

Davita L. Watkins, Ph.D.

Department of Chemistry and Biochemistry

William G. Lowrie Department of Chemical and Biomolecular Engineering

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Education	Doctor of Philosophy , Chemistry <i>The University of Memphis</i> Dissertation: <i>Novel Photochromic Spirooxazine Dimers: Synthesis, Characterization, and Applications</i>	Memphis, TN 2007-2012
	Bachelor of Science , Chemistry and Anthropology <i>Vanderbilt University</i>	Nashville, TN 2002-2006
Professional History	Associate Professor <i>The Watkins Laboratory, Department of Chemistry and Biochemistry (major), and Department of Chemical and Biomolecular Engineering (minor), The Ohio State University</i> Near-infrared/Shortwave-infrared (NIR/SWIR) fluorophores for bioimaging; hierarchal polymers for theranostics and biomedical applications	Columbus, OH 2022-present
	Associate Professor <i>The Watkins Laboratory, Department of Chemistry, University of Mississippi</i> - Near-infrared (NIR) conjugated polymers and fluorophores for bioimaging; Janus-type dendrimers and linear–dendritic block copolymers for theranostics <i>Collaborative studies</i> – calmodulin-based biomaterials; hydrogels and organogels; electro-copolymerization	University, MS 2020-2022
	Assistant Professor <i>The Watkins Laboratory, Department of Chemistry, University of Mississippi</i> - Optoelectronic behavior of halogen bond assemblies as semiconducting materials; self-assembling Janus dendrimers and linear–dendritic block copolymers for theranostics <i>Collaborative studies</i> – calmodulin-based biomaterials; anti-cancer agents derived from panobinostat; self-assembling magnesium oxide (MgO₂) nanoparticles; electro-copolymerization	University, MS 2014-2020
	Postdoctoral Research Associate <i>The Castellano Laboratory, Department of Chemistry, University of Florida</i> - Self-assembling oligomers for photovoltaic devices; solution and solid phase characterization of assembly formation, optoelectronic properties and redox behavior of semiconductors <i>Advisor</i> – Dr. Ronald K. Castellano, Professor	Gainesville, FL 2012-2014
	Graduate Research Assistant <i>The Fujiwara Laboratory, Department of Chemistry, University of Memphis</i> - Photochromic compounds and polymer systems for selective recognition of biomolecules and sensing of organic/inorganic molecules <i>Advisor</i> – Dr. Tomoko Fujiwara, Associate Professor	Memphis, TN 2007-2012
	Chemical Analyst I <i>Eurofins Scientific Incorporated, Memphis Division</i>	Memphis, TN 2006-2007
	Monsanto Summer Intern <i>Agriculture Company, Memphis Division</i>	Memphis, TN 2006-2006
	Undergraduate Researcher <i>The Hercules Laboratory, Vanderbilt University</i> - Characterization of decomposition occurring in polystyrene-based systems via MALDI-TOF mass spectrometry <i>Advisor(s)</i> – Dr. David Hercules/Dr. Grace Zoorob, Professors	Nashville, TN 2005-2006

Funding

President's Research Excellence (PRE) FALL 2024 Catalyst: Pushing the Boundaries of Nanolithography with Electromagnetic Nanoparticles and Polymer Innovation (PI); Period: 2025-27; TOTAL: \$ 210,000

The Ohio State University Enterprise for Research, Innovation and Knowledge (ERIK) Education Startup Award - STEM Education Faculty Startup Award (PI); Period: 2023-27; TOTAL: \$200,000

National Institute of Health (NIH); National Institute of Biomedical Imaging and Bioengineering: Ionic Liquid-Coated NIR-II Polymer Conjugates as Targeted Brain Theranostics (PI); Period: 2022-28; TOTAL: \$ 2,417,396.00; Award # AWD-113530

National Science Foundation: Harnessing the Aggregation Behavior of Near-Infrared (NIR-II) Fluorophores via Supramolecular Nano-scaffolds (PI); Period: 2022-25; TOTAL: \$464,992; Award Abstract #2203640

American Chemical Society Petroleum Research Fund New Directions: Elucidating the Effects of Molecular Structure on Janus Dendrimers as Ambidextrous Gelators (PI); Period: 2020-22; TOTAL: \$110,000; ACS PRF#61259

National Science Foundation: CAREER: Elucidating the Role of Sigma-hole Interactions in Advanced Functional Materials (PI); Period: 2017-22; TOTAL: \$493,549; Award Abstract #1652094

National Science Foundation: Mississippi NSF EPSCoR RII-Track 1: Center for Emergent Molecular Optoelectronics (CEMOs) (Thrust Leader); Period: 2018-22; TOTAL: \$20,000,000; Award Abstract #1757220

National Science Foundation: Mississippi NSF EPSCoR RII Track-2 FEC. Collaborative Research and Education on Synergized Transformational Solar Chemical Looping and Photo-Ultrasonic Renewable Biomass Refinery (Senior Personnel); Period: 2016-21; TOTAL: \$ 1,600,000; Award Abstract #1632899

Oak Ridge Associated Universities (ORAU): Ralph E. Powe Junior Faculty Enhancement Award, Halogen Bond Driven Self-Assembly of Hybrid Oligomers for Organic Semiconducting Devices (PI); Period: 2015-16; TOTAL: \$10,000

Awards

2024-25 OSU Postdoctoral Faculty Mentor Award	2025
Iota Sigma Pi 2024 Agnes Fay Morgan Research Award	2024
American Chemical Society WCC's Rising Stars for 2022	2022
C&EN 2021 Trailblazer	2021
2021 International Union of Pure and Applied Chemistry (IUPAC)	2021
• Young Observer	
2018 International Symposium on Halogen Bonding Rising Star	2018
Invited speaker	
2018 Emerging Investigators - Journal of Materials Chemistry C	2018
• Faculty early career journal issue	
Mike L. Edmonds New Scholar Award	2018
• UM faculty early career development award	
American Chemical Society Young Investigator Award	2018
• PMSE faculty early career award	
Lloyd N. Ferguson Young Scientist Award for Excellence in Research	2018
• NOBCChE faculty early career award	
National Science Foundation CAREER Award	2017
Oak Ridge Associated Universities (ORAU) Ralph E. Powe Award	2015
Carl Storm Underrepresented Minority (CSURM) Fellowship	2013
• Financial support to attend the 2013 Physical Organic Chemistry Gordon Research Conference; selected speaker	

