Ella Orion Lachman, Ph.D.

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http://ellachman.github.io/

Postdoctoral researcher at UC Berkeley, an experimental physicist, a science communicator.

Education

2012 – 2017 **Ph.D., Weizmann Institute of Science, Israel** in Condensed Matter Physics.
Thesis title: *Study of magnetically doped topological insulators using a scanning SQUID-On-Tip microscope*
Advisor: Prof. Eli Zeldov

2009 – 2012 **M.Sc. Physics, Weizmann Institute of Science, Israel**
Thesis title: *Study of Vortex Dynamics in Type-II Superconductors by SOT microscopy*.
Advisor: Prof. Eli Zeldov

2006 – 2009 **B.Sc. Physics and Chemistry (Exact-Sciences program), Hebrew University of Jerusalem, Israel.**
magna cum lauda

Experience

Physics research

since 2017 **Postdoctoral researcher.** Quantum Materials Laboratory, UC Berkeley.

2017 **Postdoctoral researcher.** Zeldov group, Weizmann Institute of Science.

2008 – 2009 **Student Position.** Hebrew University of Jerusalem
Advisor: Prof. Uri Banin
Research topic: *Microscopy and Spectroscopy of fluorescent single nano particles.*

Science communication

since Mar2020 **COO** LittleBig Science:
https://lbscience.org/about/
https://www.facebook.com/MadaGB
Includes various projects management and human resources management

since 2016 **Contributing writer and editor** LittleBig Science

2016 – 2017 **Contributing writer.** Davidson Institute's website:
http://davidson.weizmann.ac.il.

2011 – 2012 **Visitors' guide.** Clore Garden of Science, Weizmann Institute of Science.

Research Publications

Journal Articles

1. Anahory, Y., Naren, H. R., Lachman, E. O., Buhbut Sinai, S., Uri, A., Embon, L., Yaakobi, E., Myasoedov, Y., Huber, M. E., Klajn, R. & Zeldov, E. (2020). Squid-on-tip with single-electron spin sensitivity for high-field and ultra-low temperature nanomagnetic imaging. *Nanoscale*, *12*, 3174–3182. https://doi.org/10.1039/C9NR08578E

2. **Lachman**, **E.**, Murphy, R. A., Maksimovic, N., Kealhofer, R., Haley, S., McDonald, R. D., Long, J. R. & Analytis, J. G. (2020). Exchange biased anomalous hall effect driven by frustration in a magnetic kagome lattice. *Nature Communications*, *11*(1), 560. https://doi.org/10.1038/s41467-020-14326-9

3. Uri, A., Kim, Y., Bagani, K., Lewandowski, C. K., Grover, S., Auerbach, N., Lachman, E. O., Myasoedov, Y., Taniguchi, T., Watanabe, K., Smet, J. & Zeldov, E. (2019). Nanoscale imaging of

equilibrium quantum hall edge currents and of the magnetic monopole response in graphene. *Nature Physics*. https://doi.org/10.1038/s41567-019-0713-3

4 **Lachman**, **E.**, Mogi, M., Sarkar, J., Uri, A., Bagani, K., Anahory, Y., Myasoedov, Y., Huber, M. E., Tsukazaki, A., Kawasaki, M., Tokura, Y. & Zeldov, E. (2017). Observation of superparamagnetism in coexistence with quantum anomalous Hall $C = \pm 1$ and $C = 0$ Chern states. *npj Quantum Materials*, *2*(1), 70. https://doi.org/10.1038/s41535-017-0072-1

5 Embon, L., Anahory, Y., Jelić, Ž., **Lachman**, **E.**, Myasoedov, Y., Huber, M. E., Mikitik, G. P., Silhanek, A. V., Milošević, M. V., Gurevich, A. & Zeldov, E. (2017). Imaging of super-fast dynamics and flow instabilities of superconducting vortices. *Nature Communications*, *8*(1), arXiv 1706.00628, 85. https://doi.org/10.1038/s41467-017-00089-3

