

Mark W. Tibbitt, Ph.D. Candidate  
Department of Chemical and Biological Engineering  
University of Colorado  
[mark.tibbitt@colorado.edu](mailto:mark.tibbitt@colorado.edu)

## Education

Ph.D. (in progress), Chemical and Biological Engineering, Univ. of Colorado-Boulder Aug. 2012  
GPA: 4.0

B.A., Integrated Science and Mathematics, Northwestern University, June 2007  
GPA: 3.86 *Magna Cum Laude*, Phi Beta Kappa, Pi Mu Epsilon

## Research Experience

*Graduate Researcher*, University of Colorado at Boulder, Anseth Group, Jan. 2008 - current

- “Characterization, synthesis, and application of photodegradable hydrogel networks”
- Model the degradation kinetics and profiles of photolytically degradable poly(ethylene glycol) networks
- Apply this scaffold to cellular systems to study dynamic cell-extracellular matrix interactions
- Fabricate photodegradable microparticles for spatiotemporally controlled delivery of trophic factors in cell culture
- Development of microfluidic devices for the selective capture and release of circulating tumor cells

*Lab Rotation*, University of Colorado at Boulder, Hrenya Group, Fall 2007

- “Towards a proper discretization of a continuous distribution of particle sizes for theoretical simulations”
- Developed MATLAB codes to analyze the efficacy of employing a direct quadrature method of moments to discretize normal and log-normal distributions in a previously derived kinetic theory

*Undergraduate Researcher*, Northwestern University, Spring 2006 - Fall 2007

- Investigated the efficacy of one-stage and two-stage methane biodigesters for fuel production
- Quantified the microbial populations of biodigesters and related this to the reactors efficacy

*Hollings Summer Intern*, Hollings Marine Laboratory, Summer 2006

- Collected field samples in coastal tidal creeks for the Oceans and Human Health project
- Analyzed the water samples for fecal contamination and analyzed the data using ANOVA and ANCOVA
- Planned and organized the collection and processing of field samples

*Undergraduate and NASA Researcher*, Northwestern University, Spring 2004 – Fall 2006

- “Computational simulation of the dynamics of small N-body systems”
- Researched the field of N-body simulations and wrote code to simulate the gravitational dynamics of small N-body systems
- Applied findings to the process of planetary formation, stabilization and evolution about a central massive star as well as stellar evolution about an intermediate mass black hole

## **Teaching and Mentoring Experience**

*Lead Teaching Assistant*, University of Colorado at Boulder, Fall 2010 – current

This position serves as the liaison between the Graduate Teaching Program and the Department of Chemical and Biological Engineering. Organize incoming and advanced teaching assistants, train TA's for their positions, and organize and put on several workshops on teaching engineering education in and out of the classroom.

*Teaching Assistant*, University of Colorado at Boulder, Fall 2009

Intermediate Chemical Engineering Thermodynamics: Held multiple recitation sessions each week, gave multiple lectures, and helped write test/homework questions for this graduate course  
FCQ: 5.5/6.0, **Outstanding Graduate Teaching Award**

*Teaching Assistant*, University of Colorado at Boulder, Spring 2008

Creative Technology: Held weekly office hours, assisted students in writing various papers on the topics of biotechnology, alternative energy, and nanotechnology

*Teaching Assistant*, Northwestern University, Fall 2004 – Spring 2006

ISP 101-1,2,3: Helped form the curriculum for this introduction to computing class, ran lab sessions to aid students with project in HTML, C++, Perl, etc., held office hours to offer further assistance in the theory of computing and with projects outside of lab time

