Alexander M. Bronstein

Contact Information

Alexander Bronstein
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Research interests

Computational imaging, signal and image processing, computer vision, depth imaging and 3D vision, computational shape analysis, autonomous vehicle and aircraft perception, medical imaging and image analysis, large-scale information retrieval, deep learning algorithms and hardware, financial signal analysis, bioinformatics, structural biology, computational chemistry.

Academic Degrees

Technion – Israel Institute of Technology

Ph.D., Computer Science, 2007
Supervisor: Prof. Ron Kimmel

M.Sc., Electrical Engineering (*summa cum laude*), 2005
Supervisors: Dr. Michael Zibulevsky and Prof. Yehoshua Y. Zeevi

B.Sc., Electrical Engineering (*summa cum laude*), 2002

Academic appointments

Professor, Institute of Science and Technology, Austria, *From* 2024

Dan Broida Academic Chair, Technion, *From* 2021

Professor, Faculty of Computer Science, Technion, *From* 2018 · Secondary affiliations with the Faculty of Biomedical Engineering (*from* 2019) and Biology (*from* 2023)

Associate Professor (tenured), Faculty of Computer Science, Technion, 2016-2018

Associate Professor (tenured), School of Electrical Engineering, Tel Aviv University, 2013–2016

Senior Lecturer, School of Electrical Engineering, Tel Aviv University, 2010–2013

Visiting appointments

Visiting Professor, Institute of Science and Technology, Austria, 2023 – 2024

Visiting Professor, College of Engineering, Duke University, 2014

Visiting Professor, Dipartimento di Informatica, Verona University, 2010, 2014

Visiting Lecturer, Department of Computer Science, Stanford University, 2009

Visiting Lecturer, Dipartimento di Elettronica e Informazione, Politecnico di Milano, 2008

Industrial appointments

Scientific Advisory Board member, Autobrains, *From* 2023

Chief Magician (a.k.a. Scientific Advisor), AKA Foods Limited, *From* 2021

Scientific Advisory Board member, Quris, 2020-2023

Co-founder and **Chief Scientist**, Sibylla, *From* 2019

Co-founder and **Scientific Advisor**, Embryonics, 2018–2023 (acquired by RHEA)

Co-founder and **Chief Scientist**, Videocites, 2015-2023

Principal Engineer, Intel Corporation, 2016–2021

Senior Research Scientist, Intel Corporation, 2012–2016

Co-founder, Invision, 2009–2012 (acquired by Intel)

Co-founder and **Vice President video technology**, Novafora Inc., 2006–2009

Teaching experience

Institute of Science and Technology, Austria

Co-lecturer, Applied deep learning for scientists, 2024

Technion, Department of Computer Science

Lecturer, Advanced topics in deep learning (undergraduate/graduate), 2022-2023

Lecturer, Geometric deep learning (undergraduate/graduate), *From* 2022

Lecturer, Deep learning on computing accelerators (undergraduate/graduate), 2018-2023

Lecturer, Digital image processing (undergraduate/graduate), 2017-2023

Lecturer, Logic design (undergraduate), 2017-2018

Lecturer, Seminar in computer graphics (graduate), *From* 2016

Instructor, Project in operating systems (undergraduate), 2005

Teaching assistant, Numerical geometry of images (undergraduate), 2006

Lecturer, Advanced topics in computer vision (graduate), 2006

Duke University, College of Engineering

Instructor, Digital image (ad)ventures (undergraduate/graduate), 2014

Lecturer, Optimization for scientists and engineers (short graduate course), 2013

Tel Aviv University, Department of Electrical Engineering

Lecturer, Optimization (graduate), 2014-2016

Academic supervisor, Advanced lab in image processing (graduate), 2015–2016

Lecturer, Processing and analysis of video (graduate), 2013-2017

Lecturer, Digital processing of single and multi-dimensional signals (graduate), 2012-2017

Lecturer, Random signals and noise (undergraduate), 2011-2016

Lecturer, Processing and analysis of geometric shapes (graduate), 2010-2012

Verona University, Dipartimento di Informatica

Lecturer, Computational shape analysis (short graduate course), 2014

Lecturer, Numerical geometry of non-rigid shapes (graduate), 2010

Stanford University, Department of Computer Science

Lecturer, Topics in geometric algorithms (graduate), 2009

Politecnico di Milano, Dipartimento di Elettronica e Informazione

Lecturer, Numerical geometry of non-rigid shapes (graduate), 2008

Tutorials and Short Courses

Lecturer, Spectral methods for 3D data analysis
Computer Vision and Pattern Recognition (CVPR), Honolulu, USA, 2017

Lecturer, Summer school on computational shape analysis
Universidad La Salle, Arequipa, Peru, 2015

Lecturer, Bases for images and surfaces (BASIS)
Computer Vision and Pattern Recognition (CVPR), Columbus, USA, 2014

Lecturer, Diffusion geometry in shape analysis
Int'l Conference on Computer Vision, Sydney, Australia, 2013

Lecturer, Diffusion geometry in shape analysis
Symposium on Geometry Processing, Genova, Italy, 2013

Lecturer, Diffusion geometry in shape analysis
Eurographics, Cagliari, Italy, 2012

