

Dmitry V. Peryshkov

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Education and Work Experience:

- 2019-present* Associate Professor, Department of Chemistry and Biochemistry,
University of South Carolina
- 2013-2019* Assistant Professor, Department of Chemistry and Biochemistry,
University of South Carolina
- 2011-2013* Postdoctoral Research Associate, Department of Chemistry
Massachusetts Institute of Technology (Advisor: Professor R. R. Schrock)
- 2006-2011* Ph.D. in Chemistry, Department of Chemistry
Colorado State University (Advisor: Professor S. H. Strauss)
- 1998-2004* B.S. and M.S. in Materials Science, Department of Materials Science
Moscow State University, Russia (Advisor: Professor E. A. Goodilin)

Awards

Doctoral New Investigator Award, American Chemical Society Petroleum Research Fund, 2014

National Science Foundation Faculty Early Career Development Program (CAREER) Award, 2017

USC Breakthrough Star Award, 2018

List of Publications:

56. Riffle, J. R.; Hemingway, T. M.; Smith, M. D.; **Peryshkov, D. V.*** Synthesis and Cluster Structure Distortions of Biscarborane Dithiol, Thioether, and Disulfide. *Dalton Transactions* **2024**, 53, 4444–4450.
55. Nussbaum, B. C.; Humphries, A. L.; Gange, G. B.; **Peryshkov, D. V.*** Redox-active Carborane Clusters in Bond Activation Chemistry and Ligand Design. *Chemical Communications* **2023**, 59, 9918–9928.
54. Islam, M. J.; Park, K. C.; Manley, O. M.; Smith, M. D.; Makris, T. M.; **Peryshkov, D. V.*** Room-Temperature Aerobic C–CN Bond Activation in Nickel(II) Cyanomethyl Dicarboranyl Complex. *Organometallics* **2023**, 42, 1997–2004.
53. Gange, G. B.; Humphries, A. L.; Smith, M. D.; **Peryshkov, D. V.*** Activation of Alkynes by a Redox-Active Carboranyl Diphosphine and Formation of Boron-Containing Phosphacycles. *Inorganic Chemistry* **2022**, 61, 18568–18573.
52. Martin, C. R.; Park, K. C.; Leith, G. A.; Yu, J.; Mathur, A.; Wilson, G. R.; Gange, G. B.; Barth, E. L.; Ly, R. T.; Manley, O. M.; Forrester, K. L.; Karakalos, S. G.; Smith, M. D.; Makris, T. M.;

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Vannucci, A. K.; **Peryshkov, D. V.**; Shustova, N. B.* Stimuli-Modulated Metal Oxidation States in Photochromic MOFs. *Journal of the American Chemical Society* **2022**, *144*, 4457–4468.

51. Eleazer, B. J.; Jayaweera, H. D. A. C.; Gange, G. B.; Smith, M. D.; Martin, C. R.; Park, K. C.; Popov, A. A.*; **Peryshkov, D. V.*** Bimetallic Ru-Pd and Trimetallic Ru-Pd-Cu Assemblies on the Carborane Cluster Surface. *Inorganic Chemistry* **2021**, *60*, 16911–16916.

50. Redden, B. K.; Clark, R. W.; Gong, Z.; Rahman, M. M.; **Peryshkov, D. V.**; Wiskur, S. L.* Mechanistic investigations of alcohol silylation with isothioureia catalysts. *Organic & Biomolecular Chemistry* **2021**, *19*, 10181–10188.

49. Gange, G. B.; Humphries, A. L.; Royzman, D. E.; Smith, M. D.; **Peryshkov, D. V.*** Metal-Free Bond Activation by Carboranyl Diphosphines. *Journal of the American Chemical Society* **2021**, *143*, 29, 10842–10846.

48. Jayaweera, H. D. A. C.; Rahman, M. M.; Pellechia, P. J.; Smith, M. D.; **Peryshkov, D. V.*** Free Three-Dimensional Carborane Carbanions. *Chemical Science* **2021**, *12*, 10441–10447.

47. Eleazer, B. J.; Smith, M. D.; **Peryshkov, D. V.*** Reaction of a Ruthenium B-carboranyl Hydride Complex and $\text{BH}_3(\text{SMe}_2)$: Selective Formation of a Pincer-supported Metallaborane $\text{LRu}(\text{B}_3\text{H}_8)$. *Tetrahedron* (Invited: Tetrahedron Symposium in Print “Frustrated Lewis Acids and Organoboranes”) **2019**, *75*, 1471–1474.

