Or Litany

CONTACT INFORMATION

Research Scientist,
NVIDIA

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RESEARCH INTERESTS

Computer Vision, 3D Deep Learning for Scene Understanding and Shape Analysis, Learning under limited or corrupted labels.

EDUCATION

Tel Aviv University, Tel Aviv, Israel

Ph.D., Electrical Engineering, October 2018.
Advisor: Prof. Alex M. Bronstein

Tel Aviv University, Tel Aviv, Israel

M.Sc., Electrical Engineering (Computer Vision), August 2012

Hebrew University, Jerusalem, Israel

Talpiot Program[1]: B.Sc., Physics and Mathematics, August 2005

ACADEMIC APPOINTMENTS

Stanford University, CA, USA

Postdoctoral Researcher

September 2019 - August 2020

Advisor: Prof. Leonidas Guibas

Facebook AI Research, CA, USA

Postdoctoral Researcher

September 2018 - September 2019

Hosts: Prof. Leonidas Guibas and Prof. Jitendra Malik

Working on Geometric Deep Learning

Technische Universität München, Munich, Germany

Visiting Scholar

March - May 2016,

Working on 3D shape analysis; Host: Prof. Daniel Cremers

and April 2017

Duke University, North Carolina, USA

Visiting Scholar

November 2014

Working on Computational Photography; Host: Prof. Guillermo Sapiro

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[1]An elite Israel Defense Forces training program, for recruits who have demonstrated outstanding academic ability in the sciences and leadership potential (Acceptance rate $< 0.5\%$).

ICML Outstanding Paper Award (2 of 4,990 submissions), 2020

ICCV Best Paper Nomination (11 of 4,300 submissions), 2019

ICLR LLD workshop Best Paper Award, 2019

Elsevier Outstanding Reviewer, 2017

SGP Best Paper Award, 2016

Microsoft Research top talent intern, 2016

German Academic Exchange Service (DAAD) research grant, 2016

Weinstein prize for graduate studies, 2015

Google conference travel grant for ECCV, 2014

Tel Aviv University: graduated Magna Cum Laude, 2012

PUBLICATIONS

"Mix3D: Out of Context Data Augmentation by Mixing 3D Scenes", A.Nekrasov, J.Schult, O.Litany, F.Engelmann, B.Leibe. 3DV 2021 Oral presentation, 1st place on ScanNet benchmark.

"Contrast to Divide: Self-Supervised Pre-Training for Learning with Noisy Labels",E.Zheltonozhskii, C.Baskin, A.Mendelson, A.M.Bronstein, O.Litany, WACV 2022.

"DIB-R++: Learning to Disentangle Material from Lighting Using a Deferred Image-based Renderer", W.Chen, J.Litalien, J.Gao, Z.Wang, C.F.Tsang, S.Khamis, O.Litany, S.Fidler, NeurIPS 2021.

"Causal BERT: Improving object detection by searching for challenging groups", Cinjon Resnick, O.Litany, A.Kar, K.Kreis, J.Lucas, K.Cho, S.Fidler, AVVision2021 workshop at ICCV 2021.

"Vector Neurons: A General Framework for SO (3)-Equivariant Networks", C.Deng, O.Litany, Y.Duan, A.Poulenard, A. Tagliasacchi, L.Guibas, ICCV 2021. Oral presentation

"3DIoUMatch: Leveraging IoU Prediction for Semi-Supervised 3D Object Detection", H.Wang*, Y.Cong*, O.Litany, Y.Gao, L.Guibas, CVPR 2021.

"Weakly Supervised Learning of Rigid 3D Scene Flow", Zan Gojcic, O.Litany, Andreas Wieser, Leonidas J. Guibas, Tolga Birdal, CVPR 2021. Oral presentation

"ReLMoGen: Integrating Reinforcement Learning and Motion Generation for Interactive Navigation", F.Xia, C.Li, R.M.Martin, A.Toshev, O.Litany, S.Savarese., ICRA 2021.

"Human 3D keypoints via spatial uncertainty modeling", F.Williams, O.Litany, A.Sud, K.Swersky, A.Tagliasacchi1. (arXiv).

"Learned Equivariant Rendering without Transformation Supervision", C.Resnick, O.Litany, H.Larochelle, J.Bruna, K.Cho, Neurips 2020 workshop on Differentiable Computer Vision, Graphics, and Physics in ML.

