

## Andrew L. Thall, Ph.D.

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### Business Address

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Alma College  
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### Degrees

2004 Ph.D. in Computer Science, The University of North Carolina at Chapel Hill

1997 M.S. in Computer Science, The University of North Carolina at Chapel Hill

1984 B.A. in Mathematics, Kalamazoo College

### Experience

May–August 2015	Visiting Scholar at Kitware, Inc.
May–December 2014	Visiting Scholar at Kitware, Inc. (sabbatical)
January 2012 – present	Associate Professor at Alma College Department of Mathematics and Computer Science Department of Communications and New Media Studies
August 2008 – December 2011	Assistant Professor at Alma College Department of Mathematics and Computer Science
August 2007 – May 2008	Visiting Lecturer in Computer Science, UMN, Morris (UMM) Division of Science and Mathematics
August 2002 – August 2007	Assistant Professor at Allegheny College Department of Computer Science
January 1993 – May 2004	Teaching and Research Assistant at UNC-Chapel Hill Dept. of Computer Science, Dept. of Radiation Oncology

### Grants

2014–2015	NCI Grant 5R43CA165621-02: Admin. Suppl. to Quantitative Ultrasound Analysis of Vascular Morphology for Cancer Assessment. Role: co-investigator and chief researcher for GPU and hardware acceleration (Dr. Stephen Aylward, PI)
2010–2012	Support from Alma's PRISM Project (Positive Routes Into Science and Mathematics), for summer research advising and student salaries, and for participation in the ASPIRE program for incoming science students; PRISM is funded under a 5-year NSF STEP grant (Dr. David Clark, Dr. John Davis, Dr. Myles McNally, co-PIs).
2003–2006	"Teaching Computing in the 21 <sup>st</sup> Century." A <i>Buhl Foundation</i> grant to the Allegheny Department of Computer Science of \$50,000 to support new pedagogy and software development for interactive teaching. (Dr. Robert Cupper, PI)
1998–1999	"M-reps: Deformable Solid Modeling for Computer Graphics and Simulation using Medially-Defined Multifigural Objects." <i>NSF SGER (Special Grant for Exploratory Research)</i> , \$44,000 to support thesis research. (Dr. Stephen Pizer, PI)

### Honors and Awards

1997–1998	Link Foundation Fellowship to support thesis research on deformable medial models
1980–1984	F.W. & Elsie Heyl Scholarship, four-year math/science scholarship

**Professional Societies**

ACM SIGGRAPH (Association of Computing Machinery, Special Interest Group on Graphics)  
ACM SIGCSE (Special Interest Group on Computer Science Education)  
Consortium for Computing Sciences in Colleges  
IEEE Computer Society  
New Media Consortium

**Publications: Book Chapter**

S. Pizer, Q. Han, S. Joshi, P. T. Fletcher, P. A. Yushkevich, and A. Thall, "Synthesis, Deformation, and Statistics of 3D Objects via M-Reps," in *Medial Representations: Mathematics, Algorithms and Applications*, K. Siddiqi and S. Pizer, Eds., Springer, 2008, Ch. 8. Available online: <http://www.springerlink.com/content/978-1-4020-8658-8>.

