Ofir Lindenbaum

Web: https://www.eng.biu.ac.il/lindeno
Email: ofirlin@gmail.com
Date: 14/04/2023

Research Interest

My research is mainly focused on the intersection between machine learning and signal processing. I am interested in theory and practice of the following challenges:

- **Unsupervised learning-** extracting latent parameters from high dimensional or multi-modal data.
- **Interpretability-** exploiting sparsity to learn robust interpretable models that lead to the identification of predictive variables.
- **Generative Models-** synthesizing reliable artificial data to enhance the prevalence of rare sub-population in biological/dynamical processes.

Work Experience

Bar-Ilan University
Assistant Professor at the Faculty of Engineering 2021–Present

Yale University
Gibbs Assistant Professor in Applied Mathematics 2018–2021

Invented several supervised and unsupervised machine learning methods for identifying meaningful parameters from raw empirical measurements. Numerous publications in top-tier conferences and Q1 Journals.

Tel Aviv University
Head Teaching Assistant 2012–2017

Zoran Microelectronics
Analog Circuit designer 2008–2010

Israeli Air Force
Flight Cadet 2002–2004

Education

Yale University
Postdoctoral research, Host: Prof. Ronald R. Coifman 2017–2018

Tel Aviv University
Ph.D. in Electrical Engineering, GPA: 93 2012–2017

– Advisors: Prof. Amir Averbuch and Prof. Arie Yeredor.

Tel Aviv University
M.Sc. in Electrical Engineering 2010–2012

– Advisor: Prof. Arie Yeredor and Prof. Israel Cohen.

Technion - Israel Institute of Technology
B.Sc. in Electrical Engineering, B.Sc. in Physics (both Summa Cum Laude), GPA: 96 2006–2010

Teaching Experience

- **Lecturer** at Yale University — Fall 2018, 2020
  "Linear algebra with applications" (MATH 222)
- **Lecturer** at Yale University — Spring 2018–2020
  Senior seminar: "Mathematical topics on networks" (MATH 480)
- **Head Teaching Assistant** at Tel Aviv University — 2012–2017
  "Analog Circuits"
- **Head Teaching Assistant** at Tel Aviv University — 2013–2017
  "Basic Electronics"
- **Teaching Assistant** at Tel Aviv University — 2012
  "Random Signals and Noise"
- **Undergraduate Project Supervisor** at Tel Aviv University — 2012–2016
  Guided 6 *signal processing projects including* 2 *excellence project awards.*

Scholarships and Awards

- The Weinstein Research Institute for Signal Processing award for scientific paper publication — 2016
- The David and Paulina Trotsky foundation award for outstanding Ph.D. students — 2015
- Tel Aviv university award for outstanding teaching assistants — 2014
- The Weinstein Research Institute for Signal Processing award for outstanding graduate students — 2011
- President's list, The Technion- Israel Institute of Technology — 2006–2010

Grants

- Data Science Institute grant 100K$ — 2022
- Collaborator on several NIH grants in genomics — 2019–2020

Academic Experience

- **Reviewer:** *Transactions on Machine Learning Research (TMLR)* — 2022–Present
- **Reviewer:** *Transactions on Image Processing* — 2022–Present
- **Reviewer:** *International Conference on Learning Representations (ICLR)* — 2020–Present
- **Reviewer:** *Conference on Neural Information Processing Systems (NeurIPS)* — 2018–Present
- **Reviewer:** *International Conference on Machine Learning (ICML)* — 2019–Present
- **Reviewer:** *SIAM Journal on Mathematics of Data Science* — 2019
- **Reviewer:** *IEEE Transactions on signal processing* — 2015–2018
- **Seminar organizer:** *Yale University- Program in applied mathematics* — 2019–2021

Publication List- Ofir Lindenbaum

Journal and Full Length Conference Papers

1. J. Yang, **O. Lindenbaum**, Y. Kluger, A. Jaffe, "Multi-modal Differentiable Unsupervised Feature Selection." *The Conference on Uncertainty in Artificial Intelligence (UAI), 2023.*