Lecturer, Spectral methods in shape analysis
Summer School on Image Processing (SSIP), Szeged, Hungary, 2011

Lecturer, Diffusion geometry methods in shape analysis
Computer Vision and Pattern Recognition (CVPR), Colorado Springs, USA, 2011

Lecturer, Diffusion geometry in shape analysis
European Conference on Computer Vision (ECCV), Heraklion, Greece, 2010

Lecturer, Numerical geometry of non-rigid shapes
SIAM Imaging Science meeting, Chicago, USA, 2010

Lecturer, Numerical geometry of non-rigid shapes
Int'l Conference on Computer Vision (ICCV), Kyoto, Japan, 2009

Lecturer, Numerical geometry of non-rigid shapes
Computer Vision and Pattern Recognition (CVPR), Minneapolis, USA, 2007

Institutional and departmental service

Member, **Faculty Professional Union Presidency** · 2022-2023

Member, **Computation & Information Systems Committee** · *From* 2020

Faculty representative at the Technion Senate · 2020–2023

Vice Dean Industrial Liaisons · Department of Computer Science, 2018-2022

Member, **Curriculum committee** · Department of Computer Science, *From* 2017

Member, **Hiring and promotions preparatory committee** · Department of Computer Science, *From* 2018 · Department of Biomedical Engineering, *From* 2020

Founding member, **Machine Learning and Intelligent Systems Center (MLIS)** · *From* 2018
Head, **Center for Intelligent Systems** · *From* 2016

Head, **Vision Theory and Applications (VISTA) Laboratory** · *From* 2016

Public professional activities

Member, ELLIS Ph.D. and Postdoc Committee · *From* 2023

Associate Editor, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) · *From* 2021

Associate Editor, SIAM Journal on Imaging Sciences (SIIMS) · *From* 2018

Reviewer for Int'l Journal of Computer Vision (IJCV), IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), Journal of Computer Vision and Image Understanding (CVIU), SIAM Journal on Imaging Sciences (SIIMS), Journal of Machine Learning Research (JMLR), European Conference of Computer Vision (ECCV), *From* 2007

Member of the grant proposal judgment committees for the Israeli Science Foundation (ISF) and European Research Council (ERC), *From* 2015

Reviewer of grant proposals for the Israeli Science Foundation (ISF) and the European Research Council (ERC), *From* 2014

Membership in professional societies

European Laboratory for Learning and Intelligent Systems (ELLIS), *Fellow* 2020

Institute of Electrical and Electronic Engineers (IEEE), *Member* 2001 · *Senior Member* 2012 · *Fellow* 2018

Society for Industrial and Applied Mathematics (SIAM), *Member* 2017

Fellowships, Awards and Honors

Morton and Beverley Rechler Prize for Excellence in Research, 2024

Dan Broida Academic Chair, 2021

Schmidt Career Advancement Chair in Artificial Intelligence, 2021

3DVision best paper award, 2018

Fellow of the IEEE *for contributions to three-dimensional geometric processing in imaging*, 2018

Symposium on Geometry Processing best paper award, 2016

Viterbi Career Advancement Chair, 2016

Tel Aviv University Rector's list for excellence in teaching, 2013, 2014

Tel Aviv University Dean's honorable mention for excellence in teaching, 2013

Int'l Society for Music Information Retrieval best poster presentation, 2012

Krill prize by the Wolf Foundation *for excellence in scientific research*, 2012

Wilk Familiy award *for best undergraduate project supervision*, 2007

Adams fellowship *(renounced)*, 2006

Conf. on Multigrid Methods best paper award, 2005

Kasher prize *for best undergraduate project supervision*, 2003, 2004

Technion Excellence program alumnus, 2003

Gensler counter terrorism prize *for work on facial recognition*, 2003

Hershel Rich Technion innovation award *for work on facial recognition*, 2003

Invited as a delegate to the International Achievement Summit, Washington DC, 2003

Technion Graduate School scholarship *for excellence in studies*, 2003

Kasher prize *for best undergraduate project*, 2002

Thomas Schwartz prize *for best undergraduate project*, 2002

Technion Department of Humanities and Arts award *for the translation of Shakesperian sonnets into Italian*, 2001

Technion President's achievement list *for excellence in studies*, 1999–2001

GRADUATE STUDENTS & POSTDOCS

Postdocs and Research Scientists

Dr. Ailie Marx (2020-2023) · currently Senior Research Scientist, Migal.

Dr. Aviv Rosenberg (2023)

Dr. Chaim Baskin (2021-2022) · currently Assistant Professor, Dept. of Electrical and Computer Engineering, Ben Gurion University.

Dr. Alex Masley (2019-2023)

Dr. Or Litany (2017-2018) · currently Assistant Professor, Dept. of Computer Science, Technion.

