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Lilla Zöllei

Objective

Research-oriented academic position in the field of medical image analysis. Preference given to statistical and information theoretic approaches.

Education

2001-2006 Massachusetts Institute of Technology Cambridge, MA

- **Ph.D.**, Electrical Engineering and Computer Science
- Thesis: *Unified Information Theoretic Framework for Pair- and Group-wise Registration of Medical Images*
- Advisors: Prof E. Grimson, Prof W.M. Wells

1999-2001 Massachusetts Institute of Technology Cambridge, MA

- **MS.**, Electrical Engineering and Computer Science
- Thesis: *2D-3D Rigid-Body Registration of X-Ray Fluoroscopy and CT Images*
- Advisors: Prof E. Grimson, Prof W.M. Wells

1995-1999 Mount Holyoke College South Hadley, MA

- **BA.**, Computer Science and Mathematics (**summa cum laude**)
- Thesis: *Place Recognition Using Color Region Analysis*
- Advisors: Prof C. Fennema

Work and Research Experience

2010–present Massachusetts General Hospital Charlestown, MA

- **Instructor**: Finding mathematical correspondence between various types of MRI acquisitions of the developing brain, designing automatic segmentation tools and analyzing diffusion weighted images.

2006–2010 Massachusetts General Hospital Charlestown, MA

- **Research Fellow**: Finding mathematical correspondence between various types of MRI acquisitions of the brain; statistical comparison of control and diseased groups.

2005–2006 Ecole Centrale de Paris Paris, France

- **Postdoctoral Researcher and Lecturer**: Analyzed Diffusion Tensor MRI images of skeletal muscle. Designed and taught introductory image processing class (Image Processing: Basics,

Challenges and Perspectives)

1999–2005 Massachusetts Institute of Technology Cambridge, MA

- **Research and Teaching Assistant**: Investigated 2D/3D and 3D/3D correspondence of MRI, CT and fluoroscopy images. Lectured and assisted in the graduate level biomedical image processing class (Biomedical Signal and Image Processing).

Summer 2002 Project Odyssee, INRIA Sophia Antipolis, France

- **Visiting Researcher**: Identified effects of physiological noise in functional MRI.

Summer 2000 Visualization Technology, Inc Lawrence, MA
Software Consultant: Integrated a 3D-3D CT-MRI rigid body alignment algorithm into a commercial software package.

Summer 1999 Small Business Group, Microsoft, Co Redmond, WA
Software Design Engineer: Designed and tested modules for initiating outgoing and monitoring incoming phone calls in Outlook.

Summer 1998 GTE Laboratories Waltham, MA
Software Developer: Helped designing a Web-based telecommunications ordering system.

Grants

- *Age-Dependent Analysis Techniques for Pediatric Structural and Diffusion MRI Data* (NIH Pathway to Independence (PI) Award (K99/R00)); July 1, 2010 - present

Publications

- **L. Zöllei**: *2D-3D Rigid-Body Registration of X-Ray Fluoroscopy and CT Images*, MS Thesis, AI Lab, MIT, August 2001.
- **L. Zöllei**, et al.: *2D-3D Rigid Registration of X-Ray Fluoroscopy and CT Images Using Mutual Information and Sparsely Sampled Histogram Estimators*, IEEE CVPR, 2001.
- A. Yezzi, **L. Zöllei**, et al.: *A Variational Framework for Joint Segmentation and Registration*, MMBIA, IEEE CVPR, 2001.
- A. Yezzi, **L. Zöllei**, et al.: *A Variational Framework for Integrating Segmentation and Registration Through Active Contours*, Medical Image Analysis, 7 (2), 2003, 171-185.
- **L. Zöllei**, et al.: *A Unified Statistical and Information Theoretic Framework for Multimodal Image Registration*, Information Processing in Medical Imaging 2003, LNCS 2732, 366-77.
- **L. Zöllei**, et al.: *Exploratory Identification of Cardiac Noise in fMRI Images*, MICCAI 2003, Montreal, Canada, LNCS 2878, 475-483.
- **L. Zöllei**, et al.: *A Unified Statistical and Information Theoretic Framework for Multimodal Image Registration*, #AIM-2004-011.
- **L. Zöllei**, et al.: *An Introduction to Statistical Methods of Medical Image Registration*, Mathematical Models in Computer Vision: The Handbook, Springer (2005).
- **L. Zöllei** et al.: *Efficient Population Registration of 3D Data*, Computer Vision for Biomedical Image Applications, ICCV 2005.
- **L. Zöllei**: *A Unified Information Theoretic Framework for Pair- and Group-wise Registration of Medical Images*, Ph.D. Thesis, CSAIL, MIT, February 2006.

