

# CURRICULUM VITAE

## PERSONAL INFORMATION

Name

Address

Telephone

E-Mail

Nationality

Date of birth

Webpage

Interests

TOLGA BIRDAL, M.Sc.

Georgenschwaigstrasse 11  
80807, Muenchen, Deutschland

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tolga.birdal@tum.de

tbirdal@gmail.com

Turkish

17.12.1983

<http://tbirdal.me>

<https://linkedin.com/in/tbirdal>

<http://campar.in.tum.de/Main/TolgaBirdal>

<https://profiles.stanford.edu/tolga-birdal>

3D Computer Vision, Machine Learning, Machine Vision, Pattern Recognition, High Performance Computing



## EDUCATION

▷ Period

- Acquired qualifications
- Institute
- Supervisor

2019 - Present

**Postdoctoral Research Fellow**

Stanford University

Prof. Leonidas Guibas / Geometric Computing Group

▷ Period

- Acquired qualifications
- Institute
- Principal subjects
- Thesis subject

2014–2018

**Dr. Rer. Nat. (Ph.D.)**

Technical University of Munich

Informatics

Geometric Methods for 3D Reconstruction from Large Point Clouds

▷ Period

- Acquired qualifications
- Institute
- Principal subjects
- Thesis subject

2008–2011

**Master of Science**

Technical University of Munich

Computational Science and Engineering

3D Deformable Surface Recovery Using RGBD Cameras

▷ Period

- Acquired qualifications
- Institute
- Principal subjects

2004–2008

**Bachelor of Science**

Sabanci University

Electronics Engineering

▷ Period

- Graduate school
- Principal subjects

1999–2004

Robert College

Science

## PROFESSION

- ▷ Period
- Employer
- Position
- Projects

2014–2018

### **Siemens Corporate Technology**

Otto Hahn Ring 6, 81739, Muenchen, Deutschland

Research Scientist

I have started to contribute in Siemens' machine vision research as a byproduct of my Doctoral studies on large scale 3d reconstruction, where the presence of clutter and occlusion is inevitable. We expect our research to impact Autonomous Systems and Quality Assurance.

- ▷ Period
- Employer
- Position
- Supervisor
- Projects

2014–2014

### **Google Summer of Code**

Mountain View, CA, USA

Student

Dr. Vincent Rabaud

Implementation of surface matching algorithms into OpenCV

- ▷ Period
- Employer
- Position
- Projects

2010–2014

### **Gravi Information Technologies**

Istanbul, Turkey

CEO & Co-Founder

Gravi is a research oriented machine vision company in Turkey, developing industry oriented vision libraries. I was responsible in the management and the direction of the research on 3D machine vision.

- ▷ Period
- Employer
- Position
- Projects

2008–2011

### **BeFunky Inc.**

San Francisco, CA, USA

Chief Engineer & Co-Founder

I have co-founded BeFunky, an online digital art engine, which utilizes state of the art computer vision algorithms. Besides being the co-founder I have developed the entire system and most of the basis for the algorithms running on BeFunky ([www.befunky.com](http://www.befunky.com))

- ▷ Period
- Employer
- Position
- Supervisor
- Projects

2009–2010

### **Mitsubishi Electric Research Labs**

Cambridge, MA, USA

Intern

Prof. Fatih Porikli

At MERL, I worked on simulating human breathing in 4D. This included the implementation of Random Walks for image segmentation, 3D CT processing on CUDA, and real-time Bilateral Filtering.

- ▷ Period
- Employer
- Position
- Supervisor
- Project

2007

### **Carnegie Mellon University**

Pittsburgh, PA, USA

Intern

Prof. Martial Hebert & Dr. Yan. Ke

Shape Matching Algorithm using Spatial Segmentation Data

- ▷ Period
- Employer
- Position
- Supervisor
- Projects

2005–2007

**Vistek Isra Vision**

Teknokent, Gebze, Turkey

Application Developer

Prof. Aytul Ercil

Development of industrial computer vision systems on OCR/OCV, Bar-code Reading, Robot Control, Object Classification based on Halcon.

