

SYMONE L. M. ALEXANDER, Ph.D.

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Georgia Institute of Technology, Dept. of Chemical and Biomolecular Engineering
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Skills and Qualifications Highlights:

- Expertise in chemistry, chemical engineering, polymer science and engineering, biophysics, and science communication
- 5+ years of experience teaching and mentoring diverse high school, undergraduate, and graduate students
- Wrote & contributed to numerous successful grants and proposals (3 Fellowships, ACS New Directions Grant, 2 National Lab GUPs)
- Received accolades such as 2018 MIT Rising Star in Chemical Engineering, 2019 ACS PMSE Future Faculty Scholar, 1st Place Covestro Student Lecturer, NSF Graduate Research Fellowship

EDUCATION

Ph.D. Macromolecular Science and Engineering Case Western Reserve University Principal Investigator: Prof. LaShanda Korley	August 2018
B.S. in Chemical Engineering Howard University Magna cum Laude	May 2013

FELLOWSHIPS, AWARDS, & HONORS

10. American Chemical Society (ACS PMSE) Future Faculty Scholar	2019 – 2019
9. 2018 MIT Rising Stars in Chemical Engineering	2018 – 2018
8. 2018 Eckert Postdoctoral Research Fellowship (Georgia Tech ChBE, accepted)	2018 – 2020
7. MIT MLK Visiting Scholar Postdoctoral Research Fellowship (awarded)	2018 – 2020
6. National Science Foundation (NSF) Graduate Research Fellowship	2015 – 2018
5. GRC Carl Storm Underrepresented Minority (CSURM) Fellowship	2017 – 2017
4. 1 st Place – Covestro Student Lecture Award Competition 2016-2017	2017 – 2017
3. Massachusetts Institute of Technology (MIT) Visiting Scholar	2016 – 2016
2. Tau Beta Pi Engineering Honors Society, <i>DC Alpha Chapter</i>	2012 – 2013
1. Legacy Scholarship, <i>Howard University</i>	2009 – 2013

RESEARCH EXPERIENCE

Eckert Postdoctoral Research Fellow Georgia Institute of Technology, <i>Dept. of Chemical and Biomolecular & Engineering</i> Principal Investigator: Prof. Saad Bhamla	2018 – Present
<ul style="list-style-type: none">• Investigating how hierarchical biomaterials are utilized to achieve ultrafast motion	

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- Utilized field research and theoretical physics to reveal web release strategies of slingshot spiders – from biological function to silk mechanics
- Currently utilizing SEM, nanoindentation, and confocal microscopy to investigate the rapid uncoiling of keratin barbules from Sandgrouse feathers
- Fostering international collaboration with the Alliance for a Sustainable Amazon and MaCTec Peru and collaboration with the Smithsonian Institute
- Wrote successfully funded postdoctoral research proposal (Eckert Postdoctoral Research Fellowship)
- Presented research to diverse, interdisciplinary scientific audiences (APS, NSF iPoLS, Polymers GRS)
- Currently mentoring three undergraduate students in ChBE and several graduate students at various institutions

Ph.D. Macromol. Science and Engineering, NSF Graduate Research Fellow
Case Western Reserve University, *Dept. of Macromolecular Science & Engineering*
Principal Investigator: Prof. LaShanda T. J. Korley

2013 – 2018

- Investigated mechanically enhanced multi-stimuli responsive materials with a focus on low molecular weight gels and electrospun nanofibers in polymer composites;
- Developed a research platform for hygromorphic bilayer composites.
- Five first author publications and one third author publication
- Wrote a successfully funded NSF Graduate Research Fellowship Proposal, Contributed to a successful ACS New Directions grant, Wrote two successful general user proposals to Argonne National Laboratory
- Awarded 1st place in the Covestro Student Lecture Competition for excellence in graduate research and oral communication
- Trained and mentored 3 undergraduates and 5 junior graduate students

Visiting Scholar

Summer – 2016

Massachusetts Institute of Technology, *Dept. of Mechanical Engineering*
Principal Investigator: Prof. Mathias Kolle

- Fabricated gradient density electrospun nanofiber meshes and utilized the meshes for proof-of-concept fabrication, and testing of fiber-wrapped light guides.
- Fostered collaboration with the Korley and Kolle research groups that is currently included in a successful grant and intellectual property.

