

# SELIM BENHIMANE, DR., ENG.

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## WORK EXPERIENCE

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**Intel Corporation, California, USA**, Senior Computer Vision System Architect *April 2013 - Present*

- Definition of computer vision, augmented reality, and human computer interaction features for smartphone and tablet devices
- Development of the platform architecture for the features integration

**metaio GmbH, Germany**, Head of Research *September 2008 - February 2013*

- Development of core computer vision algorithms
- Optimization for computationally and memory restricted mobile devices
- Implementation of multi-platform localization and tracking technology
- Management of research projects
- Patents, scientific paper publications at international conference proceedings and journals

**Technical University of Munich, Germany**, Research Associate *November 2005 - August 2008*

- Head of the Computer Vision Group at the CAMPAR team
- Design of computer vision algorithms: simulations and prototypical implementations
- Scientific paper publications at international conference proceedings and journals
- Management of research projects
- Supervision of graduated student projects and co-supervision of Ph.D. students
- Teaching computer vision lectures

**INRIA Sophia Antipolis, France**, Research Assistant *March 2002 - October 2005*

- Final year internship and doctoral degree preparation at the ICARE team
- Design of computer vision and visual servoing algorithms: simulations and prototypical implementations
- Scientific paper publications at international conference proceedings and journals
- Experimental validation on robotic arm positioning and autonomous car driving (vision-based control)

**ABB Corporate Research, Billingstad, Norway**, Intern *August 2001 - September 2001*

- Feasibility study for Augmented Reality usage during visualization task
- Augmented Reality algorithms implemented in C/C++ and in OpenGL using ARToolkit
- Applications using an industrial robot arm

## EDUCATION

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**École Nationale Supérieure des Mines de Paris, France** *December 2006*

*Ph.D. Degree - Doctor in Science (Docteur en Sciences)*

Specialization: Real-time systems, Control and Robotics

Title: Toward a unified approach to real-time visual tracking and servoing

Passed with the highest distinction (mention Très Honorable et les Félicitations du Jury)

**Louis Pasteur University, Strasbourg, France** *September 2002*

*Postgraduate Advanced Diploma - Master of Philosophy*

Photonics, Imaging et Cybernetics - Specialization: Control and Vision

Passed with the highest distinction (mention Très Bien)

Ranked 1<sup>st</sup> over all specializations

**National School of Higher Education in Physics, Strasbourg, France** *September 2002*

*Engineering Degree*

Specialization: Engineering systems, Automation and Vision

**Lycée Pilote Bourguiba, Tunis, Tunisia** *June 1997*

*Baccalaureate in Mathematics (equivalent to 'A'-level)*

Passed with the highest distinction (mention Très Bien)

## AWARDS AND HONORS

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**Tracking Contest Prize**, International Symposium of Mixed and Augmented Reality (ISMAR) *October 2011*  
Winner of the ISMAR 2011 tracking contest with the metaio team

**Ph.D. Prize**, Federation of the French High Technology Associations (ASTI) *November 2007*  
Prize of the Best French Ph.D. of the two years 2005 and 2006 in Applied and Innovative Research

**Ph.D. Scholarship**, INRIA Sophia Antipolis *October 2002 - October 2005*

**University Scholarship**, Tunisian Government *September 1998 - September 2002*

## SKILLS

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**Programming:** C, C++, Matlab, Octave, Scilab, Maple, OpenGL, Java, Basic, Pascal, Javascript, HTML, L<sup>A</sup>T<sub>E</sub>X

**Operating Systems:** Linux, MS Windows, Mac OS X, Dos.  
Real-time OS Linux RTAI and VxWorks. Attended Linux Applications and Real-Time Kernels courses by AVOLYS Sophia-Antipolis

**Languages:** English (fluent), French (native), Arabic (native), German (proficient), Italian (basic)

## HOBBIES

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**Leisure:** High tech in general, former member of a Robotics Club (PoBot Club Sophia Antipolis)

