

# Dr. Frank R. Schmidt

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Born: March 20, 1977—Bonn, Germany  
Nationality: German



## Current position

*Research Scientist*, Bosch Center for Artificial Intelligence, Renningen, Germany

## Areas of specialization

Shape Analysis, Image Segmentation, Discrete and Continuous Optimization, Artificial Intelligence.

## Education

- 2010 PhD in Computer Science (Dr. rer. nat.), University of Bonn  
Title: “Efficient Methods for Continuous and Discrete Shape Analysis”  
Supervisor: *Prof. Dr. Daniel Cremers*  
Commission: *Prof. Dr. Daniel Cremers, Prof. Dr. Michael Clausen, Prof. Dr. Reinhard Klein, Prof. Dr. Martin Rumpf*  
Grade: *Magna Cum Laude*  
Date: *November 12, 2010*
- 2003 MSc in Mathematics (Dipl. Math.) , University of Bonn  
Title: “Beispiele hyperelliptischer Flächen mit mindestens zwei guten Hosen”  
Supervisor: *Prof. Dr. Ursula Hamenstädt*  
Grade: *Sehr gut*  
Date: *September 24, 2003*
- 2000 BSc in Mathematics (Vordiplom), University of Bonn  
Grade: *Sehr gut*

## Awards

- 2009 *CVPR Doctoral Spotlight Award*, awarded by *Google Inc.*

## Employment

- 2017– today *Research Scientist*, Bosch Center for Artificial Intelligence  
2015– 2017 *Postdoctoral Fellow*, Technical University of Munich, Germany with *Prof. Daniel Cremers*  
2013–2015 *Postdoctoral Fellow*, University of Freiburg, Germany with *Prof. Thomas Brox*  
2012–2013 *Postdoctoral Fellow*, Université Paris-Est, France with *Prof. Hugues Talbot*  
2010–2012 *Postdoctoral Fellow*, University of Western Ontario, Canada with *Prof. Yuri Boykov*  
2006–2010 *Research and Teaching Assistant*, University of Bonn, Germany with *Prof. Daniel Cremers*  
2004–2005 *Research and Teaching Assistant*, University of Bonn, Germany with *Prof. Michael Clausen*

## Publications & Talks

### JOURNAL PUBLICATIONS & BOOK CHAPTERS

- 2016B F. R. Schmidt, L. Gorelick, I. Ben Ayed, Y. Boykov, T. Brox, “Shape Distances for Binary Image Segmentation”, “Perspectives in Shape Analysis” in the series *Mathematics and Visualization*, October 2016.  
2016A M. Strumia, F. R. Schmidt, C. Anastasopoulos, C. Granziera, G. Krueger, T. Brox, “White Matter MS-Lesion Segmentation Using a Geometric Brain Model”, *Computer Graphics Forum (Proc. Symposium Geometry Processing)*, IEEE Transactions on Medical Imaging, July 2016.  
2011A T. Windheuser, U. Schlickewei, F. R. Schmidt, D. Cremers, “Large-Scale Integer Linear Programming for Orientation-Preserving 3D Shape Matching”, *Computer Graphics Forum (Proc. Symposium Geometry Processing)*, Lausanne, Switzerland, Eurographics, July 2011.

### REFEREED PUBLICATIONS

- 2019a E. Wong, F. R. Schmidt, J. Z. Kolter, “Wasserstein Adversarial Examples via Projected Sinkhorn Iterations”, *International Conference on Machine Learning (ICML)*, June 2019  
2019b J. B. Li, F. R. Schmidt, J. Z. Kolter, “Adversarial Camera Stickers: A physical Camera-Based Attack on Deep Learning Systems”, *International Conference on Machine Learning (ICML)*, June 2019  
2018a E. Wong, F. R. Schmidt, J. H. Metzen, J. Z. Kolter, “Scaling Provable Adversarial Defenses”, *Advances in Neural Information Processing Systems (NeurIPS)*, December 2018  
2018b C. Domokos, F. R. Schmidt, D. Cremers, “MRF Optimization with Seperable Convex Prior on Partially Ordered Labels”, *European Conference on Computer Vision (ECCV)*, September 2018  
2018c V. Estellers, F. R. Schmidt, D. Cremers, “Robust Fitting of Subdivision Surfaces for Smooth Shape Analysis”, *International Conference on 3D Vision (3DV)*, September 2018  
2018d E. Laude, J.-H. Lange, J. Schüpfer, C. Domokos, L. Leal-Taixé, F. R. Schmidt, B. Andres, D. Cremers, “Discrete-Continuous ADMM for Transductive Inference in Higher-Order MRFs”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2018

