

Bogdan Georgescu



CONTACT INFORMATION

Siemens Corporate Research
Integrated Data Systems Department
755 College Road East
Princeton, NJ 08540 USA

Phone: (609) 734-3594
Cell: (732) 407-8384
Fax: (609) 734-6565
E-mail: BogdanDOTGeorgescuATsiemens DOT com
budagogATgmail DOT com

EDUCATION

Rutgers University, September 1998 - May 2004

Ph.D., Division of Computer & Information Sciences, May 2004

Dissertation: "Interpretation of the 3D Visual Environment from Uncalibrated Image Sequences"

Advisor: Professor Peter Meer

GPA: 4.0/4.0

M.Sci., Computer Science, May 2001

Essay: "Improved Method for Reconstruction from Uncalibrated Views"

GPA: 4.0/4.0

Course Work: Foundations of Computer Science, Pattern Recognition, Design and Analysis of Data Structures and Algorithms, Linear Programming, Computational Geometry, Parallel Computation: Algorithms and Complexity, Image Understanding, Machine Learning, Robust Computer Vision, Numerical Analysis, Topics in Computers in Biomedicine, Principles of AI.

Polytechnic University of Bucharest, September 1991 - July 1997

M. Sci. in Applied Electronics and Information Theory, July 1997

Department of Electronics and Telecommunications

Thesis: "Neural Model for Compression of Image Sequences"

Graduating Mark: 10.0/10.0

B. S., in Applied Electronics and Information Theory, July 1996

Department of Electronics and Telecommunications

Thesis: "A Neural Approach to Face Recognition"

Graduating Mark: 9.79/10.0

RESEARCH INTERESTS

Robust Computer Vision, Structure from Motion, Image Understanding, Machine Learning, Information Fusion, Object Detection and Tracking.

HONORS AND AWARDS

Rated "outstanding" (2004, 2005, 2006, 2007) by Siemens SCR senior management

1991 to 1997 - Government Merit Scholarship awarded to the top 1% of the students in Romania

First prize at the Student Workshop'96, Department of Applied Electronics and Information Engi-

neering, Polytechnic University of Bucharest.

Honorable mention in the 1987 National Physics Olympics, Romania.

PROFESSIONAL
EXPERIENCE

Senior Research Scientist

October, 2008 - present

Project Manager

October, 2005 - October, 2008

Integrated Data Systems Department, Siemens Corporate Research, Princeton, NJ. Provide robust solutions for advanced cardiac quantification with applications to 2D/3D/4D echocardiography, 4D CT and 4D MR. Formulate a new learning based approach to segmentation which uses expert knowledge embedded in large annotated medical databases. Push database-guided solutions for a wide range of medical applications such as catheter detection and tracking in angiography, tumor characterization in radiation therapy for oncology, automatic fetal measurements in ultrasound and semantic indexing of medical images.

Member of Technical Staff

January, 2004 - September, 2005

Integrated Data Systems Department, Siemens Corporate Research, Princeton, NJ. Emphasis on robust statistical methods for real-time vision systems with focus on medical applications. Work on real-time detection, tracking and quantification of myocardial wall motion in ultrasound image sequences. Developed algorithms for adaptive appearance modeling for object tracking with occlusion modeling.

Graduate Research Assistant

September 1998 - May, 2004

Center for Advanced Information Processing (CAIP), Rutgers University, Piscataway, NJ. Work in Robust Image Understanding Laboratory (RIUL) (www.caip.rutgers.edu/riul) with Prof. Peter Meer to investigate the use of robust methods in structure from motion problems. Implementation of an automatic system for recovery of 3D structure and camera motion from uncalibrated image sequences. Initial estimation is solved with the HEIV method accounting for point dependent noise. Design of a robust algorithm for camera calibration and lens distortion correction based on analysis of line parametric space. Reformulation of image filtering as vector space projection with application to confidence based edge detection and image segmentation (EDISON system). Detection of interest point correspondences by combining the traditional optical flow with matching color distributions estimated with oriented kernels, achieving subpixel accuracy under large image transformations. (Includes current Ph.D. research, Ph.D. and Masters level coursework and research/consulting projects). Other Projects:

Object Recognition System. Extraction and grouping of surface and shape features from coupled range/color images. Graph modeling and matching for object correspondences, identity and location.