**Publications: Articles**

- Andrew Thall. Fast Mersenne Prime Testing on the GPU. In *GPGPU-4: Proceedings of the Fourth Workshop on General Purpose Processing on Graphics Processing Units*, March 5, 2011, Newport Beach, CA, USA., March 2011.
- Andrew Thall. Extended-precision floating-point numbers for GPU computation. Poster at ACM SIGGRAPH Annual Conference on Computer Graphics (SIGGRAPH 06), Boston, Mass., July 30–August 3, 2006.
- Matthew J. Rummel, Gregory M. Kapfhammer, and Andrew Thall. Towards the prioritization of regression test suites with data flow information. In *SAC '05: Proceedings of the 2005 ACM Symposium on Applied Computing*, pages 1499–1504, New York, NY, USA, 2005. ACM Press.
- Stephen M. Pizer, P. Thomas Fletcher, Sarang Joshi, A. Graham Gash, Joshua Stough, Andrew Thall, Gregg Tracton, and Edward L. Chaney. A method and software for segmentation of anatomic object ensembles by deformable m-reps. *Medical Physics*, 32(5):1335–1345, May 2005.
- Joseph Zumpella and Andrew Thall. Texture synthesis using reaction-diffusion systems and genetic evolution. Poster at ACM SIGGRAPH Annual Conference on Computer Graphics (SIGGRAPH 04), Los Angeles, August 2004.
- Andrew L. Thall. *Deformable Solid Modeling via Medial Sampling and Displacement Subdivision*. PhD thesis, The University of North Carolina at Chapel Hill, March 2004.
- Qiong Han, Conglin Lu, Shawn Liu, Stephen M. Pizer, Sarang C. Joshi, and Andrew Thall. Representing multi-figure anatomical objects. In *IEEE International Symposium on Biomedical Imaging (ISBI)*, pages 1251–1254, 2004.
- Paul A. Yushkevich, P. Thomas Fletcher, Sarang C. Joshi, Andrew Thall, and Stephen M. Pizer. Continuous medial representations for geometric object modeling in 2D and 3D. *Image Vision Comput.*, 21(1):17–27, January 2003. Special issue on Generative-Model-Based Vision (GMBV2002).
- Stephen M. Pizer, P. Thomas Fletcher, Andrew Thall, Martin Styner, Guido Gerig, and Sarang C. Joshi. Object models in multiscale intrinsic coordinates via m-reps. *Image Vision Comput.*, 21(1):5–15, January 2003. Special issue on Generative-Model-Based Vision (GMBV2002).

- Stephen M. Pizer, P. Thomas Fletcher, Sarang Joshi, Andrew Thall, James Z. Chen, Yonatan Fridman, Daniel S. Fritsch, A. Graham Gash, John M. Glotzer, Michael R. Jiroutek, Conglin Lu, Keith E. Muller, Gregg Tracton, Paul Yushkevich, and Edward L. Chaney. Deformable m-reps for 3D medical image segmentation. *Int. J. Comput. Vision*, 55(2-3):85–106, 2003.
- Sarang C. Joshi, Stephen M. Pizer, P. Thomas Fletcher, Paul A. Yushkevich, Andrew Thall, and J. S. Marron. Multi-scale deformable model segmentation and statistical shape analysis using medial descriptions. *IEEE Transactions on Medical Imaging (TMI)*, 21(5):538–550, May 2002.
- Sarang C. Joshi, Stephen M. Pizer, P. Thomas Fletcher, Andrew Thall, and Gregg Tracton. Multi-scale 3-D deformable model segmentation based on medial description. In *IPMI '01: Proceedings of the 17th International Conference on Information Processing in Medical Imaging*, pages 64–77, London, UK, 2001. Springer-Verlag.
- D. Fritsch, E. Chaney, A. Boxwala, M. McAuliffe, S. Raghavan, A. Thall, and J. Earnhart. Core-based portal image registration for automatic radiotherapy treatment verification. *International Journal of Radiation, Oncology, Biology, Physics; Special Issue on Conformal Therapy*, 5(33):1287–1300, 1995.

#### **Publications: Technical Reports**

- Andrew Thall. Implementing a fast Lucas-Lehmer test on programmable graphics hardware. Technical report. Fall 2007 (rev. Fall 2009).
- Andrew Thall. Extended-precision floating-point numbers for GPU computation. Technical report. Fall 2007 (rev. Fall 2009).
- Andrew Thall. Fast  $C^2$  interpolating subdivision surfaces using iterative inversion of stationary subdivision rules. Technical Report TR02-001, Chapel Hill, NC, USA, 2000.
- P. Thomas Fletcher, Yoni Fridman, Andrew Thall, and Daniel Fritsch. SCAMP: A solid modeling program using slice-constrained medial primitives for modeling 3D anatomical objects. Technical Report TR99-035, Chapel Hill, NC, USA, 1999.

#### **Patents**

- S. Joshi, E. Chaney, S. Pizer, P. T. Fletcher, A. Thall. Methods and Systems for Modeling Objects and Object Image Data using Medial Atoms. U.S. Patent 7200251, April 3, 2007.

#### **Software Products**

- November 2009 – The patented technology listed above has been developed into a medical image analysis product by Morphormics, Inc. This product, MxStruct<sup>®</sup>, has been licensed for Accuray's MultiPlan<sup>®</sup> Treatment Planning System.

