

Joshua Tropp, Ph.D.

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Education

- 2015 – 2020 **Ph.D. in Polymer Science and Engineering**
Department of Polymer Science and Engineering
University of Southern Mississippi, Hattiesburg, MS
Dissertation: Establishing Design Guidelines for Conjugated Polymer-Based Sensing Technologies for Environmental Monitoring
Advisor: Professor Jason D. Azoulay
- 2011 – 2015 **B.A. in Chemistry; ACS Certification**
Washington & Jefferson College, Washington, PA
Summa cum laude

Professional Appointments

- 2023 – Present **Assistant Professor**
Department of Chemistry & Biochemistry
Texas Tech University, Lubbock, TX
- 2020 – 2023 **Postdoctoral Research Associate: Organic Bioelectronics**
Department of Biomedical Engineering
Northwestern University, Evanston, IL
Advisor: Professor Jonathan Rivnay
- 2020 **Postdoctoral Research Associate: Chemical Sensing**
School of Polymer Science and Engineering
University of Southern Mississippi, Hattiesburg, MS
Advisor: Professor Jason D. Azoulay

Selected Honors and Awards

- 2022 **PMSE Future Faculty Awardee** – ACS, Division of Polymeric Materials Science and Engineering
- 2022 **Rising Star in Soft and Biological Matter** – MRSEC at the University of Chicago
- 2022 **Postdoc of the Month, August** – Northwestern University Postdoctoral Association
- 2022 **Postdoc Talk Competition Winner** – Georgia Institute of Technology
- 2022 **CIRTL Scholar** – Searle Center for Advancing Learning and Teaching, Northwestern University
- 2020 **2020 CAS Future Leaders Program** – Chemical Abstract Services (CAS)
- 2019 **Graduate Student Hall of Fame (*One recipient per school*)** - The University of Southern Mississippi
- 2019 **3-Minute Thesis Grand Champion** – Graduate School, The University of Southern Mississippi
- 2019 **1st Place Poster Competition** – Applied Polymer Technology Extension Consortium
- 2018 **Graduate Competitive Travel Award** – University of Southern Mississippi
- 2016 **Graduate Research Traineeship** – National Science Foundation
- 2015 **Phi Beta Kappa Inductee (*One recipient per school*)** – Washington & Jefferson College
- 2015 **Jesse W. Lazear Book Prize** – Department of Chemistry, Washington & Jefferson College
- 2015 **Outstanding Senior Chemistry Major** – Society of Analytical Chemists of Pittsburgh
- 2015 **Samuel Jones Prize in Chemistry (*Top Grade on Exam*)** – Departments of Chemistry and Physics

Publications ([Google Scholar Profile](#))

Journal Articles (chronological order) – (* denotes equally contributed first-author)

