

US Citizen

Zachary T Berent

berent2@illinois.edu
773-251-8053
405 S. Orchard
Urbana, IL 61801

EDUCATION

University of Illinois at Urbana-Champaign

Mechanical Engineering, Ph.D.

May 2020

Advisor: Amy J. Wagoner Johnson

GPA: 3.88/4.00

Minor: College Teaching

Minor Coursework: Changing College Curriculum, College Teaching, The College Student, Research Methods in the Learning Sciences, Engineering Teaching & Leadership

Mechanical Engineering, M.S.

May 2016

Advisor: Amy J. Wagoner Johnson

Thesis: Proliferation and morphology of pre-osteoblast cells on 25 – 1000 micron diameter patterned features on polyacrylamide hydrogels

Certificates: Graduate Teacher | Teacher Scholar

Engineering Mechanics, B.S.

May 2013

Minors: Bioengineering | Mathematics

GPA: 3.61/4.00

TEACHING EXPERIENCE

Department of Mechanical Science & Engineering | UIUC

Spring 2014 – Present

Summary of courses taught: ENG 333 Creativity Innovation & Vision, ME 330 Engineering Materials, ME 470 Senior Design, ME 482 Experimental Tissue Mechanics, TAM 335 Introductory Fluid Mechanics, TAM 412 Intermediate Dynamics

Graduate Teaching Fellow TAM 412 Intermediate Dynamics

1 semester

- Instruct theory and practical applications of Newtonian and Lagrangian mechanics for 40 junior to graduate students

Graduate Teaching Fellow TAM 335 Introductory Fluid Mechanics

1 semester

- Instruct theory and practical applications of fluid mechanics for 40 junior level students
- Integrate active learning exercises into lecture

Lab Instructor ME 482 Experimental Tissue Mechanics

4 semesters

- Instruct students in pre-lab lectures and lab activities that use biological and mechanical protocols
- Develop and evaluate pre-lab lecture, lab, lab report, and homework materials and revise future labs based on results
- Improve laboratory experiments to increase student hands-on research experiences

Head Lab Instructor TAM 335 Introductory Fluid Mechanics

6 semesters

- Instruct fluid mechanics laboratory to demonstrate theoretical principles to students
- Train new laboratory instructors
- Teach theory of fluid mechanics in the lecture sections during instructor absences.

Lab Instructor ME 330 Engineering Materials

2 semesters

- Instruct engineering materials laboratory to demonstrate theoretical principles to students
- Train new laboratory instructors

Teaching Assistant ME 470 Senior Design

1 semester

- Mentor and evaluate student teams in the research, development, execution, and data analysis of projects from companies or research institutions

College of Engineering | UIUC

Fall 2016

Co-Instructor ENG 333 Creativity, Innovation, & Vision

1 semester

- Mentor and evaluate intercollegiate teams in a service-based project learning course to create an innovative product

ADMINISTRATION EXPERIENCE

Department of Mechanical Science & Engineering | UIUC

December 2016 – Present

Graduate Student Adviser for Undergraduate Affairs

- Redesigning the Engineering Mechanics Secondary Field curriculum to better serve the needs of students
- Evaluate prerequisite and corequisite knowledge for core and elective coursework
- Advise Engineering Mechanics and Mechanical Engineering students on courses and career options

Berent – CV

- Articulate courses from other universities for UIUC credit
- Assist in determination of teaching assignments and course offerings for each semester

RESEARCH EXPERIENCE

Applied Biomaterials and Biomechanics Laboratory | UIUC

July 2013 – Present

Graduate Research Assistant

- Optimizing osteogenic differentiation through control of cell geometry, cell density, and stiffness in pre-osteoblast cells using a novel microcontact printing method on hydrogels
- Programming a simulation of pre-osteoblast cell proliferation and osteogenic differentiation on micro-islands
- Modeled capillary rise and forces in mineral scaffolds to increase cell growth
- *Published, J. Biomech Eng.* Performed and analyzed cell traction force measurements to evaluate the different cell adhesion mechanisms in undifferentiated and differentiated cells
- Mentor two undergraduate research assistants with independent projects related to the research above

Human Dynamics and Controls Lab | UIUC

September 2010 – August 2013

Undergraduate Research Assistant

- *In prep, J. Appl. Biomech.* Formulated and analyzed a 6-condition experiment testing muscle fatigue and injury recovery using a custom-built orthosis, which will enhance rehabilitation procedures
- Evaluated a set of actuators for efficient performance in powered orthosis