46. Rahman, M. M.; Smith, M. D.; **Peryshkov, D. V.*** Imido Group Interchange in Reactions of Zwitterionic Tantalum(V) Vinylimido Complexes and Nitriles. *Organometallics*, **2018**, *37*, 2945–2949.

45. Eleazer, B. J and **Peryshkov, D. V.*** Coordination Chemistry of Carborane Clusters: Metal-Boron Bonds in Carborane, Carboranyl, and Carboryne Complexes *Comments on Inorganic Chemistry* (Invited Review) **2018**, *3*, 79–109.

44. Eleazer, B. J.; Smith, M. D.; Popov, A. A.*; **Peryshkov, D. V.*** Expansion of the (BB) >Ru Metallacycle with Coinage Metal Cations: Formation of B-M-Ru-B (M = Cu, Ag, Au) Dimetalacyclodiboryls *Chemical Science* **2018**, *9*, 2601–2608.

43. Islam, M. J.; Smith, M. D.; **Peryshkov, D. V.*** Sterically Encumbered Dianionic Dicarboranyl Pincer Ligand $(\text{C}_5\text{H}_3\text{N})(\text{C}_2\text{B}_{10}\text{H}_{11})_2$ and its CNC Nickel(II) Complex *Journal of Organometallic Chemistry* (Special issue in celebration of Irina P. Beletskaya 85th Birthday) **2018**, *867*, 208–213.

42. Rahman, M. M.; Smith, M. D.; Amaya, J. A.; Makris, T. M.; **Peryshkov, D. V.*** Activation of C–H Bonds of Alkyl- and Arylnitriles by the $\text{TaCl}_5\text{--PPh}_3$ Lewis Pair *Inorganic Chemistry* **2017**, *56*, 11798–11803.

41. Eleazer, B. J.; Smith, M. D.; Popov, A. A.*; **Peryshkov, D. V.*** Rapid Reversible Borane to Boryl Hydride Exchange by Metal Shuttling on the Carborane Cluster Surface *Chemical Science* **2017**, *8*, 5399–5407.

40. **Peryshkov, D. V.***; Strauss, S. H.* Exceptional Structural Compliance of the $\text{B}_{12}\text{F}_{12}^{2-}$ Superweak Anion *Inorganic Chemistry*, **2017**, *56*, 4072–4083.