- 2017a F. Bernhard, F. R. Schmidt, J. Thunberg, D. Cremers, “A Combinatorial Solution to Non-Rigid 3D Shape-to-Image Matching”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, July 2017
- 2016a Z. Löhner, E. Rodolà, F. R. Schmidt, M. M. Bronstein, D. Cremers, “Efficient Globally Optimal 2D-to-3D Deformable Shape Matching”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, June 2016
- 2015a N. Nagaraja, F. R. Schmidt, T. Brox, “Video Segmentation with Just a Few Strokes”, *IEEE International Conference on Computer Vision (ICCV)*, December 2015.
- 2014a F. R. Schmidt, T. Windheuser, U. Schlickewei, D. Cremers, “Dense Elastic 3D Shape Matching”, *Efficient Algorithms for Global Optimization Methods in Computer Vision*, April 2014.
- 2013a L. Gorelick, F. R. Schmidt, Y. Boykov, “Fast Trust Region for Segmentation”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Portland, Oregon, June 2013.
- 2012b F. R. Schmidt, Y. Boykov “Hausdorff Distance Constraint for Multi-Surface Segmentation”, *European Conference on Computer Vision (ECCV)*, Florence, Italy, October 2012.
- 2012a L. Gorelick, F. R. Schmidt, Y. Boykov, A. Delong, A. Ward, “Segmentation with non-linear regional constraints via line-search cuts”, *European Conference on Computer Vision (ECCV)*, Florence, Italy, October 2012.
- 2011c T. Windheuser, U. Schlickewei, F. R. Schmidt, D. Cremers, “Geometrically Consistent Elastic Matching of 3D Shapes: A Linear Programming Solution”, *IEEE International Conference on Computer Vision (ICCV)*, Barcelona, Spain, November 2011.
- 2011b F. R. Schmidt, H. Ackermann, B. Rosenhahn, “Multilinear Model Estimation with  $L^2$ -Regularization”, *Pattern Recognition (Proc. DAGM)*, Frankfurt, Germany, Springer, LNCS, Vol. 6835, 81–90, August 2011.
- 2011a A. Delong, L. Gorelick, F. R. Schmidt, O. Veksler, and Y. Boykov, “Interactive Segmentation with Super-Labels”, *Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR)*, Sankt Petersburg, Russia, Springer, LNCS, Vol. 6819, 147–162, July 2011.
- 2009b F. R. Schmidt, D. Cremers, “A Closed-Form Solution for Image Sequence Segmentation with Dynamical Shape Priors”, *Pattern Recognition (Proc. DAGM)*, Jena, Germany, Springer, LNCS, Vol. 5748, 31–40, September 2009. **(oral)**
- 2009a F. R. Schmidt, E. Toeppe, D. Cremers, “Efficient Planar Graph Cuts with Applications in Computer Vision”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Miami, Florida, June 2009. **(awarded)**

