

Christopher John Bettinger

cbetting@andrew.cmu.edu
<http://biomicrosystems.net>

Mailing Address: 5000 Forbes Ave
Wean Hall 4315
Carnegie Mellon University
Pittsburgh, PA 15213

Office: (412) 268-7677
Fax: (412) 268-7596

EDUCATION

Massachusetts Institute of Technology
Ph.D. in Materials Science and Engineering, (2008)

Massachusetts Institute of Technology
M.Eng. in Biomedical Engineering, (2004)

Massachusetts Institute of Technology
S.B. in Chemical Engineering, (2003)

AWARDS and HONORS

Huck Distinguished Lecture, Pennsylvania State University (2022)
National Institutes of Health – Trailblazer Award (2022)
College of Fellows, American Institute of Medical and Biological Engineering (2020)
Philbrook Prize in Engineering – CMU Materials Science & Engineering (2018)
Materials Research Society – Meeting Co-Chair (2017)
Journal of Materials Chemistry Lectureship (2016)
Early Career Professorship – Carnegie Mellon School of Engineering (2015)
DARPA Young Faculty Award (2014)
George Tallman Ladd Research Award – Carnegie Mellon School of Engineering (2014)
Gordon Research Conference on Biomaterials – Junior Faculty Poster Award (2013)
National Academy of Sciences – Award for Initiatives in Materials Science Research (2012)
Pittsburgh City Council – “Christopher Bettinger Day” in Pittsburgh PA (Feb 14 2012)
Beckman Young Investigator Program – Finalist (2012)
American Heart Association – AHA Scientist Development Grant (2012)
Technology Review TR35 – Young Innovator Award (2011)
Frontiers of Engineering – Invited Member – National Academy of Engineering (2011)
American Chemical Society AkzoNobel Award – Outstanding Graduate Research in Polymer Chemistry (2009)
IUPAC Prize for Young Chemists (2009)
Wake Forest Institute for Regenerative Medicine – Young Investigator Award (2009)
Quadrant International Award for Polymer Research – Finalist (2009)
NIH Ruth L. Kirschstein Postdoctoral Fellowship (2008-2010)
MIT Materials Science and Engineering – Outstanding PhD Thesis Research Award (2008)
Kavli Fellow – National Academy of Sciences (2008-2009)
MIT \$100K Entrepreneurship Finalist (2007)
Charles Stark Draper Graduate Fellowship (2004–2008)
Mallinckrodt Undergraduate Fellowship (1999-2003)
Biological Process Engineering Center Research Fellowship (2002)
MIT Division of Biomedical Engineering Research Fellowship (2001)
Harvard-MIT HST Biomedical Research Fellowship (2000)
University of North Texas Dean’s List (1999)
Stanford University Book Award (1998)
University of North Texas Summer Research Fellowship (1998)

APPOINTMENTS AND TRAINING

Defense Advanced Research Projects Agency (DARPA)

Biological Technologies Office (BTO) (2022–present)

Carnegie Mellon University

Professor (2019–present)

Department of Biomedical Engineering

Department of Materials Science and Engineering

Associate Professor (2015–2019)

Department of Biomedical Engineering

Department of Materials Science and Engineering

Assistant Professor (2010–2014)

Department of Biomedical Engineering

Department of Materials Science and Engineering

École Polytechnique Fédérale de Lausanne (Swiss Federal Institute of Technology Lausanne)

Visiting Professor (2019–2020)

Department of Electrical and Electronic Engineering

Department of Microengineering

Linköping University

Visiting Professor (2022)

Laboratory of Organic Electronics

Stanford University

Post-doctoral Fellow (2008–2010)

Department of Chemical Engineering

Ruth Kirschstein NIH NSRA Fellowship

Advisor: Zhenan Bao

Massachusetts Institute of Technology

Graduate Research Assistant (2003–2008)

Department of Materials Science and Engineering

Charles Stark Draper Fellowship

Advisor: Robert Langer

INDUSTRY & CONSULTING EXPERIENCE

Expert Witness

Bio-materials and Bio-interfaces related to SARS-CoV2 adsorption (2021–2022)

Wiggin & Dana LLP

Medical Device Design and Failure Analysis (2019–2020)

Medical Device and Medical Materials; IP Infringement (2016–2017)

Williams and Connolly, LLP

Texas Instruments, Inc.

Semiconductor Research and Development Process Engineer (2001–2002)

Research and Development Fabrication Facility, Dallas TX

TEACHING

Introduction to Biomedical Engineering

Redesigned introductory course in biomedical engineering designed for freshmen.
Carnegie Mellon University, Pittsburgh PA

Engineering Biomaterials

Redesigned an undergraduate course in the Departments of Biomedical Engineering and Materials Science that studies fundamentals of biomaterials interactions including thermodynamics, statistical mechanics, cell behavior, and tissue interactions.
Carnegie Mellon University, Pittsburgh PA

Polymeric Biomaterials

Created a new graduate course in the Departments of Biomedical Engineering and Materials Science that explores the design, synthesis, and characterization of synthetic polymeric materials for biomedical applications.
Carnegie Mellon University, Pittsburgh PA

Virtual Intellectual Property Laboratory (VIPlab)

Designed a new course component in the Departments of Biomedical Engineering and Materials Science that interfaces with “Synthetic Polymer Networks”. The VIPlab introduces students to intellectual property strategy in the context of designing new polymeric materials. The VIPlab allows students to learn about licensing, prior art, claims strategy, and the like in a mildly competitive group activity. This activity operates in a virtual IP landscape that is free of the restrictions of complex and overbearing real world IP literature.

Carnegie Mellon University, Pittsburgh PA

Teaching Performance

<u>Course Title</u>	<u>Semester</u>	<u># Students</u>	<u>Course Score¹</u>	<u>Instructor Score²</u>
Polymeric Biomaterials [Virtual]	S2022	30	4.74	4.80
Engineering Biomaterials [Virtual]	F2021	28	4.48	4.57
Polymeric Biomaterials [Virtual]	S2021	24	4.60	4.65
Engineering Biomaterials [Virtual]	F2020	25	4.36	4.30
Polymeric Biomaterials	S2019	23	4.63	4.72
Engineering Biomaterials	F2018	47	4.56	4.67
Polymeric Biomaterials	S2018	23	4.60	4.66
Engineering Biomaterials	F2017	47	4.22	4.29
Molecular & Microscale Biomaterials	S2017	17	4.33	4.46
Engineering Biomaterials	F2016	51	4.30	4.49
Molecular & Microscale Biomaterials	S2016	30	4.30	4.41
Engineering Biomaterials	F2015	47	3.81	4.07
Molecular & Microscale Biomaterials	S2015	25	4.86	4.72
Engineering Biomaterials	F2014	41	3.87	3.84
Introduction to Biomedical Engineering	S2014	82	3.97	3.53
Engineering Biomaterials	F2013	53	4.26	4.29
Introduction to Biomedical Engineering	S2013	55	3.34	3.36
Introduction to Biomaterials	F2012	37	4.20	4.25
Molecular & Microscale Biomaterials	S2012	21	3.80	4.13
Introduction to Biomaterials	F2011	39	4.17	4.21
Molecular & Microscale Biomaterials	F2010	15	4.27	4.45

^{1,2}Faculty course evaluations of course¹ and instructor² as submitted by students out of 5.0

SCIENTIFIC ORGANIZATIONS AND ACTIVITIES

Scientific Societies

Gordon Research Conference

- Discussion Leader, Bioelectronics (2023)
- Discussion Leader, Silk proteins and the Transition to Biotechnologies (2023)
- Session Chair, Biointerface Science – Tuscany, Italy (2014)

National Academies of Science & Engineering

- Frontiers of Science & Engineering – Rio de Janeiro, Brazil (2014)
 - Session Chair – Bioengineering and Public Health
- Frontiers of Engineering Education – Irvine, CA (2013)
- Frontiers of Engineering – Mountain View, CA (2011)
- Frontiers of Science – Kunming, China (2009)
- Frontiers of Science – Irvine, CA (2008)

Materials Research Society (2004–)

- MRS-Kavli Workshop Chair on Brain-Machine Interfaces (Spring 2019)
- Meeting Co-Chair (Spring 2017)
- Member, MRS Bulletin Editorial Board (2016–)
- Chair, MRS Bio-staging Task Force (2017–2020)
- Facilitator, Science Communication Workshop (2016)
- Symposium Organizer, Stretchable Electronics (2015)
- Symposium Organizer, Organic Bio-Electronics (2014)
- Symposium Organizer, Biomolecular Electronics (2014)
- Chair, News Editorial Board (2011–2015)
- Symposium Organizer, Biomaterials-based Electronics (2012)
- European MRS (2011–)

Biomedical Engineering Society (2009–)

- Session Chair, Biomaterials for Vascular Applications (2011)
- Session Chair, Drug Delivery (2011)

Northeast Bioengineering Conference (NEBEC)

- Session Chair, Biomaterials (2014)

Society for Biomaterials (2009–)

- Program Chair, Proteins and Cells at Interfaces (2013–)
- Founding Faculty Advisor – Carnegie Mellon SFB Chapter (2017–)

