

Samantha E. Cassel, M.S.

PhD Candidate
Chemical and Biomolecular Engineering
University of Delaware
150 Academy Street, Newark DE 19716

secassel@udel.edu 

linkedin.com/in/samantha-cassel 

@SamanthaCassel 

EDUCATION

PhD Candidate in Chemical Engineering

University of Delaware, Newark DE

Fall 2017 – present

MS in Biomedical Engineering

Drexel University, Philadelphia PA
Accelerated Dual Degree Program

Spring 2017

BS in Biomedical Engineering

Drexel University, Philadelphia PA
Concentration: Biomaterials and Tissue Engineering
Summa Cum Laude

Spring 2017

RESEARCH EXPERIENCE

Graduate Research Assistant

University of Delaware, Department of Chemical and Biomolecular Engineering
Advisor: Prof. April Kloxin

Fall 2017 – present

Development of a dynamic, *in vitro* disease model of pulmonary fibrosis using a synthetic hydrogel platform with multiscale, self-assembling fibrillar structure and dynamic reporters of cell response.

Research Assistant

Drexel University, School of Biomedical Engineering, Science, and Health Systems
Advisors: Prof. Amy Throckmorton & Prof. Kara Spiller

June – August 2017

Design of a dynamic cardiovascular shunt with increasing lumen diameter to improve outcomes of Norwood procedure in patients with single ventricle physiology.

Team Leader

Drexel University, School of Biomedical Engineering, Science, and Health Systems
Advisor: Prof. Amy Throckmorton

Fall 2016 – Spring 2017

Senior Capstone Project: development of a novel fluid off-loading rotary pump for the lymphatic circulation, designed to drive lymph fluid from the thoracic duct into the subclavian vein, unloading fluid congestion and reintroducing it into the cardiovascular system.

RESEARCH SKILLS

Material synthesis and characterization: solid phase peptide synthesis, small molecule synthesis, end-group modification of commercial polymers, click chemistry, ¹H NMR, reverse-phase HPLC, mass spectroscopy (ESI, LC-MS), circular dichroism, UV-Vis spectroscopy, rheology

Cell culture: mammalian culture, viability/metabolic assays, immunostaining, flow cytometry, confocal microscopy, lentiviral production, stable cell line production, bacterial culture, transformations, plasmid purification, gel electrophoresis

Computer: MATLAB, Python, Minitab, ImageJ

TEACHING EXPERIENCE

Teaching Assistantship at University of Delaware [students enrolled]

- CHEG112: Intro to Chemical Engineering [120] Spring 2019
 - Profs. Joshua Enzser and Abraham Lenhoff
- CHEG332: Chemical Engineering Kinetics [70] Fall 2018
 - Profs. April Kloxin and Raul Lobo

Teaching Assistantship at Drexel University [students enrolled]

Under Prof. Amy Throckmorton:

- BMES507: Mathematics for the Biomedical Sciences III [22] Spring 2017
 - BMES506: Mathematics for the Biomedical Sciences II [28] Winter 2017
 - BMES505: Mathematics for the Biomedical Sciences I [31] Fall 2016
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HONORS & AWARDS

- Summa Cum Laude, Drexel University 2017
 - 2nd place poster, Drexel BIOMED Senior Design Showcase 2017
 - Outstanding Peer Mentor Award, Drexel BIOMED 2017
 - Univest Bank and Trust Co. Scholarship 2014-17
 - A.J. Drexel Scholarship 2012-17
 - John Phillip Sousa Award and Scholarship 2012
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PROFESSIONAL EXPERIENCE

Biomaterials R&D Engineering Co-op Fall 2015 – Spring 2016

DePuy Synthes, Bone Graft Substitutes, West Chester PA

- Tested biocompatible polymer-ceramic composites for regenerative orthopedic applications
- Conducted cross-linking, degradation, and mechanical testing studies
- Developed rheological methods for polymer characterization

Quality Engineering Co-op Fall 2014 – Spring 2015

Secant Medical, LLC, Quality Engineering, Perkasie PA

- Developed FMEA documents for textile production processes
- Designed and implemented Test Method Validation protocols
- Analyzed datasets for Process & Operational Qualifications of development products
- Assisted in non-conformance investigations and root-cause analysis

Clinical Research Assistant Fall 2013 – Spring 2014

Thomas Jefferson University, Department of Emergency Medicine, Philadelphia PA

- Conducted screening and informed consent in research subject recruitment
- Revised protocols and regulatory documents for submission to Institutional Review Board
- Developed databases for statistical and retrospective analysis
- Collaborated with research coordinators to troubleshoot and revise recruitment methods