- 2008b T. Schoenemann, F. R. Schmidt, D. Cremers, “Image Segmentation with Elastic Shape Priors via Global Geodesics in Product Spaces”, *British Machine Vision Conference (BMVC)*, Leeds, UK, September 2008.
- 2008a D. Cremers, F. R. Schmidt, F. Barthel, “Shape Priors in Variational Image Segmentation Convexity, Lipschitz Continuity and Globally Optimal Solutions”, *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Anchorage, Alaska, June 2008.
- 2007c F. R. Schmidt, Dirk Farin, D. Cremers, “Fast Matching of Planar Shapes in Sub-cubic Runtime”, *IEEE International Conference on Computer Vision (ICCV)*, Rio de Janeiro, Brazil, October 2007.
- 2007b F. R. Schmidt, E. Toeppe, D. Cremers, Y. Boykov, “Intrinsic Mean for Semimetric Shape Retrieval via Graph Cuts”, *Pattern Recognition (Proc. DAGM)*, Heidelberg, Germany, Springer, LNCS, Vol. 4713, 446–455, September 2007. **(oral)**
- 2007a F. R. Schmidt, E. Toeppe, D. Cremers, Y. Boykov, “Efficient Shape Matching via Graph Cuts”, *Energy Minimization Methods in Computer Vision and Pattern Recognition (EMM-CVPR)*, Ezhou, China, Springer, LNCS, Vol. 4679, 39–54, August 2007. **(oral)**
- 2006a F. R. Schmidt, M. Clausen, D. Cremers, “Shape Matching by Variational Computation of Geodesics on a Manifold”, *Pattern Recognition (Proc. DAGM)*, Berlin, Germany, Springer, LNCS, Vol. 4174, 142–151, September 2006.

#### INVITED TALKS (CONFERENCES AND WORKSHOPS)

- 2017 Workshop “Functoriality in Geometric Data”, *Dagstuhl Seminar*, Dagstuhl Castle, Germany, January 9 2017.
- 2014 Workshop “New Perspectives in Shape Analysis”, *Dagstuhl Seminar*, Dagstuhl Castle, Germany, February 11 2014.
- 2011 Workshop “Methods and Applications of Shape Models for Biomedical Image Segmentations”, *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, Toronto, Canada, September 18 2011.
- 2008b General (Nonlinear Nonconvex) Models, *SIAM Conference on Imaging Science*, San Diego (CA), USA, July 7 2008.
- 2008a Workshop “Geometry and Statistics of Shape”, *Hausdorff Center for Mathematics (HCM)*, Bonn, Germany, June 9 2008.

#### INVITED TALKS (INSTITUTES)

- 2017a München, Germany, *Deutsches Zentrum für Luft- und Raumfahrt (DLR)*, February 22 2017.
- 2013e Freiburg im Breisgau, Germany, *Universitätsklinikum Freiburg*, October 31 2013.
- 2013d Paris, France, *Ecole Supérieure d’Ingénieurs en Electronique et Electrotechnique (ESIEE)*, February 21 2013.
- 2013c Freiburg im Breisgau, Germany, *Albert-Ludwigs-Universität Freiburg*, February 15 2013.
- 2013b Birlinghoven, Germany, *Fraunhofer-Gesellschaft (FHG)*, January 18 2013.
- 2013a Munich, Germany, *Technische Universität München (TUM)*, January 14 2013.
- 2012f Heidelberg, Germany, *Ruprecht-Karls-Universität Heidelberg*, Heidelberg Collaboratory for Image Processing, December 18 2012.
- 2012e Lausanne, Switzerland, *Ecole Polytechnique Fédérale de Lausanne*, December 3 2012.
- 2012d Paris, France, *Dauphine - Université Paris*, November 26 2012.
- 2012c Paris, France, *Ecole Normale Supérieure Cachan*, November 23 2012.
- 2012b Paris, France, *Ecole Centrale Paris*, October 30 2012.
- 2012a Paris, France, *Institut national de recherche en informatique et automatique (INRIA)*, October 19 2012.
- 2011c Paris, France, *Ecole Supérieure d’Ingénieurs en Electronique et Electrotechnique (ESIEE)*, April 8 2011.
- 2011b Paris, France, *Institut national de recherche en informatique et automatique (INRIA)*, April 5 2011..
- 2011a Iowa City(IA), USA, *University of Iowa*, Iowa Institute for Biomedical Imaging, February 21 and 23 2011.
- 2010b Munich, Germany, *Technische Universität München (TUM)*, Computer Science Department, November 19 2010.
- 2010a Hannover, Germany, *Leibniz Universität Hannover*, Electrical Engineering and Computer Science Department (TNT), November 16 2010.
- 2008 London (ON), Canada, *University of Western Ontario (UWO)*, Computer Science Department, February 14 2008.