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39. Eleazer, B. J.; Smith, M. D.; **Peryshkov, D. V.*** POBOP Pincer Complexes of Nickel(II): Synthesis and B–H Activation of the Carborane Ligand Upon Oxidation with Iodine *Journal of Organometallic Chemistry* (Special Issue “Frontiers in Organometallic Chemistry 2016”) **2017**, 829, 42–47.
38. Wong, Y. O.; Smith, M. D.; **Peryshkov, D. V.*** Reversible Water Activation Driven by Contraction and Expansion of the 12-vertex-*closo*-12-vertex-*nido* Biscarborane Cluster *Chemical Communications* **2016**, 52, 12710–12713.
37. Eleazer, B. J.; Smith, M. D.; Popov, A. A.*; **Peryshkov, D. V.*** (BB)-Carboryne Complex of Ruthenium: Synthesis by Double B–H Activation at a Single Metal Center *Journal of the American Chemical Society* **2016**, 138, 10531–10538.
36. Adams, R. D.*; Kiprotich, J.; **Peryshkov, D. V.***; Wong, Y. O. Opening of Carborane Cages by Metal Cluster Complexes. The Reaction of a Thiolate-Substituted Carborane with Triosmium Carbonyl Cluster Complexes *Inorganic Chemistry* **2016**, 55, 8207–8213.
35. Rahman, M. M.; Smith, M. D.; **Peryshkov, D. V.*** Formation of a Cationic Vinylimido Group upon C–H Activation of Nitriles by Trialkylamines in the Presence of TaCl₅ *Inorganic Chemistry* **2016**, 55, 5101–5103.
34. Wong, Y. O.; Smith, M. D.; **Peryshkov, D. V.*** Synthesis of the first example of the 12-vertex-*closo*-12-vertex-*nido* biscarborane cluster by a metal-free B–H activation at a phosphorus(III) center *Chemistry – A European Journal* **2016**, 22, 6764–6767.
33. Adams, R. D.*; Kiprotich, J.; **Peryshkov, D. V.***; Wong, Y. O. Cage Opening of a Carborane Ligand by Metal Cluster Complexes *Chemistry – A European Journal* **2016**, 22, 6501–6504.
32. Eleazer, B. J.; Smith, M. D.; **Peryshkov, D. V.*** Metal- and Ligand-Centered Reactivity of *meta*-Carboranyl-Backbone Pincer Complexes of Rhodium *Organometallics*, **2016**, 35, 106–112.
31. Bukovsky, E. V.; **Peryshkov, D. V.**; Wu, H.; Zhou, W.; Tang, W. S.; Jones, W. M.; Stavila, V.; Udovic, T. J.; Strauss, S. H. Comparison of the Coordination of B₁₂F₁₂²⁻, B₁₂Cl₁₂²⁻, and B₁₂H₁₂²⁻ to Na⁺ in the Solid State: Crystal Structures and Thermal Behavior of Na₂(B₁₂F₁₂), Na₂(H₂O)₄(B₁₂F₁₂), Na₂(B₁₂Cl₁₂), and Na₂(H₂O)₆(B₁₂Cl₁₂) *Inorganic Chemistry* **2017** 56, 4369–4379.
30. Malischewski, M.; **Peryshkov, D. V.**; Bukovsky, E. V.; Seppelt, K.; Strauss, S. H. Structures of M₂(SO₂)₆B₁₂F₁₂ (M = Ag or K) and Ag₂(H₂O)₄B₁₂F₁₂: Comparison of the Coordination of SO₂ versus H₂O and of B₁₂F₁₂²⁻ versus Other Weakly Coordinating Anions to Metal Ions in the Solid State *Inorganic Chemistry* **2016**, 55, 12254–12262.
29. Conley, M. P.; Mougél, V.; **Peryshkov, D. V.**; Forrest, Jr. W. P.; Gajan, D.; Lesage, A.; Emsley, L.; Copéret, C.; Schrock, R. R. A Well-Defined Silica-Supported Tungsten Oxo Alkylidene Is a Highly Active Alkene Metathesis Catalyst *Journal of the American Chemical Society* **2013**, 135, 19068–19070.
28. Cain, M. F.; Forrest, Jr. W. P.; **Peryshkov, D. V.**; Schrock, R. R.; Müller, P. Synthesis of a TREN in Which the Aryl Substituents are Part of a 45 Atom Macrocyclic *Journal of the American Chemical Society* **2013**, 135, 15338–15341.

