

Joshua Tropp, Ph.D.

Assistant Professor, College of Arts & Sciences, Texas Tech University, ESB2-301C

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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 <i>Summa cum laude</i>

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 (<i>One recipient per school</i>) - 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 (<i>One recipient per school</i>) – 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 (<i>Top Grade on Exam</i>) – Departments of Chemistry and Physics

Publications ([Google Scholar Profile](#))

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

1. **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.* **2023**, *Just Accepted*. DOI: 10.26434/chemrxiv-2023-q6bc0
2. **J. Tropp**, D. Meli, J. Rivnay, "Organic Mixed Conductors for Electrochemical Transistors" *Matter.* **2023**, *In Press*. –**Highlighted Research, Front Cover**
3. **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.
4. **J. Tropp**, "Biomaterial Platforms Offer Capability of Efficacious Male Contraceptives" *MRS Bull.* **2022**, *47*, 649.
5. **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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. **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**.
13. R. L. Keate, **J. Tropp**, J. Rivnay, "A Collagen-Conducting Polymer Composite with Enhanced Chondrogenic Potential" *Cell Mol. Bioeng.* **2021**, *14*, 501-512.
14. 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.
15. 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**
16. **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.
17. 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**
18. 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.

19. **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**
20. 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**.
21. 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**
22. 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.
23. 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:

24. R. Keate, **J. Tropp**, R. Wu, A. Petty, E. Hsu, G. Ameer, J. Rivnay, "Decoupling poly(3,4-ethylenedioxythiophene) influence on cell fate from changes in material characteristics" *In Review*. **2023**.
25. 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 PPy/Collagen Constructs for Peripheral Nerve Intrafacing" *ChemRxiv*. **2023**. DOI: 10.26434/chemrxiv-2023-gmd5q
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*. **2023**.
27. R. Wu, X. Ji, Q. Ma, **J. Tropp**, J. Rivnay "Operando X-ray Fluorescence: A Direct Approach to Quantify Ion Composition and Mobility in Organic Mixed Ionic-Electronic Conductors" *In Review*. **2023**.

Patents and Patent Applications:

28. **J. Tropp**, J. Rivnay, "Acid Crystallized PEDOT Particles and Composites Thereof" US Patent Serial Number 63/491,753, **2023**.
29. **J. Tropp**, D. Amato, D. Patton, J. D. Azoulay "Thiol Based Post-Modification of Conjugated Polymers" US Patent Serial Number 11,649,320, **2023**.
30. J. D. Azoulay, **J. Tropp**, E. King "Gold Catalyzed Polymerization Reactions of Unsaturated Substrates" US Patent. 11,359,049, **2022**.
31. J. D. Azoulay, **J. Tropp**, V. Kaphle, A. R. Benasco, A. Flood, "Macrocyclic Embedded Organic Electronic Materials, Composites, and Compositions for Chemical Sensing" US Patent App. 17/519,083, **2022**.
32. **J. Tropp**, J. D. Azoulay "Methods for Detecting Analytes Using Conjugated Polymers and the Inner Filter Effect" US Patent App. 20210293706, **2021**.

Selected Academic Presentations (Contributed to > 50 Presentations)

1. [Invited Talk] "Enabling Novel Organic Mixed Conductors Through Controlled Synthesis and Processing" *15th International Symposium on Functional-Pi Electron Systems*, Raleigh, June **2023**.
2. [Poster] "PEDOT Nanoparticles: A Tool to Enhance 3D Charge Percolation within Conductive Biomaterials" *15th International Symposium on Functional-Pi Electron Systems*, Raleigh, June **2023**.
3. [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**.
4. [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

5. [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

6. [Invited Talk] "PEDOT-NHS a versatile conjugated polyelectrolyte for bioelectronics"
Rising Stars in Soft and Biological Matter Symposium, Virtual, October **2022**.
7. [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

8. [Oral] "Functional conjugated polyelectrolytes: Toward the detection of environmental pollutants in seawater"
American Chemical Society Fall 2022 National Meeting, Chicago, August **2022**.
9. [Poster] "Designing Conjugated Polyelectrolytes for Bioelectronics"
Tosoh Polymer Conference, Hollywood, June **2022**.
10. [Poster] "Molecular Design of Conducting Biomaterial Composites"
American Chemical Society Spring 2022 National Meeting, San Diego, March **2022**.
11. [Oral] "Molecular Design of Conducting Biomaterial Composites"
American Chemical Society Fall 2021 National Meeting, Virtual, August **2021**.
12. [Oral] "Designing Functional Conjugated Materials for Biological Integration"
American Chemical Society Spring 2021 National Meeting, Virtual, April **2021**.
13. [Invited Talk] "Polymer-Based Chemical Sensing Platform for the Identification of Azo Dye Pollutants"
ACS Virtual Postdoc Symposium, Virtual, November **2020**.
14. [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**.
15. [Oral] "Detection and Discrimination of Polycyclic Aromatic Hydrocarbons Using Conjugated Polymers"
American Chemical Society Spring 2020 National Meeting, Philadelphia, PA, March **2020**.
16. [Competition] "Emergent Sensing Technologies for Water Quality Monitoring" *Annual Three-Minute Thesis: Conference of Southern Graduate Schools*, Birmingham, AL, March **2020**.
17. [Competition] "Emergent Sensing Technologies for Water Quality Monitoring" *Annual Three-Minute Thesis: The University of Southern Mississippi*, Hattiesburg, MS, November **2019**.
Awarded Finalist of Physical Sciences and Mathematics & Grand Champion
18. [Oral] "Detection and discrimination of seawater pollutants using conjugated polymers"
Applied Polymer Technology Extension Consortium, Baton Rouge, LA, November **2019**.

Research Experience

- 2020 – present **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*)

Mentoring - 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*)

Mentoring - 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*)
- Lauren E. Gonce (*Research and Development Chemist at Resinall Corp*)

Academic Service & Outreach

- 2023 **Served 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**,
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
- 2021 **ACS Science Coaches Program**, Streamwood High School – Streamwood, IL
- 2020 **Expanding your Horizons: Cornell**, Invited Speaker
- 2018 **Supramolecular Analytical Chemistry** – Organizer and Chair
256th 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**,
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