Protein Structure Characterization by Distance Feature Vectors. Correlation with Secondary Structure. (Presented at Computer Science Open House, Rutgers University, 2001). A new labeling scheme is derived based on clustering feature vectors extracted from distance matrices. The new representation is put in correspondence with the secondary structure of proteins.

Computer Consultant and Engineer

September 1993 - June 1998

Amerilex S.R.L, Bucharest, Hewlett-Packard Authorized Support Provider and Corporate Account Reseller in Romania. Work in deploying and administration of computer networks; Networked Systems Professional Certificate from Hewlett-Packard.

PUBLICATIONS

Journal

R. I. Ionasec, I. Voigt, **B. Georgescu**, Y. Wang, H. Houle, F. Vega-Higuera, N. Navab, D. Comaniciu, "Patient-Specific Modeling and Quantification of the Aortic and Mitral Valves from 4D Cardiac CT and TEE, IEEE", *Transactions on Medical Imaging*, (Accepted in April, 2010).

I. Zalud, S. Good, G. Carneiro, **B. Georgescu**, K. Aoki, L. Green, F. Shahrestani, R. Okumura, “Fetal biometry: a comparison between experienced sonographers and automated measurements”, *The Journal of Maternal-Fetal and Neonatal Medicine*, 22:43–50, Issue 1, 2009.

Y. Zheng, A. Barbu, **B. Georgescu**, Michael Scheuering, and D. Comaniciu, “Four-Chamber Heart Modeling and Automatic Segmentation for 3D Cardiac CT Volumes Using Marginal Space Learning and Steerable Features”, *IEEE Transactions on Medical Imaging*, 11:1668–1681, November 2008.

G. Carneiro, **B. Georgescu**, S. Good, D. Comaniciu, “Detection of Fetal Anatomies from Ultrasound Images using a Constrained Probabilistic Boosting Tree”, *IEEE Transactions on Medical Imaging Journal (TMI)*, 9:1342–1355, September 2008.

B. Georgescu, P. Meer, “Point Matching Under Large Image Deformations and Illumination Changes”. *IEEE Trans. Pattern Anal. Machine Intell.*, 26:674–689, June 2004.

P. Meer and **B. Georgescu**, “Edge Detection with Embedded Confidence”, *IEEE Trans. Pattern Anal. Machine Intell.*, 23:1315–1365, December 2001.

Peer Reviewed Conferences

Y. Wang, **B. Georgescu**, D. Comaniciu, H. Houle, “Learning-Based 3D Myocardial Motion Flow Estimation Using High Frame Rate Volumetric Ultrasound Data”, *IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI)*, Rotterdam, The Netherlands, April 2010.

V. Mihalef, R. Ionasec, Y. Wang, Y. Zheng, **B. Georgescu**, D. Comaniciu, “Patient-Specific Modeling of Left Heart Anatomy, Dynamics and Hemodynamics from High Resolution 4D CT” *IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI)*, Rotterdam, The Netherlands, April 2010.

I. Voigt, D. Vitanovski, R. I. Ionasec, A. Tsymbal, **B. Georgescu**, K. Zhou, M. Huber, N. Navab, J. Hornegger, D. Comaniciu, “Learning discriminative distance functions for valve retrieval and improved decision support in valvular heart disease”, *SPIE Medical Imaging*, 2010, San Diego, USA, February 2010.

S. Grbic, R. I. Ionasec, Y. Zheng, D. Zaeuner, **B. Georgescu**, D. Comaniciu “Aortic Valve and Ascending Aortic Root Modeling from 3D and 3D+t CT”, *SPIE Medical Imaging*, 2010, San Diego, USA, February 2010.

R. I. Ionasec, Y. Wang, **B. Georgescu**, I. Voigt, N. Navab, D. Comaniciu “Robust Motion Estimation Using Trajectory Spectrum Learning: Application to Aortic and Mitral Valve Modeling from 4D TEE”, *International Conference on Computer Vision (ICCV)*, Kyoto, Japan, September 2009.

D. Vitanovski, R. I. Ionasec, **B. Georgescu**, M. Huber, R. Taylor, J. Hornegger, D. Comaniciu, “Personalized pulmonary trunk modeling for intervention planning and valve assessment estimated from CT data”, *Medical Image Computing and Computer Assisted Intervention (MICCAI)*, London, UK, September 20-24 2009.

