Elias Nehme

Curriculum Vitae, 19/09/2022

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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: "Statistical Methods in Image Processing", EE048954.
- 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

2022 **Excellent Paper Award, MLIS-TCE Conference, Israel**.
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. **T. Naor, Y. Nogin, Elias Nehme, Boris Ferdman, Lucien E Weiss, Onit Alalouf, and Yoav Shechtman**, *"Quantifying cell-cycle-dependent chromatin dynamics during interphase by live 3D tracking"*, Iscience, 25(5), 104197 (2022).

2. **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).
3. **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).
4. **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.
5. **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).
6. **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).
7. **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).
8. **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).
9. **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).
10. **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).
11. **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).
    - 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 BioImaging 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 BioImaging 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, Nature Scientific Reports, and Patterns.*.

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.