Tissue Engineering and Regenerative Medicine Society (2008–)

- Session Chair, Microfabrication and Printing (2011)

Metals, Minerals, and Materials Society (2007–)

Congressional Visit Day (Mar 2007)

American Chemical Society (2005–)

- Member, Polymeric Materials: Science and Engineering Division (2012–)

Peer Review Activities

National Institutes of Health Review Panels

2022/01 ZRG1 BST-U (80) S

- Exploratory Research for Technology Development (R21 - Clinical Trial Not Allowed)
- Special Emphasis Panel/Scientific Review Group

2021 ZRG1 ETTN-A (13)

- Small Business: Neuroscience Assays, Diagnostics, Instrumentation and Interventions

2021-05 BNVT

- Bioengineering of Neuroscience, Vision and Low Vision Technologies Study Section

2020/01 ZEB1 OSR-E (J1) S

- Mentored Career Development (K) and Conference (R13) Award Application Review

2018/05 ZEB1 OSR-E (M1) S

- Mentored Career Development (K) and Conference (R13) Award Application Review

ZNS1 SRB E (06) Recording and Modulation in the Human CNS

- RFA-NS-15-006 Next-Generation Devices for Recording and Modulation in the Human CNS (UH2/UH3)
- RFA-NS-15-008 Clinical Studies to Advance Next-Generation Invasive Devices for Recording and Modulation in the Human Central Nervous System (UH3)

ZNS1 SRB-E (10) BRAIN Review Meeting

- RFA-NS-16-009 Next-Generation Invasive Devices for Recording and Modulation in the Human Central Nervous System (UG3/UH3)
 - RFA-NS-16-0010 Clinical Studies to Advance Next-Generation Invasive Devices for Recording and Modulation in the Human Central Nervous System (UH3)
 - RFA-NS-16-0011 Next-Generation Invasive Devices for Recording and Modulation in the Human Central Nervous System (U44)
- 2022/01 ZRG1 BST-U (80) S
- Special Emphasis Panel

National Science Foundation

Chair, Biomanufacturing Workshop (2013)
 Review Panel Member
 DMR (CAREER 2011; MRSEC 2015)
 CBET (Ad hoc reviewer)

NASA

80HQTR18NOA01-19NIAC-A1 Space Technology Research, Development, Demonstration, and Infusion-2018 (SpaceTech-REDDI-2018)

Army Research Office

Bioelectronics Program

National Academy

Research Associate Partnership (2011–2015)

North Carolina Biotech Center

Health Innovation Challenge (UK)

Carnegie Mellon Service Activities

CMU School of Engineering

Strategic Planning Committee (Jan 2014)

CMU Department of Biomedical Engineering

Lead Organizer, Seminar Series (2010–2013)
 Graduate Admissions Committee (2010–2014)
 Graduate Seminar Committee Chair (2011–2013)
 Master's Degree Advising Committee (2013–)
 Department Head Search Committee (2018–2019)
 Graduate Curriculum Committee (2020–)

CMU Department of Materials Science

Materials Characterization Facility – Steering Committee Member (2021–)
 Graduate Admissions Committee (2010–2021)
 Graduate Seminar Committee Chair (2011–2013)
 Communications Committee Chair (2020–2021)
 Faculty Search Committee (2020–2022)
 Junior Faculty Mentor (2020–)

CMU Department of Chemistry

Faculty Search Committee (2013–2014)

Scientific Publication Activities

ACS Biomaterials Science

Editorial Advisory Board (2015–)

Biomimetics

Editorial Advisory Board (2018–2022)

Bioelectronics (BioEI)

International Advisory Board (2015–)

Journal of Materials Chemistry B

International Advisory Board (2014–)

Macromolecular Bioscience

International Advisory Board (2015–)

Materials Horizons

Editorial Advisory Board (2020–)
MRS Bulletin
Editorial Advisory Board (2015–)
Multifunctional Materials
Editorial Advisory Board (2017–2020)

Other External Activities

École Polytechnique Fédérale de Lausanne
Guest Lecturer in Flexible Electronics Course (2020)
University of Costa Rica
1-week Workshop on Bioinspired Materials and Structures (2019)
University of Pittsburgh McGowan Institute for Regenerative Medicine
Co-Organizer for Annual Retreat (2018)
National Science Foundation Initiative on Biomanufacturing
Continental Europe Delegation (Mar 2014)
Southeast Asia Delegation (Jul 2014)
Tufts University – IGERT on Soft Robotics
Advisory Board Member – Materials (2014–2017)
The Cure is Now
Member of Scientific Advisory Board (2012–2018)
STREAM Academy – PA Cyber Online High School
Member of Academic Steering Committee (2011–2013)
Chinese-American Kavli Frontiers of Science Symposium
Irvine, CA (Oct 2008)
Kunming, China (Sep 2009)
Boston Museum of Science
Hall of Human Life Exhibit—Advisor (2008)
MIT Graduate Materials Council (2006–2008)
New Jersey Center for Biomaterials (2006–2008)
Military Biomaterials Roadmap Workshop (Nov 2006)

MENTORSHIP

Current Students and Trainees

PhD Students

Gaurav Balakrishnan – Materials Science and Engineering
Durva Naik – Materials Science and Engineering
Spencer Matonis – Materials Science and Engineering
Jiwoo Song – Materials Science and Engineering

Masters Students

Xiaozili Huang – Materials Science and Engineering
Arnav Bhat – Biomedical Engineering
Bozhong Zhuang – Materials Science and Engineering
Faith Dias – Chemical Engineering

Undergraduate Students

Nihar Trivedi – Materials Science and Engineering
Brian Woolley – Chemical Engineering
Julie Shin Kim – Chemical Engineering
Mia Ritter – Materials Science and Engineering
Richel Seiko Murata – Materials Science and Engineering
Siya Scindia – Chemical Engineering

Alumni

Doctoral Students

Chenchen Mou (PhD 2021, MS 2017)
Xiaomin Tang (PhD 2019)
Ik Soo Kwon (PhD 2018)
Luke Klosterman (PhD 2016)
Proud Pholpabu (PhD 2016)
Haosheng Wu (PhD 2015, MS 2012)
Aditya Balasubramanian (PhD 2014, MS 2011)
Suze Ninh (PhD 2014)
Congcong Zhu (PhD 2014)

Masters of Science

Mahathy Rajagopalan (MS 2022)
Audrey Schreiner (MS 2022)
Puqing Ding (MS 2021)
Coco Wang (MS 2020)
Weiyin Sun (MS 2020)
Han Zhang (MS 2019)
Peng Peng (MS 2018)
Po-Ju "Brian" Chiang (MS 2018)
Guannan Tang (MS 2018)
Faisal Ali (MS 2017)
Natee Johnson (MS 2016)
Ashley Guertin (MS 2016)
Riddhi Kachole (MS 2016)
Jingsi Zhao (MS 2015)
Aimon Iftikhar (MS 2014)
Monisha Menon (MS 2012)
Stephen Kustra (MS 2012)

Masters of Engineering

Malia Okamura (MEng 2021)
Jake Zimmer (MEng 2021)
Zihao "Derrick" Ding (MEng, 2018)
Derek Loh (MEng 2016, BS 2016)
Faisal Ali (MEng 2016)
Madeline Cramer (MEng 2015, CIT Honors Thesis 2014)
Serena Zhou (MEng 2015)
Julian Kessler (MEng 2013)
Kaihei Takagi (MEng 2013)
Ashley Ocvirk (MEng 2012)
Sumit Goenka (MEng 2012)
Jane Sun (MEng 2012)

Undergraduate Students

Jared Cohen (BS)
Lily Gido (BS, CIT Honors Thesis)
Emma Graham (BS)
Nathan Roblin (BS)
Isabelle Joyce (BS)
Allie Carron (BS)
Leon Min (BS)
Tiffaney Hsia (BS)
Sophia Eristoff (BS)
Shanley Lenart (BS)
Gage Anderson (BS)
Charles Webb (BS)

Kira Vargas (BS)
Cynthia Lao (BS)
Heather Bowman (BS, CIT Honors Thesis)
Derek Loh (BS)
Andy Zhang (BS)
Haobo Wang (BS)
Marissa Schwartz (BS)
Evan Gates (BS, CIT Honors Thesis)
Rob Morhard (BS, CIT Honors Thesis)
Nicole Kawakami (BS)
Shreya Munjal (BS)
Tejank Shah (BS)
Marvin Alim (BS)
Sharanya Venkat (BS)
Tanu Chellam (BS)

Visiting Scholars & Post-doctoral Fellows

Emily Augustine (BS, MS, University of Pennsylvania)
Junan Chen (BS, Tsinghua University)
Derrick Wells (MS, Carnegie Mellon University)
Paula Calderon (MS, University of Costa Rica)
Hang-Ah Park (PhD, Carnegie Mellon University)
Wei-Chen Huang (PhD, Taipei Medical University)
Hanjun Ding, PhD (PhD, Beijing Institute of Technology)
Young Jo Kim (PhD, University of Missouri)
Hector Becerrill (PhD, BYU-Idaho)
Yunfang Yang (BS, Tsinghua University)
Berend Jan DeBruin (MD, Erasmus University)
Mellanie Grellier (BS, Polytech Nantes)