R. I. Ionasec, I. Voigt, **B. Georgescu**, H. Houle, J. Hornegger, N. Navab, D. Comaniciu, “Modeling and assessment of the Aortic-Mitral valve coupling from 4D TEE and CT”, *Medical Image Computing and Computer Assisted Intervention (MICCAI)*, London, UK, September 20-24 2009 - BEST SESSION POSTER AWARD.

X. Lu, **B. Georgescu**, D. Comaniciu, “Discriminative Joint Context for Automatic Landmark Set Detection from a Single Cardiac MR Long Axis Slice”, *Functional Imaging and Modeling of the*

Heart (FIMH), LNCS 5528, pp. 457-465, Nice, France, June 2009.

Y. Zheng, X. Lu, **B. Georgescu**, A. Littmann, E. Mueller, D. Comaniciu, “Robust Object Detection Using Marginal Space Learning and Ranking-Based Multi-Detector Aggregation: Application to Left Ventricle Detection in 2D MRI Images”, Proc. IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR), June 2009.

I. Voigt, R. I. Ionasec, **B. Georgescu**, H. Houle, M. Huber, J. Hornegger, D. Comaniciu “Model-driven physiological assessment of the mitral valve from 4D TEE”, SPIE Medical Imaging 2009, Orlando, USA, February 2009.

R. I. Ionasec, A. Tsymbal, D. Vitanovski, **B. Georgescu**, K. Zhou, N. Navab, D. Comaniciu, “Shape-based diagnosis of the aortic valve”, SPIE Medical Imaging, 2009, Orlando, USA, February 2009.

Y. Zheng, X. Lu, **B. Georgescu**, A. Littmann, E. Mueller, and D. Comaniciu, “Automatic Left Ventricle Detection in MRI Images Using Marginal Space Learning and Component-Based Voting”, Proc. SPIE Medical Imaging, February 2009.

H. Houle, S. Liu, A. Nitunu, T. Van Houten, **B. Georgescu**, Y. Wang, C. Duong, T. Sockeel, S. Datta, M. E. Orsinelli, T. Ryan, M. Vannan, “Automated Quantification of Volume Myocardial Mechanics By Transthoracic Real-Time Volume Imaging: Initial Clinical Experience”, ASE 20th Annual Scientific Sessions, February 2009.

J. Choi, **B. Georgescu**, R. I. Ionasec, S. Raman, G. Hong, S. Liu, H. Houle, M. A. Vannan, “Novel Semi-Automatic Quantitative Assessment of The Aortic Valve and Aortic Root from Volumetric 3D Echocardiography: Comparison to Volumetric Cardiac Computed Tomography (CT)”, American Heart Association Scientific Sessions, AHA, New Orleans, USA, November 2008.

E. Gassner, R. I. Ionasec, **B. Georgescu**, S. Vogt, U. J. Schoepf, D. Comaniciu, “Performance of a Dynamic Aortic Valve Model for Quantification of the Opening Area at Cardiac MDCT. Comparison to Manual Planimetry”, Radiological Society of North America, RSNA, 2008, Chicago, USA, November 2008.

R. I. Ionasec, **B. Georgescu**, D. Comaniciu, S. Vogt, U. J. Schoepf, E. Gassner, “Patient Specific 4D Aortic Root Models Derived from Volumetric Image Data Sets”, Radiological Society of North America, RSNA, 2008, Chicago, USA, November 2008.

Y. Zheng, X. Lu, **B. Georgescu**, A. Littmann, E. Mueller, D. Comaniciu, “Automatic Left Ventricle Detection in MRI Images Using Marginal Space Learning and Component-Based Voting”, SPIE Medical Imaging, 2009.

Y. Zheng, **B. Georgescu**, M. Scheuring, D. Comaniciu, “Left Ventricle Endocardium Segmentation for CT Volumes Using an Optimal Smooth Surface”, SPIE Medical Imaging, 2009.

H. Ling, S. K. Zhou, Y. Zheng, **B. Georgescu**, M. Suehling, D. Comaniciu, “Hierarchical, Learning-based Automatic Liver Segmentation”, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Anchorage, Alaska, June 2008.

L. Yang, **B. Georgescu**, Y. Zheng, P. Meer, D. Comaniciu, “3D Ultrasound Tracking of the Left Ventricles Using One-Step Forward Prediction and Data Fusion of Collaborative Trackers”, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Anchorage, Alaska, June 2008.

