

# Dipl.-Ing. Dr.techn. Michael Bleyer

Interactive Media Systems Group  
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**Personal Information**      Date of Birth: 12. 07. 1977  
Place of Birth: Mödling / Austria  
Citizenship: Austrian

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**Research Interests**      Computer Vision, Stereo Matching, Multi-View Reconstruction, Temporal Stereo, Novel View Synthesis, Optical Flow, Video Object Segmentation, Image Matting, Interactive Segmentation, Image Filtering; Combinatorial Optimization, Video Compression;

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## Education

**2002-2006**      PhD Student in Computer Science  
Dr.techn. (with Distinction)  
Thesis: "Segmentation-based Stereo and Motion with Occlusions",  
*Institute for Software Technology and Interactive Systems, Vienna University of Technology, March 2006.*  
Advisor: Margrit Gelautz

**1995-2002**      Master Student in Computer Science  
Dipl.-Ing. (with Distinction)  
Thesis: "An Efficient Hybrid Evolutionary Algorithm for the Capacitated Minimum Spanning Tree Problem", *Institute of Computer Graphics and Algorithms, Vienna University of Technology, June 2002.*  
Advisor: Günther Raidl

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## Professional Experience

**2006-Present**      PostDoc Researcher  
*Institute for Software Technology and Interactive Systems, Vienna University of Technology*  
Funded by:

- ◆ WWTF-Project: "Temporal-Consistent Stereo Matting for High-Quality Novel View Synthesis and Visual Effects"
- ◆ FWF-Project: "Evaluation and Design of Energy Functions for Global Stereo Matching"

- 2002-2006** Research Assistant  
*Institute for Software Technology and Interactive Systems, Vienna University of Technology*  
Funded by:  
◆ FWF-Project: "3D Videoanalyse für interaktive Multimedia Anwendungen"
- 1998-1999** Software Developer  
*Software Data Service (SDS), Vienna*
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## Publications

- PhD Thesis** ◆ Bleyer, M., "Segmentation-based Stereo and Motion with Occlusions", PhD thesis, Vienna University of Technology, 2006. **(OVE Award)**
- Journal Articles**
- ◆ Seitner F., M. Bleyer, M. Gelautz and R. Beuschel, "Evaluation of Data-Parallel H.264 Decoding Approaches for Strongly Resource-Restricted Architectures", *Multimedia Tools and Applications*, 2010.
  - ◆ Seitner F., M. Bleyer, M. Gelautz, R. Beuschel, "Development of a High-Level Simulation Approach and Its Application to Multicore Video Decoding", *IEEE Transactions on Circuits and Systems*, vol. 19, nr. 11, pp. 1667-1679, 2009
  - ◆ Bleyer, M. and M. Gelautz, "Graph-cut Based Stereo Matching Using Image Segmentation with Symmetrical Treatment of Occlusions", *Signal Processing: Image Communication*, vol. 22, nr. 2, pp. 127-143, 2007.
  - ◆ Bleyer M., M. Gelautz and C. Rhemann, "Colour Segmentation-based Computation of Dense Optical Flow with Application to Video Object Segmentation", *ÖGAI Journal*, vol. 24, pp. 11 – 15, 2005.
  - ◆ Bleyer, M. and M. Gelautz, "A Layered Stereo Matching Algorithm Using Image Segmentation and Global Visibility Constraints", *ISPRS Journal of Photogrammetry and Remote Sensing*, vol. 59, nr. 3, pp. 128-150, 2005. **(Best Paper Award)**
- Conferences**
- ◆ Bleyer, M., C. Rhemann and C. Rother, "PatchMatch Stereo - Stereo Matching with Slanted Support Windows", *British Machine Vision Conference (BMVC)*, 2011. **(Oral Presentation; Acceptance Rate for Orals: 8%)**
  - ◆ Bleyer, M., C. Rother, P. Kohli, D. Scharstein and S. Sinha, "Object Stereo - Joint Stereo Matching and Object Segmentation", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2011.
  - ◆ Rhemann, C., A. Hosni, M. Bleyer, C. Rother and M. Gelautz, "Fast Cost-Volume Filtering for Visual Correspondence and Beyond", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2011.

