Dr. Tolga Birdal

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Google Scholar

Academic Positions

2026—Present **Associate Professor**, UKRI Future Leaders Fellow & AI Speaker, Imperial College London, UK
2022—2026 **Assistant Professor**, UKRI Future Leaders Fellow & AI Speaker, Imperial College London, UK
2019—2021 **Postdoctoral Research Fellow**, Geometric Computing Group, Stanford University, Stanford CA

Industrial Positions and Entrepreneurship

2026—Present **Scientific Advisor** to KnotX (stealth mode)
2011—2024 **Consultant** for numerous startups including Shape, Fantasmo, Carbon, Parcelist and Hover
2014—2018 **Doktorand**, Siemens Corporate Technology Munich, Germany
2011—2014 **Co-Founder/CEO**, Gravi Information Technologies Ltd. Istanbul, Turkey
2008—2011 **Co-Founder/CTO**, BeFunky Inc., Portland OR [**Acquired by** Tiny Capital in 2022]

Education

2014—2018 **Ph.D.**, Chair of Computer Aided Medical Procedures (CAMP) TU Munich, Germany
Doctoral thesis: *Geometric Methods for 3D Reconstruction from Large Point Clouds* [pdf]
2008—2011 **M.Sc.**, Computational Science & Engineering (CSE), TU Munich, Germany
Master's thesis: *3D Deformable Surface Recovery Using RGBD Cameras*
2004—2008 **B.Sc.**, Electronics Engineering, Sabancı University, Turkey

Awards

2026 **Best Paper Award**, in European Conference on Computer Vision (ECCV)
2026 **Best Paper Finalist**, in The Medical Image Computing and Computer Assisted Intervention (MICCAI) Society
2026 **Outstanding Area Chair**, in CVPR and ECCV
2024 **Future Leaders Fellowship**, flagship fellowship of UK Research and Innovation (UKRI)
2020 **Outstanding Reviewer**, in NeurIPS, CVPR and ECCV
2019 **Best Paper Finalist**, Conference on Computer Vision and Pattern Recognition (CVPR)
2017 **Best Student Paper Award**, ICCV Workshop on Multiview Relationships in 3D Data (MVR3D)
2016 **Young Professional Award** by European Machine Vision Association (EMVA) for my PhD work
2016 **Ernst von Siemens PhD Scholarship** by Siemens AG, Germany
2013 **NSF Scholarship**, Institute for Pure and Applied Mathematics (IPAM), UCLA
2008 **Finalist** (BeFunky), TechCrunch40 Technology Start-up Competition
2004 **Merit Scholarship**, Sabancı University
2004 **Sait Halman Award for Excellence in Computer Science** by American Robert College of Istanbul

Funding (**£ 3.7M in total**: £ 2.5M as PI, £ 1.2M as co-PI)

2026 **UKRI 300,000 GPU hours on Isambard AI Supercomputer** [PI, Est. £ 750K] for Topological Foundation Models
2024 **UKRI Future Leaders Fellowship** [PI, £ 1.6M] for UNTOLD: Unifying Foundations for Topological Deep Learning
2024 **Amazon AWS Cloud Credit Awards** [PI, £ 42,765] for Topological Deep Learning research
2024 **Royal Society Research Grant** [PI, £ 70,000] for TODDLE: Topological Deep Learning
2023 **Meta (Facebook) Research Award** [PI, $ 50,000] for perception of hand interactions in 2D and 3D scenes
2023 **D-Wave Quantum Cloud Service Gift** [PI, £ 3,600] for training neural networks on quantum computers
2022 **UKRI EPSRC Grant (EP/X011364/1)** [Co-PI, £ 1M] for GNOMON: Deep non-Euclidean Generative Models
2022 **Google Cloud Research Credit** [PI, $ 17,000] for building 3D generative models
2022 **Google University Gift** [PI, $ 10,000] for characterizing the geometry of latent spaces of generative models
2021 **US Office of Naval Research Grant** [Co-PI, $ 125,000] for modeling uncertainty in self-navigation
2019 **Google Daydream University Research Gift** [Co-PI, $ 80,000] for semantic point cloud understanding

