Andriy Y. Fedorov

CONTACT INFORMATION

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CITIZENSHIP

Ukraine (USA F-1 visa)

RESEARCH INTERESTS

Inter-disciplinary research in application of advances in computer science to critical life problems, with the focus on medical image computing and computer vision, distributed and grid computing and mesh generation.

EDUCATION

The College of William and Mary, Williamsburg, Virginia USA
Advisor: Professor Nikos Chrisochoides

Ph.D., Computer Science, expected May 2009

- Thesis: Enabling Technology for Non-Rigid Image Registration during Image Guided Neurosurgery

M.S., Computer Science, December 2003, GPA 4.0/4.0

- Thesis: Location Management in a Distributed Object Runtime Environment

Institute for Computing and Information Technologies, Ternopil, Ukraine

B.S. (Red diploma honors), Computer Science and Engineering, 2003, GPA 5.0/5.0

EXPERIENCE

The College of William and Mary, Williamsburg, Virginia USA

Research Assistant **August 2002 to present**

Supervisor: Professor Nikos Chrisochoides

- Designed a distributed workflow implementation of non-rigid image registration on TeraGrid
- Developed tools for mesh generation from medical images
- Implemented software system to support dynamic load balancing
- Surveyed and summarized research in mesh generation from medical data, grid computing for medical applications, validation and assessment of non-rigid image registration

Teaching Assistant **2001, Fall 2006**

- Conducted lab sessions, graded homeworks (Intro to Computer Science, Compiler Construction, Programming Languages)
- Assisted in the development of Biomedical Image Processing and Analysis class, read selected lectures, designed and graded projects

Computational Radiology Lab and Surgical Planning Lab, Brigham and Women's Hospital/Harvard Medical School, Boston, Massachusetts USA
Supervisor: Professor Simon K. Warfield

Visiting Researcher **2005, Summer 2006**

- Developed mesh generation software for FEM component of brain registration
- Contributed to the development of distributed high performance registration

PUBLICATIONS

- A.Fedorov, E.Billet, M.Prastawa, A.Radmanesh, G.Gerig, R.Kikinis, S.K.Warfield, N.Chrisochoides. *Evaluation of Brain MRI Alignment with the Robust Hausdorff Distance Measures* In Proc. of *4th International Symposium on Visual Computing*, 1-3 December 2008 (accepted)
- A.Fedorov, N.Chrisochoides. *Tetrahedral Mesh Generation for Non-rigid Registration of Brain MRI: Analysis of the Requirements and Evaluation of Solutions* In Proc. of *17th International Meshing Roundtable*, October 13-15, 2008 (accepted)
- E.Billet, A.Fedorov, N.Chrisochoides. *The Use of Robust Local Hausdorff Distances in Accuracy Assessment for Image Alignment of Brain MRI* ISC Insight Journal, 2008
- A.Fedorov, N.Chrisochoides *Adaptive Mesh Refinement for Non-Rigid Registration of Brain MRI* In *Computational Bioimaging and Visualization Minisymposium, 8th World Congress on Computational Mechanics*, 2008
- A.Fedorov, N.Chrisochoides *Toward Improved Tumor Targeting for Image Guided Neurosurgery with Intra-operative Parametric Search using Distributed and Grid Computing* In Proc. of *IEEE International Parallel and Distributed Processing Symposium (IPDPS 2008), NSFNGS Workshop*, 2008
- B.Joshi, A.Fedorov, N.Chrisochoides, S.K.Warfield, S.Ourselin *A Quantitative Assessment of Approaches to Mesh Generation for Surgical Simulation* Engineering with Computers 24(4):417-430, 2008
- N.Chrisochoides, A.Fedorov, A.Kot, N.Archip, D.Goldberg-Zimring, D.Kacher, S.Whalen, R.Kikinis, F.Jolesz, O.Clatz, S.K.Warfield, P.M.Black, A.Golby. *Grid-Enabled Software Environment for Enhanced Dynamic Data-Driven Visualization and Navigation during Image-Guided Neurosurgery* In Proc. of *International Conference on Computational Science, Dynamic Data Driven Application Systems Workshop (ICCS DDDAS 2007)*, pp.980-987, 2007
- B.Joshi, A.Fedorov, N.Chrisochoides, S.K.Warfield, S.Ourselin. *Application-driven Quantitative Assessment of Approaches to Mesh Generation* In Proc. of *IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'07)*, pp.1160-1163, 2007
- N.Archip, O.Clatz, S.Whalen, D.Kacher, A.Fedorov, A.Kot, N.Chrisochoides, F.Jolesz, A.Golby, P.M.Black, S.K.Warfield. *Non-rigid alignment of pre-operative MRI, fMRI, and DT-MRI with intra-operative MRI for enhanced visualization and navigation in image-guided neurosurgery* Neuroimage 35(2):609-624, 2007
- N.Chrisochoides, A.Fedorov, A.Kot, N.Archip, P.M.Black, O.Clatz, A.Golby, S.K.Warfield. *Toward Real-time Image Guided Neurosurgery Using Distributed and Grid Computing* In Proc. of *IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing 2006)*, 2006.
- M.-C.Rivara, C.Calderon, A.Fedorov, N.Chrisochoides. *Parallel decoupled terminal edge bisection method for 3D mesh generation* Engineering with Computers 22(2):111-119, 2006.
- R.Staubs, A.Fedorov, L.Linardakis, B.Dunton, N.Chrisochoides. *Parallel N-Dimensional Exact Signed Euclidean Distance Transform* ISC Insight Journal 2006 July-December, 2006
- A.Fedorov, N.Chrisochoides, R.Kikinis, S.K.Warfield. *An Evaluation of Three Approaches to Tetrahedral Mesh Generation for Deformable Registration of Brain MR Images* In Proc. of *IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI'06)*, pp.658-661, 2006