PUBLICATIONS

PEER REVIEWED JOURNAL ARTICLES (CARNEGIE MELLON)

*Citation statistics: >10,500 total citations, h-index = 45 (Google Scholar)

ORCID ID: <https://orcid.org/0000-0002-6564-5681>

- [98] G Balakrishnan, A Bhat, D Naik, J S Kim, S Marukyan, L Gido, M Ritter, A Khair, **C J Bettinger**. Gelatin-based Ingestible Impedance Sensor to Evaluate Gastrointestinal Epithelial Barriers. (submitted).
- [97] S Matonis, B Zhuang, A Bishop, N Durva, Z Temel, **C Bettinger**. Edible origami actuators using gelatin-based bioplastics (submitted).
- [96] V Nair, A N Dalrymple, G Balakrishnan, **C J Bettinger**, D J Weber, K Yang, J T Robinson. Miniature Wireless Bioelectronics (submitted).
- [95] J Song, C Mou, G Balakrishnan, Y Wang, M Rajagopalan, A Schreiner, D Naik, T Cohen-Karni, M. S. Halbreiner, **C J Bettinger**. Hysteresis-free and High-Sensitivity Strain Sensing of Ionically Conductive Hydrogels. *Advanced NanoBiomed Research* **2022**. DOI: 10.1002/anbr.202200132
- [94] G Balakrishnan, J Song, C Mou, **C J Bettinger**. Recent Progress in Materials Chemistry to Advance Flexible Bioelectronics in Medicine. *Advanced Materials* **2021**. 34 (10) 2106787. DOI: 10.1002/adma.202106787
- [93] T Datta-Chaudhuri, T Zanos, EH Chang, PS Olofsson, S Bickel, C Bouton, D Grande, L Rieth, C Aranow, O Bloom, AD Mehta, G Civillico, MM Stevens, E Glowacki, **C Bettinger**, M Schüttler, C Puleo, R Rennaker, S Mohanta, D Carnevale, SV Conde, B Bonaz, D Chernoff, S Kapa, M Berggren, K Ludwig, S Zanos, L Miller, D Weber, D Yoshor, L Steinman, SS Chavan, VA Pavlov, Y Al-Abed, KJ Tracey. The Fourth Bioelectronic

Medicine Summit “Technology Targeting Molecular Mechanisms”: current progress, challenges, and charting the future. *Bioelectron. Med.* **2021**, 7, 7. DOI: 10.1186/s42234-021-00068-6

- [92] E Augustine, P Deng, C Mou, M Okamura, B Woolley, M Horowitz, **C J Bettinger**. Control Release and Diffusion-Reaction Kinetics of Genipin-Eluting Fibers Using an *In Vitro* Aneurysm Flow Model. *ACS Biomaterials Science & Engineering* **2021**. 7 (11) 5144–5153. DOI: 10.1021/acsbomaterials.1c00773
- [91] C Horn, M Forssell, M Sciuillo, JE Harms, S Fulton, C Mou, F Sun, T Simpson, G Xiao, LE Fisher, **CJ Bettinger**, GK Fedder. Hydrogel-based electrodes for selective cervical vagus nerve stimulation. *Journal of Neural Engineering* **2021**. 18 (5). DOI: 10.1088/1741-2552/abf398.
- [90] AS Sharova, F Melloni, G Lanzani, **CJ Bettinger**, M Caironi. Edible Electronics: The Vision and the Challenge. *Advanced Materials Technologies* **2021**. 6 (2) 2000757. DOI: 10.1002/admt.202000757.
- [89] CC Horn, M Forssell, M Sciuillo, JE Harms, S Fulton, C Mou, F Sun, TW Simpson, G Xiao, LE Fisher, **CJ Bettinger**, GK Fedder. Tuning Electrical Stimulation of the Cervical Vagus Nerve for Abdominal Signaling While Reducing Cardiovascular Side Effects. *bioRxiv* **2020**. 2020.12.10.420398. DOI: 10.1101/2020.12.10.420398.
- [88] **CJ Bettinger**, M Ecker, TDY Kozai, G Malliaras, E Meng; W Voit. Recent Advances in Neural Interfaces—Materials Chemistry to Clinical Translation. *MRS Bulletin* **2020**. 45 (8) 655–668. DOI: 10.1557/mrs.2020.195.
- [87] S-K Kang, L Yin, **C J Bettinger**. The emergence of transient electronic devices. *MRS Bulletin* **2020**. 45 (2) 87-95. DOI: 10.1557/mrs.2020.19
- [86] X Tang, B Wang, S Eristoff, H Zhang, **C J Bettinger**. Dynamic contributions to the bulk mechanical properties of self-assembled polymer networks with reconfigurable bonds. *Macromolecular Rapid Communications* **2020**, 41 (3) 1900551. DOI: 10.1002/marc.201900551.
- [85] A Golabchi, B Wu, B Cao, **C J Bettinger**, X T Cui. Zwitterionic Polymer/Polydopamine Coating Reduce Acute Inflammatory Tissue Responses to Neural Implants. *Biomaterials* **2019**. 225 119519. DOI: 10.1016/j.biomaterials.2019.119519.
- [84] **C J Bettinger**. The Road to Practical E-Textiles Is Smooth as Silk. *Matter* **2019**. 1 (1) 20-21. DOI: 10.1016/j.matt.2019.05.024
- [83] C Mou, F Ali, A Malaviya, **C J Bettinger**. Electrochemical-mediated gelation of catechol-bearing hydrogels based on multimodal crosslinking. *Journal of Materials Chemistry B* **2019**. 7 (10) 1690-1696. DOI: 10.1039/C8TB02854K
- [82] **C J Bettinger**. Edible hybrid microbial-electronic sensors for bleeding detection and beyond. *Hepatobiliary Surgery and Nutrition* **2019**. 8 (2) 157-160. DOI: 10.21037/hbsn.2018.11.14
- [81] I Kwon, **C J Bettinger**. Polydopamine Nanostructures as Biomaterials for Medical Applications. *Journal of Materials Chemistry B* **2018**. 6 6895-6903. DOI: 10.1039/C8TB02310G
- [80] **C J Bettinger**. Advanced Materials for Ingestible Electromechanical Medical Devices. *Angewandte Chemie* **2018**. 57 (52) 16946-16958. DOI: 10.1002/anie.201806470
- [79] Z Ding, F Fatollahi-Fard, I S Kwon, P C Pistorius, **C J Bettinger**. Polydopamine Nanomembranes as Adhesion Layers for Improved Corrosion Resistance in Low Carbon Steel. *Advanced Engineering Materials* **2018**. 20 (11) 1800621. DOI: 10.1002/adem.201800621
- [78] P-J Chiang, G Tang, I Kwon, S Eristoff, **C J Bettinger**. Reversible Chemo-Topographic Control of Adhesion in Polydopamine Nanomembranes. *Macromolecular Materials and Engineering* **2018**. 303 (11) 1800258. DOI: 10.1002/mame.201800258

