

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

- 2024 **WelchX Retreat Invitee** – Welch, Theme: Chemistry of Life
- 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. 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” *Sci. Adv.* **2024**, *Accepted Article*.
2. 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/adv.202305562
3. 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**, 26, 2301488.
4. **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.
5. **J. Tropp**, D. Meli, J. Rivnay, “Organic Mixed Conductors for Electrochemical Transistors” *Matter.* **2023**, 6, 3132. **–Highlighted Research, Front Cover**
6. **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.
7. **J. Tropp**, “Biomaterial Platforms Offer Capability of Efficacious Male Contraceptives” *MRS Bull.* **2022**, 47, 649.
8. **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.
9. 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.
10. 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.
11. 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.
12. A. R. Benasco, **J. Tropp**, V. Kaphle, Y. Chen, W. Zhao, N. Eedugurala, A. Flood, J. D. Azoulay, “Macrocyclic Induced Doping of Conjugated Polymer Transistors: Toward the Selective and Ultrasensitive Detection of Phosphate in Seawater” *Adv. Electron. Mater.*, **2022**, 7, 2101353.
13. 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.
14. 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.
15. **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.**
16. R. L. Keate, **J. Tropp**, J. Rivnay, “A Collagen-Conducting Polymer Composite with Enhanced Chondrogenic Potential” *Cell Mol. Bioeng.* **2021**, 14, 501-512.
17. 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.
18. 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**

19. **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.
20. 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**
21. 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.
22. **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**
23. 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**.
24. 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**
25. 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.
26. 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:

27. 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**.
28. N. Gill, I. Srivastava, **J. Tropp*** "Rational Design of NIR-II Emitting Conjugated Polymer Derived Nanoparticles for Image-Guided Cancer Interventions" *Adv. Health. Mater.* **2024**, *In Review - Invited*.

Patents and Patent Applications:

29. **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**.
30. **J. Tropp**, J. Rivnay, "Acid Crystallized PEDOT Particles and Composites Thereof" US Patent Serial Number. 63/491,753, **2023**.
31. **J. Tropp**, D. Amato, D. Patton, J. D. Azoulay "Thiol Based Post-Modification of Conjugated Polymers" US Patent Serial Number 11,649,320, **2023**.
32. J. D. Azoulay, **J. Tropp**, E. King "Gold Catalyzed Polymerization Reactions of Unsaturated Substrates" US Patent Serial Number. 11/359,049, **2022**.
33. 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
 Fall 2024 **CHEM 5304 Special Topics: Polymer Chemistry**, Texas Tech University
 Spring 2024 **CHEM 3306 Undergraduate Organic Chemistry II**, 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 (*Medical Student at the University of Florida*)
- 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

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|----------------|---|
| 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> |