Educational Activities

Teaching **Non-Euclidean Methods in Machine Learning** at Imperial College London, UK (COMP70112)
Computer Graphics at Imperial College London, UK (COMP60005)
Non-Euclidean Methods in Machine Learning at Stanford University, CA (CS468)
Non-Euclidean Methods in Machine Learning at Bosphorus University, Turkey (CMPE58L01)
Outreach Mentor at MIT Summer Geometry Institute (sgi.mit.edu)
Board Member at **London Geometry & Machine Learning** Summer School (logml.ai)
Lecturer at **Probability in Turkey 2026** Summer School (webpage)
Regular teaching on AI/ML at Nesin Mathematics Village, Science Village and Arkhé Project

Selected Keynotes & Invited Talks (out of a pool of >40 talks, excluding contributed conference presentations)

Keynotes	Conference on Signal Processing and Communications Applications (SIU) (Istanbul, TR) CERN Steam Academy (Geneva, CH) Workshop on Topological Deep Learning (Fribourg, CH) ICERM Workshop on Foundations of Computational Geometry and Topology (Providence, USA) CaLISTA Geometry and Machine Learning Conference (Vienna, AT) International Conference on Applied Quantum Methods in Computational Science (Aachen, DE) Geometry and Machine Learning Conference (Paris, FR) London Geometry and Machine Learning Summer School (London, UK)
Workshops	ELLIS Algebraic Vision & Machine Learning Workshop 2024 Workshop on Scene Graphs and Graph Representation Learning (**ICCV**, Hawaii) Workshops on 3D Compositional Vision, Deep Learning & Geometric Computing, Shape Recovery from Partial Textured 3D Scans (**all CVPRs**) International Workshop on Recovering 6D Object Pose (**ECCV**)
Academic Talks	Uni. Manchester (’24), Oxford (’22, ’24), Uni. Bristol (’23), Uni. Maryland (’22), KAUST (’22), École des Ponts (’21), NYU (’21), University of Amsterdam (’21), Telecom Paristech (’20), HKU (’24)
Talks in Industry	Autodesk (’24, ’19), Intel (’23), Twitter (’22), Huawei (’21), MagicLeap (’21), DLR (’21), Google (’19)

Academic Service

Former associate editor	Journal of Real-Time Image Processing, and The Visual Computer
Thesis award chair	3D Vision (3DV) 2027 (appointed)
Publication chair	3D Vision (3DV) 2025
Area chair	NeurIPS 27, CVPR (h-440) 24–27, ICML (h-272) 25, ICCV (h-291) 23, ECCV (h-206) 24, 3DV 24
Program committee	>20 times at NeurIPS, ICML, ICLR, CVPR, ICCV, ECCV, ICLR, SIGGRAPH, 3DV, BMVC
Journal reviewing	>10 times at Nature, T-PAMI, IJCV, JMLR & RA Letters
Organizations	**ECCV’26 Workshop** on Geometric Intelligence: From Vision to Scientific Discovery **CVPR’23, ECCV’24–26 Workshops** on Quantum Computer Vision & Machine Learning **CVPR’24, CVPR’25, CVPR’26 Workshops** on Urban Scene Modeling **CVPR’24 Workshop** on Topological Deep Learning for Computer Vision **CVPR 2020 Tutorial** on Synchronization and Cycle Consistency **ICCV 2017 Workshop** on Multiview Relationships in 3D Data
Membership	Institute of Electrical and Electronics Engineers (IEEE) London Mathematical Society (LMS)

Current Supervision at CIRCLE (7 PostDocs, 14 PhD and 7 MSc students: *17 main supervision, 7 co-supervision*)

My CIRCLE team unites researchers from maths, computer science, psychology, philosophy, chemical engineering, physics, and biomedical engineering, providing the breadth to investigate geometric / topological learning, quantum computing and stochastic dynamics, mechanistic interpretability, and emerging directions in AI4Science.

