

Joel Coffel

University of Iowa, Department of Chemical & Biochemical Engineering, Iowa City, Iowa
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Education

Doctor of Philosophy, University of Iowa, Iowa City, Iowa

Chemical and Biochemical Engineering

Expected completion date: August 2016

Thesis title: "Implementation and Modeling of *in situ* Magnetic Hyperthermia"

Bachelor of Science, University of Missouri, Columbia, Missouri

Chemical Engineering

Graduated May 2011, *cum laude* and Honors Scholar

Professional Experience

Fall 2011 to present

Graduate Research Assistant, University of Iowa, Chemical & Biochemical Engineering

Developed magnetic nanoparticle coatings to remotely heat infected medical device implants

Investigated heat transfer through biological tissue mimics for hyperthermia studies

Built computational models of eroding biodegradable polymers for pulsatile drug delivery

Fall 2009 to Spring 2011

Undergraduate Researcher, University of Missouri, Columbia

Developed patterning techniques for specific protein adsorption onto non-fouling surfaces

Summer 2011

Summer Internship, Eagle Picher Technologies, Joplin, Missouri

Studied colloidal properties of slurries used in the production of battery electrodes

Summer 2008 to Summer 2009

Contracted with ASRC Management Services at the Columbia Environmental Research Center at the U.S. Geological Survey, Columbia, Missouri

Conducted weekly biochemical assays for analyzing thiamine levels in Great Lake fish species

Honors & Awards

Department of Chemical & Biochemical Engineering Kammermeyer Research Award, 2016

Graduate College Summer Fellowship, 2016

Department of Chemical & Biochemical Engineering Vetter Service Award, Spring 2014

Kammermeyer Graduate Fellowship, Fall 2011

Omega Chi Epsilon, Chemical Engineering Honorary, University of Missouri, inducted Spring 2010

College of Engineering Dean's Honor Roll, University of Missouri, Fall 2007 to Spring 2011

Chemical Engineering Development Scholarship, University of Missouri, 2008 to 2009

Loofbourrow Educational Trust Scholarship, 2007 to 2011

Teaching Experience

Fall, 2014

Teaching Assistant, University of Iowa, Transport Phenomena I

Led discussion sections and graded homework for 15 graduate students

Fall, 2013

Teaching Assistant, University of Iowa, Process Dynamics and Control in Design

Prepared lectures for a weekly discussion section and supervised three lab sections; graded homework and lab reports for 36 undergraduate seniors

Fall, 2011

Teaching Assistant, University of Iowa, Engineering Problem Solving I

Supervised lab section and graded homework and lab reports for 25-30 undergraduate freshman

Synergistic Activities

Tutored 15-25 middle school students, weekly, in math and science as part of the Multi-Ethnic Engineering and Sciences Association (MESA) tutoring program, University of Iowa, Spring 2012

Mentored six undergraduate researchers in the Nuxoll Research Group, Summer 2012 to present:

Iowa Center for Research by Undergraduates (ICRU) program (two students)

NSF-REU Program in Nanoscience and Nanotechnology (three students)

Mentored three high school students in the Nuxoll Research Group as part of Kirkwood Community College's Workplace Learning Connection internship program Fall 2012 to Summer 2014

Director of Outreach, Mizzou Engineering Student Council (MESOC), University of Missouri, Spring 2010 to Spring 2011. Planned and organized MESOC's Engineering High School Weekend; a two day event which invites 30-40 prospective high school students to learn about engineering and college life

Publications

- (4) Ricker, E., J. Coffel, and E. Nuxoll, "In situ Mitigation of Bacterial Biofilms Using Magnetic Composite Coatings." 2016. In preparation.
- (3) J. Coffel, S. Gandhi and E. Nuxoll, "Unified Polymer Erosion Model for Pulsatile Drug Delivery." *J. Membrane Sci.*, 2016. DOI:10.1016/j.memsci.2016.03.055
- (2) J. Coffel and E. Nuxoll, "Poly(vinyl alcohol) Tissue Phantoms as a Robust *in vivo* Model for Heat Transfer." *Int. J. Polym. Mater.*, 2016. DOI: 10.1080/00914037.2016.1171222
- (1) J. Coffel and E. Nuxoll, "Magnetic Nanoparticle / Polymer Composites for Medical Implant Infection Control." *J. Mater. Chem. B*, 2015, 3: pp7538-7545

