MEGAN E. SCHROEDER, PH.D.

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EDUCATION

University of Colorado, Boulder, Colorado, August 2014- August 2020
Ph.D. in Materials Science and Engineering, Biomaterials emphasis
Thesis: Synthetic Hydrogels to Elucidate Microenvironmental Cues in Mediating the Valvular Interstitial Cell Pro-Calcific Phenotype

University of Missouri, Columbia, Missouri, August 2010- May 2014
B.S. in Bioengineering
Thesis: Multifunctional Polyampholyte Hydrogels with Fouling Resistance and Protein Conjugation Capacity

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher, University of Colorado Boulder, September 2020- current
Department of Chemical and Biological Engineering, Research Advisor: Dr. Kristi Anseth
- Identify role of macrophage-mediated inflammation in the progression of sex-specific aortic valve disease using tailored hydrogel platforms

Graduate Student Researcher, University of Colorado Boulder, August 2014- August 2020
Department of Chemical and Biological Engineering, Research Advisor: Dr. Kristi Anseth
- Investigate mechanobiologic and biochemical effects on fibrotic and calcific phenotype of valvular interstitial cells (VICs) and their subsequent roles in calcific aortic stenosis (CAS) through the use of 3D poly(ethylene glycol) based hydrogels as valve-ECM mimics

Graduate Student Teaching Assistant, University of Colorado Boulder, Fall 2014
Department of Chemical and Biological Engineering, Dr. Joel Kaar
- Prepared and graded assignments and exams

Research Assistant, University of Missouri, June 2014- August 2014
Department of Biological Engineering, Research Advisor: Dr. Sheila Grant
- Tailored ELISA protocol from Bernards lab to assess biofouling on polycaprolactone/soy lecithin electrospun matrix
- Harvested and decellularized porcine diaphragms
- Crosslinked gold nanoparticles to porcine diaphragms to probe potential as a natural biomaterial construct

Undergraduate Researcher, University of Missouri, November 2010- May 2014
Department of Chemical Engineering, Research Advisor: Dr. Matthew Bernards
- Synthesized a homogenously mixed-charged hydrogel from oppositely charged monomers
- Demonstrated the nonfouling properties of the hydrogel through enzyme-linked immunosorbant assay (ELISA) with fibrinogen and lysozyme
- Developed procedures and demonstrated specific protein conjugation to the surface of hydrogel

Research Experience for Undergraduates (REU), Syracuse University, June 2013-August 2013
Department of Biomedical and Chemical Engineering, Syracuse Biomaterials Institute, Research Adviser: Dr. Rebecca Bader

- Encapsulated statin within a polysaccharide micelle to treat peripheral artery disease via targeted drug delivery using vascular smooth muscle cells (VSMCs)

Environmental Intern, Science Applications International Corporation (SAIC), Earth City, MO, June 2011-August 2011

- Assisted the Division Records Coordinator in filing essentials to the Central Records Facility
- Discovered over 2,000 missing coordinates to update database for clientele
- Compiled logbook annotations in a network location to allow employee access

PUBLICATIONS

**Mentee co-authors highlighted*

1. Aguado, B. A., Walker, C. J., Grim, J. C., **Schroeder, M. E**., Batan, D., Vogt, B. J., Gonzalez Rodriguez, A., Schwisow, J. A., Moulton, K. S., Heistad, D. D., Weiss, R. M., Leinwand, L. A., Anseth, K. S. "Genes that escape X chromosome inactivation modulate sex differences in valve myofibroblasts." *Circulation,* submitted.

2. **Schroeder, M.E**., Gonzalez Rodriguez, A., Speckl, K. F.*, Peters, D. K., Walker, C. J., Aguado, B. A., Grim, J. C., Weiss, R. M., Anseth, K. S. "Engineered valve tissue mimics recapitulate sex-specific valvular calcification and osteopontin activity." *Matrix Biology,* submitted.

3. **Schroeder, M. E**., Gonzalez Rodriguez, A., Speckl, K. F.*, Walker, C. J., Midekssa, F. S.*, Grim, J. C., Weiss, R. M., Anseth, K. S. "Degradable PEG hydrogels reveal the role of microenvironmental cues on valvular interstitial cell calcification." *Acta Biomaterialia,* 2020.

4. Gonzalez Rodriguez, A., **Schroeder, M. E**., Grim, J. C., Walker, C. J., Speckl, K. F.*, Weiss, R. M., Anseth, K. S. "TNF-α promotes and exacerbates calcification in heart valve myofibroblast populations." *FASEB,* 2020.