Dr. Michael Zibulevsky (*from* 2016)

Completed Ph.D. theses

Moran Davoodi (2019-2024) · *Heart rate variability: applications in security* · Co-supervised with Prof. Yael Yaniv, Dr. Joachim Bechar

Eyal Rozenberg (2019-2024) · *Reduced-Supervision and ab initio machine learning approaches with applications to quantum physics and medicine*

Tomer Weiss (2018-2023) · *Deep Learning Approaches for Inverse Problems in Computational Imaging and Chemistry*

Eli Schwartz (2018-2023) · *Adapting computer vision models to novel distributions* · Co-supervisor: Prof. Raja Giryes

Aviv Rosenberg (2018-2023) · *Statistical methods and machine learning for medical and biological application* · Co-supervisor: Prof. Yael Yaniv, Dr. Ailie Marx

Amit Alfassy (2017-2023) · *Learning with less data*

Brian Chmiel (2018-2023) · *Resource efficient training and inference in deep neural networks*

Amit Boyarski (2015-2021) · *Geometry in numerical algorithms*

Chaim Baskin (2017-2021) · *Designing deep neural networks for efficient and robust inference* · Co-supervisor: Prof. Avi Mendelson

Tal Remez (2014-2018) · *Learning to Segment via Cut-and-Paste*

Evgeny Tsizin (2013-2024) · *Source estimation and classification for real-time neurofeedback and brain-machine interface* · Co-supervisor: Prof. Amir Boag

Or Litani (2014–2017) · *Geometry and learning for scene understanding and synthesis*

Haim Harel (2012–2017) · *Phase-coded aperture for extended depth-of-field imaging and depth measurement capabilities from a single image* · Co-supervisor: Prof. Emanuel Marom

Roee Litman (2012–2017) · *Modeling and learning similarity of shapes, images and signals*

Completed M.Sc. theses

Nitsan Yehishalom (2022-2024) · *Exploring the role of synonymous genetic coding in shaping the local protein backbone structure* · Co-supervised with Prof. Gadi Schuster and Dr. Ailie Marx

Tsachi Abu (since 2021-2023) · *Threat model-agnostic adversarial defense using diffusion models* · Co-supervisor: Dr. Chaim Baskin

Roi Klein (2021-2023) · *High frequency data-driven evapotranspiration estimation from remote multimodal imagery* · Co-supervisor: Dr. Moti Freiman

Lynore Ackerman Schraier (2020-2022) · *A machine learning exploration of relations between protein structures and their genetic coding* · Co-supervisor: Dr. Michael Zibulevsky, Dr. Ailie Marx

Tom Hirshberg (2021-2022) · *Sound source modeling of multi-rotor in free space and indoors towards acoustics-based indoor localization*

Ben Finkelshtein (2021-2022) · *Robustness and expressiveness of graph neural networks* · Co-supervisor: Dr. Chaim Baskin

Dean Zadok (2021-2022) · *Neural Handshake: learning to operate robotic prosthesis by fusing kinematics and music* · Co-supervised with Prof. Alon Wolf and Dr. Oren Salzman

Adam Botach (2021-2022) · *Intelligent video capture using learned exposure control* · Co-supervised with Prof. Ehud Rivlin and Dr. Chaim Baskin

Amir Livne (2020-2022) · *How to avoid depth reconstruction in 3D vision tasks: methods for analysis and processing of visual and geometric information using neural networks* · Co-supervised with Prof. Ron Kimmel

Nir Diamant (2019-2022) · *Improving real-world data generation using adversarial Sim2Real models*

Elad Amrani (2017-2022) · *Self-supervised multimodal learning using unlabeled videos*

Omer Dahari (2018-2021) · *Digital Gimbal: end-to-end deep image stabilization with learnable exposure times*

Evgenii Zheltonozhskii (2020-2021) · *Reducing supervision in visual recognition tasks* · Co-supervisor: Prof. Avi Mendelson

Maria Tunik (2017-2021) · *Learning problems in recommender systems*

Yonathan Elul (2018-2020) · *Applied artificial intelligence for medicine: a deep learning framework for the diagnosis of cardiac arrhythmia* · Co-supervisors: Prof. Yael Yaniv, Prof. Assaf Schuster

Sanketh Vedula (2017-2020) · *Learning-based design of ultrasound imaging systems*· Co-supervisor: Dr. Michael Zibulevsky

Idan Hasson (2017-2019) · *Aquisition and prediction of gestures surface EMG data using sequential deep learning methods*

Yochai Tzur (2017-2019) · *Differentiable neural architecture search with an arithmetic complexity constraint*

Ortal Senouf (2017-2018) · *Improving ultrasound imaging with deep neural networks*· Co-supervisor: Dr. Michael Zibulevsky

Eli Schwartz (2016-2018) · *Inverse problems in image processing* · Co-supervised with Prof. Raja Giryes

Tal Mund (2015-2020) · *EEG source localization using compressed measurements and the fabrication of an anisotropic phantom head model*

Shachar Yossef (2015-2017) · *FPGA platform for real-time image enhancement*

Keren Rotker (2013-2018) · *Over-parameterized models for vector fields with application to phase-contrast MRI data*· Co-supervisor: Prof. Dafna Ben-Bashat

Amit Boyarski (2012-2014) · *Optimization of distance maps with applications to deformable shape processing*

Tal Ben Yakar (2012-2014) · *Automatic polyphonic music transcription*

Ohad Menashe (2011-2014) · *Real-time compressed imaging of scattering volumes*

Or Litani (2011-2012) · *Regularized multi-part shape registration and segmentation*