PEER REVIEWED PUBLICATIONS

1. EE Garven, K Govender, **SE Cassel**, N Neavling, J Muscella, K John, R Stevens, K Spiller, and A Throckmorton. "Tunable Modified Blalock-Taussig Blood Shunt for Norwood Procedure Recipients" *transactions on Biomedical Engineering*, **submitted**, 2019
 2. ME Smithmyer, **SE Cassel**, and AM Kloxin. "Bridging 2D and 3D culture: probing impact of extracellular environment on fibroblast activation in layered hydrogels" *AICHE J, Futures Issue*, 2019. DOI: 10.1002/aic.16837
 3. ME Smithmyer, CC Deng, **SE Cassel**, PJ LeValley, BS Sumerlin, and AM Kloxin. "Self healing boronic acid-based hydrogels for 3D co-cultures" *ACS Macro Letters*, **7**, 1105-1110, 2018. DOI: 10.1021/acsmacrolett.8b00462
 4. **SE Cassel**, C Fox, M Sahni, K Chung, R Stevens, and AL Throckmorton. "Implantable roller pump for heart-failure induced lymphedema" *Biomedical Journal of Scientific & Technical Research*, **3**, 2018. DOI: 10.26717/BJSTR.2018.03.000880
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CONFERENCE PRESENTATIONS

1. **SE Cassel**, ME Smithmyer, CC Deng, PJ LeValley, BS Sumerlin, and AM Kloxin. "Co-culture of Lung Fibroblasts and Breast Cancer Cells in Boronic Acid-Based Hydrogels" *Poster presentation at 2019 Annual SFB Meeting; April 3-6, 2019; Seattle, WA*
 2. **SE Cassel**, CS Fox, K Fox, M Sahni, R Dulman, K Chung and A Throckmorton. "Novel Implantable Roller Pump to Treat Heart Failure-Induced Lymphedema" *Poster presentation at 63rd Annual ASAIO Conference; June 21-24, 2017; Chicago, IL*
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OTHER PRESENTATIONS

1. **SE Cassel** and AM Kloxin. "Optimizing use of a temporal reporter as a tool to investigate dynamic changes in cell behavior" *Poster presentation at 2019 IDeAS Symposium; University of Delaware, Newark DE*
 2. **SE Cassel**, ME Smithmyer, CC Deng, PJ LeValley, BS Sumerlin, and AM Kloxin. "Co-culture of Lung Fibroblasts and Breast Cancer Cells in Boronic Acid-Based Hydrogels" *Poster presentation at 2019 Frontier in Chemistry and Biology Interface Symposium (FCBIS); NIH, Bethesda, MD*
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LEADERSHIP EXPERIENCE

University of Delaware:

President, Colburn Club

Fall 2019 – present

- Previous positions: 2nd Year Representative (2018-19), 1st Year Representative (2017-18)
- Student organizer of chemical engineering graduate student recruitment
- Organize and execute various social, academic, and professional development events

Peer Mentor, EmPOWER

Fall 2019 – present

- Serve as a student mentor in a low-barrier peer-support group created to break the stigma associated with mental health and wellness in Graduate School
- Provide support for graduate students by organizing de-stressing events, active listening, assisting with time management, resource allocation, LGBTQ-related issues, and other graduate-related stress-ers

Drexel University:

President & Founder, Dragons for Donation Fall 2015 – Spring 2017

- Student-led coalition to advocate for organ and tissue donation
- Organized and executed 12-15 informational, advocacy, volunteer, and fundraiser events annually, including local registration drives, meal preparation at the Philadelphia Gift of Life Family House, volunteering at the Gift of Life Annual Donor Dash, and advocacy events for National Donate Life Month

Peer Mentor, Drexel BIOMED Fall 2014 – Spring 2017

- Assigned as personal mentor to 3 incoming freshman students each year to assist with transition to the university and to BIOMED
- Served as Teaching Assistant to Freshman University 101 classes
- Student Lead for *Biomed Engineering Design Challenge* at Accepted Students Days
- Served on student panels to answer questions for incoming students and families

Professional Development Committee, Society of Women Engineers 2014 – 2015

Select events include:

- *LinkedIn Literacy Workshop* – in collaboration with Steinbright Career Development Center
- *“SWE Meets SIG” Meet & Greet* – Drexel SWE hosted Susquehanna International Group (SIG) employees who lead Q&A discussion about succeeding in STEM fields

Other positions held: Historian chair (2015), active member (2012-2015)

VOLUNTEERING & SERVICE

Math Tutor, Serivam Girls Academy, New Castle DE Fall 2017 – present

Hospital Volunteer, Thomas Jefferson University Hospital, Philadelphia PA 2014 – 2015