

# **R E S U M E**

## **1. PERSONAL DETAILS**

Full Name: Leeya Engel  
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## **2. ACADEMIC DEGREES**

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

## **3. ACADEMIC APPOINTMENTS**

Oct 2022- Senior Lecturer, Mechanical Engineering, Technion – Israel Institute of Technology  
2018-2022 Postdoctoral Research Fellow, Chemical Engineering, Stanford University  
2016-2018 Postdoctoral Research Fellow, Mechanical Engineering, Stanford University  
2015-2016 Visiting Student Researcher, Mechanical Engineering, UC Berkeley

## **4. PROFESSIONAL EXPERIENCE (outside academia)**

2009-2011 GMAT/GRE Course Instructor & Assistant Director, MBA Center, Tel Aviv, Israel

## **5. RESEARCH INTERESTS**

Bio-microsystems, Bio-MEMS, Microfabrication, Mechanobiology, Cryo-electron tomography

## **6. TEACHING EXPERIENCE**

### **Teaching Assistant**

2011 Physics I, Undergraduate level, School of Electrical Engineering, Tel Aviv University  
2011-2013 Materials Lab, Undergraduate level, Materials Engineering, Tel Aviv University  
2013-2014 Linear Algebra, Undergraduate level, International School of Electrical Engineering, Tel Aviv University

### **Guest Lecturer**

2017 Mechanobiology and Biofabrication Methods, Graduate level, Stanford University  
2019 Health Fab: Making Stuff for Life, Undergraduate level, Stanford University  
2022 Exposure to Research in Mechanical Engineering, Technion – Israel Institute of Technology

## **7. TECHNION ACTIVITIES**

## **8. DEPARTMENTAL ACTIVITIES**

2023 Serve on the Advanced Degrees Committee  
2023 Presented a talk and served on panel at the Mechanical Engineering Open Day  
2023 Serve on the Committee for Shared Lab Facilities (GTIIT)  
2023 Undergraduate Project Coordinator

## **9. PUBLIC PROFESSIONAL ACTIVITIES**

2014 Founded student chapter of the Israel Vacuum Society (IVS) in Israel.  
 2014 Founded student chapter of the Materials Research Society (MRS) at Tel Aviv University.  
 2016 Reviewed for ACS Sustainable Chemistry & Engineering.  
 2016 Reviewed twice for Sensors and Actuators A: Physical.  
 2017, 2018, 2019 Reviewed for Journal of Micromechanics and Microengineering.  
 2020 Reviewed for Polymers for Advanced Technologies.  
 2020 Reviewed for the 64th International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN) as part of the Program Committee (cancelled due to COVID-19).  
 2021 Served on the Program Committee for EIPBN June 1-4, 2021.  
 2021 Reviewed for *JoVE Journal*.  
 2021 Reviewed for *BIOCELL*.  
 2021 Reviewed for *ACS Applied Materials & Interfaces*.  
 2021-2022 Co-chaired the Stanford University Postdoctoral Association (SURPAS) Justice Equity Diversity and Inclusion Committee (JEDI).  
 2021-2022 Served on the Strategic Vision Team for the Vice Provost for Graduate Education and Postdoctoral Affairs (VPGE), Stanford University.  
 2022 Served on the Program Committee and as a Session Chair at the 65th International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN).  
 2022 Reviewed for *JoVE Journal*.  
 2022 - present Serve as Area Editor for *Micro and Nano Engineering* (MNE), an Elsevier Journal.  
 2022 Served on the AVS Nanoscale Science and Technology Division (NSTD) Executive Committee.  
 2022 Reviewed for *Journal of Vacuum Science and Technology*.  
 2022 Session chair at the 48<sup>th</sup> International Conference on Micro and Nano Engineering (MNE), Leuven, Belgium.  
 2023 Serve on the Program Committee and Session Chair at the 66<sup>th</sup> International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN).  
 2023 Panelist at the Early Career Panel Discussion at the 2023 EIPBN WIN event June 1, 2023  
 2023 Topic Member in the Nanoscale Science and Technology Division program committee for the AVS 69th International Symposium & Exhibition.  
 2023 Reviewed for *Nature Communications*.

