Haggai Maron

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Email: haggaimaron@gmail.com Phone +972-544-914250

Websites: haggaim.github.io, Google Scholar

Academic positions

2023- **Assistant Professor, The Robert J. Shillman Fellow,**
Faculty of Electrical and Computer Engineering, Technion, Israel.

Education

2015-2019 **Ph.D., Computer Science and Mathematics**, Weizmann Institute of Science. Thesis title: "Deep and Convex Shape Analysis". Supervisor: Prof. Yaron Lipman.

2012-2014 **MSc, Computer Science and Mathematics**, Weizmann Institute of Science. Thesis title: "A Passive 8D Display: Light and Viewpoint Sensitive Display of 3D Content". Final grade: 97/100. Supervisor: Prof. Anat Levin.

2008-2011 **BSc, Computer Science and Mathematics**, The Hebrew University of Jerusalem. GPA: 96/100.

Honors and awards

2024 Alon scholarship for the Integration of Outstanding Faculty (Israel Council for Higher Education).

2024 Best paper award, Workshop on High-dimensional Learning Dynamics, ICML 2024.

2023 The Robert J. Shillman Career Advancement Chair, Technion.

2020 ICML 2020 Outstanding Paper award for "On Learning Sets of Symmetric Elements" (lead author, two papers out of 4990 submissions).

2020 The Giora Yoel Yashinski Memorial Prize in recognition of academic excellence and scientific accomplishments during Ph.D. studies, Feinberg Graduate School.

2019 Participant in the SIGGRAPH 2019 Doctoral Consortium.

2015 The Feinberg Graduate School Dean's prize in recognition of academic excellence and scientific accomplishments.

Teaching

2024 (Spring) Deep Learning and groups (Technion)

2023 (winter), 2024(winter)	Topics in Deep Learning on Graphs (Technion)
2019 (Spring)	Geometric and Algebraic Methods in Deep Learning (WIS)
2018 (Winter)	Geometry and Deep Learning (WIS)

Professional activities

- Co-organizer of the "Graph Learning Meets Theoretical Computer Science" workshop at the Simons Institute (https://simons.berkeley.edu/workshops/graph-learning-meets-theoretical-computer-science)
- I serve as an area chair for NeurIPS (2023,2024), Learning on Graphs (LoG) (2022, 2023, 2024).
- Grant reviewer for ERC, ISF, NSF
- I served as a reviewer for NeurIPS, ICML, ICLR and other top conferences and journals.
- I initiated and co-organized the Israeli Workshop on Geometric Deep Learning, IGDL (2020, 2021) (https://gdl-israel.github.io/).

Grants

1. "Expressive, Efficient, and Domain-Agnostic Graph Learning with Subgraph-based Networks", (2023-2026), Israel Science Foundation (ISF) personal research grant no. 264/23. 810,000 NIS.
2. New faculty equipment grant (2023), Israel Science Foundation (ISF) no. 532/23. 940,000 NIS.

Other work experience

2023-today	Senior Research Scientist at NVIDIA Research (part-time)
2019-2023	Senior Research Scientist at NVIDIA Research.
2017-2019	Deep learning algorithm developer at Photomyne Ltd.
2015-2017	Deep learning algorithm developer at Fifth Dimension Ltd.
2010-2012	Real-time Software developer at NDS Group Ltd.

Invited talks

[1] 21st International Workshop on Mining and Learning with Graphs, 9th September 2024, Vilnius, Lithuenia, jointly with ECMLPKDD. Keynote speaker. Title: Exploiting Symmetries for Learning in Deep Weight Spaces.

[2] Equivariant Vision: From Theory to Practice, CVPR 2024 Workshop, Seattle, WA June 18 2024, Keynote speaker. Title: Exploiting Symmetries for Learning in Deep Weight Spaces.

[3] Geometric Deep Learning workshop, University of Cambridge 10-12 June 2024. Keynote speaker Title: Exploiting Symmetries for Learning in Deep Weight Spaces.

[4] Foundetional Aspect of Neuro Symbolic Computing Workshop, Universidad San Sebastián, Santiago, Chile. March 2024. Title: Exploiting Symmetries for Learning in Deep Weight Spaces.

[5] RIKEN-AIP and Bar-Ilan University Joint Machine Learning Workshop, July 2023, virtual Title: Equivaraint architectures for learning in deep weight spaces.

[6] ETH AI Center AI, Zurich, Switzerland July 2023 Title: Deep Learning on Data with Symmetries

[7] Samsung virtual AI Workshop "When Deep Learning Meets Logic", June 2022 Title: Subgraph-based networks for expressive, efficient, and domain-independent graph learning.