#### EDITOR

- 2011 Y. Boykov, F. Kahl, V. Lempitsky, F. R. Schmidt, *Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR)*, Sankt Petersburg, Russia, Springer, LNCS, Vol. 6819, ISBN: 978-3-642-23093-6.
- 2009b D. Cremers, Y. Boykov, A. Blake, F. R. Schmidt, *Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR)*, Bonn, Germany, Springer, LNCS, Vol. 5681, ISBN: 978-3-642-03640-8.
- 2009a D. Cremers, B. Rosenhahn, A. L. Yuille, F. R. Schmidt, *Statistical and Geometrical Approaches to Visual Motion Analysis (International Dagstuhl Seminar)*, Dagstuhl, Germany, Springer, LNCS, Vol. 5604, ISBN: 978-3-642-03060-4.

#### GUEST EDITOR

- 2013 Y. Boykov, F. Kahl, V. Lempitsky, F. R. Schmidt, *International Journal of Computer Vision (IJCV)*, Special Issue: "Energy Optimization Methods", Vol. 104, Issue 3, ISSN(Print): 0920-5691, ISSN(Online): 1573-1405.

## Teaching

#### LECTURER

- 2016/7 Lecturer of *Undergraduate Course on "Numerical Programming"*, Technical University Munich.
- 2016 Lecturer of 10 course units for *Graduate Course on "Analysis of Three-Dimensional Shapes"*, Technical University Munich.
- 2015 Lecturer of 13 course units for *Graduate Course on "Combinatorial Optimization in Computer Vision"*, Technical University Munich.
- 2013 Lecturer of 3 course units for *Graduate Course on "Computer Vision I"*, Albert-Ludwigs-Universität Freiburg.
- 2011 Lecturer of 2 course units for *Graduate Course on "Algorithms for Image Analysis"*, University of Western Ontario.

#### INSTRUCTOR

- 2016/7 Instructor for *Seminar on "Image Segmentation and Shape Analysis"*, Technical University Munich.
- 2016 Instructor for *Seminar on "Shape Analysis in Computer Vision"*, Technical University Munich.
- 2015 Instructor for *Practical Course on "GPU Programming in Computer Vision"*, Technical University Munich.
- 2009 Instructor at *Deutsche Schüler Akademie (DSA) – Hilden, Germany* Sommer school for high school students.

- 2007 Instructor for *Practical on “Shape-Based Object Recognition in Real-Time”*, University of Bonn.
- 2006 Instructor for *Seminar on “Statistical Methods and Variational Approaches in Computer Vision”*, University of Bonn.

#### TEACHING ASSISTANT

- 2014b Teaching Assistant for *Graduate Course on “Computer Vision II”*, Albert-Ludwigs-Universität Freiburg.
- 2014a Teaching Assistant for *Graduate Course on “Computer Vision I”*, Albert-Ludwigs-Universität Freiburg.
- 2013 Teaching Assistant for *Undergraduate Course on “Optimization”*, Albert-Ludwigs-Universität Freiburg.
- 2013b Teaching of *Graduate Course on “Computer Vision II”*, Albert-Ludwigs-Universität Freiburg.
- 2013a Teaching Assistant for *Graduate Course on “Computer Vision II”*, Albert-Ludwigs-Universität Freiburg.
- 2008 Teaching Assistant for *Graduate Course on “Computer Vision II”*, University of Bonn.
- 2006 Teaching Assistant for *Graduate Course on “Computer Vision I”*, University of Bonn.

## Service to the Profession

#### JOURNAL REVIEWING

- TPAMI IEEE Transactions on Pattern Analysis and Machine Intelligence.
- TIP IEEE Transactions on Image Processing.
- TMI IEEE Transactions on Medical Imaging.
- IJCV International Journal of Computer Vision.
- SIIMS SIAM Journal on Imaging Sciences.

#### PROGRAM COMMITTEE

- SIGGRAPH Intern. Conference and Exhibition on Computer Graphics and Interactive Techniques.
- MICCAI Intern. Conference on Medical Image Computing and Computer-Assisted Intervention.
- CVPR IEEE International Conference on Computer Vision and Pattern Recognition.
- ICCV IEEE International Conference on Computer Vision.
- ECCV European Conference on Computer Vision.
- ACCV Asian Conference on Computer Vision.
- EMMCVPR Energy Minimization Methods in Computer Vision and Pattern Recognition.
- 3DV 3D Vision.