	5th Annual National Science Foundation (NSF) Future Faculty Workshop	2012
	• Selected and invited scholar	
	Dow Chemical Company B. E. S. T. Symposium, Invited scholar	2012
	First Generation Ph.D. Scholar, Fellowship recipient	2008-2012
Service	Evans Polymer Laboratory, Core facilities director	2025
	ACS Omega, Associate editor	2023
	ACS Applied Polymer Materials, Editorial advisory board	2023
	OSU Chemistry Bridge, Mentor and advisor	2022
	OSU NOBCChE, OSU co-advisor	2022
	Regional NOBCChE Meeting Committee, Co-organizer	2022
	Programming Committee Division of Polymeric Materials Science and Engineering, Co-Chair	2021
	Journal of Physical Organic Chemistry, Editorial advisory board	2021
	ACS Omega, Editorial advisory board	2021
	University Faculty Representative Federal Demonstration Partnership	2021
	Member at Large American Chemical Society Colloid and Surface Chemistry Division	2020
	American Association for the Advancement of Science, Member	2020
	Women in Supramolecular Chemistry, Advisory board	2020
	NSF Future Faculty Workshop in Soft Matter, Mentor	2019
	Member at Large American Chemical Society PMSE Division	2019
	Sigma Xi Scientific Research Honor Society, Member	2019
	Operation ICB (I Can Be), Program coordinator	2015
	University Chapter of the National Organization of Black Chemists and Chemical Engineers (NOBCChE), UM co-advisor	2015
	Society of STEM Women of Color, Inc., Member	2015
	Local Section American Chemical Society (ACS) Governance, Secretary	2014-2017
	American Chemical Society (ACS), Member	2012
Technical Reviewing	Molecular Foundry, Lawrence Berkeley National Laboratory	
	National Institute of Health (NIH)	
	American Chemical Society PRF	
	ADMIRE Marie Skłodowska-Curie Action COFUND in Advanced Materials Research	
	National Aeronautics and Space Administration (NASA)	
	National Science Foundation, Macromolecular, Supramolecular and Nanochemistry (MSN) program and Division of Materials Research (DMR)	
	Journal of Polymer Science, Part A: Polymer Chemistry, ACS Applied Materials & Interfaces, Polymer Chemistry, Journal of Materials Chemistry C, Crystal Growth and Design, and Frontiers Chemistry (Supramolecular)	

Publications (Total 49; 3 submitted, 4 in prep)

1. Ghazala, M.; Garcia, S. P.; Sheldon, C.; Moaven, S.; Turro, C.; **Watkins, D. L.**; Positional Tuning of Ether-Substituted NIR Donor-Acceptor-Donor Fluorophores. *J. Phys. Chem. A*, **submitted**
2. Deeba, F.; Mazed T. E.; **Watkins, D. L.**; Rappleye, C. A.; Wood, D. W.; Chitinase Food Coating: A Smart, Sustainable Bioshield for Fungal Protection. *Enzyme Microb Technol*, ENZMICTEC-D-25-00210; **submitted**
3. Green, K.; Kulkarni, A.; Jankoski, P.; Worden, R.; Derbigny, B.; Clemons, T.; **Watkins, D. L.**; Morgan, S. Influence of Saccharide Structure on the Self-Assembly, Thermal Properties, and Lectin Binding of Amphiphilic Glycopolymer-PLA Block Copolymers. *Bioconjugate Chem.* BC-2024-00439e; **submitted**
4. Kulkarni, M. L. Yaddehige, D. J. Cooke, C. M. Hamadani, A. S. Flynt, E. E. L. Tanner, E. L. Que, **D. L. Watkins**, Multifunctional Fluorinated Copolymer Nanoparticles via a Cationic Dendritic-Based Macromolecular RAFT-CTA. *Macromol. Chem. Phys.* 2024, 2400354. DOI: 10.1002/macp.202400354
5. Green, K. A.; Kulkarni, A.; Jankoski, P. E.; Newton, T. B.; Clemons, T. D.; **Watkins, D. L.**, Morgan, S. E., Biocompatible Glycopolymer-PLA Amphiphilic Hybrid Block Copolymers with Unique Self-Assembly, Uptake, and Degradation Properties. *Biomacromolecules*, 2024, DOI:10.1021/acs.biomac.4c00885
6. Mukherjee, S.; Kulkarni, A.; Holbrook, J. H.; Dasanayake, G. S.; Hu, D.; Tanner, E. E. L.; Hummon, A. B.; and **Watkins, D. L.**, Uptake of Self-Assembling Amphiphilic Tryptophan-Based Polymer Nanoparticles in Three-Dimensional Cell Culture Models. *ACS Appl. Nano Mater.*, 2024, DOI: 10.1021/acsanm.4c04589
7. Sparks, N. E.; Smith, C.; Stahl, T.; Hamadani, C. M.; Lambert, E.; Hammer, N. I.; Sokolov, A. Y.; Fitzkee, N. C.; Tanner, E. E. L.; **Watkins, D. L.**, Multifunctional NIR-II Emissive Thienothiadiazole (TTD)-based Fluorophores and Nanoparticles with Dual Imaging and Photothermal Properties. *J. Mater. Chem. C* 2024, DOI: 10.1039/D3TC04747D.
8. Sparks, N. E.; Vijayan, S. M.; Roy, J. K.; Dorris, A.; Lambert, E.; Karunathilaka, D.; Hammer, N. I.; Leszczynski, J.; **Watkins, D. L.**, Synthesis and Characterization of Novel Thienothiadiazole-Based D- π -A- π -D Fluorophores as Potential NIR Imaging Agents. *ACS Omega* 2023, DOI: 10.1021/acsomega.3c02602.
9. Edgecomb, S. X.; Hamadani, C. M.; Roberts, A.; Taylor, G.; Merrell, A.; Suh, E.; Yaddehige, M. L.; Chandrasiri, I.; **Watkins, D. L.**; Tanner, E. E. L., Investigation of Physicochemical Drivers Directing Ionic Liquid Assembly on Polymeric Nanoparticles. *Electrochem. Sci. Adv.* 2023, DOI: 10.1002/elsa.202300013.
10. Ranathunge, T.A.; Curiac, C.; Green, K. A.; Kolodziejczyk, W.; Hill, G.; Morgan, S.; Delcamp, J. H.; and **Watkins, D. L.** "Heteroacene-Based Polymer with Fast-Switching Visible-Near Infrared Electrochromic Behavior," *ACS Appl. Mater. Interfaces*, 2023, DOI: 10.1021/acsaami.2c21111

