

LEEYA ENGEL, Ph.D

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EDUCATION

Ph.D. Materials Engineering & Nanotechnologies, Tel Aviv University, Tel Aviv, Israel	2016
M.Sc. Materials Engineering & Nanotechnologies, Tel Aviv University, Tel Aviv, Israel	2014
B.Sc. Physics, The Hebrew University of Jerusalem, Jerusalem, Israel	2008

RESEARCH

- Postdoctoral Research Fellow**, Stanford University, Stanford, CA, USA 2016-present
Project: Microfabricating cell culture platforms for mechanobiology studies
Postdoctoral advisors: Prof. Alex Dunn, Prof. Beth Pruitt, Prof. Bill Weis
- Innovated micropatterning for cryo-electron tomography of cells to increase throughput and modulated cellular assembly and position to study nm-scale subcellular architecture.
 - Developed microfluidic platforms to exact spatial control over stem cell differentiation.
- Graduate Student Researcher**, Tel Aviv University, Tel Aviv, Israel 2011-2016
Project: Electroactive polymer micro-actuators
PhD advisors: Prof. Yosi Shacham, Prof. Slava Krylov
- Developed micron-scale electroactive polymer sensors and actuators (polymer MEMS).
 - Collaborated with the Dvir lab to design and microfabricate an electronic cardiac patch.
 - Characterized the behavior of a novel smart material as part of a European Union consortium applying electroactive hydrogels to treatment of cardiovascular disorders.
- Visiting Student Researcher**, University of California, Berkeley, CA, USA 2015-2016
- Initiated collaborations with labs of Prof. Liwei Lin (ME) and Prof. Arias labs (EE) to develop an integrated system for stimulating electroactive hydrogels with printed electronics.
- Undergraduate Student Researcher**, The Hebrew University of Jerusalem, Israel 2006-2007
- Explored effect of UV exposure on hydrogel crosslinking in the lab of Prof. Eran Sharon.

HONORS & AWARDS

Postdoctoral Award, Israeli Council for Higher Education (VATAT)	2016
Stanford ChEM-H Mechanobiology Postdoctoral Fellowship	2016
AVS Nellie Yeoh Whetten Award: National Student Award, American Vacuum Society	2015
International Travel Grant, Israel Ministry of Science	2015
NA'AMAT Award for Women in Engineering Sciences	2015
Excellence Award for Advising Electrical Eng. M.Sc Project (A. Klein), Tel Aviv University	2013
Excellence Award for Advising Electrical Eng. M.Sc Project (S. Kruk), Tel Aviv University	2013
Marian Gertner Medical Nanosystems Fellowship	2013
Dean's Award for Outstanding Achievement, Tel Aviv University	2013
Academic Excellence Award in Materials and Nanotechnologies, Tel Aviv University	2012
Dorothy M. and Earl S. Hoffman Travel Grant, American Vacuum Society (AVS)	2012
Best poster award at the 29 th Israel Vacuum Society conference	2011
Merit based scholarship of half tuition coverage, The Hebrew University	2005
Yeshiva University Anne Schreiber Scholarship (declined)	2004

