

Department of Computer Science
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Research Overview

Research into automated techniques and computational representations for scientific modeling and data visualization.

Education

Ph.D., Computer Science, Brown University, 2007.

Data-Driven Predictive Modeling of Diarthrodial Joints

Research in computer graphics and visualization for biological applications. Created novel computational modeling, visualization, and analysis tools which are needed to model anatomical joints and their variation with disease progression.

Sc.M., Computer Science, Brown University, 2001.

Estimating Ligament Lengths from Bone Kinematics and Surfaces

M.S., Computer Science & Electrical Engineering, Politehnica University, Romania, 1998.

KQML – Communication among Intelligent Agent Systems

B.S., Computer Science & Electrical Engineering, Politehnica University, Romania, 1997.

Time-delay Neural Network System for Speech Recognition

Experience and Appointments

Current:

Assistant Professor, Department of Computer Science, University of Pittsburgh, 2007 – present.

Computational research into robust, scalable and effective computer science and visualization tools to solve problems in biology, medical imaging, science, and engineering. Specific research projects include visualization of large scale vector-valued and tensor-valued fields, visualization and cross-registration of large-scale, multivariate data, intelligent algorithms for automated tracking of orthopaedic data, geometric tools for tissue modeling and simulation, interactive visualization of machine translations, visualization of software programs.

Joint Assistant Professor, Department of Computational and Systems Biology, University of Pittsburgh, Secondary Appointment, 2009 – present.

Visualization, modeling and simulation for rule-based biochemical systems.

Adjunct Assistant Professor of Computer Science, Robotics Institute, Carnegie Mellon University, 2007 – present.

Computational modeling research to help solve problems in robotics and computer animation.

Past:

Research Assistant, Brown University, 2000 – 2007.

Interdisciplinary work in articulation modeling and visualization (CS, Bioengineering, Orthopedics, Evolutionary Biology).

CS Faculty-Graduate Liaison, Brown University, 2003 – 2005.

Lobbied and raised funding for grad student interests.

Instructor, Brown University, 2004.

“Interactive Computer Graphics”, full class responsibility together with fellow graduate students M. McGuire and T. Moscovich

Teaching Assistant, Brown University, 2003.

“Interactive Computer Graphics”. Led seminars and help-sessions, guest-lectured, mentored final projects.

Research intern, Philips Research, Netherlands, Summer 1998.

Designed and implemented a geometry compression engine for video-games.

Lab instructor, Politehnica University, Romania, 1997 – 1999.

Introductory Programming, Data Structures and Algorithms, Scientific Computing, Parallel Processing. Taught seminars and labs, designed and graded assignments and independent-study projects.

Intern, Electromagnetica Ltd, Romania, Summers 1992, 1994.

Programmed parts of a VLSI-circuit design project.

Honors and Awards

2012 **Honorable Mention** (Best-Paper Runner-Up Award), IEEE LDAV 2012

2012 **CRA-W Advanced Career Mentoring Workshop Travel Award**

2012 Pitt CS Teaching Award, Graduate course level

2011 **Best Paper Award**, IEEE BioVis 2011; Pitt faculty honoree

2011 Pitt CS Teaching Award, Upper-level undergraduate course

2010 Pitt CS Teaching Award, Upper-level undergraduate course, top 4% in School of A&S

2010 **NSF CAREER Award**; Pitt faculty honoree

2009 Pitt Speaking in the Disciplines Fellowship

2009 Pitt CS Teaching Award, Graduate course, top 4% in School of A&S

2009 **Innovation in Education Award**, Pitt Provost’s Advisory Council on Instructional Excellence

- 2008 Pitt CS Teaching Award, Graduate seminar
- 2004 **ACM SIGGRAPH Student Research Competition semifinalist** – twice, first nomination with students Peter Sibley and Phil Montgomery; and second with students Ethan Bromberg and Arni Jonsson. Brown University Travel Grant and **ACM Travel Awards**.
- 2001 **Pixar Fellowship**
- 2000 **Microsoft Fellowship**
- 1999 **Brown University Fellowship**
- 1997,1996 **Romanian National 'Scholar Merit' Fellowship**
- 1996 **Best Paper Award** at the Politehnica Bioengineering'96 Scientific Session

Pitt CS Teaching Awards reward most-effective teaching at specific levels during the previous academic year; measured using the University-conducted student-evaluations of courses and instructors.

Journal Publications

(In most cases, the last author listed denotes the project leader. In rare cases where the project leader is not listed last, they are indicated with an asterisk – *.

underscores denote my advisees; IF – impact factor; xx% -- acceptance rate, where known)

J8. Md. A. Haque, W. Anderst, S. Tashman, G.E. Marai, “Hierarchical Dynamic Model-based Tracking of Cervical Vertebrae from Fluoroscopy Images”, *Medical Physics and Engineering*, pp. 1-10, 2012, In press (**IF 2.11**)

J7. A.M. Smith, W. Xu, Y. Sun, J.R. Faeder, G.E. Marai, “RuleBender: Integrated Modeling, Simulation and Visualization for Rule-Based Intracellular Biochemistry”, *BMC Bioinformatics*, 13(Suppl 8):S3: 1-24, Jun 2012. (**IF 2.75**)