Research Assistant

Spring – Summer 2013

Howard University, *Dept. of Chemical Engineering*
Principal Investigator: Prof. Preethi Chandran

- Conducted an investigation of the formation of DNA/PEI nanoparticles using atomic force microscopy
- Led development of lab research protocols including a written training manual and provided training for incoming students on the AFM.

REU Participant

Summer – 2012

Case Western Reserve University, *Dept. of Macromolecular Science & Engineering*

Principal Investigator: Prof. LaShanda T. J. Korley

Graduate Student: J. Casey Johnson

- Developed a photo-responsive filler for use in EO-EPI composites.
- Chosen as one of two presenters to represent CWRU at the NEO Undergraduate Research Symposium

REU Participant

Summer – 2011

Kent State University, *Dept. of Chemistry*

Principal Investigator: Prof. Robert Twieg

Graduate Student: Randall Breckon

- Synthesized and characterized a new class of liquid crystals with non-traditional meta-substitutions.

PEER-REVIEWED PUBLICATIONS

6. **Symone L. M. Alexander** & LaShanda T. J. Korley, Restricting molecular mobility in polymer nanocomposites with self-assembling low-molecular-weight gel additives, **ACS Appl. Mater. Interfaces**, 2018, 10 (49), 43040–43048
5. **Symone L. M. Alexander** & LaShanda T. J. Korley, Nucleation effects of high molecular weight polymers on low molecular weight gels, **Polymer Journal-NPG**, 2018, 50, 775-786 (*Invited*)
4. M. E. Prévôt, H. Andro, **S. L. M. Alexander**, S. Ustunel, C. Zhu, S. T. Rafferty, M. T. Brannum, L. T. J. Korley, E. J. Freeman, J. A. McDonough, R. J. Clements, and E. Hegmann*, Liquid crystal elastomer foams with elastic properties specifically engineered as biodegradable brain tissue scaffolds, **Soft Matter**, 2018, 14, 354-360
3. **Symone L. M. Alexander**, Shadi Ahmadmehrabi, LaShanda T. J. Korley, Programming shape and tailoring transport: advancing hygromorphic bilayers with aligned nanofibers, **Soft Matter**, 2017, 13, 5589-5596
2. **Symone L. M. Alexander**, L. E. Matolyak, LaShanda T. J. Korley, Intelligent nanofiber composites: Dynamic communication between materials and their environment, **Macromolecular Materials and Engineering**, 2017, 1700133 (Featured on Advanced Science News)
1. **Symone L. M. Alexander** & LaShanda T. J. Korley, Tunable hygromorphism: structural implications of low molecular weight gels and electrospun nanofibers in bilayer composites, **Soft Matter**, 2017, 13, 283-291 (First published 14 July 2016, Featured in Soft Matter Emerging Investigators 2017)

INVITED PRESENTATIONS & CONFERENCE PAPERS

Invited Presentations:

7. **ACS PMSE Future Faculty Symposium** (2019) – Ultrafast motion of slingshot spiders powered by a 3-D elastic web
6. **American Physical Society** (APS March Meeting 2019) – Slingshot Spider: Ultrafast kinematics, biological function and physical models of an extreme arachnid
5. **255th ACS National Meeting and Exposition** – Molecular gel composites: From solution to solid-state reversibility

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4. **NOBCCHE NExM 2017 Graduate Research Lecture** – Tunable Hygromorphism: structural implications of molecular gels and electrospun nanofibers in bilayer composites
3. **Featured Keynote Research Talk** – Hygromorphic Bilayer Composites, 14th Annual Northeast Ohio Undergraduate Research Symposium (NOURS 2017)
2. **Covestro Student Award Lecture** – Tunable Hygromorphism: structural implications of molecular gels and electrospun nanofibers in bilayer composites
1. **NEO Undergraduate Research Symposium** – Development of a Photo-responsive Filler for use in EO-EPI Composites

Conference Papers:

4. **Alexander, S.** (2017) Tunable Hygromorphism: structural implications of molecular gels and electrospun nanofibers in bilayer composites, 253rd ACS National Meeting (**Distinguished Poster Nominee**)
3. **Alexander, S.** (2014); Synthesis, Modeling and Rheological Investigation of Polydiacetylene Gels; National Technical Association Conference
2. **Cook, S.**; Breckon, R.; (2011) Synthesis and Characterization of All Meta and MMP Benzoates: An examination of the boundary conditions of mesogenic activity; NEO Undergraduate Symposium
1. **Cook, S.**; **Chandran, P.** (2014) Squishy DNA Nanoparticles; Biomedical Engineering Society (BMES) Annual Meeting