- [77] K Ye, D Kaplan, G Bao, **C J Bettinger**, G Forgacs, C Dong, A Khademhosseini, Y Ke, K Leong, A Sambanis, W Sun, P Yin. Advanced Cell and Tissue Biomanufacturing. *ACS Biomaterials Science & Engineering* **2018**. 4 (7) 2292–2307. DOI: 10.1021/acsbiomaterials.8b00650
- [76] W-C Huang, X C Ong, I Kwon, C Gopinath, H Wu, G K Fedder, R Gaunt*, **C J Bettinger***. Ultra-Compliant Hydrogel-Based Neural Interfaces Fabricated by Aqueous-Phase Microtransfer Printing. *Advanced Functional Materials* **2018**. 28 (29) 1801059. DOI: 10.1002/adfm.201801059
****Highlighted in Advanced Science News.**
- [75] **C J Bettinger**. Recent Advances in Materials and Flexible Electronics for Peripheral Nerve Interfaces. *Bioelectronic Medicine* **2018**. 4 (1) 6. DOI: 10.1186/s42234-018-0007-6
- [74] I Kwon, G Tang, P-J Chiang, **C J Bettinger**. Texture-dependent Adhesion in Polydopamine Nanomembranes. *ACS Applied Materials and Interfaces* **2018**. 10 (9) 7681–7687. DOI: 10.1021/acsami.7b15608
- [73] X Tang, **C J Bettinger**. Multimodal Underwater Adhesion Using Self-assembled Dopa-bearing ABA Triblock Copolymer Networks. *Journal of Materials Chemistry B* **2018**. 6 545–549. DOI: 10.1039/C7TB02371E
****Selected as Cover Graphic in Journal of Materials Chemistry.**
****Invited Paper in Recognition of Journal of Materials Chemistry Lectureship.**
- [72] A Lampel, S McPhee, H-A Park, G G Scott, S Humagain, D R Hekstra, B Yoo, P W J M Frederix, T D Li, R R Abzalimov, S G Greenbaum, T Tuttle, C Hu, **C J Bettinger**, R V Ulijn. Polymeric peptide pigments with sequence-encoded properties. *Science* **2017**. 356 (6342) 1064–1068. DOI: 10.1126/science.aal5005
- [71] L Klosterman, Z Ahmad, V Viswanathan, **C J Bettinger**. Synthesis and Measurement of Cohesive Mechanics in Polydopamine Nanomembranes. *Advanced Materials Interfaces* **2017**. 4 (10) 1700041. DOI: 10.1002/admi.201700041
****Recognized as one of most downloaded articles for Advanced Materials Interfaces.**
- [70] W-C Huang, F Ali, J Zhao, K Rhee, C Mou, **C J Bettinger**. Ultrasound-Mediated Self-Healing Hydrogels Based on Tunable Metal-Organic Bonding. *Biomacromolecules* **2017**. 18 (4) 1162–1171. DOI: 10.1021/acs.biomac.6b01841
- [69] L Klosterman, **C J Bettinger**. Calcium-Mediated Control of Polydopamine Film Oxidation and Iron Chelation. *International Journal of Molecular Sciences* **2017**. 18 (1) 14. DOI: 10.3390/ijms18010014
- [68] H Ding, Z Wang, G Xie, C Mahoney, Rachel Ferebee, M Zhong, W F M Daniel, J Pietrasik, S S Sheiko, **C J Bettinger**, M R Bockstaller, K Matyjaszewski. Preparation of ZnO Hybrid Nanoparticles by ATRP. *Polymer* **2016**. 107 492–502. DOI: 10.1016/j.polymer.2016.09.022
- [67] H Ding, S Park, M Zhong, X Pan, J Pietrasik, **C J Bettinger**, K Matyjaszewski. Facile Arm-First Synthesis of Star Block Copolymers via ARGET ATRP with ppm Amounts of Catalyst. *Macromolecules* **2016**. 49 (18) 6752–6760. DOI: 10.1021/acs.macromol.6b01597
- [66] H Wu, V Sariola, J Zhao, H J Ding, M Sitti, **C J Bettinger**. Composition-dependent Underwater Adhesion of Melanin-Inspired Hydrogels. *Polymer International* **2016**. 65 (11) 1355–1359. DOI: 10.1002/pi.5246
- [65] P Phopabu, S Yerneni, C Zhu, P Campbell, **C J Bettinger**. Controlled Release of Small Molecules from Elastomers for Reducing Epidermal Downgrowth in Percutaneous Devices. *ACS Biomaterials Science & Engineering* **2016**. 2 (9) 1464–1470. DOI: 10.1021/acsbiomaterials.6b00192
- [64] H-A Park, Y J Kim, I S Kwon, L Klosterman, **C J Bettinger**. Lithium purification from aqueous solutions using bioinspired redox active melanin membranes. *Polymer International* **2016**. 65 (11) 1331–1338. DOI: 10.1002/pi.5184
- [63] J Epstein, Wee-Liat Ong, **C J Bettinger**, J A Malen. Temperature Dependent Thermal Conductivity and Thermal Interface Resistance of Pentacene Thin Films with Varying Morphology. *ACS Applied Materials & Interfaces* **2016**. 8 (29) 19168–19174. DOI: 10.1021/acsami.6b06338

- [62] H Ding, M Zhong, H Wu, S Park, J Mohin, L Klosterman, Z Yang, H Yang*, K Matyjaszewski*, **C J Bettinger***. Elastomeric Conducting Polyaniline Formed through Topological Control of Molecular Templates. *ACS Nano* **2016**. 10 (6) 5991–5998. DOI: 10.1021/acsnano.6b01520
- [61] I Kwon, Y J Kim, L Klosterman, M Forssell, G K Fedder, **C J Bettinger**. In vitro electrochemical characterization of polydopamine melanin as a tissue stimulating electrode material. *Journal of Materials Chemistry B* **2016**. 4 (18) 3031–3036. DOI: 10.1039/C5TB02618K
****Selected as Cover Graphic** in *Journal of Materials Chemistry*.
****Selected as Part of Emerging Investigators Issue** in *Journal of Materials Chemistry*.
- [60] Y J Kim, A Khetan, W Wu, S E Chun, V Viswanathan, J F Whitacre, **C J Bettinger**. Evidence of Porphyrin-like Structures in Natural Melanin Pigments Using Electrochemical Fingerprinting. *Advanced Materials* **2016**. 28 (16) 3173–3180. DOI: 10.1002/adma.201504650
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OTHER TECHNICAL WRITINGS

- [O1] Current Challenges and Future Opportunities in Electronic and Photonic Materials. NSF-EPM Workshop held on September 25-26th, 2017 Supported by NSF, DMR-1748163.

FUNDING

National Institutes of Health (Pending)

Ingestible Bioreactors for Resolving In Vivo Microbiome Dynamics

PI: Bettinger

(R01) National Institute of General Medical Sciences. \$1,500,000 (direct). (Sep-22 to Aug-25)

National Institutes of Health (Pending)

Flexible Bioelectronics for Gut Iontophoresis

PI: Bettinger

(R01) National Institute of Diabetes and Digestive and Kidney Diseases. \$2,200,000 (direct). (Apr-22 to Mar-27)

National Institutes of Health (Pending)

Ingestible Sensors for Monitoring Esophageal Inflammation from Food Allergens

PI: Bettinger

(R21) National Institute of Allergy and Infectious Diseases. \$275,000 (direct). (Sep-21 to Aug-23)

National Institutes of Health (Pending)

Ingestible Pills for Non-Invasive Modulation of the Enteric Nervous System

PI: Bettinger

(R01) National Institute of Diabetes and Digestive and Kidney Diseases. \$1,500,000 (direct). (Sep-21 to Aug-26)

National Institutes of Health (Pending)

Ingestible Electronics for Oral Delivery of Peptides

PI: Bettinger

(R21) National Institute of Biomedical Imaging and Bioengineering Trailblazer. \$400,000 (direct). (Sep-21 to Aug-24)

National Institutes of Health (R21EB032519)

Ingestible Electronic Devices for Non-Invasive Vagal Stimulation

PI: Bettinger

(R21) National Institute of Biomedical Imaging and Bioengineering Trailblazer. \$400,000 (direct). (Sep-22 to Aug-25)

National Institutes of Health (R21EB028418)

Adhesive Transient Strain Sensors for Monitoring Post-Cardiotomy Hemodynamics

PI: Halbreiner

Co-PI: Bettinger

(R21) National Institute of Biomedical Imaging and Bioengineering Trailblazer. \$400,000 (direct). (Sep-20 to Aug-23)

Pennsylvania Infrastructure Technology Alliance

Flexible Adhesive Hydrogels for Electrophysiological Monitoring

PI: Bettinger

University Grant. \$60,000. (Aug-21 to May-22)

Pennsylvania Infrastructure Technology Alliance

Chemo-mechanical Interlocking for Ingestible Oral Drug Delivery Devices

PI: Bettinger

University Grant. \$112,748. (Aug-20 to May-22)

National Institutes of Health (R21EB026073)

Microstructured Mucoadhesive Devices for Sustained Oral Delivery

PI: Bettinger

(R21) National Institute of Biomedical Imaging and Bioengineering. \$380,046. (Jan-20 to Dec-21)

CMU Center for Machine Learning and Health

Ingestible Impedance Sensors to Acquire Large-Scale Data Sets from Patients with Eosinophilic Esophagitis

PI: Bettinger

Pittsburgh Health Data Alliance Gift. \$100,000 (July-19 to Jun 20)

National Institutes of Health (NINDS) (R44NS107111)

Drug Eluting Coils for Improved Treatment of Brain Aneurysms

PI: Bettinger; Co-I: Horowitz

(R44) Small Business Innovation Research (Fast-Track Phases I & II). \$1,725,000 (Sep-19 to Aug-2021)

Pennsylvania Infrastructure Technology Alliance

Manufacturing of Genipin-Eluting Microfibers

PI: Bettinger

University Grant. \$35,000 (Jan-19 to Dec-19)

University of Pittsburgh Medical Center

OncoBioelectrx: Vagus Nerve Stimulation for Oncobiology

PI: Fedder

Co-PI Bettinger

University Grant. \$188,080 (Jan-18 to Jun-18)

Pennsylvania Infrastructure Technology Alliance

Chemotopographic Control of Adhesion in Complex Fluids

PI: Bettinger

University Grant. \$35,000 (Jan-18 to Dec-18)

Wilton E. Scott Institute for Energy Innovation

Equipment Grant: Upgrade of ATR-FTIR Microscope

PI: Bettinger

SEED grant. \$8,500 (Jan-18)

Pennsylvania Infrastructure Technology Alliance
Drug-Eluting Coils for Improved Treatment of Intracranial Aneurysms
PI: Bettinger
University Grant. \$50,000 (Jan-17 to Dec-17)

Defense Advanced Research Projects Agency (DARPA)
Gaseous-depolymerizing Infiltrating Flying Transport (GIFT)
PI: Kellas (MORSE, Corp)
Co-PI Bettinger (Lead for Carnegie Mellon)
Microsystems Technology Office. \$828,142 (Apr-16 to May-18)