- ◆ He L., M. Bleyer and M. Gelautz, "Object Removal by Depth-guided Inpainting, *ÖAGM/AAPR*, 2011. (Oral Presentation)
- ◆ Hosni A., C. Rhemann, M. Bleyer and M. Gelautz, "Temporally Consistent Disparity and Optical Flow via Efficient Spatiotemporal Filtering", *Pacific-Rim Symposium on Image and Video Technology (PSIVT)*, 2011.
- ◆ Hosni A., M. Bleyer, C. Rhemann, M. Gelautz and C. Rother, "Real-time Local Stereo Matching Using Guided Image Filtering", *IEEE International Workshop on Hot Topics in 3D*, 2011. (Oral Presentation)
- ◆ Bleyer, M., C. Rother, P. Kohli, "Surface Stereo with Soft Segmentation", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2010. **(Toshiba Research Best Presentation Prize at ICVSS 2010)**
- ◆ Bleyer, M., S. Chambon, "Does Color Really Help in Dense Stereo Matching?", *International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT)*, 2010. (Oral Presentation)
- ◆ Hosni, A., M. Bleyer and M. Gelautz, "Near Real-Time Stereo with Adaptive Support Weight Approaches", *International Symposium on 3D Data Processing, Visualization and Transmission (3DPVT)*, 2010. (Oral Presentation)
- ◆ Bleyer, M., M. Gelautz, C. Rother, C. Rhemann, "A Stereo Approach that Handles the Matting Problem via Image Warping", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2009. **(Oral Presentation; Acceptance Rate for Orals: 4.1%)**
- ◆ Hosni, A, M. Bleyer, M. Gelautz, C. Rhemann, "Local Stereo Matching Using Geodesic Support Weights", *IEEE International Conference on Image Processing (ICIP)*, 2009.
- ◆ Hosni A., M. Bleyer and M. Gelautz, "Image Segmentation Via Iterative Geodesic Averaging", *5th International Conference on Image and Graphics*, 2009. (Oral Presentation)
- ◆ Bleyer, M. and M. Gelautz, "Temporally Consistent Disparity Maps from Uncalibrated Stereo Videos", *Proceedings of the 6th International Symposium on Image and Signal Processing and Analysis (ISPA 2009)*, 2009. (Oral Presentation)
- ◆ Jordan, H., F. Seitner, M. Bleyer and M. Gelautz, "Runtime-Optimised Intra-4x4 Mode-Decision for H.264/AVC Video Encoding", *Proceedings of the 6th International Symposium on Image and Signal Processing and Analysis (ISPA 2009)*, 2009. (Oral Presentation)
- ◆ Bleyer, M., S. Chambon, U. Poppe and M. Gelautz, "Evaluation of Different Methods for Using Colour Information in Global Stereo Matching Approaches", *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, Vol. XXXVII, Part B3a, Pages 415-422, 2008. (Oral Presentation)
- ◆ Bleyer, M. and M. Gelautz, "Simple but Effective Tree Structures for Dynamic Programming-based Stereo Matching", *International Conference on Computer Vision Theory and Applications*, vol. 2, pp. 415-422, 2008. (Oral Presentation)