1. R. Keate, **J. Tropp**, R. Wu, A. Petty, E. Hsu, G. Ameer, J. Rivnay, "Decoupling the Influence of Poly(3,4-ethylenedioxythiophene)-Collagen Composite Characteristics on Cell Stemness" *Adv. Sci.* **2024**, *Early View*, 2305562. DOI: 10.1002/advs.202305562
2. R. P. Trueman, O. Guillemot-Legris, H. T. Lancashire, A. S. Mehta, **J. Tropp**, R. E. Daso, J. Rivnay, A. B. Tabor, J. B. Phillips, B. C. Schroeder "Aligned Bioelectronic Polypyrrole/Collagen Constructs for Peripheral Nerve Interfacing" *Adv. Eng. Mater.* **2024**, *Early View*, 2301488. DOI: 10.1002/adem.202301488
3. **J. Tropp**, C. P. Collins, X. Xie, R. E. Daso, A. S. Mehta, S. P. Patel, M. M. Reddy, S. E. Levin, C. Sun, J. Rivnay, "Conducting polymer nanoparticles with intrinsic aqueous dispersibility for conductive hydrogels" *Adv. Mater.* **2024**, *36*, 2306691.
4. **J. Tropp**, D. Meli, J. Rivnay, "Organic Mixed Conductors for Electrochemical Transistors" *Matter.* **2023**, *6*, 3132. **–Highlighted Research, Front Cover**
5. **J. Tropp**,* D. Meli,* R. Wu, B. Xu, S. Hunt, J. Azoulay, B. Paulsen, J. Rivnay, "Revealing the Impact of Molecular Weight on Mixed Conduction in Glycolated Polythiophenes Through Electrolyte Choice" *ACS Mater. Lett.*, **2023**, *5*, 1367.
6. **J. Tropp**, "Biomaterial Platforms Offer Capability of Efficacious Male Contraceptives" *MRS Bull.* **2022**, *47*, 649.
7. **J. Tropp**, A. S. Mehta, R. Wu, M. M. Reddy, A. Petty, J. Rivnay, "Versatile Poly (3, 4-ethylenedioxythiophene) Polyelectrolytes for Bioelectronics by Incorporation of an Activated Ester" *Chem. Mater.*, **2022**, *35*, 41.
8. M. H. Ihde,* **J. Tropp**,* M. Diaz, A. M. Shiller, M. Bonizzoni, J. D. Azoulay, "A Sensor Array for the Ultra-Sensitive Discrimination of Heavy Metal Pollutants in Seawater" *Adv. Funct. Mater.*, **2022**, *32*, 2112634.
9. R. L. Keate, **J. Tropp**, C. Collins, H. T. O. Ware, A. J. Petty, G. Ameer, C. Sun, J. Rivnay, "3D-printed electroactive hydrogel architectures with sub-100 μm resolution promote myoblast viability" *Macromol. Biosci.*, **2022**, *22*, 2200103.
10. E. A. Schafer, R. Wu, D. Meli, **J. Tropp**, M. Moser, I. B. McCulloch, B. D. Paulsen, J. Rivnay, "Sources and Mechanisms of Degradation in P-type Thiophene-Based Organic Electrochemical Transistors" *ACS Appl. Electron. Mater.*, **2022**, *4*, 1391.
11. A. R. Benasco, **J. Tropp**, V. Kaphle, Y. Chen, W. Zhao, N. Eedugurala, A. Flood, J. D. Azoulay, "Macrocyclization Induced Doping of Conjugated Polymer Transistors: Toward the Selective and Ultrasensitive Detection of Phosphate in Seawater" *Adv. Electron. Mater.*, **2022**, *7*, 2101353.
12. F. M. Fung,* S. Z. Jilani,* M. L. Ohnsorg,* R. L. Pinals,* M. Saraf,* **J. Tropp**,* P. Carlton, "How Early-Career Scientists Responded to the Space Created by the COVID-19 Pandemic with Resiliency" *ACS Cent. Sci.*, **2022**, *8*, 294-296.
13. S. Griggs, A. Marks, D. Meli, G. Rebetez, O. Bardagot, B. D. Paulsen, H. Chen, K. Weaver, M. I. Hugraha, E. A. Shafer, **J. Tropp**, C. M. Aithison, T. D. Anthopoulos, N. Baneerji, J. Rivnay, I. McCulloch, "The effect of residual palladium on the performance of organic electrochemical transistors" *Nat. Commun.* **2022**, *13*, 7964.
14. **J. Tropp**, J. Rivnay, "Design of Biodegradable and Biocompatible Conjugated Polymers for Bioelectronics" *J. Mater. Chem. C* **2021**, *9*, 13543-13556. **–Highlighted Research, "HOT Paper" and Front Cover.**
15. R. L. Keate, **J. Tropp**, J. Rivnay, "A Collagen-Conducting Polymer Composite with Enhanced Chondrogenic Potential" *Cell Mol. Bioeng.* **2021**, *14*, 501-512.
16. P. R. Paudel, **J. Tropp**, V. Kaphle, J. D. Azoulay, B. Lussem, "Organic Electrochemical Transistors – From Device Models to a Targeted Design of Materials" *J. Mater. Chem. C* **2021**, *9*, 9761-9790.
17. E. R. King, **J. Tropp**, N. Eedugurala, L. E. Gonce, S. Stanciu, J. D. Azoulay, "Gold Catalyzed Direct C-H Activation Polymerization for the Synthesis of Aromatic Polymers" *Angew. Chem.* **2020**, *132*, 22155-22159. **–Highlighted Research, Supplemental Cover**
18. **J. Tropp**, M. H. Ihde, E. R. Crater, N. C. Bell, R. Bhatta, I. C. Johnson, M. Bonizzoni, J. D. Azoulay, "A Sensor Array for the Nanomolar Detection of Azo Dyes in Water" *ACS Sens.* **2020**, *5*, 1541-1547.