## AWARDS

### ▷ Personal awards

2016, **EMVA Young Professional Award**. Given to young professionals and novel works with great industrial impact

2014, **Ernst von Siemens Scholarship**, Siemens AG. Given to

talented PhD candidates in industry, showing high academic potential

2004, **Merit Scholarship**, Sabanci University for success in University Entrance Exam

2004, Ranked 81<sup>st</sup> in Istanbul and ~ 600<sup>th</sup> in Turkey in University Entrance Exam, among ~ 1.7M applicants

2004, Received Robert College **Sait Halman Computer Honor Prize** (Given to one who has great achievements in Computer Science)

### ▷ Publication awards

**Best Student Paper Award** at International Conference on Computer Vision (ICCV) 2017 Workshop on Multiview Relationships in 3D Data (MVR3D)

**Alper Atalay Best Paper Award** at SIU 2013 Ranked 3<sup>rd</sup>

### ▷ Entrepreneurial Awards

2011, **Hottest iPhone App** in Photo & Video Category on Apple iTunes Store

2009, Motorola Worldwide Mobile Widget Competition - **Winner**

2009, GTS Tech Start-up Competition - **Finalist**, Presenter

2007, TechCrunch40 Tech Start-up Competition - **Finalist**

### ▷ Awards in other competitions

2008, Ranked 1<sup>st</sup> with robot ROBO112 in Projistor Robot Competition at Dogus University

2008, Ranked 2<sup>nd</sup> with robot ROBO112 in ITURO Robot Competition at Istanbul Technical University

2000, Ranked 10<sup>th</sup> in Izmir Aegean Chess Tournament

## LANGUAGES

NATIVE LANGUAGE

Turkish

OTHER LANGUAGES

English (Proficient), German (Intermediate)

## PUBLICATIONS

### ► International Conferences

Fabian Manhardt, Diego Arroyo, Christian Rupprecht, Benjamin Busam, **Tolga Birdal**, Nassir Navab, Federico Tombari: *Explaining the Ambiguity of Object Detection and 6D Pose from Visual Data*, ICCV 2019

**Tolga Birdal** & Umut Simsekli: *Probabilistic Permutation Synchronization using the Riemannian Structure of the Birkhoff Polytope*, CVPR 2019 **[oral]**

Haowen Deng, **Tolga Birdal** & Slobodan Ilic: *3D Local Features for Direct Pairwise Registration*, CVPR 2019

Yongheng Zhang, **Tolga Birdal**, Haowen Deng & Federico Tombari: *3D Point-Capsule Networks*, CVPR 2019

**Tolga Birdal**, Umut Simsekli, Onur Eken & Slobodan Ilic: *Bayesian Pose Graph Optimization via Bingham Distributions and Tempered Geodesic MCMC*, NIPS 2018

**Tolga Birdal**, Benjamin Busam, Nassir Navab, Slobodan Ilic & Peter Sturm: *Generic Primitive Detection in Point Clouds Using Novel Minimal Quadric Fits*, T-PAMI, 2019

Haowen Deng, **Tolga Birdal** & Slobodan Ilic: *PPF-FoldNet: Unsupervised Learning of Rotation Invariant 3D Local Descriptors*, ECCV 2018

Adrian Haarbach, **Tolga Birdal** & Slobodan Ilic: *Survey of Higher Order Rigid Body Motion Interpolation Methods for Keyframe Animation and Continuous-Time Trajectory Estimation*, 3DV 2018 **[spotlight]**

**Tolga Birdal**, Benjamin Busam, Nassir Navab, Slobodan Ilic & Peter Sturm: *A Minimalist Approach to Type-Agnostic Detection of Quadrics in Point Clouds*, CVPR 2018

Haowen Deng, **Tolga Birdal** & Slobodan Ilic: *PPFNet: Global Context Aware Local Features for Robust 3D Point Matching* CVPR 2018 **[spotlight]**

**Tolga Birdal** & Slobodan Ilic: *CAD Priors for Accurate and Flexible 3D Reconstruction*, ICCV 2017

Benjamin Busam, **Tolga Birdal** & Nassir Navab: *Camera Pose Filtering with Local Regression Geodesics on the Riemannian Manifold of Dual Quaternions*, ICCVW 2017

