Activity: Metal Binding and DNA Damage Prevention,” East Carolina University, Chemistry Department (27 February 2009).
  20. Perron, N. R.; Wang, H. C.; Brumaghim, J. L. “Developing a Predictive Model for Polyphenol Prevention of DNA Damage,” University of Georgia, Chemistry and

- Biochemistry Department (30 March 2009).
21. Perron, N. R.; Wang, H. C.; Brumaghim, J. L. "Developing a Predictive Model for Polyphenol Prevention of DNA Damage," Old Dominion University, Chemistry and Biochemistry Department (3 April 2009).
  22. Perron, N. R.; Wang, H. C.; Brumaghim, J. L. "Developing a Predictive Model for Polyphenol Prevention of DNA Damage," University of South Carolina, Chemistry and Biochemistry Department (7 April 2009).
  23. Battin, E. B.; Zimmerman, M. T.; Kimani, M. M. "The Metals Matter: DNA Damage Prevention by Sulfur and Selenium Antioxidants," Auburn University, Chemistry Department (4 November 2010).
  24. Perron, N. R.; Garcia, C. R.; Brumaghim, J. L. "The Metals Matter: DNA Damage Prevention by Polyphenolic Antioxidants." Brigham Young University, Chemistry and Biochemistry Department (6 September 2011).
  25. Perron, N. R.; Garcia, C. R.; Brumaghim, J. L. "The Metals Matter: DNA Damage Prevention by Polyphenolic Antioxidants." Utah State University, Chemistry Department (7 September 2011).
  26. Perron, N. R.; Garcia, C. R.; Brumaghim, J. L. "The Metals Matter: DNA Damage Prevention by Polyphenolic Antioxidants." University of Utah, Chemistry Department (8 September 2011).
  27. Zimmerman, M. T.; Stadelman, B.S.; Kimani, M. M.; Brumaghim, J. L. "DNA Damage Prevention by Multifunctional Selenium Antioxidants," Clemson University, Environmental Toxicology Program (17 January 2012).
  28. Perron, N. R.; Wang, H. C. "Antioxidant Prevention of DNA Damage and Cell Death," University of Alaska at Fairbanks, Chemistry and Biochemistry Department (22 October 2013).
  29. Perron, N. R.; Wang, H. C. "Antioxidant Prevention of DNA Damage and Cell Death," University of Alaska at Anchorage, Chemistry Department (23 October 2013).
  30. Perron, N. R.; Wang, H. C. "Antioxidant Prevention of DNA Damage and Cell Death," University of Alaska Southeast (Juneau, AK), Environmental Sciences Department (24 October 2013).
  31. Brumaghim, J. L. "The Metals Matter: Antioxidant Prevention of Oxidative DNA Damage," NASA Johnson Space Center (Huston, TX), Nutritional Biochemistry Laboratory (20 March 2014).
  32. Battin, E. E.; Zimmerman, M. T.; Brumaghim, J. L. "Developing Predictive Models for Metal-Mediated DNA Damage Prevention by Sulfur and Selenium Antioxidants," Department of Inorganic and Nuclear Chemistry, Universidad Nacional Autónoma de México, Mexico City, Mexico (14 May 2014).