*Research Mentor*, University of Colorado at Boulder

Kristen Feaver, Senior Thesis Student, Fall 2010 - current

Lisa Sawicki, NSF-REU, University of Florida (undergraduate), Summer 2010

Emily Maginnis, Undergraduate researcher, Fall 2009 - current

Bruce Han, Undergraduate researcher, Summer 2009 - current

Donna Kuntzler, Undergraduate researcher, Fall 2009

Kayla Culver, NSF-REU, John's Hopkins (undergraduate), Summer 2009

Kiran Dyamenahalli, MSTP Rotation student, Summer 2009

Cara Rahon, Rotation student, Spring 2009

Caroline Szczepanski, NSF REU, Lafayette College (undergraduate), Summer 2008

## **Honors and Awards**

Teets Family Endowed Fellowship 2010-current

Best Should Teach Silver Award 2010

Outstanding Graduate Teaching Award 2010

NIH Molecular Biophysics Training Grant, University of Colorado 2009-current

DoEd GAANN Fellowship, University of Colorado 2008-2010

Dean's Outstanding Merit Fellowship, University of Colorado 2007-2008

Inductee of Phi Beta Kappa and Pi Mu Epsilon 2007

NOAA Ernest F. Hollings Scholarship, NOAA 2006-2007

NASA Summer Research Fellowship, NASA 2005

Dean's List, Northwestern University 2003-2007

Robert C. Byrd Scholarship, United States Department of Education 2003-2007

Semi-Finalist, United States Physics Team 2003

## Service Activities

*High School Honors Institute*, University of Colorado – Boulder, 2008-2010

*StARS Planning Committee*, University of Colorado – Boulder, 2008-9

*Volunteer*, Boulder Homeless Shelter, 2007-2009

*Science and Math Tutor*, La finca del nino, Honduras, 2007-2008

*Engineers for a Sustainable World*, Northwestern University, 2007

*Evanston High School Tutor*, Evanston, IL 2005-2007

*Special Olympics Assistant*, 2003-2007

## Publications

Kloxin AM, **MW Tibbitt**, and KS Anseth, “Photoresponsive hydrogels for cell culture,” *Macromolecules*, **In Preparation**

**Tibbitt MW**, AM Kloxin, and KS Anseth, “Modeling photodegradation in thick polymer networks for the predictable control of network evolution,” *Macromolecules*, **In Preparation**

Kloxin AM, **MW Tibbitt**, and KS Anseth, “Synthesis of photodegradable hydrogels as dynamically tunable materials for 2D and 3D cell culture,” *Nature Protocols*, **5** (2010) 1867-1887

**Tibbitt MW**, AM Kloxin, KU Dyamenahalli, and KS Anseth, “Controlled two-photon photodegradation of PEG hydrogels to study and manipulate subcellular interactions on soft materials,” *Soft Matter*, **6** (2010) 5100-5108.

Kloxin AM, **MW Tibbitt**, AM Kasko, J Fairbairn, and KS Anseth, “Controlled Degradation of Photolabile PEG-based Hydrogels,” *Advanced Materials*, **22** (2010) 61-66.

**Tibbitt MW** and KS Anseth, “Hydrogels as extracellular matrix mimics for 3D cell culture,” *Biotechnology and Bioengineering*, **103** (2009) 655-663.

Aimetti AA, **MW Tibbitt**, and KS Anseth, “Human neutrophil elastase responsive delivery from poly(ethylene glycol) hydrogels,” *Biomacromolecules*, **10** (2009) 1484-1489.

## Conference Presentations

**Tibbitt MW**, Kloxin AM, Dyamenahalli KU, and Anseth KS, “Control of synthetic ECM context to direct cell morphology and cell adhesion in 2D and 3D”, oral presentation at the Annual Meeting of AIChE, November, 2010, Salt Lake City, UT

**Tibbitt MW**, Kloxin AM, Dyamenahalli KU, and Anseth KS, “Spatiotemporal control of cell-ECM interactions with photoactive PEG-based hydrogels”, poster presentation at Gordon Research Conference: Signal Transduction in Engineered Extracellular Matrices, June, 2010, Biddeford, ME

**Tibbitt MW**, Kloxin AM, and Anseth KS, “Photodegradable hydrogels to investigate the effect of ECM mechanics on cell function,” poster presentation at CalTech Soft Materials Workshop, February, 2010, Pasadena, CA

**Tibbitt MW**, Kloxin AM, Dyamenahalli KU, and Anseth KS, “Photodegradable hydrogels to investigate the effect of network structure on encapsulated cell function,” oral presentation at MRS Fall Meeting, December, 2009, Boston, MA

**Tibbitt MW**, Kloxin AM, and Anseth KS, “Photodegradable hydrogels to investigate the effect of network structure on encapsulated cell function,” poster presentation at Photopolymerization Fundamentals Conference, June, 2009, Breckenridge, CO

**Tibbitt MW**, Kloxin AM, and Anseth KS, “Spatial patterning of structural properties in a photodegradable PEG-based hydrogel for cell culture,” oral presentation at SFB Annual Meeting, April, 2009, San Antonio, TX

**Tibbitt MW**, GT DiDonato, and AF Holland, “Oceans and Human Health: Tracking point source contaminants in tidal creeks,” presented at NOAA Hollings Intern Conference, August 2006, Silver Spring, MD

**Tibbitt MW**, JM Fregeau, and FA Rasio, “Small N-body simulations and extrasolar planetary system stability,” presented at NASA Fellows Conference, August 2005, Evanston, IL