G. Carneiro, F. Amat, **B. Georgescu**, S. Good, D. Comaniciu, “Semantic-based Indexing of Fetal

Anatomies from 3-D Ultrasound Data Using Global/Semi-local Context and Sequential Sampling”, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Anchorage, Alaska, June 2008.

L. Yang, **B. Georgescu**, Y. Zheng, D. J. Foran, D. Comaniciu, “A Fast and Accurate Tracking Algorithm of the Left Ventricle in 3D Echocardiography”, 5th IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI), Paris, France, May 2008.

X. Lu, **B. Georgescu**, Y. Zheng, J. Otsuki, D. Comaniciu, “Automatic Detection of Standard Planes in 3D Echocardiography”, 5th IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI), Paris, France, May 2008.

Y. Zheng, A. Barbu, **B. Georgescu**, M. Scheuering, D. Comaniciu, “Four-Chamber Heart Modeling and Automatic Segmentation for 3D Cardiac CT Volumes”, SPIE Symposium on Medical Imaging, San Diego California, February 2008, (oral presentation).

Y. Zheng, A. Barbu, **B. Georgescu**, M. Scheuering, D. Comaniciu, “Fast Automatic Heart Chamber Segmentation from 3D CT Data Using Marginal Space Learning and Steerable Features”, 11th International Conference on Computer Vision (ICCV), Rio de Janeiro, Brazil, October 2007 (oral presentation).

G. Carneiro, **B. Georgescu**, S. Good, D. Comaniciu, “Automatic Fetal Measurements in Ultrasound Using Constrained Probabilistic Boosting Tree”, Proc. of Medical. Image Computing and Computer Assisted Intervention (MICCAI), Brisbane, Australia, October 2007.

A. Barbu, V. Athitsos, **B. Georgescu**, S. Boehm, P. Durlak, D. Comaniciu, “Hierarchical Learning of Curves: Application to Guidewire Localization in Fluoroscopy”, IEEE Conf. Computer Vision and Pattern Recognition (CVPR), pp. 1–8, Minneapolis, MN, 2007 (oral presentation).

S. K. Zhou, J. Shao, **B. Georgescu**, D. Comaniciu, R. Chellappa, “Pairwise Active Appearance Model and its Application to Echocardiography Tracking”, Proc. of Medical Image Computing and Computer Assisted Intervention (MICCAI), pp. 736–743, Copenhagen, Denmark, October 2006, (oral presentation).

J. Xiao, **B. Georgescu**, S. Zhou, D. Comaniciu, T. Kanade, “Simultaneous Registration and Modeling of Deformable Shapes”, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), vol.2, pp. 2429–2436, New York, NY, June 2006.

X. S. Zhou, J. H. Park, **B. Georgescu**, C. Simopoulos, J. Otsuki, D. Comaniciu, “Image-based Multiclass Boosting and Echocardiographic View Classification”, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), vol.2, pp. 1559–1565, New York, NY, June 2006.

X. S. Zhou, J. Shao, **B. Georgescu**, D. Comaniciu, “BoostMotion: Boosting a Discriminative Similarity Function for Motion Estimation, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), vol.2, pp. 1761–1768, New York, NY, June 2006, (oral presentation).

W. Hong, **B. Georgescu**, X. S. Zhou, S. Krishnan, Y. Ma, D. Comaniciu, “Database-Guided Simultaneous Multi-slice 3D Segmentation for Volumetric Data”, 9th European Conference on Computer Vision, (ECCV), IV:pp. 397–409 Graz, Austria, May 2006.

Y. Zheng, X. S. Zhou, **B. Georgescu**, S. Zhou, D. Comaniciu, “Example Based Non-rigid Shape Detection”, 9th European Conference on Computer Vision, (ECCV), IV:pp. 423–436, Graz, Austria, May 2006.

B. Georgescu, X. S. Zhou, D. Comaniciu, B. Rao, “Database-Guided Segmentation of Anatomical Structures with Complex Appearance”, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 429–436, San Diego, CA, June 2005, (oral presentation).

S. K. Zhou, **B. Georgescu**, X. S. Zhou, D. Comaniciu, “Image Based Regression Using Boosting Method”, 10th International Conference on Computer Vision (ICCV), pp. 541–548, Beijing, China, October 2005.