PUBLICATIONS

14. M. Garcia, E. Sadeghipour, **L. Engel**, W.J Nelson, B.L. Pruitt
MEMS Device for Applying Shear and Tension to an Epithelium combined with
Fluorescent Live Cell Imaging. Under review in *J. Micromech. Microeng.* (2020)
13. K.W. Cui*, **L. Engel***, C.E. Dundes, T.C. Nguyen, K.M. Loh, A.R. Dunn (*equal contribution)
Spatially controlled stem cell differentiation via morphogen gradients: A comparison of
static and dynamic microfluidic platforms. *Journal of Vacuum Science & Technology A*
38 (033205). (2020) doi: 10.1116/1.5142012
12. **L. Engel**, G. Gaietta, L.P. Dow, M.F. Swift, G. Pardon, N. Volkman, W.I. Weis, D. Hanein,
B.L. Pruitt. Extracellular matrix micropatterning technology for whole cell cryogenic
electron microscopy studies. *J. Micromech. Microeng.* 29 115018. (2019)
11. **L. Engel**, C. Liu, N. Hemed, Y. Khan, A. Arias, S. Krylov, Y. Shacham-Diamand, L. Lin.
Local electrochemical control of hydrogel microactuators in microfluidics. *J.*
Micromech. Microeng. 28 (10), 105005. (2018)
10. M. Ben David, **L. Engel**, Y. Shacham-Diamand.
Spectroscopic Ellipsometry Study of Spin Coated P(VDF-TrFE-CTFE) Thin Films and P(VDF-
TrFE-CTFE)/PMMA Blends. *Microelectronic Engineering.* 17, 37-43. (2017)
9. **L. Engel***, K.R. Van Volkinburg*, M. Ben-David, G.N. Washington, S. Krylov, Y. Shacham-
Diamand. (*equal contribution) Fabrication of a self-sensing electroactive polymer
bimorph actuator based on polyvinylidene fluoride and its electrostrictive terpolymer.
Proc. SPIE 9798, Electroactive Polymer Actuators and Devices (EAPAD). (2016)
8. R. Feiner, **L. Engel**, S. Fleisher, M. Malki, A. Shapira, Y. Shacham- Diamand, T. Dvir
Engineered hybrid cardiac patches with multifunctional electronics. *Nature Materials.*
(2016) DOI: 10.1038/NMAT4590
7. K. Hakshur*, **L. Engel***, Y. Shacham- Diamand, S. Ruschin (*equal contribution)
High surface area thermoplastic polymer films fabricated by mechanical tearing using
nano-porous silicon. *Microelectronic Engineering* 150, 71-73. (2016)
6. **L. Engel**, S. Kruk, J. Shklovsky, S. Krylov, Y. Shacham-Diamand
A study toward the development of an electromechanical poly(vinylidene fluoride-
trifluoroethylene-chlorofluoroethylene) buckling membrane actuator.
J. Micromech. Microeng. 24 (12), 125027. (2014)
5. N. Jackson, P. Verbrugghe, D. Cuypers, K. Adesanya, **L. Engel**, et al.
A Cardiovascular Occlusion Method based on the use of a Smart Hydrogel.
IEEE Transactions on Biomedical Engineering 62 (2), 399-406. (2014)
4. **L. Engel**, S. Krylov, Y. Shacham-Diamand
Thermoplastic nano-imprint lithography of electro active polymer poly(vinylidene
fluoride-trifluoroethylene-chlorofluoroethylene) for micro/nano scale sensors and
actuators. *J. Micro/Nanolithography, MEMS, and MOEMS* 13 (3), 033011-033011. (2014)
3. **L. Engel**, O. Berkh, K. Adesanya, J. Shklovsky, P. Dubruel, S. Krylov, Y. Shacham-
Diamand
Actuation of a novel Pluronic-based hydrogel: Electromechanical response and the
role of applied current. *Sensors and Actuators B: Chemical* 191, 650-658. (2013)
2. J. Shklovsky*, **L. Engel***, Y. Sverdlov, S. Krylov, Y. Shacham-Diamand (*equal contribution)
Nano-imprinting lithography of P(VDF-TrFE-CFE) for flexible freestanding MEMS devices.
Microelectronic Engineering. 100, 41-46. (2012)
1. **L. Engel**, J. Shklovsky, D. Schreiber, S. Krylov, Y. Shacham-Diamand
Freestanding smooth micron-scale polydimethylsiloxane (PDMS) membranes by thermal
imprinting. *J. Micromech. Microeng.* 22 (4), 045003. (2012)

PATENTS PENDING

2. T. Dvir, Y. Shacham-Diamand, R. Feiner, **L. Engel**
Electronic Scaffold and Uses Thereof. U.S. Patent 61/905,230. Filed November 17, 2014.
1. F. Stam, N. Jackson, P. Dubruel, K. Adensanya, A. Embrechts, E. Mendes, H.P. Neves, P. Herijgers, P. Verbrugghe, Y. Shacham, **L. Engel**, S. Krylov
Hydrogel based occlusion systems. U.S. Patent 13/832,069. Filed March 15, 2013.

ORAL PRESENTATIONS AT INTERNATIONAL CONFERENCES

6. 45th International Conference on Micro and Nano Engineering (MNE), Sept 23-26, 2019, Rhodes, Greece. *Extracellular matrix protein micropatterning technology for whole cell cryogenic electron microscopy studies*
5. Materials Research Society (MRS) Fall Meeting and Exhibit, Nov 29-Dec 4, 2015, Boston, MA. *Electroactive Polymers for Integrated Medical Microsystems*
4. AVS 62nd International Symposium and Exhibition, Oct 18-23, 2015, San Jose, CA. *Frequency Based Deflection Control of a Self-sensing Electroactive Polymer Bimorph Actuator*
3. AVS 60th International Symposium and Exhibition, Oct 28-Nov2, 2013, Long Beach, CA. *Nano-Imprinting Lithography of P(VDF-TrFE-CFE) for Flexible Freestanding Bio-MEMS Devices*
2. 39th International Conference on Micro and Nano Engineering (MNE), Sept 16-19, 2013, London, UK. *Thermoplastic Nano-Imprinting Lithography of Electro Active Polymer P(VDF-TrFE-CFE) for Nano Scale Sensors and Actuators*
1. AVS 59th International Symposium and Exhibition, Oct 28-Nov2, 2012, Tampa, FL.
 - a. *Electric-Stimulus-Responsive Pluronic Hydrogels as Actuators*
 - b. *Electroactive Polymeric MEMS Actuators Fabricated by Thermal Imprinting of P(VDF-TrFE-CFE) and Polydimethylsiloxane (PDMS)*