2. S. Jana, H. Li, Y. Yamada,**O. Lindenbaum**, "Support recovery with Projected Stochastic Gates: Theory and application for linear models." *Elsevier Signal Processing, 2023.*

3. J. Yang*,**O. Lindenbaum***, Y. Kluger, "Locally Sparse Neural Networks for Tabular Biomedical Data." *International Conference on Machine Learning (ICML), 2022.*

4. **O. Lindenbaum**, M. Salhov, A. Averbuch, Y. Kluger, "ℓ_0-based Sparse Canonical Correlation Analysis." *International Conference on Learning Representations (ICLR), 2022.*

5. U. Shaham*, **O. Lindenbaum***, J. Svirsky, Y. Kluger, "Deep Unsupervised Feature Selection by Discarding Nuisance and Correlated Features." *Elsevier, Neural Networks, 2022.*

6. **O. Lindenbaum**, S. Steinerberger, "Refined Least Squares for Support Recovery." *Elsevier, Signal Processing, 2022.*

7. Shelli F, **O. Lindenbaum**, et al., "HIV viral transcription and immune perturbations in the CNS of people with HIV despite ART." *JCI insigh, 2022.*

8. **O. Lindenbaum***, U. Shaham*, J. Svirsky, E. Peterfreund, Y. Kluger, "Differentiable Unsupervised Feature Selection Based on a Gated Laplacian." *Conference on Neural Information Processing Systems (NeurIPS), 2021.*

9. J. Zhao, A. Jaffe, H. Li, **O. Lindenbaum**, X. Cheng, R. Flavell, Y. Kluger, "Detecting regions of differential abundance between scRNA-seq datasets." *Proceedings of the National Academy of Sciences (PNAS)* , 118.22, 2021.

10. **O. Lindenbaum***, A. Sagiv*, G. Mishne, R Talmon, "Kernel-based parameter estimation of dynamical systems with unknown observation functions." *Chaos: An Interdisciplinary Journal of Nonlinear Science, 31.4: 043118, 2021.*

11. L. Irshaid, E. Weinberger, J. Garritano, R. Shallis, J. Patsenker, **O. Lindenbaum**, Y. Kluger, S. Katz, M. Xu. "Histopathologic and Machine Deep Learning Criteria to Predict Lymphoma Transformation in Bone Marrow Biopsies." *Archives of Pathology and Laboratory Medicine, 2021.*

12. **O. Lindenbaum**, N. Nouri, Y. Kluger, S. H. Kleinstein, "Alignment free identification of clones in B cell receptor repertoires." *Nucleic Acid Research (NAR), 2021.*

13. **O. Lindenbaum**, S. Steinerberger, "Randomly Aggregated Least Squares for Support Recovery." *Elsevier Journal of Signal Processing, Vol. 180, 107858, 2021.*

14. H. Li*, **O. Lindenbaum***, X. Cheng, A. Cloninger, "Variational Diffusion Autoencoders with Random Walk Sampling." *European Conference on Computer Vision (ECCV)*, 2020.

15. Y.Yamada*, **O. Lindenbaum***, S. Negahban, Y. Kluger., "Feature selection using Stochastic Gates." *International Conference on Machine Learning (ICML)*, 2020.

16. E. Peterfreund*, **O. Lindenbaum***, F. Dietrich, T. Bertalan, M. Gavish, I. G. Kevrekidis, R. R. Coifman, "LOcal Conformal Autoencoder for standardized data coordinates." *Proceedings of the National Academy of Sciences (PNAS), 117(49), pp.30918-30927, 2020.*

17. A. Jaffe, Y. Kluger, **O. Lindenbaum**, J. Patsenker, E. Peterfreund, S. Steinerberger. (alphabetical order) "The Spectral Underpinning of word2vec." *Frontiers in Applied Mathematics and Statistics, 6:593406, 2020.*

18. **O. Lindenbaum**, M. Salhov, A. Yeredor, A. Averbuch, "Gaussian Bandwidth Selection for Manifold Learning and Classification." *Data Mining and Knowledge Discovery*, pp. 1-37, 2020.