J6. W. Xu, A. Smith, J.R. Faeder, G.E. Marai, “RuleBender: A Visual Interface for Rule-Based Modeling”, *Bioinformatics Journal*, 27: 1721-2, Apr 2011 (**IF 5.47**)

J5. J.S. Albrecht, R. Hwa, G.E. Marai, “The Chinese Room: Visualization and Interaction to Understand and Correct Ambiguous Machine Translation”. *Computer Graphics Forum* 28: 1047-1054 (*also in 2009 Eurographics/IEEE Symposium on Visualization, Proceedings of*), June 2009. (**IF 1.47**)

J4. G.E. Marai*, C.M. Grimm, D.H. Laidlaw, “Arthroial Joint Markerless Cross-Parameterization and Biomechanical Visualization”, *IEEE Transactions on Visualization and Computer Graphics* 13(5): 1095-1104, Sep/Oct 2007. (**IF 2.22**)

J3. J.J. Crisco*, D. Moore, G.E. Marai, D.H. Laidlaw, E. Akelman, A.C. Weiss, S.W. Wolfe, “Effects of Distal Radius Malunion on Distal Radioulnar Joint Mechanics—An In Vivo Study”, *Journal of Orthopedic Research* 25(4): 547-555, Jan. 2007. (**IF 2.81**)

J2. G.E. Marai, J.J. Crisco, D.H. Laidlaw, “Super-Resolution Registration Using Tissue-Classified Distance Fields”, IEEE Transactions on Medical Imaging, 25(2): 177-187, Feb. 2006. (IF 3.64)

J1. G.E. Marai, C. Demiralp, S. Andrews, C.M. Grimm, J.J. Crisco, D.H. Laidlaw, “Estimating Joint Contact Areas and Ligament Lengths from Bone Kinematics and Surfaces”, IEEE Transactions on Biomedical Engineering, 51(5): 790-799, May 2003 (IF 2.28)

In Review:

J10. A. Maries, M. Olson, K. Wong, W. Layton, C. Rosano, H. Aizenstein, R. Boudreau, S.L. Yilmaz, G.E. Marai, “GRACE: A Visual Comparison Framework for Integrated Spatial and Non-Spatial Geriatric Data”, IEEE Transactions on Visualization and Computer Graphics, pp. 1-12, 2012, In Review (IF 2.22)

J9. N. Mays, C. Rosano, H. Aizenstein, R. Boudreau, G.E. Marai, A. Maries, W. Layton*, F. Thomas, K. Yaffe, L.J. Launer. A.B. Newman, “Using iterated Tikhonov regularization with the L-curve method to Quantify the Correlation Between Neuroimaging and Gait Data”, Journal of Computational and Mathematical Methods in Medicine, pp. 1-27, 2012, In Review (IF 0.81)

Edited Collections

E1. *Special Section on Biomedical Applications: From Data Capture to Modeling*, IEEE Computer Graphics & Applications, C. Grimm and G.E. Marai, IEEE 2012. In press.

Peer-reviewed Conference Papers

C7. M. Liang, J. Guerra, G.E. Marai, P. Brusilovsky, “Collaborative E-Learning through Open Social Student Modeling and Progressive Zoom Navigation”, The 8th IEEE International Conference on Collaborative Computing: Networking, Applications and Worksharing, pp. 1-10, Oct 2012. (35%) In Press

C6. T. Luciani, S. Myers, B. Sun, B. Cherinka, W.M. Wood-Vassey, A. Labrinidis, G.E. Marai, “Panning and Zooming the Observable Universe with Prefix-Matching Indices and Pixel-Based Overlays”, IEEE Large-scale Data Analysis and Visualization Symposium, pp. 1-8, Oct 2012. **Best-Paper Runner-Up Award.**

C5. A.M. Smith, W. Xu, Y. Sun, J.R. Faeder, G.E. Marai, “RuleBender: Integrated Visualization for Biochemical Rule-Based Modeling”, IEEE Visualization 2011, IEEE BioVis: Symposium on Biological Data Visualization, pp.1-8, Oct 2011. (37%) **Best Paper Award.**

C4. G.E. Marai, J.J. Crisco, D.H. Laidlaw, “Development of a Kinematic 3D Carpal Model to Analyze In Vivo Soft-Tissue Interaction Across Multiple Static Postures”, IEEE 31st Conf. of the Engineering in Medicine and Biology Society (EMBC'09), pp. 7176–7179, Sept. 2009. (Podium, 25%)

C-. J.S. Albrecht, R. Hwa, G.E. Marai, “The Chinese Room: Visualization and Interaction to Understand and Correct Ambiguous Machine Translation”, Eurographics/IEEE Symposium on Visualization, Proceedings of, pp. 1-8, June 2009, *also in Computer Graphics Forum Journal*. (29%)

C3. J. Albrecht, R. Hwa*, G.E. Marai, “Correcting Automatic Translations through Collaborations between MT and Monolingual Target-Language Users”, EACL 2009, 12th Conference of the European Chapter of the Association for Computational Linguistics, pp. 60-68, Mar. 2009. (28%)

C2. G.E. Marai, J.J. Crisco, D.H. Laidlaw, “A Kinematics-Based Method for Generating Cartilage Maps and Deformations in the Multi-Articulating Wrist Joint From CT Images”, IEEE 28th Conf. of the Engineering in Medicine and Biology Society (EMBC'06), pp. 2079-2082, Sept. 2006.

