Daniel J. Cohen

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Princeton University
Dept. of Mechanical and Aerospace Engineering
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Academic Appointments

Princeton University

Assistant Professor of Mechanical and Aerospace Engineering	2018 – present
Associate Faculty Princeton Materials Institute (PRISM)	2018 – present
Associate Faculty Chemical and Biological Engineering	2018 – present
Associate Faculty Molecular Biology	2019 – present
Associate Faculty Quantitative and Computational Biology	2020 – present

Education and Training

Stanford University
LSRF Fellow (postdoctoral) in Cell Biology — 2014 – 2017
Supervisor: W. James Nelson

Molecular Biology Laboratory at Woods Hole
Trainee in Cell Physiology — Summer, 2011

University of California, Berkeley and UCSF
Joint Ph.D. in Bioengineering — 2013

Princeton University
B.S.E. in Mechanical and Aerospace Engineering — 2008

Awards and Honors

NSF CAREER Award	2021 – present
NIH/NIGMS Outstanding Investigator Award (MIRA)	2019 – present
Alfred Rheinstein Faculty Award	2022
Princeton Engineering Commendation for Outstanding Teaching	2018-2021
Life Sciences Research Foundation Fellow, Sponsored by HHMI	2014-2017
NSF Postdoctoral Research Fellowship in Biology	offered
Electrochemical Society Daniel Cubicciotti Award	2013
National Science Foundation Graduate Research Fellow (GRFP)	2008 – 2013
ASEE-NDSEG Graduate Fellowship	2008 – 2011
UC Berkeley Lloyd Distinguished Graduate Student Fellowship	2008
Princeton University John Marshall II Memorial Award	2008

Publications

Google Scholar: https://scholar.google.com/citations?user=1xX1QU0AAAAJhl=en

Preprints Under Review

2. Heinrich MA, Alert R, Wolf A, Kosmrlj A, and **Cohen DJ**. *Tissue Tessellations*, avail. bioRxiv (Revisions at Nat. Comm., 2022)

1. Princeton Open Ventilator Monitor Consortium. *Inexpensive multi-patient respiratory monitoring system for helmet ventilation during COVID-19 pandemic*, medRxiv (2020)

Peer-Reviewed Articles

20. LaChance JM, and **Cohen DJ**. *Learning the rules of collective cell behaviors using deep attention networks*, (In Press, PLoS Comp Bio, 2022; avail. bioRxiv)

19. LaChance JM, Zajdel TJ, Schottdorf M, Saunders JL, Dvali S, Marshall C, Seirup L, Notterman DA, **Cohen DJ**. *PVP1—The People's Ventilator Project: A fully open, low-cost, pressure-controlled ventilator* (In Press, PLoS ONE, 2022)

18. Wolf A, Heinrich MA*, Breinyn I*, Zajdel TJ, and **Cohen DJ**. *Short-term stimulation of collective cell migration induces long-term, supracellular changes to tissue behavior*, PNAS Nexus (2021)

17. Shim G, Devenport DD, and **Cohen DJ**. *Overriding endogenous coordination makes cell migration more susceptible to external control*, PNAS (2021)

16. Nirody J, Rosario LD, Johnston D, and **Cohen DJ**. *Tardigrades exhibit robust interlimb coordination across walking speeds*, PNAS (2021)
Media attention: Smithsonian Institute, Scientific American, CNN Argentina, Vice, Engadget, and others

15. Zajdel TJ and **Cohen DJ**. *Come together: Bioelectric 'healing-on-a-chip' to accelerate tissue healing*, Biosensors and Bioelectronics (2021)

14. Hart KC et al., **Cohen DJ**, Tan J, Nelson WJ, and Pruit BL. *An Easy-to-Fabricate Cell Stretcher Reveals Density-Dependent Mechanical Regulation of Collective Cell Movements in Epithelia*, Cellular and Molecular Bioengineering (2021)

13. Suo et al., **Cohen DJ**, and Hazan E. *Machine Learning for Mechanical Ventilation Control*, Proceedings of Machine Learning Research v.158 (2021)

12. Zajdel, TJ., Shim G, Wang L, Rossello M, and **Cohen DJ.**, *SCHEEPDOG: Programming Electric Cues to Herd Cell Migration*, Cell Systems (2020)
Media attention: Science Magazine's Frontpage News

11. Heinrich MA, Alert R, LaChance J, Zajdel TJ, Kosmrlj A, and **Cohen DJ**, *Size-dependent patterns of cell proliferation and migration in freely-expanding epithelia*, eLife (2020)

10. Bisaria A, Hayer A, Garbett D, **Cohen DJ**, and Meyer T. *Membrane-proximal F-actin restricts local membrane protrusions and directs cell migration*, Science (2020)