**Sports:** Basketball (basketball team leader during the engineering school period), tennis, table tennis, chess

## EDITORIAL AND CONFERENCE DUTIES

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Co-chair and organizer of the *Tracking Method and Application Workshop* at the International Symposium on Mixed and Augmented Reality in 2012

Co-chair and organizer of the *TrakMark Workshop* at the International Symposium on Mixed and Augmented Reality in 2011

Member of the Science and Technology Program Committee of the International Symposium on Mixed and Augmented Reality in 2010 and 2011

Co-chair and organizer of the *Workshop on Industrial Augmented Reality: Needs and Solutions* at the International Symposium on Mixed and Augmented Reality in 2008

Co-chair and organizer of the *Tutorial on Rigid and Deformable Tracking using Markers or Scene Features* at the International Symposium on Mixed and Augmented Reality in 2007

## PATENTS

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S. BenHimane, S. Hintestroisser, N. Navab: Computer vision CAD models. EP2201495, US/2010/0259537, PCT/EP2008/063640, WO/2009/047335

S. BenHimane: Method for determining the pose of a camera with respect to at least one real object. EP2382599, US/2012/0120199, PCT/EP2009/005495, WO/2011/012142

P. Meier, S. BenHimane, S. Misslinger, B. Blachnitzky: Methods and systems for determining the pose of a camera with respect to at least one object of a real environment. EP2396767, US/2010/0208057, PCT/EP2010/000882, WO/2010/091875

D. Kurz, S. BenHimane: Method of providing a descriptor for at least one feature of an image and method of matching features. EP2491529, US/2012/0219188, PCT/EP2010/057461, WO/2011/047888

S. BenHimane, S. Lieberknecht: Method for determining a parameter set designed for determining the pose of a camera and/or for determining a three-dimensional structure of the at least one real object. PCT/EP2010/007831, WO/2012/083982

S. BenHimane, D. Ulbricht: Method for determining correspondences between a first and a second image, and method for determining the pose of a camera. PCT/EP2011/051142, WO/2012/100829

S. BenHimane and D. Ulbricht: Method of determining reference features for use in an optical object initialization tracking process and object initialization tracking method. EP2339537, US/2011/0194731

S. BenHimane, D. Kurz: Method for registering at least one part of a first and second image using a collineation warping function. PCT/EP2011/054456, WO/2012/126522

S. BenHimane, S. Lieberknecht, A. Huber, Method for estimating a camera motion and for determining a three-dimensional model of a real environment, PCT/EP2011/065007, WO/2013/029675

## PUBLICATIONS

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D. Kurz, T. Olszamowski, S. BenHimane

*Representative Feature Descriptor Sets for Robust Handheld Camera Localization*

In Proc. IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR2012), Atlanta, Georgia, USA, 2012

D. Kurz, S. BenHimane

*Handheld Augmented Reality involving gravity measurements*

In Computers and Graphics, Special Section on Augmented Reality, pp. 866-883, November 2012 (Volume 36, Issue 7)

S. Lieberknecht, A. Huber, S. Ilic, S. BenHimane

*RGB-D Camera-Based Parallel Tracking and Meshing*

The 10th IEEE and ACM International Symposium on Mixed and Augmented Reality, Basel, Switzerland, Oct. 26 - 29, 2011

D. Kurz, S. BenHimane

*Gravity-Aware Handheld Augmented Reality*

In Proc. IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR2011), pp. 111-120, Basel, Switzerland, 2011.