## **10. MEMBERSHIP IN PROFESSIONAL SOCIETIES**

2012-2015, 2022 Member, American Vacuum Society (AVS)  
 2015-2016 Member, Materials Research Society (MRS)  
 2017-2018, 2020-2021 Member, Biophysical Society (BPS)  
 2018-2021 Member, American Society for Cell Biology (ASCB)  
 2021 Member, Microanalysis Society (MAS)  
 2022 Member, International Micro and Nano Engineering society (iMNEs)

## **11. FELLOWSHIPS, AWARDS AND HONORS**

2022-2026 Diane and Guilford Glazer Foundation Faculty Fellowship, Technion - IIT  
 2022 Stanford Bio-X Travel Award  
 2017 Postdoctoral Award from Israeli Council for Higher Education (VATAT)  
 2016 ChEM-H Mechanobiology Postdoctoral Fellowship, Stanford University  
 2015 Nellie Yeoh Whetten Award, National Student Award from American Vacuum Society

2015 NA'AMAT Award for Women in Engineering Sciences  
 2013 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 Institute for Medical Nanosystems Fellowship, Tel Aviv University  
 2013 Dean's Award for Outstanding Achievement, Tel Aviv University  
 2012 Academic Excellence Award in Materials and Nanotechnologies, Tel Aviv University  
 2012 Dorothy M. and Earl S. Hoffman Travel Grant, American Vacuum Society  
 2011 Best poster award at the 29<sup>th</sup> Israel Vacuum Society Conference  
 2005 Merit based scholarship of half tuition coverage, The Hebrew University of Jerusalem

## **12. MENTORING**

2023 Nadav Jacobsen, M.Sc. Project Mentor, Technion - IIT  
 2023 Hila Waizman, M.Sc. Project Mentor, Technion - IIT  
 2023 Shani Tchernier, Ph.D. Research Mentor, Technion - IIT  
 2019-2022 Kiara Cui, Graduate Student Mentor, Stanford University  
 2021 Minsung Cho, Graduate Research Mentor, Stanford University  
 2019-2020 Belle Sow, Undergraduate Research Mentor, Stanford University  
 2019 Tina Nguyen, High School Student Mentor, Stanford University RISE Internship  
 2018-2019 Liam Dow, Graduate Research Mentor, Stanford University  
 2017 Vivek Gupta, Graduate Research Mentor, Stanford University  
 2016-2017 Chengming Liu, Undergraduate Research Mentor, UC Berkeley  
 2016 Moti Ben-David, M.Sc. Research Mentor, Tel Aviv University  
 2015 Dimitry Mazor, M.Sc. Research Mentor, Tel Aviv University  
 2013 Shahar Kruk, M.Sc. Research Mentor, Tel Aviv University (excellence award)  
 2013 Amir Klein, M.Sc. Research Mentor, Tel Aviv University (excellence award)

## **13. SPONSORED LONG-TERM VISITORS AND POST-DOCTORAL ASSOCIATES**

### **14. RESEARCH GRANTS**

2016 Stanford University ChEM-H, \$145,000, Cell-cell Adhesion Studies Using Microfabricated Force-sensing Culture Platforms, PI: Leeya Engel  
 2017 VATAT, \$42,000, Cell-cell Adhesion Studies Using Microfabricated Force-sensing Culture Platforms, PI: Leeya Engel  
 2021 NIH National Network for Cryo-ET, access to training and cryo-FIB/cryo-ET equipment at the Stanford-SLAC Cryo-ET Specimen Preparation Center, Visualizing the architecture of cell-cell adhesions in cardiomyocytes, PI: Alexander Dunn