- **L. Zöllei** et al.: *Multi-modal Image Registration Using Dirichlet-encoded Prior Information*, WBIR 2006.
- **L. Zöllei**, et al.: A Marginalized MAP Approach and EM Optimization for Pair-wise Registration, Information Processing in Medical Imaging 2007, LNCS 4584, 662-674.
- G. M. Postelnicu, **L. Zöllei**, et al.: Geometry Driven Volumetric Registration, Information Processing in Medical Imaging 2007, LNCS 4584, 675-686.
- *A. Mewes, **L. Zöllei**, et al.:* Displacement of Brain Regions in Preterm Infants with Non-Synostotic Dolichocephaly Investigated by MRI, *NeuroImage, 36, 2007, 1074-1085.*
- **L. Zöllei**, et al.: The Impact of Atlas Formation Methods on Atlas-Guided Brain Segmentation, Statistical Registration: Pair-wise and Group-wise Alignment and Atlas Formation workshop, MICCAI, Brisbane, Australia, Nov 2007.
- M. Maddah, **L. Zöllei**, et al.: A Mathematical Framework for Incorporating Anatomical Knowledge in DT MRI Analysis, International Symposium on Biomedical Imaging: From Nano to Macro, May 2008.
- *M. Maddah, **L. Zöllei**, et al.:* Modeling of Anatomical Information in Clustering of White Matter Fiber Trajectories Using Dirichlet Distribution, Mathematical Methods in Biomedical Image Analysis, *June 2008.*
- G.M. Postelnicu*, **L. Zöllei***, et al.: Combined Volumetric and Surface Registration, IEEE Transactions on Medical Imaging, July 2008 (accepted) (*joint first author)
- **L. Zöllei**, et al.: *Diffusion Weighted Information Used in a Combined Volumetric and Surface-based Brain Registration Framework*, Human Brain Mapping, June 2009
- **L. Zöllei**, W. Wells: *On the Optimality of Mutual Information as an Image Registration Objective Function*, International conference of IEEE, ICIP, November 2009
- **L. Zöllei**, et al.: *Improved Tractography Alignment Using Combined Volumetric and Surface Registration*, NeuroImage 51 (2010), 206-213.
- **L. Zöllei**, et al.: *Improved Tractography Alignment Using Combined Volumetric and Surface Registration*, Human Brain Mapping, June 2010
- **L. Zöllei**, et al.: *Non-linear Registration of Intra-subject Ex-vivo and In-vivo Brain Acquisitions*, Human Brain Mapping, June 2010

Publications under submission

- **L. Zöllei**, et al.: *An Efficient Group-wise Spatial Alignment of Medical Image Volumes*, submitted to Medical Image Analysis
- **L. Zöllei**, et al.: *A Unified Statistical and Information Theoretic Framework for Multi-modal Image Registration*, submitted to Transactions on Information Theory
- **L. Zöllei**, et al.: *A Marginalized MAP Approach to Pair-wise Registration*, in preparation

Invited talks

- IEEE EMBS International Summer School on Biomedical Imaging, Berder, France, Robust and Accurate Alignment of Structural MRI Images and Diffusion Tractography (June 18-26, 2010)
- Advance Neuroimaging Techniques, Boston, MA, Probabilistic Tractography (October 19-20,

2009)