"Representation Learning Through Latent Canonicalizations", O.Litany, A.Morcos, S.Sridhar, L.Guibas, J.Hoffman, WACV 2021.

"Continuous Geodesic Convolutions for Learning on 3D Shapes", Z.Yang, O.Litany, T.Birdal, S.Sridhar, L.Guibas, WACV 2021.

"PointContrast: Unsupervised Pretraining for 3D Point Cloud Understanding", S.Xie, J.Gu, D.Guo,

C.Qi, L.Guibas, O.Litany., ECCV 2020. Spotlight

"Towards Precise Completion of Deformable Shapes", O.Halimi, I.Imanuel, O.Litany, G.Trappolini, E.Rodol, L.Guibas, R.Kimmel., ECCV 2020.

"On Learning Sets of Symmetric Elements", H.Maron, O.Litany, G.Chechik, E.Fetaya., ICML 2020. Outstanding paper award

"ImVoteNet: Boosting 3D Object Detection in Point Clouds with Image Votes", C.Qi, X.Chen, O.Litany, L. Guibas., CVPR 2020.

"Object-Centric Multi-View Aggregation", S. Tulsiani, O.Litany, C.Qi, H.Wang, L.Guibas., (arXiv).

"Deep Hough Voting for 3D Object Detection in Point Clouds", C.Qi, O.Litany, K. He, L. Guibas., ICCV 2019. Oral, Nominated for best paper award

"Dual-Primal Graph Convolutional Networks", F.Monti, O.Shchur, A.Bojchevski, O.Litany, S.Gnnemann, M.Bronstein., Graph Embedding and Mining (GEM) workshop at ECML-PKDD, 2019. Oral presentation

"SOSELETO: A Unified Approach to Transfer Learning and Training with Noisy Labels", ICLR 2019 workshop on Learning from Limited Labeled Data O.Litany, D.Freedman. Oral, Best Paper award

"Self-supervised Learning of Dense Shape Correspondence", O.Halimi, O.Litany, E.Rodolà, A.Bronstein, R.Kimmel. CVPR 2019. Oral presentation

"SHREC19: Shape Correspondence with Isometric and Non-Isometric Deformations", R.M.Dyke, C.Stride, Y.K.Lai, P.L.Rosin, [and 22 others, including O.Litany]. Eurographics Workshop on 3D Object Retrieval 2019.

Book chapter: "Partial Single-and Multishape Dense Correspondence Using Functional Maps", O.Litany, E.Rodolà, A.Bronstein, M.Bronstein, D.Cremers. Elsevier, 2018.

"Class-Aware Fully-Convolutional Gaussian and Poisson Denoising", T.Remez, O.Litany, R.Giryes, A.Bronstein. Transactions on Image Processing, 2018.

"Generative Non-Rigid Shape Completion with Graph Convolutional Autoencoders", O.Litany, A.Bronstein, M.Bronstein, A.Makadia. CVPR 2018.

"Deep Functional Maps: Structured Prediction for Dense Shape Correspondence", O.Litany, T.Remez, E.Rodolà, A.Bronstein, M.Bronstein, ICCV 2017.

"Efficient Deformable Shape Correspondence via Kernel Matching", Z.Lahner, M.Vestner, A.Boyarski, O.Litany, R.Slossberg, T.Remez, E.Rodolà, A.Bronstein, M.Bronstein, D.Cremers, R.Kimmel, 3DV 2017. Oral presentation

"White Matter Fiber Representation using Continuous Dictionary Learning", G.Alexandroni, Y.Podolsky, O.Litany, T.Remez, A.Bronstein, H.Greenspan, R. Giryes, MICCAI, 2017.

"Deep Class Aware Denoising", T.Remez, O.Litany, R.Giryes, A.Bronstein, IEEE International Conference on Image Processing (ICIP), 2017.

"SHREC'17: Deformable Shape Retrieval with Missing Parts", E.Rodolà, L.Cosmo, O.Litany, M.Bronstein, A.Bronstein et al., EUROGRAPHICS Workshop on 3D Object Retrieval (3DOR 2017).

"Cloud Dictionary: Sparse Coding and Modeling for Point Clouds", O.Litany, T.Remez, A. Bronstein, Signal Processing with Adaptive Sparse Structured Representations (SPARS), 2017.

"Fully Spectral Partial Shape Matching", O.Litany, E.Rodolà, A.Bronstein, M.Bronstein. Eurographics 2017.