Roee Litman (2010-2012) · *Detection of stable components in deformable shapes*

Jonathan Pokrass (2010-2012) · *Intrinsic shape matching*

Ph.D. theses in progress

Tsachi Blau (since 2023 · expected graduation in 2026) · *Diffusion models for adversarial defenses* · Co-supervisor: Dr. Chaim Baskin

Barak Hefer Gahtan (since 2021 · expected graduation in 2026), Direct PhD track · *5G scheduling with reinforcement learning* · Co-supervisor: Prof. Reuven Cohen

Dean Zadok (since 2022 · expected graduation in 2028) · *Control of prosthetic limbs using ultrasound* · Co-supervised with Prof. Alon Wolf and Dr. Oren Salzman

Elad Amrani (since 2022 · expected graduation in 2028) · *Self-supervised learning*

Yonathan Elul (since 2020 · expected graduation in 2024) · *Discovery and estimation of governing dynamics in physiological and physical systems* · Co-supervisors: Prof. Yael Yaniv, Prof. Assaf Schuster

Sanketh Vedula (since 2020 · expected graduation in 2024) · *Machine learning techniques with statistical guarantees*· Co-supervisor: Dr. Michael Zibulevsky

Yaniv Nemcovsky (since 2020 · expected graduation in 2024) · *Adversarial attacks and defenses on visual odometry systems*· Co-supervised with Prof. Avi Mendelson

M.Sc. theses in progress

Tsachi Abu (since 2019 · expected graduation in 2024) · *Neural-network control of a drone with non-standard performance objectives* · Co-supervised with Prof. Ehud Rivlin

Yoav Bar (since 2019 · expected graduation in 2024) · *Using deep learning to improve image quality in cardiac CT image reconstruction* · Co-supervised with Prof. Jonathan Lessick

Research Grants

IBM · *AI-based identification of protein targets involved in sub-cellular localization of the proteasome in cultured cells and patients biopsies* (PI joint with Prof. A. Ciechanover), 2024 · ILS 240K

Horizon Europe Framework Programme · *An innovative non-contact and harmless screening modality set to change the course of breast cancer detection and patient monitoring (ThermoBreast)* (PI), 2023 · EUR 650K

Israel Innovation Authority · *Self-supervised learning on multimodal inputs* (PI joint with Dr. Chaim Baskin), 2022 · ILS 1.1M

Israel Council for Higher Education · *Model-Based Geometrical Neural Networks: Construction, Applications, and Theory* (PI joint with Prof. M. Elad and Dr. Y. Romano), 2021 · ILS 1.82M

Binational Science Foundation (BSF) · *Hardware-Aware Optimization of Graph Neural Networks* (PI joint with Prof. Ronald Dreslinski, University of Michigan), 2021 · USD 216K

Prime Minister's Office · *Byzantine Adversarial attacks on IoT and Autonomous machines* (PI joint with Prof. Avi Mendelson), 2020 · USD 110K

European Research Council (ERC) consolidator grant · *Acoustics-based drone navigation and interaction (EARS)* (PI), 2020 · EUR 2M

PMRI - Technion · *Proof of concept of Telemonitoring Biometric Recognition* (PI joint with Prof. Yael Yaniv), 2020 · USD 28K

Prime Minister's Office · *Biometric recognition via beating rate variability analysis* (PI joint with Prof. Yael Yaniv), 2020 · USD 110K

European Research Council (ERC) PoC grant · *Learning efficient millimeter wave radar imaging for autonomous vehicles (DEEP-RADAR)* (PI), 2019 · EUR 150K

CSST- Technion · *The piper of Hamelin 2.0: adversarial attacks on airborne visual navigation systems* (PI), 2019 · USD 240K

TASP · *Imaging system for autonomous marine vessels* (PI), 2019 · USD 50K

Israel Innovation Authority · *Learning to see: end-to-end task-driven learning of imaging systems* (PI), 2019 · USD 158K

Israel Innovation Authority - Smart Imaging Consortium · *Smart Imaging for Gimbal-Less Image Stabilization* (PI), 2019 · USD 212K

Prime Minister's Office · *Anti-adversarial attack techniques* (PI joint with Prof. Avi Mendelson), 2018 · USD 85K

Hyundai NGV · *Anti-adversarial attack techniques* (PI joint with Prof. Avi Mendelson), 2018 · USD 200K

Technion Biomedical Informatics Grant · *Towards predictive treatment of cardiac fibrillation* (PI joint with Profs. Yael Yaniv, Assaf Schuster, Mahmoud Suleiman, Shmuel Rispler), 2018 · USD 110K

Israeli Ministry of Science and Technology · *Flying Ears: Acoustic Navigation and Interaction in Multi-Rotor Aircraft* (PI joint with Dr. Oksana Stalnov), 2018 · USD 350K

Ministry of Defence · *Inertial navigation system with integrated Lidar and DTM* (PI in place of Prof. Ehud Rivlin), 2018 · USD 61.1K

Ministry of Defence · *Data-driven Monocular VO* (PI in place of Prof. Ehud Rivlin), 2017 · USD 49K