C1. G.E. Marai*, A. Ivan, “Neural Networks versus Fuzzy Logic”, Politehnica Bioengineering Scientific Session, pp. 1-10, Politehnica University of Bucharest, pp. 1-10, May 1996. **Best paper award.**

Book Chapters (peer-reviewed)

B3. H. Hagen, M. Hlawitschka, I. Hotz, G.E. Marai*, R. Moreno, G. Scheuermann, M. Stommel, A. Wiebel, E. Zhang, “Top Challenges in the Visualization of Engineering Tensor Fields”, *Visualization and Processing of Tensors and Higher-Order Descriptors for Multi-field Data*, Springer 2013, **In Review**

B2. A. Maries, Md.A. Haque, S.L. Yilmaz, M.B. Nik, G.E. Marai, “Interactive Exploration of Stress Tensors Used in Computational Turbulent Combustion”, *New Developments in the Visualization and Processing of Tensor Fields*, pp. 137 – 156, D. Laidlaw and A. Villanova (editors), Springer 2012.

B1. D.H. Laidlaw, G.E. Marai, K.E. Fleischer, A. Barr, “Partial Volume Segmentation and Boundary Distance Estimation with Voxel Histograms”, in *Handbook of Medical Imaging: Processing and Analysis*, 2nd edition, pp. 223 – 244, I.N. Bankman (editor), Academic Press 2010.

Peer-reviewed Conference Short Papers, Abstracts and System Demonstrations

S21. T. Luciani, A. Maries, H. Tran, M. Nik, S.L. Yilmaz, G.E. Marai, “A Novel Method for Tracking Tensor-based Regions of Interest in Large-Scale, Spatially-Dense Turbulent Combustion Data”, *IEEE Visualization 2012*, Poster Abstracts with System Demonstration, pp. 1-2, Oct 2012.

S20. P. Neophytou, R. Gheorghiu, R. Hachey, T. Luciani, B. Sun, A. Labrinidis, G.E. Marai, P. K. Chrysanthis, “AstroShelf: Understanding the Universe through Scalable Navigation of a Galaxy of Annotations”, *SIGMOD 2012 System Demonstrations*, pp. 1-4, May 2012 (42%).

S19. Md. A. Haque, W. Anderst, S. Tashman, G.E. Marai, “Validation of a Non-invasive Automated Hierarchical Method to Precisely Measure Lumbar Spine Movement”, *The 2012 Annual Meeting of the Orthopaedic Research Society*, Image Processing track, pp. 1, March 2012. (*grown into J8*)

- S18. T. Luciani, R. Hachey, D.Q. Oliphant, B.A. Cherinka, G.E. Marai, “Pixel-based Overlays for Navigating a Galaxy of Observations”, IEEE Visualization 2011, Large-scale Data Analysis and Visualization Symposium, Poster Abstracts with System Demonstration, pp. 1-2, Oct 2011.
- S17. A. Maries, S. Mandayam, C. Rosano, G.E. Marai, “Visual Analysis of Brain/Gait Correlations”, IEEE Visualization 2011, Poster Abstracts with System Demonstration, pp. 1-2, Oct 2011. (*grown into J10*)
- S16. S.D. Rothenberger, J.E. Wenskovitch, G.E. Marai, “Pexel and Heatmap Visual Analysis of Multidimensional Gun/Homicide Data”, IEEE Visualization 2011, Visual Analytics Science and Technology, Poster Abstracts with System Demonstration, pp. 1-2, Oct 2011.
- S15. A. Smith, W. Xu, J.R. Faeder, G.E. Marai, “Scalable Global Views for Biological Rule-Based Modeling”, IEEE Visualization 2011, InfoVis Poster Abstracts with System Demonstration, pp. 1-2, Oct 2011. (*grown into J7*)
- S14. Md. A. Haque, A. Maries, S.L. Yilmaz, M.B. Nik, G.E. Marai, “Tensor Visualization in Computational Turbulent Combustion: A Case Study”, IEEE Visualization 2010, Poster Abstracts with System Demonstration, pp. 1-2, Oct 2010. (*grown into B2*)
- S13. G.E. Marai, J.J. Crisco, D.H. Laidlaw, “Estimation of Optimal Carpal Contact in the Human Wrist from Multiple Static Articulation Postures”, 2009 Biomedical Engineering Society (BMES) Annual Meeting, Computational Modeling track, pp.1, Oct 2009 (Podium).
- S12. G.E. Marai, “MyWorld4D: Introduction to Computer Graphics with a Modeling and Simulation Twist”, ACM SIGGRAPH 2009, Education Talks Track, pp. 1, Aug. 2009.
- S11. A.M. Smith, J.J. Geiger, G.M. Kapfhammer, M. Renieris, G.E. Marai, “Interactive Coverage Effectiveness Multiplots for Evaluating Prioritized Regression Test Suites”, IEEE Visualization 2009, Poster Abstracts with System Demonstration, pp. 1-2, Oct 2009.
- S10. J.S. Albrecht, R. Hwa, G.E. Marai, “The Chinese Room - Understanding and Correcting Machine Translation”, IEEE Information Visualization 2008, Poster Abstracts with System Demonstration, pp. 1-2, Oct. 2008. (*grown into J5*)
- S9. G.E. Marai, J.J. Crisco, D.H. Laidlaw, “A Kinematics-Based Method for Evaluating the Stabilizing Role of Ligaments in the Carpal Joint”, 16th Annual Symposium on Computational Methods in Orthopaedic Biomechanics, Computational Modeling track, pp. 1-4, Mar. 2008 (Podium).
- S8. G.E. Marai*, D.H. Laidlaw, “Markerless inter-subject bone shape matching using 2D projections”, Medical Image Computing and Computer Assisted Intervention (MICCAI) 2005, pp. 1-2, 2005. (*grown into J4*)
- S7. G.E. Marai, C. Demiralp, S. Andrews, D.H. Laidlaw, “JointViewer – an interactive system for exploring orthopedic data”, IEEE Visualization 2004, Poster Abstracts with System Demonstration, pp. 1-2, 2004.
- S6. E. Bromberg, A. Jonsson, G.E. Marai*, M. McGuire, “Hybrid Billboard Clouds for Model Simplification”, ACM SIGGRAPH Poster Compendium, pp. 1-2, 2004. **ACM Student Research Competition semifinalist.**
- S5. P. Sibley, P. Montgomery, G.E. Marai, “Wang Cubes for Video Synthesis and Geometry Placement”, ACM SIGGRAPH Poster Compendium, pp. 1-2, 2004. **ACM Student Research Competition semifinalist.**