D. Kurz, S. Lieberknecht, S. BenHimane

*Benchmarking Inertial Sensor-Aided Localization and Tracking Methods*

The 2nd International Workshop on AR/MR Registration, Tracking and Benchmarking (TrakMark2011), Basel, Switzerland, Oct. 25, 2011

D. Kurz, S. BenHimane

*Inertial sensor-aligned visual feature descriptors*

In Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR2011), pp. 161-166, Colorado Springs, USA, 2011

S. Hinterstoisser, V. Lepetit, S. BenHimane, P. Fua, N. Navab

*Learning Real-Time Perspective Patch Rectification*

International Journal of Computer Vision (IJCV), Springer Verlag, The final publication is available at [www.springerlink.com](http://www.springerlink.com)

S. Lieberknecht, S. BenHimane, S. Ilic

*Simultaneous Reconstruction and Tracking of non-planar Templates*

33rd Annual Symposium of the German Association for Pattern Recognition, Frankfurt am Main, Germany, August 30th - September 2nd 2011

S. Lieberknecht, S. BenHimane, P. Meier, N. Navab

*Benchmarking Template-based Tracking Algorithms*

International Journal of Virtual Reality, Volume 15, Issue 2-3, pages 99-108, June 2011

Sebastian Lieberknecht, Quintus Stierstorfer, Georg Kuschik, Daniel Ulbricht, Marion Langer, Selim BenHimane

*Evolution of a Tracking System*

Handbook of Augmented Reality, Springer, pages 355-377, 2011

M. Langer, S. BenHimane

*An Interactive Vision-based 3D Reconstruction Workflow for Industrial AR Applications*

ISMAR Workshop on Augmented Reality Super Models, October 2010

S. BenHimane

*Asservissement visuel 2D direct. Un asservissement visuel basé sur l'homographie*  
Techniques et Sciences Informatiques, Volume 29/1 - pages 31-54, 2010

P. Georgel, S. BenHimane, J. Sotke, N. Navab

*Recovering the Full Pose from a Single Keyframe*

IEEE Workshop on Applications of Computer Vision (WACV) , Snowbird, Utah, USA, December 7-8 2009

S. Lieberknecht, S. BenHimane, P. Meier, N. Navab

*A Dataset and Evaluation Methodology for Template-based Tracking Algorithms*

The 8th IEEE and ACM International Symposium on Mixed and Augmented Reality, Orlando, US, Oct. 19 - 22, 2009

P. Georgel, S. BenHimane, J. Sotke, N. Navab

*Photo-based Industrial Augmented Reality Application Using a Single Keyframe Registration Procedure*

The 8th IEEE and ACM International Symposium on Mixed and Augmented Reality, Orlando, US, Oct. 19 - 22, 2009

C. Unger, S. BenHimane, E. Wahl, N. Navab

*Efficient Disparity Computation without Maximum Disparity for Real-Time Stereo Vision*

British Machine Vision Conference (BMVC), London (UK), September 7-10, 2009

L. Wang, J. Traub, S.M. Heining, S. BenHimane, R. Graumann, E. Euler, N. Navab

*Long Bone X-ray Image Stitching using C-arm Motion Estimation*

Proceedings of Bildverarbeitung fuer die Medizin (BVM 2009), Heidelberg, Germany, March 22-24 2009

C. Mei, S. BenHimane, E. Malis and P. Rives

*Efficient homography-based tracking and 3D reconstruction for single viewpoint sensors*

IEEE Transactions on Robotics, Volume 24, Number 4, pages 1352-1364, 2008

P. Georgel, P. Schroeder, S. BenHimane, M. Appel, N. Navab

*How to Augment the Second Image? Recovery of the Translation Scale in Image to Image Registration*

The 7th IEEE and ACM International Symposium on Mixed and Augmented Reality, Cambridge, UK, Sept. 15 - 18, 2008.