## **15. PUBLICATIONS**

### **Theses**

2016 Leeya Engel, Electroactive Polymer Micro-actuators, Tel Aviv University

### **Refereed papers in professional journals**

#### **Published papers**

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)
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)
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)
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)
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 (20), 399-406. (2014)
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)
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)
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
9. 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)
10. **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)
11. **L. Engel**, G. Gaietta, L.P. Dow, M.F. Swift, G. Pardon, N. Volkmann, W.I. Weis, D. Hanein, B.L. Pruitt. Extracellular matrix micropatterning technology for whole cell cryogenic electron microscopy studies. *J Micromech Microeng* 29 (11). (2019)
12. 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
13. 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. *J Micromech Microeng* 30 125004. (2020)
14. **L. Engel\***, C.G. Vasquez\*, E.A. Montabana, B.M. Sow, M.P. Walkiewicz, W.I. Weis, A.R. Dunn (\*equal contribution). Lattice micropatterning for cryo-electron tomography studies of cell-cell contacts. *Journal of Structural Biology* 213(4), 107791. (2021)

### Submitted papers

15. K.W. Cui\*, **L. Engel\***, K.J. Liu, V.T. Vachharajani, C.E. Dundes, S.L. Zheng, M. Begur, K.M. Loh, L. Ang, A.R. Dunn (\*equal contribution). A microfluidic platform for anterior-posterior human endoderm patterning via countervailing morphogen gradients *in vitro*. *iScience*. (2023)

### Refereed papers in conference proceedings

**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, Las Vegas, Nevada, USA.

### **Patents granted**

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 Appl. No.: 13/832,069. (2013)
2. T. Dvir, Y. Shacham-Diamand, R. Feiner, **L. Engel**. Electronic Scaffold and Uses Thereof. U.S. Patent Appl. No.: 61/905,230. (2014)

### **Patents submitted**

3. S.L. Oliver and **L. Engel**. Affinity capture system for electron microscopy. U.S. Patent Appl. No.: 63/334470. (2022)

## **16. CONFERENCES**

### **Invited talks**

1. **L. Engel**, et al., Micropatterning of Electron Microscopy Grids for Improved Cryo-electron Tomography Throughput, 65<sup>th</sup> International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN), New Orleans, Louisiana, USA, June 3, 2022.
2. **L. Engel**, Micropatterning cells for cryo-FIB and cryo-ET, CZI Imaging Institute Workshop on Frontiers for CryoET: Hardware Developments, Redwood City, CA, USA, May 22-25, 2023.
3. **L. Engel**, et al., Micropatterning human induced pluripotent stem cell cardiomyocytes for cryo-electron tomography studies, European Materials Research Society Meeting, Warsaw, Poland, September 18-21 2023.

### **Contributed international talks**

1. **L. Engel** et al., Electric-Stimulus-Responsive Pluronic Hydrogels as Actuators, AVS 59<sup>th</sup> International Symposium and Exhibition, Tampa, FL, USA, Oct 28-Nov 2, 2012, oral.
2. J. Shklovsky, **L. Engel** et al., Electroactive Polymeric MEMS Actuators Fabricated by Thermal Imprinting of P(VDF-TrFE-CFE) and Polydimethylsiloxane (PDMS), AVS 59<sup>th</sup> International Symposium and Exhibition, Tampa, FL, USA, Oct 28-Nov 2, 2012, oral.
3. **L. Engel** et al., Thermoplastic Nano-Imprinting Lithography of Electro Active Polymer P(VDF-TrFE-CFE) for Nano Scale Sensors and Actuators, 39<sup>th</sup> International Conference on Micro and Nano Engineering (MNE), London, UK, Sept 16-19, 2013, oral.
4. **L. Engel** et al., Nano-Imprinting Lithography of P(VDF-TrFE-CFE) for Flexible Freestanding Bio-MEMS Devices, AVS 60<sup>th</sup> International Symposium and Exhibition, Long Beach, CA, USA, Oct 28-Nov 2, 2013, oral.
5. **L. Engel** et al., Frequency Based Deflection Control of a Self-sensing Electroactive Polymer Bimorph Actuator, AVS 62<sup>nd</sup> International Symposium and Exhibition, San Jose, CA, USA, Oct 18-23, 2015, oral.
6. **L. Engel** et al., Electroactive Polymers for Integrated Medical Microsystems, Materials Research Society (MRS) Fall Meeting and Exhibit, Boston, MA, USA, Nov 29-Dec 4, 2015, oral.
7. **L. Engel** et al., Extracellular matrix protein micropatterning technology for whole cell cryogenic electron microscopy studies, 45<sup>th</sup> International Conference on Micro and Nano Engineering (MNE), Rhodes, Greece, Sept 23-26, 2019, oral.
8. **L. Engel** et al., Micropatterning of Electron Microscopy Grids for Improved Cellular Cryo-electron Tomography Throughput, Microscopy & Microanalysis (M&M) 2021, Virtual, August 5, 2021, oral.

