Or Litany

CONTACT INFORMATION

Senior Research Scientist,
NVIDIA

Cell: (+1)669-264-3983
E-mail: orlitany at gmail dot com
Homepage: `https://orlitany.github.io`

RESEARCH INTERESTS

Computer Vision, 3D Deep Learning for Scene Understanding, Generative AI, Learning under limited supervision.

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

Technion - Israel Institute of Technology,
Assistant Professor (incoming) **September 2023 -**

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

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

Honors and Awards

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

"Trace and Pace: Controllable Pedestrian Animation via Guided Trajectory Diffusion", D.Rempe, Z.Luo, X.Peng, Y.Yuan, K.Kitani, K.Kreis, S.Fidler, O.Litany. CVPR 2023

"Neural Kernel Surface Reconstruction", J.Huang, Z.Gojcic, M.Atzmon, O.Litany, S.Fidler, F.Williams". CVPR 2023

"Fast Monocular Scene Reconstruction with Global-Sparse Local-Dense Grids", W.Dong, C.Choy, C.Loop, Y.Zhu, O.Litany, A.Anandkumar. CVPR 2023.

"Mask3D for 3D Semantic Instance Segmentation", J.Schult, F.Engelmann, A.Hermans, O.Litany, S.Tang, B.Leibe. ICRA 2023

"GET3D: A Generative Model of High Quality 3D Textured Shapes Learned from Images", J.Gao, T.Shen, Z.Wang, W.Chen, K.Yin, D.Li, O.Litany, Z.Gojcic, S.Fidler. NeurIPS 2022

"LION: Latent Point Diffusion Models for 3D Shape Generation", X.Zeng, A.Vahdat, F.Williams, Z.Gojcic, O.Litany, S.Fidler, K.Kreis. NeurIPS 2022

"Language-Grounded Indoor 3D Semantic Segmentation in the Wild", D.Rozenberszki, O.Litany, A.Dai. ECCV 2022

"MVDECOR: Multi-view Dense Correspondence Learning for Fine-grained 3D Segmentation", G.Sharma, K.Yin, S.Maji, E.Kalogerakis, O.Litany, Sanja Fidler. ECCV 2022

"Learning Smooth Neural Functions via Lipschitz Regularization", D.Liu, F.Williams, A.Jacobson, S.Fidler, O.Litany. SIGGRAPH 2022.

"Neural Fields as Learnable Kernels for 3D Reconstruction", Francis Williams*, Zan Gojcic*, Sameh Khamis, Denis Zorin, Joan Bruna, Sanja Fidler, O.Litany. CVPR 2022

"Generating Useful Accident-Prone Driving Scenarios via a Learned Traffic Prior", Davis Rempe, Jonah Philion, Leonidas Guibas, Sanja Fidler, O.Litany. CVPR 2022.

"Federated Learning with Heterogeneous Architectures using Graph HyperNetworks", O.Litany, Haggai Maron, David Acuna, Jan Kautz, Gal Chechik, Sanja Fidler. arXiv 2022.

"Neural Fields in Visual Computing and Beyond", Yiheng Xie, Towaki Takikawa, Shunsuke Saito, O.Litany, Shiqin Yan, Numair Khan, Federico Tombari, James Tompkin, Vincent Sitzmann, Srinath Sridhar, EUROGRAPHICS State-of-the-art report (STAR) 2022.

"Spectral Unions of Partial Deformable 3D Shapes", L.Moschella, S.Melzi, L.Cosmo, F.Maggioli, O.Litany, M.Ovsjanikov, L.Guibas, E.Rodolà. Eurographics 2022.

"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.

"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.

"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 scene BERT: Improving object detection by searching for challenging groups", C.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.Rodolà, 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 (NORDIA), 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

- 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.
- Workshop / tutorial organizer:
  - "3DOVScene: Open-Vocabulary 3D Scene Understanding" workshop at ICCV, 2023.
  - "Neural Fields in Computer Vision" workshop at CVPR, 2022.
  - "Learning 3D Representations for Shape and Appearance" workshop at ICCV, 2021.
  - "iGDL: Israeli Geometric Deep Learning workshop (First)" workshop at , 2020.
  - "iGDL: Israeli Geometric Deep Learning workshop (Second)" workshop at , 2021.
  - "Deep Learning and Geometry" workshop at EUSIPCO, 2017.
  - "Learning 3D Representations for Shape and Appearance" workshop at ECCV, 2020.
  - "Deep Learning for Computer Graphics and Geometry Processing" workshop at Eurographics, 2019.
  - "Deep Learning meets Geometry" tutorial at ECCV, 2018.
- Area Chair: 3DV 2022.
- Session chair:
  - Nvidia NTECH conference
  - IAS Workshop on Machine Learning for 3D Understanding (2018)
- International Program Committee (PC):
  - AAAI 2020
  - Eurographics 2020
  - SUMO (Scene Understanding and Modeling) Challenge, 2019.
  - 3D Object Retrieval (3DOR) 2017, 2020-2023.
- Mentor at the CVPR 2020 Doctoral Consortium.
- 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, IEEE Robotics and Automation Letters. **2022**: SIGGRAPH, CVPR, TMLR, 3DV, NeurIPS. **2023**: CVPR, WAD workshop, SIGGRAPH, ICCV

Invited Talks

- ICCV 2023 Workshop on Visual Continual Learning – Keynote.
- 5.24.23 Singapore Vision Day – Keynote.
- 4.28.23 Brown Visual Computing Seminar
- Data-driven Simulation for AV, ECCV 2022 workshop on 3D Perception for Autonomous Driving. Tel-Aviv, Israel. Invited by Prof. Gal Chechik and Raja Giryes.
- 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

Sr. Research Scientist **August 2020 - Present**
Manager: Prof. Sanja Fidler

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.