Ministry of Defence · *UAV Indoor Navigation* (PI in place of Prof. Ehud Rivlin), 2017 · USD 50.6K

Ministry of Defence · *Monocular VO* (PI in place of Prof. Ehud Rivlin), 2016 · USD 55.6K

TASP · *GPS jamming and spoofing for landing a quadcopter* (PI in place of Prof. Ehud Rivlin), 2016 · USD 40K

Israeli Ministry of Science · *Talk to your brain online (T2URBO)* (PI), 2014 · ILS 2M (PI joint with Profs. Doron Freedman, Nira Liberman, Oren Shriki, and Talma Hendler)

Kamin Applied Research Grant · *Real-time compressed imaging* (PI), 2014 · ILS 800K

European Research Council (ERC) proof of concept grant · *Spatial superresolution of electrophysiological measurements (NETEEG)* (PI), 2015 · EUR 150K

European Research Council (ERC) startup grant · *Rapid parsimonious modeling (RAPID)* (PI), 2013 · EUR 1.5M

German Israeli Foundation (GIF) · *Regular structure in deformable 3D geometry* (PI), 2011 · EUR 39K

Binational Science Foundation (BSF) · *Sparse modeling of weakly-coupled multi-modal data* (PI joint with Prof. Guillermo Sapiro, Duke University), 2011 · USD 75K

Israel Science Foundation (ISF) · *Spectral methods for deformable shape analysis* (PI), 2011 · ILS 720K

Israel Science Foundation (ISF) · *New faculty equipment grant* (PI), 2011 · USD 60K

Publications

All publications since 2010 are as a senior author. PI's name underlined. Students and postdocs from my group (at the time of the publication) are marked with *. Peer senior collaborators are marked with †. Most influential papers are highlighted.

Theses

1. A. M. Bronstein. Numerical geometry of non-rigid shapes: embedding problems, *Department of Computer Science*, Technion, 2007.
2. A. M. Bronstein. Blind deconvolution using relative Newton algorithm and learnable sparse representations. *Department of Electrical Engineering*, Technion, 2005.

Refereed papers in multidisciplinary journals

∗**1.** T. Weiss*, L. Cosmo, E. Mayo Yanes, S. Chakraborty, A. M. Bronstein, R. Gershoni-Poranne†. Guided diffusion for inverse molecular design, *Nature Computational Science* 3(10), 2023.

∗**2.** A. A. Rosenberg*, N. Yehishalom, A. Marx†, A. M. Bronstein. An amino-domino model described by a cross-peptide-bond Ramachandran plot defines amino acid pairs as local structural units, *Proc. US National Academy of Sciences (PNAS)*, 2023.

∗**3.** A. Rosenberg*, A. Marx, A. M. Bronstein. Codon-specific Ramachandran plots show amino acid backbone conformation depends on identity of the translated codon, *Nature Communications*, 2022.

∗**4.** E. Rozenberg*, A. Karnieli, O. Yesharim, J. Foley-Comer, S. Trajtenberg-Mills, D. Freedman†, A. M. Bronstein, A. Arie†. Inverse design of spontaneous parametric down-conversion for generation of high-dimensional qudits, *Optica*, 9, pp. 602-615, 2022.

5. Y. Elul*, A.A. Rosenberg*, A. Schuster†, A. M. Bronstein, Y. Yaniv†. Meeting the unmet needs of clinicians from AI systems showcased for cardiology with deep-learningbased ECG analysis, *Proc. US National Academy of Sciences (PNAS)*, 2021.
6. Y. Aflalo, A. M. Bronstein, R. Kimmel†. On convex relaxation of graph isomorphism, *Proc. National Academy of Sciences (PNAS)*, 2015.

∗**7.** A. M. Bronstein, M. M. Bronstein, R. Kimmel. Generalized multidimensional scaling: a framework for isometry-invariant partial surface matching, *Proc. National Academy of Sciences (PNAS)*, vol. 103(5), pp. 1168–1172, 2006.

