Dec. 2023

Eli Schwartz, PhD – Curriculum Vitae

me@eli-schwartz.com +972-505-790959 Google Scholar LinkedIn

I am an AI Research Scientist with 15 years of tech experience, holding a strong publication record in top-tier conferences such as NeurIPS, CVPR, AAAI, and ICCV. I am dedicated to performing research that has a significant, real-world impact and drives progress in practical applications. My primary research interests are in representation learning and vision and language foundation models.

Education

2019-2023 **Ph.D. Electrical Engineering, Tel-Aviv University, Israel**

- Advisors – Prof. Raja Giryes (TAU) and Prof. Alex Bronstein (CS@Technion)
- Thesis – "**Adaptable Computer Vision Models for Shifting Data Distributions**", Adapting Deep Learning models to new data distributions with limited data (Few-shot Learning; Domain Adaptation/Generalization; Anomaly Detection).

2016-2018 **M.Sc. Electrical Engineering, Tel-Aviv University, Israel**

- Advisors – Prof. Raja Giryes (TAU) and Prof. Alex Bronstein (CS@Technion)
- Thesis – **"Learning an End-to-End Image Processing Pipeline".** First to show learning of the entire camera's image processing pipeline in an end-to-end fashion.

2007-2011 **B.Sc. Electrical Engineering, Technion - Israel institute of technology**

Employment

2017-Present **Research Scientist – IBM Research AI**

- Published and productized research.
- Led a customer-facing project, collaborating closely with dev, UX, product, and CS.
- Achievements: **11 Papers; 6 Patents; 2 research projects delivered as products.**

2015-2017 **Co-founder & CTO – Inka Robotics**

- Co-founded a startup focused on developing a vision-based autonomous tattooing robot.
- Spearheaded the technical team, overseeing the development of software and algorithms.
- Successfully transformed the concept into a working prototype, culminating in a tattoo on my own leg.

2013-2016 **Computer Vision Algorithm Developer – Microsoft**

- Contributed to the HoloLens AR Glasses Project in its early days.
- Served as a member of an incubation team, rapidly developing PoCs for cutting-edge technologies.
- Specialized in developing computer vision algorithms, notably for depth cameras and gaze tracking.

2011-2013 **ASIC Engineer – Qualcomm**
Played a pivotal role as the Formal Verification Technical Lead

2008-2011 **ASIC Engineering Intern – IBM**
Gained hands-on experience in ASIC formal and functional verification

Awards

- The Weinstein Research Institute for Signal Processing's Outstanding Paper Award, 2023
- IBM PhD Fellowship Award, 2021-2022
- IBM Research Accomplishment Award, 2020
- IBM Invention Plateau Award (for prolific inventors), 2020
- IMVC Best Student Paper, 2019
- Thomas Schwartz Award for outstanding projects (Senior Thesis), 2011

Languages Hebrew – native; English – fluent **Programing languages** TensorFlow/Pytorch, OpenCV, Python, C++

Publications full list on Google Scholar * indicates equal contribution

Peer-reviewed papers

S. Doveh, A. Arbelle, S. Harary, **E. Schwartz**, R. Herzig, R. Giryes, D. Kim, R. Feris, R. Panda, S. Ullman, L. Karlinsky, "*Teaching Structured Vision & Language Concepts to Vision & Language Models*", CVPR 2023 pdf

D. Lang, **E. Schwartz**, C. Bercea, R. Giryes, J. Schnabel, "*Multispectral 3D Masked Autoencoders for Anomaly Detection in Non-Contrast Enhanced Breast MRI*", CAPTION Workshop MICCAI 2023 pdf

E. Schwartz, R. Giryes and A. M. Bronstein, "*ISP Distillation*", IEEE Open Journal of Signal Processing 2022 pdf

A. Alfassy*, A. Arbelle*, O. Halimi, S. Harary, R. Herzig, **E. Schwartz**, R. Panda, M. Dolfi, C. Auer, K. Saenko, P. Staar, R. Feris, L. Karlinsky*, "*FETA: Towards Specializing Foundation Models for Expert Task Applications*", NeurIPS 2022 pdf

S. Harary*, **E. Schwartz***, A. Arbelle, P. Staar, S. Abu-Hussein, E. Amrani, R. Herzig, A. Alfassy, R. Giryes, H. Kuehne, D. Katabi, K. Saenko, R. Feris, L. Karlinsky*, "*Unsupervised Domain Generalization by Learning a Bridge Across Domains*", CVPR 2022 (Oral) pdf

E. Schwartz*, L. Karlinsky*, R. Feris, R. Giryes and A. Bronstein, *"Baby steps towards few-shot learning with multiple semantics*", Pattern Recognition Letters 2022 pdf

A. Arbelle*, S. Doveh*, A. Alfassy*, J. Shtok, G. Lev, **E. Schwartz**, H. Kuehne, H. Barak Levi, P. Sattigeri, R. Panda, C. Chen, A. Bronstein, K. Saenko, S. Ullman, R. Giryes, R. Feris, L. Karlinsky, *"Detector-Free Weakly Supervised Grounding by Separation"*, ICCV 2021 (Oral) pdf