S4. J.J. Crisco*, G.E. Marai, D.H. Laidlaw, D. Moore, E. Akelman, “Kinematic and mechanical changes in the distal radioulnar joint (DRUJ) of patients with malunited distal radius fractures”, 49th Annual Meeting of the Orthopaedic Research Society, Computational Modeling track, pp. 1, 2003. (*grown into J1*)

S3. G.E. Marai, D.H. Laidlaw, J.J. Coburn, M.A. Upal, J.J. Crisco, “A 3D Method for Segmenting and Registering Carpal Bones from CT Volume Images”, Annual Meeting of the American Society of Biomechanics, Medical Imaging track, pp. 1, 2003. (*grown into J2*)

S2. G.E. Marai, D.H. Laidlaw*, C. Demiralp, C. Grimm, J.J. Crisco, D. Moore, and E. Akelman, “Contact Areas and Ligament Lengths are Abnormal in Patients with Malunited Distal Radius Fracture Despite Normal Radioulnar Kinematics”, 4th World Congress Biomechanics, Computational Modeling track, pp.1-2, 2002.

S1. C. Demiralp, G.E. Marai, S. Andrews, D.H. Laidlaw*, J.J. Crisco, C. Grimm, “Modeling and Visualization of Inter-Bone Distances in Joints”, IEEE Visualization 2001, Work in Progress Proceedings, pp. 24-25, 2001.

Other Publications

O4. D.Q. Oliphant, G.E. Marai, “Real Time Ray Tracing in a Space Limited Environment”, Technical Report TR-2011-03, University of Pittsburgh, Computer Science Department, 2010.

O3. A.M. Smith, W. Xu, Y. Sun, J.R. Faeder, G.E. Marai, “Visual Tools for Modeling and Simulation of Cell Signaling Networks”, Carnegie Mellon Bioimaging Informatics Symposium, Sep 2010.

O2. W. Xiong, D. Litman, G.E. Marai, “Analyzing Prosodic Features and Student Uncertainty using Visualization”, Association for the Advancement of Artificial Intelligence Fall Symposium (AAAI-FS'09), Nov 2009.

O1. G.E. Marai, “Geometry Compression of DirectX Files”, Technical Report 322/98, Philips Research, September 1998 (company-restricted distribution).

Patents

Intelligent algorithms for tracking three-dimensional skeletal movement from dynamic stereo-radiographic image sequences, S. Tashman; G.E. Marai; Md.A. Haque; provisional filing 02603/March 2012.

Open-Source Software

Created, maintained, and freely distributed

RuleBender: a free visual tool for constructing, debugging, simulating and analyzing rule-based biological models. Distribution for Windows, Linux and OSX, 32 bit and 64 bit. <http://www.rulebender.org>

Research Grants and Awards

“CDS&E: Data Management and Visualization in Petascale Turbulent Combustion Simulation”, NSF CBET-1250171, Co-PI (P. Givi PI; other co-PIs L. Yilmaz, A. Labrinidis, P. Chrysanthis), \$500K (*\$352K direct*), Sept 2012 – August 2015.

“CDI-Type II: Understanding the Universe through Scalable Navigation of a Galaxy of Annotations”, NSF OIA-1028162, Co-PI (A. Labrinidis, PI; other Co-PIs P. Chrysanthis, J. Newman, M. Wood-Vasey), \$1.6M (*\$1.1M direct*), Sept 2010 – Sept 2014.

“CAREER: Data-Driven Bottom-Up Humanoid Articulations”, NSF CAREER Award IIS-0952720, PI, \$546K (*\$385K direct*), April 2010 – March 2015.

