

# Stanford

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## Tolga Birdal

Postdoctoral Research Fellow, Computer Science

### Bio

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#### BIO

Tolga Birdal is a Postdoctoral Research Fellow at the Geometric Computing group of Prof. Leonidas Guibas. He has recently defended his PhD thesis at the Computer Vision Group, Chair for Computer Aided Medical Procedures, Technical University of Munich and was a Doktorand at Siemens AG. He completed his Bachelors as an Electronics Engineer at the Sabanci University in 2008. In his subsequent postgraduate programme, he studied Computational Science and Engineering at Technical University of Munich. In continuation to his Master's thesis on "3D Deformable Surface Recovery Using RGBD Cameras", he focused his research and development on large object detection, pose estimation and reconstruction using point clouds. Tolga is awarded both Ernst von Siemens Scholarship and EMVA Young Professional Award 2016 for his PhD work. He has several publications at the well respected venues such as NeurIPS, CVPR, ICCV, ECCV, IROS, ICASSP and 3DV. Aside from his academic life, Tolga is a natural Entrepreneur. He has co-founded multiple companies including Befunky, a widely used web based image processing platform. For further information, visit [tbirdal.me](http://tbirdal.me) and <http://campar.in.tum.de/Main/TolgaBirdal>.

#### HONORS AND AWARDS

- Outstanding Reviewer Award, Neural Information Processing Systems (NeurIPS) (2020)
- Outstanding Reviewer Award, European Conference on Computer Vision (ECCV) (2020)
- Outstanding Reviewer Award, Conference on Computer Vision and Pattern Recognition (CVPR) (2020)
- Best Paper Finalist, Conference on Computer Vision and Pattern Recognition (CVPR) (2019)
- Young Professional Award, European Machine Vision Association (EMVA) (2016)
- Ernst von Siemens Scholarship, Siemens AG (2014-2018)
- IPAM Computer Vision Graduate Summer School Scholarship, National Science Foundation (NSF) (2013)
- Best Student Paper Award, ICCV Workshop on Multiview Relationships in 3D Data (2017)
- Alper Atalay Best Paper Award, IEEE Conference on Signal Processing and Communications Applications (SIU) (2013)
- Merit Scholarship, Sabanci University (2004-2008)
- Sait Halman Computer Honor Prize, Robert College (2004)

#### PROFESSIONAL EDUCATION

- Doctor of Philosophy, Technische Universitat Munchen (2019)
- Bachelor of Science, Sabanci University (2008)
- Master of Science, Technische Universitat Munchen (2011)
- PhD, Technical University of Munich , Informatics (Computer Science) (2018)

## STANFORD ADVISORS

- Leonidas Guibas, Postdoctoral Faculty Sponsor

## LINKS

- My personal website: <http://www.tbirdal.me>
- Google scholar profile: [https://scholar.google.com/citations?user=\\_Bxd5ggAAAAJ&hl=en](https://scholar.google.com/citations?user=_Bxd5ggAAAAJ&hl=en)

## Teaching

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### COURSES

#### 2020-21

- Topics in Geometric Algorithms: Non-Euclidean Methods in Machine Learning: CS 468 (Aut)

## Publications

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### PUBLICATIONS

- **From Planes to Corners: Multi-Purpose Primitive Detection in Unorganized 3D Point Clouds** *RA-Letters*  
Sommer, C., Sun, Y., Guibas, L. J., Cremers, D., Birdal, T.  
2020; 5: 8
- **6D Camera Relocalization in Ambiguous Scenes via Continuous Multimodal Inference** *European Conference on Computer Vision*  
Bui, M., Birdal, T., Albarqouni, S., Guibas, L., Ilic, S., Navab, N.  
2020: 139–157
- **Synchronizing Probability Measures on Rotations via Optimal Transport** *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*  
Birdal, T., Arbel, M., Simsekli, U., Guibas, L.  
2020: 1566–76
- **Learning Multiview 3D Point Cloud Registration** *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*  
Gojcic, Z., Zhou, C., Wegner, J. D., Guibas, L. J., Birdal, T.  
2020: 1756–66
- **Quaternion Equivariant Capsule Networks for 3D Point Clouds** *European Conference on Computer Vision*  
Zhao, Y., Birdal, T., Lenssen, J. E., Menegatti, E., Guibas, L., Tombari, F.  
2020: 1–19
- **Deformation-Aware 3D Model Embedding and Retrieval** *European Conference on Computer Vision*  
Uy, M. A., Huang, J., Sung, M., Birdal, T., Guibas, L.  
2020
- **Explaining the Ambiguity of Object Detection and 6D Pose from Visual Data** *International Conference on Computer Vision (ICCV)*  
Manhardt, F., Arroyo, D., Rupprecht, C., Busam, B., Birdal, T., Navab, N., Tombari, F.  
2019
- **Probabilistic Permutation Synchronization using the Riemannian Structure of the Birkhoff Polytope**  
Birdal, T., Simsekli, U., IEEE Comp Soc  
IEEE.2019: 11097–108
- **Ppf-foldnet: Unsupervised learning of rotation invariant 3d local descriptors** *Proceedings of the European Conference on Computer Vision (ECCV)*  
Deng, H., Birdal, T., Ilic, S.  
2018
- **A Minimalist Approach to Type-Agnostic Detection of Quadrics in Point Clouds**  
Birdal, T., Busam, B., Navab, N., Ilic, S., Sturm, P., IEEE  
IEEE.2018: 3530–40

- **Bayesian Pose Graph Optimization via Bingham Distributions and Tempered Geodesic MCMC**  
Birdal, T., Simsekli, U., Eken, M., Ilic, S., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.  
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018
- **Survey of Higher Order Rigid Body Motion Interpolation Methods for Keyframe Animation and Continuous-Time Trajectory Estimation**  
Haarbach, A., Birdal, T., Ilic, S., IEEE  
IEEE.2018: 381–89
- **PPFNet: Global Context Aware Local Features for Robust 3D Point Matching**  
Deng, H., Birdal, T., Ilic, S., IEEE  
IEEE.2018: 195–205
- **Camera Pose Filtering with Local Regression Geodesics on the Riemannian Manifold of Dual Quaternions**  
Busam, B., Birdal, T., Navab, N., IEEE  
IEEE.2017: 2436–45
- **A Point Sampling Algorithm for 3D Matching of Irregular Geometries**  
Birdal, T., Ilic, S., Bicchi, A., Okamura, A.  
IEEE.2017: 6871–78
- **CAD Priors for Accurate and Flexible Instance Reconstruction**  
Birdal, T., Ilic, S., IEEE  
IEEE.2017: 133–42
- **X-Tag: A Fiducial Tag for Flexible and Accurate Bundle Adjustment**  
Birdal, T., Dobryden, I., Ilic, S., IEEE  
IEEE.2016: 556–64
- **Online Inspection of 3D Parts via a Locally Overlapping Camera Network**  
Birdal, T., Bala, E., Eren, T., Ilic, S., IEEE  
IEEE.2016
- **Point Pair Features Based Object Detection and Pose Estimation Revisited**  
Birdal, T., Ilic, S., Brown, M., Kosecka, J., Theobalt, C.  
IEEE.2015: 527–35
- **A UNIFIED PROBABILISTIC FRAMEWORK FOR ROBUST DECODING OF LINEAR BARCODES**  
Simsekli, U., Birdal, T., IEEE  
IEEE.2015: 1946–50