09/2026— **Jiří Minarčík** (Postdoc), Mathematics (BSc & MSc), Mathematical Modelling (PhD)
09/2026— **Navami Kairanda** (Postdoc), Computer Science (BSc), Visual Computing (MSc), Computer Science (PhD)
02/2026— **Lennart Bastian** (Postdoc & RS Newton Fellow), Mathematics (BSc & MSc), Computer Science (PhD)
01/2026— **Dong-Sig Han** (Postdoc), Computer Science (BSc & PhD)
09/2025— **Yaman Kındap** (Postdoc), Chemical Engineering & Physics (BSc), Computer Science (MSc & PhD)
07/2024— **Melih Barsbey** (Postdoc), Psychology (BSc & MA), Computer Engineering (PhD)
07/2023— **Simone Foti** (Postdoc), Computer Science (BSc), Biomedical Engineering (MSc), Computer Science (PhD)
10/2026— **Andjela Todorovic** (PhD), Computer Science (BSc), Artificial Intelligence (MSc)
09/2026— **Christine Zeh** (PhD), Mathematics (BSc), Complex Adaptive Systems (MSc) [**joint with CERN**]
12/2025— **Zuhao Liu** (PhD), Electronics Engineering (BSc), Computer Engineering (MSc)
10/2025— **Maximilian Krahn** (PhD), Mathematics & Computer Science (BSc), Machine Learning (MSc)
10/2025— **Mario Tuci** (PhD) Mathematics (BSc & MSc) [**joint with INRIA**]
10/2025— **Yuhao Zhang** (PhD), Mathematics & Computer Science (BSc)
09/2025— **Emre Ulusoy** (PhD), Mathematics & Computer Science (BSc), Mathematics (MSc)
10/2024— **Nathalie Kirch** (PhD) Philosophy & Cognitive Psychology (BSc), Artificial Intelligence (MSc)
09/2024— **Yiming Huang** (PhD), Computer Science (BSc & MSc)
05/2024— **Zhengrui Xiang** (PhD), Computer Science (BSc), Statistics & Machine Learning (MSc)
12/2023— **Zhengdi Yu** (PhD / RA), Computer Science (BSc & MSc)
10/2023— **Caner Korkmaz** (PhD), Mathematics & Computer Science (BSc), Computer Science (MSc)
10/2023— **Lucas Prieto** (PhD), Mathematics & Computer Science (BSc), Data Science (MSc)
10/2022– **Edward Stevinson** (PhD), Engineering, Economics & Management (BSc), Artificial Intelligence (MSc)

Publications (from a larger pool of **>100** publications, **>50** of which are lead/senior-authored)

My research began in 3D/4D computer vision, leaped into learning theory, and then helped establish topological deep learning. In parallel, I developed a line of work in quantum computing and stochastic dynamics. I have now begun exploring new questions in physics and biochemistry.
*Below is a thematic list (Google Scholar (Sep. 2026): > 5750 citations with an h-index of 33. * indicates* equal contribution*)*:

Book Under Development

- Mustafa Hajij, Vincent P. Grande, Theodore Papamarkou, **Tolga Birdal** & Michael Schaub: *Fundamentals of Topological Deep Learning: Learning on Higher-Order Structures*, Book in Preparation [TDL book webpage]