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27. **Peryshkov, D. V.**; Forrest, Jr. W. P.; Schrock, R. R.; Smith, S. J.; Müller, P. B(C₆F₅)₃ Activation of Oxo Tungsten Complexes That Are Relevant to Olefin Metathesis *Organometallics*, **2013**, *32*, 5256–5259.
26. Bukovsky, E. V.; Fiedler, S. R.; **Peryshkov, D. V.**; Popov, A. A.; Strauss, S. H. The Structure of (H₃O)₂B₁₂F₁₂·6H₂O – a CCP Lattice of B₁₂F₁₂²⁻ Anions Intercalated with a Nonplanar Network of O–H···O Connected O₆ Rings. *European Journal of Inorganic Chemistry* **2012**, 208–212.
25. **Peryshkov, D. V.**, Schrock, R. R. Synthesis of Tungsten Oxo Alkylidene Complexes *Organometallics*, **2012**, *31*, 7278–7286
24. **Peryshkov, D. V.**; Schrock, R. R.; Takase, M. K.; Mueller, P.; Hoveyda, A. H. Z-Selective Olefin Metathesis Reactions Promoted by Tungsten Oxo Alkylidene Complexes. *Journal of the American Chemical Society* **2011**, *133*, 20754–20757.
23. Belletire, J. L.; Schneider, S.; Shackelford, S. A.; **Peryshkov, D. V.**; Strauss, S. H. Pairing heterocyclic cations with closo-dodecafluorododecaborate (2-). Synthesis of binary heterocyclium(1+) salts and a Ag₄(heterocycle)₈⁴⁺ salt of B₁₂F₁₂²⁻. *Journal of Fluorine Chemistry* **2011**, *132*, 925–936.
22. Shackelford, S. A.; Belletire, J. L.; Boatz, J. A.; Schneider, S.; Wheaton, A. K.; Wight, B. A.; Ammon, H. L.; **Peryshkov, D. V.**; Strauss, S. H. Bridged Heterocyclium Dicationic closo-Icosahedral Perfluoroborane, Borane, and Carborane Salts via Aqueous, Open-Air Benchtop Synthesis (vol 12, pg 2714, 2010). *Organic Letters* **2011**, *13*, 2795–2796.
21. Shustova, N. B.; **Peryshkov, D. V.**; Kuvychko, I. V.; Chen, Y.-S.; Mackey, M. A.; Coumbe, C. E.; Heaps, D. T.; Confait, B. S.; Heine, T.; Phillips, J. P.; Stevenson, S.; Dunsch, L.; Popov, A. A.; Strauss, S. H.; Boltalina, O. V. Poly(perfluoroalkylation) of Metallic Nitride Fullerenes Reveals Addition-Pattern Guidelines: Synthesis and Characterization of a Family of Sc₃N@C-80(CF₃)_(n) (n=2-16) and Their Radical Anions. *Journal of the American Chemical Society* **2011**, *133*, 2672–2690.
20. Shustova, N. B.; Kuvychko, I. V.; **Peryshkov, D. V.**; Whitaker, J. B.; Larson, B. W.; Chen, Y.-S.; Dunsch, L.; Seppelt, K.; Popov, A. A.; Strauss, S. H.; Boltalina, O. V. Chemical tailoring of fullerene acceptors: synthesis, structures and electrochemical properties of perfluoroisopropylfullerenes. *Chemical Communications* **2011**, *47*, 875–877.
19. **Peryshkov, D. V.**; Strauss, S. H. K₂B₁₂F₁₂ A rare A₂X structure for an ionic compound at ambient conditions. *Journal of Fluorine Chemistry* **2010**, *131*, 1252–1256.
18. **Peryshkov, D. V.**; Goreshnik, E.; Mazej, Z.; Strauss, S. H. Co-crystallization of octahedral and icosahedral fluoroanions in K₃(AsF₆)(B₁₂F₁₂) and Cs₃(AsF₆)(B₁₂F₁₂) Rare examples of salts containing fluoroanions with different shapes and charges. *Journal of Fluorine Chemistry* **2010**, *131*, 1225–1228.
17. **Peryshkov, D. V.**; Popov, A. A.; Strauss, S. H. Latent Porosity in Potassium Dodecafluoro-closo-dodecaborate(2-). Structures and Rapid Room Temperature Interconversions of Crystalline K₂B₁₂F₁₂, K₂(H₂O)₂B₁₂F₁₂, and K₂(H₂O)₄B₁₂F₁₂ in the Presence of Water Vapor. *Journal of the American Chemical Society* **2010**, *132*, 13902–13913.