### **Recruiting Seminars**

1. Brumaghim, J. L. "Metal-Mediated Oxidative DNA Damage: From Free Radicals to

- Cancer,” University of the South, Sewanee, TN (12 March 2004).
2. Perron, N. R.; Battin, E. E.; Brumaghim, J. L. “Metal-Mediated Oxidative DNA Damage: From Free Radicals to Cancer,” Tennessee State University, Nashville, TN (18 November 2004).
  3. Perron, N. R.; Battin, E. E.; Brumaghim, J. L. “Metal-Mediated Oxidative DNA Damage: From Free Radicals to Cancer,” Davidson College, Davidson, NC (3 December 2004).
  4. Perron, N. R.; Battin, E. E.; Brumaghim, J. L. “Metal-Mediated Oxidative DNA Damage: From Free Radicals to Cancer,” Columbia College, Columbia, SC (11 April 2005).
  5. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Metal-Mediated Oxidative DNA Damage: From Free Radicals to Cancer,” East Tennessee State University, Johnson City, TN (7 October 2005).
  6. Battin, E. E.; Brumaghim, J. L. “How Antioxidants Prevent Metal-Mediated DNA Damage: From Free Radicals to Cancer Prevention,” Western Carolina University, Cullowhee, NC (24 March 2006).
  7. Battin, E. E.; Brumaghim, J. L. “How Antioxidants Prevent Metal-Mediated DNA Damage: From Free Radicals to Cancer Prevention,” College of Charleston, Charleston, SC (21 September 2006).
  8. Battin, E. E.; Sathyamurthy, R.; Brumaghim, J. L. “Determining Antioxidant Inhibition of DNA Damage: From Free Radicals to Cancer Prevention” Winthrop University, Rock Hill, SC (24 January 2007).
  9. Battin, E. E.; Perron, N. R.; Brumaghim, J. L. “Antioxidant Inhibition of DNA Damage: From Oxygen Radicals to Cancer Prevention,” University of North Carolina at Asheville, Chemistry Department (19 January 2009).
  10. Battin, E. E.; Perron, N. R.; Ramoutar, R. R., Wang, H. C.; Kimani, M.; Brumaghim, J. L. “Antioxidant Inhibition of DNA Damage: From Oxygen Radicals to Cancer Prevention,” Furman University, Chemistry Department (19 February 2009).
  11. Perron, N. R.; Wang, H. C.; Brumaghim, J. L. “You Are What You Eat: Food Polyphenols Prevent Oxidative DNA Damage and Cell Death by Metal Coordination,” Georgia Southern University, Chemistry Department (3 September 2010).
  12. Brumaghim, J. L. “An Apple a Day, or Garlic, or Chocolate? The Edible Antioxidant World and the Link Between Basic Chemistry and Health,” Salem College, Chemistry Department (23 February 2011).
  13. Brumaghim, J. L. “You Are What You Eat: DNA Damage Prevention by Polyphenolic Antioxidants ,” Converse College, Chemistry Department (21 February 2012).
  14. Brumaghim, J. L. “An Apple a Day, or Garlic, or Chocolate? The Edible Antioxidant World and the Link Between Basic Chemistry and Health,” East Tennessee State University, Chemistry Department (27 September 2013).
  15. Brumaghim, J. L. “An Apple a Day, or Garlic, or Chocolate: Fruit Polyphenols Prevent Oxidative DNA Damage Through Metal Coordination,” University of North Georgia, Chemistry Department (17 January 2014).



16. Brumaghim, J. L. "You Are What You Eat: Fruit Polyphenols Prevent Oxidative DNA Damage Through Metal Coordination," Middle Tennessee State University, Chemistry Department (7 March 2014).

## **SPONSORED RESEARCH**

### **Pending proposals**

1. "Metal Coordination and DNA Interactions Influence Mechanisms of Biologically Relevant Sulfur and Selenium Antioxidants," National Science Foundation, Principal Investigator, \$755,841 (\$566,545); *pending*.
2. "Chalcogen-DTPA Ligands for Improved Phase Transfer Kinetics *and* Separation Factors in ALSEP," Department of Energy (NEUP), Principal Investigator, \$799,606 (\$279,071); *pending*.
3. "Do Ergothioneine and Analogs Prevent Ischemia-Reperfusion Injury by Binding Iron?," American Heart Association, Principal Investigator, \$154,000 (\$133,225); *pending*.
4. "Building the Foundation for a Sulfur/Selenium Drug Discovery Center," National Institutes of Health (R15), Principal Investigator, \$300,000 (\$170,245); *pending*.
5. "Evaluation of Polyphenol Antioxidants to Lower Redox-Active Iron Levels and Prevent Cellular Oxidative Damage," NASA EPSCoR, Principal Investigator, \$25,000 (\$25,000); *pending*.

### **Current projects**

1. "Selenium Antioxidant Mechanisms: Metal Binding vs. Reactive Oxygen Species Scavenging," National Science Foundation, Principal Investigator, \$390,000 (\$390,000), 2012-2017.
2. "Selenium Antioxidant Mechanisms: Metal Binding vs. Reactive Oxygen Species Scavenging," National Science Foundation Supplement for International Collaborations, Principal Investigator, \$12,080 (\$12,080), 2014-2017.
3. "Preventing Ischemia-Reperfusion Injury with Multifunctional Selenium Antioxidants," American Heart Association Grant-In-Aid, Principal Investigator, \$154,000 (\$154,000), 2014-2017.