19. S. Davis, D. Nugegoda, **J. Tropp**, J. D. Azoulay, J. H. Delcamp, "Molecular Au(I) Complexes in the Photosensitized Photocatalytic CO₂ Reduction Reaction" *MRS Commun.* **2020**, *10*, 252-258.
–**Highlighted Research, Front Cover**
20. W. Zhao, **J. Tropp**, B. Qiao, M. Pink, J. D. Azoulay, A. H. Flood, "Tunable Adhesion from Stoichiometry-controlled Supramolecular Polymers emerge using Cyanostar-stabilized Anion-anion Attraction" *J. Am. Chem. Soc.*, **2020**, *142*, 2579–2591.
21. **J. Tropp**, M. H. Ihde, A. K. Williams, N. J. White, N. Eedugurala, N. C. Bell, M. Bonizzoni, J. D. Azoulay, "A Sensor Array for the Discrimination of Polycyclic Aromatic Hydrocarbons Using Conjugated Polymers and the Inner Filter Effect" *Chem. Sci.*, **2019**, *10*, 10247–10255. –**Highlighted Research, Back Cover**
22. A. E. London, H. Chen, M. A. Sabuj, **J. Tropp**, B. A. Zhang, Y. Liu, X. Gu, B. Wong, N. Rai, M. K. Bowman, J. D. Azoulay, "A High Spin Ground State Donor-Acceptor Conjugated Polymer" *Sci. Adv.*, *5*(5), eaav2336, **2019**.
23. W. Zhao, B. Qiao, **J. Tropp**, M. Pink, J. D. Azoulay, A. H. Flood* "Anion Dimers Drive Supramolecular Polymerization of Telechelic Di-phosphonates inside Cyanostar Macrocycles" *J. Am. Chem. Soc.* **2019**, *130*, 10464–10465. –**Highlighted Research, Supplemental Cover**
24. A K. Williams,* **J. Tropp**,* E. R. Crater, N. Eedugurala, J. D. Azoulay, "Thiol-Ene Click Post-Polymerization Modification of a Fluorescent Conjugated Polymer for Parts-per-Billion Pyrophosphate Detection in Seawater" *ACS Appl. Polym. Mater.* **2019**, *1*, 309–314.
25. A. E. London, L. Huang, B. A. Zhang, M. B. Oviedo, **J. Tropp**, W. Yao, Z. Wu, B. M. Wong, T. N. Ng, J. D. Azoulay "Donor-Acceptor Polymers with Tunable Infrared Photoresponse" *Polym. Chem.*, **2017**, *8*, 2922–2930. –**Highlighted Research, Back Cover**

Manuscripts submitted, in review, or in press:

26. A. S. Mehta, S. L. Zhang, X. Xie, **J. Tropp**, S. Khanna, X. Ji, R. Daso, C. Franz, S. Jordan, J. Rivnay "Decellularized BIOhybrid nerve promotes motor neuron projections" *In Review*. **2024**.
27. R. Wu, X. Ji, Q. Ma, B. D. Paulsen, **J. Tropp**, J. Rivnay "Direct quantification of ion composition and mobility in organic mixed ionic-electronic conductors" *In Review*. **2024**.

Patents and Patent Applications:

28. **J. Tropp**, J. D. Azoulay "Methods for Detecting Analytes Using Conjugated Polymers and the Inner Filter Effect" US Patent Serial Number. 11/781,986, **2023**.
29. **J. Tropp**, J. Rivnay, "Acid Crystallized PEDOT Particles and Composites Thereof" US Patent Serial Number. 63/491,753, **2023**.
30. **J. Tropp**, D. Amato, D. Patton, J. D. Azoulay "Thiol Based Post-Modification of Conjugated Polymers" US Patent Serial Number 11,649,320, **2023**.
31. J. D. Azoulay, **J. Tropp**, E. King "Gold Catalyzed Polymerization Reactions of Unsaturated Substrates" US Patent Serial Number. 11/359,049, **2022**.
32. J. D. Azoulay, **J. Tropp**, V. Kaphle, A. R. Benasco, A. Flood, "Macrocycle Embedded Organic Electronic Materials, Composites, and Compositions for Chemical Sensing" US Patent App. 17/519,083, **2022**.

