

Erica M. Comber

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EDUCATION

Fall 2017- Present	Carnegie Mellon University (CMU), Pittsburgh, PA PhD Candidate in Biomedical Engineering	GPA: 3.93/4.0
Fall 2013- Spring 2017	University of Delaware (UD), Newark, DE Bachelor of Science in Biomedical Engineering, Honors Degree with Distinction	Major GPA: 3.744/4.0

GRADUATE RESEARCH – Carnegie Mellon University

Fall 2017- Present	PhD candidate in the labs of Dr. Keith Cook (Cardiopulmonary Eng) & Dr. Adam Feinberg (Regen. Biomat.) Focus area: Tissue engineering gas exchange channels for a biomimetic respiratory assistance device.
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EDUCATION RESEARCH: Teaching experience – Carnegie Mellon University

Fall 2018- Present	College of Engineering BME Senior Design Teaching Assistant Mentoring/project management of 25 undergraduate and masters students/year working on medical devices <i>Involvement with Bayer Radiology, Medtronic, and UPMC Children's Hospital of Pittsburgh.</i>
Fall 2018 – Present	Research with Dr. Conrad Zapanta (BME teaching professor) & Dr. Wayne Chung (Product design) Focus area: Engineering and industrial design subteams for a multi-disciplinary BME design course
Fall 2017 - Present	CMU's Future Faculty Program – Eberly Center for Teaching Excellence & Educational Innovation Program participants attend seminars, receive lecture feedback, create a syllabus and teaching philosophy

UNDERGRADUATE RESEARCH – University of Delaware

Spring 2015- Spring 2017	Dr. Jason Gleghorn Lab (Cell to tissue Eng.) Developed 3D cell culture models of the embryonic vascular system in collagen hydrogels. Senior Thesis: Studied how O ₂ concentrations affect embryonic mouse lung morphogenesis.
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PUBLICATIONS | Full length papers or conference proceedings

- Roberts KG, Umei N, Shin S, Wu K, Lai A, **Comber M**, **Skooq J**, Ichiba S, Jiang S, Chopra GK, Bacchetta MD, Cook KE. In Vivo Testing of a Lightweight, Destination Therapy, Ambulatory ECMO System Incorporating and Extracorporeal Ventricular Assist Device for Support of Chronic Lung Diseases. Military Health System Research Symposium (MHSRS). 2020 (abstract submitted).
- Comber EM**, Melanie A Loppnow, Hudson AR, Raeker-Jordan EA, Roberts KG, Chung WC, Zapanta CM. Engineering and Industrial Design Subteams for a Multi-Disciplinary Biomedical Engineering Design Course. ASEE 2020 Annual Conference, Montréal, Québec, Canada June 20-24, 2020 (work-in-progress publication).
- Comber EM**, Palchesko RN, NG Wai Hoe, Ren X, Cook KE. De novo lung biofabrication: clinical need, construction methods, and design strategy. *Translational Research*. (2019).
- Shirazi J, Morgan JT, **Comber EM**, Eschenburg C, Gleghorn JP. Fabrication of centimeter-scale and geometrically arbitrary vascular networks using in vitro self-assembly. *Biomaterials*. (2018).
- Shirazi J, Morgan JT, **Comber EM**, Eschenburg C, Gleghorn JP. Generation and morphological quantification of large scale, three-dimensional, self-assembled vascular networks. *MethodsX*. (2018).

CONFERENCE PODIUM AND POSTER PRESENTATIONS

- Podium presentation *and* poster at McGowan Retreat 2020; session: Pulmonary Injury Repair, Regen. and Transplantation
Comber E., Palchesko R., Ren X., Feinberg A., Cook K. De Novo Lung Biofabrication: Clinical Need, Design

Strategy, and Novel Construction Methods. McGowan Institute of Regenerative Medicine Scientific Retreat, Oglebay Resort, WV. March 9-10, 2020.

Poster presented at Biomaterials Day – Society of Biomaterials:

Comber E., Palchesko R., Ren X., Feinberg A., Cook K. Collagen I fabrication methods for a biomimetic, respiratory support organ. Biomaterials Day, Cleveland, OH. Oct. 26, 2019.

Poster presented at Carnegie Mellon Forum on Biomedical Engineering:

Comber EM, Palchesko R., Ren X., Feinberg A Cook K. Extracellular matrix fabrication method for a biomimetic respiratory support organ. Carnegie Mellon Forum on Biomedical Engineering, Pittsburgh, PA. Sept 19-20, 2019.

Poster presented at American Society of Transplantation Conference: Cutting Edge of Transplantation (AST):

Ukita R, Wu K, Lai A, Naito N, **Comber E**, Bouloubassis K, Tipograf Y, Skoog D, Umei N, Cooke A, Wilbs J, Heinis C, Jiang S, Bacchetta M, Cook K. Progress Toward Artificial Lung Destination Therapy. American Society of Transplantation, Pheonix, AZ, Feb 21-23, 2019

Poster presented at the American Society for Cell Biology (ASCB):

Shirazi J, Morgan JT, **Comber EM**, Gleghorn JP. The physical microenvironment influences plexus self-assembly in a 3D in vitro model of vasculogenesis. American Society for Cell Biology Conference, Philadelphia, PA, Dec 2-6, 2017

Best Overall Poster Award – 2015 Mid Atlantic Biomedical Engineering Graduate School Fair:

Comber EM, Morgan JT, Gleghorn JP. Generating Self-Assembled In-Vitro Endothelial Cell Networks. Mid Atlantic Biomedical Engineering Grad Fair, University of Delaware, Newark DE, Nov 14, 2015