19. Y. Bregman, **O. Lindenbaum**, N. Rabin, "Array Based Earthquakes-Explosion Discrimination Using Diffusion Maps." *Pure and Applied Geophysics*, pp. 1-16, 2020.

20. **O. Lindenbaum**, A. Yeredor, M Salhov, A. Averbuch, "Multiview diffusion maps." *Information Fusion*, vol. 55, pp. 127-149, 2020.

21. **O. Lindenbaum**, N. Rabin, Y. Bregman, A. Averbuch, "Seismic Event Discrimination Using Deep CCA." *IEEE Geoscience and Remote Sensing Letters*, 2019.

22. M Salhov, **O. Lindenbaum**, Y Aizenbud, A Silberschatz, Y Shkolnisky, A Averbuch, "Multi-view kernel consensus for data analysis." *Applied and Computational Harmonics Analysis (ACHA)*, vol 49.1, pp. 208-228, 2019.

23. **O. Lindenbaum***, Jay S. Stanley III*, Guy Wolf, Smita Krishnaswamy, "Geometry-Based Data Generation." *Conference on Neural Information Processing Systems (NeurIPS)*, 2018 (spotlight 4% acceptance rate).

24. **O. Lindenbaum**, Y. Bregman, N. Rabin, A. Averbuch., "Multi-View Kernels for Low-Dimensional Modeling of Seismic Events." *IEEE Transactions on Geoscience and Remote Sensing (TGRS)*, vol. 56.6, pp. 3300-3310, 2018.

25. N. Rabin, Y. Bregman, **O. Lindenbaum**, Y. Ben-Horin, A. Averbuch, "Earthquake-explosion discrimination using diffusion maps." *Geophysical Journal International*, vol. 207.3, pp. 1484-1492, 2018.

26. **O. Lindenbaum**, A. Yeredor, I. Cohen, "Musical key extraction using diffusion maps." *Elsevier Journal of Signal Processing*, vol. 117, pp. 198-207, 2015.

27. **O. Lindenbaum**, A. Yeredor, R. Vitek, M. Mishali. "Blind separation of orthogonal mixtures of spatially-sparse sources with unknown sparsity levels and with temporal blocks." *Journal of Signal Processing Systems*, 79(2), pp.167-178, 2015.

*Indicates equal contribution

Short Conference and Workshop Proceedings

1. B. Battash, L. Wolf, **O. Lindenbaum**, "Revisiting the noise Model of SGD." *NeurIPS 2023 Workshop Heavy Tails in Machine Learning,* 2023.

2. T. Yampolsky, R. Talmon, **O. Lindenbaum**, "Domain and Modality Adaptation Using Multi-Kernel Matching." *European Signal Processing Conference (EUSIPCO)),* 2023.

3. J. Svirsky, **O. Lindenbaum**, "SG-VAD: Stochastic Gates Based Speech Activity Detection." *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP),* 2023.

4. O. Ophir, O. Shefi, **O. Lindenbaum**, "Neuronal Cell Type Classification Using Locally Sparse Networks." *IEEE International Conference on Acoustics, Speech, and Signal Processing Workshops (ICASSPW),* 2023.

5. **O. Lindenbaum**, A. Yeredor, A. Averbuch. "Clustering based on multiview diffusion maps." *IEEE 16th International Conference on Data Mining Workshops (ICDMW),* 2016.

6. **O. Lindenbaum**, N. Rabin, Y. Bregman, A. Averbuch, "Multi-channel fusion for seismic event detection and classification." *IEEE International Conference on the Science of Electrical Engineering (ICSEE)*, 2016.

7. **O. Lindenbaum**, A. Yeredor, A. Averbuch. "Bandwidth selection for kernel-based classification." *IEEE International Conference on the Science of Electrical Engineering (ICSEE)*, 2016.

8. A. Averbuch, M. Salhov, **O. Lindenbaum**, A. Silberschatz, Y. Shkolnisky, "Multi-view kernel-based data analysis." *IEEE International Conference on the Science of Electrical Engineering (ICSEE)*, 2016.