Refereed papers in professional journals

1. O. Wengrowicz, A. M. Bronstein, O. Cohen†. Unsupervised physics-informed deep learning-based reconstruction for time-resolved imaging by multiplexed ptychography, *Optics Express*, 2024.
2. T. Weiss*, A. Wahab, A. M. Bronstein, R. Gershoni-Poranne†. Interpretable deep learning unveils structure-property relationships in polybenzenoid hydrocarbons, *Journal of Organic Chemistry*, 2023.
3. A. M. Bronstein, A. Marx†. Water stabilizes an alternate turn conformation in horse heart myoglobin, *Scientific Reports*, 2023.
4. E. Schwartz*, A. M. Bronstein, R. Giryes†. ISP distillation, *IEEE Open Journal of Signal Processing* 4, 12-20, 2023.
5. E. Schwartz*, L. Karlinsky, R. Feris, R. Giryes†, A. M. Bronstein. Baby steps towards few-shot learning with multiple semantics, *Pattern Recognition Letters*, 2022.
6. D. E. Fordham, D. Rosentraub, A. L. Polsky, T. Aviram, Y. Wolf, O. Perl, A. Devir, S. Rosentraub, D. H. Silver, Y. Gold Zamir, A. M. Bronstein, M. Lara Lara, J. Ben Nagi, A. Alvarez, S. Munne†. Embryologist agreement when assessing blastocyst implantation probability: is data-driven prediction the solution to embryo assessment subjectivity? *Human Reproduction*, 2022.
7. L. Ackerman-Schraier*, A. A. Rosenberg, A. Marx, A. M. Bronstein. Machine learning approaches demonstrate that protein structures carry information about their genetic coding, *Scientific Reports*, 2022.
8. G. Pai, A. M. Bronstein, R. Talmon†, R. Kimmel†. Deep isometric maps, *Image and Vision Computing*, 2022.
9. P. Kang, Z. Lin, Z. Yang, A. M. Bronstein, Q. Li†, W. Liu†, Deep fused two-step cross-modal hashing with multiple semantic supervision, *Multimedia Tools and Applications*, 2022.
10. Y. Nemcovsky*, E. Zheltonozhskii*, C. Baskin*, B. Chmiel*, A. M. Bronstein, A. Mendelson†. Adversarial robustness via noise injection in smoothed models, *Applied Intelligence*, 2022.
11. P. Kang, Z. Lin, Z. Yang, X. Fang, A. M. Bronstein, Q. Li†, W. Liu†. Intra-class low-rank regularization for supervised and semi-supervised cross-modal retrieval, *Applied Intelligence*, 52(1), pp. 33-54, 2022.
12. T. Weiss*, O. Senouf, S. Vedulal*, O. Michailovich†, M. Zibulevsky†, A. M. Bronstein. PILOT: Physics-Informed Learned Optimal Trajectories for accelerated MRI. *Journal of Machine Learning for Biomedical Imaging (MELBA)*, 2021.
13. C. Baskin*, B. Chmiel*, E. Zheltonozhskii*, R. Banner, A. M. Bronstein, A. Mendelson†. CAT: Compression-aware training for bandwidth reduction, *Journal of Machine Learning Research (JMLR)*, 2021.
14. A. Karbachevsky, C. Baskin*, E. Zheltonozshkii*, Y. Yermolin, F. Gabbay, A. M. Bronstein, A. Mendelson†. Early-stage neural network hardware performance analysis, *Sustainability*, 2021.
15. P. Kang, L. Zehang Y. Zhenguo, F. Xiaozhao Fang, A. M. Bronstein, L. Qing†, and L. Wenyin†. Intra-class Low-rank Regularization for Supervised and Semi-supervised Cross-modal Retrieval, *Applied Intelligence*, pp. 1–22, 2021.
16. E. Rozenberg*, D. Friedman†, A. M. Bronstein. Learning to Localize Objects Using Limited Annotation, With Applications to Thoracic Diseases, *IEEE Access*, pp 67620–67633, 2021.
17. C. Baskin*, E. Schwartz*, E. Zheltonozhskii*, N. Liss, R. Giryes†, A. M. Bronstein, A. Mendelson†. UNIQ: Uniform noise injection for non-uniform quantization of neural networks, *ACM Transactions on Computer Systems (TOCS)*, Vol. 37(1–4), pp. 1–15, 2021.

18. K. Rotker*, D. Ben-Bashat†, A. M. Bronstein. Over-Parameterized Models for Vector Fields, *SIAM Journal on Imaging Sciences (SIIMS)*, Vol. 13(3), pp. 1386–1414, 2020.

19. G. Mariani, L. Cosmo, A. M. Bronstein, E. Rodolà†. Generating Adversarial Surfaces via Band-Limited Perturbations, *Computer Graphics Forum (CGF)*, Vol. 39(5), pp. 253–264, 2020.

20. S. Sommer, A. M. Bronstein. Horizontal Flows and Manifold Stochastics in Geometric Deep Learning, *IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)*, 2020.

∗**21.** A. Zabatani, V. Surazhsky, E. Sperling, S. Ben Moshe, O. Menashe, D. H. Silver, Z. Karni, A. M. Bronstein, M. M. Bronstein†, R. Kimmel†. Intel RealSense SR300 Coded light depth Camera, *IEEE Trans. Pattern Analysis and Machine Intelligence (TPAMI)*, 2019.

22. T. Remez*, O. Litany*, R. Giryes†, A. M. Bronstein. Class-aware fully convolutional Gaussian and Poisson denoising, *IEEE Trans. on Image Processing*, Vol. 27(11), pp. 5707–5722, 2018.

23. E. Schwartz*, R. Giryes†, A. M. Bronstein. DeepISP: Toward learning an end-to-end image processing pipeline, *IEEE Trans. on Image Processing*, Vol. 28(2), pp. 912–923, 2018.

∗**24.** H. Haim, S. Elmalem, R. Giryes†, A. M. Bronstein, E. Marom†. Depth estimation from a single image using deep learned phase coded mask, *IEEE Trans. Computational Imaging*, Vol. 4(3), pp. 298–310, 2018 (Winner of the OSA Student Grand Challenge The Optical System of the Future)

25. R. Giryes, Y. C. Eldar†, A. M. Bronstein, G. Sapiro†. Tradeoffs between convergence speed and reconstruction accuracy in inverse problems, *IEEE Trans. Signal Processing*, (TSP) vol. 66(7), pp. 1676–1690, 2018.