### **Completed projects**

1. "Recognition and Isomerization of Ferric Siderophores," NIH NSRA Postdoctoral Fellowship, Principal Investigator, \$30,256 (\$30,256), 1999-2001.
2. "Understanding the Antioxidant Properties of Selenium in Biological Systems," University Research Grant, Principal Investigator, \$3,000 (\$3,000), 2004.
3. "DNA Damage Inhibition by Selenium Antioxidants: The Role of Metal Coordination," American Heart Association, Principal Investigator, \$132,000 (\$132,000), 2006-2008.
4. "Determining the Role of Metal Coordination in Selenium Antioxidant Activity – An Interdisciplinary Approach to Chemical Biology Education and Research," National Science Foundation CAREER Award, Principal Investigator, \$540,000 (\$540,000), 2006-2012.

5. "Behavior of TiO<sub>2</sub> Nanoparticles in Fresh and Marine Waters," L'Oreal Group, Co-principal Investigator, \$6,500 (\$42,500), 2012-2013.
6. "Iron Binding as the Primary Mechanism for Polyphenol Antioxidant Prevention of Cell Death and DNA Damage," SC Space Grant Consortium (NASA EPSCoR), Principal Investigator, \$30,000 (\$30,000); 2014-2015.
7. "Investigating Mechanism of Intracellular Rotational Transport with Optical Tracking Magnetic Twisting Cytometry," National Institutes of Health R15, Co-Investigator, \$42,500 (\$150,144), 2012-2016.

#### **OTHER SPONSORED ACTIVITY**

Travel Grant, American Chemical Society and the Camille and Henry Dreyfus Foundation, \$1000, (2004-2005).

#### **STUDENT ADVISING**

##### **Doctoral Graduates**

- Battin, E. E. (Ph.D.), "The Role of Metal Coordination in the Inhibition of Iron(II)- and Copper(I)-Mediated DNA Damage by Organoselenium and Organosulfur Compounds," (August 2008).
- Perron, N. R. (Ph.D.), "Effects of Polyphenol Compounds on Iron- and Copper-Mediated DNA Damage: Mechanisms and Predictive Models," (August 2008).
- Ramoutar, R. R. (Ph.D.), "Understanding the Antioxidant Mechanisms of Inorganic Selenium, Oxo-sulfur, and Polyphenol Compounds, and the Biological Implications of Functionalized Nanoparticles," (August 2009).
- Kimani, M. (Ph.D.), "Synthesis, Characterization, and Reactivity of Biologically Relevant Copper(I) Selone and Thione Complexes," (May 2011).
- Wang, H. C. (Ph.D.), "DNA Damage Prevention by Polyphenol Antioxidants: Comparing Reactive Oxygen Species Scavenging and Metal Binding Mechanisms *in Vitro* and in *E. coli*." (December 2011).
- Zimmerman, M. T. (Ph.D.), "Determining DNA Damage Prevention Mechanisms for Multifunctional Selenium and Sulfur Antioxidants and the DNA-Damaging Capabilities of Clotrimazole and Pseudoephedrine-Derived Metal Complexes," (December 2014).
- Stadelman, B. S. (Ph.D.), "Synthesis, Characterization, and Reactivity of Iron(II)- and Zinc(II) Complexes of Imidazole Thione and Selone Ligands: Investigations into Oxidation Mechanisms," (May 2016)
- Angelé-Martinez, C. (Ph.D.), "Prevention of DNA Damage and Reactive Oxygen Species Generation by Fe(II), Co(II), Cu(II), and CuO Nanoparticles with Polyphenol and Neurotransmitter Antioxidants," (May 2016).

##### **Masters Graduates**

- Underwood, C. (M.S.), "The Electrochemical Study of Tris(pyrazolyl)-type Iron(II) Complexes, Iron(II) Sulfur- and Selenium-Containing Complexes, and

Tris(pyrazolyl)-Type Ruthenium(II) Complexes,” (December 2010).

Garcia, C. (M.S.), “Prevention of Iron- and Copper-Mediated Oxidative DNA Damage by Neurotransmitters and Related Compounds: Evidence for Metal Binding as an Antioxidant Mechanism,” (December 2011).

### **Current Graduate Student Advising**

Goodman, S. C. (Ph.D.), “Effects of Polyphenol Antioxidants on DNA Damage and Cell Death in *E. coli*,” (December 2017).

Gaertner, A. (Ph.D.), “Developing Second-Generation Thione and Selone Antioxidants for DNA Damage Prevention,” (May 2018).

Murphy, J. (Ph.D.), “Iron Coordination Chemistry and Oxidation Studies of Sulfur and Selenium Antioxidants,” (May 2018).