Coauthor of SB3C Biomechanics, Bioengineering and Biotransport Conference Abstract:

Morgan JT, Shirazi J, **Comber EM**, Sariano PA, Gleghorn JP. Biophysical regulation of in vitro self-assembly for millimeter Scale Vascular Networks. Summer Biomechanics, Bioengineering, and Biotransport Conference, National Harbor, MD, June 29-July 2, 2016

PROJECT MANAGEMENT

Fall 2018- Spring 2020	Medtronic Senior Design Project Management 2 years oversight of 3 Medtronic-sponsored groups Worked with undergraduate students on a spinal simulator (2 years) and improvement to patient guided surgery system (1 year) alongside Jerald Redmond and Mark Grizzard.
Fall 2018- Spring 2019	Mentorship of Undergraduate Senior Thesis – Leslie Chen (<i>successfully defended</i>) - <i>C.M.U., Pittsburgh PA</i> Thesis title: Design of device to test induced mechanical strain on pulmonary epithelial cells.
Fall 2016- Spring 2017	Meat Impaction Removal Surgical Tool (<i>Project lead</i>) - <i>Nemours/A.I. DuPont Hospital -Wilmington, DE</i> Created a more efficient tool for removing an esophageal meat bolus during a flexible endoscopy procedure National Science Foundation I-Corps Sites Participant
Spring 2017	Modified Kayak for Muscular Dystrophy Patient (<i>Project lead</i>) - <i>Assistive Medical Technologies Club (AMT)</i> Worked with physical therapists to make a kayak with a patient-specific seat support and oar system.
Fall 2016	Modified Walker for Muscular Sclerosis Patient (<i>Project lead</i>) - <i>Assistive Medical Technologies Club (AMT)</i> Added telescoping wheels, designed a break, and raised the seat while maintaining collapsibility
Spring 2015-	Weight Monitoring Device for Congestive Heart Failure Patients - <i>Meerkat Health</i> Designed an affordable scale to track daily weight changes in CHF patients to prevent re-hospitalization.

CLINICAL EXPERIENCE

Winter 2017	Thomas Jefferson University Hospital – Rothman Institute of Orthopedics – Philadelphia, PA Shadowed Dr. Vaccaro (Pres. of Rothman Inst) during spine surgery to identify med device needs.
Summer 2014- Spring 2016	Abington Memorial Hospital - Emergency Department - Abington, PA Shadowed a physician to observe patient care and team dynamics in a clinical setting

Winter 2016 **Union Hospital - Cardiology Department - Elkton, MD**
Assisted electrocardiogram and echocardiogram technicians during patient procedures.

LEADERSHIP

Fall 2018-
Spring 2020 **CMU Women in Biomedical Engineering - President**
Co-founder of a group of Biomedical Engineers at CMU to prepare the next generation of female scientists through educational seminars and to enhance a sense of community through social events.

Fall 2018-
Spring 2019 **Graduate Biomedical Engineering Society President – Carnegie Mellon University – Pittsburgh, PA**
Mentoring 4 groups of undergraduate and masters students working on medical-based design projects sponsored by various companies and university grants

Spring 2014-
Spring 2017 **Assistive Medical Technologies Club (AMT) – member, President year of 2016**
Provided assistive medical technologies to members of the local community with mobility disabilities
President (2016) –
Led club meetings, managed design projects, and raised funds by communicating with both corporate and nonprofit donors.
Family Coordinator (2015)
Scheduled meetings with device recipients and the project teams.

Fall 2014-
Present **Alpha Omega Epsilon Sorority (ΑΩΣ) – engineering and technical science sorority**
Vice President (Fall 2016-Spring 2017)
Oversaw committees planning professional, social, and service events.

Spring 2014-
Spring 2015 **Blue Hen Leadership Program**
Leadership training program: <https://studentcentral.udel.edu/organization/bhlp>

SKILLSET

Programs: Microsoft Office, Solid Works, Matlab, Mathematica, JMP, ImageJ, Imaris

Benchtop: mammalian cell culture embryonic mouse lung, kidney dissections western blotting
bacteria cell culture protein quantification (DC Assays) aseptic techniques

Microscopy: scanning confocal microscopy, two-photon microscopy, optical coherence tomography

HONORS AND AWARDS

May 2020 Outstanding Graduate Teaching Award for Fall 2019 – Spring 2020 | CMU BME Department

April 2020 Mara H. Wasburn Early Engineering Educator Grant | American Society of Eng. Education, WIED

2020-2023 **National Science Foundation Graduate Research Fellowship Program (NSF GRFP)**

April 2019 Graduate Student Association Departmental Appreciation Award

2013-2019 Dean’s List every semester

May 2017 Biomedical Engineering Chairperson’s Award (*Chairperson: Dr. Dawn Elliott*)

April 2017 Brad and Jen Bono Award in Entrepreneurship

Feb 2017 First Step Entrepreneurship Grant Recipient

Dec 2017 Senior Design Biomedical Engineering Chairperson Award (1 out of 43 teams)

May 2016 Biomedical Engineering Department Distinguished Junior Award

June 2016 Delaware INBRE 2016 Summer Scholar

June 2015 U.D. 2015 Summer Scholar Grant Recipient

SERVICE

Spring 2018 U.S.A. National Science and Engineering Festival – *Washington, DC*
3-day long exhibition of NSF funded science for the public.

Spring 2015 Yspaniola Learning Center - *Batey Libertad, Dominican Republic*
Worked in a Spanish learning center in Batey Libertad to improve Spanish literacy.

Spring 2014

Urban Tree Connection- *Philadelphia, PA*

Converted an abandoned lot into an urban farm to provide access to healthy food and employment