9. LaChance JM and **Cohen DJ**, *Practical Fluorescence Reconstruction Microscopy for Large Samples and Low-Magnification Imaging*, PLoS Comp. Bio. (2020)

8. **Cohen DJ**, Nelson WJ. *Secret Handshakes: cell-cell recognition and adhesion*, Current Opinion in Cell Biology (2018)

7. **Cohen DJ**, Gloerich M, Nelson WJ. *Epithelial self-healing is recapitulated by a 3D biomimetic E-cadherin junction*, Proceedings of the National Academy of Sciences (2016)

6. Gloerich M, Bianchini JM, Siemers KA, **Cohen DJ**, Nelson WJ. *Cell division orientation is coupled to cell-cell adhesion by the E-cadherin/LGN complex*, Nature Communications (2016)
5. **Cohen DJ**, Nelson WJ, Maharbiz MM. *Galvanotactic control of collective cell migration in epithelial monolayers*, Nature Materials (2014)
4. **Cohen DJ**, Mitra D, Peterson K, Maharbiz MM. *A highly elastic, capacitive strain gauge based on percolating nanotube networks*, Nano Letters (2012)
3. Libby T, Moore TY, Chang-Siu E, Li D, **Cohen DJ**, Jusufi A, Full RJ. *Tail-assisted pitch control in lizards, robots and dinosaurs*, Nature (2012)
2. Chen J, Bly RA, Saad MM, Alkhodary MA, El-Backly RM, **Cohen DJ**, Kattamis N, Fatta MM, Moore WA, Arnold CB, Marei MK, Soboyejo WO. *In-vivo study of adhesion and bone growth around implanted laser groove/RGD-functionalized Ti-6Al-4V pins in rabbit femurs*, Materials Science and Engineering: C (2011)
1. **Cohen DJ**, Morfino R, Maharbiz M, *A Modified Consumer Inkjet for Spatiotemporal Control of Gene Expression*, PLoS ONE (2009)

Issued Patents

1. *Methods and apparatus for monitoring wound healing using impedance spectroscopy 2014, USPO 62/012,975* , US Patent #10,783,989
2. *Bioelectric device to program cell migration in multiple dimensions 2019, USPO 62/938,770*, Provisional Status

Invited and Contributed Talks

Invited Academic Talks

28. **Gordon Research Conference on Directed Cell Migration** Sch., 01/2023
27. **Abercrombie Meeting, Royal Microscopy Society, Oxford** invited speaker on Tissue Mechanics and Cell Migration. *Prestigious meeting held only every 5 years.* Sch., 09/2022
26. **Gordon Research Conference on Collective Behavior,** invited speaker Cellular Swarm Engineering. Sch., 06/2022
25. **Tufts University** Allen Discovery Center seminar; (virtual) November, 2021
24. **Montana State University** Cell Biology department seminar; (virtual) October, 2021
23. **Princeton University** Robotics Seminar Series September, 2021
22. **Materials Research Society, March Meeting,** Remote, Invited Speaker on Bio-electronics; (virtual) April, 2021
21. **NIH Distinguished Lecturer in Cell Biology,** National Institutes of Health–NHLBI; (virtual) April, 2021
20. **University of British Columbia; Vancouver, Canada;** Biomathematics Seminar (virtual) January, 2021
19. **Mid-Atlantic Micro-Nano Alliance, U. Maryland at College Park, MD.** Micro-engineering symposium; (virtual) October, 2020
18. **Cell Migration Seminars Series, University College London, UK.** Collective migration seminar; (virtual) August, 2020
17. **ORD Camp 2020. Google, Chicago, IL.** bioelectricity seminar January, 2020
16. **Mid-Atlantic Soft Matter Conference, Baltimore MD.** Symposium speaker September, 2019
15. **Biophysics Seminar, Brandeis University, Waltham MA.** September, 2019

14. **Biomedical Engineering Seminar, Rutgers University, Rutgers NJ.** September, 2019
13. **Biophysics Seminar, Syracuse University, Syracuse NY.** September, 2019
12. **Systems Biology Seminar, Boston University, Boston MA.** September, 2019
11. **EMBO Dynamics of Living Cells Fall Workshop, France.** Collective cell behavior seminar October, 2017
10. **Bioengineering Seminar, University of Pennsylvania, Philadelphia PA.** April, 2017
9. **Bioengineering Seminar, Columbia University, New York NY.** April, 2017
8. **Mechanical and Aerospace Engineering Seminar, Princeton University, Princeton NJ.** March, 2017
7. **Bioengineering Seminar, Carnegie-Mellon University, Pittsburgh PA.** February, 2017
6. **Life Sciences Research Foundation, Seattle WA.** Invited fellows talk October, 2017
5. **Biophysics Seminar, Institut Curie, Paris, France.** November, 2015
4. **Gordon Research Conference: Directed Cell Migration** Flash talk February, 2015
3. **Stanford Biomechanics Seminar** Post-doctoral Interview October, 2013
2. **California Academy of Arts and Sciences, San Francisco CA.** Cellular Bioelectricity October, 2013
1. **Berkeley Sensors and Actuator Center.** Research talk on bacterial bioprinting for Industrial Advisory Board Spring, 2009