S. Hinterstoisser, S. BenHimane, V. Lepetit, P. Fua, N. Navab

*Simultaneous Recognition and Homography Extraction of Local Patches with a Simple Linear Classifier*

British Machine Vision Conference (BMVC), Leeds (UK), September 1-4, 2008

A. Ladikos, S. BenHimane, N. Navab

*High Performance Model-Based Object Detection and Tracking*

Computer Vision and Computer Graphics. Theory and Applications, Communications in Computer and Information Science, Vol. 21, Springer, 2008

A. Ladikos, S. BenHimane, N. Navab

*Multi-View Reconstruction using Narrow-Band Graph-Cuts and Surface Normal Optimization*

British Machine Vision Conference (BMVC), Leeds (UK), September 1-4, 2008

P. Georgel, S. BenHimane, N. Navab

*A Unified Approach Combining Photometric and Geometric Information for Pose Estimation*

British Machine Vision Conference (BMVC), Leeds (UK), September 1-4, 2008

L. Wang, J. Traub, S.M. Heining, S. BenHimane, R. Graumann, E. Euler, N. Navab

*Long Bone X-ray Image Stitching Using Camera Augmented Mobile C-arm*

Medical Image Computing and Computer-Assisted Intervention, MICCAI, 2008, New York, USA, September 6-10 2008

A. Ladikos, S. BenHimane, N. Navab

*Real-time 3D Reconstruction for Collision Avoidance in Interventional Environments*

Medical Image Computing and Computer-Assisted Intervention, MICCAI, 2008, New York, USA, September 6-10 2008

S. Atasoy, D. Noonan, S. BenHimane, N. Navab, G. Z. Yang

- A Global Approach for Automatic Fibroscopic Video Mosaicing in Minimally Invasive Diagnosis*  
 Medical Image Computing and Computer-Assisted Intervention, MICCAI, 2008, New York, USA, September 6-10 2008
- A. Ladikos, S. BenHimane, N. Navab  
*Efficient Visual Hull Computation for Real-Time 3D Reconstruction using CUDA*  
 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, Anchorage, Alaska (USA), June 2008. Workshop on Visual Computer Vision on GPUs (CVGPU)
- S. Hinterstoisser, S. BenHimane, N. Navab, P. Fua, V. Lepetit  
*Online Learning of Patch Perspective Rectification for Efficient Object Detection*  
 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, Anchorage, Alaska (USA), June 2008.
- R. Lasowski, S. BenHimane, J. Vogel, T. F. Jakobs, C. J. Zech, C. Trumm, M. Brokate, N. Navab  
*Adaptive visualization using the annealing M-estimator*  
 Workshop Bildverarbeitung für die Medizin, Berlin, Germany, April 6-8, 2008
- R. Lasowski, S. BenHimane, J. Vogel, T. F. Jakobs, C. J. Zech, C. Trumm, Ch. Clason, N. Navab  
*Adaptive visualization for needle guidance in RF Liver Ablation: taking organ deformation into account*  
 SPIE Medical Imaging, San Diego, California, USA, February 2008
- A. Ladikos, S. BenHimane, M. Appel, N. Navab  
*Model-Free Markerless Tracking for Remote Support in Unknown Environments*  
 International Conference on Computer Vision Theory and Applications, Funchal, Portugal, January 2008.
- S. BenHimane, H. Najafi, M. Grundmann, E. Malis, Y. Genc, N. Navab  
*Real-time object detection and tracking for industrial applications*  
 International Conference on Computer Vision Theory and Applications, Funchal, Portugal, January 2008.
- P. Georgel, P. Schroeder, S. BenHimane, S. Hinterstoisser, M. Appel, N. Navab  
*An Industrial Augmented Reality Solution For Discrepancy Check*  
 Proceedings of the International Symposium on Mixed and Augmented Reality (ISMAR), Nara, Japan, November 2007
- S. Hinterstoisser, S. BenHimane, N. Navab  
*N3M: Natural 3D Markers for Real-Time Object Detection and Pose Estimation*  
 IEEE International Conference on Computer Vision, Rio de Janeiro, Brazil, October 2007
- S. BenHimane, E. Malis  
*Homography-based 2D Visual Tracking and Servoing*  
 International Journal of Computer Vision, Special Joint Issue IJCV/IJRR on Robot and Vision, July 2007
- S. BenHimane, A. Ladikos, V. Lepetit, N. Navab  
*Linear and Quadratic Subsets for Template-Based Tracking*  
 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, Minneapolis, Minnesota, June 2007
- T. Klein, S. BenHimane, J. Traub, S.M. Heining, E. Euler, N. Navab  
*Interactive Guidance System for C-arm Repositioning without Radiation*  
 Proceedings of Bildverarbeitung für die Medizin, Munich, Germany, March 2007
- A. Ladikos, S. BenHimane, N. Navab  
*A Real-Time Tracking System Combining Template-Based and Feature-Based Approaches*  
 International Conference on Computer Vision Theory and Applications, Barcelona, Spain, March 2007
- S. BenHimane, E. Malis  
*Integration of Euclidean constraints in template-based visual tracking of piecewise-planar scenes*  
 IEEE/RSJ International Conference on Intelligent Robots Systems, Beijing, China, October 2006
- C. Mei, S. BenHimane, E. Malis, P. Rives  
*Homography-based Tracking for Central Catadioptric Cameras*  
 IEEE/RSJ International Conference on Intelligent Robots Systems, Beijing, China, October 2006