Prior to OSU

1. Qi, Y.; Yaddehige, M. L.; Green, K.; Moore, J.; Jha, S.; Ma, G.; Wang, C.; **Watkins, D. L.**; Gu, X.; Patton, D.; Morgan, S.; Dai, Q., "Perovskite Films Passivated by a Dendrimer Toward High Efficiency and High Stability Devices". *J. Power Sources*. 2022. DOI: 10.1016/j.jpowsour.2022.231518
2. Hamadani, C. M.; Chandrasiri, I.; Yaddehige, M. L.; Dasanayake, G. S.; Owolabi, I.; Flynt, A.; Hossain, M.; Liberman, L.; Lodge, T. P.; Werfel, T. A.; **Watkins, D. L.**; Tanner, E. E. L., "Improved Nanoformulation and Bio-functionalization of Linear-Dendritic Block-co-Polymers with Biocompatible Ionic Liquids". *Nanoscale* 2022. DOI: 10.1039/d2nr00538g
3. Sparks, N.; Dorris, A.; Vijayan, S. M.; Chandrasiri, I.; Zia, M. F.; Hammer, N. I.; Flynt, A.; **Watkins, D. L.**, "Amphiphilic Self-assembling Isoindigo-based Donor-Acceptor Fluorophore for Near-infrared Bioimaging Applications". *Mol. Syst. Des. Eng.* 2022, DOI: 10.1039/d2me00014h
4. Chandrasiri, I.; Yaddehige, M. L.; Li, B.; Sun, Y.; Meador, W.; Dorris, A.; Zia, M. F.; Hammer, N. I.; Flynt, A.; Delcamp, J. H.; Davis, E.; Lippert, A.; and **Watkins, D. L.** "Crosslinking PCL-PAMAM Linear Dendritic Block Copolymers (LDBC) for Theranostic Nanomedicine," *ACS App. Poly. Mater.*, 2022, DOI: 10.1021/acsaapm.1c01131
5. Don, R. W.; Dowell, T. J.; Simms, B. L.; **Watkins, D. L.**; Wipf, D. O.; and Scott, C.N. "Polyrhodamine: A pH-Responsive Redox Stable Conducting Polyelectrolyte," *Polym. Chem.*, 2021, DOI: 10.1039/D1PY01474A.
6. Ndaleh, D.; Smith, C.; Yaddehige, M. L.; Shaik, A.; **Watkins, D. L.**; Hammer, N. I.; Delcamp, J. H. "Shortwave Infrared Absorptive and Emissive Pentamethine-Bridged Indolizine Cyanine Dyes," *J. Org. Chem.*, 2021, DOI: 10.1021/acs.joc.1c01908.