6 Uri, A., Meltzer, A. Y., Anahory, Y., Embon, L., **Lachman**, **E.**, Halbertal, D., HR, N., Myasoedov, Y., Huber, M. E., Young, A. F. & Zeldov, E. (2016). Electrically Tunable Multiterminal SQUID-on-Tip. *Nano Letters*, *16*(11), arXiv 1606.05088, 6910–6915. https://doi.org/10.1021/acs.nanolett.6b02841

7 **Lachman**, **E.**, Young, A. F., Richardella, A., Cuppens, J., Naren, H. R., Anahory, Y., Meltzer, A. Y., Kandala, A., Kempinger, S., Myasoedov, Y., Huber, M. E., Samarth, N. & Zeldov, E. (2015). Visualization of superparamagnetic dynamics in magnetic topological insulators. *Science Advances*, *1*(10), e1500740–e1500740. https://doi.org/10.1126/sciadv.1500740

8 Finkler, A., Vasyukov, D., Segev, Y., Ne'eman, L., **Lachman**, **E.**, Rappaport, M. L., Myasoedov, Y., Zeldov, E. & Huber, M. E. (2012). Scanning superconducting quantum interference device on a tip for magnetic imaging of nanoscale phenomena. *The Review of scientific instruments*, *83*(7), 073702. https://doi.org/10.1063/1.4731656

9 Yoskovitz, E., Menagen, G., Sitt, A., **Lachman**, **E.** & Banin, U. (2010). Nanoscale Near-Field Imaging of Excitons in Single Heterostructured Nanorods. *Nano Letters*, *10*(8), 3068–3072. https://doi.org/10.1021/nl101614s

Awards and distinctions

2018-9 ■ Awardee of the Weizmann Institute of Science - National Postdoctoral Award Program for Advancing Women in Science.

2009 ■ Graduated *magna cum lauda*.

Seminars and Talks

Oct 2019 ■ **3rd EPiQS-TMS alliance workshop on Topological Phenomena in Quantum Materials (KITP, USA)**, Exchange biased Anomalous Hall Effect driven by frustration in a magnetic Kagome lattice.

Mar 2018 ■ **American Physical Society March meeting (Los Angeles, USA)**, Observation of Superparamagnetism in Coexistence with Quantum Anomalous Hall $C = \pm 1$ and $C = 0$ Chern States.

Oct 2017 ■ **ABC...z seminar, (UC Santa Barbara, USA)**, Magnetism in magnetically doped topological insulators revealed by SQUID-On-Tip microscopy.

Mar 2016 ■ **GLAM Special Seminar, (Stanford, USA)**, SQUID-On-Tip microscopy of magnetically doped topological insulators.

■ **American Physical Society March meeting (Baltimore, USA)**, Visualization of superparamagnetic dynamics in magnetic topological insulators.

Dec 2015 ■ **The Israel Physical Society Conference 2015, (BIU, Israel) - Invited talk**, Visualization of superparamagnetic dynamics in magnetic topological insulators.

Skills

Experimental - Hardware	Cryogenics, Scanning probe microscopy, micropipette handling and SQUID-On-Tip fabrication, evaporation and sputtering, crystal growths, transport measurements, magnetic measurements, strain measurements, VdW materials manipulation.
Experimental - Software	Design and automation of experiments (LabView), image and data analysis (MatLab, Python), Arduino programming and interfacing with chip evaluation boards.
3D part design	table-top scale (SPM system, strain system), high precision mm sized parts for CNC fabrication, micron-sized sample masks for e-beam and optical lithography. Using Autodesk Inventor, Layout Editor and Eagle Cad.
Outreach and teaching	Guiding groups of all ages (K-12 to seniors) and education levels (non-scientific to physics undergraduates) through physics exhibits at the Clore garden of science. Public speaking in both Hebrew and English about supreconductivity, the wonders of microscopy, superconductivity and topological phases. Writing about scientific subjects to the general public.

Extra Curricular

- Fellow physicist and editor at “Mada Gadol Baktana”, the largest independent science outreach group in Israel. http://lbscience.org/
- Co-organizer, Weizmann Condensed Matter student journal club (2014)
- Zeldov Group website and blog coordinator (2014-2017)
- A member of the Israeli Physics Society (2012-2015)
- A member of the American Physics Society (since 2015)
- Member of the Weizmann Institute’s theater ensemble (2015-2017)