

Elias Nehme

Curriculum Vitae, 27/11/2021

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Researcher in Computational Imaging and Machine Learning

Education

- 2018–2023 **Ph.D. Candidate in Electrical Engineering (Direct Track)**, *Technion - IIT*.
◦ Thesis: "Deep Learning for Computational Imaging".
◦ Supervised by Prof. Tomer Michaeli and Prof. Yoav Shechtman.
- 2011–2016 **B.Sc. in Biomedical Engineering**, *Technion - IIT*.

Professional Experience

- 2021–2022 **Verily (Google Life Sciences)**, *Haifa*.
Research Scientist Intern.
- 2017–2018 **Magentiq Eye**, *Haifa*.
Image Processing and Deep Learning Engineer.
- 2017–2018 **Inspiring Vision**, *Haifa*.
Software and Algorithm Developer.
- 2015–2016 **The Laboratory for Synthetic Biology and Bio-electronics**, *Haifa*.
Research Assistant.
- 2014–2015 **Hospitech Respiration & Rambam Medical Center**, *Haifa*.
Clinical Trials Assistant.

Teaching Experience

- 2018–Present **Teaching Assistant**, *Technion*.
◦ T.A. in charge: "Algorithms and Applications in Computer Vision", EE046746.
◦ T.A. in charge: "Computational Optical Imaging", BME336547.
◦ T.A. in charge: "Analysis of Biological Signals", BME336208.
- 2016–2017 **Lab Instructor**, *Technion*.
◦ Undergraduate lab on "Digital Systems", BME335002.

Fellowships, Awards and Honors

- 2021 **VATAT Prize in Data Science, Machine Learning and Intelligent Systems**, *Technion*.
- 2020–2021 **Jacobs-Qualcomm Fellowship**, *Technion*.
- 2019 **VATAT Prize in Data Science, Machine Learning and Intelligent Systems**, *Technion*.
- 2019 **Best Poster Award**, *Quantitative Bio-Imaging Conference, France*.
- 2018–2019 **Excellent TA Award**, *Biomedical Engineering, Technion*.
- 2018 **Lev-Margulis Memorial Prize**, *Israeli Society for Microscopy (ISM) Conference, Tel Aviv*.
- 2016 **Dean Excellence Award**, *Biomedical Engineering, Technion*.

Publications

Journal Publications

1. A. Saguy, F. Jünger, A. Peleg, B. Ferdman, E. Nehme, A. Rohrbach, and Y. Shechtman, "Deep-ROCS: from speckle patterns to superior-resolved images by deep learning in rotating coherent scattering microscopy", *Optics Express*, 29(15), 23877–23887 (2021).
2. A. Saguy, T.N. Baldering, L.E. Weiss, E. Nehme, C. Karathanasis, M.S. Dietz, M. Heilemann, and Y. Shechtman, "Automated Analysis of Fluorescence Kinetics in Single-Molecule Localization Microscopy Data Reveals Protein Stoichiometry", *The Journal of Physical Chemistry B*, 125 (22), 5716–5721 (2021).