7. Chatterjee, S.; Meador, W.; Smith, C.; Chandrasiri, I.; Zia, M. F.; Dorris, A.; Flynt, A.; **Watkins, D. L.**; Hammer, N. I.; Delcamp, J. H. "SWIR Emissive RosIndolizine Dyes and Nanoencapsulation of the Dyes in Water Soluble Dendrimers," *RSC Adv*, 2021, 10.1039/d1ra05479a.
8. Ranathunge, T. A.; Yaddehige, M. L.; and **Watkins, D. L.** "Heteroacene-Based Amphiphile as a Molecular Scaffold for Bioimaging Probes," *Front. Chem.: Suprasters of Chemistry Edition*, 2021, 10.3389/fchem.2021.729125.
9. Simms, B. L.; Chandrasiri, I.; Rieger, W. D.; Yaddehige, M. L.; Williams, J. S. D.; and **Watkins, D. L.** "Physicochemical Properties and Bio-Interfacial Interactions of Surface Modified PDLLA-PAMAM Linear Dendritic Block Copolymers (LDBCs)," *J. Polym. Sci.*, 2021, DOI: 10.1002/pol.20210448.
10. Ranathunge, T. A.; Nirmani, L. P. T.; Nelson, T. L.; and **Watkins, D. L.** "Benzodithiophene-S,S-tetraoxide (BDTT) as an Acceptor Towards Donor-Acceptor (D-A) Type Semiconducting Electropolymers," *ChemElectroChem*, 2021, DOI: 10.1002/celec.202100219.
11. Vijayan, S. M.; Sparks, N.; Roy, J. K.; Smith, C.; Tate, C.; Hammer, N. I.; Leszczynski, J.; and **Watkins, D. L.** "Evaluating Donor Effects in Isoindigo Based Small Molecular Fluorophores," *J. Phys. Chem. A.*, 2020, DOI:10.1021/acs.jpca.0c07796.
12. Yaddehige, M. L.; Chandrasiri, I.; Kotha, A.; Barker, A.; Simms, B. L.; Williams, J. S. D.; Abebe, D. G.; Kucheryavy, P.; Chougule, M. B.; and **Watkins, D. L.** "Cationic, Anionic and Neutral Functionalized PAMAM - Fatty Acid Amphiphilic Janus Dendrimers for Therapeutic Applications," *ChemNanoMat.*, 2020, DOI:10.1002/cnma.202000498.
13. Sparks, N.; Ranathunge, T. A.; Karunathilaka, D.; Tate, C. M.; Delcamp, J. H.; Rajapakse, R. M. G.; and **Watkins, D. L.** "Achieving Complex Isoindigo-based Donor-Acceptor (D-A) Type Copolymeric Materials Via Electro-Copolymerization," *ChemElectroChem*, 2020, DOI: 10.1002/celec.202000897
14. Chandrasiri, I.; Abebe, D. G.; Yaddehige, M. L.; Williams, J. S. D.; Zia, M. F.; Dorris, A.; Barker, A.; Simms B. L.; Parker, A.; Le, N.; Gayton, J. N.; Hammer, N. I.; Flynt, A.; Delcamp, J. H.; and **Watkins, D. L.** "Self- Assembling PCL-PAMAM Linear Dendritic Block Copolymers (LDBCs) for Bioimaging and Phototherapeutic Applications," *ACS Appl. Bio Mater.*, 2020, DOI: 10.1021/acsabm.0c00432
15. Ranathunge, T. A.; Ngo, D.; Karunathilaka, D.; Attanayake, N. H.; Chandrasiri, I.; Delcamp, J. H.; Rajapakse, R. M. G.; and **Watkins, D. L.** "Hierarchical Structures of Complex Electronically Conducting Organic Polymers Via One-Step Electro-Polymerization," *J. Mater. C.*, 2020, DOI: 10.1039/c9tc06945c
16. Balasubramaniam, S.; May, X.; Rivas, F.; Dodson, K.; Vijayan, S. Adhikari, S., **Watkins, D. L.**, Stoddard, S. "Design and Synthesis of Diazine-based Panobinostat Analogues for HDAC8 Inhibition," *Beilstein J. Org. Chem.*, 2020, 16, 628–637, DOI:10.3762/bjoc.16.59
17. Stoddard, S. V., Dodson, K., Adams, K., **Watkins, D. L.**, "In silico Design of Novel Histone Deacetylase 4-Inhibitors: Design Guidelines for Improved Binding Affinity," *Int. J. Mol. Sci.* 2020, DOI: 10.3390/ijms21010219
18. Ranathunge, T. A.; Ngo, D.; Attanayake, N. H.; Karunathilaka, D.; Delcamp, J. H.; Rajapakse, R. M. G.; and **Watkins, D. L.** "Radically Accessing D-A Type Ambipolar Copolymeric Materials with Intrinsic Electrical Conductivity and Visible–Near Infrared Absorption Via Electro-Copolymerization," *Macromol. Chem. Phys.*, 2019, 220, 1900289, DOI: 10.1002/macp.201900289
19. Steen, A. E., Ellington, T. L., Shuford, K. L., Tschumper, G. S., **Watkins, D. L.** and Hammer, N. I. "A Raman Spectroscopic and Computational Study of New Aromatic Pyrimidine-Based Halogen Bond Acceptors," *Inorganics: Special Issue on Halogen Bonding*, 2019, 7(10), 119, DOI: 10.3390/inorganics7100119
20. Steen, A.; Ellington, T. L.; Nguyen, S. T.; Balasubramaniam, S.; Chandrasiri, I.; Delcamp, J. H.; Tschumper, G. S.; Hammer, N. I.; **Watkins, D. L.** "Probing the Photophysical Behavior of Furan- and Thiophene-Containing Bispyridyl Oligomers via Spectroscopic and TD-DFT Methods," *J. Phys. Chem. C.* 2019, DOI: 10.1021/acs.jpcc.9b01510
21. Chandrasiri, I.; Abebe, D. G.; Gupta, S.; Williams, J. S. D.; Rieger, W. D.; Simms, B. L.; Noh, Y.; Payne, M. E.; Fortenberry, A.; Smith, A.; Lee, B.; Grayson, S. M.; Schneider, G. J. and **Watkins, D. L.**, "Synthesis and Characterization of PAMAM-Polylactide "Janus-type" Linear-Dendritic Hybrids." *J. Polym. Sci. A*, 2019, DOI: 10.1002/pola.29409
22. Johnson, S. N.; Ellington, T. L.; Nevarez, J.; Ngo, D.; Sparks, N.; Rheingold, A. L.; **Watkins, D. L.** and Tschumper, G. S. "Probing Non-covalent Interactions Driving Molecular Assembly in Organo-electronic Building Blocks," *CrystEngComm.*, 2019, DOI: 10.1039/C9CE00219G.

