

# CURRICULUM VITAE

## PERSONAL INFORMATION

Name  
Adresse  
  
Telephone  
E-Mail

Nationality  
Date of birth  
Webpage  
Interests

TOLGA BIRDAL, M.Sc.  
Georgenschwaigstrasse 11  
80807, Muenchen, Deutschland  
+49-176 80898287  
tolga.birdal@tum.de  
tbirdal@gmail.com

Turkish

17.12.1983

www.tbirdal.me

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



## EDUCATION

- ▷ Period
- Acquired qualifications
- Institute
- Principal subjects
- Thesis subject

2014–Present

### **Dr. Rer. Nat. (Expected)**

Technical University of Munich  
Informatics

Large Scale 3D Object Reconstruction

- ▷ Period
- Acquired qualifications
- Institute
- Principal subjects
- Thesis subject
- Grade

2008–2011

### **Master of Science**

Technical University of Munich

Computational Science and Engineering

3D Deformable Surface Recovery Using RGBD Cameras

1.9 / 5 (1 maximum)

- ▷ Period
- Acquired qualifications
- Institute
- Principal subjects
- Grade

2004–2008

### **Bachelor of Science**

Sabanci University

Electronics Engineering

3.1 / 4 (4 maximum)

- ▷ Period
- Graduate school
- Principal subjects
- Grade

1999–2004

Robert College

Science

88 / 100

## PROFESSION

- ▷ Period
- Employer
- Position

2014–Present

### **Siemens Corporate Technology**

Otto Hahn Ring 6, 81739, Muenchen, Deutschland

Research Scientist

- Projects
  - ▷ Period
    - Employer
      - Position
      - Supervisor
      - Projects
  
- ▷ Period
  - Employer
    - Position
    - Projects
  
- ▷ Period
  - Employer
    - Position
    - Projects
  
- ▷ Period
  - Employer
    - Position
    - Supervisor
    - Projects
  
- ▷ Period
  - Employer
    - Position
    - Supervisor
    - Project
  
- ▷ Period
  - Employer

I have started contributing in Siemens' machine vision research as a part of my Doctoral studies. Our goal is to develop generic large scale 3d reconstruction algorithms, where the presence of clutter and occlusion is inevitable. We expect our research to assist Autonomous Systems, Medical Imaging and Quality Assurance.

2014–2014

**Google**

Mountain View, CA, USA

Google Summer of Code Student

Dr. Vincent Rabaud

Implementation of surface matching algorithms into OpenCV

2010–2014

**Gravi Information Technologies**

Istanbul, Turkey

CEO & Co-Founder

Gravi is the one and only research oriented machine vision company in Turkey, who conducts its own research and develops machine vision libraries. I was responsible in the management and the direction of the research on 3D machine vision.

2008–2011

**BeFunky Inc.**

San Francisco, CA, USA

Chief Engineer & Co-Founder

Together with my three colleagues, I have 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))

2009–2010

**Mitsubishi Electric Research Labs**

Cambridge, MA, USA

Intern

Prof. Fatih Porikli

At MERL, I designed an algorithm for simulating human breathing in 4D. This included the implementation of Random Walks for Image Segmentation, 3D CT processing on CUDA, and implementation of true real-time Bilateral Filtering.

2007

**Carnegie Mellon University**

Pittsburgh, PA, USA

Intern

Prof. Martial Hebert & Dr. Yan. Ke

Shape Matching Algorithm using Spatial Segmentation Data

2006–2008

**Sabanci University**

Istanbul, Turkey

- Position
- Supervisor
- Main responsibilities

Teaching Assistant  
 Prof. Aytul Ercil  
 Teaching Assistant in Computer Vision & Pattern Recognition Courses

- ▷ Period
- Employer

2005–2007

**Vistek Isra Vision**

Teknokent, Gebze, Turkey

Application Developer

Prof. Aytul Ercil

Development of industrial computer vision systems on OCR/OCV, Barcode Reading, Robot Control, Object Classification based on Halcon framework.

- Position
- Supervisor
- Projects

## RESEARCH

- ▷ Multi-View 3D Measurement

A multi-view system which is used for 3D reconstruction of industrial parts. It relies on triangulation fundamentals, while exploiting calibration of non-overlapping cameras in local and global coordinate spaces. (@Gravi)

- ▷ Deformable 3D Tracking

A novel scene flow methodology for recovering deformations on RGB-D scenes is proposed and implemented.

- ▷ Shape Matching and Tracking

Targeting robust Augmented Reality systems, I have implemented a detection-tracking framework, which is invariant to: Rotation/scale changes, illumination, occlusion and clutter.

- ▷ Scalable Image Retrieval

An improved cloud based implementation of [Nister, Stewinius 2006]. The system scales up to 5M images.

- ▷ Fastest Bilateral Filtering on GPU

Implementation of Fatih Porikli's Bilateral Filtering algorithm on GPU. Runs in around 2ms per image.