INDUSTRY EXPERIENCE

Gamma Technologies Inc. | Westmont, IL

Summer 2012

Student Engineer

- Designed 15 features using mathematical models to expand user library for use in vehicle systems analysis
- Improved 46 user interface, processing, and post-processing features to enhance user experience with software

FELLOWSHIPS

ASME Graduate Teaching Fellowship (American Society of Mechanical Engineers) – 2018-2019 & 2019-2020

MechSE Summer Teaching Fellowship (Dept. Mechanical Science & Engineering) – 2017

AWARDS

Excellence in Undergraduate Teaching (University of Illinois at Urbana-Champaign) – 2018

MechSE ME TA Excellence Award (Dept. Mechanical Science & Engineering) – 2017

List of Teachers Ranked as Outstanding (Top 10%, Center for Innovation in Teaching & Learning) – 11 semesters

List of Teachers Ranked as Excellent (Top 30%, Center for Innovation in Teaching & Learning) – 3 semesters

National Science Foundation Graduate Research Fellowship Program Honorable Mention – 2013

Bioengineering John C. & Elizabeth J. Chato Award (Dept. Mechanical Science & Engineering) – 2013

Women's Resources Center Emerging Leader Award – 2013

PUBLICATIONS

Sivaguru M, Kabir MM, Gartia R, Biggs, D, Sivaguru B, Sivaguru A, **Berent ZT**, Wagoner Johnson AJ, Fried G, Liu G, Sadayappan S, Toussaint K. Enhancing Resolution and Contrast in Second-Harmonic Generation Microscopy Using an Advanced Maximum Likelihood Estimation Restoration Method. 2017;10069:1-8. doi:10.1117/12.2256534.

Poellmann MJ, Estrada JB, Boudou T, **Berent ZT**, Franck C, Wagoner Johnson AJ. Differences in Morphology and Traction Generation of Cell Lines Representing Different Stages of Osteogenesis. *J Biomech Eng.* 2015;137(12):124503. doi:10.1115/1.4031848.

PRESENTATIONS

Berent ZT, Alidoost, K. Tackling Common Issues in Engineering Lab Courses. Fall 2017 Graduate Academy for College Teaching; August 2017; Urbana, IL.

Berent ZT, Alidoost, K. Mechanical Engineering TA Overview. Spring 2017 Graduate Academy for College Teaching; January 2017; Urbana, IL.

Berent ZT. Treat Yo Self! Self Care in College Teaching. Fall 2016 Graduate Academy for College Teaching; August 2016; Urbana, IL.

Berent – CV

Berent ZT, Diberadino LA, Hsiao-Wecksler ET. .Examination of Neuromuscular Compensation Strategies During Recovery from Injury. 2013 GEM4 BioNanotech.

CURRENT SERVICE HIGHLIGHTS

College of Engineering Diversity Committee, *Graduate Representative*
Graduate College Executive Committee, *Graduate Representative*

Aug 2017 – Present
Aug 2017 – Present

HISTORY OF SERVICE

Professional Societies: American Society of Mechanical Engineers | Tau Beta Pi Engineering Honor Society | Society for Experimental Mechanics

Education & Campus Advancement: Graduate College Executive Committee | Department of Mechanical Science & Engineering Undergraduate Programs Committee | Department of Mechanical Science & Engineering Student Society Committee | Students Advising on Graduate Education (SAGE) | Engineering Graduate Student Advisory Committee (EGSAC) | Graduate Student Research & Academic Integrity Committee | MechSE Academic Integrity Committee | Faculty Summer Institute Steering Committee | Graduate Teacher Program | Teacher Scholar Program

Diversity & Inclusion Programs: Out at Illinois | Chancellor and Provost Committee for LGBTQ Concerns | College of Engineering Advisory Committee on Diversity and Inclusion | oSTEM | Engineering Graduate Student Advisory Committee Diversity Committee | Intensive English Institute | College of Engineering Advisory Committee on Diversity and Inclusion

Mentoring & Outreach: Summer Undergraduate Research Fellowship (SURF) | Illinois Researchers in partnership with K-12 Science Educators (I-RISE) | Mentoring Undergraduates in Science and Engineering (MUSE)

Community Service Engagement: Rosecrance Emergency Crisis Intervention | Rape Advocacy, Counseling, & Education Services, Emergency Crisis Intervention | March of Dimes | Sexual Assault Awareness Month Committee | Domestic Violence Awareness Month Committee | National Eating Disorder Week Committee | Crisis Nursery | Illini Art Therapy Association