23. Rajapakse, R. M. G.; Attanayake, N. H.; Karunathilaka, D.; Steen, A. E., Hammer, N. I.; Strongin, D. R.; and **Watkins, D. L.** "Advances in Electro-copolymerization of NIR Emitting and Electronically Conducting Block Copolymers" *J. Mater. C. (Communications)*, 2019, DOI: 10.1039/C8TC06331A
24. Ranathunge, T. A.; Karunaratne, D.; Rajapakse, R.; **Watkins, D.L.** "Doxorubicin Loaded Magnesium Oxide Nanoflakes as pH Dependent Carriers for Simultaneous Treatment of Cancer and Hypomagnesemia," *Nanomaterials.*, 2019, DOI: 10.3390/nano9020208
25. May, X., Rivas, F., Dodson, K., Vijayan, S. Adhikari, S., Parker, K., **Watkins, D. L.**, Stoddard, S. "Design of Potent Panobinostat Histone Deacetylase Inhibitor Derivatives: Molecular Considerations for Enhanced Isozyme Selectivity between HDAC2 and HDAC8," *Mol. Inf.*, 2018, DOI:10.1002/minf.201800080
26. Baumann, A., Cheema, H., Sabuj, M A., McNamara, L. E., Peddapuram, A., Zhang, Y., Nguyen, S. T., **Watkins, D. L.**, Hammer, N. I., Raib, N. and Delcamp, J. H. "Iodine Binding with Thiophene Versus Furan Based Dyes for DSC," *Phys. Chem. Chem. Phys.* 2018, DOI: 10.1039/c8cp03065k
27. Weldeab, A. O.; Starkenburg, D. J.; Steen, A., Abboud, K. A.; Xue, J.; Castellano, R. K.; and **Watkins, D. L.** "Hierarchical Assembly of a Low Energy Gap Pi-Conjugated Oligomer via Synergetic Halogen and Hydrogen Bonding," *J. Mater. Chem. C.* 2018, DOI: 10.1039/c8tc00074c
28. Nguyen, S. T., Ellington, T. L., Allen, K. E., Gorden, J. D., Rheingold, A. L., Tschumper, G. S., Hammer, N. I., and **Watkins, D. L.** "Systematic Experimental and Computational Studies of Substitution and Hybridization Effects in Solid-State Halogen Bonded Assemblies," *Cryst. Growth Des.*, 2018, DOI: 10.1021/acs.cgd.8b00398
29. Cheema, H.; Peddapuram, A.; Adams, R.; McNamara, L.; Hunt, L.; Le, N.; **Watkins, D. L.**; Hammer, N. I.; Schmehl, R.; Delcamp, J. "Molecular Engineering of NIR Absorbing Thienopyrazine Double Donor Double Acceptor Organic Dyes for DSCs". *J. Org. Chem.* 2017, DOI: 10.1021/acs.joc.7b01750.
30. Zhang, Y.; Autry, S.; McNamara, L.; Nguyen, S.; Le, N.; Brogdon, P.; **Watkins, D. L.**; Hammer, N.I.; Delcamp, J. "Near-Infrared Fluorescent Thienothiadiazole Dyes with Large Stokes Shifts and High Photostability", *J. Org. Chem.* 2017, DOI: 10.1021/acs.joc.7b00422
31. Gindt, B. P.; Tang, Z.; **Watkins, D. L.**; Abebe, D. G.; Seo, S.; Tuli, S.; Ghassemi, H.; Zawodzinski, T. A.; Fujiwara, T. "Effects of Sulfonated Side Chains Used in Polysulfone- based PEMs for VRFB Separator", *J. Membrane Sci.* 2017, DOI: 10.1016/j.memsci.2017.03.013.
32. Ellington, T.L.; Reves, P.L.; Simms, B.L.; Wilson, J.L.; **Watkins, D. L.**; Tschumper, G.S.; Hammer, N.I. "Quantifying the Effects of Halogen Bonding by Haloaromatic Donors on the Acceptor Pyrimidine", *Phys. Chem. Chem. Phys.* 2017, DOI: 10.1002/cphc.201700114
33. Nguyen, S.T.; Rheingold, A.; Tschumper, G. S.; **Watkins, D. L.** "Elucidating the Effects of Fluoro and Nitro Substituents on Halogen Bond Driven Assemblies of Pyridyl-capped π -Conjugated Molecules", *Cryst. Growth Des.* 2016, DOI: 10.1021/acs.cgd.6b01321
34. Albers, T.; **Watkins, D. L.**; Gameiro, A.; Povstyanoy, V.Y.; Povstyanoy, M.; Lebedyeva, I., Benzotriazole-Based Strategies Toward Peptidomimetics, Conjugates, and Other Peptide Derivatives. In *Topics in Heterocyclic Chemistry*, Springer Berlin Heidelberg: 2015; 1-47.
35. Wilson, J.; Williams, J. S. D.; Petkovsek, C.; Reves, P.; Jurss, J. W.; Hammer, N. I.; Tschumper, G. S.; **Watkins, D. L.** "Synergistic Effects of Halogen Bond and π - π Interactions in Thiophene-based Building Blocks", *R. Soc. Chem. Adv.* 2015, DOI: 10. 1039/C5RA16680B.

Prior to UM

1. Shewmon, N. T.; **Watkins, D. L.**; Galindo, J.; Bou Zerdan, R.; Chen, J.; Keum, J.; Roitberg, A. E.; Xue, J.; Castellano, R. K. "Enhancement in Organic Photovoltaic Efficiency through the Synergistic Interplay of Molecular Donor Hydrogen Bonding and π -Stacking", *Adv. Funct. Mater.* 2015, 25, 5166-5177. DOI: 10.1002/adfm.201501815
2. Xueying, Z.; Cruz, J. F.; **Watkins, D. L.**; Xue, J.; Roitberg, A. E.; Castellano, R. K.; Perry, S. S. "Hydrogen Bond Directed Assembly of Oligothiophene/fullerene Superstructures on Au", *Org. Electron.* 2015, 19, 61-69. DOI: 10.1016/j.orgel.2015.01.022

- Schulze, B. M.; **Watkins, D. L.**; Zhang, J.; Ghiviriga, I.; Castellano, R. K. "Estimating the Shape and Size of Supramolecular Assemblies by Variable Temperature Diffusion Ordered Spectroscopy", *Org. Biomol. Chem.* 2014, 12, 7932-7936. DOI: 10.1039/C4OB01373E
- Schulze, B. M.; Shewmon, N. T.; Zhang, J.; **Watkins, D. L.**; Mudrick, J. P.; Cao, W.; Bou Zerdan, R.; Quartararo, A. J.; Ghiviriga, I.; Xue, J.; Castellano, R. K. "Consequences of Hydrogen Bonding on Molecular Organization and Device Performance in Molecular Organic Photovoltaic Cells", *J. Mater. Chem. A.* 2014, 2, 1541-1549. DOI: 10.1039/C3TA13529B
- Watkins, D. L.**; Fujiwara, T. "Bis-Spiro naphthooxazine Based Photochromic Polymer Materials", *J. Mater. Chem. C.* 2013, 1, 506-514. DOI: 10.1039/C2TC00098A
- Watkins, D. L.**; Fujiwara, T. "Synthesis, Characterization, and Solvent-Independent Photochromism Spiro naphthooxazine Dimers", *J. Photochem. Photobiol. A: Chem.* 2012, 228, 51-59. DOI: 10.1016/j.jphotochem.2011.11.011
- Kumar, S.; **Watkins, D. L.**; Fujiwara, T. "Tailored Spirooxazine Dimer as a Photoswitchable Binding Tool", *Chem. Commun.* 2009, 28, 4369-4371. DOI: 10.1039/B909496B

Patents (Total 1, 1 in prep)

- Kulkarni, D. L. Watkins, Saccharide-Based Raft Agents. 63/693,869. Sept 12, 2024, 103362-032PV1; T2025-002 (Provisional Patent)

Books and Other Scholarly Works (Total 3)