Alan S. Katz, Sriram Krishnan, Xiang Zhou, **Bogdan Georgescu**, Michael Gera, Dorin Comaniciu, Jinbo Bi, Glenn Fung, Jianming Liang, Bharat Rao, Roger Grimson, Nathaniel Reichek, “Clinical Evaluation of a Novel Automatic Real-Time Myocardial Tracking and Wall Motion Scoring Algorithm for Echocardiography Introduction” oral abstract, American College of Cardiology Annual Scientific Session, Orlando, Florida, March 2005 (oral presentation).

W. Chen, P. Meer, **B. Georgescu**, W. Hei, L. A. Goodell, D. J. Foran, “Image mining for investigative pathology. Using optimized feature extraction and data fusion”, Computer Methods and Programs in Biomedicine, 79:59–72, May 2005.

B. Georgescu, X. S. Zhou, D. Comaniciu, B. Rao, “Real-Time Multi-Model Tracking of Myocardium in Echocardiography using Robust Information Fusion”, Proc. of Medical. Image Computing and Computer Assisted Intervention (MICCAI), pp. 777–785, Rennes, Saint-Malo, France, September 2004.

B. Georgescu, D. Comaniciu, T. X. Han, S. Zhou, “Multi-Model Component-Based Tracking using Robust Information Fusion”, 2nd Workshop on Statistical Methods in Video Processing, Prague, Czech Republic, May 2004.

B. Georgescu, I. Shimshoni and P. Meer, “Mean Shift Based Clustering in High Dimensions: A Texture Classification Example”, 9th International Conference on Computer Vision, pp. 456–463, Nice, France, October 2003.

B. Georgescu and P. Meer, “Balanced Recovery of 3D Structure and Camera Motion from Uncalibrated Image Sequences”, 7th European Conference on Computer Vision, Vol. II, pp. 294–308, Copenhagen, Denmark, May 2002.

C. M. Christoudias, **B. Georgescu**, P. Meer, “Synergism in Low Level Vision”, 16th International Conference on Pattern Recognition, Vol. IV, pp. 150–155, Quebec City, Canada, August 2002.

B. Matei **B. Georgescu** and P. Meer, “A Versatile Method for Trifocal Tensor Estimation”, 8th International Conference on Computer Vision, Vol. II, pp. 578–585, Vancouver, BC, Canada, July 2001.

K. Xu, **B. Georgescu**, D. Comaniciu, P. Meer, “Performance Analysis in Content-Based Retrieval with Textures”, 15th International Conference on Pattern Recognition, Vol IV, pp. 275–278, Barcelona, Spain, September 2000.

D. Comaniciu, **B. Georgescu**, P. Meer, W. Chen, D. Foran, “Decision Support System for Multiuser Remote Microscopy in Telepathology”, Proc. 12th IEEE Symposium on Computer-Based Medical Systems, Stamford, CT, June 1999.

V.E. Neagoe and **B. Georgescu**, “A Neural Vector Quantization for Image Sequence Compression”, Real World Application of Intelligent Technologies, Proc. of Romanian-German Workshop, Bucharest, 1997.

B. Georgescu and B. Iordanescu, a series of 4 articles about advanced applications in Z80 assembly language (in romanian), "PC Magazin", no. 4/1990, no. 1/1991, no. 2/1991, no. 3/1991.

OTHER

Reviewer:

IEEE Trans. Pattern Analysis and Machine Intelligence

IEEE Trans. on Image Processing

IEEE Trans. on Biomedical Engineering

IEE Electronic Letters

IEEE Signal Processing Letters

Image and Vision Computing Journal

IEEE International Conf. on Computer Vision 2001, 2003, 2005, 2007

European Conf. on Computer Vision 2002

IEEE Computer Society Workshop on Motion and Video Computing 2005

IEEE Conf. on Computer Vision and Pattern Recognition 2003, 2004, 2005, 2006, 2007

International Symposium on Visual Computing 2005.

Program Committee Member:

IEEE Computer Society Workshop on Motion and Video Computing 2005

International Symposium on Visual Computing 2005

IEEE Conf. on Computer Vision and Pattern Recognition 2006.

Patents: 8 Patents Granted; 50 Patent Applications (registered with Siemens/US patent office).

COMPUTER SKILLS

Languages: [Current] C/C++, MATLAB, [Past] Java, Prolog, Lisp, x86 assembly, TMS320C50, Z80.

Operating Systems: Unix/Linux, Windows.

LANGUAGES

Romanian (native), English (fluent), French (proficient).