National Institutes of Health (R21NS095250)
Hydrogel Multielectrode Arrays for Therapeutic Peripheral Nerve Stimulation
PI: Bettinger; Co-I: Gaunt (University of Pittsburgh)
(R21) National Institute of Neurological Disorders And Stroke. \$409,046. (Sep-15 to Aug-17)

National Science Foundation (DMR1542196)
EAGER: Biomimetic Materials for Improving Abiotic-Biotic Signal Transduction in Brain-Machine Interfaces
PI: Bettinger
Division of Materials Research. \$300,000 (Sep-15 to Aug-17)

Draper Laboratory (SC001-0860)
Vanishing Electronics for Biomedical Applications
PI: Bettinger
University Research and Development UR&D. \$60,000 (Aug-15 to May-16)

National Institutes of Health (NINDS) (R43NS090821)
Drug Eluting Coils for Improved Treatment of Brain Aneurysms
PI: Bettinger; Co-I: Horowitz
(R43) Small Business Innovation Research (Phase I). \$225,000 (May-15 to Oct-15)

Defense Advanced Research Projects Agency (DARPA) (D14AP00040)
Orthogonal Parameterization of Bioinspired Peripheral Nerve Interface Materials
PI: Bettinger
Young Faculty Award. \$500,000 (Sep-14 to Aug-16)

*[Large Medical Device Manufacturer]**
Genipin-loaded Coils for Improved Treatment of Intracranial Aneurysms
PI: Bettinger
Sponsored Research Contract. \$99,000 (Mar-14 to Feb-15)
**Conditions of contract prohibit disclosure of sponsor*

Draper Laboratory
Edible Electronics for Management of Diabetes
PI: Bettinger
University Research and Development UR&D. \$110,000 (Jun-14 to May-15)

Australian Research Council
Biocompatible Electro-Ionic Signal Transduction
PI: Meredith (University of Queensland); Co-I: Bettinger, Rolandi (University of Washington)
ARC Discovery Projects. \$10,000 to Bettinger (Aug-14 to Jul-15)

Carnegie Mellon University
Equipment Infrastructure Grant
PI: Bettinger
Combined Atomic Force Microscopy and Raman Imaging System. \$475,000. (Aug-14)

Shurl and Kay Curci Foundation
Edible Electronics for Management of Diabetes
PI: Bettinger
Gift to Bettinger Group. \$100,000 (Mar-13 to Feb-14)

Pennsylvania Infrastructure Technology Alliance
Biodegradable Electronic Devices
PI: Bettinger
University Grant. \$50,000 (Jan-13 to Dec-13)

American Heart Association (12SDG12050297)
Drug-Eluting Biodegradable Elastomeric Grafts to Improve Vascular Remodeling
PI: Bettinger
Scientist Development Grant. \$308,000 (Sep-12 to Aug-15)

Department of Defense (Army)
Tissue-Engineered Muscle Constructs as Biomimetic Peripheral Nerve Interfaces
PI: Bettinger; Co-I: Matyjaszewski & Marra
USAMEDD \$1,631,887 (Sep-12 to Sep-16)

National Institutes of Health (R21EB015165)
Regenerative Interfaces for Percutaneous Devices
PI: Bettinger; Co-I: Campbell
(R21) National Institute of Biomedical Imaging and Bioengineering. \$419,000. (Mar-12 to Feb-13)

American Chemical Society
Hydrolytically-Active Shape-Memory Biodegradable Elastomers
PI: Bettinger
Doctoral New Investigator Award. \$100,000. (Jan-12 to Dec-13)

Berkman Foundation
Biodegradable Transistors
PI: Bettinger
New Faculty Development Grant. \$5,000. (Jan-11 to Dec-11)

Proctor and Gamble
Virtual Intellectual Property Laboratory
PI: Bettinger
Educational Development Grant. \$10,000. (Jan-11 to Dec-11)

National Science Foundation
Symposium UU: Integration of Natural and Synthetic Materials with Organic Electronics
PI: Bettinger
Conference Funding for MRS. \$12,500. (Apr-12)

Carnegie Mellon University
Equipment Infrastructure Grant
PI: Bettinger; Co-I: Bockstaller
Thermo-mechanical Characterization Laboratory. \$216,000. (Aug-11)

National Institutes of Health (F32NS064771-01)
Biodegradable Field-Effect Transistors for Electronically Active Scaffolds
PI: Bettinger
Ruth Kirschstein Post-doctoral Fellowship. \$100,000. (Jan-09 to Aug-10)

Charles Stark Draper Laboratory
Biodegradable Electronic Devices

INTELLECTUAL PROPERTY

US PATENTS (ISSUED)

- [1] **C J Bettinger**, J M Karp, S J Kim, R S Langer, A Zumbuehl, J P Bruggeman, L Da Silva-Ferreira, C Nijst, J Burdick. Biodegradable elastomers. US Patent# 8143042.
- [2] **C J Bettinger**, Z Bao, et al. Method of Manufacturing Electric Device, Array of Electric Devices, and Manufacturing Method Therefor. US Patent# 8679984.
- [3] **C J Bettinger**, J P Bruggeman, L Ferreira, J M Karp, R S Langer, C Nijst, A Zumbuehl, J Burdick, S J Kim. Method comprising contacting tissue with a cross-linkable polyester prepolymer. US Patent# 8691203.
- [4] J T Borenstein, **C J Bettinger**, D Kaplan. Microfluidic device comprising silk films coupled to form a microchannel. US Patent# 8975073.
- [5] J M Karp, A Mahdavi, L Ferreira, D Carter, A Zumbuehl, J Borenstein, **C J Bettinger**, R Langer. Adhesive articles. US Patent# 9060842.
- [6] **C J Bettinger**, M B Horowitz. Coated vaso-occlusive device for treatment of aneurysms. US Patent# 9655999; WIPO Patent# WO 2014/165023 A1.
- [7] **C J Bettinger**. Ingestible, electrical device for stimulating tissues in a gastrointestinal tract of an organism. US Patent# 9770588B2.
- [8] **C J Bettinger**. Ingestible, electrical device for oral delivery of a substance. US Patent# 9884011
- [9] **C J Bettinger**, J F Whitacre, Y J Kim. Melanins as active components in energy storage materials. US Patent# US9928968B2.
- [10] **C J Bettinger**, M B Horowitz. Coated vaso-occlusive device for treatment of aneurysms. US Patent# 10034966. European Patent No. 2967824.
- [11] **C J Bettinger**, J P Bruggeman, L Ferreira, J M Karp, R S Langer, C Nijst, A Zumbuehl, J Burdick, Sonia Kim. Method Comprising Contacting Tissue With a Cross-Linkable Polyester Prepolymer. US Patent# 10179195.
- [12] Y J Kim, J F Whitacre, **C J Bettinger**. Electrochemical cell with melanin electrode. US Patent# 10326139B2.
- [13] **C J Bettinger**, J P Bruggeman, L Ferreira, J M Karp, R S Langer, C Nijst, A Zumbuehl, J Burdick, S J Kim. Method comprising contacting tissue with a cross-linkable polyester prepolymer. US Patent# 10864303B2.
- [14] R V Ulijn, A Lampel, T Tuttle, G Scott, S McPhee, **C J Bettinger**. Self-Assembling Peptide Polymer. US Patent# 11021516B2.

PENDING TECHNOLOGY DISCLOSURES (Carnegie Mellon University)

- Ultracompliant Neural Interfaces
- Stretchable Electronics
- Self-Assembling Peptides
- Transfer Printing of Electronic Structures to Hydrogels
- Adhesive Hydrogel-based Neural Interfaces

ENTREPRENEURSHIP

AnCure, LLC

Co-Founder, President, and CTO (2013 –)
Selected for Ignition Program Sponsored by Pittsburgh Idea Foundry
Awarded Phase I SBIR from National Institutes of Health (NINDS)
Awarded Fast-Track SBIR from National Institutes of Health (NINDS)

MAD Nanolayers®

15.390 – New Enterprises – MAD Nanolayers
MIT \$1K Entrepreneurship Competition Winner – Tiny Technology Category – “MAD Nanolayers”
MIT \$100K Entrepreneurship Competition Finalist – “MAD Nanolayers”

INVITED SEMINARS**

*(**Over 100 Invited Seminars and Talks including >25 International Presentations)*