- ▷ Random Walks

Implementation of Leo Grady's famous algorithm in C. (@MERL)

- ▷ Breathing Simulation on GPU

Generating 4D CT breathing data. (@MERL)

- ▷ RoboChess

A physical 3-axis chess playing robot using color cameras. Computer vision engine, chess engine, Flash graphics, remote server communication, PLC programming are implemented. (@SU)

- ▷ BeFunky

An online platform where users can recreate their images using tons of state-of-the-art photo effects, and editing tools. Day by day BeFunky evolves into a bigger platform.

- ▷ T Vision Library

Core Library of all Gravi Industrial Vision algorithms (more than 1200 operations).

- ▷ T Effects Library      Core Library of all BeFunky effects/editing. Many low level image processing & vision algorithms are implemented (more than 600 operations).
- ▷ Workflow Analysis using 4D Data      Using 3D Reconstruction environment, I started developing a 4D data analysis framework. (@ CAMP-TUM)
- ▷ 3D Stereo Reconstruction & 3D Adaptive Space Carving      Implementation of state of the art 3D reconstruction algorithms.
- ▷ 3D Talking Avatar      Automatically generate your 3D Avatar and let it say what you say. (@ SU)
- ▷ Template Matching on CUDA      Pyramidal Normalized Cross Correlation matching on CUDA. (@ SU)
- ▷ Robo112      Autonomous, helper robot. It can read text, follow signs, and grasp pieces. (@ SU)
- ▷ Climbing Robot using Wireless CAMs      Obstacle avoidance for hill climbing robots. Sensor data and decisions are transmitted over wireless network. (@CMU)
- ▷ Active Contours on GPU      Implemented active contours without re-initialization on GPU.
- ▷ Painting Classification      Classification of paintings according to Genre using SVMs.

## PUBLICATIONS

- ▷ Publications
  - Tolga Birdal, Emrah Bala, Tolga Eren & Slobodan Ilic: *Online Inspection of 3D Parts via a Locally Overlapping Camera Network* WACV 2016, Lake Placid
  - Tolga Birdal, Slobodan Ilic: *Point Pair Features Based Object Detection and Pose Estimation Revisited* 3DV 2015, Lyon
  - Umut Simsekli, Tolga Birdal: *A Unified Probabilistic Framework For Robust Decoding Of Linear Barcodes* ICASSP 2015, Brisbane
  - Umut Simsekli, Tolga Birdal, Emre Koc, Taylan Cemgil: *A Factorization Based Recommender System for Online Services* SIU 2013, Cyprus
  - Tolga Birdal, Diana Mateus, Slobodan Ilic: *Towards A Complete Framework For Deformable Surface Recovery Using RGBD Cameras* IROS 2012, Vilamoura/Portugal
  - Tolga Birdal, Emrah Bala: *Flow Enhancing Line Integral Convolution Filter* ICIP, 2010, Istanbul
  - Tolga Birdal and Aytul Ercil: *Real-time Automated Road, Lane and Car Detection for Autonomous Driving* DSPincars, 2007, Istanbul

▷ Patents

Tolga Birdal, Mehmet Ozkanoglu, Abdi Tekin Tatar: *METHOD AND SYSTEM FOR GENERATING ONLINE CARTOON OUTPUTS* Patent application number: 20090219298. IPC8 Class: AG09G502F1

Tolga Birdal, Emrah Bala, Emre Koc, Mehmet Ozkanoglu, Abdi Tekin Tatar: *METHOD AND SYSTEM FOR PROVIDING AN IMAGE EFFECTS INTERFACE* Patent application number: 20100223565. IPC8 Class: AG06F3048F1

## CONFERENCES

▷ Summer schools

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

2012, International Computer Vision Summer School, Sicily, Successful Completion Certificate

▷ Trainings

2008, MVTec Halcon 8.0 Training - Munich

2007, Siemens Simatic Machine Vision Workshop - Nuremberg

2007, Intel Multi Core Programming - Ankara

▷ Academic conferences

SIU 2013, Presenter - Girne

IROS 2012, Presenter - Vilamoura

SIU 2008 - Didim

DSPInCars 2007, Presenter - Istanbul

SIU 2006 - Antalya

▷ Industrial conferences

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

## AWARDS

▷ Professional 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

▷ Publication awards

SIU 2013, Alper Atalay Best Paper Award - Ranked 3<sup>rd</sup>

- ▶ Academic awards
  - 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 80<sup>th</sup> in Istanbul and 600<sup>th</sup> in Turkey in University Entrance Exam, among 1500000 applicants
  - 2004, Received Robert College Sait Halman Computer Honor Prize (Given to one who has great achievements in Computer Science)
  
- ▶ Awards in 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  
OTHER LANGUAGES

**Turkish**  
English (Proficient), German (Beginner)

## ABILITIES

PROGRAMMING SKILLS

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

HARDWARE SKILLS

Camera Systems (Basler, IDS, Sony, JAI, The Imaging Source etc), 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, March 18, 2016

Birdal, Tolga