- Leigh, J., Hiscock, J., McConnell, A., Haynes, C., Caltagirone, C., Kieffer, M., Draper, E., Slater, A., Krbek, L. v., Hutchins, K., Watkins, D., & Busschaert, N. (2022). *Women in Supramolecular Chemistry*. Bristol, UK: Policy Press. Retrieved May 19, 2025, DOI: 10.51952/9781447362395
- Leigh, J. S., Hiscock, J. R., Koops, S., McConnell, A. J., Haynes, C. J., Caltagirone, C., Kieffer, M., Draper, E. R., Slater, A. G., Hutchins, K. M., Watkins, D., Busschaert, N., & von Krbek, L. K. (2024). "6: Analyzing creative multimodal data for a scientific audience". In *The Handbook of Creative Data Analysis*. Bristol, UK: Policy Press. Retrieved May 19, 2025, DOI:10.51952/9781447369592.ch006
- Leigh, J. S.; Hiscock, J. R.; Koops, S.; McConnell, A. J.; Haynes, C. J. E.; Caltagirone, C.; Kieffer, M.; Draper, E. R.; Slater, A. G.; Hutchins, K. M.; Watkins, D.; Busschaert, N.; von Krbek, L. K. S.; Jolliffe, K. A.; Hardie, M. J., Managing research throughout COVID-19: Lived experiences of supramolecular chemists. *Chem* 2022, 8 (2), 299-311. DOI: 10.1016/j.chempr.2022.01.001

Presentations and Lectures (Total 68)

Formal Conference Presentations

- Amphiphilic Dendritic Hybrid Block Copolymers (HBCS) For Theranostic Nanomedicine; ACS Columbus Local Section, Columbus, OH, May 23, 2024
- NIR-II Emissive Fluorophores and Nanoparticles for Dual Fluorescence Bioimaging and Photothermal Therapy Applications, 20th International Symposium of Novel Aromatic Compounds, ISNA-20 in Toronto, Canada, Aug 11-16, 2024
- Theranostic nanoparticles via amphiphilic dendritic hybrid block copolymers (HBCs), Spring ACS National Meeting, New Orleans, LA, March 17-22, 2024
- Amphiphilic Dendritic Hybrid Block Copolymers (HBCS) For Theranostic Nanomedicine; 18th Pacific Polymer Conference, June 18-23, 2023
- Self-Assembling pH-responsive Block Copolymers as Nanocarriers for On-Off Emissive Dyes; Artificial Molecular Switches and Motors Gordon Conference, June 18-23, 2023
- NIR-II Emissive Fluorophores and Nanoparticles for Dual Fluorescence Bioimaging and Photothermal Therapy Applications; 15th International Symposium on Functional pi-Electron System (Fpi15), Raleigh-Durham, NC, June 17-2, 2023
- Amphiphilic Dendritic Hybrid Block Copolymers (HBCs) for Biomedical Applications; Spring ACS National Meeting, Indianapolis, IN, March 26-30, 2023

8. Multifunctional Supramolecular Nanoparticles for Theranostic Nanomedicine; Spring ACS National Meeting, Indianapolis, IN, March 26-30, 2023
9. Supramolecular Strategies for Theranostics Polymer Nanocarriers, International Materials Research Congress, Cancun, Mexico, Aug 14-19, 2022
10. Supramolecular Polymer Hybrids for Theranostic Nanomedicine, Empowering Women in Organic Chemistry (EWOC), Pfizer, June 24, 2022
11. Supramolecular Crosslinking Strategies for Theranostics Polymer Nanocarriers, 16th International Symposium of Macrocyclic and Supramolecular Chemistry (ISMSC2022), Eugene, OR, June 19-24, 2022
12. A Curious Mind and the Wonders Behind the Number 5, 2022 American Chemical Society Women Chemists Committee's (WCC) Rising Stars Symposium, San Diego, CA, March 22, 2022
13. Supramolecular Crosslinking Strategies for Polylactone-Based Nanocarriers; Polymer-Mediated Supramolecular Assemblies, IUPAC CCCE 2021, Zoom Talk, Aug 5, 2021
14. Supramolecular Crosslinking Strategies for Polylactone-Based Nanocarriers; Spring 2021 ACS National Meeting, Zoom Talk, April 2, 2021
15. A Spotlight on Supramolecular Chemistry in Nanomedicine; University of Mississippi Student Members of the American Chemical Society (SMACS), Zoom Talk, Sept 2, 2020
16. Analysis of Structure-Property Relationship in "Janus-Type" Linear-Dendritic Block Copolymers (LDBC)s with Variations in Hydrophobicity; Fall 2019 ACS National Meeting, San Diego, CA, Aug 25-29, 2019
17. Synthesis and Properties of "Janus-Type" Linear-Dendritic Block Copolymers (LDBC)s for Therapeutic Applications; GPC 2019; The Polymer and Biomacromolecular Applications and Characterization Conference, New Orleans, LA, July 10-11, 2019
18. Systematic Experimental and Computational Studies of Solid-State Halogen Bonded Assemblies for Organic Optoelectronics; Physical Organic Gordon Conference, Holderness, NH, June 23-28, 2019
19. Synthesis and Properties of "Janus-Type" Linear-Dendritic Block Copolymers (LDBC)s for Therapeutic Applications; Polymer-Based Gene & Drug Delivery Systems Symposium; 2019 Spring ACS National Meeting, Orlando, FL, March 30-April 3, 2019
20. Heterobifunctional Linear-Dendritic Block Copolymers (LDBC)s as Multifunctional Carriers for Targeted Drug Therapy; 256th ACS National Meeting, Boston, MA, Aug 19-23, 2018
21. Synthesis and Properties of "Janus-Type" Linear-Dendritic Block Copolymers (LDBC)s for Therapeutic Applications; 256th ACS National Meeting, Boston, MA, Aug 19-23, 2018
22. Systematic Experimental and Computational Studies of Solid-State Halogen Bonded Assemblies for Organic Optoelectronics; 3rd International Symposium on Halogen Bonding (ISXB3), Halogen Bonding Conference, Greenville, SC, June 10-14, 2018
23. Elucidating the Synergic Effects of Sigma-Hole Interactions and pi-pi Stacking within Organic Electronic Materials for Applications in OFETs and OPVs; Cope and Molecules to Functional Molecular Materials Symposium at the 68th SERMACS Conference, Columbia, SC, Oct 23-26, 2016
24. Design and Synthesis of Supramolecular Janus-Type Dendrimers as Efficient Therapeutic Carriers; Block Copolymer Synthesis and Applications Symposium at the 67th SERMACS Conference, Memphis, TN, Nov 4-7, 2015
25. Supramolecular Approaches Towards Organic Electronic Devices; Conjugated Organic Materials for Energy Storage, Energy Conversion and Charge Transport Symposium at the 66th SERMACS Conference, Nashville, TN, Oct 16-19, 2014