C. Baskin*, N. Liss*, T.Rozen*, Y. Chai, E. Zheltonozhskii, **E. Schwartz**, R. Giryes, A. Mendelson and A. M. Bronstein, "*NICE: Noise Injection and Clamping Estimation for Neural Network Quantization*", Mathematics 2021 pdf

G. Bukchin, **E. Schwartz**, K. Saenko, O. Shahar, R. Feris, R. Giryes*, L. Karlinsky* "*Fine-grained Angular Contrastive Learning with Coarse Labels*", CVPR 2021 (Oral, 3.5% acceptance rate) pdf

S. Doveh*, **E. Schwartz***, C. Xue, R. Feris, A. Bronstein, R. Giryes, L. Karlinsky "*MetAdapt: Meta-Learned Task-Adaptive Architecture for Few-Shot Classification*", Pattern Recognition Letters 2021 pdf

L. Karlinsky*, J. Shtok*, A. Alfassy*, M. Lichtenstein*, S. Harary, **E. Schwartz**, S. Doveh, P. Sattigeri, R. Feris, A. Bronstein, R. Giryes, "*StarNet: towards weakly supervised few-shot detection and explainable few-shot classification*", AAAI 2021 pdf

C. Baskin*, **E. Schwartz***, E. Zheltonozhskii, N. Liss, R. Giryes, A. M. Bronstein and A. Mendelson, "*UNIQ: Uniform Noise Injection for the Quantization of Neural Networks*", ACM Transactions on Computer Systems, 2020 pdf

N. Diamant*, D. Zadok*, C. Baskin, **E. Schwartz** and A. M. Bronstein, "*Beholder-GAN: Generation and Beautification of Facial Images with Conditioning on Their Beauty Level*", ICIP 2019 pdf

L. Karlinsky*, J. Shtok*, S. Harary*, **E. Schwartz***, M. Marder, S. Pankanti, R. Feris, A. Kumar, R. Giryes and A. Bronstein, "*RepMet: Representative-based metric learning for classification and one-shot object detection*", CVPR 2019 pdf

E. Schwartz*, L. Karlinsky*, J. Shtok, S. Harary, M. Marder, R. Feris, A. Kumar, R. Giryes and A. Bronstein, "*Delta-encoder: an effective sample synthesis method for few-shot object recognition*", NeurIPS 2018 (Spotlight, 3% acceptance rate) pdf

E. Schwartz, R. Giryes and A. M. Bronstein, "*DeepISP: Learning End-to-End Image Processing Pipeline*", IEEE Transactions on Image Processing, 2018 pdf

Preprints

N. Shabtay*, **E. Schwartz***, R. Giryes, "*Positional-Encoding Image Prior*", 2022 pdf

E. Schwartz, A. Arbelle, L. Karlinsky, S. Harary, F. Scheidegger, S. Doveh, R. Giryes, "*MAEDAY: MAE for few and zero shot AnomalY-Detection*", 2022 pdf

Patents

E. Schwartz, L. Karlinsky, R. Feris, "*System and method for augmenting few-shot object classification with semantic information from multiple sources*." US Patent 11,263,488.

E. Schwartz, L. Karlinsky, S. Doveh, "*Task-Adaptive Architecture for Few-Shot Classification.*" US patent application No. 17/106114.

O. K. Fabian, G. Adler, L. Y. Chertkow, E. Schwartz, R. Danon, J. Nes-El, "*Automated Tattooing System and Method*." WO/2020/178818

L. Karlinsky, J. Shtok, E. Schwartz, "*TAFSSL: Task Adaptive Feature Sub-Space Learning for few-shot learning.*" US patent application No. 17/000,319.

L. Karlinsky, E. Schwartz, J. Shtok, M. Marder and S. Harary, "*Representative-Based Metric Learning for Classification and Few-Shot Object Detection*." US patent application No. 16/240,927.

L. Karlinsky, M. Marder, E. Schwartz, J. Shtok and S. Harary, "*Out-of-sample generating few-shot classification networks*." US patent application No. 16/206,528.

C. Baskin, E. Schwartz, E. Zheltonozhskii, N. Liss, R. Giryes, A. M. Bronstein and A. Mendelson, "*System and method for emulating quantization noise for a neural network.*" US provisional patent application No. 62/661,016.

E. Schwartz, R. Giryes and A. M. Bronstein, "*Method and system for end-to-end image processing*." U.S. Patent Application No. 16/251,123.

E. Shalev, S. Katz, and E. Schwartz. "*Imaging devices and methods for authenticating a user*." U.S. Patent Application No. 14/995,025.

Community Service

- Program Chair – Multimodal Foundation Models Workshop, CVPR 2024
- Program Chair – Multimodal Foundation Models Workshop, ICCV 2023
- Program Chair – Learning with Limited Labels Workshop, CVPR 2020
- Reviewer:
    - IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
    - Conference on Computer Vision and Pattern Recognition (CVPR)
    - Computer Vision and Image Understanding (CVIU)
    - International Conference on Learning Representations (ICLR)
    - IEEE Transactions on Multimedia
    - IEEE Transactions on Image Processing