Quantum Computing

- Max Krahn, Roberto Bondesan, Björn Schuller & **Tolga Birdal**: *QECFM: Quantum Error Correcting Code Generation via Training-Free Guidance*, Under Review [code coming soon]
- Natacha Meli, **Tolga Birdal**, Prayag Tiwari, Vladislav Golyanik, Michael Moeller: *Bernstein-Vazirani Networks: Quantum Machine Learning by Interference*, Under Review [arXiv] [code coming soon]
- Natacha Meli, Shuteng Wang, Marcel S. Benkner, Michele Sasdelli, Tat-Jun Chin, **Tolga Birdal**, Michael Moeller, Vladislav Golyanik: *Quantum-enhanced Computer Vision: Going Beyond Classical Algorithms*, Under Review [arxiv]
- Dong-Sig Han & **Tolga Birdal**: *Complex Schrödinger Bridges*: NeurIPS 2026 [code coming soon]
- Gabriel Nobis, ..., Wojciech Samek* & **Tolga Birdal***: *Fractional Diffusion Bridge Models*, NeurIPS 2025 [code]
- Julius H Ramlau, Friedrich Hastedt, **Tolga Birdal**, Antonio del Río Chanona, Nausheen S Basha, Omar K Matar: *Learning Interface Breakup: A Geometry-Conditioned Latent Surrogate for Spray Formation*. ICML AI4Physics Workshop 2026 [code]
- Rembert Daems, Manfred Opper, Guillaume Crevecoeur & **Tolga Birdal**: *Efficient Training of Neural SDEs Using Stochastic Optimal Control*. ESANN 2025 [paper]
- Gabriel Nobis, Max Springenberg, ..., **Tolga Birdal** *et al.*: *Generative Fractional Diffusion Models*, NeurIPS 2024 [code]
- Rembert Daems, Manfred Opper, Guillaume Crevecoeur & **Tolga Birdal**: Variational Inference for SDEs Driven by Fractional Noise, ICLR 2024 [**spotlight**] [webpage]
- Jan-Nico Zaech, Martin Danelljan, **Tolga Birdal**, Luc Van Gool: *Probabilistic Sampling of Balanced K-Means using Adiabatic Quantum Computing*, CVPR 2024 [arXiv]
- Max Krahn, Michele Sasdelli, Fengyi Yang, Vlad Golyanik, Juho Kannala, Tat-Jun Chin, **Tolga Birdal**: *Projected Stochastic Gradient Descent with Quantum Annealed Binary Gradients*, BMVC 2024 [webpage]
- Alp Yurtsever, **Tolga Birdal**, Vladislav Golyanik: *Q-FW: A Hybrid Classical-Quantum Frank-Wolfe for Quadratic Binary Optimization*, ECCV 2022 [paper]
- **Tolga Birdal**, Vlad Golyanik, Christian Theobalt & Leo Guibas: *Quantum Permutation Synchronization*, CVPR 2021 [webpage]

Geometry, Topology & Deep Learning

- Lennart Bastian, Sam Leventhal, Mustafa Hajij & **Tolga Birdal**: *Topological Neural Operators*, Under Review [arXiv]
- Francesco Viganò, **Tolga Birdal**, Michael Schaub & Mauricio Barahona: *Root-to-Leaf Path Random Walks, Normalized Hodge Laplacians, and Cheeger Inequalities on Simplicial Complexes*, Under Review [arXiv]
- Iris Liao, Maximilian Krahn, Emre Ulusoy, Lennart Bastian & **Tolga Birdal**: *Hodge Spectral Concentration in Simplicial Complex Neural Networks*, Under Review
- Emre Ulusoy, Francesco Viganò, **Tolga Birdal** & Mauricio Barahona: *Dirac Convolutional Neural Networks for Simplicial Complexes*, Under Review
- Nathan Mankovich, Andrei Gavrilov, **Tolga Birdal** & Gustau Camps-Valls: *Comparing dynamical operators with flags*, Under Review
- Andrew Bond, Ege Erdem Özlü, Tuna Çimen, Ilkin Umut Melanlioglu, **Tolga Birdal**, Erkut Erdem & Aykut Erdem: *Task-Induced Riemannian Metrics for Vision Transformer Feature Spaces*. NeurIPS 2026 [webpage]
- Max Krahn, Lennart Bastian, Vikas K Garg, Björn Schuller & **Tolga Birdal**: *Collapsed Effective Operators for Higher-order Structures*. ICML 2026 [webpage]
- Yiming Huang & **Tolga Birdal**: *HOG-Diff: Higher-Order Guided Diffusion for Graph Generation*, ICLR 2026 [webpage]
- Tony Danjun Wang, Ka Young Kim, **Tolga Birdal**, Nassir Navab & Lennart Bastian: *TopoOR: A Unified Topological Scene Representation for the Operating Room*. MICCAI 2026 [**Best Paper Finalist & MICCAI Young Scientist Award - Tony**] [webpage]
- Mustafa Hajij, Lennart Bastian, ..., Theodore Papamarkou & **Tolga Birdal**: *Copresheaf Topological Neural Networks: A Generalized Deep Learning Framework*, NeurIPS 2025 [paper]
- Lennart Bastian, Mohammad Rashed, Nassir Navab & **Tolga Birdal**: *Forecasting Continuous Non-Conservative Dynamical Systems in SO(3)*, ICCV 2025 **[oral]** [webpage]
- Caner Korkmaz, Brighton Nuwagira, Barış Coşkunuzer & **Tolga Birdal**: *CuMPerLay: Learning Cubical Multiparameter Persistence Vectorizations*, ICCV 2025 [webpage]
- Nathan Mankovich, Ignacio Santamaria, Gustau Camps-Valls & **Tolga Birdal**: *A Flag Decomposition for Hierarchical Datasets*. CVPR 2025 [code]
- Mustafa Hajij, ..., **Tolga Birdal**, ..., Nina Miolane: *TopoX: A Suite of Python Packages for Machine Learning on Topological Domains*, JMLR 2024 [webpage]
- Theo Papamarkou, **Tolga Birdal** *et al.*: *Topological Deep Learning is the New Frontier for Relational Learning*, ICML 2024
- Nathan Mankovich, Gustau Camps-Valls & **Tolga Birdal**: *Fun with Flags: Robust Principal Directions via Flag Manifolds*, CVPR 2024 [code]