16. Shackelford, S. A.; Belletire, J. L.; Boatz, J. A.; Schneider, S.; Wheaton, A. K.; Wight, B. A.; Ammon, H. L.; **Peryshkov, D. V.**; Strauss, S. H. Bridged Heterocyclium Dicationic closo-Icosahedral Perfluoroborane, Borane, and Carborane Salts via Aqueous, Open-Air Benchtop Synthesis. *Organic Letters* **2010**, *12*, 2714–2717.
15. **Peryshkov, D. V.**; Popov, A. A.; Strauss, S. H. Direct Perfluorination of $K_2B_{12}H_{12}$ in Acetonitrile Occurs at the Gas Bubble-Solution Interface and Is Inhibited by HF. Experimental and DFT Study of Inhibition by Protic Acids and Soft, Polarizable Anions. *Journal of the American Chemical Society* **2009**, *131*, 18393–18403.
14. Shustova, N. B.; **Peryshkov, D. V.**; Kareev, I. E.; Boltalina, O. V.; Strauss, S. H. 1,4,7,11,18,21,24,31,35,39,51,58,61,64-Tetradecakis(trifluoromethyl)-1,4,7,11,18,21,24,31,35,39,51,58,61,64-tetradecahydro($C_{70}-D_{5h}$)[5,6]fullerene p-xylene trisolvate. *Acta Crystallographica Section E-Structure Reports Online* **2007**, *63*, O3928–U1876.
13. Shustova, N. B.; **Peryshkov, D. V.**; Boltalina, O. V.; Strauss, S. H. 1,4,10,19,25,41,55,60,67,69-Decakis(trifluoromethyl)-1,4,10,19,25,41,55,60,67,69-decahydro($C_{70}-D_{5h}$)[5,6] fullerene. *Acta Crystallographica Section E-Structure Reports Online* **2007**, *63*, O4073–U3278.
12. Shustova, N. B.; **Peryshkov, D. V.**; Kareev, I. E.; Boltalina, O. V.; Strauss, S. H. 1,6,11,16,18,24,27,36-octakis(trifluoromethyl)-1,6,11,16,18,24,27,36-octahydro($C_{60}-I_h$)[5,6]fullerene deuteriochloroform solvate. *Acta Crystallographica Section E-Structure Reports Online* **2007**, *63*, O3398–U2441.
11. Shustova, N. B.; **Peryshkov, D. V.**; Popov, A. A.; Boltalina, O. V.; Strauss, S. H. 1,6,11,18,24,27,33,51,54,60-decakis(trifluoromethyl)-1,6,11,18,24,27,33,51,54,60-decahydro($C_{60}-I_h$)[5,6]fullerene. *Acta Crystallographica Section E-Structure Reports Online* **2007**, *63*, O3129–U2823.
10. Kareev, I. E.; Shustova, N. B.; **Peryshkov, D. V.**; Lebedkin, S. F.; Miller, S. M.; Anderson, O. P.; Popov, A. A.; Boltalina, O. V.; Strauss, S. H. X-ray structure and DFT study of $C_{1-C_{60}}(CF_3)_{12}$. A high-energy, kinetically-stable isomer prepared at 500 °C. *Chemical Communications* **2007**, 1650–1652.
9. Shlyakhtina, A. V.; Knotko, A. V.; Boguslavskii, M. V.; Stefanovich, S. Y.; **Peryshkov, D. V.**; Kolbanev, I. V.; Shcherbakova, L. G. Effects of the synthesis procedure, doping and non-stoichiometry on the order-disorder transformation in $Ln_2Ti_2O_7$ ($Ln = Tm-Lu$) oxygen conductors. *Solid State Ionics* **2005**, *176*, 2297–2304.
8. Shlyakhtina, A. V.; Knotko, A. V.; Boguslavskii, M. V.; Stefanovich, S. Y.; Kolbanev, I. V.; **Peryshkov, D. V.**; Shcherbakova, L. G. Influence of structural defects on the electrical conductivity of $(Yb_{1-x}Sc_x)_2Ti_2O_7$ ($x=0, 0.09, 0.3$). *Inorganic Materials* **2005**, *41*, 406–411.
7. Goodilin, E. A.; **Peryshkov, D. V.**; Presniakov, I. A.; Didenko, K. V.; Tretyakov, Y. D. A comparative Mossbauer study of the $Nd_{1+x}Ba_{2-x}(Cu_{0.97}^{57}Fe_{0.03})_3O_z$ solid solution: the role of low-temperature treatment. *Superconductor Science & Technology* **2004**, *17*, 1353–1360.

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6. Goodilin, E. A.; **Peryshkov, D. V.**; Didenko, K. V.; Makarova, M. V.; Tretyakov, Y. D. Dynamics of cation ordering in an intentionally prepared low-T_c pseudocubic NdBa₂Cu₃O_{6.9} phase. *Superconductor Science & Technology* **2004**, *17*, 1341–1345.

5. **Peryshkov, D. V.**; Goodilin, E. A.; Presnyakov, I. A.; Didenko, K. V.; Tretyakov, Y. D.; Birkner, A.; Grunert, W. Thermal instability of a cation-disordered NdBa₂Cu₃O₇ superconductor. *Mendeleev Communications* **2004**, 161–163.

4. Tretyakov, Y. D.; Goodilin, E. A.; **Peryshkov, D. V.**; Itkis, D. M. Structural and microstructural features of functional materials based on cuprates and manganites. *Uspekhi Khimii* **2004**, *73*, 954–973.