[8] 10th International Conference on Curves and Surfaces, Arcachon, France, June 2022. Title: Subgraph-based networks for expressive, efficient, and domain-independent graph learning.

[9] GraphLearn: Machine Learning and Signal Processing on Graphs, Centre International de Rencontres Mathématiques, Marseille, France, November 2022. Title: Subgraph-based networks for expressive, efficient, and domain-independent graph learning

[10] Graph Embeddings: Theory meets Practice, Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Germany, March 2022
Title: Subgraph-based networks for expressive, efficient, and domain-independent graph learning.

[11] String_data2020 workshop, CERN (virtual), December 2020
Title: Leveraging Permutation Group Symmetries for Equivariant Neural Networks.

[12] Workshop on Equivariance and Data Augmentation, University of Pennsylvania (virtual), September 2020
Title: Leveraging Permutation Group Symmetries for Equivariant Neural Networks.

Group

Postdocs: Dr Fabrizio Frasca (2024-today)

Phd students:
Yam Eitan (2024 - today), Guy Bar-Shalom (2023 - today, joint supervision with Ran El-Yaniv), Matan Ostrovsky (2023 - today), Yoav Gelberg (2024-today, joint supervision with Michael Bronstein).

MSc students:

Ran Elbaz (2023-today), Ofir Haim (2023-2024, joint supervision with Shie Mannor), Yaniv Galron (2023-today, joint supervision with Eran Treister (BGU)), Edan Kinderman (2023-today, joint supervision with Daniel Soudry), Yuval Aidan (2023-today, joint supervision with Ayellet Tal).

Unoffcial supervision / close collaboration with students:
Fabrizio Frasca (2021-2023), Derek Lim (MIT, 2021-today), Beatrice Bevilacqua (Purdue, 2021-today), Moshe Eliasof (Cambridge, 2022-today), Aviv Navon (BIU, 2021-today), Aviv Shamsian (BIU, 2022-today).

Publications

Conference Papars (Peer reviewed)

1. Yoni Kasten, Wuyue Lu, Haggai Maron. Fast Encoder-Based 3D from Casual Videos via Point Track Processing. NeurIPS 2024.

2. Moshe Eliasof, Beatrice Bevilacqua, Carola-Bibiane Schönlieb, Haggai Maron. GRANOLA: Adaptive Normalization for Graph Neural Networks. NeurIPS 2024

3. Derek Lim, Theo Putterman, Robin Walters, Haggai Maron, Stefanie Jegelka. The Empirical Impact of Neural Parameter Symmetries, or Lack Thereof. NeurIPS 2024.

4. Guy Bar-Shalom, Yam Eitan, Fabrizio Frasca, Haggai Maron. A Flexible, Equivariant Framework for Subgraph GNNs via Graph Products and Graph Coarsening. NeurIPS 2024.

5. Aviv Navon, Aviv Shamsian, Ethan Fetaya, Gal Chechik, Nadav Dym, Haggai Maron. Equivariant Deep Weight Space Alignment. International Conference on Machine Learning (ICML), 2024. https://arxiv.org/abs/2310.13397

6. Guy Bar-Shalom, Beatrice Bevilacqua, Haggai Maron. Subgraphormer: Unifying Subgraph GNNs and Graph Transformers via Graph Products. International Conference on Machine Learning (ICML), 2024. https://arxiv.org/abs/2402.08450

7. Aviv Shamsian*, David W. Zhang*, Aviv Navon, Yan Zhang, Ethan Fetaya, Gal Chechik, Haggai Maron. Improved Generalization of Weight Space Networks via Augmentations. International Conference on Machine Learning (ICML), 2024. https://arxiv.org/abs/2402.04081

8. Bohang Zhang, Lingxiao Zhao, Haggai Maron. On the Expressive Power of Spectral Invariant Graph Neural Networks. International Conference on Machine Learning (ICML), 2024.