- Mustafa Hajij, Ghada Zamzmi, Theodore Papamarkou, Aldo Guzmán-Sáenz, **Tolga Birdal** & Michael Schaub: *Combinatorial Complexes: Bridging the Gap Between Cell Complexes and Hypergraphs*, ALISOMAR 2023
- Nathan Mankovich & **Tolga Birdal**: *Chordal Averaging on Flag Manifolds and Its Applications*, ICCV 2023 **[oral]** [code]
- Mustafa Hajij, Ghada Zamzmi, Theodore Papamarkou, Nina Miolane, Aldo Guzmán-Sáenz, Karthikeyan Natesan Ramamurthy, **Tolga Birdal**, Tamal K. Dey, Soham Mukherjee, Shreyas N. Samaga, Neal Livesay, Robin Walters, Paul Rosen & Michael Schaub: *Topological Deep Learning: Going Beyond Graph Data* [arXiv]
- **Tolga Birdal**, Michael Arbel, Umut Şimşekli & Leonidas Guibas: *Synchronizing Probability Measures on Rotations via Optimal Transport*. CVPR 2020 [arXiv] [code]
- **Tolga Birdal** & Umut Şimşekli: *Probabilistic Permutation Synchronization using the Riemannian Structure of the Birkhoff Polytope*. CVPR 2019 **[Best Paper Finalist]** [webpage]

Learning Theory, Stochastic Dynamics & Mechanistic Interpretability

- Mario Tuci, Lennart Bastian, Benjamin Dupuis, Nassir Navab, **Tolga Birdal** & Umut Şimşekli: *Stability, Complexity and Data-Dependent Worst-Case Generalization Bounds*, Under Review [arXiv]
- Lucas Prieto, Edward Stevinson, Melih Barsbey, Pedro Mediano & **Tolga Birdal**: *The Shared Geometry of Language Models*, Under Review
- Gabriel Nobis, Tim Korjakow, Luca Schmidt, Maximilian Springenberg, Thomas Demeester, Wojciech Samek, Manfred Opper, **Tolga Birdal** & Rembert Daems: *Generative Fractional Interpolants*, Under Review
- Yaman Kındap, Manfred Opper, Benjamin Dupuis, Umut Şimşekli, **Tolga Birdal**: *Variational Inference for Lévy Process-Driven SDEs via Neural Tilting*, Under Review [arxiv]
- Mario Tuci, Caner Korkmaz, Umut Şimşekli & **Tolga Birdal**: *Generalization at the Edge of Stability*, NeurIPS 2026 [webpage]
- Melih Barsbey, Antônio H. Ribeiro, Umut Şimşekli & **Tolga Birdal**: *On the Interaction of Compressibility and Adversarial Robustness*, ICLR 2026 [paper]
- Lucas Prieto, Ed Stevinson, Melih Barsbey, Pedro Mediano* & **Tolga Birdal***: *From data statistics to feature geometry: How correlations shape superposition*, ICLR 2026 [code]
- Ed Stevinson, Lucas Prieto, Melih Barsbey & **Tolga Birdal**: *Adversarial Attacks Leverage Interference Between Features in Superposition*, ICML 2026 [webpage]
- Karti Prakhya, **Tolga Birdal** & Alp Yurtsever: *Convex Formulations for Training 2-Layer ReLU Networks*, ICLR 2025 [code]
- Lucas Prieto, Melih Barsbey, Pedro Mediano & **Tolga Birdal**: *Grokking at the Edge of Numerical Stability*, ICLR 2025 [code]
- Melih Barsbey, Stefanos Zafeiriou & **Tolga Birdal**: *Large Learning Rates Simultaneously Achieve Robustness to Spurious Correlations and Compressibility*, ICCV 2025 [paper] [code]
- Rayna Andreeva, Benjamin Dupuis, Umut Şimşekli & **Tolga Birdal** : *Topological generalization bounds for discrete-time stochastic optimization algorithms*, NeurIPS 2024 [code]
- **Tolga Birdal**, Aaron Lou, Leo Guibas & Umut Şimşekli: *Intrinsic Dimension, Persistent Homology and Generalization in Neural Networks*, NeurIPS 2021 [code]