"Non-rigid Puzzles", O.Litany, E.Rodolà, A.Bronstein, M.Bronstein, D.Cremers, Computer Graphics Forum, Wiley, 2016. SGP best paper award.

"ASIST: Automatic Semantically Invariant Scene Transformation", O.Litany, T. Remez, D.Freedman, L.Shapira, A.Bronstein, R.Gal, CVIU journal.

"A picture is worth a billion bits: Real-time image reconstruction from dense binary threshold pixels", T. Remez, O.Litany, A.Bronstein, ICCP 2016.

"Image reconstruction from dense binary pixels", O.Litany, T.Remez, A.Bronstein, Signal Processing with Adaptive Sparse Structured Representations (SPARS), 2015.

"Putting the Pieces Together: Regularized Multi-part Shape Matching", O.Litany, A.Bronstein, M.Bronstein, Proc. Workshop on Nonrigid Shape Analysis and Deformable Image Alignment (NOR-DIA), 2012.

"FPGA system for real-time computational extended depth of field imaging using phase aperture coding", T.Remez, O.Litany, S.Yoseff, H.Haim, A.Bronstein.

PROFESSIONAL SERVICE	

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- Admin of the twitter page: "The TL;DR of 3D Deep Learning" ($> 1,000$ followers). Daily posts of carefully chosen insightful papers on 3D deep learning.
- Organizer of "Learning 3D Representations for Shape and Appearance" workshop at ICCV, 2021.
- Organizer of iGDL 2021: Israeli Geometric Deep Learning Workshop.
- Session chair at Nvidia NTECH conference.
- International Program Committee (PC) member of the workshop on 3D Object Retrieval (3DOR) 2021.
- Organizer of iGDL 2020: Israeli Geometric Deep Learning Workshop.
- Mentor at the CVPR 2020 Doctoral Consortium.
- Organizer of "Learning 3D Representations for Shape and Appearance" workshop at ECCV, 2020.
- International Program Committee (PC) member of the workshop on 3D Object Retrieval (3DOR) 2020.
- Program Committee (PC) member of the AAAI 2020.
- International Program Committee (IPC) member of the Eurographics 2020.
- Organizing Committee member, "Deep Learning for Computer Graphics and Geometry Processing" at Eurographics, 2019.
- Committee member at the SUMO (Scene Understanding and Modeling) Challenge, 2019.
- Organizing Committee Member, "Deep Learning meets Geometry", tutorial at ECCV 2018. Munich, Germany, September 2018.
- Organizing Committee Member, "Deep Learning and Geometry", workshop at the EUSIPCO. Kos, Greece, September 2017.
- Organizing Committee Member, "Deformable Partial Shape Retrieval", track at the EURO-GRAPHICS Shape Retrieval Contest (3DOR SHREC 2017). Lyon, France, May 2017.
- Session chair at IAS Workshop on Machine Learning for 3D Understanding (2018).
- Reviewer at:
  2016: ECCV; **2017**: 3DV, CVPR; **2018**: CVPR, TPAMI, Pattern Recognition, ICASSP, ECCV, 3DV, Transactions on Graphics (TOG), NIPS, SIGGRAPH ASIA, GMDL workshop; **2019**: Eurographics, CVPR, IEEE Robotics and Automation Letters, Computer Vision for

Global Challenges Workshop at CVPR, GMDL workshop at ICCV, 3DRW workshop at ICCV, TPAMI, Transactions on Image Processing, AAAI, ICLR (emergency); **2020**: CVPR, Siggraph, NeurIPS, CAG journal (Elsevier), Journal of Imaging, NeurIPS, 3DOR, IEEE TVCG, PAMI. **2021**: CVPR, WACV, ICCV, NeurIPS, TPAMI