- N. Navab, S. Wiesner, S. BenHimane, E. Euler, S.M. Heining  
*Visual Servoing for Intraoperative Positioning and Repositioning of Mobile C-arms*  
Proceedings of Medical Image Computing and Computer-Assisted Intervention, Copenhagen, Denmark,  
October 2006
- C. Mei, S. BenHimane, E. Malis, P. Rives  
*Constrained Multiple Planar Template Tracking for Central Catadioptric Cameras*  
British Machine Vision Conference, Edinburgh, UK, September 2006
- S. BenHimane, E. Malis  
*A new approach to vision-based robot control with omni-directional cameras*  
IEEE International Conference on Robotics and Automation, Orlando, USA, May 2006
- S. BenHimane, E. Malis  
*Homography-based 2D Visual Servoing*  
IEEE International Conference on Robotics and Automation, Orlando, USA, May 2006
- S. BenHimane, E. Malis  
*A Direct Approach for 2D Visual Servoing*  
15<sup>th</sup> French-speaking Congress AFRIF-AFIA of Pattern Recognition and Artificial Intelligence, Toulouse,  
France, January 2006
- E. Malis, S. BenHimane  
*A unified approach to visual tracking and servoing*  
Journal of Robotics and Autonomous Systems, vol. 52, issue 1, pp. 39-52, July 2005.
- S. BenHimane, E. Malis, P. Rives, J. R. Azinheira  
*Vision-based Control for Car Platooning using Homography Decomposition*  
IEEE International Conference on Robotics and Automation, Barcelona, Spain, April 2005
- S. BenHimane, E. Malis  
*Real-time image-based tracking of planes using efficient second-order minimization*  
IEEE/RSJ International Conference on Intelligent Robots and Systems, vol. 1, pp. 943-948, Sendai, Japan,  
October 2004
- S. BenHimane, E. Malis  
*Self-calibration of the distortion of a zooming camera by matching points at different resolutions*  
IEEE/RSJ International Conference on Intelligent Robots and Systems, vol. 2, pp. 2307-2312, Sendai, Japan,  
October 2004
- E. Malis, S. BenHimane  
*A unified framework for real-time visual tracking and servoing*  
Workshop in Advances in Robot Vision - From Domestic Environments to Medical Applications, Sendai,  
Japan, October 2004
- S. BenHimane, E. Malis  
*Matching images at different resolutions using intrinsics-free measures*  
14<sup>th</sup> French-speaking Congress AFRIF-AFIA of Pattern Recognition and Artificial Intelligence, Toulouse,  
France, January 2004
- S. BenHimane, E. Malis  
*Vision-based control with respect to planar and non-planar objects using a zooming camera*  
IEEE International Conference on Advanced Robotics, vol. 2, pp. 991-996, Coimbra, Portugal, July 2003