Selected Academic Presentations (Contributed to > 50 Presentations)

1. [Invited Talk] "Conjugated Polymer NIR-II Emitters for Cancer Imaging" *School of Veterinary Medicine HQ*, Amarillo, November **2023**.
2. [Invited Talk] "Enabling Novel Organic Mixed Conductors Through Controlled Synthesis and Processing" *15th International Symposium on Functional-Pi Electron Systems*, Raleigh, June **2023**.
3. [Poster] "PEDOT Nanoparticles: A Tool to Enhance 3D Charge Percolation within Conductive Biomaterials" *15th International Symposium on Functional-Pi Electron Systems*, Raleigh, June **2023**.

4. [Invited Talk] "'Revealing the Impact of Molecular Weight on Mixed Conduction in Glycolated Polythiophenes Through Electrolyte Choice" *American Chemical Society Spring 2023 National Meeting*, Indianapolis, March **2023**.
5. [Invited Talk] "Tailoring Opto(electronic) Chemosensors for Healthcare and the Environment through Precision Conjugated Polymer Synthesis" *Georgia Institute of Technology*, November **2022**.
Invited by the Student Polymer Network as Winner of the Postdoc Talk Competition
6. [Invited Talk] "Advancing Next-Generation Bioelectronics through Rational OMIEC Design" *2022 AIChE Annual Meeting*, Phoenix, November **2022**.
Invited to Meet the Faculty and Post-Doc Candidates Poster Session
7. [Invited Talk] "PEDOT-NHS a versatile conjugated polyelectrolyte for bioelectronics" *Rising Stars in Soft and Biological Matter Symposium*, Virtual, October **2022**.
8. [Invited Talk] "Advancing materials design for next-generation bioelectronic applications" *American Chemical Society Fall 2022 National Meeting*, Chicago, August **2022**.
Invited to PMSE Future Faculty Symposium
9. [Oral] "Functional conjugated polyelectrolytes: Toward the detection of environmental pollutants in seawater" *American Chemical Society Fall 2022 National Meeting*, Chicago, August **2022**.
10. [Poster] "Designing Conjugated Polyelectrolytes for Bioelectronics" *Tosoh Polymer Conference*, Hollywood, June **2022**.
11. [Poster] "Molecular Design of Conducting Biomaterial Composites" *American Chemical Society Spring 2022 National Meeting*, San Diego, March **2022**.
12. [Oral] "Molecular Design of Conducting Biomaterial Composites" *American Chemical Society Fall 2021 National Meeting*, Virtual, August **2021**.
13. [Oral] "Designing Functional Conjugated Materials for Biological Integration" *American Chemical Society Spring 2021 National Meeting*, Virtual, April **2021**.
14. [Invited Talk] "Polymer-Based Chemical Sensing Platform for the Identification of Azo Dye Pollutants" *ACS Virtual Postdoc Symposium*, Virtual, November **2020**.
15. [Oral] "Polymer-Based Chemical Sensing Platform for the Identification of Azo Dye Pollutants" *American Chemical Society Fall 2020 National Meeting*, San Francisco, CA, August **2020**.

Research Experience

- 2020 – 2023 **Postdoctoral research** – *Northwestern University, Evanston, IL*
- Developing electroactive biomaterials to promote tissue regeneration
 - Synthesis and characterization of organic mixed ion – electronic conductors for biosensors
- 2015 – 2020 **Doctoral research** – *University of Southern Mississippi, Hattiesburg, MS*
- Synthesis of conjugated materials for the optical and electronic detection of chemical pollutants
 - Synthetic methodology development of conjugated materials for (opto)electronics
 - Synthesis and characterization of stimuli-responsive supramolecular polymers
- 2018 **National Science Foundation Grant (\$10,000)**, – *University of Southern Mississippi* **Role: PI**
Title: RAFT Polymerization based Template (RAPT) for the Controlled Synthesis of Conjugated Scaffolds

