

Simge Uzun

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Soon-to-be graduate with a PhD in Materials Science and Engineering and several years of experience and internships. A motivated, innovative, problem-solving research professional with a proven track record of success in the development of functional yarns/textiles for wearable smart textile applications. Highly skilled in electrochemistry, rheology, SEM, synchrotron X-ray diffraction, UV-Vis spectroscopy, dynamic light scattering and tensile testing. Goal-oriented, communicative and personable; self-starter and team player, able to adapt quickly, take direction and serve internal and external customers with poise and professionalism.

Areas of Expertise

- Functional Fibers/Yarns
 - Printed Electronics
 - Energy Storage
 - Yarn/Textile Supercapacitors
 - Pressure/Strain Sensors
 - Wet Spinning
 - Antenna
 - Electrospinning
 - Research & Development
 - Team Collaboration
 - Staff Mentorship
 - Staff Instruction
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EDUCATION

Doctor of Philosophy in Materials Science & Engineering | Drexel University, Philadelphia, PA, 2020

Master of Science in Fiber & Polymer Science | Cornell University, Ithaca, NY, 2016

Bachelor of Science in Textile Engineering, Magna Cum Laude | Istanbul Technical University, Istanbul, Turkey, 2014

Erasmus Program Graduate in Mechanical Engineering | Dresden University of Technology, Dresden, Germany, 2012

AWARDS & DISTINCTIONS

- Materials Research Society, Go with the Flow: Electrodes of the Future SciVid Competition – First Place Winner, 2019*
 - Life at the Frontiers of Energy Research Video Contest II, “Future of Energy Storage” – Best Cinematography Award, 2019*
 - Materials Research Society, Science in Video Competition. “Smart Textiles, Future of Fashion” – Second Place, 2018*
 - Materials Research Society, Science in Art Competition, “Coral MXenes,”- First Place Winner, 2018*
 - American Ceramic Society Annual Meeting, Ceramographic Exhibit, “MXene City,” – First Place Winner, 2018*
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EXPERIENCE HIGHLIGHTS

A. J. DREXEL NANOMATERIALS INSTITUTE & CENTER FOR FUNCTIONAL FABRICS, Philadelphia, PA, 2017-Present

Research & Teaching Assistant, Drexel University

Conduct research in the development of functional fibers/yarns by utilizing conductive MXene inks to assess and control physical, chemical, and functional properties of produced fibers/yarns, as well as to design and manufacture MXene-containing textile-based devices. Instruct approximately 35 students in advanced materials laboratory to support research efforts; year-long and month-long mentorship of one undergraduate student and one high school student, respectively.

Key Accomplishments:

- Attracted unsolicited media coverage for the successful development of washable, knittable, conductive MXene-coated cellulose-based yarns for smart textile applications including energy storage, sensors, and electromagnetic interference (EMI) shielding.
- Reported first experimental observation of self-assembled liquid crystalline (LC) phases in aqueous MXene inks without use of LC additives, binders or stabilizing agents and spun pure, free-standing MXene fibers with an electrical conductivity of $7,750 \text{ S cm}^{-1}$.
- Initiated collaboration with high profile organization to embroider MXene-coated yarns for textile production with energy storage, sensing and communication capabilities.

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Page Two of Three

HEWLETT-PACKARD, San Diego, CA, Summer 2019

Engineering Intern, Industrial, Commercial and Enterprise Lab

Developed additive-free aqueous conductive inks for thermal ink-jet printing and demonstrated three possible applications for wearables: micro-supercapacitors, antennas, and capacitive pressure sensors.

Key Accomplishments:

- Launched HP/Drexel collaboration to develop the premiere jettable and conductive aqueous ink formulation devoid of any additives, binders and surfactants; reduced ink production costs by 2 % and the supercapacitor electrode cost by 60 % by eliminating the use of current collectors.
- Honored and recognized as HP Innovator of the Month.

RHEOLOGY, COMPLEX FLUIDS AND SURFACE LABORATORY, Pennsylvania, PA, 2016 - 2017

Research Fellow, Drexel University

Significantly contributed to 7-month research efforts funded by Defense Advanced Research Projects Agency (DARPA) in the development of thermoplastic coating of carbon fibers.

Key Accomplishments:

- Built novel conveying apparatus with ability to disperse short carbon fibers to achieve uniform thermoplastic coating, patent pending.
- Conducted multiple rheology experiments on hydrogels and boger fluids—an elastic fluid with constant viscosity.

TEXTILES NANOTECHNOLOGY LABORATORY & MECHANICS FOR MATERIAL DESIGN, Ithaca, NY, 2014 - 2016

Research Assistant, Cornell University

Produced nonwoven mats and characterized their properties through SEM, XRD, tensile tester, etc. by learning fiber spinning techniques including electrospinning and industrial-sized extruder. Studied in-situ deformation mechanisms of polypropylene and aramid nonwoven mats using in-situ X-ray diffraction and micro-computer tomography (μ CT) imaging during beam time at Cornell High Energy Synchrotron Source (CHESS).

Key Accomplishments:

- Investigated the fiber orientation evolution *via* in-situ XRD and the changes in 3D microstructure of nonwoven materials under deformation using in-situ micro computed tomography imaging at CHESS.