#### **Professional Contracts and Consulting**

- 2014 – Consultant for Kitware Inc. (Carrboro, NC), on development of cross-platform GPU-accelerated image-derivative software.

**Talks and Presentations**

- “An Introduction to Computing with Python for Students of Cryptanalysis.” A 4-day interactive tutorial for upper-level mathematics students in Math 221: Introduction to Cryptography. October 29–November 5, 2012, Alma College.
- “Advances in Audio Massage: a State of FLEX.” Dr. Ray Riley and Dr. Andrew Thall, a preconference workshop on Logic-Pro 9 audio processing for the New Media Consortium 2011 Annual Conference (*NMC '11*), Madison, Wisconsin, July 15, 2011.
- “Computational Arts and Sciences at Alma College” (March 18, 2011). Presentation at the Alma College Faculty Forum.
- “Fast Mersenne Prime Testing on the GPU.” Paper presentation at *GPGPU-4: The Fourth Workshop on General Purpose Processing on Graphics Processing Units*, March 5, 2011, Newport Beach, CA, USA., March 2011.
- “Why does Dr. T. run amok? (Irrational numbers are not unreasonable!)” (February 14, 2011). Presentation for the Alma College Mathematics and Computer Science Colloquium.
- “Doing What You Like: Careers in Computer Science and Digital Media.” Four 20-minute talks for Career Day at Pine Avenue Elementary School, Alma, Michigan, May 7, 2010.
- “How to Win \$100,000 by Being a Geek! (A Rousing Tale of Multiplication)” (February 9, 2010). Presentation for the Alma College Mathematics and Computer Science Colloquium.
- “Extended-Precision Floating-Point Numbers for GPU Computation” (2006). Invited talk for the Advanced Visual Computing Group, Intel Research, Cornell Oaks Campus, October 16, 2006.
- “An Infrastructure and Pedagogy to Support Interactive Teaching of Computer Science” (2005). A. Thall, B. Cupper. Invited talk at the *Liberal Arts Computer Science Consortium Annual Meeting (LACS'05)*. Rochester Institute of Technology.
- “Computer Graphics and Animation!” (2005). A learning event for 3–6 graders as part of *Super Science Saturday!* at Meadville First District Elementary School.
- “Doing Research in an Undergraduate Setting” (March 21, 2005). Presentation at Image Lunch, UNC–Chapel Hill, Dept. of Computer Science.
- “Texture Synthesis Using Reaction-Diffusion Systems and Genetic Evolution” (2004). Poster session with Joseph Zumpella (Senior Thesis), *SIGGRAPH, 31<sup>st</sup> International Conference on Computer Graphics and Interactive Techniques*, Los Angeles.
- “Doing What You Like: a Personal Perspective on Graduate School and the Ph.D.” (Feb. 2004). Presentation for the ACM Student Chapter at Allegheny College.
- “Fast Interpolating Subdivision Surfaces using Iterative Inversion of Subdivision Rules” (February 2003). Presentation to MIDAG (Medical Image Display and Analysis Group) at UNC–Chapel Hill.
- “M-reps: Medial Geometry Primitives for Image-Analysis and Computer Graphics” (2002). Invited talk, Allegheny College.
- “Shapemonger: Mathematics Visualization and Software Design” (2001). Invited talk, Kalamazoo College, Department of Mathematics and Computer Science.

**Teaching Summary**

Courses taught at Alma College, Fall 2008 – Winter 2013:

CSC 120	Object-Oriented Programming and Design: A Digital-Media Based Approach (Processing)
CSC 120	Object-Oriented Programming and Design: A Digital-Media Based Approach (Python)
CSC 120	Object-Oriented Programming and Design: A Digital-Media Based Approach (Java)
CSC 180B	Medical Image Acquisition and Analysis
CSC 220	Data Structures and Advanced Programming Techniques(Java)
CSC 230	Software Engineering
CSC 240	Algorithms and Complexity
CSC 280	Computer Game Programming (Spring Term)
CSC 310	Computer Organization
CSC 335	Interactive 3D Computer Graphics (OpenGL-based)
CSC 335	Computer Graphics and Interactive Media (Processing and OpenFrameworks-based)
CSC 420	Modern Operating Systems
CSC 430	Theory of Computation
FYS 021/101-14	The Computer as a Mirror of the World: When is a Map the Territory?
FYS 024	Research in Natural Sciences (Lab rotation supervisor)
NMS 220	Introduction to Media Programming and Computation
NMS 280A	The 24-Hour Media Challenge (Spring Term)