Contributed Talks

('*' indicates talks given by my student)

18. **IBEC M-CELS Multicellularity Conference,** , Barcelona June, 2022
17. **SFB 2022,** , Baltimore, MD April, 2022
16. **NEBEC 2022,** , Columbia University, NYC April, 2022
15. **Biomedical Engineering Society Annual Meeting,** , Scheduled for oral presentation: COVID Cancellation October, 2021
14. **Asilomar Workshop on Bioelectronics,** Participant, COVID Cancellation September, 2021
13. **American Society for Cell Biology, Washington D.C.** Morphogenesis mini-symposium (virtual) December, 2020
12. **American Society for Cell Biology, Washington D.C.** Tissue dynamics mini-symposium: "Tissue jousting: epithelial collision dynamics" (virtual) December, 2020
11. **Society of Engineering Sciences (Virtual).** Heinrich MA*, Kosmrlj A, and Cohen DJ: "Mechanics of tissue collisions" March, 2020
10. **APS March Meeting, Boston MA.** Heinrich MA*, Kosmrlj A, and Cohen DJ: "Mechanics of tissue collisions" March, 2020
9. **American Society for Cell Biology, Washington D.C.** Cell Migration micro-symposium: "Cellular crowd control" December, 2019
8. **Materials Research Society, Boston.** Bioelectronics session speaker: "Bioelectric cellular herding" December, 2019

7. **APS March Meeting, Boston MA.** "Cellular Crowd Control" March, 2019

6. **APS March Meeting, Boston MA.** Zajdel T* and Cohen DJ: "Electrically programming cell migration" March, 2019

5. **APS March Meeting, Boston MA.** Heinrich MA*, Kosmrlj A, and Cohen DJ: "Size-dependent effects on epithelial expansion in large tissues March, 2019

4. **American Society for Cell Biology, San Francisco CA.** Micro-symposium on morphogenesis: "Cell-mimetic biomaterials" December, 2017

3. **Gordon Research Seminar/Conference: Biointerfaces, Switzerland.** Talk, Best Poster Award: "Cell-mimetic biomaterials" June, 2017

2. **SWARM 2015, Kyoto University, Japan.** "Engineering cooperative cell migration" October, 2015

1. **ICAM Collective Behavior Workshop: Cargese, France.** Talk on collective cell dynamics June, 2012

Teaching and Mentoring

Courses

Princeton University

MAE 344/566 — Biomechanics and Biomaterials 2018–Present
Princeton Teaching Commendations 2018/2020
Parental leave: 2019, 2022

MAE 567 - Crowd Control: Swarm Dynamics and Engineering Collective Behavior 2019 - Present
Princeton Teaching Commendation 2019/2020

MAE 519 - Experimental Methods and Techniques in Engineering (co-taught) 2018–Present

Postdoctoral Fellows

Anamika Singh, PhD 2021-Present

Tom Zajdel, PhD 2018-2021
current: Faculty at Carnegie Mellon, EECS

PhD Students

Graduated Alumni

Julienne LaChance MAE PhD program 2021

Matthew Heinrich MAE PhD program; co. with A. Kosmrlj 2021

Avi Wolf CBE PhD program FPO scheduled 2021

Current

Celeste Rodgriguez MOL PhD program
Isaac Breinyn QCB PhD program
Irving Miramontes MOL PhD program 2020-present

- **Kevin Suh** CBE PhD program 2020-present

Elena Cho CBE PhD program 2020-present

Gawoon Shim MAE PhD program. 2021 Harari Fellow 2019-present

Lisset Rosario MOL PhD program; co. with J. Avalos 2019-present

Service

University Service

Mentor at NSF CAREER Junior Faculty proposal workshop Oct. 2021

Lab Tales science storytelling workshop for STEM graduate students (NSF CAREER outreach) Summer 2021-present

Bioengineering Institute Steering Committee 2020-present

Bioengineering Institute Building Committee 2020-present
90+ hrs of meetings to date for Bioengineering

EE Faculty Search Committee: bioelectronics emphasis 2020-2021

Bioengineering Institute Symposium Committee Fall, 2020

MAE Graduate Committee 2019-present

First-Year BSE Advising; Mathey 2019-present

MAE Upper Class Advising 2018-Present

Engineering Biology Certificate Committee 2018-present

MAE ad hoc Data Committee Fall, 2018

Professional Activities

Gordon Research Conference Session Chair
GRC on Collective Behaviors, Resched: Summer 2022 after COVID19 delays Sch. June 2022

