

Jonathan Balzer

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EDUCATION	Karlsruhe Institute of Technology (KIT) , Karlsruhe, Germany M.Sc. (Dipl.-Math. techn.), Applied Mathematics, October 2008 Ph.D. (Dr. rer. nat.), Computer Science, February 2008 M.Eng. (Dipl.-Ing.), Mechanical Engineering, May 2004	
ACADEMIC APPOINTMENTS	Postdoctoral Scholar UCLA Vision Lab, University of California, Los Angeles • Supervisor: Prof. Stefano Soatto	January 2012 to December 2014
	Postdoctoral Scholar Center for Geometric Modeling and Scientific Visualization, King Abdullah University of Science and Technology, Thuwal, Kingdom of Saudi Arabia • Supervisor: Prof. Helmut Pottmann	September 2009 to November 2011
	Research Assistant Geometric Modeling and Industrial Geometry Group, Vienna University of Technology, Vienna, Austria • Supervisor: Prof. Helmut Pottmann	November 2008 to August 2009
	Research Assistant Vision and Fusion Lab, KIT, Karlsruhe, Germany • Supervisor: Prof. Jürgen Beyerer	September 2004 to October 2008
REFEREED JOURNAL PUBLICATIONS	[1] MÖRWALD, T.; BALZER, J.; VINCZE, M.: Modeling connected regions in arbitrary planar point clouds by robust B-spline approximation. <i>Robotics and Autonomous Systems</i> 76, 2016 [2] PETERS, M.; BALZER, J.; SHAMS, L.: Smaller = denser, and the brain knows it: Natural statistics of object density shape weight expectations. <i>PLoS ONE</i> , 2015 [3] SACHAROW, A.; BALZER, J.; BIERMANN, D.: Registration methods for the analysis and compensation of form errors. <i>Computer Aided Design</i> 43 Nr. 12, 2010 [4] BALZER, J.: A Gauss-Newton Method for the Integration of Spatial Normal Fields in Shape Space. In: <i>Journal of Mathematical Imaging and Vision</i> 44 Nr.1, 2012 [5] BALZER, J.; WERLING, S.; BEYERER, J.: Lineare Deflektometrie - Regularisierung und experimentelles Design. <i>Technisches Messen</i> 78 Nr. 1, 2011 [6] BALZER, J.; WERLING, S.: Principles of Shape from Specular Reflection. <i>Measurement</i> 43 Nr. 10, 2010 [7] BALZER, J.: Second-Order Domain Derivative of Normal-Dependent Boundary Integrals. <i>Journal of Evolution Equations</i> 10 Nr. 3, 2010 [8] LELLMANN, J.; BALZER, J.; RIEDER, A.; BEYERER, J.: Shape from Specular Reflection and Optical Flow. <i>International Journal of Computer Vision</i> 80 Nr. 2, 2008	

- [9] BALZER, J.; WERLING, S.; BEYERER, J.: Deflektometrische Rekonstruktion teilspiegelder Freiformflächen. *Technisches Messen* 74 Nr. 11, 2007
- [10] GRABER, G.; BALZER, J.; SOATTO, S.; POCK, T.: Efficient Minimal-Surface Regularization of Perspective Depth Maps in Variational Stereo. *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2015
- [11] DONG, J.; HERNANDEZ, J.; BALZER, J.; DAVIS, D.; SOATTO, S.: Multiview Feature Learning and Engineering. *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2015
- [12] MÖRWALD, T.; BALZER, J.; VINCZE, M.: Direct optimization of T-splines based on Multiview Stereo. *Proceedings of International Conference on 3D Vision*, 2014
- [13] BALZER, J.; ACEVEDO, D.; SOATTO, S.; HÖFER, S.; HADWIGER, M.; BEYERER, J.: Cavlectometry: Towards Holistic Reconstruction of Large Mirror Objects. *Proceedings of International Conference on 3D Vision*, 2014
- [14] BALZER, J.; SOATTO, S.: Second-order Shape Optimization for Geometric Inverse Problems in Vision. *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, arXiv:1311.2626, 2014
- [15] DAVIS, D.; BALZER, J.; SOATTO, S.: Asymmetric sparse kernel approximations for nearest neighbors search. *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 2014
- [16] BALZER, J.; PETERS, M.; SOATTO, S.: Volumetric Reconstruction Applied to Perceptual Studies of Size and Weight. *Proceedings of IEEE Winter Conference on Applications of Computer Vision*, 2014
- [17] BALZER, J.; SOATTO, S.: CLAM: Coupled localization and mapping with efficient outlier handling. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, 2013
- [18] BALZER, J.; MÖRWALD, T.: Isogeometric Finite-Elements Methods and Variational Reconstruction Tasks in Vision - A Perfect Match. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, 2012
- [19] RICHTSFELD A., MÖRWALD T., PRANKL J., BALZER J., ZILlich M., VINCZE M.: Towards Scene Understanding - Object Segmentation Using RGBD-Images. *Proceedings of the Computer Vision Winter Workshop*, 2012
- [20] BALZER, J.: Shape-from-Specular-Reflection in Calibrated Environments and the Integration of Spatial Normal Fields. *Proceedings of the IEEE International Conference on Image Processing*, 2011
- [21] BALZER, J.; HÖFER, S.; BEYERER, J.: Multiview Specular Stereo Reconstruction of Large Mirror Surfaces. *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, 2011
- [22] SCHIFTNER, A.; BALZER, J.: Statics-Sensitive Layout of Planar Quadrilateral Meshes. *Advances in Architectural Geometry*, 2010
- [23] BALZER, J.; HÖFER, S.; WERLING, S.; BEYERER, J.: Optimization on Shape Curves with Application to Specular Stereo. *Lecture Notes in Computer Science* 6376, 2010
- [24] BALZER, J.; DIBBELT, J.; BEYERER, J.: Über die Eindeutigkeit der stereo-regularisierten deflektometrischen Oberflächenrekonstruktion. *Tagungsband Bildverarbeitung in der Mess- und Automatisierungstechnik*, 2007