Emerging Research Directions

- Daniel Sanchez, **Tolga Birdal**, Simone Foti, Max Esposito: *Paradifferential Neural Operators: Better Call Bony for Non-Linear PDEs*, Under Review [webpage]
- Yiming Huang, Lennart Bastian, Hanqun Cao, Luis Vollmers & **Tolga Birdal**: *RNADyn: A Benchmark for Generating and Understanding RNA Dynamics*, Under Review [webpage]
- Yiming Huang, Yujie Zeng, Vijay Prakash Dwivedi, Simone Foti, Jianmin Wang, Jure Leskovec & **Tolga Birdal**: *Higher-Order Molecular Grammars for Generative and Foundation Models in Chemistry*, Under Review [webpage]

3D / 4D Computer Vision

- Zuhao Liu, Melih Darcan, Zhengdi Yu, Riza Alp Guler & **Tolga Birdal**: *HaNDF: Object-Conditioned Geometric Neural Hand Distance Fields*, NeurIPS 2026 [webpage]
- Lisa Weijler, Irene Ballester, Guofeng Mei, **Tolga Birdal** & Pedro Hermosilla: *Latent Riemannian Flow Matching for Geometry-Grounded 3D Foundation Models*, NeurIPS 2026 [webpage]
- Bo Pang, Simone Foti & **Tolga Birdal**: *Learning Geometry-Aware Embedding Fields for Intrinsic Riemannian Mappings*, ECCV 2026 [webpage]
- Yuhao Zhang, Gerard Pons-Moll & **Tolga Birdal**: *SAMoR: Motion Modelling for Articulated Objects of Any Skeleton and Topology*. NeurIPS 2026 [webpage]
- Tony Danjun Wang, **Tolga Birdal**, Nassir Navab & Lennart Bastian: *COMPOSE: Hypergraph Cover Optimization for Multi-view 3D Human Pose Estimation*. NeurIPS 2026 [arXiv][code]
- Simone Foti*, Caner Korkmaz, Stefanos Zafeiriou & **Tolga Birdal**: *Heat Kernel Textures: the Geodesic Gaussians That Do Not Splat*, ECCV 2026 **[Best Paper Award]** [webpage]
- Zhengdi Yu, Simone Foti, Linguang Zhang, Amy Zhao, Cem Keskin, Stefanos Zafeiriou & **Tolga Birdal**: *Geometric Neural Distance Fields for Learning Human Motion Priors*, CVPR 2026 **[spotlight]** [webpage]
- Jebastin Nadar, Simone Foti & **Tolga Birdal**: *PoseD-Flow: Versatile and Guided Flow Matching Model of Human Pose*, CVPR 2026 **[spotlight]** [webpage]
- Hippolyte Verninas, Caner Korkmaz, Stefanos Zafeiriou, **Tolga Birdal*** & Simone Foti*: *Parallelised Differentiable Straightest Geodesics for 3D Meshes* , CVPR 2026 [webpage]
- Tony Danjun Wang, **Tolga Birdal**, Nassir Navab & Lennart Bastian: *DisPOSE: Projected Polystochastic Diffusion for Self-Supervised Multi-View 3D Human Pose Estimation*. ICML 2026 [webpage]