INVITED LECTURES

8. Bay Area cryo-EM meeting, Feb 6, 2020, Dublin, CA
Micropatterning of ECM proteins on EM grids
7. Nature research webinar hosted by Alvéole, Oct 15, 2019
Micropatterning on EM grids: A strategy for improving cryo-ET workflow
6. Cryo-ET Club, Stanford University, Sept. 4, 2019, Stanford, CA
Extracellular matrix micropatterning technology for whole cell cryogenic electron microscopy studies
5. Seminar at Stanford University, Feb 9, 2015, Stanford, CA
Electroactive polymers for medical applications
4. Seminar at PARC, Oct 2, 2015, Palp Alto, CA
Electroactive polymer micro-actuator technologies
3. Women's Day Event at Tel Aviv University, March 8, 2015, Tel Aviv University, Tel Aviv, Israel
Invited representative of female engineering PhD students.
Micro/Nano Scale Sensors and Actuators Based on Electroactive Polymers
2. 1st Israel Vacuum Society (IVS) Annual Student Meeting, April 29, 2014, Tel Aviv, Israel
Electroactive Polymer Actuators
1. IEEE 27th Convention of Electrical and Electronics Engineers in Israel, Nov 14, 2012, Eilat, Israel. *Nano-Imprinting Lithography of P(VDF-TrFE-CFE) for Flexible Freestanding Bio-MEMS Devices*

TEACHING EXPERIENCE

Guest Lecturer , Stanford University, Stanford, CA	
MATSCI 85N: Health Fab: Making Stuff for Life	2019
ME 342A: Mechanobiology and Biofabrication Methods (BIOPHYS 342A)	2017
Teaching Assistant , Tel Aviv University, Tel Aviv, Israel	
Linear Algebra, International School of Electrical Engineering	2013-2014
Materials Lab Instructor. Tensile testing & precipitation hardening	2011-2013
Physics I, School of Electrical Engineering	2011
GMAT/GRE Course Instructor & Assistant Director , MBA Center, Tel Aviv, Israel	2009-2011
Designed curriculum for eight-session GMAT math course.	
Delivered weekly classes and assigned weekly homework.	
Provided one-on-one tutoring for GMAT and GRE	

MENTORING

Belle Sow, Undergraduate Research Mentor, Stanford University	2019-2020
Tina Nguyn, High School Student Mentor, Stanford University RISE Internship	2019
Liam Dow, Graduate Research Mentor, Stanford University	2018-2019
Vivek Gupta, Graduate Research Mentor, Stanford University	2017
Chengming Liu, Undergraduate Research Mentor, UC Berkeley	2016-2017
Dimitry Mazor, Graduate Research Mentor, Tel Aviv University	2015
Shahar Kruk, Graduate Research Mentor, Tel Aviv University (excellence award)	2013
Amir Klein, Graduate Research Mentor, Tel Aviv University (excellence award)	2013

SERVICE & LEADERSHIP

- Organized the EM Grid Micropatterning Workshop at Stanford on Feb 12, 2020.
- Co-organized the CHEM-H Mechanobiology Symposium at Stanford in 2018 as part of the ChEM-H Interdisciplinary Postdoctoral Training Program in Quantitative Mechanobiology.
- Launched and co-chaired 1st and 2nd Israel Vacuum Society Annual Student Meeting as founding president of student chapters of the Materials Research Society (MRS) and Israel Vacuum Society (IVS) in 2014 and 2015.
- Review for J Micromech Microeng, ACS Sustainable Chem Eng, Sensor Actuat A-Phys.

INDEPENDENT FUNDING

ChEM-H Mechanobiology Postdoctoral Fellowship , Stanford University	\$145k	7/2016-10/2019
Cell-cell adhesion studies using microfabricated force-sensing culture platforms		
Postdoctoral Award , Israeli Council for Higher Education	\$42k	1/2017-1/2019

LANGUAGES

English (Native), Hebrew (Fluent in reading, writing and speaking)