∗**26.** O. Litani*, E. Rodolà, A. M. Bronstein, M. M. Bronstein†. Fully-spectral partial shape matching, *Computer Graphics Forum (CGF)*, vol. 36, No. 2, 2017.

27. O. Litany*, T. Remez*, D. Freedman, L. Shapira, A. Bronstein, R. Gal†. ASIST: Automatic Semantically Invariant Scene Transformation, *Computer Vision and Image Understanding*, vol. 157, pp. 284–299, 2017.

28. R. Giryes, G. Sapiro†, A. M. Bronstein. Deep neural networks with random Gaussian weights: A universal classification strategy? *IEEE Trans. Signal Processing* (TSP), vol. 64, No. 13, pp. 3444-3457, 2016.

29. O. Litani*, E. Rodolà, A. M. Bronstein, M. M. Bronstein†, D. Cremers†. Non-rigid puzzles, *Computer Graphics Forum (CGF)*, vol. 35(5), 2016 · *SGP best paper award*

30. X. Bian, H. Krim†, A. Bronstein, L. Dai†. Sparsity and Nullity: Paradigms for Analysis Dictionary Learning, *SIAM Journal Imaging Science*, vol. 9, No. 3, pp. 1107–1126, 2016.

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Granted patents

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Pending patent applications

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2. A. Bronstein, D. H. Silver, T. Knafo, A. Harpaz, Food processing systems and methods, WO Patent Application No. 2023170639A1, March, 2023.
3. A. Bronstein, D. H. Silver, T. Knafo, A. Harpaz, O. Dahary, Molecular embedding systems and methods, WO Patent Application No. 2023170641A1, March, 2023.
4. T. Hendler, M. Medvedovsky, T. Gazit, E. Tsizin-Goldman, A. Bronstein. EEG electrode array and method of use, WO Patent Application No. 2021181395A1, March, 2021.
5. Y. Yaniv, N. Keidar, G. Eidelsztein, A. Bronstein. Predicting ventricular fibrillation, WO Patent Application No. 2020049571, September, 2019.
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8. M. Bronstein, R. Kimmel, A. Bronstein, O. Menashe, E. Sperling, A. Zabatani, V. Surazhsky. Range estimation for light detecting and ranging (lidar) systems, US Patent Application No. 20190049586, March, 2018.
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11. A. Bronstein, E. Tsitzin-Goldman. Novel biosignal acquisition method and algorithms for wearable devices, US Patent Application No. 201662361529, July 2016.

Other publications

1. A. M. Bronstein. New dimensions of media, *Revista de Ciencias de la Computación, Universidad La Salle, Peru*, August, 2015.
2. A. M. Bronstein, M. M. Bronstein. Similarity learning in image processing and computer vision problems (in Hebrew: *Lemidat dimyon beba'ayot ibud t'muna vereiya memuhshevet*), *Tehnologiyot*, January, 2010.
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4. M. M. Bronstein, A. M. Bronstein. Biometrics was no match for hair-raising tricks, *Nature*, vol. 420, p. 739, 2002.

Conferences

Plenary, keynote, or invited talks

Verona University, 2024, Verona · *seminar talk*

Ca' Foscari University, 2024, Venezia · *colloquium talk*

Danube Int'l School, 2024, Vienna · *TEDx talk*

ISTA Young Scientists Symposium, 2023, Vienna · *plenary talk*

University of Vienna, 2023, Vienna · *invited talk*

Austrian Institute of Science and Technology, 2023, Vienna · *colloquium talk*

La Sapienza, 2023, Rome · *colloquium talk*

36th Umbrella Symposium, 2023, Haifa · *invited talk*

Artificial Intelligence in Music, 2023, Haifa · *guest speaker and pianist*

International Summer School on Imaging for Medical Applications, 2022, Oradea · *invited talk*

Mathematical Imaging and Surface Processing, 2022, Oberwolfach · *invited talk*

Hammers and Nails, 2022, Weizmann Institute of Science · *invited talk*

Israel Machine Vision Conference (IMVC), 2021 · *keynote talk*

INdAM Workshop Mathematical Methods for Objects Reconstruction: from 3D Vision to 3D Printing, virtual, 2021 · *invited talk*

International Congress CORE, virtual, 2020 · *keynote talk*

SIAM Conference Mathematics of Data Science conference (MDS), virtual, 2020 · *invited talk*

International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), 2019 · *invited talk*

Applied Inverse Problems Conference (AIP), Grenoble, France, 2019 · *invited talk*

IPAM Workshop: Shape Analysis, 2019 · *invited talk*

University of Bern, 2019 · *invited talk*

Simula Metropolitan Center for Digital Engineering (Simula@OsloMet), 2019 · *invited talk*

International Biomedical and Astronomical Signal Processing (BASP) Frontiers workshop, 2019 · *invited talk*

International Conference on the Science of Electrical Engineering (ICSEE), 2018 · *invited talk*

KDD 2018: The 24th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2018 · *invited talk*

A mini-symposium on 3D shape reconstruction and application, 2018 · *invited talk*

SIAM Conference on Imgaing Science, 2018 · *invited talk*

International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2018 · *invited talk*

