

ELIZABETH J. ORWIN

EDUCATION

- 2000 **University of Minnesota**, Minneapolis, MN
Ph.D. in Biomedical Engineering, minor Mechanical Engineering
Thesis: An Engineered Collagen Sponge Matrix as an In Vitro Model for
Corneal Wound Healing. Advisor: Dr. Allison Hubel
- 1998 **University of Minnesota**, Minneapolis, MN
M.S. in Biomedical Engineering, minor in Mechanical Engineering
Thesis: Culture of Human Corneal Cells on an Engineered Collagen Matrix
- 1995 **Harvey Mudd College**, Claremont, CA
Bachelor of Science in Engineering (with Honors)

ADMINISTRATIVE APPOINTMENTS

- 2020-current **Harvey Mudd College, Claremont, CA**
Co-Chair, College Core Curriculum Implementation Committee
- 2018-current **Harvey Mudd College, Claremont, CA**
Member
- 2018-current **Harvey Mudd College, Claremont, CA**
Chair, Department of Engineering
- 2005-current **Harvey Mudd College, Claremont, CA**
Director, Engman Fellowship Program
- 2012-2014 **Harvey Mudd College, Claremont, CA**
Associate Dean for Research and Experiential Learning
- 2011-2014 **Harvey Mudd College, Claremont, CA**
Faculty Executive Committee

ACADEMIC

Adjunct Professor

Responsibilities included teaching a course in engineering design, advising a masters student and assisting in the setup of a student section of the Society of Women Engineers.

WORK EXPERIENCE

2000-2001

Gel-Del Technologies, St. Paul, MN

Technical Biological Engineer

Project involved investigation of a novel protein matrix for wound healing applications. Responsible for cell culture work, quality control studies, developing and giving pitches to angel investors, and development of a marketable product.

1996-2001

Science Museum of Minnesota, St. Paul, MN

Instructor, Biomedical Engineering Camp, Bioneers Camp, Camp-In Program

Taught classes to children aged 8-14 in various subjects including bones, nervous system, vision, kidney function, biomaterials, genetics, nutrition and engineering structures. Developed curriculum for all courses taught and wrote design projects for group work.

LEADERSHIP PROGRAMS AND PROFESSIONAL DEVELOPMENT

- Worked with our advancement team to raise funds to support curricular redesign and other programs in support of our strategic initiatives. We have raised a total of \$3.7M under my leadership for department programming.
- Worked with our advancement team to identify equipment and tooling and to raise funds for a college makerspace facility. I have been involved in raising \$1.1M to date for this project.
- Led the Department through a successful ABET accreditation in 2015 and continue to work with faculty on the development of best assessment practices.
- Led the Department Chairs Committee in the data gathering and writing of a document describing faculty workload and the impact of college growth and curricular revision, which I presented to the Board of Trustees to help us better plan for new opportunities in the future.
- Working with the Director of Institutional Research to develop new processes for collecting feedback on the program from students, which we are submitting to the American Association of Colleges and Universities annual meeting in 2021.
- Developing an Engineering Leadership Program with a steering committee. This involves creating a leadership competency model, assembling a leadership advisory board, and managing the steering committee as they develop new curriculum. It also involves working on creating space in the curriculum for this new program.
- Developing a Prototyping Mindset program for the department that is focused on: (1) prototyping your future self for students, (2) prototyping curricular innovation processes, and (3) prototyping a culture of equity and inclusion for everyone. We have submitted an NSF INCLUDES grant

- Represented

study is to characterize the ability of rabbit corneal epithelial cells to attach to and migrate over a corneal onlay made from a novel biomaterial. These *in vitro* tests will provide some insight into the cytocompatibility of this material and aid in the selection of material parameters to advance to animal studies.

Wound Healing Characteristics of HemCon Bandages
Summer 2005 – Summer 2006

Viejo, CA), HemCon, Inc. (Portland, OR), Refractec, Inc. (Bloomington, MN), Oregon Medical Laser Center (Portland, OR), Synedgen (Claremont, CA), Tissue Genesis (Honolulu, HI), and most, recently Optics Medical (Aliso Viejo, CA) . Details available upon request.

BOOK PUBLICATIONS

Dym, Little, and Orwin. Engineering Design: A Project Based Introduction, 4th edition, 2013.
Dym, Little, Orwin and Spjut. Engineering Design: A Project Based Introduction, 3rd edition, 2008.