9. Christopher Morris, Nadav Dym, Haggai Maron, Ismail Ilkan Ceylan, Fabrizio Frasca, Ron Levie, Derek Lim, Michael M. Bronstein, Martin Grohe, Stefanie Jegelka. Position Paper: Future Directions in Foundations of Graph Machine Learning. International Conference on Machine Learning (ICML), 2024. https://arxiv.org/abs/2402.02287

10. Efficient Subgraph GNNs by Learning Effective Selection Policies. Beatrice Bevilacqua, Moshe Eliasof, Eli Meirom, Bruno Ribeiro, Haggai Maron. International Conference on Learning Representations (ICLR) 2024. https://arxiv.org/abs/2312.04501

11. Graph Metanetworks for Processing Diverse Neural Architectures. Derek Lim, Haggai Maron, Marc T. Law, Jonathan Lorraine, James Lucas. International Conference on Learning Representations (ICLR) 2024. Spotlight Presentation. https://arxiv.org/abs/2312.04501

12. Derek Lim, Joshua Robinson, Stefanie Jegelka, Haggai Maron. Expressive Sign Equivariant Networks for Spectral Geometric Learning, Annual Conference on Neural Information Processing Systems (NeurIPS), 2023. Spotlight presentation. https://arxiv.org/abs/2312.02339

13. Dvir Samuel, Rami Ben-Ari, Nir Darshan, Haggai Maron, Gal Chechik. Norm-guided latent space exploration for text-to-image generation, Annual Conference on Neural Information Processing Systems (NeurIPS), 2023. https://arxiv.org/abs/2306.08687

14. Aviv Navon, Aviv Shamsian, Idan Achituve, Ethan Fetaya, Gal Chechik, Haggai Maron. Equivariant Architectures for Learning in Deep Weight Spaces, International Conference on Machine Learning (ICML), 2023. Oral presentation. https://arxiv.org/abs/2301.12780

15. Moshe Eliasof, Fabrizio Frasca, Beatrice Bevilacqua, Eran Treister, Gal Chechik, Haggai Maron. Graph Positional Encoding via Random Feature Propagation, International Conference on Machine Learning (ICML), 2023. https://arxiv.org/abs/2303.02918

16. Omri Puny, Derek Lim, Bobak T. Kiani, Haggai Maron, Yaron Lipman. Equivariant Polynomials for Graph Neural Networks, International Conference on Machine Learning (ICML), 2023. Oral presentation. https://arxiv.org/abs/2302.11556

17. Derek Lim, Joshua Robinson, Lingxiao Zhao, Tess Smidt, Suvrit Sra, Haggai Maron, Stefanie Jegelka. Sign and Basis Invariant Networks for Spectral Graph Representation Learning, International Conference on Learning Representations (ICLR), 2023. Spotlight paper (top 25%). https://arxiv.org/abs/2202.13013

18. Rinon Gal, Or Patashnik, Haggai Maron, Gal Chechik, Daniel Cohen-Or. StyleGAN-NADA: CLIP-Guided Domain Adaptation of Image Generators, ACM SIGGRAPH, 2022. https://arxiv.org/abs/2108.00946

19. Fabrizio Frasca, Beatrice Bevilacqua, Michael M. Bronstein, Haggai Maron. Understanding and Extending Subgraph GNNs by Rethinking Their Symmetries, Annual Conference on Neural Information Processing Systems (NeurIPS), 2022. Oral presentation. https://arxiv.org/abs/2206.11140

20. Aviv Navon, Aviv Shamsian, Idan Achituve, Haggai Maron, Kenji Kawaguchi, Gal Chechik, Ethan Fetaya. Multi-Task Learning as a Bargaining Game, International Conference on Machine Learning (ICML), 2022. https://arxiv.org/abs/2202.01017

21. Eli A Meirom, Haggai Maron, Shie Mannor, Gal Chechik. Optimizing Tensor Network Contraction Using Reinforcement Learning, International Conference on Machine Learning (ICML), 2022. https://arxiv.org/abs/2204.09052

22. Beatrice Bevilacqua, Fabrizio Frasca, Derek Lim, Balasubramaniam Srinivasan, Chen Cai, Gopinath Balamurugan, Michael M. Bronstein, Haggai Maron. Equivariant Subgraph Aggregation Networks, International Conference on Learning Representations (ICLR), 2022. Spotlight presentation. https://arxiv.org/abs/2110.02910

23. Yochai Yemini, Ethan Fetaya, Haggai Maron, Sharon Gannot. Scene-Agnostic Multi-Microphone Speech Dereverberation, INTERSPEECH, 2021. https://arxiv.org/pdf/2010.11875.pdf

24. Dror Moran, Hodaya Koslowsky, Yoni Kasten, Haggai Maron, Meirav Galun, Ronen Basri. Deep Permutation Equivariant Structure from Motion, International Conference on Computer Vision (ICCV), 2021. Oral presentation. https://arxiv.org/abs/2008.02831

25. Gilad Yehudai, Ethan Fetaya, Eli Meirom, Gal Chechik, Haggai Maron. From Local Structures to Size Generalization in Graph Neural Networks, International Conference on Machine Learning (ICML), 2021. https://arxiv.org/pdf/2010.08853