- N.Archip, A.Fedorov, B.Lloyd, N.Chrisochoides, A.Golby, P.M.Black, S.K.Warfield. *Integration of Patient Specific Modeling and Advanced Image Processing Techniques for Image Guided Neurosurgery* SPIE Medical Imaging, pp.422-429, 2006
- A.Fedorov, N.Chrisochoides, R.Kikinis, S.Warfield. *Mesh Generation for Medical Imaging* Insight Journal, ISC/NA-MIC/MICCAI Workshop on Open-Source Software, 2005
- A.Fedorov, N.Chrisochoides. *Location Management in Object-based Distributed Computing* In Proc. of *IEEE International Conference on Cluster Computing*, pp.299-308, 2004
- A.Fedorov, N.Chrisochoides. *Communication Support for Dynamic Load Balancing of Irregular Adaptive Applications* In Proc. of *IACC International Conference on Parallel Processing, Compiler and Runtime Techniques for Parallel Computing Workshop (CRTPC 04)*, pp.555-562, 2004
- N.Chrisochoides, A.Fedorov, B.B.Lowekamp, M.Zangrilli, C.Lee. *A Case Study of Optimistic Computing on the Grid: Parallel Mesh Generation* In Proc. of *International Parallel and Distributed Processing Symposium*, p.204b, 2003
- I.Vasiltsov, B.Karpinskij, A.Fedorov. *Investigation of the Statistical Parameters of the LFSR Quasi-random Generator* In Proc. of *International Conference on Modern Problems of Radio Engineering, Telecommunications and Computer Science*, pp.168-169, 2002

PRESENTATIONS

- "High Performance Non-rigid Registration for Image-Guided Neurosurgery" *Doctoral Research Showcase, Supercomputing'07*, 15 Nov 2007
- "Near Real-Time Non-Rigid Registration for Image-Guided Neurosurgery", *Computer Science Lecture, Bowdoin College, Brunswick, ME*, 14 Sept 2007
- "Role and Implementation of Mesh Generation for Image-guided Clinical Procedures", *5th Annual Graduate Research Symposium, College of William & Mary*, 24-25 March 2006
- "Toward a Runtime Support System for Partially Coupled Grid Computations" *SIAM Parallel Processing 2006 minisymposium*, 23-25 February 2006
- "Mesh Generation for Non-rigid Registration" *SIAM Parallel Processing 2006 minisymposium*, 23-25 February 2006
- "Location Management in Distributed Computing" *SIAM Parallel Processing 2004*, 24-28 February 2004
- "Clam: Light Communication Layer for Asynchronous Mobile Computations" *Poster presentation, 2003 LACSI Symposium*, 26-30 October, 2003
- "Location Management in the Distributed Object Programming Model" *Poster presentation, 2nd Annual Graduate Research Symposium, College of William & Mary*, 7 February 2003
- "A Case for System Evolution" *Graduate Student Research Seminar talk, Department of Computer Science, College of William & Mary*, October 20, 2003

Awards	Award for Excellence in Scholarship in the Natural and Computational Sciences, 6th Annual Graduate Research Symposium, College of William and Mary, 2007
	IEEE TCSC Student Travel scholarship, Supercomputing 2006
	NSF financial student support, SPM/SMI 2005
	IEEE Student Travel Award, IEEE Cluster 2004
	College of William & Mary Office of Student Activities conference funding support: LACSI 2003, IEEE Cluster 2004, MICCAI 2005, SC2006
	NSF Student Travel Award, SIAM Parallel Processing 2004
	The President of Ukraine scholarship 2000-2001
Service	Student volunteer for Supercomputing 2003, 2004, 2005, 2007 conferences
	Paper reviewing for *Supercomputing 2003*, *ICPP 2004*, *HPC 2007*, *IDAACS 2007*
	Graduate Student Association officer, 2003
Skills	Demonstrated communication, team work and supervising skills
	Programming languages and tools: C, C++, ITK, VTK, Paraview, CMake
	Mesh generation tools and libraries: Tetgen, NETGEN, CGAL
	Hands-on experience with parallel and distributed computing tools and platforms: MPI, Posix threads, Globus Toolkit, SwiftScript, TeraGrid
	Languages: English, Russian (native), Ukrainian (fluent)
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