

Curriculum Vitae

MARK S. FOSKEY

Business Address:
Morphormics, Inc.
6320 Quadrangle Dr.
Suite 380
Chapel Hill, NC 27517
(919) 923-5295
mark.foskey@morphormics.com

Home Address:
104 Saint Andrews Lane
Chapel Hill, NC 27517
(919) 932-6827

Education

M.S. in Computer Science, May 2001. University of North Carolina, Chapel Hill.

Ph.D. in Mathematics, 1994. University of California, San Diego. Dissertation in algebraic topology, "Higher Projective Planes and the Cohomology of n -Fold Loop Spaces."

M.A. in Mathematics, June 1991. University of California, San Diego.

A.B. in Mathematics, June 1988. Princeton University.

Experience

Morphormics, Inc. 2010–Present: **Senior Software Development Engineer**

University of North Carolina, Chapel Hill

2004–2010: **Research Assistant Professor**, Department of Radiation Oncology

2003–Present: **Adjunct Research Assistant Professor**, Department of Computer Science

2002–2004: **Research Assistant Professor**, Department of Radiology

2001–2002: **Postdoctoral Research Associate**, Department of Computer Science

1998–2001: **Research Assistant**, Department of Computer Science

Jacksonville University, Jacksonville, FL.

1994–1998: **Assistant Professor**, Department of Mathematics.

Bibliography

Books and Chapters

Mark Foskey, Dinesh Manocha, Tim Culver, John Keyser, and Shankar Krishnan. Reliable geometric computations with algebraic primitives and predicates. In Joab Winkler and Mahesan Naranjan, editors, *Uncertainty in Geometric Computations*, pages 91–106. Kluwer, 2002.

Refereed Papers

Sungkyu Jung, Mark Foskey, J. S. Marron. Principal arc analysis on direct product manifolds. *The Annals of Applied Statistics*. To appear.

Huai-Ping Lee, Mark Foskey, Joshua H. Levy, Rohit Saboo, Edward L. Chaney. Image estimation from marker locations for dose calculation in prostate radiation therapy. In *Medical Image Computing and Computer Assisted Intervention, Part III*, pages 335–342, 2010.

Huai-Ping Lee, Mark Foskey, Marc Niethammer, and Ming C. Lin. Physically-based deformable image registration with material property and boundary condition estimation. Proc. of *IEEE Int. Symposium on Biomedical Imaging*, 2010.

Qianjin Feng, Mark Foskey, Songyuan Tang, Wufan Chen, and Dinggang Shen. Segmenting CT prostate images using population and patient-specific statistics for radiotherapy. *Medical Physics* 37: 4121–4132, 2010.

Sungkyu Jung, Mark Foskey, and J. S. Marron. *Discussion on: Intrinsic Shape Analysis: Geodesic PCA for Riemannian manifolds Modulo Isometric Lie Group Actions* (Paper by Huckemann, Hotz, and Munk). *Statistica Sinica*, 20 (1): 63–65, 2010.

Qianjin Feng, Mark Foskey, Songyuan Tang, Wufan Chen, and Dinggang Shen. Segmenting CT prostate images using population and patient-specific statistics for radiotherapy. In *Proceedings of the IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI)*, pages 282–285, 2009.

Huai-Ping Lee, Ming C. Lin, and Mark Foskey. Physically-based validation of deformable medical image registration. In *Medical Image Computing and Computer Assisted Intervention, Lecture Notes in Computer Science 5242*, pages 830–838, 2008.