Presentations and Posters (as presenter only)

- (13) J. Coffel and E. Nuxoll “A Unified Polymer Erosion Model for Pulsatile Drug Delivery.” poster at the Research Open House, University of Iowa, College of Engineering, 2016
- (12) J. Coffel “How to Kill a Biofilm: A Chemical Engineer’s Prospective.” Coe College Science Talk Series, Cedar Rapids, Iowa, 2016.
- (11) J. Coffel “Wirelessly Heating Magnetic Coatings Towards Mitigating Infections on Medical Implants.” 18th Annual Jakobsen Memorial Graduate Conference, University of Iowa, 2016
- (10) J. Coffel and E. Nuxoll, “Wireless, Thermal Deactivation of Medical Device Infections using an Iron Oxide Nanoparticle / Polymer Coating.” presentation at the AIChE National Meeting, Salt Lake City, 2015
- (9) J. Coffel and E. Nuxoll, “Poly(vinyl alcohol) tissue phantoms for robust modeling of in vitro thermal transport.” presentation at the AIChE National Meeting, Salt Lake City, 2015
- (8) J. Coffel and E. Nuxoll, “Unified Polymer Erosion Model for Pulsatile Drug Delivery.” presentation at the Department of Chemical & Biochemical Engineering Fall Seminar, University of Iowa, 2015
- (7) J. Coffel and E. Nuxoll, “Remote heating of magnetite composites for hyperthermic treatment of infections on implanted surfaces.” poster at the Research Open House, University of Iowa, College of Engineering, 2015
- (6) J. Coffel and E. Nuxoll, “Computational and Experimental Modeling of Hyperthermia in Physiological Systems.” presentation at the AIChE National Meeting, Atlanta, 2014
- (5) J. Coffel and E. Nuxoll, “Controlled, Wireless Heating of Iron Oxide Nanoparticle Composites.” presentation at the AIChE National Meeting, Atlanta, 2014
- (4) J. Coffel and E. Nuxoll, “To Kill a Biofilm.” presentation at the Department of Chemical & Biochemical Engineering Fall Seminar, University of Iowa, 2014
- (3) J. Coffel and E. Nuxoll, “Thermal Modeling of Hyperthermia in Physiological Mimics for Wireless Control of Infections on Implanted Medical Devices.” poster at the Research Open House, University of Iowa, College of Engineering, 2014
- (2) J. Coffel and E. Nuxoll, “Thermal Modeling of Wirelessly Heated Tissue Mimics.” presentation at the AIChE National Meeting, San Francisco, 2013
- (1) J. Coffel and M. Bernards, “Conjugating Proteins using a nonfouling, carboxybetaine Surface.” posters at the 2010 and 2011 Undergraduate Research and Creative Achievements Forum and the 2010 and 2011 Life Sciences Week Poster Session, University of Missouri

Related Professional Skills

Object drawing and modeling using AutoCAD

3-D printing including editing gcode for print jobs

Web site development using html and CSS; example work: www.nuxoll.net

FORTTRAN programming language

Computational fluid dynamics modeling using ANSYS ICEM-CFD and Fluent

PID feedback control loop integration with lab equipment using LabVIEW software

Microscopy techniques using scanning electron microscopes (SEM)

Crystallography analysis on powdered samples using an x-ray diffractometer (pXRD)

Elemental analysis using inductively coupled plasma optical emission spectrometry (ICP-OES)

Professional Society Memberships

American Institute of Chemical Engineers

Controlled Release Society