TEACHING EXPERIENCE

Adjunct Faculty – Morehouse College

2019-Present

Elementary Inorganic Chemistry Lab

- Undergraduate course with 90+ students across 4 sections
- Instructor position where I teach students about the scientific process, laboratory procedures, and how to use experimental techniques to validate fundamental concepts

Additional Courses:

EMAC 355/405 - Polymer Analysis Lab/ Polymer Characterization Lab

2015 – 2018

- EMAC 355:
 - Undergraduate course with 20+ students
 - TA position where I developed and presented lecture content and laboratory materials and training along with assessment of laboratory assignments
 - Taught students fundamental concepts along with analytical tools and how to apply them to solve real-world problems such as how to determine if a material is bullet proof
- EMAC 405
 - Graduate level course with ~5-10 Ph.D. and Masters level students
 - TA position where I developed and presented lecture content and laboratory materials and training along with assessment of laboratory assignments
 - Taught graduate students in depth fundamental concepts and the various applications of analytical techniques.

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- Taught graduate students how to select and apply analytical techniques to their research along with real-world problems

Training and Certification:

- Fundamentals in Teaching and Learning for Postdocs (Georgia Tech)
- Advancing Learning through Evidence-Based STEM Teaching (CIRTL)
- Practicum in Developing Assessments (CIRTL)
- Understanding and Implementing Metacognition in the Classroom
- Equity in STEM for All Genders (CIRTL)
- Graduate Teaching I (Case Western Reserve University)

Additional Experience:

Undergraduate Mentoring:

- Trained and mentored undergraduate students from diverse academic backgrounds in laboratory research and technical writing
- Helped students build confidence, critical thinking, and problem solving skills necessary to conduct research independently
- Resulted in a manuscript with one of my undergraduate mentees as 2nd author

Departmental Shared Facility Supervisor:

- Trained undergraduate, graduate, and post-doctoral students on proper usage of instruments and data interpretation
- Maintained the shared facility for the department, including communicating with the department chair and faculty about best practices and new instruments and techniques to enhance the research facility

PROFESSIONAL APPOINTMENTS, UNIVERSITY SERVICE, & COMMUNITY SERVICE

Professional Appointments

- **Session Presider for ACS PMSE Young Investigators Symposium** 2019 – 2019
- **Chair – Polymers Gordon Research Seminar (2019 Polymers GRS)** 2017 – 2019
- **Social Media Contributor, *The Biophysical Journal*** 2018 – Present
- **Discussion Leader (2017 Polymers GRS)** 2018 – 2017

University Service

- **Postdoctoral Representative for ChBE Board of Directors, Georgia Tech** 2018 – 2018
- **Science and Human Rights Coalition CWRU (Co-founder)** 2016 – 2018
-Served as Treasurer and Director of Community Outreach
- **Graduate Student Senate Representative for Macro. Sci. and Eng., CWRU** 2014 – 2016
-Voted on behalf of graduate students in Macro on university legislation
-Served on the Diekhoff awards committee which selects the top four faculty members nominated for excellence in teaching and mentoring
- **Sister 2 Sister Discussion Lead and Organizer, CWRU** 2013 – 2018

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-Co-hosted annual events to connect women, with a focus on women of color, faculty, administrators, and students by creating a welcoming and informal environment to form valuable academic and professional support systems.

Community Service

- **MaCTec Peru Workshop Leader** 2018 – 2018
-Co-led a workshop on ultrafast motion for elementary school Peruvian girls in Lima, Peru
- **Group Leader – Goodyear STEM Day** 2016 – 2018
-Developed fun polymer related activities for 150+ students in grades K-12
- **Korley Group Outreach Organizer** 2013 – 2018
-Led classroom learning activities at inner city schools designed to get diverse students interested in and excited about science and form lasting connections with educators
- **Sustainability in Polymers Ed. and Research (SPEAR) Founder, CWRU** 2013 – 2013
-Developed academic resources & a website for K-12th grade sustainability education