American Physical Society March Meeting Focus Session Organizer March 2022

National Science Foundation Study Section Nov 2021

American Physical Society March Meeting Session Chair March 2021

COVID19 Voluntary Activities
Designed and delivered 3000+ PAPR protective full-head gaskets to Penn Medicine System. Developed PVP1 Open Source ventilator; pediatric simulation testing ongoing with Cleveland Clinic for early 2021 2020-Present

PCTS Symposium on Collective Cell Migration
Co-organized with Ned Wingreen, Celeste Nelson, and Ricard Alert January, 2020

Clinical Applied Sciences and Engineering Seminar: CASES

Organizer and creator of regular clinical engineering seminars led by physicians or industrial specialists; ran Sep. 2019 to March 2020, will resume in 2021/2022 pending clinician availability.

Peer Reviewer; selected venues

PNAS, eLife, Nature, Cell Systems, Applied Physics Letters, Science Advances, Nature Methods, Nature Physics, Molecular Biology of the Cell, PLoS Biology, Nature Communications, Biophysical Journal, iScience, ACS Applied Materials and Interfaces, Biotechnology Progress, Journal of Physiology, PLoS ONE, Sensing and Biosensing Research, Journal of Cell Physiology

Outreach: *selected activities from 59 engagements since 2014. Complete list available upon request.*

Fellow of the Odd Salon and Co-Founder of Odd Salon: NYC

Odd Salon is an affiliate 501(c)3 non-profit running educational programming focused on the history of STEM and the arts in San Francisco (Public Works Theater) and New York City (The Kraine Theater). Odd Salon will return in 2022.

17. Curated Odd Salon: Chutzpah 2019
16. Co-Producer, Odd Salon: Empire 2019
15. Curated, Odd Salon: Afterlives 2018
14. Co-Producer, Odd Salon: Racket 2018
13. Co-Producer, Odd Salon: Renegades 2018
12. (Speaker) Zilvervloot: Piracy Pays 2018
11. (Speaker) Le Grand K: Life of the Kilogram 2018
10. (Speaker) Renaissance Rhinoplasty 2017
9. (Exhibitor/Speaker) Marvelous Strange Art Gallery, San Francisco 2017
8. (Speaker) Equal and Opposite: Newton and Chaloner 2017
7. (Speaker) Cracked Condyles and the Piltdown Man 2017
6. (Speaker) Secret Lives of Fiber Composites: centrifuges to erectile mechanics 2017
5. (Speaker) Turing's Morphogenesis 2016
4. (Speaker) Zilvervloot: the Largest Heist in History and Piracy Math 2016
3. (Speaker) Alcohol, Inspiration, and Strouhal Numbers in the Prose Edda 2016
2. (Speaker) Revenge through art and tall buildings 2015
1. (Speaker) Bioelectricity: From Frankenstein to the Flexner Report 2015

Tower to Town Public Lecture Series 2019

Created a public lecture series at the Princeton Public Library for researchers to gain experience presenting to the public. I presented 2 lectures myself and hosted 4 other speakers in our first season. On hold re: COVID19

Johns Hopkins Center for Talented Youth Education Day 2018, 2019

Outreach workshop with day-long teaching hands-on module on microfluidics and micro-organisms in collaboration with Prof. Michael Littman

- Extreme Biology and Waterbears 2019
- A Tale of Lizard Tails and Waterbears 2018

Nerd Nite

Nerd Nite is a national organization dedicated to technical, public lectures. These talks were given in San Francisco, CA.

6. (Speaker) Walk This Way–Bioelectricity Then and Now (@ The Battery) 2017
5. STEM representative at Bedlam Festival at the Battery 2016
4. (Speaker) The Forger and the Nazi (@ Rickshaw Stop) 2015
3. (Speaker) History of Bioelectricity (@ Rickshaw Stop) 2014
2. (Speaker) Swarm Behaviors (@ Parkway Theater) 2013
1. (Speaker) History of Frankenstein (@ Cal. Acad. of Sci.) 2013

Bay Area Arts and Sciences Interdisciplinary Council 2014-2015

3. (Speaker) Science of Swarming2014
2. (Speaker) Science of Monsters2014
1. (Exhibitor) Aggregate Space Art Gallery–Cellular Cinematography2015

Exploratorium Helix 2014

Helix was a pop-up museum affiliated with the Exploratorium in San Francisco. I did live microscopy demonstrations of Waterbears along with public lectures on extremophile biology.

Kid's in the Lab 2009-2013

I organized field trips for disadvantaged children from inner-city schools in Oakland, CA (e.g. St. Anthony's) to visit labs and resources at UC Berkeley, and to meet with graduates students to learn their stories about how they came to science.