- Zhengdi Yu, Stefanos Zafeiriou & **Tolga Birdal**: *Dyn-HaMR: Recovering 4D Interacting Hand Motion from a Dynamic Camera*, CVPR 2025 **[spotlight]** [webpage]
- Simone Foti, Stefanos Zafeiriou & **Tolga Birdal**: *UV-free Texture Generation with Denoising and Geodesic Heat Diffusions*, NeurIPS 2024 [webpage]
- Zhengdi Yu, Shaoli Huang, Yongkang Cheng, **Tolga Birdal**: *SignAvatars: A Large-scale 3D Sign Language Holistic Motion Dataset and Benchmark*, ECCV 2024 [webpage]
- Shishir Vutukur, Rasmus Laurvig Haugaard, Junwen Huang, Benjamin Busam, **Tolga Birdal**: *Alignist: CAD-Informed Orientation Distribution Estimation by Fusing Shape and Correspondences*, ECCV 2024 [arXiv]
- Yannan He, Garvita Tiwari, **Tolga Birdal** & Gerard Pons-Moll: *NRDF: Neural Riemannian Distance Fields for Learning Articulated Pose Priors*, CVPR 2024 **[spotlight]** [webpage]
- Zhiying Leng, **Tolga Birdal**, Xiaohui Liang, Federico Tombari: *HyperSDFusion: Bridging Hierarchical Structures in Language and Geometry for Enhanced 3D Text2Shape Generation*, CVPR 2024 [webpage]
- Jiahui Huang, **Tolga Birdal**, Zan Gojcic, Leo Guibas & Shi-Min Hu: *Multiway Non-rigid Point Cloud Registration via Learned Functional Map Synchronization*, T-PAMI 2022 [webpage]
- Yongheng Zhao, Guangchi Fang, Yulan Guo, Leo Guibas, Federico Tombari & **Tolga Birdal**: *3DPointCaps++: Learning 3D Representations with Capsule Networks*, IJCV 2022 [webpage]
- Haowen Deng, Mai Bui, Nassir Navab, Leo Guibas, Slobodan Ilic & **Tolga Birdal**: *Deep Bingham Networks: Dealing with Uncertainty and Ambiguity in Pose Estimation*, IJCV 2022 [webpage]
- Mikaela A. Uy, Yen-yu Chang, Minhyuk Sung, Purvi Goel, Joseph Lambourne, **Tolga Birdal** & Leo Guibas: *Point2Cyl: Reverse Engineering 3D Objects From Point Clouds to Extrusion Cylinders*, CVPR 2022 [webpage]
- Jiayi Chen, Yingda Yin, **Tolga Birdal**, Baoquan Chen, Leo Guibas & He Wang: *Projective Manifold Gradient Layer for Deep Rotation Regression*, CVPR 2022 [code]
- Davis Rempe, **Tolga Birdal**, Aaron Hertzmann, Jimei Yang, Srinath Sridhar & Leo Guibas: *HuMoR: 3D Human Motion Model for Robust Pose Estimation*, ICCV 2021 **[oral]** [webpage]
- Zan Gojcic, Or Litany, Andreas Wieser, Leo Guibas & **Tolga Birdal**: *Weakly Supervised Learning of Rigid 3D Scene Flow*, CVPR 2021 **[oral]** [webpage]
- Jiahui Huang, He Wang, **Tolga Birdal**, Minhyuk Sung, Federica Arrigoni, Shi-Min Hu & Leo Guibas: *MultiBodySync: Multi-Body Segmentation and Motion Estimation via 3D Scan Synchronization*, CVPR 2021 **[oral]** [code]
- Zhangsihao Yang, Or Litany, **Tolga Birdal**, Srinath Sridhar, Leonidas Guibas: *Continuous Geodesic Convolutions for Learning on 3D Shapes*, WACV 2021 [paper]
- Davis Rempe, **Tolga Birdal**, Yongheng Zhao, Zan Gojcic, Srinath Sridhar & Leo Guibas: *CaSPR: Learning Canonical Spatiotemporal Point Cloud Representations*, NeurIPS 2020 [**spotlight**] [webpage]
