

Dr. Israel Kellersztein

Department of Mechanical and Civil Engineering
California Institute of Technology
1200 E California Blvd, MC 104-44, Pasadena, CA 91125.
israelke@caltech.edu
<https://israelke.people.caltech.edu>

General Information

Place of birth: Mexico City, Mexico.

Date of birth: August 1st, 1985.

Military service: Commander in the Shaked battalion of the Givati Brigade, IDF, Israel.

Research Interests

Hierarchical structures, multiscale properties, mechanics of polymeric and biological composites, bioinspired structural materials.

Education

Weizmann Institute of Science, Israel.

PhD, Chemical Sciences, Dept. of Materials and Interfaces, 2016-2020.

Thesis: "The Structure and Mechanical Function of Scorpion Pincers".

Advisor: Prof. H. Daniel Wagner

Shenkar College of Engineering and Design, Israel.

MSc, Polymers and Plastics Engineering, *CUM LAUDE*, 2013-2015.

Thesis: "Chemical Surface Modification of Wheat Straw Fibers for Polymers Reinforcement".

Advisor: Prof. Ana Dotan

Shenkar College of Engineering and Design, Israel.

BSc, Polymers and Plastics Engineering, 2010-2014.

Research Experience

Postdoctoral Scholar Research Associate, Department of Mechanical and Civil Engineering, California Institute of Technology (03/2021-current):

Project: “Reduced carbon-emission biocomposites to replace plastics and engineered woods”
Advisor: Prof. Chiara Daraio

Postdoctoral Fellow, Department of Materials and Interfaces, Weizmann Institute of Science (10/2020- 02/2021):

Project: “Mechanical characterization of single silkworm fibers for multifunctional biocomposites”
Advisor: Dr. Ulyana Shimanovich

Graduate Research Assistant, Department of Materials and Interfaces, Weizmann Institute of Science, (9/2015-3/2016).

Supervisor: Prof. H. Daniel Wagner

Publications

10. H. Zhang*, **I. Kellersztein***, G. Freychet, M. Zhernenkov, H. D. Wagner and J. R. Greer, “*Chemo-mechanical-microstructural coupling in the tarsus exoskeleton of the scorpion *Scorpio palmatus**”, In Press, *Acta Biomater.*, 2023. *Equal contribution
9. **I. Kellersztein**, I. Greenfeld and H.D. Wagner, “*Structural analysis across length scales of the scorpion pincer cuticle*”, *Bioinspir. Biomim.* 16 026013, 2021.
8. I. Greenfeld*, **I. Kellersztein***, and H.D. Wagner, “*Nested helicoids in biological microstructures*”, *Nat Comm* 11, 224, 2020. *Equal contribution.
7. **I. Kellersztein**, S. R. Cohen, B. Bar-On, and H. D. Wagner, “*The exoskeleton of scorpions’ pincers: Structure and micro-mechanical properties*”, *Acta Biomater.*, vol. 94, pp. 565–573, 2019.
6. **I. Kellersztein**, U. Shani, I. Zilber, and A. Dotan, “*Sustainable composites from agricultural waste: The use of steam explosion and surface modification to potentialize the use of wheat straw fibers for wood plastic composite industry*”. *Polym. Compos.*, 40: E53-E61, 2019.
5. D.B. Anthony, X. Sui, **I. Kellersztein**, H.G. De Luca, E.R. White, H.D. Wagner, E.S. Greenhalgh, A. Bismarck, M.S.P. Shaffer, “*Continuous carbon nanotube synthesis on charged carbon fibers*”, *Compos. Part A Appl. Sci. Manuf.*, vol. 112, pp. 525–538, 2018.
4. W. Ignaczak, X. Sui, **I. Kellersztein**, H. D. Wagner, and M. El Fray, “*The effect of fibre sizing and compatibilizer of polypropylene/poly(butylene terephthalate) blends on the mechanical and interphase properties of basalt fibre reinforced composites*” *Polym. Int.* 67: 414-421, 2018.
3. **I. Kellersztein** and A. Dotan, “*Agricultural waste can replace wood in plastic composites*”, *Plastics research online*, Society of Plastics Engineering, 2017. DOI: 10.2417/spepro.006970.

2. **I. Kellersztein**, E. Amir, and A. Dotan, “*Grafting of wheat straw fibers with poly (ϵ -caprolactone) via ring-opening polymerization for poly(lactic acid) reinforcement*”, *Polym. Adv. Technol.*, vol. 27, no. 5, 2016.

1. **I. Kellersztein** and A. Dotan, “*Chemical surface modification of wheat straw fibers for polypropylene reinforcement*,” *Polym. Compos.*, 37: 2133-2141, 2016.

Honors and Awards

Fulbright Postdoctoral Fellowship	2020
The Moshe Meir Horwitz Fund Award, KKL	2019
Israeli Student elected for SAMPE Europe 2015, Amiens, France.	2015
The Yaakov Rozen Award for Design and Sustainable Technologies	2015
Distinction in Studies, Shenkar College of Engineering and Design	2013 and 2014
Heseg Foundation Fellowship	2010-2014

