

EDUCATION

- PhD**, GPA: 3.95 January 2012
 Scientific Computing and Imaging Institute, University of Utah
 Dissertation Title: Nonparametric Models for High-Dimensional Data Analysis
 Dissertation Advisor: Ross T. Whitaker
 Committee Members: Tolga Tasdizen, Hal Daumé III, Sarang C. Joshi, Davar Khoshnevisan
- Engineer Computer Science**, GPA: 3.71 Fall 2004
 University of Applied Sciences Northwestern Switzerland
 Thesis Advisor: Manfred Vogel

PROFESSIONAL EXPERIENCE

- Research Assistant** 2006 - Ongoing
 Scientific Computing and Imaging Institute, University of Utah, Salt Lake City
Research on nonparametric models for high dimensional data. Developed a statistical manifold learning algorithm based on the notion of principal curves with application to large sets of magnetic resonance brain images to investigate variability in brain anatomy. Combined Morse theoretic tools and dimension reduction for visualization and regression of high dimensional scalar functions with applications to parameter space exploration of climate simulation analysis.
- Teaching Assistant** 2010
 Park City Mathematics Institute, Institute for Advanced Study (IAS), Park City
Teaching assistant to Prof. Whitaker at the IAS summer program on image processing.
- IPAM Fellow** 2007
 Institute for Pure and Applied Math, University of California Los Angeles, Los Angeles
Core participant in IPAM program on “Mathematics of Knowledge and Search Engines”. Investigated the properties and use of the graph Laplacian for data analysis tasks. Began collaboration on shape detection in microscopy images.
- Research Assistant** 2005 - 2006
 Institute 4D Technologies and Data Spaces, University of Applied Sciences Northwestern Switzerland, Brugg
Research on efficient numerical calculations and result visualization for a civil engineering application on structural behavior of beams under torsion and lateral stress.
- Consultant** 2004
 Consolidated Contractors Company (CCC), Athens, Greece
Integration of geometrical boolean operations on meshes into existing software package.

AWARDS

- Best paper**, Invited paper [J4] for the journal of Medical Image Analysis 2010
- Fellowship**, Institute for Pure and Applied Mathematics 2007
- Scholarship for Masters in the US**, ABB Company 2005
- Scholarship for Masters in the US**, Swiss friends of the USA 2005
- Best diploma thesis**, University of Applied Sciences Northwestern Switzerland 2004

PUBLICATIONS

Journals

[J5] **Conditional Expectation Curves***Samuel Gerber, Ross Whitaker*

Under review, 2012 (preprint available on request)

[J4] **Morse-Smale Regression***Samuel Gerber, Oliver Rübél, Peer-Timo Bremer, Valerio Pascucci, Ross Whitaker*

To appear, Journal of Computational and Graphical Statistics, 2012

[J3] **Data Analysis with the Morse-Smale Complex: The msr Package for R***Samuel Gerber, Kristin Potter*

To appear, Journal of Statistical Software, 2012

[J2] **Visual Exploration of High Dimensional Scalar Functions***Samuel Gerber, Peer-Timo Bremer, Valerio Pascucci, Ross Whitaker*

IEEE Transactions on Visualization and Computer Graphics, Proceedings of VIS 2010

[J1] **Manifold Modeling for Brain Population Analysis***Samuel Gerber, Tolga Tasdizen, Tom Fletcher, Sarang Joshi, Ross Whitaker*

Invited paper for the journal of Medical Image Analysis (MedIA), 2010

Conferences

[C7] **Fast Shape-Based Nearest-Neighbors Search for Brain MRIs using Hierarchical Feature Matching***Peihong Zhu, Suyash Awate, Samuel Gerber, Ross Whitaker*

International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2011

[C6] **Learning Multiple Tasks using Manifold Regularization***Arvind Agarwal, Hal Daume III, Samuel Gerber*

Advances in Neural Information Processing Systems 23 (NIPS) 2010

[C5] **On the Manifold Structure of the Space of Brain Images***Samuel Gerber, Tolga Tasdizen, Sarang Joshi, Ross Whitaker*

International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2009

[C4] **Dimensionality Reduction and Principal Surfaces via Kernel Map Manifolds***Samuel Gerber, Tolga Tasdizen, Ross Whitaker*

International Conference on Computer Vision (ICCV), 2009

[C3] **A Variational Image-Based Approach to the Correction of Susceptibility Artifacts in the Alignment of Diffusion Weighted and Structural MRI***Ran Tao, Thomas Fletcher, Samuel Gerber, Ross Whitaker*

Information Processing in Medical Imaging (IPMI), 2009

[C2] **Variational Shape Detection in Microscope Images Based on Joint Shape and Image Feature Statistics***Matthias Fuchs, Samuel Gerber*

Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA), 2008

[C1] **Robust Non-linear Dimensionality Reduction using Successive 1-Dimensional Laplacian Eigenmaps***Samuel Gerber, Tolga Tasdizen, Ross Whitaker*

International Conference on Machine Learning (ICML), 2007

INVITED TALKS

Conferences

Tutorial on Manifold Learning, MICCAI	2011
IEEE Visualization Conference	2010
International Conference on Medical Image Computing and Computer Assisted Intervention	2009
Workshop on Mathematical Methods in Biomedical Image Analysis	2008
International Conference on Machine Learning	2007

Seminars

Image Analysis and Vision Group, University of Carolina at Chapel Hill	2010
Laboratory of Mathematics in Imaging, Harvard Medical School Boston	2009
Computer Vision Laboratory, ETH Zürich	2009

PEER REVIEW

IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Visualization and Computer Graphics , IEEE Transaction on Neural Networks, IEEE Transaction on Medical Imaging, Computer Aided Geometric Design, Neurocomputing, International Conference on Pattern Recognition, Medical Image Analysis

SCIENTIFIC SOFTWARE**Morse-Smale visualization and regression**

R package msr [J3] implementing the visualization and regression in [J2, J4].

<http://cran.r-project.org/web/packages/msr/>

Manifold learning

R package cems implementing the manifold learning approach and model complexity control in [C4, J5].

<http://cran.r-project.org/web/packages/cems/>

Image analysis

C++ code for registration and manifold learning of magnetic resonance images.

<http://www.cs.utah.edu/~sgerber/software>

COMPUTER SKILLS

Programming: C, C++, R, Java, Matlab, SQL, OpenGL, ITK

Systems: Linux, OS X, Windows

LANGUAGES

English: fluent — **German:** fluent — **Swiss-German:** native — **French:** beginner