University of British Columbia. School of Biomedical Engineering. Mar 2023
University of Connecticut. Department of Biomedical Engineering. Mar 2023.
Purdue University. Electrical and Computer Engineering. West Lafayette, IN (virtual). Oct 2022.
Penn State University. Huck Distinguished Lecturer. State College, PA. Sep 2022.
Technical University Munich. Keynote Speaker at Neuroengineering Symposium. Munich, GER. May 2022.
Cleveland Clinic. APT Center Distinguished Lecture Series. Cleveland, OH. Apr 2022.
West Virginia University. Mechanical & Aerospace Engineering. Morgantown, WV. Oct 2021.
Texas Academy of Mathematics and Science. Distinguished Alumni Series. Denton, TX. Sep 2021.
Mayo Clinic. Transforming Transplants Seminar. Rochester, MN (virtual). Sep 2021.
University of Costa Rica, Bioinspired Materials Symposium. San Jose, CR (virtual). Aug 2021.
Carnegie Mellon University, Department of Materials Science and Engineering Graduate Student Summer Symposium. Pittsburgh, PA (virtual). Jun 2021.
Seoul National University, Department of Materials Science and Engineering. Seoul, South Korea (virtual). Jan 2021.
University of Pittsburgh, Department of Gastroenterology, Hepatology and Nutrition (Grand Rounds). Pittsburgh, PA. Oct 2020.
4th Bioelectronic Medicine Summit (Session 1: Materials Science & Electronics). New York, NY (virtual) Sep 2020.
INM - Leibniz-Institut für Neue Materialien gGmbH. Materials for the Digital Environment. Saarbrücken, Germany (virtual). Jul 2020.
Linköping University. Laboratory for Organic Electronics. Mar 2020.
Université de Rennes. Institut NuMeCan. St. Gilles. Feb 2020.
Wyss Center at Campus Biotech (EPFL). Center for Neuroprosthetics. Geneva, Switzerland. Dec 2019.
US-Arab Frontiers of Science, Engineering, and Medicine. Sensing Technologies. Cairo, Egypt. Nov 2019.
China-America Frontiers of Engineering Symposium. New Materials: Biomimetic Underwater Adhesives. San Diego, CA. Jun 2019.
Materials Research Society Spring Meeting. MRS-Kavli Workshop. Brain-Machine Interfaces: From Materials to Clinical Translation. Phoenix, AZ. Apr 2019.
Materials Research Society Spring Meeting. Materials Strategies and Device Fabrication for Biofriendly Electronics. Phoenix, AZ. Apr 2019.
IEEE EMBS Neural Engineering Conference on March 20, 2019. From flexible materials to cell-scale recording: emerging frontiers in neural interface technology. San Francisco, CA. Mar 2019.
Caltech. Division of Chemistry and Chemical Engineering. Pasadena, CA. Dec 2018.
Eli Lilly Corporation. External Innovation BioTDR Seminar. Indianapolis, IN. Nov 2018.
Rutgers University. Department of Electrical Engineering. Rutgers, NJ. Nov 2018.
American Chemical Society. Biosensors and Bioelectronics. Boston, MA. Aug 2018.
University of Texas at Dallas. Department of Biomedical Engineering. Dallas, TX. May 2018.
Society for Biomaterials. Thought Leader: Philip B. Messersmith. Atlanta, GA. Apr 2018.
Carnegie Mellon University. Device Science and Nanofabrication Initiative Seminar. Apr 2018.
University of Costa Rica. National Laboratory of Materials & Structural Models. San Jose, Costa Rica. Mar 2018.

University of Costa Rica. Center of Investigation of Microscopic Structures. San Jose, Costa Rica. Mar 2018.
University of Florida. Department of Biomedical Engineering. Gainesville, FL. Oct 2017.
University of Pittsburgh. Department of Bioengineering. Pittsburgh, PA. Oct 2017.
University of Michigan. Biomaterials Day. Ann Arbor, MI. Oct 2017.
University of North Carolina. Applied Physical Systems. Chapel Hill, NC. Sep 2017.
American Chemical Society. Washington DC. Aug 2017.
Materials Research Society Spring Meeting. Bioelectronics Symposium. Phoenix, AZ. Apr 2017.
Semiconductor Research Corporation. Microsystems for Bioelectronic Medicine. Washington DC. Apr 2017.
Lubrizol Corporation. LEARN Seminar. Brecksville, OH. Apr 2017.
University of Minnesota. Mechanical Engineering. Minneapolis, MN. Mar 2017.
Virginia Tech. Macromolecules Innovation Institute. Blacksburg, VA. Feb 2017.
Materials Research Society Fall Meeting. Edible Electronics: Bioinspired Materials and Structures for Next-
Generation Ingestible Devices. Boston, MA. Nov 2016.
Semiconductor Research Corporation. Global Forum on Nanoelectronic Manufacturing. Almaden, CA. Nov 2016.
Defense Advanced Research Projects Agency. Neurophysiological Monitoring. San Diego, CA. Nov 2016.
Asilomar Symposium on Bioelectronics. Asilomar, CA. Sep 2016.
CIMTEC. Medical Applications of Novel Biomaterials and Nanotechnology. Rome, ITA. Jun 2016.
Helmholtz-Zentrum. Institute of Biomaterials Science. Berlin, GER. May 2016.
SPIE. Micro- and Nanotechnology Sensors, Systems, and Applications VIII. Baltimore, MD. Apr 2016.
Ecole Polytechnique du Montreal. Department of Applied Physics. Montreal, CAN. Apr 2016.
Materials Research Society Spring Meeting. Edible Electronics: Bioinspired Materials and Structures for Next-
Generation Ingestible Devices. Phoenix, AZ. Apr 2016.
Controlled Radical Polymerization Consortium. CMU Chemistry. Pittsburgh, PA. Mar 2016.
American Chemical Society. POLY: Tunable and Dynamic Biomaterials. San Diego, CA. Mar 2016.
ASM International – Pittsburgh Chapter. Pittsburgh Night Lecture. Pittsburgh, PA. Jan 2016
Arab-American Frontiers Program. Sensing Technologies, Networks and Applications. Saudi Arabia. Dec 2015
King Abdullah University of Science and Technology. Electrical Engineering. Tuwal Saudi Arabia. Dec 2015
Charles Stark Draper Laboratory. Distinguished Technical Speaker. Cambridge, MA. Dec 2015
Materials Research Society Fall Meeting. Boston, MA. Dec 2015.
Istituto Italiano di Tecnologia - Center for Nano Science and Technology. Milan, Italy. Nov 2015
Merck Research Laboratories. Exploratory Products & Technologies. Kenilworth, NJ. Nov 2015
University of California – Berkeley. Materials Science and Engineering. Berkeley, CA. Oct 2015
DARPA ElectRx Kickoff Meeting. Salt Lake City, UT. Oct 2015.
Iowa State University. Mechanical Engineering. Ames, IA. Sep 2015
IEEE SPIE Meeting. Flexible, Stretchable, Transient Electronics – What's Next?. Baltimore, MD. Apr 2015.
Johns Hopkins University. Tissue Engineering Research Center. Baltimore, MD. Apr 2015.
U. of Wollongong. ARC Center of Excellence for Electromaterials Science. Wollongong, Australia. Feb 2015.
University of Linz. Organic Bioelectronics Winter School. Kirchberg, Austria. Feb 2015.
University of Costa Rica. 40th Anniversary Celebration of Electron Microscopy. San Jose, Costa Rica. Nov 2014.
University of Costa Rica. Mechanical & Industrial Engineering. San Jose, Costa Rica. Nov 2014.
Universite de Cergy-Pontoise. International workshop on Biomaterial Innovations. Cergy, France. Oct 2014.
Semiconductor Research Corporation. Global Forum on Nanoelectronic Manufacturing. Mumbai, India. Oct 2014.
XXIII Materials Research Congress. Bio & Bio-Inspired Materials. Cancun, Mexico. Aug 2014.
XXIII Materials Research Congress. Smart and Functional Polymeric Materials. Cancun, Mexico. Aug 2014.
Controlled Release Society. Breakthrough Technologies. Chicago, IL. Jul 2014.
World Congress of Biomechanics. Mechanics at the Cell-Biomaterials Interface. Boston, MA. Jun 2014.
Materials Research Society Spring Meeting. San Francisco, CA. Apr 2014.
National Research Council – Biomaterials Roundtable. Washington DC. Apr 2014.
Costa Rica Life Sciences Forum. San Jose, Costa Rica. Apr 2014.
Air Force Research Lab. Wright Patterson Base – Human Effectiveness Directorate. Dayton, OH. Mar 2014.
University of Cincinnati. Department of Electrical Engineering. Cincinnati, OH. Mar 2014.
Syracuse University. Department of Biomedical Engineering. Syracuse, NY. Feb 2014.
Koch Institute for Integrative Cancer Research – MIT. Cambridge, MA. Dec 2013.
Materials Research Society Fall Meeting. Boston, MA. Dec 2013.
Cornell University. Department of Materials Science. Nov 2013.
CTO Forum – Rethink Disruption. San Francisco, CA. Nov 2013.
San Diego State University. Department of Chemistry. Nov 2013.
University of California – San Diego. Department of Nanoengineering. Nov 2013.