“Geriatric Research in Ambulatory and Cognitive Excellence (GRACE)”, University of Pittsburgh Research Council's Multidisciplinary Small Grant Program, Co-PI (C. Rosano PI; other co-PI W. Layton), \$150K (*\$150K direct*), July 2009 – June 2012.

“Immersive Software Engineering”, Pitt Provost's Advisory Council on Instructional Excellence (ACIE) Innovation in Education grant, PI, \$16K (*\$16K direct*), May 2009 – April 2010.

Funded Research Experiences for Undergraduates (REU) and Workshops

“REU - CAREER: Data-Driven Bottom-Up Humanoid Articulations”, NSF IIS-1241554, PI, \$16K (*\$13K direct*), May 2012–May 2013.

“WORKSHOP: Doctoral Colloquium at IEEE VisWeek 2011”, NSF IIS-1139350, Co-PI (R. Kosara, PI; other co-PIs E. Zhang, T.J. Jankun-Kelly), \$20K (*\$20K direct*), Aug 2011–Aug 2012.

“REU - CAREER: Data-Driven Bottom-Up Humanoid Articulations”, NSF IIS-1130458, PI, \$16K (*\$13K direct*), Apr 2011–Apr 2012.

Outreach

2012 Organized and ran the Pitt Women in Computer Science “Mentoring Lunch”, 14 participants (20% participation rate), Oct

Co-Organized the “Lunch with the Industry and National Labs” event at IEEE VisWeek'12, 100 participants, Oct

Co-organized and ran the “Lunch with the Mentors” event at IEEE VisWeek'12, 100 participants, Oct

- Scientific Visualization outreach presentation (w/ VisLab), Pittsburgh Academy for Science and Technology, 100 participants, Jan
- 2011 Created and organized the “Lunch with the Mentors” mentoring system at IEEE VisWeek’11, 150 participants, Oct
- 2010 Created, organized and ran the Technology Leadership Initiative VideoGame Design and Implementation workshop (w/ VisLab) for 18 under-represented and under-privileged elementary school students; excellent reviews, Feb
- Created, organized and ran the Tech Divaz Build a Computer workshop (w/ Women in Computer Science) for the Technology Leadership Initiative; 18 participants, excellent reviews, June
- 2009 Worked with the Technology Leadership Initiative organizer, T. Groover, to revise a Google RISE small grant proposal to support a diversity summer camp, March; awarded (\$5K).
- Visualization and Computational Modeling for Science and Engineering presentation, Technology Leadership Initiative, 25 participants, May
- 2008 Visualization and Computational Modeling for Science and Engineering presentation, Technology Leadership Initiative (Pitt CS Diversity program, reaching to under-represented African-American elementary and highschool students), 25 participants, May
- 2005 - Women in Computer Science coordinator, Brown University; launched and coordinated the
2007 graduate student arm of the organization, 20 graduate members, Feb

Popular Press Recognition

- “VisWeek 2011: New Compass Activities for New Researchers”, A. Tarbox, Conduit Vol. 21(1), May 2012
- “Pitt scientists get grant to catalog space data”, D. Erdley, Pittsburgh Tribune-Review, July 2011
- “Pitt Researchers Tackle Flood of Space Data With \$1.6 Million Project”, M.Kelly, University of Pittsburgh University Times, May 2011
- “Comp sci adds another CAREER award”, University of Pittsburgh University Times, Apr 2010
- “Rethinking Computer Science education”, M. Lane-Ogden, University of Pittsburgh Teaching Times, Sept 2009
- “Making moves: Pitt experiment tracks body shifts”, M. Cronin, Pittsburgh Tribune-Review, March 2009

“Transformational Research through Modeling and Simulation: Pitt Researchers Tackle Some of the Most Complex Issues of Our Times in New Center”, R. Frazier, Pitt Center for Simulation and Modeling Inaugural Brochure, October 2008

“CS224 Final Projects Win @ ACM SIGGRAPH '04”, S. Howe, Conduit Vol 13(1), Aug 2004

Invited Presentations

- 2012 University of Pittsburgh, Department of Biomedical Informatics, Oct
- University of Maryland, Baltimore County, Oct
- Pittsburgh Academy for Science and Technology (w/ VisLab), Pittsburgh PA, Jan
- CHIA Dataverse Colloquium (w/ cs1630 students), Pittsburgh PA, Mar
- 2011 **Dagstuhl** Tensor Symposium, Germany, Dec (prestigious, invitation-only CS workshop sponsored by the German federal government)
- IEEE VisWeek 2011, Providence, RI, Oct
- AEGIS Colloquium (w/ students T. Luciani and R. Hachey), Pittsburgh PA, July
- 2010 Carnegie-Mellon Bioimaging Day, Pittsburgh PA, March
- Tech Divaz camp, Technology Leadership Initiative, Pittsburgh PA, June
- Diversity Workshop (w/ VisLab), Technology Leadership Initiative, Pittsburgh PA, Feb
- 2009 Georgia Tech & Carnegie-Mellon University Graphics Retreat, Pittsburgh PA, Nov
- BMES 2009, Pittsburgh PA, Oct
- University of Minnesota, Computer Science, Graphics Group Seminar, Sept
- EMBC 2009, Minneapolis MN, Sept
- ACM SIGGRAPH Talks, New Orleans LA, August
- Dagstuhl** Tensor Symposium, Germany, July (prestigious, invitation-only CS workshop sponsored by the German federal government)
- Eurographics/IEEE Symposium on Visualization, Berlin, Germany, June
- University of Pittsburgh, Center for Simulation and Modeling, January