- Suman K. Sen, Mark Foskey, James S. Marron, and Martin A. Styner. Support vector machine for data on manifolds: An application to image analysis. In *Proceedings of the IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI)*, pages 1195–1198, 2008.
- Joshua H. Levy, Mark Foskey, and Stephen M. Pizer. Rotational flows for interpolation between sampled surfaces. In *Computer Vision and Pattern Recognition Workshops (CVPR)*, pages 1-8, 2008.
- Avneesh Sud, Mark Foskey, and Dinesh Manocha. Homotopy-preserving medial axis simplification. *International Journal of Computational Geometry and Applications*, 17 (5): 423–451, 2007.
- Mark Foskey, Bradley C. Davis, Lav Goyal, Sha Chang, Edward L. Chaney, Nathalie Strehl, Sandrine Tomei, Julian Rosenman, and Sarang Joshi. Large deformation 3D image registration in image-guided radiation therapy. *Physics in Medicine and Biology*, 50:5869–5892, 2005.
- Bradley C. Davis, Mark Foskey, Julian Rosenman, Lav Goyal, Sha Chang, and Sarang Joshi. Automatic segmentation of intra-treatment CT images for adaptive radiation therapy of the prostate. In *Medical Image Computing and Computer Assisted Intervention, Lecture Notes in Computer Science 3749*, pages 442–450, 2005.
- Avneesh Sud, Mark Foskey, and Dinesh Manocha. Homotopy-preserving medial axis simplification. In *Proceedings of ACM Symposium on Solid and Physical Modeling*, pages 39–50, 2005.
- John Keyser, Tim Culver, Mark Foskey, Shankar Krishnan, and Dinesh Manocha. ESOLID—a system for exact boundary evaluation. *Computer-Aided Design*, 36(2):175–193, 2004. Special issue on ACM Solid Modeling.
- Mark Foskey, Ming C. Lin, and Dinesh Manocha. Efficient computation of a simplified medial axis. *Journal of Computing and Information Science in Engineering*, 3:274–284, 2003. Special issue on solid modeling theory and engineering applications.
- Mark Foskey, Ming C. Lin, and Dinesh Manocha. Efficient computation of a simplified medial axis. In *Proceedings of the ACM Symposium on Solid Modeling*, pages 96–107, 2003.
- Derek Cool, Dini Chillet, Jisung Kim, Mark Foskey, and Stephen Aylward. Tissue-based affine registration of brain images to form a vascular density atlas. In *Proceedings of the Conference on Medical Image Computing and Computer-Assisted Intervention, Part II*, pages 8–15, 2003.

- Jean-Philippe Guyon, Mark Foskey, Jisung Kim, Zeynep Firat, Bradley C. Davis and Stephen Aylward. VETOT, volume estimation and tracking over time: Framework and validation. *Medical Image Computing and Computer-Assisted Intervention, Part II*, pages 142–149, 2003.
- Mark Foskey, Ming C. Lin, and Dinesh Manocha. Efficient computation of a simplified medial axis. *Proceedings of the ACM Symposium on Solid Modeling*, pages 96–107, 2003.
- Ming C. Lin, William Baxter, Mark Foskey, Miguel Otaduy, and Vince Scheib. Haptic interaction for creative processes with simulated media. *Proceedings of the IEEE Conference on Robotics and Automation*, 2002.
- John Keyser, Tim Culver, Mark Foskey, Shankar Krishnan, and Dinesh Manocha. ESOLID—a system for exact boundary evaluation. *Proceedings of the ACM Symposium on Solid Modeling*, pages 23–34, 2002.
- Mark Foskey, Miguel Otaduy, and Ming C. Lin. ArtNova: Touch-enabled 3D model design. *Proceedings of the IEEE Virtual Reality Conference*, pages 119–126, 2002.
- Mark Foskey, Max Garber, Ming C. Lin, and Dinesh Manocha. A Voronoi-based hybrid planner. *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2001.
- Mark Foskey. Split dual Dyer-Lashof operations. *Journal of Pure and Applied Algebra*, 128:233–249, 1998.
- Mark Foskey and Michael Slack. On the odd primary cohomology of higher projective planes. *Pacific Journal of Mathematics*, 173: 77–92, 1996.

Published Abstracts

- Xiaoli Tang, Randall Kimple, Stephen Harris, Mark Foskey, Gregg Tracton, Sha X. Chang, Edward L. Chaney, Stephen Pizer, Katharin M. Deschesne. A clinical evaluation of the m-rep-based automatic prostate segmentation. *Medical Physics*, 36:2455, 2009.
- Jun Lian, Mark Foskey, Julian Rosenman, Gregg Tracton, Sha X. Chang. A hybrid deformable registration method to warp image with contrast. *Medical Physics*, 36:2516, 2009.
- Jun Lian, Mark Foskey, Sigen Wang, Dinggang Shen, Sha X. Chang. In-vivo correspondence validation of a deformable image registration Method. *Medical Physics*, 36:2711, 2009.