Abbas, Mohammed (Ph.D.), “Synthesis and Evaluation of Second-Generation Thione and Selone Compounds as Multifunctional Antioxidants,” (May 2019)

Pollard, Deanna (Ph.D.), “Synthesis and Evaluation of Second-Generation Thione and Selone Compounds as Multifunctional Antioxidants,” (May 2020)

### **Other Graduate Student Advising**

Andrea, V. M. (Ph.D.), Chemical Education Ph.D. student from Dr. Bhattacharyya’s research group for a one-year research project (August 2008-August 2009).

Quarles, C. D. (Ph.D.), “Determining Speciation of Metal Binding Proteins using Glow Discharge Mass Spectroscopy and Particle Beam/Hollow Cathode Optical Emission Spectroscopy,” joint student with Prof. R. Kenneth Marcus at Clemson (May 2011).

### **Postdoctoral Researcher Advising**

Sathyamurthy, R., “Synthesis of Biologically-Relevant Iron-Selenolate Complexes,” (2004-2006).

Patel, U. “Synthesis of Copper Complexes with Thione, Selone, and Selenium Macrocyclic Ligands,” (2013-2016).

### **Undergraduate and High School Student Advising**

Supervised the research of 31 undergraduate students and 5 high school students (from EUREKA! program) from 2003 to present. Of these, 16 entered graduate school, 3 entered medical school, 3 entered pharmacy school, 5 are working in chemistry-related industrial positions with B.S. degrees, and 5 are still undergraduates.

## **TEACHING**

### **Courses Taught**

CH 9000, Bioinorganic Chemistry, F03

CH 6040/4040, Bioinorganic Chemistry, S06, S08, S10, F11, S13, S15, S17

CH 8070, Chemistry of the Transition Elements, F04, F05, F06, F07, F08, F09, F10, F12, F13, F14, F15, F16

CH 2050, Introductory Inorganic Chemistry, S05  
CH 2060, Introductory Inorganic Chemistry Laboratory, S05  
CH 8510, Organic/Inorganic Graduate Student Seminar F04, F06  
CH 8600, Chemical Biology, S09, S11, S12, S14  
CES 1900 S15, S16

Supervised seven undergraduate researchers in a Creative Inquiry project titled “Imaginative Ligands and Unique Metal Complexes: A Marriage of Organic and Inorganic Chemistry” in collaboration with Prof. Modi Wetzler (Chemistry, Clemson University), F13, S14, F14, S15, Summer 15, F15, S16, Summer 16.

Developed and taught a CES 1900 Foundations for Research Excellence course in collaboration with Ms. Sue Lasser, head of the PEER program, and Mr. Freddy Paige, a civil engineering graduate student. The course was designed to help incoming minority freshmen engineering and science majors learn tool to help them be successful college students and undergraduate researchers.

### **New Course Development**

CH 9000, Bioinorganic Chemistry, F03  
CH 6040/4040, Bioinorganic Chemistry, S06  
CH 8600, Chemical Biology, S07  
CH 4030, Synthetic Techniques Laboratory, F08  
CES 1900, Foundations for Research Excellence, Summer 15 (for PEER program participants)

## **UNIVERSITY AND PUBLIC SERVICE**

### **Appointments**

Faculty Member, Environmental Toxicology Graduate Program at Clemson University (2005-present).  
Fellow, Institute for Nutraceutical Research at Clemson University (2006-present).

### **Committees**

University: Elected Member, Faculty Senate (2014-2017).  
Elected Member, President’s Commission on the Status of Women (2011-2016). Chair, Committee on Childcare (*ad hoc*)  
Member, Associate Dean of Research Search Committee (2013-2014).  
Department: Member, Graduate committee (2009-2011; 2013-present).  
Member, Long-range planning committee (2014-2015).  
Member, Chair’s advisory committee (2013-2015).  
Member, Honors and Awards committee (2005-2009; 2016-present).  
Member, Newsletter committee (2011-2014).  
Member, Chemistry Department Chair Search committee (2012-2013).  
Member, Chemistry Department Seminar Series committee (2006-2009).

Chair, Chemical Biology committee (2006-2008).

Member, Bio-organic Faculty Search committee (2005-2006).

Member, NMR Instrumentation committee (2003-2005).

Member, TA/RA Support committee (2003-2004).

Other: Member, Environmental Toxicology Curriculum and Admissions committee (2006-present).

**Other Service**

Faculty Advisor, Foundation for the International Medical Relief of Children (FIMRC),  
Clemson Student Chapter (2006-present).

*27 February 2017.*