3. **E. Nehme***, **B. Ferdman***, **L.E. Weiss**, **T. Naor**, **D. Freedman**, **T. Michaeli**, and **Y. Shechtman**, "Learning optimal wavefront shaping for multi-channel imaging", IEEE Transactions on Pattern Analysis and Machine Intelligence, 43(7), 2179-2192 (2021).
*E. Nehme and B. Ferdman contributed equally to this work.
4. **R. Orange**, **E. Nehme**, **L.E. Weiss**, **B. Ferdman**, **O. Alalouf**, and **Y. Shechtman**, "3D printable diffractive optical elements by liquid immersion", Nature Communications, 12(1), 1-6 (2021).
5. **L. von Chamier**, **R.F. Laine**, **J. Jukkala**, **C. Spahn**, **D. Krentzel**, **E. Nehme**, **M. Lerche**, **S. Hernández-Pérez**, **P.K. Mattila**, **E. Karinou**, **S. Holden**, **A.C. Solak**, **A. Krull**, **T. Buchholz**, **M.L. Jones**, **L.A. Royer**, **C. Leterrier**, **Y. Shechtman**, **F. Jug**, **M. Heilemann**, **G. Jacquemet**, and **R. Henriques**, "Democratising deep learning for microscopy with ZeroCostDL4Mic", Nature Communications, 12(1), 1-18 (2021).
6. **R. Gordon-Soffer**, **L.E. Weiss**, **R. Eshel**, **B. Ferdman**, **E. Nehme**, **M. Bercovici**, and **Y. Shechtman**, "Microscopic scan-free surface profiling over extended axial ranges by point-spread-function engineering", Science Advances, 6(44), eabc0332 (2020).
7. **B. Ferdman**, **E. Nehme**, **L.E. Weiss**, **R. Orange**, **O. Alalouf**, and **Y. Shechtman**, "VIPR: Vectorial Implementation of Phase Retrieval for fast and accurate microscopic pixel-wise pupil estimation", Optics Express, 28(7), 10179-10198 (2020).
8. **E. Nehme**, **D. Freedman**, **R. Gordon**, **B. Ferdman**, **L.E. Weiss**, **O. Alalouf**, **R. Orange**, **T. Michaeli**, and **Y. Shechtman**, "DeepSTORM3D: dense 3D localization microscopy and PSF design by deep learning", Nature Methods 17(7), 734-740 (2020).
9. **N. Granik**, **L.E. Weiss**, **E. Nehme**, **M. Levin**, **M. Chein**, **E. Perlson**, **Y. Roichman**, and **Y. Shechtman**, "Single particle diffusion characterization by deep learning", Biophysical Journal 117, 185-192 (2019).
10. **E. Nehme**, **L.E. Weiss**, **T. Michaeli**, and **Y. Shechtman**, "Deep-STORM: super-resolution single-molecule microscopy by deep learning", Optica 5, 458-464 (2018).
 - o Research highlighted in Nature Methods: R. Strack, "Deep learning advances super-resolution imaging", Nature Methods 15, 403 (2018).

Peer-reviewed Conference Proceedings

1. **E. Nehme***, **B. Ferdman***, **L.E. Weiss**, **T. Naor**, **D. Freedman**, **T. Michaeli**, and **Y. Shechtman**, "Learning optimal wavefront shaping for multi-channel imaging", IEEE International Conference on Computational Photography (ICCP), May 23-25, 2021.
*Selected for a Special Issue of IEEE Transactions on Pattern Analysis and Machine Intelligence.

Conferences

Talks

1. **Paper Talk**, "Learning Optimal Wavefront Shaping for Multi-channel Imaging", IEEE International Conference on Computational Photography 2021, Leonardo Hotel, Haifa, Israel, May 23-25, 2021.
2. **Plenary Award Lecture**, "DeepSTORM3D: deep learning for dense 3D localization microscopy", Quantitative Biolmaging 2020, Mathematical Institute at the University of Oxford, Oxford, UK, January 6-9, 2020.
3. **Plenary Award Lecture**, "Deep-STORM: super-resolution single-molecule microscopy by deep learning", Israeli Society for Microscopy 2018, Dan Panorama Hotel, Tel Aviv, Israel, June 20, 2018.

Poster Presentations

1. **E. Nehme**, **L.E. Weiss**, **D. Freedman**, **T. Michaeli**, and **Y. Shechtman**, "Deep learning for dense single-molecule localization microscopy", Learning for Computational Imaging Workshop in conjunction with ICCV 2019, Seoul, South Korea, Nov 2, 2019.
2. **E. Nehme**, **D. Freedman**, **T. Michaeli**, and **Y. Shechtman**, "DeepSTORM3D: deep learning for dense 3D localization microscopy", Quantitative Biolmaging 2019, Rennes, France, Jan 9-12, 2019.
3. **E. Nehme**, **L.E. Weiss**, **T. Michaeli**, and **Y. Shechtman**, "DeepSTORM: super-resolution single-molecule microscopy by deep learning", NANO IL, International convention center, Jerusalem, Israel, Oct 9-11, 2018.

Extracurricular Activities and Academic Service

- 2019-2021 **Teachers Qualification Program**, *Israel's Ministry of Education & Biomedical Engineering, Technion-IIT*.
Basics of biological signal and image processing delivered to electronics high school teachers.
- 2018-Present **Reviewer**, *Optics Express, Biomedical Optics Express, Optica, and Nature Scientific Reports*.
- 2015 **Students Semester Representative**, *Biomedical Engineering, Technion-IIT*.
- 2013-2014 **Nachshon Coordinator**, *The Center of Educational Technology (CET) & Perach*.
Supervising a group of 60 tutors, each one mentoring a group of 2-3 students from peripheral high schools for the 5-unit curriculum in mathematics.