Additional Experience

Intern (Summer 2011) ▪ RWTC Aachen University, Aachen, Germany

Research Assistant (2013 – 2014) ▪ Istanbul Technical University, Istanbul, Turkey

Assistant Fabric Purchase Specialist (February – June 2014) ▪ IPEKYOL, Istanbul, Turkey

Weaving Intern (August 2012) ▪ SANKO Textile ISKO Division, Bursa, Turkey

Fiber Spinning Intern (June 2011) ▪ Orta Anadolu Textile, Kayseri, Turkey

SELECTED PUBLICATIONS

1. **S. Uzun**, S. Seyedin, A. L. Stoltzfus, A. S. Levitt, M. Alhabebe, M. Anayee, C. J. Strobel, J. M. Razal, G. Dion, Y. Gogotsi. "Knittable and Washable Multifunctional MXene-Coated Cellulose Yarns". *Advanced Functional Materials* (2019), 1905015.
2. J. Zhang*, **S. Uzun***, S. Seyedin, P. A. Lynch, B. Akuzum, Z. Wang, S. Qin, M. Alhabebe, C. E. Shuck, W. Lei, W. Yang, X. Wang, G. Dion, J. M. Razal, Y. Gogotsi. "Additive-free MXene Liquid Crystals and Fibers". *ACS Central Science* (2020). *Equal Contribution
3. S. Seyedin, **S. Uzun**, A. S. Levitt, B. Anasori, G. Dion, J. M. Razal, Y. Gogotsi. "MXene Composite and Coaxial Fibers with High Stretchability and Conductivity for Wearable Strain Sensing Textiles". *Advanced Functional Materials* (2020).
4. J. Zhang, N. Kong, **S. Uzun**, A. Levitt, S. Seyedin, P. A. Lynch, S. Qin, M. Han, W. Yang, J. Liu, X. Wang, Y. Gogotsi, J. M. Razal. "Scalable Manufacturing of Freestanding, Strong $Ti_3C_2T_x$ MXene Films with Outstanding Conductivity". *Advanced Materials* (2020). *Just Accepted*
5. L. Li, X. Fu, S. Chen, **S. Uzun**, A. S. Levitt, W. Han, Y. Gogotsi. "Hydrophobic and Stable MXene-polymer Pressure Sensors for Wearable Electronics". *ACS Applied Materials & Interfaces* (2020).
6. A. S. Levitt, D. Hegh, P. Phillips, **S. Uzun**, M. Anayee, J. M. Razal, Y. Gogotsi, G. Dion. "3D Knitted Energy Storage Textiles Using MXene-Coated Yarns". *Materials Today* (2020).
7. B. Akuzum, P. Singh, D. A. Eichfeld, L. Agartan, **S. Uzun**, Y. Gogotsi, E. C. Kumbur. "Percolation Characteristics of Conductive Additives for Capacitive Flowable (Semi-Solid) Electrodes". *ACS Applied Materials & Interfaces* (2020).
8. C. E. Shuck, A. Sarycheva, M. Anayee, A. Levitt, Y. Zhu, **S. Uzun**, V. Balitskiy, V. Zahorodna, O. Gogotsi, Y. Gogotsi. "Scalable Synthesis of $Ti_3C_2T_x$ MXene". *Advanced Engineering Materials* (2020).
9. M. Alhabebe, K. Maleski, T. S. Mathis, A. Sarycheva, C. B. Hatter, **S. Uzun**, A. Levitt, Y. Gogotsi. "Selective Etching of Silicon from Ti_3SiC_2 (MAX) to Obtain 2D Titanium Carbide (MXene)". *Angewandte Chemie*, 130 (2018), 5542-5546.
10. N. Chen, M. K. A. Koker, **S. Uzun**, M. N. Silberstein, "In-situ X-ray Study of the Deformation Mechanisms of Non-woven Polypropylene." *International Journal of Solids and Structures*, 97 (2016), 200-208.

PRESENTATIONS AND POSTERS (*PRESENTER)

1. **S. Uzun***, G. Dion, Y. Gogotsi. "MXene-based Fibers and Yarns for Wearable Smart Textile Applications", University of California San Diego, NanoEngineering Department, San Diego, CA. (Summer 2019). [Invited Talk]
2. **S. Uzun***, G. Dion, Y. Gogotsi, "Printed Energy Storage and Communication Devices Using Aqueous MXene Inks", Hewlett-Packard Labs, Palo Alto, CA. (Summer 2019). [Invited Talk]
3. **S. Uzun***, G. Dion, Y. Gogotsi, "MXene-based Fibers and Fabrics for Wearable Smart Textile Applications", Advanced Technical Talk (ATT), Hewlett-Packard, San Diego, CA. (Summer 2019). [Invited Talk]
4. **S. Uzun***, A. Levitt, M. Alhabebe, G. Dion, Y. Gogotsi. "MXene Coated Cellulose-Based Yarns for Wearable Supercapacitor Applications", Materials Research Society Meeting, Boston, MA. (Fall 2018). [Presentation]
5. **S. Uzun***, A. Levitt, M. Alhabebe, G. Dion, Y. Gogotsi. "MXene Cotton Yarns for Wearable Supercapacitor Applications", Drexel Emerging Graduate Scholars Conference, Philadelphia, PA. (April 2018). [**Drexel's Provost's Award for Best Oral Research Presentation**]
6. **S. Uzun**, A. Levitt*, M. Alhabebe, G. Dion, Y. Gogotsi. "Knittable $Ti_3C_2T_x$ MXene Cotton Yarns for Energy Storage Applications", International Union of Materials Research Societies – International Conference on Electronic Materials, Daejeon, South Korea. (Summer 2018). [Presentation]
7. **S. Uzun***, N. Chen, M. S. Manivannan, M. N. Silberstein, J. P. Hinestroza. "In-situ X-ray Study of the Deformation Mechanisms of Nonwoven Aramids", Fiber Society Conference, Ithaca, NY. (Fall 2016). [Poster]