- Hospital das Clinicas da Faculdade de Medicina da Universidade de Sao Paulo, Brazil; Freesurfer Workshop, (March 11-12, 2009)
- Section of Biomedical Image Analysis, University of Pennsylvania, Combined Volumetric and Surface Registration (January 5, 2009)
- Max Planck Institute for Human Development, Berlin, Germany; Freesurfer Workshop, (Aug 4-8, 2008)
- Sackler Summer Institute, Cornell University, Ithaca, NY; Neuroanatomical Image Analysis, (June 23, 2008)
- Center for Biomedical Imaging, University Hospitals of Geneva, Geneva, Switzerland; Combined Cortical and Subcortical Spatial Normalization and Tractography Clustering, (March 7, 2008)
- FMRIB, University of Oxford, Oxford, UK; Combined Volumetric and Surface Registration, (March 4, 2008)
- Computer Science and Artificial Intelligence Laboratory, MIT; Combined Volumetric and Surface Registration; (December 7, 2007)
- Department of Electrical and Computer Engineering, University of Iowa; Efficient Group-wise Registration of Volumetric Data Sets, (January 21, 2007)
- EPFL, Lausanne, Switzerland; Efficient Population Registration of 3D Data, (May 1, 2006).
- Service Hospitalier Frederic Joliot, Orsay, France; Group-wise Registration of Medical Image Volumes, (December 19, 2005)
- *Stochastic Systems Group, CSAIL, MIT;* A Unified Information Theoretic Framework for Pair- and Group-wise Registration of Medical Images, *(Nov 16, 2005)*
- Image Processing and Analysis Group, Yale University; Efficient Population Registration of 3D Data; (June 20, 2005)
- Siemens Corporate Research, Princeton, NJ; Efficient Population Registration of 3D Data; (Aug 2, 2005)
- Medical University of Szeged, Oncology Department, Szeged, Hungary; Medical Image Registration in Practice; (Aug 4, 2004)

Scientific Service

- Reviewer: IEEE Transactions on Medical Imaging, NeuroImage, IEEE Transactions Service on Image Processing, IEEE Transactions on Biomedical Engineering, Pattern Recognition Letters, Computer Vision and Image Understanding, International Conference on Pattern Recognition, European Conference on Computer Vision and Computer Vision and Pattern Recognition.
- Co-organizer and host: AI Student Seminar (2001-02), CSAIL Student Seminar (2003-04)
- Co-host: Workshop on Statistical Registration: Pair-wise and Group-wise Alignment and Atlas Formation, MICCAI 2007, Brisbane, Australia (> 90 participants) (*http://www.nmr.mgh.harvard.edu/martinos/training/nonlocal/miccai07-workshop/*)
- Co-organizer,lecturer: FreeSurfer Tutorial and Workshop (approx 40 people per event, 4-5

events per year), 2006-present, (*http://surfer.nmr.mgh.harvard.edu/fswiki/FreeSurferWiki*)

Awards

- Chateaubriand Fellow, 2005 (1 year postdoctoral award by the Embassy of France in the USA; 15 candidates / year)
- Best Paper Award: Computer Vision for Biomedical Image Applications, ICCV 2005
- Department Head Special Recognition Award, EECS, MIT: June, 2003
- Phi Beta Kappa Member, 1999
- Outstanding Undergraduate Award: Computing Research Association, Honorable Mention, 1999
- Microsoft Women's Technical Scholarship, 1998-99 (full tuition and summer internship offer)
- GTE Laboratories Achievement Award, July 1998

Computer Skills and Languages

- C/C++, Matlab, HTML, Java, LISP, Perl
- Operating systems: Linux, Unix, Windows, Macintosh
- Hungarian (fluent), English (fluent), French (fluent), Spanish (intermediate)

References

- Prof. Bruce Fischl, MGH (*fischl@mgh.harvard.edu*)
- Prof. Eric Grimson, MIT (*welg@csail.mit.edu*)
- Prof. Nikos Paragios, ECP (*nikos.paragios@ecp.fr*)
- Prof. William Wells, BWH, HMS (*sw@bwh.harvard.edu*)
- Prof. Alan Willsky, MIT (*willsky@mit.edu*)