JOURNAL PUBLICATIONS

*HMC student

Travis Beckman*, Deval Gupta*, Nathaniel Miller*, Robyn Low*, Sophie Parks*, Elissa Leonard*, Taylor Derby, Lina Chuy Hy, Marta K. Bechtel, Elizabeth J. Orwin. Effect of Electromagnetic Stimulation on Wound Healing in Corneal Keratocytes. Preparation for submission, the Annals of Biomedical Engineering, Spring 2020.

Russell E. Thompson*, Liana C. Boraas*, Miranda Sowder*, Marta K. Bechtel, Elizabeth J. Orwin. Three Dimensional Culture Environment Induces Partial Recovery of the Native Corneal Cell Phenotype from a Subcultured Population. *Tissue Eng Part A*. 19(13-14): 1564-1572, 2013.

Elissa Leonard*, Vincent Pai*, Phillip Amberg*, Jens Gardner*, and Elizabeth J Orwin. Design and Validation of a Corneal Bioreactor System. *Biotechnology and Bioengineering*. 109(12): 3189-3198, 2012.

Donna Phu*, Lindsay S. Wray*, Robert V. Warren*, Richard C. Haskell, and Elizabeth J. Orwin. Effect of Substrate Composition and Alignment on Corneal Cell Phenotype. *Tissue Eng Part A*. 17(5):799-807, 2011.

Donna Phu* and Elizabeth Orwin. Characterizing the Effects of Aligned Collagen Fibers and Ascorbic Acid Derivatives on Behavior of Rabbit Corneal Fibroblasts. *Proceedings of the IEEE EMBS Annual Meeting*, Sept. 2009.

Wray L* and Orwin EJ. Recreating the Microenvironment of the Native Cornea for Tissue Engineering Applications. *Tissue Eng Part A*. 15(7):1463-72, 2009.

Shah A*, Brugnano J*, Sun S*, Vase A*, Orwin E. The Development of a Tissue-Engineered Cornea. *En6sy22(i)Krf 19d3 Enw -31.473C.935(n)w 0o43 i033018 T(5)000 0108 50Jt 0109 ()T0*

- Orwin E. J. and Bennett, R.J. "Trials and Tribulations of a Freshman Design Course." *ASEE annual conference*, Montreal, Quebec, June 2002.
- Hubel, A. and Orwin, E. J. "Migration of Corneal Epithelium on a Collagen Sponge In Vitro and In Vivo." *Trans Am Soc Mech Eng*, 2001. BED-vol50: p351-352.
- Orwin, E.J. and Hubel, A. "In Vitro Culture Characteristics of Corneal Epithelial, Endothelial and Keratocytes in a Native Collagen Matrix." *Tissue Engineering*, 6(4): 307-319, 2000.

PATENTS a- Vra (na)1.0.159 -5 (e l)12.9 (er2 ()JTJ*TJ 0 T,3 (g)-5 .0.159 (u)-.10eff4 (eb)15 (na)1.0.159 5.8 (. -3.6 (xas5 (1-0.6 (r7)7.3 a

PROFESSIONAL AFFILIATIONS

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Presentation Days Committee, the Teaching and Learning Committee (Chair 2004-05), and the HMC 50th Anniversary Committee.

- Served on various Engineering Department Committees including the Infrastructure Committee (Chair, 2011-14), the Graduate School Workshop, and the Awards Committee.
- Served on numerous search committees at the college and in the department, including the Dean of Faculty search for an external dean in 2006.

SELECTED OUTREACH ACTIVITIES

- Panelist, “Women in STEM: Navigating Industry and Academia,” Harvey Mudd College, April 2019 and February 2020.
- Graduate Women in Science podcast, “Confidence is Key”, Spring 2020.
- Profiled on Engineer Girl “I’m an Engineer” series.
- “Leadership in Academia” talk to University of Washington Advancing the Next Generation of Leaders in Engineering program, March 2019.

COMMUNITY SERVICE

- Girl Scouts of the USA, Troop leader to two troops (2008-2020)
- First Lego League Mentor 2015-16, 2016-17
- Peppertree Elementary Science Fair Committee Chair 2013-2015; member 2016
- Harvey Mudd College Alumni Board of Governors, 2018-present

HONORS AND AWARDS

- ACE Fellow, American Council on Education, 2019-20
- 2017 Orange County Engineering Council Distinguished Educator Award
- 2017 Orange County Engineering Council President’s Award
- Barbara Stokes Dewey Assistant Professorship, Fall 2004-Fall 2007
- NSF Research Training Grant Recipient, 1996 to 1999
- Biomedical Engineering Society Spring Poster Symposium Award Winner
Best Poster - Tissue Engineering Category, 1999
Best Overall Poster, 1998
- Associated Students of Harvey Mudd College President, 1994-95