University of California – Los Angeles. Department of Bioengineering. Nov 2013.
 Russia Open Innovations Conference. Moscow, Russia. Nov 2013.
 University of California – Irvine. Department of Biomedical Engineering. Oct 2013.
 Rensselaer Polytechnic Institute. Department of Chemical Engineering. Oct 2013.
 West Virginia University. Department of Chemical Engineering. Oct 2013.
 MEDevice – Design of Implantable Devices, San Diego, CA Sep 2013.
 Charles Stark Draper Laboratory. Symposium on Biodegradable Electronics. Sep 2013.
 Lawrence Livermore National Laboratory. Livermore, CA. Apr 2013.
 American Chemical Society. POLY: Symposium for Award in Creative Research. Apr 2013.
 Materials Research Society Spring Meeting. San Francisco, CA. Apr 2013.
 Northeastern University. Department of Chemical Engineering. Apr 2013.
 Kansas University. Department of Chemical Engineering. Jan 2013
 Materials Research Society Fall Meeting. Boston, MA. Dec 2012.
 Mondelez International. Whippany, NJ. Oct 2012.
 Rutgers University. New Jersey Institute for Biomaterials. Oct 2012.
 Tulane University. Department of Chemical Engineering. Sep 2012.
 Society for Biomaterials. Biomaterials Day – Clemson University. Sep 2012.
 Clemson University. Department of Chemical Engineering. Sep 2012.
 European Materials Research Society. Nanostructured Surfaces for Controlling Cell Function. Strasbourg, France
 May 2012.
 European Materials Research Society. Bio-electronics in Medical Devices. Strasbourg, France. May 2012.
 TERMIS. Microfabrication and Printing. Houston, TX. Dec 2011.
 Texas A&M University. Department of Biomedical Engineering. Dec 2011.
 Emerging Technology Conference. Massachusetts Institute of Technology. Oct 2011.
 US Air Force. Sensing at the NanoBioInterface. Atlanta, GA Jun 2011.
 Air Force Research Lab. Wright Patterson Air Force Base – Materials Directorate. Dayton, OH. Mar 2011.
 Carnegie Mellon University. Center for Complex Fluids Engineering. Mar 2011.
 Tulane University. Department of Biomedical Engineering. Feb 2011.
 University of Pittsburgh. Biomechanics Day. Sep 2010.
 Wake Forest University. Institute for Regenerative Medicine. April 2010.
 University of Illinois – Urbana-Champaign. Department of Materials Science and Engineering. Apr 2010.
 Johns Hopkins University. Department of Chemical Engineering. Mar 2010.
 University of Washington. Department of Materials Science and Engineering. Mar 2010.
 University of Texas. Department of Biomedical Engineering. Mar 2010.
 Tufts University. Department of Biomedical Engineering. Feb 2010.
 Rice University. Department of Bioengineering. Feb 2010.
 Boston University. Department of Biomedical Engineering. Feb 2010.
 Carnegie Mellon University. Department of Biomedical Engineering. Feb 2010.
 Harvard University. Engineering and Applied Sciences. Cambridge, MA. Feb 2008.
 Stanford University. Department of Chemical Engineering. Stanford, CA. Oct 2007.
 Biomedical Engineering Society – Fall Meeting. Austin, TX. Oct 2010.
 American Chemical Society – Fall Meeting. Washington DC. Aug 2009.
 Trumbull High School Science Day. Cambridge, MA. May 2008.
 American Society of Materials – Boston Chapter. Cambridge, MA. Apr 2008.
 American Society of Materials – Boston Chapter. Cambridge, MA. Mar 2006.

POPULAR PRESS

TECHNCIAL REPORTS AND TESTIMONY

**Testimony given in various media outlets including Scientific American, Chemical & Engineering News, etc.*

1. Beil L. New Medical Devices Vanish Inside You [Internet]. Scientific American. [cited 2016 Mar 1]. Available from: <http://www.scientificamerican.com/article/new-medical-devices-vanish-inside-you/>
2. Uyeno G. Self-Destructing Battery Can Dissolve Itself in 30 Minutes [Internet]. Scientific American. 2016 [cited 2016 Aug 19]. Available from: <http://www.scientificamerican.com/article/self-destructing-battery-can-dissolve-itself-in-30-minutes/>

3. Bourzac K. Bionic Roses Implanted with Electronic Circuits [Internet]. Scientific American. 2015 [cited 2016 Mar 1]. Available from: <http://www.scientificamerican.com/article/bionic-roses-implanted-with-electronic-circuits/>
4. Peplow M. Biodegradable Battery Could Melt Inside the Body [Internet]. Scientific American. 2014 [cited 2016 Mar 3]. Available from: <http://www.scientificamerican.com/article/biodegradable-battery-could-melt-inside-the-body/>
5. Glaser A. Edible robots made from gelatin may soon get to work in your intestinal tract [Internet]. Recode. 2017 [cited 2017 Mar 21]. Available from: <http://www.recode.net/2017/3/12/14898954/edible-robots-gelatin-actuators-intestinal-tract>
6. Wolf LK. Drug Release In Hot Water [Internet]. Chemical and Engineering News. 2014 [cited 2018 May 7]. Available from: <https://cen.acs.org/articles/92/i15/Drug-Release-Hot-Water.html>

DISCUSSION OR REVIEWS OF WORK

**Highlights about discussions for candidate's work include work on ingestible electronics (1-15), degradable drones (16-19), and melanin-based batteries (20-22), hydrogel-based neural electrodes (23-25), and international collaborations with the University of Costa Rica (25) cited by the following media outlets: The Economist, Newsweek, Popular Science, Wired, CNBC, Stars & Stripes, Pittsburgh Tribune, Science Friday, and the MIT Tech Review.*

1. Dark arts. The Economist [Internet]. 2016 Aug 27 [cited 2016 Aug 25]; Available from: <http://www.economist.com/news/science-and-technology/21705683-bodily-pigment-may-have-industrial-uses-dark-arts>
2. A desirable solution. The Economist [Internet]. 2010 Aug 17 [cited 2018 May 7]; Available from: <https://www.economist.com/node/16837947>
3. Kim M. How An Edible Battery Could Power Medical Robots You Swallow [Internet]. NPR.org. 2016 [cited 2016 Aug 31]. Available from: <http://www.npr.org/sections/alltechconsidered/2016/08/31/491947946/how-an-edible-battery-could-power-medical-robots-you-swallow>
4. Ossala A. Power Ingestible Gadgets With Batteries You Can Eat [Internet]. Popular Science. 2015 [cited 2016 Mar 1]. Available from: <http://www.popsci.com/search-for-digestible-batteries>
5. Pastore R. Edible Electronics Will Spy On Your Intestines [Internet]. Popular Science. 2013 [cited 2018 May 7]. Available from: <https://www.popsci.com/technology/article/2013-04/edible-electronics-will-spy-on-your-intestines>
6. Ziv S. New edible batteries could power tiny medical devices [Internet]. Newsweek. 2016 [cited 2016 Aug 30]. Available from: <http://www.newsweek.com/2016/09/09/edible-batteries-medical-devices-494205.html>
7. Griffiths S. "Edible" robots and batteries you can swallow could finally help cure cancer [Internet]. WIRED UK. 2016 [cited 2018 May 7]. Available from: <http://www.wired.co.uk/article/swallow-batteries-robots-disease>
8. Whitehead K. Edible electronic "smart pills" are coming to a pharmacy near you [Internet]. South China Morning Post. 2015 [cited 2016 Mar 3]. Available from: <http://www.scmp.com/lifestyle/health-beauty/article/1871397/edible-electronic-smart-pills-are-coming-pharmacy-near-you>
9. Nield D. Here's how digestible smart pills could soon replace electronic implants [Internet]. ScienceAlert. [cited 2016 Mar 3]. Available from: <http://www.sciencealert.com/here-s-how-digestible-smart-pills-could-soon-replace-electronic-implants>
10. Patel N. Ingestible Sensors Could Revolutionize Personal Tech [Internet]. Inverse. 2015 [cited 2016 Mar 1]. Available from: <https://www.inverse.com/article/6445-could-ingestible-sensors-usher-in-a-new-kind-of-personal-technology>
11. Staedter T. Edible Sensors Powered by Stomach Acid [Internet]. Seeker. 2015 [cited 2018 May 7]. Available from: <https://www.seeker.com/edible-sensors-powered-by-stomach-acid-1770264729.html>
12. Wolford B. Edible Batteries Made From Cuttlefish Ink Could Solve Power Problem For Medical Devices [Internet]. International Science Times. 2013 [cited 2018 Jan 17]. Available from: <http://www.isciencetimes.com/articles/6584/20131227/edible-batteries-cuttlefish-ink-medical-device.htm>
13. Bourzac K. Edible Batteries to Power Edible Devices [Internet]. MIT Technology Review. 2013 [cited 2018 May 7]. Available from: <https://www.technologyreview.com/s/522581/biodegradable-batteries-to-power-smart-medical-devices/>
14. Review MT. Innovator Under 35: Christopher Bettinger, 30 [Internet]. MIT Technology Review. 2011 [cited 2018 May 7]. Available from: <http://www2.technologyreview.com/tr35/profile.aspx?TRID=1088>
15. Thompson C. Electronic Pills May Be the Future of Medicine [Internet]. CNBC. 2013 [cited 2018 May 7]. Available from: <https://www.cnbc.com/id/100653909>