3. **Peryshkov, D. V.**; Gudilin, E. A.; Makarova, M. V.; Pomerantseva, E. A.; Mudretsova, S. N.; Maiorova, A. F.; Tretyakov, Y. D. Dynamics of cation ordering in the superconducting NdBa₂Cu₃O₇ phase. *Doklady Chemistry* **2002**, *387*, 323–327.

2. Didenko, K. V.; **Peryshkov, D. V.**; Gudilin, E. A.; Presnyakov, I. A.; Pomerantseva, E. A.; Tretyakov, Y. D. Specific features of the local structure of quasi-cubic lanthanide barium cuprates Nd_{1+x}Ba_{2-x}((Cu_{0.97}⁵⁷Fe_{0.03})₃O_{7-z} (x=0, 0.6). *Doklady Chemistry* **2002**, *387*, 316–321.

1. **Peryshkov, D. V.**; Gudilin, E. A.; Makarova, M. V.; Trofimenko, E. A.; Mudretsova, S. N.; Maiorova, A. F.; Tretyakov, Y. D. Evolution of the superconducting NdBa₂Cu₃O_z phase upon isothermal annealing. *Doklady Chemistry* **2002**, *383*, 105–109.

Thesis Advisor and Postgraduate-Scholar Sponsor:

Graduate Students:

2013–2018 (Ph.D.)	Bennet J. Eleazer (University of South Carolina)
2013–2018 (Ph.D.)	Md Mamdudur Rahman (University of South Carolina)
2014–2016 (M.S.)	Surendra Karki (University of South Carolina)
2015–2020 (Ph.D.)	Md Jahirul Islam (University of South Carolina)
2016–2018	Dmitry Royzman (University of South Carolina)
2017–2022 (Ph.D.)	Gayathri Gange (University of South Carolina)
2017–2022 (Ph.D.)	Chathumal Jayaweera (University of South Carolina)
2018–2020 (M.S.)	Tyler Hemingway (University of South Carolina)
2019–present	Jared Riffle (University of South Carolina)
2020–present	Amanda Humphries (University of South Carolina)
2020–2023	Devin Elwell (University of South Carolina)
2021–present	Bryce Nussbaum (University of South Carolina)
2022–present	Cash Jowers (University of South Carolina)
2023–present	Gabby Tellier (University of South Carolina)

Postdoctoral Fellows:

2015–2017	Dr. Yuenn Onn Wong (University of South Carolina)
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Current and Completed Funding

National Science Foundation, “Redox-Active Carborane Clusters for Metal-Free Bond Activation” 2022–2025 (active) \$456,907

National Science Foundation, “CAREER: Carborane Cluster Architectures Featuring Multiple Metal-Boron Interactions” 2017–2023 (completed) \$709,725

Office of the USC Vice President for Research, ASPIRE II. 2021–2022 (completed) \$20,000

Office of the USC Vice President for Research, ASPIRE I. “Cooperative Lewis pairs: Synergy of High-Valent Group 5 Metal Complexes and Group 15 Bases” 2020–2021 (completed) \$15,000

American Chemical Society Petroleum Research Fund, “Electron-Donating Carboranyl Ligands for Iron-Catalyzed Hydrocarbon Oxidation” 2014–2016 (completed) \$110,000

Office of the USC Vice President for Research, ASPIRE I, Track I. “The Role of Boron-Metal Bonds in Cooperative Activation of Small Molecules” 2015–2016 (completed) \$15,000

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Synergistic Activities

Teaching and Service: Development of the new multidisciplinary course “Chemistry of Renewable Energy” at the University of South Carolina, attended by the students of the department of chemistry and biochemistry and the department of chemical engineering.

Peer-review service for the *J. Am. Chem. Soc.*, *Chemical Sci.*, *Dalton Trans.*, *J. Organomet. Chem.*, *Inorg. Chem.*, *Organometallics*, *Chem. Commun*, *Langmuir*, and *Inorg. Chem. Frontiers*.

Outreach: Judge at Discovery Day showcase events in Columbia, South Carolina.

Organizer of the Southeast Undergraduate Research Conference SURC-2017.

Graduate Education for Minorities (GEM) Get Ready for the Advanced Degree (GRAD) Lab faculty participant, October 2015-17.