Conference on Nonlinear Data: Theory and Algorithms, 2018 · *invited talk*

Hasso-Plattner-Institute, University of Potsdam, 2018 · *invited talk*

International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISIGRAPP), 2018 · *keynote talk*

Flows, mappings and shapes, Isaac Newton Institue, 2017 · *invited talk*

Multiview Relationships in 3D Data, ICCV, 2017 · *keynote talk*

3rd International Workshop on Recovering 6D Object Pose, ICCV, 2017 · *keynote talk*

Workshop on Geometry and Shape Analysis in Biological Sciences, 2017 · *invited talk*

International Congress on Industrial and Applied Mathematics (ICIAM), 2015 · *invited talk*

International of Advanced Study, Hong Kong University of Science and Technology, 2015 · *invited talk*

Interdisciplinary Distinguished Seminar Series, Dept. of Electrical and Computer Engineering, North Carolina State University, 2014 · *invited talk*

Simons Institute Workshop Spectral Algorithms: From Theory to Practice, 2014 · *invited talk*

Research Workshop on Shape and Image Modeling and Analysis, 2014 · *invited talk*

Dagstuhl Seminar Perspectives in Shape Analysis, 2014 · *invited talk*

SIAM Imaging Sciences, 2014 · *invited talk*

Computational Metric Geometry in Image and Shape Processing, Israel IEEE Convention, 2012 · *invited talk*

Communication and Information Technology 2025, Irvine CA, 2012 · *invited talk*

FIRST Workshop, 2012 · *invited talk*

Israeli Machine Vision Conference, 2012 · *invited talk*

Dagstuhl Seminar Perspectives in Shape Analysis, 2012 · *invited talk*

IPAM Workshop on large scale multimedia search, UCLA, 2012 · *invited talk*

Summer School on Image Processing (SSIP), 2011 · *invited lecture*

Israel Machine Vision Conference (IMVC), 2010 · *invited talk*

IPAM Workshop on Laplacian eigenvalues and eigenfunctions, UCLA, 2009 · *invited talk*

MAIPCV Symposium, Sapporo, Japan, 2008 · *invited talk*

Computer vision symposium, Technische Universität Wien, 2007 · *invited talk*

SIAM Imaging Science, Minneapolis, USA, 2006 · *invited talk*

Technion Applied Math Workshop, Israel, 2006 · *invited talk*

Participation in organizing conferences

Co-organizer, Special Session on Geometry and Topology: Furthering the Reaches of Deep Learning? Int'l Conference on Acoustics, Speech and Signal Processing (ICASSP), Calgary, 2018.

Co-organizer, Workshop on Theory of Deep Learning, Int'l Conference on Machine Learning (ICML), New York, 2016.

Chair, Workshop on Geometry Analysis and Processing Using Functional Maps, Int'l Conference on 3D Vision (3DV), Tokyo, Japan, 2014.

Program committee, International Workshop on Vision, Modeling, and Visualization, Lugano, Switzerland, 2013.

Co-chair, Fifth IEEE Workshop on Non-rigid Shape Analysis and Deformable Image Alignment (NORDIA), European Conference on Computer Vision (ECCV), Florence, Italy, 2012.

Program chair, Eurographics Workshop on 3D Object Recognition (3DOR), Cagliari, Italy, 2012.

Co-chair, Fourth IEEE Workshop on Non-rigid Shape Analysis and Deformable Image Alignment (NORDIA), Computer Vision and Pattern Recognition (CVPR) conference, Colorado Springs, USA, 2011.

Program committee, Shape Modeling International (SMI), Herzliya, Israel, 2011.

Local chair, Scale Space and Variational Methods (SSVM), Ein Gedi, Israel, 2011.

Area chair, Asian Conference on Computer Vision (ACCV), New Zealand, 2010.

Co-organizer, Shape Retrieval Contest (SHREC), Eurographics, 2010.

Co-organizer, Mini-symposium on Computer Vision Approaches in Non-Rigid Shape Analysis, SIAM Imaging Sciences, Chicago, USA, 2010.

Co-chair, Third IEEE Workshop on Non-rigid Shape Analysis and Deformable Image Alignment (NORDIA), Computer Vision and Pattern Recognition (CVPR) conference, San Francisco, USA, 2010.

Co-chair, Second IEEE Workshop on Non-rigid Shape Analysis and Deformable Image Alignment (NORDIA), Int'l Conference on Computer Vision (ICCV), Kyoto, Japan, 2009.

Co-chair, First IEEE Workshop on Non-rigid Shape Analysis and Deformable Image Alignment (NORDIA), Computer Vision and Pattern Recognition (CVPR), Anchorage, USA, 2008.

Bibliometrics *h-index:* 75 · *i10-index:* 208 · *citations:* 20,207 (Google Scholar)

Languages *human:* English, Hebrew, Russian, Italian *(fluent)* · French, Spanish *(intermediate)*
machine: Python, C, C++, C#, Matlab, Verilog

Hobbies Music (vocal and piano) · photography · long-distance running · yachting · travelling · interior design · painting · gourmet gastronomy · general relativity and quantum field theory

Updated: October 3, 2024