26. Eli A Meirom, Haggai Maron, Shie Mannor, Gal Chechik. How to Stop Epidemics: Controlling Graph Dynamics with Reinforcement Learning and Graph Neural Networks, International Conference on Machine Learning (ICML), 2021. https://arxiv.org/pdf/2010.05313

27. Nadav Dym, Haggai Maron. On the Universality of Rotation Equivariant Point Cloud Networks, International Conference on Learning Representations (ICLR), 2021. https://arxiv.org/pdf/2010.02449

28. Aviv Navon, Idan Achituve, Haggai Maron, Gal Chechik, Ethan Fetaya. Auxiliary Learning by Implicit Differentiation, International Conference on Learning Representations (ICLR), 2021. https://arxiv.org/abs/2007.02693

29. Idan Achituve, Haggai Maron, Gal Chechik. Self-Supervised Learning for Domain Adaptation on Point-Clouds, Winter Conference on Applications of Computer Vision (WACV), 2021. https://arxiv.org/pdf/2003.12641.pdf

30. Hadar Serviansky, Nimrod Segol, Jonathan Shlomi, Kyle Cranmer, Eilam Gross, Haggai Maron, Yaron Lipman. Set2Graph: Learning Graphs from Sets, Neural Information Processing Systems (NeurIPS), 2020. https://arxiv.org/abs/2002.08772

31. Haggai Maron, Or Litany, Gal Chechik, Ethan Fetaya. On Learning Sets of Symmetric Elements, International Conference on Machine Learning (ICML), 2020. Outstanding paper award. https://arxiv.org/pdf/2002.08599

32. Ilay Luz, Meirav Galun, Haggai Maron, Ronen Basri, Irad Yavneh. Learning Algebraic Multigrid Using Graph Neural Networks, International Conference on Machine Learning (ICML), 2020. https://arxiv.org/pdf/2003.05744

33. Haggai Maron, Heli Ben-Hamu, Hadar Serviansky, Yaron Lipman. Provably Powerful Graph Networks, Neural Information Processing Systems (NeurIPS), 2019. https://arxiv.org/abs/1905.11136

34. Haggai Maron, Ethan Fetaya, Nimrod Segol, Yaron Lipman. On the Universality of Invariant Networks, International Conference on Machine Learning (ICML), 2019. https://arxiv.org/abs/1901.09342

35. Haggai Maron, Heli Ben-Hamu, Nadav Shamir, Yaron Lipman. Invariant and Equivariant Graph Networks, International Conference on Learning Representations (ICLR), 2019. https://arxiv.org/pdf/1812.09902.pdf

36. Matan Atzmon, Niv Haim, Lior Yariv, Ofer Israelov, Haggai Maron, Yaron Lipman. Controlling Neural Level Sets, Neural Information Processing Systems (NeurIPS), 2019. https://arxiv.org/abs/1905.11911

37. Niv Haim, Nimrod Segol, Heli Ben-Hamu, Haggai Maron, Yaron Lipman. Surface Networks via General Covers, International Conference on Computer Vision (ICCV), 2019. https://arxiv.org/pdf/1812.10705.pdf

38. Haggai Maron, Yaron Lipman. (Probably) Concave Graph Matching, Neural Information Processing Systems (NeurIPS), 2018. Spotlight presentation. https://arxiv.org/pdf/1807.09722.pdf

39. Heli Ben-Hamu, Haggai Maron, Itay Kezurer, Yaron Lipman. Multi-chart Generative Surface Modeling, ACM SIGGRAPH Asia, 2018. https://arxiv.org/pdf/1806.02143.pdf

40. Matan Atzmon, Haggai Maron, Yaron Lipman. Point Convolutional Neural Networks by Extension Operators, ACM SIGGRAPH, 2018. https://arxiv.org/abs/1803.10091

41. Nadav Dym, Haggai Maron, Yaron Lipman. DS++: A Flexible, Scalable and Provably Tight Relaxation for Matching Problems, ACM SIGGRAPH ASIA, 2017. https://arxiv.org/abs/1705.06148

42. Haggai Maron, Meirav Galun, Noam Aigerman, Miri Trope, Nadav Dym, Ersin Yumer, Vladimir G. Kim, Yaron Lipman. Convolutional Neural Networks on Surfaces via Seamless Toric Covers, ACM SIGGRAPH, 2017. https://haggaim.github.io/projects/geometry_learning/paper_low_res.pdf

43. Anat Levin, Haggai Maron, Michal Yarom. Passive Light and Viewpoint Sensitive Display of 3D Content, International Conference on Computational Photography (ICCP), 2016. https://haggaim.github.io/projects/light_sesitive_display/LightSensitiveDisplayICCP.pdf