Conference Poster Presentations

1. Rational Design of Hybrid Oligomers and Halogen Bond Driven Self-Assembly for Organic Electronic Devices, Gordon Research Conference on Physical Organic Chemistry, Holderness, NH, June 21-26, 2015

Invited Seminar Lectures

1. Let Nitrogen Lead the Way: Designing Small Molecule NIR-II and SWIR Fluorophores; Adesis, Wilmington, DE, May 9, 2025
2. Amphiphilic Dendritic Hybrid Block Copolymers (HBCS) for Theranostic Nanomedicine; Pfizer, Groton, CT, May 1, 2024

3. Amphiphilic Dendritic Hybrid Block Copolymers (HBCS) for Theranostic Nanomedicine, Massachusetts Institute of Technology, Department of Chemistry, Cambridge, MA, Jan 24, 2024
4. Amphiphilic Dendritic Hybrid Block Copolymers (HBCS) for Theranostic Nanomedicine, Northwestern University, MSE Colloquium Series, Evanston, IL, April 2, 2024
5. Amphiphilic Dendritic Hybrid Block Copolymers (HBCS) for Theranostic Nanomedicine, Denison University, Department of Chemistry, Granville, OH April 9, 2024
6. Amphiphilic Dendritic Hybrid Block Copolymers (HBCS) for Theranostic Nanomedicine; University of California, San Diego, La Jolla, CA May 6, 2024
7. Amphiphilic Dendritic Hybrid Block Copolymers (HBCS) for Theranostic Nanomedicine; University of Pennsylvania, Philadelphia, PA, Oct 25, 2024
8. Supramolecular Polymer Hybrids: Linear-Dendritic Block Copolymers (LDBC)s as Novel Strategies for Theranostic Nanomedicine, University of Wisconsin Madison, Department of Chemistry, Nov 9-11, 2022
9. Supramolecular Polymer Hybrids: Linear-Dendritic Block Copolymers (LDBC)s as Novel Strategies for Theranostic Nanomedicine, Temple University, Department of Chemistry, Sept 1, 2022
10. Supramolecular Polymer Hybrids: Linear-Dendritic Block Copolymers (LDBC)s as Novel Strategies for Theranostic Nanomedicine, Southern Methodist University, Department of Chemistry, April 7-8, 2022
11. Supramolecular Polymer Hybrids: Linear-Dendritic Block Copolymers (LDBC)s as Novel Strategies for Theranostic Nanomedicine, University of Washington, Department of Chemistry, Feb 3, 2022
12. Janus-type Block Copolymers: Supramolecular Strategies to Theranostic Nanomedicine"; University of Florida POLY PMSE Student Chapter Summer Seminar Series, Zoom Talk, July 13, 2021
13. Janus-type Block Copolymers: Supramolecular Strategies to Theranostic Nanomedicine"; Ohio State University, Zoom Talk, April 21, 2021
14. Janus-type Block Copolymers: Supramolecular Strategies to Theranostic Nanomedicine"; University of Maryland College Park, Zoom Talk, Feb 25, 2021
15. Janus-type" Block Copolymers: Supramolecular Strategies to Theranostic Nanomedicine"; Virginia Polytechnic Institute and State University, Zoom Talk, Feb 12, 2021
16. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; University of Florida, Zoom Talk, Oct 15, 2020
17. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; University of Southern Mississippi, Zoom Talk, Oct 14, 2020
18. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; University of New Hampshire, Zoom Talk, Sept 29, 2020
19. A Spotlight on Supramolecular Chemistry in Nanomedicine" George Mason University, Zoom Talk, Sept 18, 2020
20. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; University of Windsor, Canada, Zoom Talk, Sept 16, 2020
21. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; Massachusetts Institute of Technology, Zoom Talk, Aug 25, 2020
22. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; Dartmouth College, Hanover, NH, Feb 27, 2020
23. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; The Ohio State University, Columbus, OH, Feb 21, 2020
24. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; Louisiana State University, Baton Rouge, LA, Jan 31, 2020
25. Janus-type Linear-Dendritic Block Copolymers (LDBC)s and Dendrimers for Practical Applications in Nanomedicine; UMass Amherst, Amherst, MA, Jan 24, 2020
26. Designing Janus-type Linear Dendritic Block Copolymers as Next Generation Biomaterials; John Hopkins University, Baltimore, MD, Oct 18, 2019