- Zan Gojcic, Caifa Zhou, Jan D Wegner, Leonidas J Guibas & **Tolga Birdal**: *Learning Multiview 3D Point Cloud Registration*, CVPR 2020 [code]
- **Tolga Birdal***, Yongheng Zhao*, Jan Eric Lenssen, Emanuele Menegatti, Leo Guibas & Federico Tombari: *Quaternion Equivariant Capsule Networks for 3D Point Clouds*, ECCV 2020 **[oral]** [code]
- Mai Bui, **Tolga Birdal**, Haowen Deng, Shadi Albarqouni, Leo Guibas, Nassir Navab & Slobodan Ilic: *Multimodal 6D Camera Relocalization via Bingham Mixture Models*, ECCV 2020 [webpage]
- Mikaela Uy, Jingwei Huang, Minhyuk Sung, **Tolga Birdal** & Leo Guibas: *Deformation-Aware 3D Model Embedding and Retrieval*, ECCV 2020 [webpage]
- Christiane Sommer, Yumin Sun, Leonidas Guibas, Daniel Cremers & **Tolga Birdal**: *From planes to corners: Multi-purpose primitive detection in unorganized 3d point clouds*, RA Letters / IROS 2020
- Fabian Manhardt, Diego Arroyo, Christian Rupprecht, Ben Busam, **Tolga Birdal**, Nassir Navab, Federico Tombari: *Explaining the Ambiguity of Object Detection and 6D Pose from Visual Data*, ICCV 2019 [webpage]
- Haowen Deng, **Tolga Birdal** & Slobodan Ilic: *3D Local Features for Direct Pairwise Registration*, CVPR 2019
- **Tolga Birdal***, Yongheng Zhao*, Haowen Deng & Federico Tombari: *3D Point Capsule Networks*, CVPR 2019 [code]
- **Tolga Birdal**, Benjamin Busam, Nassir Navab, Slobodan Ilic & Peter Sturm: *Generic Primitive Detection in Point Clouds Using Novel Minimal Quadric Fits*, T-PAMI 2019 [code]
- **Tolga Birdal**, Umut Şimşekli, Onur Eken & Slobodan Ilic: *Bayesian Pose Graph Optimization via Bingham Distributions and Tempered Geodesic MCMC*, NeurIPS 2018
- Haowen Deng, **Tolga Birdal** & Slobodan Ilic: *PPF-Foldnet: Unsupervised Learning of Rotation Invariant 3D Local Descriptors*, ECCV 2018
- Haowen Deng, **Tolga Birdal** & Slobodan Ilic: *PPFNet: Global Context Aware Local Features for Robust 3D Point Matching*, CVPR 2018 **[oral]**
- **Tolga Birdal**, Benjamin Busam, Nassir Navab, Slobodan Ilic & Peter Sturm: *A Minimalist Approach to Type-Agnostic Detection of Quadrics in Point Clouds*, CVPR 2018
- **Tolga Birdal** & Slobodan Ilic: *CAD Priors for Accurate and Flexible 3D Reconstruction*, ICCV 2017
- **Tolga Birdal** & Slobodan Ilic: *Point Pair Features Based Object Detection and Pose Estimation Revisited*, 3DV 2015

2D Computer Vision / Image Understanding

- Moayed Haji Ali, Andrew Bond, **Tolga Birdal**, Duygu Ceylan, Levent Karacan, Erkut Erdem & Aykut Erdem: *VidStyleODE: Disentangled Video Editing via StyleGAN and NeuralODEs*, ICCV 2023 [webpage]
- Levent Karacan, Tolga Kerimoğlu, İsmail İnan, **Tolga Birdal**, Erkut Erdem & Aykut Erdem: *Disentangling Content and Motion for Text-Based Neural Video Manipulation*, BMVC 2022 [code]
- Umut Şimşekli & **Tolga Birdal**: *A Unified Probabilistic Framework For Robust Decoding Of Linear Barcodes*, ICASSP 2015