- Eric C. Schreiber, Mark Foskey, Timothy J. Cullip, Jun Lian. Interfraction dose variation resulting from anatomic deformation in CyberKnife prostate radio-surgery. *Medical Physics*, 36:2653, 2009.
- Mark Foskey, Gregg Tracton, Jun Lian, Xiaoli Tang, Sha X. Chang. Cumulative Dose to the Rectal Wall and Implications for Prostate IGRT Treatment Planning. *Medical Physics*, 36:2508, 2009.
- Mark Foskey, Graham Gash, Qiong Han, Gregg Tracton, Sarang Joshi, Stephen Pizer, and Ed Chaney. A software toolkit for multi-image registration and segmentation in IGRT and ART. *Medical Physics*, 34 (6):2351, 2007.
- Mark Foskey, Julian Rosenman, Elaine Zeman, Jun Lian, Daniel Fried, Sarang Joshi. How much does patient repositioning using on-treatment-table CT imaging improve prostate cancer treatment outcome? *International Journal of Radiation Oncology*Biology*Physics*, 66(3):S139, 2006.
- Daniel Fried, Julian Rosenman, Mark Foskey, D. Stevenson, Arnold Bragg, David Morris, Mitchell Anscher. Simulating a randomized trial using stratification and re-sampling of retrospective data. *International Journal of Radiation Oncology*Biology*Physics*, 66(3):S517, 2006.
- Eric C. Schreiber, Zijie Xu, Amy Lorenzen, Mark Foskey, Tim Cullip, Gregg Tracton, Edward L. Chaney. PPlanUNC as an open-source radiotherapy planning system for research and education. *Medical Physics*, 33:2129, 2006.
- Mark Foskey, Bradley C. Davis, Lav Goyal, Sha Chang, Julian Rosenman, and Sarang Joshi. Automatic contouring via deformable image registration. *International Journal of Radiation Oncology*Biology*Physics*, 63:S524, 2005.
- Mark Foskey, Julian Rosenman, Lav Goyal, Sha Chang, and Sarang Joshi. Calculating biological effective dose in the presence of organ deformation. *Medical Physics*, 32(6):1921, 2005.
- Julian Rosenman, Mark Foskey, Lav Goyal, Sha Chang, Sarang Joshi. The calculation of radiation dose actually delivered to the patient. *International Journal of Radiation Oncology*Biology*Physics*, 63:S504, 2005.

Oral Presentations

- Mark Foskey. Dose Accumulation in Prostate Cancer via Deformable Registration. Second Annual North Carolina IGRT/IMRT Symposium, April 19, 2008, Greenville NC.

In-Press and Submitted Works

Sungkyu Jung, Mark Foskey and J. S. Marron. Principal Arc Analysis on direct product manifolds. Submitted to *The Annals of Applied Statistics*.

Grants

US Army Medical Research DAMD17-03-1-0134, Sarang Joshi (PI), 5/1/03-12/31/05.
Automatic Organ Localization for Adaptive Radiation Therapy for Prostate Cancer.
Role: Investigator

NCRR/NCI Grant R01 RR018615, Ed Chaney (PI), 7/1/03-6/30/09.
PlanUNC Research Platform for Radiotherapy Simulation.
Role: Investigator

NIH/NCI Grant 1R21CA129775-01A1, Stephen M. Pizer (PI), 7/1/09-6/30/10.
Deformable mapping of MRI and MRSI data to TRUS images to guide prostate biopsy.
Role: Investigator

Professional Activities

Referee for: Physics in Medicine and Biology, Eurographics conference, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Image Processing, IEEE Transactions on Medical Imaging, IEEE Transactions on Information Technology in Biomedicine, Computer Aided Design.

Software Packages

PluncSnap, a package integrating the existing ITK-SNAP segmentation tool with the treatment planning system PlanUNC. Released April 30, 2007 at <http://planunc.radonc.unc.edu/software/planunc6610/>.

ConStruct, a tool for image segmentation and registration combining methods of fluid deformation, m-rep-based segmentation that had been developed at UNC. With Graham Gash, Qiong Han, Huai-Ping Lee, and Gregg Tracton. Most recent version released June 12, 2008 at <http://planunc.radonc.unc.edu/construct>.

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