5. Grim, J. C., Aguado, B. A., Vogt, B. L., Batan, D., Andrichik, **Schroeder, M. E.**, Gonzalez Rodriguez, A., Anseth, K. S. "Secreted factors from pro-inflammatory macrophages promote an osteoblast-like phenotype in valvular interstitial cells." *Ateriosclerosis, Thrombosis, and Vascular Biology,* 2020.

6. Ma, H., Macdougall, L. J., Gonzalez Rodriguez, A., **Schroeder, M. E.**, Batan, D., Weiss, R. M., Anseth, K. S. "Calcium Signaling Regulates Valvular Interstitial Cell Alignment and Myofibroblast Activation in Fast-relaxing Boronate Hydrogels." *Macromolecular Biosciences,* 2020.

7. Khang, A., Gonzalez Rodriguez, A., **Schroeder, M. E.**, Sansom, J., Lejeune, E., Anseth, K. S., Sacks, M. S. "Quantifying heart valve interstitial contractile state using highly tunable poly(ethylene glycol) hydrogels." *Acta Biomaterialia,* 2019.

8. **Schroeder, M. E**.+, Gonzalez Rodriguez, A.+, Walker, C. J., Anseth, K.S. "FGF-2 inhibits contractile properties of valvular interstitial cell myofibroblasts encapsulated in 3D MMP-degradable hydrogels." *APL Bioengineering,* 2(4), 2018. +*contributed equally*

9. Mabry, K. M., **Schroeder, M. E**., Payne, S. Z.*; Anseth, K. S. "Three-Dimensional High-Throughput Cell Encapsulation Platform to Study Changes in Cell-Matrix Interactions." *ACS Appl. Mater. Interfaces,* 8(34): 21914-21922, 2016.

10. **Schroeder, M. E.**; Zurick, M. K; McGrath, D. E.; Bernards, M. T. "Multifunctional Polyampholyte Hydrogels with Fouling Resistance and Protein Conjugation Capacity." *Biomacromolecules*, 14(9):3112-3122, 2013.

PRESENTATIONS

Oral (presenter underlined)

1. Schroeder, M. E., Gonzalez Rodriguez, A., Anseth, K. S., "The Role of Osteopontin and Sex-Specific Differences in Valvular Interstitial Cells and Their Response to Biochemical Cues," 2019 Society for Biomaterials Annual Meeting, April 2019, Seattle, WA.
2. Gonzalez Rodriguez, A., Schroeder, M. E., Anseth, K. S., "Tunable 3D hydrogel scaffolds to assess fibroblast contractility during the wound healing response," 2017 Materials Research Society Fall Meeting, November 2017, Boston, MA.
3. Bernards, M., Schroeder, M. E., McGrath, D., and Zurick, K., "Nonfouling and Functionalizable Hydrogels based on Polyampholyte Chemistries," 2013 Society for Biomaterials Annual Meeting, April 2013, Boston, MA.
4. Schroeder M. E., Zurick K., McGrath D., and Bernards, M., "Multifunctional Polyampholyte Hydrogels with Nonfouling and Protein Conjugation Capacity," 2013 American Institute of Chemical Engineers (AIChE) Annual Meeting, November 2013, San Francisco, CA
5. Bernards, M., Schroeder, M. E., and Q. Wang, "Polyampholyte Polymers as a Novel Nonfouling Biomaterial Platform," American Institute of Chemical Engineers (AIChE) Annual Meeting, November 2013, San Francisco, CA.

Posters (presenter underlined)

1. Schroeder, M. E., Gonzalez Rodriguez, A., Anseth, K. S., "The Role of Osteopontin and Sex-Specific Differences in Valvular Interstitial Cells and Their Response to Biochemical Cues," 2019 Society for Biomaterials Annual Meeting, April 2019, Seattle, WA.
2. Gonzalez Rodriguez, A., Schroeder, M. E., Anseth, K.S., "Fibrotic and calcific roles of TNF-α on Valvular Interstitial Cells Encapsulated within 3D MMP-degradable hydrogels", 2019 Society for Biomaterials Annual Meeting, April 2019, Seattle, WA.
3. Khang, A., Gonzalez Rodriguez, A., Schroeder, M. E., Anseth, K. S., Sacks, M. "Studying Valve Interstitial Cell Mechanobiology Using Poly(ethylene Glycol) Hydrogels," 2018 Society for Biomaterials Annual Meeting, April 2018, Atlanta, GA.
4. Schroeder, M. E., Gonzalez Rodriguez, A., Anseth, K. S. "Three-dimensional synthetic matrix environments to probe cytokine role in VIC myofibroblast activation and wound healing response," 2017 Tissue Engineering and Regenerative Medicine Americas Annual Conference and Exhibition, December 2017, Charlotte, NC.
5. Schroeder, M. E., Mabry, K. M., Payne, S. Z., Anseth, K. S. "High-throughput platform to investigate effects of dynamic presentation of mechanical and biochemical matrix cues on VIC phenotype," World Biomaterials Congress, May 2016, Montreal, Canada.
6. Schroeder, M. E., Bernards, M. "Multifunctional Polyampholyte Hydrogels with Nonfouling and Protein Conjugation Capacity," Spring Undergraduate Research and Creative Achievements Forum, April 2012, Columbia, MO.
7. Schroeder, M. E., Bernards, M. "Investigating Polymer Based Biomaterials for Improved Medical Implant Performance," Undergraduate Research Day at the Capitol, March 2013, Jefferson City, MO.