44. Haggai Maron, Nadav Dym, Itay Kezurer, Shahar Kovalsky, Yaron Lipman. Point Registration via Efficient Convex Relaxation, ACM SIGGRAPH, 2016. https://haggaim.github.io/projects/point_registration/PMSDP_final_light.pdf

Journal Papers

45. Christopher Morris, Yaron Lipman, Haggai Maron, Bastian Rieck, Nils M. Kriege, Martin Grohe, Matthias Fey, Karsten Borgwardt. Weisfeiler and Leman go Machine Learning: The Story so far, Journal of Machine Learning Research (JMLR), 2023. https://arxiv.org/abs/2112.09992

46. Jonathan Shlomi, Sanmay Ganguly, Eilam Gross, Kyle Cranmer, Yaron Lipman, Hadar Serviansky, Haggai Maron, Nimrod Segol. Secondary Vertex Finding in Jets with Neural Networks, European Physical Journal C, 2021. https://arxiv.org/abs/2008.02831

47. Yam Kushinsky, Haggai Maron, Nadav Dym, Yaron Lipman. Sinkhorn Algorithm for Lifted Assignment Problems, SIAM Journal on Imaging Sciences, 2019. https://arxiv.org/abs/1707.07285

Workshop Papers (Peer reviewed)

48. Efficient Subgraph GNNs via Graph Products and Coarsening. Guy Bar-Shalom, Yam Eitan, Fabrizio Frasca, Haggai Maron. NeurIPS 2024 Workshop on Symmetry and Geometry in Neural Representations.

49. On the Reconstruction of Training Data from Group Invariant Networks. Ran Elbaz, Gilad Yehudai, Meirav Galun, Haggai Maron. NeurIPS 2024 Workshop on Symmetry and Geometry in Neural Representations.

50. Topological Blindspots: Understanding and Extending Topological Deep Learning Through the Lens of Expressivity. Yam Eitan, Yoav Gelberg, Guy Bar-Shalom, Fabrizio Frasca, Michael M. Bronstein, Haggai Maron. NeurIPS 2024 Workshop on Symmetry and Geometry in Neural Representations.

51. Towards Foundation Models on Graphs: An Analysis on Cross-Dataset Transfer of Pretrained GNNs. Fabrizio Frasca, Fabian Jogl, Moshe Eliasof, Matan Ostrovsky, Carola-Bibiane Schönlieb, Thomas Gärtner, Haggai Maron. NeurIPS 2024 Workshop on Symmetry and Geometry in Neural Representations.

52. Guy Bar-Shalom, Beatrice Bevilacqua, Haggai Maron. Subgraph GNNs meet Graph Transformers, NeurIPS 2023 New Frontiers in Graph Learning Workshop, 2023. https://drive.google.com/file/d/1x1e4VjnW6Z3ubF_Q5YcjEBs4W471cTdo/view?usp=drive_link

53. Aviv Shamsian, David W. Zhang, Aviv Navon, Yan Zhang, Miltiadis Kofinas, Idan Achituve, Riccardo Valperga, Gertjan J. Burghouts, Estratios Gavves, Cees G. M. Snoek, Ethan Fetaya, Gal Chechik, Haggai Maron. Data Augmentations in Deep Weight Spaces, Symmetry and Geometry in Neural Representations Workshop, 37th Annual Conference on Neural Information Processing Systems (NeurIPS 2023), 2023. https://haggaim.github.io/projects/weight_aug/paper.pdf

54. Sohir Maskey, Ali Parviz, Maximilian Thiessen, Hannes Stark, Ylli Sadikaj, Haggai Maron. Generalized Laplacian Positional Encoding for Graph Representation Learning, NeurIPS 2022 Workshop on Symmetry and Geometry in Neural Representations, 2022. https://arxiv.org/abs/2210.15956

55. Ben Finkelshtein, Chaim Baskin, Haggai Maron, Nadav Dym. A Simple and Universal Rotation Equivariant Point-cloud Network, Workshop on Topology, Algebra, and Geometry in Learning, ICML 2022. https://arxiv.org/abs/2203.01216

56. Haggai Maron, Heli Ben-Hamu, Yaron Lipman. Open Problems: Approximation Power of Invariant Graph Networks, NeurIPS 2019 Graph Representation Learning Workshop, 2019. https://haggaim.github.io/projects/open_problems_igns/Open%20Problems%20Approximation%20Power%20of%20InvariantGraph%20Networks.pdf