- ◆ Seitner F., M. Bleyer, R. Schreier and M. Gelautz, "Evaluation of Data-Parallel Splitting Approaches for H.264 Decoding", *Proceedings of the 6th International Conference on Advances in Mobile Computing and Multimedia*, 2008. (Oral Presentation)
- ◆ Seitner F., R. Schreier, M. Bleyer and M. Gelautz, "A High-Level Simulator for the H.264/AVC Decoding Process in Multi-Core Systems", *Proceedings of SPIE, Multimedia on Mobile Devices*, 2008. (Oral Presentation)
- ◆ Seitner, F., J. Meser, G. Schedelberger, A. Wasserbauer, M. Bleyer, M. Gelautz, M. Schutti, R. Schreier, P. Vaclavik, K. Krottendorfer, G. Truhlar, T. Bauernfeind and P. Beham: "Design Methodology for the SVENm Multimedia Engine", *Proceedings of the 16th Austrian Workshop on Microelectronics*, 2008.
- ◆ Seitner F., M. Bleyer and M. Gelautz, "Development of Multi-Core Video Decoding Platforms based on High-Level Architecture Simulations", *Proceedings of the JSC*, 2008.
- ◆ Seitner F., R. Schreier, M. Bleyer and M. Gelautz, "A Macroblock-Level Analysis on the Dynamic Behaviour of an H.264 Decoder", *Proceedings of International Symposium on Consumer Electronics*, 2007. (Oral Presentation)
- ◆ Bleyer, M., C. Rhemann and M. Gelautz, "Segmentation-based Motion with Occlusions using Graph-cut Optimization", *DAGM 2006, Lecture Notes in Computer Science 4174*, vol. 4174, pp. 465-474, 2006. (Oral Presentation)
- ◆ Rhemann C., M. Bleyer and M. Gelautz, "A Graph-based Approach to Optical Flow Estimation", *Proceedings of the JSC*, 2006.
- ◆ Bleyer, M. and M. Gelautz, "Graph-Based Surface Reconstruction from Stereo Pairs Using Image Segmentation", *SPIE Symposium on Electronic Imaging 2005 (Videometrics VIII)*, 2005. (Oral Presentation)
- ◆ Stavrakis E., M. Bleyer, D. Markovic and M. Gelautz, "Image-Based Stereoscopic Stylization"; *IEEE International Conference on Image Processing*, 2005.
- ◆ Bleyer, M., M. Gelautz and C. Rhemann, "Region-Based Optical Flow Estimation with Treatment of Occlusions", *Joint Hungarian-Austrian Conference on Image Processing and Pattern Recognition*, pp. 235-242, 2005. (Oral Presentation)
- ◆ Bleyer, M. and M. Gelautz, "A Layered Stereo Algorithm using Image Segmentation and Global Visibility Constraints", *IEEE International Conference on Image Processing (ICIP)*, pp. 2997-3000, 2004. (Oral Presentation; **Semi-Final IBM Best Student Paper Award**)
- ◆ Gelautz M., E. Stavrakis and M. Bleyer, "Stereo-Based Image and Video Analysis for Multimedia Applications", *The International Archives of Photogrammetry*, 2004.
- ◆ Bleyer, M. and M. Gelautz, "Video-Based 3D Reconstruction of Moving Scenes Using Multiple Stationary Cameras", *ÖAGM/AAPR*, 2003.

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**Review  
Activities**

- ◆ IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)
- ◆ International Journal of Computer Vision (IJCV)
- ◆ Computer Vision and Image Understanding (CVIU)
- ◆ SIGGRAPH Asia
- ◆ International Conference on Computer Vision (ICCV)
- ◆ British Machine Vision Conference (BMVC)
- ◆ IEEE Transactions on Multimedia
- ◆ International Conference on Pattern Recognition (ICPR)
- ◆ IEEE Transactions on Systems, Man and Cybernetics
- ◆ IEEE Transactions on Broadcasting
- ◆ Environmental Modelling & Software
- ◆ Image and Vision Computing
- ◆ Signal Processing: Image Communication
- ◆ Journal of Selected Topics in Signal Processing
- ◆ ACM Multimedia
- ◆ Neurocomputing
- ◆ EURASIP Journal on Advances in Signal Processing
- ◆ International Symposium on Image and Signal Processing and Analysis (ISPA) [Jointly Organized the Special Session on 3DTV with Margrit Gelautz in 2009]
- ◆ Conference on Mobile Computing and Multimedia (MoMM)
- ◆ Conference of the Austrian Association for Pattern Recognition (AAPR)

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**Teaching**

- ◆ VU Stereo Vision  
([http://www.ims.tuwien.ac.at/teaching\\_detail.php?ims\\_id=188.HQK](http://www.ims.tuwien.ac.at/teaching_detail.php?ims_id=188.HQK))

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**Awards and  
Special  
Achievements**

- ◆ Microsoft Visual Computing Award given to the best young Austrian researcher in the field of visual computing (2011)
- ◆ Prize for the Best Oral Presentation at the International Computer Vision Summer School (ICVSS) 2010.
- ◆ ISPRS Journal of Photogrammetry and Remote Sensing: Best Paper 2004 (Volume 59)
- ◆ PhD-thesis Award given by “Österreichischer Verband für Elektrotechnik”
- ◆ IEEE International Conference on Image Processing 2004: Semi-Final IBM Best Student Paper Award (12 Papers out of 154 Applications), Rated among the 10 Percent of the most Valuable Contributions
- ◆ Dr.techn. with Distinction
- ◆ Dipl.-Ing. with Distinction

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**Research  
Stays**

- ◆ Microsoft Research Cambridge (June and July 2011)
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Vienna, August 2011

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(Dipl.-Ing. Dr. Michael Bleyer)