9. L. Engel et al., Micropatterning of Electron Microscopy Grids for Improved Cellular Cryo-electron Tomography Throughput, 48<sup>th</sup> International Conference on Micro and Nano Engineering (MNE), Leuven, Belgium, Sept 19-23, 2022, oral.
10. L. Engel, et al., A Workflow for Nanoscale Imaging of Cardiomyocytes Differentiated from Pluripotent Stem Cells, 66<sup>th</sup> International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN), San Francisco, CA, USA, May 30-June 2, 2023.

### **Contributed talks in Israel**

11. L. Engel, et al., Nano-Imprinting Lithography of P(VDF-TrFE-CFE) for Flexible Freestanding Bio-MEMS Devices, IEEE 27<sup>th</sup> Convention of Electrical and Electronics Engineers in Israel, Eilat, Israel, Nov14-17, 2012, oral.
12. L. Engel, et al. Electroactive Polymer Actuators, 1<sup>st</sup> Israel Vacuum Society (IVS) Annual Student Meeting, Tel Aviv, Israel, April 29, 2014, oral.

### **Contributed posters**

1. L. Engel, et al. Nano-imprinting Lithography of P(VDF-TrFE-CFE) and Poly(dimethylsiloxane) (PDMS) for Integrated Multi-Polymer MEMS Devices. 29<sup>th</sup> IVS Annual Conference, Herzliya, Israel, June 6, 2011, poster.
2. L. Engel, et al. Electrically Induced Volume Transitions and Bending of Pluronic Based Hydrogels. 8<sup>th</sup> Tel Aviv University Nano Workshop, Galilee, Israel, June 26-28, 2012, poster.
3. L. Engel, et al. Nano-imprinting Lithography of P(VDF-TrFE-CFE) and Poly(dimethylsiloxane) (PDMS) for Flexible Freestanding MEMS Devices. 37<sup>th</sup> Conference on Micro and Nano Engineering (MNE), Berlin, Germany, Sept. 19-23, 2011, poster.
4. L. Engel, et al. Nano-imprinting Lithography of P(VDF-TrFE-CFE) and Poly(dimethylsiloxane) (PDMS) for Flexible Freestanding MEMS Devices. 15<sup>th</sup> Israel Materials Engineering Conference, Dead Sea, Israel, Feb 28-Mar 1, 2012, poster.
5. L. Engel, G. Gaietta, L.P. Dow, N. Volkmann, W.I. Weis, D. Hanein, B.L. Pruitt. Extracellular Matrix Protein Micropatterning for Whole-cell Cryo-electron Microscopy Studies. Society for Cell Biology (ASCB) and European Molecular Biology Organization (EMBO) Meeting, San Diego, CA, USA, Dec 11, 2018, poster.
6. L. Engel, C.G. Vaquez, E. Montabana, W.I. Weis, A.R. Dunn. Micropatterning of EM Grids for Cryo-electron Tomography of Endothelial Cell-cell Junctions. American Society for Cell Biology (ASCB) and European Molecular Biology Organization (EMBO) Meeting, Washington, DC, USA, Dec 7-11, 2019, poster.
7. L. Engel, C.G. Vaquez, E. Montabana, B.M. Sow, W.I. Weis, A.R. Dunn. Micropatterning of EM Grids for Cryo-electron Tomography of Endothelial Cell-cell Junctions. American Society for Cell Biology (ASCB) and European Molecular Biology Organization (EMBO) Online Meeting, Cell Bio Virtual 2020, Dec 16, 2020, poster.
8. L. Engel, C.G. Vaquez, E. Montabana, B.M. Sow, M. Walkiewicz, W.I. Weis, A.R. Dunn. Lattice Micropatterning of Electron Microscopy Grids for Improved Cryo-electron Tomography Throughput. 65<sup>th</sup> Biophysical Society (BPS) Annual Meeting, Virtual, Feb 24, 2021, poster.