9. **O. Lindenbaum**, M. Salhov, A. Yeredor, "Learning coupled embedding using multiview diffusion maps." *International Conference on Latent Variable Analysis and Signal Separation (LVA/SCA)*, 2015.

10. **O. Lindenbaum**, A. Yeredor, R. Vitek, M. Mishali. "Blind separation of spatially-block-sparse sources from orthogonal mixtures." *IEEE. International Workshop on Machine Learning for Signal Processing (MLSP)*, 2013.

11. **O. Lindenbaum**, S. Maskit, O. Kutiel, G. Nave, "Musical features extraction for audio-based search." *IEEE 26th Convention of Electrical and Electronics Engineers in Israel (IEEEI)*, 2010.

*Indicates equal contribution

Refereed Abstracts

1. S. Farhadian, **O. Lindenbaum**, J. Zhao, R. Garcia-Milian, J. Chiarella, M. Chintanaphol, R. Calvi, Y. Kluger, and S.S. Spudich., "Single-cell genomic analysis of blood and csf t cells in hiv+ and hiv–adults." *Conference on Retroviruses and Opportunistic Infections*, 2020.

2. **O. Lindenbaum***, E. Peterfreund*, F. Dietrich, T. Bertalan, M. Gavish, I. G. Kevrekidis, R. R. Coifman, "LOcal Conformal Autoencoder." *Deep Math, 2020.*

3. H. Li, **O. Lindenbaum**, X. Cheng, A. Cloninger, "Variational Diffusion Autoencoders." *Deep Math*, 2019.

4. L. Irshaid, E. Weinberger, J. Garritano, J. Patsenker, **O. Lindenbaum**, Y. Kluger, S. Katz, M. Xu. "Histopathologic and Machine Deep Learning Criteria to Predict Lymphoma Transformation in Bone Marrow Biopsies." *Laboratory Investigation, 2019.*

5. **O. Lindenbaum**, Jay S. Stanley III, Guy Wolf, Smita Krishnaswamy, "Geometry-Based Data Generation." *ICML Workshop on Computational Biology*, 2018.

Invited Talks

- Weizmann institute, invited talk 2023
- Bar Ilan University, Learning club, invited talk 2022
- Tel Aviv University, Applied Math, invited talk 2021
- Technion Israel Institute of Technology, Electrical and ComputerEengineering, invited talk 2021
- Yale University, Program in applied math, invited talk 2021
- Second Symposium on Machine Learning and Dynamical Systems online, invited talk 2020
- Weizmann University, Faculty of Mathematics and Computer Science, invited Talk 2018
- University of California, Berkeley, Department of Electrical Engineering, invited Talk 2016
- Princeton University, Mathematics Program in Applied and Computational Mathematics, invited talk 2016
- Yale University, Program in applied math, invited talk 2016
- California Institute of Technology, invited talk 2014
- Yale University, Program in applied math, invited Talk 2014

Contributed Talks

- Uncertainty in Artificial Intelligence (UAI), contributed talk 2023
- International Conference on Machine Learning (ICML), contributed talk 2022
- International Conference on Learning Representations(ICLR), contributed talk 2022
- Conference on Neural Information Processing Systems(NeuRIPS), contributed talk 2021
- International Conference on Machine Learning (ICML), contributed talk 2020
- European Conference on Computer Vision (ECCV), contributed talk 2020
- Conference on Neural Information Processing Systems (Neurips), spotlight talk 2018
- IEEE 16th International Conference on Data Mining Workshops (ICDMW), contributed talk 2016
- IEEE International Conference on the Science of Electrical Engineering (ICSEE) , contributed Talk 2016
- IEEE International Workshop on Machine Learning for Signal Processing (MLSP), contributed Talk 2013
- IEEE Convention of Electrical and Electronics Engineers in Israel (IEEEI), contributed Talk 2010

Skills

- **Advanced:** Python, Tensorflow, Matlab
- **Intermediate:** Pytorch, C, C++, Spectre, Verilog, VerilogA

Languages

- **Mother tong:** Hebrew
- **Fluent:** English