- [25] WERLING, S.; BALZER, J.; BEYERER, J.: A New Approach for Specular Surface Reconstruction Using Deflectometric Methods. *Proceedings of 37. Jahrestagung der Gesellschaft für Informatik e.V. (GI): INFORMATIK 2007 - Informatik trifft Logistik*, 2007
- [26] WERLING, S.; BALZER, J.; BEYERER, J.: Initial Value Estimation for Robust Deflectometric Reconstruction. *Proceedings of the 8th International Conference on Optical 3-D Measurement Techniques*, 2007
- [27] MILIGHETTI, G.; H.-B.KUNTZE; FREY, C.; DIESTEL-FEDDERSEN, B.; BALZER, J.: On a Primitive Skill-Based Supervisory Robot Control Architecture. *Proceedings of the IEEE International Conference on Advanced Robotics*, 2005
- OTHER
CONFERENCE
PUBLICATIONS
- [28] BALZER, J.; WERLING, S.; BEYERER, J.: Regularization of the deflectometry problem using shading data. *Proceedings of the SPIE Optics East*, 2006
- BOOKS
- [29] BALZER, J.: *Regularisierung des Deflektometrieproblems – Grundlagen und Anwendung*, KIT Scientific Publishing, ISSN: 978-3-86644-230-6, 2008
- PATENTS
- [30] BALZER, J.; WERLING, S.; BEYERER, J.; HEIZMANN, M.: *Verfahren zur Erfassung der Oberflächenform einer teilspiegelnden Oberfläche*. Patent Nr. DE 10 2006 012 432 B3
- TALKS
- “Second-order Shape Optimization for Geometric Inverse Problems in Vision”, CVPR, 2014, Columbus, OH
- “Overview of 3-d motion estimation and reconstruction from video streams”, IPAM Workshop on Mathematical Challenges in Ophthalmology, 2014, Los Angeles
- “Visual Metrology and 3-d Capturing from Video”, UCLA Engineering Tech Forum, 2013, Los Angeles
- “Shape from Specular Reflection in Calibrated Environments” (invited talk), ICIAP, 2011, Brussels
- “Isogeometric Analysis for Statics-Aware Rationalization of Freeform Architecture”, International Workshop on New Trends in Applied Geometry, 2011, Hurdalsjoen.
- “Isogeometric Analysis for Statics-Aware Rationalization of Freeform Architecture”, Isogeometric Analysis: Integrating Design and Analysis, 2011, Austin
- “Statics-Sensitive Layout of Planar Quadrilateral Meshes”, Advances in Architectural Geometry, 2010, Vienna
- “Existence and Uniqueness of Solutions to the Deflectometry Problem”, Image Processing in Measurement and Control Theory, 2007, Regensburg
- “Constrained Level Set Evolutions for Deflectometric Reconstruction of Specular Surfaces”, Control Theory Colloquium, 2007, Boppard
- “Regularization of the Deflectometry Problem Using Shading Data”, SPIE Optics East, 2006, Boston

SOFTWARE SKILLS **Programming languages:** C/C++ (experience with generic programming, multi-threading, SSE instruction sets, and common APIs/SDKs such as STL, OpenCV, LAPACK, OpenGL, OpenNurbs, QT, VTK, DC1394, and many more), Python, GLSL, Java, JavaScript (frontend and backend), Matlab, LaTeX, HTML, Jade, CSS, PHP, Assembler, Fortran, SQL, MongoDB

I am the lead developer of two open-source projects:

- **R4R:** reconstruction for recognition library, which provides a C++ frame work for 3-d recognition.
- **YAS:** a software for the alignment of RGBD images recorded from a discrete set of vantage points and their integration into a common polygonal mesh model.

Simulation: Simulink, Matlab, Maple, LabView, Rhino3d, POV-Ray, Blender

Operating Systems: Linux, Android, Windows, Mac OS

Others: Microsoft Office, GIT

THESIS SUPERVISION DIBBELT, J.: *Level Set Evolutions for Constrained Optimization Problems*, KIT, Bachelor's thesis, 2010

GERNUICHE, D.: *Solution of the Deflectometric Boundary Value Problem*, KIT, Bachelor's thesis, 2008

LELLMANN, J.: *Mathematical Modelling and Analysis of the Deflectometry Problem*, KIT, Master's thesis, 2006

GRANTS AND SCHOLARSHIPS KAUST Collaborative Travel Fund, 2010

Willy-Höfler Scholarship from the Engineering Department of KIT, 2003

ASSIST Scholarship, 1995

PROFESSIONAL SERVICE **Reviewing for**

- ACCV
- IEEE ICCV
- ACM SIGGRAPH
- SIAM Journal of Imaging Science
- IEEE Transactions on Image Processing
- Elsevier Optics & Lasers.

PERSONAL INTERESTS **Music:** piano, drums, guitar, bass, saxophone

Sports: mountaineering, rock climbing