8. Schroeder, M. E., Bernards, M. "Investigating Polymer Based Biomaterials for Improved Medical Implant Performance," Missouri Life Sciences Week, April 2013, Columbia, MO.
9. Schroeder, M. E., Bernards, M. "Investigating Polymer Based Biomaterials for Improved Medical Implant Performance," Spring Undergraduate Research and Creative Achievements Forum, April 2013, Columbia, MO.
10. Schroeder, M. E., Wilson, D., Gahtan, V., Bader, R. "Statin Delivery by Targeted, Micellar Nanocarriers to Treat Peripheral Artery Disease," Research Experience for Undergraduates (REU) Commencement Poster Session, August 2013, Syracuse, NY.
11. Schroeder, M. E., Wilson, D., Gahtan, V., Bader, R. "Statin Delivery by Targeted, Micellar Nanocarriers to Treat Peripheral Artery Disease," Syracuse University Undergraduate Symposium, August 2013, Syracuse, NY.
12. Schroeder, M. E., Wilson, D., Gahtan, V., Bader, R. "Statin Delivery by Targeted, Micellar Nanocarriers to Treat Peripheral Artery Disease," Beyond the Columns Poster Session, September 2013, Columbia, MO
13. Schroeder, M. E., Bernards, M. "Investigating Polymer Based Biomaterials for Improved Medical Implant Performance," Spring Undergraduate Research and Creative Achievements Forum, April 2014, Columbia, MO.

MENTORING

- **Kelly Speckl**, B.S. Candidate, University of Colorado Boulder, Biological Sciences Initiative, 2019- 2020
  - *Project: Characterization of calcific and fibrotic phenotypes in VICs within a 3D hydrogel network*
- **Firaol Midekssa**, B.S. Candidate, University of Rochester, New York, Young Scholars Summer Research Program, 2019
  - *Project: Studying the Calcification of Valvular Interstitial Cells in 3D Hydrogels in the Presence of Osteogenic Initiating Factors*
- **Daren Kraft**, B.S. Candidate, University of Colorado Boulder, 2018
- **Samuel Payne**, B.S., University of Colorado Boulder, 2014-2017
- **Rylee Schauer**, B.S., University of Colorado Boulder, 2015-2016
- **Laura Flemming**, Fairview High School, 2015-2016
  - *Project: The Effect of Pro-inflammatory Cytokines on Valvular Interstitial Cell Activation Through Culture on Synthetic PEG Hydrogels*

OUTREACH

- Cool Girls Science and Art Club, Guest lecturer, April 2018
- Science Fair Judging, High Peaks Elementary School, November 2017
- Science Fair Project Ideas Open House, Hands on Help, High Peaks Elementary School October 2017
- Girl Scouts lab tour and science demos, November 2017
- Expand Your Horizons Conference, Women in Science and Engineering (WiSE), University of Colorado Boulder, February 2017

ACTIVITES

- Boulder Food Rescue Volunteer, January 2018- present
- Alpha Epsilon Honors Society, 2013- May 2014
- Engineers Without Borders, 2010- May 2014
  - Technical Team Project Co-Chair, 2011-2012
  - Travel Team Member for Spring 2013 Implementation Trip in Honduras
- Mizzou Women Mentoring Women Program, 2013- May 2014

AWARDS

- National Science Foundation Graduate Research Fellow, Fall 2014
- Outstanding Undergraduate Research Accomplishments Award, University of Missouri Columbia, Spring 2014
- Mizzou Award for Academic Distinction, University of Missouri Columbia, Spring 2014
- Office of Undergraduate Research Student Travel Award, University of Missouri, Columbia, Fall 2013
- Mizzou Advantage Student Travel Award, University of Missouri, Columbia, Fall 2013
- First place poster at Missouri Life Sciences Week Poster Session in Bioengineering and Informatics Category, Undergraduate Division, University of Missouri, Columbia, April 19, 2013
- Freshman Recognition Award, American Institute of Chemical Engineers (AIChE), University of Missouri Columbia, Spring 2011