Teaching and Mentoring Experience

Instructor of Record

Fall 2023 **CHEM 5304 Special Topics: Polymer Chemistry**, Texas Tech University

Educational Experiences

- 2023 **President's STEM Mentoring Academy**, Texas Tech University
- 2022 **2022 Searle Teaching-As-Research Program**, Northwestern University
- Performed classroom-based research focused on improving student learning
 - Investigated the use of writing to overcome acid-base misconceptions in the organic chemistry classroom
- 2021 **2021 Searle Teaching Certificate Program**, Northwestern University

- Year-long intensive program focused on improving student learning

2021 **An Introduction to Evidence-Based Undergraduates STEM Teaching, CIRTl**

- “An eight-week course to equip the next generation of STEM faculty to be effective teachers”

Mentoring – Texas Tech University

- Robert Posey (*Graduate Student at TTU in Chemistry*)
- Brenda Alfaro (*Graduate Student at TTU in Chemistry*)
- Nikita Gill (*Graduate Student at TTU in Chemistry*)
- Helena Garza (*Undergraduate Student at TTU in Chemistry*)
- Daniel Fernandez (*Undergraduate Student at TTU in Chemistry*)
- Nicholas Payne (*Undergraduate Student at TTU in Chemistry*)
- Andrea Perry (*Undergraduate Student at TTU in Pre-Medicine/Business Management*)

Mentored - Northwestern University

- Manideep M. Reddy (*Undergraduate Student at NU in Biology*)
- Shiv Patel (*Undergraduate Student at NU in Neuroscience*)
- Caroline F. Harms (*Undergraduate Student at NU in Materials Science and Engineering*)
- Vidhika Sidda (*Undergraduate Student at NU in Biomedical Engineering*)

Mentored - University of Southern Mississippi

- Erin R. Crater (*Graduate Student at Virginia Tech – Chemistry*): **Barry M. Goldwater Scholar 2019**
- Rimsha Bhatta (*Graduate Student at UIUC – Materials Science and Engineering*)
- Riley Bassetti (*Graduate Student at Brody School of Medicine – Cell Biology and Anatomy*)
- Noel Bell (*Process Engineer at Masonite*): **McNair Scholar 2019**
- Lauren E. Gonce (*Research and Development Chemist at Resinall Corp*)

Academic Service & Outreach

2023 – present	Serves as a STEM CORE Member
2023 – present	Serves as a Junior Mentor for the AIChE Future Faculty Mentoring Program
2023	Served as a Judge for AIChE 3MT Competition
2023	Polymer Division Meeting at 52nd IUPAC General Assembly, Virtual Attendee
2022	CIRTl Round Table, Invited Panelist – Fall 2022 CIRTl General Meeting
2018 – present	Reviewer Responsibilities, <i>Biomaterials, Chem. Mater., Chem. Rev, J. Am. Chem. Soc., JACS Au, ACS Appl. Mater. Interfaces, ACS Mater. Lett., Adv. Funct. Mater., Adv. Mater. Interfaces, Adv. Mater., Adv. Sci., Mater. Horiz., Nat. Commun., Sci. Adv., Soft Matter, J. Mater. Chem. C</i>
2021	ACS Science Coaches Program, Streamwood High School – Streamwood, IL
2020	Expanding your Horizons: Cornell, Invited Speaker
2018	Supramolecular Analytical Chemistry – Organizer and Chair 256 th ACS National Meeting, August, Boston MA, USA.
2018	Served on Screening Committee for Selection of Dean of College of Arts and Sciences Represented Student Body, The University of Southern Mississippi
2018	President of Graduate Student Senate – University of Southern Mississippi
2018	Judge Region 1: High School Science and Engineering Fair –Southern Mississippi
2017 – present	Local K-12 Demonstrations, Tours, and Lectures, <i>2023 Family STEM Night, Whiteside Elementary School, Streamwood, Purvis, Lanier, Hattiesburg, Sumrall, Laurel, and Hancock High Schools, Homes Community College, Jackson State University, and Longleaf Elementary School</i>