Major Conference Contributions

1. Polymer Processing Society (PPS), Europe-Africa PPS Conference, Tel Aviv, Israel, October 2014. (Oral presentation)
2. Green Plastics, Packaging and Environment Conference, Shenkar College of Engineering and Design, Ramat Gan, Israel, January 2015. (Oral presentation)
3. Society for the Advancement of Material and Process Engineering (SAMPE), SAMPE Europe 2015, Amiens, France, September 2015. (Poster)
4. Israel Polymers and Plastics Society (IPPS), 44th annual meeting, Jerusalem, Israel, December 2015. (Poster)
5. Society for the Advancement of Material and Process Engineering (SAMPE), SAMPE Israel Conference, Hertzliya, Israel, September 2016. (Oral presentation)
6. The Israel Society for Microscopy (ISM), The 51st Annual Meeting of the Israel Society for Microscopy, Weizmann Institute of Science, Rehovot, Israel, May 2017. (Poster)
7. Israel Vacuum Society, IVS-MRS 2017 Student Conference, Weizmann Institute of Science, Rehovot, Israel, July 2017. (Poster)
8. 4th Euro Bio-inspired Materials 2018, International School and Conference on Biological Materials Science, Potsdam, Germany, March 2018. (Poster)
9. Israel Vacuum Society, IVS-MRS 2018 Student Conference, Weizmann Institute of Science, Rehovot, Israel, July 2018. (Poster)

10. Society for the Advancement of Material and Process Engineering (SAMPE), SAMPE Israel Conference, Hertzliya, Israel, September 2018. (Oral presentation)
11. The 11th Meeting of the Israel Association of Arachnology, Midreshet Sde Boker, Israel, October 2018. (Oral presentation)
12. Inaugural Celebration: Breaking Resolution Barriers in Electron Imaging, Weizmann Institute of Science Rehovot, Israel, April 2019. (Poster)
13. The Israel Society for Microscopy (ISM), the 53rd Annual Meeting of the Israel Society for Microscopy, Tel Aviv, Israel, May 2019. (Oral presentation + poster)
14. Israel Vacuum Society, IVS-IPSTA 2019- 37th Annual Conference of the Israel Vacuum Society, Sammy Ofer Stadium, Haifa, Israel, September 2019. (Oral presentation)
15. Multifunctional Materials and Structures, Gordon Research Conference, Ventura Beach Marriot, Ventura, CA, United States, January 2020. (Poster)
16. Multifunctional Materials and Structures, Gordon Research Conference, Ventura Beach Marriot, Ventura, CA, United States, September 2022. (Poster)

Symposiums and Seminars

1. SAMPE Europe Students Symposium 2015, Society for the Advancement of Material and Process Engineering (SAMPE), Amiens, France, September 2015. (Oral presentation)
2. The 2017 Symposium on Polymeric Biomaterials, "10 years of The Division of Biomaterials and Microbiological Technologies", West Pomeranian University of Technology, Szczecin, Poland, May 2017. (Oral presentation)
3. Electron Microscopy Unit Division Seminar, Weizmann Institute of Science, Rehovot, Israel, January 2020. (Oral presentation)
4. Group seminar, Department of Mechanical Engineering, Stanford University, Stanford, CA, United States, January 2020. (Oral presentation)
5. Group seminar, Division of Engineering and Applied Science, California Institute of Technology, Pasadena, CA, United States, January 2020. (Oral presentation)
6. Group seminar, John A. Paulson School of Engineering and Applied Sciences, Harvard University, Cambridge, MA, United States, July 2020. (Oral presentation).
7. Resnick Sustainability Institute Research Seminar, California Institute of Technology, Pasadena, CA, United States, May 2021. (Virtual presentation)

Professional Experience

Israel Plastics and Rubber Center, Ramat Gan, Israel.

Research Assistant, R&D Engineer, Supervisor: Prof. Ana Dotan

2013-2015

Teaching experience and Program coordination

Guest lecturer at California Institute of Technology (2022):

ME012B- Mechanics of Materials

Instructor at Shenkar College (10/2017-2/2021):

Plastics Processing Lab.

Academic Coordinator of the chemical research at the Davidson Institute for Science Education in the “Alpha Program” (11/2019-2/2021)

Teaching Assistant at Shenkar College (10/2013-08/2015)

Students mentored

1. Inbar Zilber (Shenkar college, 2015)
2. Uri Shani (Shenkar college, 2015)
3. Mashav Manela (Alpha program, Davidson Institute, 2018)
4. Lavi shaked Golan (Alpha program, Davidson Institute, 2018)
5. Maya Golan (Alpha program, Davidson Institute, 2019)
6. Michal Catz (Alpha program, Davidson Institute, 2020)
7. Amelia Burns (SURF program, Caltech, 2022)
8. Janet Teng (SURF-the-WAVE program, Caltech, 2022)

Organizing Committee of Conference and Symposia

1. IVS-MRS 2019 student conference, Ben-Gurion University, Israel, 2019.
2. Chair, Multifunctional Materials and Structures, Gordon Research Seminar (GRS), Ventura Beach Marriot, Ventura, CA, United States, January 2024.

Journals Reviewed

- Acta Biomaterialia
- Journal of Structural Biology
- ACS Nano Letters

Other Experiences

1. Scientific advisor of the public yearly exhibition “Inspired by Nature” in the Clore Garden of Science, Weizmann Institute of Science (2019).

Professional Societies

Society of Plastics Engineers	2012-present
Israel Polymers and Plastics Society	2012-present
Polymer Processing Society	2014-2015
Society for the Advancement of Materials and Process Engineering	2015-2016
The Israel Society of Microscopy	2017-present
The Israel Vacuum Society	2017-present
American Chemical Society	2020-present

Community Service

Hanoar Hatzioni

Youth guide, Organization Head in Mexico and Latin America (among others) 1990-2005

Hanoar Hatzioni

Guide of Latin-American Jewish young people that come to Israel for 1-year program 2005-2010

Or Yarok Association

Moderator to improve driving culture in Israel 2010-2012

Latet- Israeli Humanitarian Help Fundation

Youth guide of children under the poverty line 2012-2013

Nefesh B'Nefesh Organization

Assistant of the Latin American desk coordinator 2013-2014

Hanoar Hatzioni

Member of the board of directors 2016-Present

Heseg Fundation

Mentor of a lone solder during his academic studies 2019-2020