27. Designing Janus-type Linear Dendritic Block Copolymers as Next Generation Biomaterials; Texas A&M University, College Station, TX, Sept 17, 2019
28. Supramolecular Approaches to Advanced Functional Materials; Kansas State University, Manhattan, KS, Sept 12, 2019
29. Supramolecular Approaches to Next Generation Biomaterials, Pharmacy Research Seminar, University of Mississippi School of Pharmacy, University, MS, Apr 25, 2019
30. Supramolecular Approaches to Advanced Functional Materials, Chemistry Seminar, Texas Technological University, Lubbock, TX, Mar 27, 2019
31. Supramolecular Approaches to Next Generation Biomaterials, Graduate Polymer Research Seminar, Georgia Institute of Technology, Atlanta, GA, Mar 15, 2019
32. Supramolecular Approaches to Advanced Functional Materials, Organic Chemistry Seminar, University of Georgia, Athens, GA, Mar 7, 2019
33. Supramolecular Approaches to Advanced Functional Materials, Chemistry Seminar, Mississippi State University, Starkville, MS, Feb 8, 2019
34. Supramolecular Approaches to Advanced Functional Materials, Chemistry Seminar, University of Virginia, Charlottesville, VA, Apr 20, 2018
35. Supramolecular Approaches to Biomaterials, Chemistry Seminar, University of Memphis, Memphis, TN, Nov 9, 2018
36. Supramolecular Approaches to Advanced Functional Materials, Chemistry Seminar, University of Virginia, Charlottesville, VA, Apr 20, 2018
37. Supramolecular Approaches to Advanced Functional Materials, Chemistry Seminar, University of Alabama, Tuscaloosa, AL, Sept 27, 2018
38. Supramolecular Approaches to Advanced Functional Materials, Chemistry Seminar, Tulane University, New Orleans, LA Apr 9, 2018
39. Supramolecular Approaches to Advanced Functional Materials, Chemistry Seminar, Auburn University, Auburn, AL, Feb 8, 2018
40. Supramolecular Approaches to Advanced Functional Materials, Macromolecular Chemistry Seminar, Louisiana State University, Baton Rouge, LA, Apr 22, 2016
41. Controlled Arrangement of pi-Conjugated Building Blocks via Non-covalent Interactions, Chemistry Seminar, Jackson State University, Jackson, MS Oct 30, 2015
42. Controlled Arrangement of pi-Conjugated Building Blocks via Non-covalent Interactions, Chemistry Seminar, University of Memphis, Memphis, TN Feb 22, 2015

Mentoring

Postdoctoral Advising

Daniel G. Abebe	2015-2017	Senior Research Scientist, Dow Chemical
Sivaraman Balasubramaniam	2018-2019	Research Scientist, Bristol Myers Squibb
Anjua Kulkarni	2022-2024	Consulting
Sarasija Das	2023-2024	ACS Publishing
Shiva Moaven	2024-2025	Asst. Professor, Youngstown State University
Maria Priscila Quiñonez Angulo	2024-	

Thesis/Dissertation Advising

Jon Dal Williams	2014-2019	Research Scientist, Kebotix
Briana Simms	2016-2021	Assistant Professor, University of Cincinnati
Indika Chandrasiri	2016-2021	Associate Research Scientist, Thermofisher Scientific
Dilan Karunathilaka	2017-2022	Assistant Research Scientist, Thermofisher Scientific

Mahesh De Silva	2017-2022	Research Scientist, Intel
Sajith Vijayan	2017-2022	Assistant Research Scientist, Thermofisher Scientific
Tharindu Ranathunge	2018-2022	Senior Research Technologist, St. Jude Research Hospital
Nicholas Sparks	2018-2023	Postdoctoral Research Associate, University of Minnesota
Blaine Derbigny	2020-2025	
Angel Weather	2021-	
Thejana Gunathilake	2022-	
Mukherjee Shreyasi	2022-	
Maryam Ghazala	2022-	
Ioana Cosmin	2022-	
Anusree Puthiyarakkal	2024-	
Qurat ul Ain	2024-	

Thesis/Dissertation Committee – Christopher Mortensen, Meredith Rudich, Gaya Dasanayake, Mario Djugovski, Christine Hamadani, Ravindar Kaur, Jonathon Watson, Christine Curiac, Sarah Johnson, Yanbing Zhang, Alexandra Baumann, Sweta Adhikari, Adithya Peddapuram, Roberta Rodrigues, Tanya Jones, Michael Molnar, Matthew Dukes, April Steen, Kayla Milano, Keshia Dykes, Yusuke Takahashi

Undergraduate Research Supervision – Erin Hundall, Christina Wurm, Jamey Wilson, Ngoc Le, Suong Nguyen, Christopher Tate, Justin McCray, Sweta Adhikari, William Rieger, Nicholas Sparks, Pu Ouyang, Abigail Barker, Chinwe Udemgba, Azizah Parker, Jordan Varma, Rashandra Rankin, Brianna Sumler, Clarissa Prince, Sheng Wei Tang, Allison Rattey, Nimi Oyelese, Sydney Stewart, Regene Jarvis, Cameron Sheldon, Connor Duguid, Andrew Wise, Ulrich Truck

High School Research Supervision – Zora Womack, Mykah Walters, Zaria Cooper, Alisha Burch, Violet Jira, Taniya Bland, Samantha Anderson, Mia Riddle, Latanya Walters, Shuchi Patel, Takiya Moore, Tia Wilson, Ayana Love

Teaching

Polymer Chemistry I: Synthesis (CHEM 8999)

Special topics course in polymer science that surveys contemporary synthetic strategies, macromolecular design, and the mechanistic principles governing polymer formation and performance.

Introduction to Physical Organic Chemistry (CHEM 6440)

Overview of advanced-level chemical kinetic postulates and principles for studying reaction mechanisms and complex reaction pathways.

Organic Chemistry for Majors II (CHEM 2620)

Continuation from 2610, including aromatic systems, carboxylic acids, carboxylic acid derivatives, amines, carbon-carbon bond-forming reactions, polymers, carbohydrates, and amino acids.

Elementary Organic Chemistry (CHEM 221 and 222)

An entry-level survey of modern organic chemistry including nomenclature, structure and bonding, and reactions of hydrocarbons and overview of natural and synthetic organic compounds.

Advanced Organic Chemistry: Structure and Mechanism (CHEM 527)

Course provides an advanced level understanding of physical-chemical methods and theories regarding properties of organic molecules and the reactions/processes in which they take part. There is an emphasis on bonding and electronic structure theories, chemical kinetics, molecular structure and thermodynamics.

Advanced Organic Chemistry: Structure and Synthesis (CHEM 528)

Course provides a review of basic reaction mechanisms, stereoelectronic effects, functional groups and acid-base chemistry. There is an emphasis on the writing of mechanisms using curved-arrow notation, bonding and electronic structure theories and named organic reactions.

Organic Spectroscopy and Mass Spectrometry (CHEM 563/525)

Course aims to provide an overview of spectroscopic methods and characterization techniques that are used to elucidate the structure of complex organic molecules.