INVITED TALKS

- 9.30.21 Research presentation at Nvidia's NTECH conference.
- 9.29.21 Reduced supervision for 3D scene understanding. SIAM Conference on Geometric and Physical Modeling (GD/SPM21). Invited by Prof. Qixing Huang.
- 6.2.21 Deep Learning on graphs and manifolds. Guest speaker at Stanford course CS233.
- Nvidia GTC 2021
- 12.14.20 Hebrew University of Jerusalem (HUJI). Invited by Prof. Raanan Fattal.
- 12.8.20 Tel-Aviv CS. Invited by Prof. Sivan Toledo.
- 12.1.20 Technion Pixel-Club. Invited by Prof. Ron Kimmel.
- 11.30.20 Tel-Aviv EE. Invited by Prof. Shai Avidan.
- 10.16.20 UT Austin's Forum for Artificial Intelligence (FAI) seminar. Invited by Prof. Qixing Huang.
- 9.9.20 Google Cambridge. Invited by Prof. Bill Freeman.
- 8.2.20 Talk at iGDL
- 7.29.20 Talk at Google. Invited by Prof. Thomas Funkhouser.
- 7.8.20 SIAM 20: Learning and Processing of Geometric Visual Structures. Invited by Prof. Ron Kimmel.
- 1.7.20 Talk at Amazon. Invited by Dr. Roee Litman.
- 9.1.20. Stanford Graphics-Cafe.
- 19.12.19. Talk at Nvidia Research, Toronto. Invited by Prof. Sanja Fidler
- 21.11.19. Talk at Apple. Invited by Dr. Oncel Tunzel
- 19.7.19. Invited speaker at the, "Deep Learning for Science School" at Berkeley.
- 17.4.2019. Cornell Tech University. Invited by Prof. Noah Snavely.
- 16.4.2019. New York University (NYU). Invited by Prof. Daniele Panozzo and Prof. Juan Bruna.
- 10.4.2019. Palo Alto Research Center (Xerox PARC). Invited by Kalai Ramea.
- 31.1.2019. "San Francisco Deep Learning Meetup", San Francisco, CA, USA.
- 4.7.2018. "TUM IAS Workshop on Machine Learning for 3D Understanding", TU Munich, Germany.
- 15.3.2018. "Imaging and Vision from Theory to Applications" workshop, Siegen, Germany. Invited by Prof. Michael Muller.
- 26.1.2018. Stanford University. Invited by Prof. Leonidas Guibas.
- 27.09.2017. New York University (NYU). Invited by Prof. Juan Bruna.
- 13.09.2017. Google New York.
- 26.06.2017. Invited speaker at Israel computer vision MeetUp. Google campus Tel-Aviv.
- 13.01.2017. Invited speaker at the Dagstuhl Seminar 17021 Functoriality in Geometric Data. Schloss Dagstuhl, Leibniz Center for Informatics (Germany).
- 25.12.2016. Invited speaker at the Israeli Computer Vision Day. IDC Herzliya (Israel).
- 24.11.2016. Weizmann Insitute of Science (Israel). Invited by Prof. Y. Lipman.
- 22.11.2016. Tel Aviv University (Israel). Invited by Prof. D. Cohen-Or.
- 27.10.2016. Invited speaker at the G-Caffe Seminar, Stanford University. Invited by Prof. L. Guibas.
- 21.06.2016. Eurographics Symposium on Geometry Processing (SGP), FU Berlin (Germany). Invited by Prof. M. Ovsjanikov and Prof. D. Panozzo.
- 5.6.2016. The Hebrew University of Jerusalem (Israel). Invited by Prof. Shmuel Peleg.
- 15.4.2016. Technische Universitt Mnchen (Germany). Invited by Prof. D. Cremers.
- 12.4.2016. USI University of Lugano (Switzerland). Invited by Prof. M. Brsontein.
- 30.11.2015. Ben Gurion University (Israel). Invited by Prof. O. Ben-Shahar.

EMPLOYMENT
HISTORY

NVIDIA

Research Scientist **August 2020 - Present**
Hosts: Jan Kautz (VP Research) and Prof. Sanja Fidler (Director of AI and Prof. at the University of Toronto)

Google TLV

Research Intern **December 2017 - August 2018**
Transfer learning algorithms in Deep Learning (best paper at ICLR LLD workshop)
Host: Dr. Daniel Freedman

Google NYC

Research Intern **July 2017 - October 2017**
Geometric deep-learning for shape completion (published at CVPR)

Intel Perceptual Computing

Research Intern **July 2016 - June 2017**
3D shape correspondence (3 publications at ICCV and Eurographics)

Microsoft Research

Research Intern **February 2015 - December 2016**
3D scene understanding and reconstruction for VR (see ASIST in publications)

IAF

Head of Section (Military rank: Major) **August 2012 - August 2014**
Led an innovation team of nine R&D engineers and physicists (B.Sc to Ph.D)

Senior researcher **August 2007 - August 2011**
Invented and led development of seed ideas/concepts to operational capabilities.

Elbit Systems Electro-optics (Elop)

Image Processing Algorithms Developer **December 2005 - December 2006**
Developed scenario simulations and tracking algorithms for a fiber laser based DIRCM system.