- 2008 Carnegie Mellon University, Graphics Group Seminar, March
- San Francisco University, Pre-Orthopaedic Research Society Symposium, March
- University of Pittsburgh – Carnegie Mellon University, Bioengineering and Bioinformatics Summer Institute, June
- Pitt CS Technology Leadership Initiative, July
- 2007 University of Pittsburgh – Carnegie Mellon University, Computational Biology Program, November
- Carnegie Mellon University, Robotics Institute Faculty Lunch Meeting, November
- University of New Hampshire, Computer Science, April

Professional Service

- 2013 Papers Co-Chair, IEEE BioVis 2013
- 2012 Guest-Editor, IEEE Computer Graphics and Applications, Special Issue, Biomedical Applications: From Data Capture to Modeling
- Program Committee, IEEE Vis 2012
- Chair, Compass Committee (see 2011), Organizing Committee IEEE VisWeek 2012
- Co-Chair, Industry Committee, Organizing Committee IEEE BioVis 2012
- Program Committee, IADIS International Conference on Computer Graphics, Visualization, Computer Vision and Image Processing
- Program Committee, MICCAI Workshop on Mesh Processing
- Travel Scholarship Reviewer for the Grace Hopper Celebration of Women in Computing
- Paper reviewing for IEEE TVCG, IEEE Vis, IEEE InfoVis, EuroVis, IEEE Computer Graphics and Applications, PacificVis
- 2011 Co-Chair, Doctoral Colloquium, IEEE VisWeek 2011; co-run the Doctoral Colloquium Workshop
- Organizing Committee, IEEE VisWeek 2011; beside O.C. duties, created and organized the Compass activities, a highly successful set of networking events for visualization researchers and practitioners.
- Panel Organizer, IEEE VisWeek 2011
- NSF Graphics & Visualization Panel
- Paper reviewing for IEEE Vis

- 2010 NSF Graphics & Visualization Panel
- ACM SIGGRAPH Bioengineering Jury
- Paper reviewing for Journal of Biomechanics, IEEE Vis
- Travel Scholarship Reviewer for the Grace Hopper Celebration of Women in Computing
- 2009 Paper reviewing for IEEE Vis, IEEE Trans. On Biomedical Engineering
- Travel Scholarship Reviewer for the Grace Hopper Celebration of Women in Computing
- 2008 Paper reviewing for ACM SIGGRAPH, Journal of Biomechanics
- External proposal reviewing for NSF
- Travel Scholarship Reviewer for the Grace Hopper Celebration of Women in Computing
- 2007 Travel Scholarship Reviewer for the Grace Hopper Celebration of Women in Computing
- Paper reviewing for IEEE Trans. on Medical Imaging, IEEE Trans. on Visualization and Computer Graphics, ACM SIGGRAPH, Journal of Biomechanics
- pre- Paper reviewing for IEEE Trans. on Medical Imaging, IEEE Trans. on Visualization and Computer
2007 Graphics, ACM SIGGRAPH (Sketches and Posters), Journal of Biomechanics
- ACM International Programming Competition'97, S-E European Regional Organizing Committee

Teaching and Research Advising

- Current Advisees
 - Abed Haque, PhD candidate (ABD 2012)
 - Adrian Maries, PhD student (post-comprehensive exam 2011)
 - Timothy Luciani, PhD student (first year 2012, NSF GRF)
 - Rebecca Hachey, MSc student (second year 2012)
 - Sean Myers, BSc student (junior 2012)

- M.Sc. Graduates
 - Adam Smith, 2012 (GDVis)
 - Wen Xu, 2011 (Microsoft)

B.Sc. Graduates (thesis/project) Tim Luciani 2011 (**NSF Graduate Research Fellowship**, Pitt CS)
 Daniel Oliphant 2010 (Google)
 Victor Powell 2010 (YinzCam)
 Matthew Seiler 2010 (Bechtel Corporation)
 Matthew Czarnek 2010 (Czarnek and Orkin Labs)
 Stephen Lauck 2009 (Force and Form)
 John Conomikes 2008 (CMU Entertainment Technology Center)

Graduate Research Advising

2011 - 2012 Abed Haque (doctoral, 4th year), Adrian Maries (doctoral, 4th year), Adam Smith (masters), Tim Luciani (doctoral, 1st year), Rebecca Hachey (masters)
 Directed study: John Wenskovich (doctoral, 1st year, co-advised)

2010 - 2011 Abed Haque (doctoral, 3rd year), Adrian Maries (doctoral, 3rd year), Adam Smith (masters), Wen Xu (masters)
 Directed study: Callen Shaw (masters), Andrew Conn (masters)

2009 - 2010 Abed Haque (doctoral, 2nd year), Adrian Maries (doctoral, 2nd year), Yao Sun (doctoral, 2nd year; *masters 2012, Amazon*), Wen Xu (masters)