**Tolga Birdal** & Slobodan Ilic: *A Point Sampling Algorithm for 3D Matching of Irregular Geometries*, IROS 2017

**Tolga Birdal**, Ievgeniia Dobryden & Slobodan Ilic: *X-Tag: A Fiducial Tag for Flexible and Accurate Bundle Adjustment*, 3DV 2016

**Tolga Birdal**, Emrah Bala, Tolga Eren & Slobodan Ilic: *Online Inspection of 3D Parts via a Locally Overlapping Camera Network*, WACV 2016

**Tolga Birdal** & Slobodan Ilic: *Point Pair Features Based Object Detection and Pose Estimation Revisited*, 3DV 2015 **[oral]**

Umut Simsekli & **Tolga Birdal**: *A Unified Probabilistic Framework For Robust Decoding Of Linear Barcodes*, ICASSP 2015

**Tolga Birdal**, Diana Mateus & Slobodan Ilic: *Towards A Complete Framework For Deformable Surface Recovery Using RGBD Cameras*, IROS 2012

**Tolga Birdal** & Aytul Ercil: *Real-time Automated Road, Lane and Car Detection for Autonomous Driving*, DSPincars 2007

▷ National Conferences

**Tolga Birdal** & Slobodan Ilic: *Task Oriented 3D Sampling via Genetic Algorithms*, SIU 2018

Umut Simsekli, **Tolga Birdal**, Emre Koc & Taylan Cemgil: *A Factorization Based Recommender System for Online Services*, SIU 2013

▷ Patents

Tolga Birdal: *Computer-aided image processing method*, WO2018137935A1.

Tolga Birdal, Ievgeniia Dobryden & Slobodan Ilic: *Marking Device*, DE102016221279A1.

Tolga Birdal, Mehmet Ozkanoglu & Abdi Tekin Tatar: *Method and System for Generating Online Cartoon Outputs* US8629883B2.

Tolga Birdal, Emrah Bala, Emre Koc, Mehmet Ozkanoglu & Abdi Tekin Tatar: *Method and System for Providing an Image Effects Interface* US9483237B2.

## CONFERENCES

▷ Academic conferences

CVPR (2017, 2018, 2019), ECCV 2017, ICCV 2017, IROS (2017, 2012), 3DV (2015, 2016), WACV 2016, SIU (2017, 2013, 2008, 2006), DSPInCars 2007

▷ Summer schools

2013, IPAM Computer Vision Graduate Summer School, UCLA with **NSF Scholarship**

2012, 2015 & 2016 International Computer Vision Summer School, Sicily - Successful Completion Certificates

▷ Industrial conferences

2016, EMVA Business Conference - Edinburgh

2012 / 2013, World of Industry, Exhibitor - Istanbul

2008, TechCunch 50, Alumni & Exhibitor - San Francisco

2008, NVISION - San Jose

2008, ARCS - Dresden

2007, TechCunch 40, Presenter - San Francisco

2007, Hannover Industrial Fair, Exhibitor - Hannover

2007, ARIF Innovation Festival, Exhibitor - Istanbul

2007, MVTec, Siemens and Intel Training and Workshops - Munich, Nuremberg, Ankara

## ABILITIES

### PROGRAMMING SKILLS

C/C++, Assembler (SSE, SSE2, SSE3, SSSE3, AVX), CUDA, Matlab, LaTeX, OpenCV, Halcon, C#, QT, OpenGL, Maple, Python and overall, the ability to adapt to different languages.

### HARDWARE SKILLS

Camera Systems (Basler, IDS, Sony, JAI, The Imaging Source etc), Siemens 3D Imaging Sensors, Lighting Systems (Falcon, RVSI, SmartVision), PIC, FPGA, I/O Control Modules, PLCs, Smart Cameras, Framegrabbers and other similar hardware.

## HOBBIES

One Frequent Jazz Drummer  
A Cook in the Evenings  
Occasional Chess Player  
A Former Point Guard on Basketball Fields

Muenchen, August 27, 2019

Birdal, Tolga