### **Participation in organizing conferences**

1. 1<sup>st</sup> Annual IVS Student Meeting, Tel Aviv University, 2014, Co-founder and Co-organizer
2. 2<sup>nd</sup> IVS-MRS Student Meeting, Tel Aviv University, 2015, Co-chair of Program Committee
3. ChEM-H Mechanobiology Symposium, Stanford University, 2018, Co-organizer
4. EM Grid Micropatterning Workshop, Stanford University, 2020, Organizer
5. 64<sup>th</sup> International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN), 2020, served on Program Committee (cancelled due to COVID-19)
6. EIPBN, Virtual, 2021, serve on Program Committee

7. 65<sup>th</sup> International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN), 2022, serve on Program Committee and chair the “Biomedical Devices II” session.
8. 66<sup>th</sup> International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication (EIPBN), 2023, serve on Program Committee and chair the “MEMS/NEMS” session.

## **17. Notes:**

### **Invited lectures**

1. Electroactive polymers for medical applications, Seminar at Stanford University, Stanford, CA, USA, Feb 9, 2015.
2. Micro/Nano Scale Sensors and Actuators Based on Electroactive Polymers, Representative Speaker of female engineering graduate students at Women’s Day Event at Tel Aviv University, Tel Aviv, Israel, March 8, 2015.
3. Electroactive polymer micro-actuator technologies, Seminar at PARC, Palo Alto, CA, USA, Oct. 2, 2015.
4. Extracellular matrix micropatterning technology for whole cell cryogenic electron microscopy studies, Stanford University Cryo-ET Club, Stanford, CA, USA, Sept. 4, 2019.
5. Micropatterning on EM grids: A strategy for improving cryo-ET workflow, Nature.com webinar, Oct 15, 2019.
6. Micropatterning of ECM proteins on EM grids, Bay Area Cryo-EM Meeting, Dublin, CA, USA, Feb 6, 2020.
7. Digging deeper into cellular mechanisms with micropatterning and cryo-ET, Alveole Tech Talk, ASCB/EMBO Cell Bio Virtual 2020, Dec 9, 2020.
8. Microelectromechanical Systems for Mechanobiology, Faculty Seminar, Faculty of Mechanical Engineering, Technion, Dec 31, 2020.
9. There is no single track to the tenure track: my experience from PhD and Postdoc to Assistant Prof., Electron Ion and Photon Beam Nanotechnologies (EIPBN) Women in Nanotechnology (WIN) Monthly event, virtual, Jan 6, 2023.
10. Micropatterning EM Grids to Streamline Cryo-ET Sample Preparation, Mini symposium on Upcoming trends in cryo-EM, Alveole/Delmic Webinar, March 22, 2023.
11. Micropatterning for Cryo-electron Tomography Studies of Cells, Life Sciences Department Seminar, Ben Gurion University, March 29, 2023.