2008 - 2009 Abed Haque (doctoral, 1st year), Sriranjani Mandayam (doctoral, 1st year, *masters 2010 School of Information Sciences*), Yao Sun (doctoral, 1st year)
 Directed study: Wenting Xiong, David Krebs, Adrian Maries

2007 - 2008 Yinglin Sun (doctoral, 2nd year, *masters 2011, N/A*)
 Directed study: Michael Lipschultz

Pre-2007 Directed study: Peter Sibley (Brown University), Phil Montgomery (Brown University)

Undergraduate Research Advising

2011 - 2012 Tim Luciani, Daniel Walker, Jordan Sawyer, Sean Myers, Ben Steele

2010 - 2011 Daniel Oliphant, Victor Powell

2009 - 2010 Daniel Oliphant, Matthew Seiller

2008 - 2009 Stephen Lauck, Victor Powell, Jackie Kircher

2007 - 2008 Matthew Czarnek, John Conomikes

Pre-2007 Ethan Bromberg (Brown University), Arni Jonsson (Brown University)

Examiner/Reader (Comprehensive Examinations, Thesis Committees)

2011 – 2012	Abed Haque, Michal Valko, Roxana Gheorghiu, Yingze Wang, Iyad Batal
2010 - 2011	Wen Xu, Abed Haque, Adrian Maries, Mike Lipschultz, Michal Valko, Roxana Gheorghiu
2009 - 2010	Ricardo Villamarin
2008 - 2009	Michal Valko, Ricardo Villamarin, Tomas Singliar
2007 - 2008	Tomas Singliar, Qinglan Li

Courses Taught at Pitt

CS2620 Interdisciplinary Modeling and Visualization (2009, 2011, 2012)
 CS1566 Introduction to Computer Graphics (2008, 2009, 2010, 2011, 2012)
 CS3610 Special Topics in Computer Graphics (2008, 2010)
 CS1699 Special Topics in CS: Software Engineering and Project Management (2010)
 CS1666 Principles of Videogame Design and Implementation (2011)
 CS1630 Software System Design and Management (2012)

2011 - 2012 CS2620 Interdisciplinary Modeling and Visualization. One of the final interdisciplinary projects makes the shortlist in the [Desire2Learn Edge Challenge](#) (\$25K industry competition challenging developers to build apps that improve the experience of teachers, students and administrators), and another one grows into a system demonstration at IEEE Visualization 2012. Pitt CS **Teaching Award**.

CS1630 Immersive Software-System Design and Management. Two large scale software projects resulted from this edition of the course: a prototype system for mining history, disease and climate data (commissioned by the Pitt History Department, successfully demonstrated at the CHIA Dataverse Colloquium'12), and an automated homework submission and grading system for the Pitt Academy of Science and Technology (product described as “perfect” by the commissioner.)

CS1566 Introduction to Computer Graphics. Content further extended to accommodate a ray-tracing programming assignment. For the first time ever, Pitt students were able to complete a simple *ray-tracer* (cornerstone of computer graphics education, featuring complex math and programming) as part of their coursework. Impressive final projects.

2010 - 2011 CS2620 Interdisciplinary Modeling and Visualization. Four short papers and system demonstrations resulting from interdisciplinary projects in this class were accepted into IEEE VisWeek 2011.

CS1666 Principles of Videogame Design and Implementation. I redesigned this course from scratch to emphasize the cross-disciplinarity of videogame design (artistic design, creative writing, and computer science). Pitt CS **Teaching Award**.

CS1566 Introduction to Computer Graphics. Updated the course with a speaking component: 5-minute student-pitches each class. Excellent final projects, followed by increased enrollment in the Videogame course CS1666.

2009 - 2010 CS1699 Immersive Software-System Design and Management. I developed this senior-level undergraduate course on software engineering in accordance with the Pitt Speaking in the Disciplines guidelines. The course emphasizes project management, usability testing, customer interviewing, specification of formal requirements, and oral communication, "soft skills" which will make our graduates more competitive in the global marketplace and less susceptible to off-shoring. Pitt CS **Teaching Award, top 4% courses in the School of A&S**.

CS1566 Introduction to Computer Graphics. Course content further extended to accommodate a ray-object intersections math and programming assignment. For the first time ever, Pitt students were able to compute ray-object intersections (complex math, and building block towards ray-tracing). Impressive gallery of final projects.

CS3610 Advanced Topics in Computer Graphics. I taught a new edition of the course, with emphasis on Visual Analytics and Human-Computer Interaction. The course follows the Pitt Speaking in the Disciplines guidelines to help students develop their oral communication skills. Student feedback indicates success.

2008 - 2009 CS2620 Interdisciplinary Modeling and Visualization. I developed and taught this graduate course for the first time in this lecture/assignments/final project format. The course emulates the process of scientific research, from a peer-reviewed proposal to a final report and presentations. Several projects resulted in publications and/or long-term interdisciplinary collaborations. Pitt CS **Teaching Award, top 4% courses in the School of A&S**.