16. Aupperlee A. Carnegie Mellon team tapped to help build self-destructing drones for DOD [Internet]. Stars and Stripes. 2016 [cited 2016 Aug 13]. Available from: <http://www.stripes.com/news/us/carnegie-mellon-team-tapped-to-help-build-self-destructing-drones-for-dod-1.423726>
17. Aupperlee A. Defense Department Taps Carnegie Mellon Team to Help Build Self-Destructing Drones [Internet]. Government Technology. 2016 [cited 2017 Feb 18]. Available from: <http://www.govtech.com/public-safety/Defense-Department-Taps-Carnegie-Mellon-Team-to-Help-Build-Self-Destructing-Drones.html>
18. Aupperlee A. Carnegie Mellon team tapped to help build self-destructing drones for Defense Department. Pittsburgh Tribune [Internet]. 2016 Aug 11 [cited 2016 Aug 13]; Available from: <http://triblive.com/news/allegheeny/10948321-74/bettinger-darpa-cmu>
19. Smit D. A drone that vanishes into the ether? CMU scientists say it's possible [Internet]. Crain's Pittsburgh. 2016 [cited 2017 Jul 4]. Available from: <http://pittsburgh.craigslist.com/article/drone-vanishes-ether-cmu-scientists-say-its-possible>
20. Flatow I. The Sunscreen Of The Future [Internet]. Science Friday. 2017 [cited 2018 May 7]. Available from: <https://www.sciencefriday.com/segments/the-sunscreen-of-the-future/>
21. Franz J. The natural sunscreen of the future [Internet]. Public Radio International. 2017 [cited 2017 Jun 29]. Available from: <https://www.pri.org/stories/2017-06-29/natural-sunscreen-future>
22. CUNY Advanced Research Center. Molecular code for melanin-like materials: These innovative materials could enable the development of a range of new cosmetic, skin care and biomedical products [Internet]. ScienceDaily. [cited 2017 Jun 29]. Available from: <https://www.sciencedaily.com/releases/2017/06/170608145504.htm>
23. Robitzski D. New jelly-like neural implant eliminates the need to drill through the brain [Internet]. Futurism. 2018 [cited 2018 May 25]. Available from: <https://futurism.com/neural-jelly-drill-brain/>
24. Chen A. Why it's so hard to develop the right material for brain implants [Internet]. The Verge. 2018 [cited 2018 May 31]. Available from: <https://www.theverge.com/2018/5/30/17408852/brain-implant-materials-neuroscience-health-chris-bettinger>
25. Sticking Electrodes To The Brain With Squishy Hydrogel [Internet]. Medical Design Technology. 2018 [cited 2018 Jun 4]. Available from: <https://www.mdtmag.com/videos/2018/06/sticking-electrodes-brain-squishy-hydrogel>
26. Picado PB. Con estructuras inspiradas en la naturaleza se pretende desarrollar nuevos materiales de uso tecnológico [Internet]. Universidad de Costa Rica. [cited 2018 May 29]. Available from: <https://www.ucr.ac.cr/noticias/2018/05/29/con-estructuras-inspiradas-en-la-naturaleza-se-pretende-desarrollar-nuevos-materiales-de-uso-tecnologico.html>

AD HOC REVIEWER

ACS Applied Material Interfaces
ACS Biomaterials Science & Engineering
ACS Nano
ACS Sensors
Acta Biomaterialia
Advanced Drug Delivery Reviews
Advanced Electronic Materials
Advanced Engineering Materials
Advanced Functional Materials
Advanced Healthcare Materials
Advanced Materials
Analytical Chemistry
Angewandte Chemie
AIP Advances
APL Materials
Artificial Blood
Bioelectronic Medicine
Biofabrication
Biomedical Microdevices
Biomacromolecules
Biomaterials
Biomaterials Science
Biomimetics

ChemComm
Chemistry of Materials
Chemical Society Reviews
Current Opinion in Biotechnology
Drug Delivery and Translational Review
European Polymer Journal
FASEB Journal
IEEE Transactions in Nanobioscience
Integrative Biology
International Journal of Biological Macromolecules
International Journal of Molecular Sciences
Journal of American Chemical Society
Journal of Biomedical Materials Research Part A
Journal of Materials Science
Journal of Materials Chemistry B
Journal of Materials Chemistry C
Journal of Polymer Science Part A
Journal of Visualized Experiments
Lab on a Chip
Macromolecular Bioscience
Materials Horizons
Materials Research Symposium Proceedings
Materials Research Society Bulletin
Materials Research Society Communications
Multifunctional Materials
Nano Letters
Nanotechnology
Nature
Nature Biomedical Engineering
Nature Biotechnology
Nature Communications
Nature Electronics
Nature Materials
Nature Nanotechnology
Organic Electronics
Proceedings of the National Academy of Sciences
Progress in Polymer Science
Public Library of Science ONE
Science
Science Advances
Science Robotics
Science Translational Medicine
Scientific Reports
Small
Solid State Electronics
Tissue Engineering

PERSONAL

Climbs of the Seven Summits

Denali (20,310 ft, Alaska Range, USA), Western Buttress (2018)
Aconcagua (22,841 ft, Andes, ARG), 360° Route (2016)
Kilimanjaro (19,341 ft, Eastern Rift, TZA), Western Breach (2013)

Climbs in the Cascades & Sierra Nevada (USA)

Mt. Whitney (14,505 ft, Sierra Nevada, USA), Winter Ascent (2019)
Mt. Shasta (14,179 ft), Ski Mountaineering via Avalanche Gulch (2019)
Mt. Rainier (14,411 ft), Disappointment Cleaver (2018)
Mt. Hood (11,249 ft), Hogsback Route with Ski Descent (2022)
Lassen Peak (10,463 ft), Ski Mountaineering via Vulcan Ridge (2019)
Mt. Baker (10,781 ft), Coleman Glacier (2017)

Climbs in the Alps

Mt. Blanc (15,781 ft, FRA), Trois Monts Route (2020)
Matterhorn (14,692 ft, SUI), Hornli Ridge (2020)
Eiger (13,020 ft, SUI), Mittellegi Ridge (2019)
Dent du Geant (13,170 ft, ITA), Normal Route (2019)
Großglockner (12,461 ft, AUS), Mayerl Ramp (2022)
Aiguille d'Entrèves (11,824 ft, FRA), Normal Route (2019)
Zugspitze (9,718 ft, GER), Reintal Route (2022)
Tita Seri (9,350 ft, SUI), Winter/Ski Descent (2020)

Climbs in the Pyrenees & Sierra Nevada (ESP)

Mulhacen (11,424 ft, ESP) & Mulhacen II (11,030 ft, ESP), Winter Ascent (2021)
Pic de Casamañya (9,009 ft, AND), Winter Ascent (2021)
Pedraforça (8,223 ft, ESP), Pany Rock Climbing Route (2019)
Cima de Tejada (6,778 ft, ESP), Winter Ascent (2021)

Climbs in the Rocky Mountains

Grand Teton (13,775 ft, Teton Range, USA), Lower Exum YDS5.7 to Upper Exum YDS5.5 (2021)
Middle Teton (12,805 ft, Teton Range, USA), Southwest Couloir (2021)
Mt. Moran (12,605 ft, Teton Range, USA), CMC Route YDS5.5 (2021)
14ers
Grays Peak (14,278 ft, Front Range, USA) (2021)
Torreys Peak (14,267 ft, Front Range, USA) (2021)
Mt. Evans (14,265 ft, Front Range, USA) via Summit Lake (2022)
13ers
Mt. Spaulding (13,842 ft, Front Range, USA) via Summit Lake (2022)
NY Mountain (12,550 ft, CO Rockies, USA), Winter/Ski Ascent (2019)
Colorado Mines Peak (12,392 ft, Front Range, USA) (2021)
Mount Yeckel (11,765 ft, Sawatch Range, USA), Backcountry Skiing (2022)
Larkspur Mountain (11,253 ft, Sawatch Range, USA), Backcountry Skiing (2022)
Bald Knob (11,086 ft, Sawatch Range, USA), Backcountry Skiing (2022)

Climbs in the Jura Mountains (SUI)

La Dôle (5,502 ft, La Jura VD, SUI), 5X Winter/Ski Ascent (2019/2020), Spring Ascent (2020)
La Barillette (5,013 ft, La Jura VD, SUI), Spring Ascent (2020)

Winter Ascents in the Appalachian Mountains (USA)

Mt. Washington (6,288 ft, White Mountains NH), Huntington Ravine (2018)
Mt. Adams (5,794 ft, White Mountains NH), Airline (2020)
Katahdin (5,269 ft, Baxter State Park ME), Knife-edge Ridge (2021)
Mt. Colden (4,715 ft, Adirondacks NY), Trap Dike WI2 (2018, 2022)

Other Adventures

Skied the Pika Glacier, Alaska Range, Alaska USA [Italy's Boot; Munchkins, etc.] (2021)
Ski descent of Southwestern Chutes on Mt. Adams, Cascades, Washington USA (2021)
Completed Great Virtual Race Across Tennessee [1000km in 100 days] (Summer 2020)
Cycled from Pittsburgh PA to Washington DC (2015 and 2016)
Cycled the US Pacific Coast, Seattle WA to San Diego CA (2008)
Rowed in Head of the Charles Regatta, Cambridge MA (2006)
Ran the Boston Marathon (2003)

Club Memberships & Activities

Ski Club of Washington
Explorers Club of Pittsburgh
 Mountaineering School
 Student (2017)
 Instructor (2018, 2021, 2022)
 Graduate Trip Coordinator (2018)
 Rock Climbing School
 Student (2018)
 Instructor (2022)
International Ski Club of Geneva (2020–2021)