CS1566 Introduction to Computer Graphics. I updated this undergraduate course to further emphasize modeling and simulation concepts; including a hot-topic GPU programming component. 100% student retention. The final projects were so compelling, I was asked to talk about this course at SIGGRAPH 2009.

2007 - 2008 CS3610 Advanced Topics in Computer Graphics. I developed and taught this graduate course for the first time this year. In it, students learned the basics of scientific modeling and visualization and emulated the process of doing interdisciplinary research by working in multi-disciplinary teams on scientific problems. The groups for each project were required to have participants from multiple disciplines, exposing them to many of the skills required for multi-disciplinary collaborative work. Pitt CS **Teaching Award**.

CS1566 Introduction to Computer Graphics. I gave this undergraduate course a much-needed re-haul. Updates include a completely new syllabus with sections on photorealism, video game design, image processing, color perception, and user interfaces.

pre-2007 Interactive Computer Graphics (Brown University CS 224, 2004). I co-designed and co-taught the 2004 edition of this research-oriented graduate level class. Full class responsibility, shared with fellow graduate students Morgan McGuire and Tomer Moscovich.

Curriculum Development

Created and proposed *Immersive Software System Design and Management* (CS 1630); approved 2010.

Proposed *Immersive Software Engineering*, Provost's ACIE award, 2009

Designed and proposed *Interdisciplinary Modeling and Visualization* (CS 2620), approved 2008.

Co-designed and co-proposed *Principles of Computer Game Design and Implementation* (CS 1666) together with Bob Daley, approved 2007.

University Service

2012 - 2013 Women in Computer Science Committee, Co-Chair; bi-monthly events

Undergraduate Recruiting and Advising Committee; besides advising, paired each diversity student advised with mentors from the Women in Computer Science community

Graduate Evaluation, Assignment and Training Committee; recitation and lab visits, evaluation and feedback to the Graduate TAs

2011 - 2012 Women in Computer Science faculty advisor and coordinator; bi-monthly events

Center for Simulation and Modeling (SAM) Advisory Board

Hosted CS "Big Data" Colloquium speakers: James Faeder (Computational Biology), Harry Hochheiser (UPMC Bioinformatics), Peter Brusilovsky (ISP), Jeffrey Newman (Astronomy), Levent Yilmaz (Engineering), Vanathi Gopalakrishnan (UPMC Bioinformatics)

2010 - 2011 Co-Chair, Distinguished Lecture Series; raised Google funding for the series

Chair, CS Colloquium

Women in Computer Science faculty advisor and coordinator; bi-monthly events

Chair, Diversity Committee; helped recruit two Hot Metal Bridge fellowships to the CS department

Center for Simulation and Modeling (SAM) Advisory Board

Hosted Colloquium speakers: Aaron Henderson (Studio Arts), Jeff Newman (Astronomy), Michael Wood-Vasey (Astronomy), William Anderst (Orthopaedics), Chris Johnson (Utah), Claudia Mello-Thoms (UPMC Bioinformatics)

2009 - 2010 Center for Simulation and Modeling (SAM) Advisory Board

Chair, CS Colloquium; helped recruit Kitware to the Pitt CS Industry Board

CS Outreach Committee; marketing departmental accomplishments via the CS website, posters, fliers etc.

CS-Day Committee; organizer Digital Media Contest

Women in Computer Science (WiCS) faculty-coordinator; regular meetings and outreach activities

Technology Leadership Initiative Advisory Board; workshop-organizing for under-represented and under-served high-school students

Hosted CS Colloquium speakers: Marcus Hanwell (Kitware Inc), Morgan McGuire (NVIDIA)

2008 - 2009 Center for Simulation and Modeling (SAM) Advisory Board

CS Colloquium Chair; helped increase corporate support for Distinguished Lecture Series from 0 to 2

Hosted CS Colloquium speakers: Joseph Konstan (Distinguished Lecturer; U. Minnesota), Fernando DeLaTorre (CMU)

CS Graduate Admissions and Financial Aid Committee

CS-Day Committee; co-organizer Digital Media Contest

CS Outreach (ad hoc) Committee; helped with international recruiting and departmental website redesign

Women in Computer Science (WiCS) faculty-coordinator; bimonthly meetings including industry guests, and outreach activities

Hosted seminar-speakers: M. Renieris (Google), M. Friedman (Public Health), M. Hanwell (Chemistry), J. Faeder (Computational Biology), G. Mustata (Drug Discovery Institute), M. Wood-Vassey and J. Newman (Astronomy).

2007 - 2008 Center for Simulation and Modeling (SAM) Organizational Committee

Women in Computer Science (WiCS) Coordinator and founder

Bioengineering and Bioinformatics Summer Institute (BBSI) Mentor

Hosted seminar-speakers: M. Renieris (Google), S. Tashman (Pitt Medical School Orthopaedics), S. Leuba (Pitt Biophysics), G. Hutchison (Chemistry), J. Faeder (Computational Biology), and N. Ebenreuter (CMU Design)

CS Graduate Admissions and Financial Aid Committee; excellent admissions record

CS Faculty Search Committee

CS-Day Committee; co-organizer Digital Media Contest

CS Outreach (ad hoc) Committee; helped with international recruiting and departmental website redesign

Memberships

ACM, SIGGRAPH, IEEE.

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