Independent Study, Research, and Honors Thesis work supervised at Alma College

Research in Computer Science (Robert Bixler, Fall 2011)
Research in Computer Science (GPGPU Bioinformatics) (Chris Welcher, Fall 2011)
Research in Computer Science (Numerical Physics) (Annie Bruce, PRISM summer research, 2011)
Research in Computer Science (GPGPU) (Alexander Hegedus, PRISM summer research, 2011)
Research in Computer Science (Numerical Physics) (Justin Closs, PRISM summer research, 2012)
Data Structures and Advanced Programming Techniques (Zachary Felton, Summer 2011)
Medical Image Computing (Robert Fryling, Winter 1011)
Advanced Computer Graphics (Daniel Krauss, Fall 2010/Winter 2011)
Web Programming using Adobe Flash (James Scheide, Winter 2010) (Dr. Ray Riley, co-supervisor)
Video Production (Daniel Bryan, Winter 2010)
Introduction to Object-Oriented Computing in Java (Chris Przybylski, Fall 2009)
Mobile Device Programming I & II (Michael Dickman, Fall 2009/Winter 2010)
Orbital Mechanics and the Interplanetary Transport Network (Charlie Cook, Spring 2009)

**New Courses, Course and Curricular Revisions (Alma College)**

CSC 120/ NMS 220 (Fall 2013)—An Introduction to Digital Media and Computation

A revision of the standard introductory programming curriculum, the lecture periods are replaced by interactive programming recitations, alongside weekly laboratory sessions. The Processing language and IDE is used to introduce Java syntax and semantics within a media-computation framework.

CSC 420 (Fall 2013)—Modern Operating Systems

Alongside a traditional OS curriculum involving student presentations of journal articles from the field, each student is provided a computer-on-a-board (Raspberry Pi<sup>®</sup>) and is responsible for installing and experimenting with a Linux-based OS on the device. Activities require C, Java, and ARM-assembly programming.

NMS 280A (Spring 2012)—The 24-Hour Media Challenge

The use of portable media devices, under time-constraint and through field work, to explore multimedia production. Media include digital photo-essay, video, podcasting, animation, web-comics, augmented reality, social media, and automated web-content creation. Students alternate project days with critique-and-methods days. Project days include off-campus trips to sites of environmental, cultural, or aesthetic relevance. Critique days evaluate projects and explore the societal impact of individual participation in the global media network.

FYS 101 (Fall 2011)—The Computer as a Mirror of the World: When is a Map the Territory?

A Freshman Seminar designed to teach reading, writing and oral presentation skills through study of philosophical, cultural, and economic issues raised broadly by computer simulation as seen in artificial intelligence, virtual reality, computer gaming and the media arts. A revision of the previous FYS 021, including a team-based digital media project using iPads during the orientation week, and using interactive and social media as tools and as conceptual axes for the course.

CSC 335 (Fall 2011)—Computer Graphics and Interactive Media Programming

A revision of the traditional raster graphics programming course to emphasize real-time interaction with programs via sensor and camera input. Students use both the Processing language (Java-based) and the OpenFrameworks API (C++-based) to design interactive video, audio and 3D graphics applications that respond to input from devices such as cameras, microphones, and game-controller-based motion-trackers.

ASPIRE Summer Research Program (July 9-15, 2011)

PRISM-sponsored work with three incoming first Alma students on a 1-week research project in coordination with the students working with Dr. Melissa Strait on asteroid impact studies. The CSC team was in charge of video image capture of collision events using high-speed video, and the analysis of the resulting data to determine average velocity of collision fragments based on material types.

PRISM Research for Rising Sophomores (May-August 2011)

Two students received a stipend and academic credit for faculty-mentored computational research on modern, GPU-based hardware. Topics learned included the Python, C++, and CUDA languages, algorithms for parallel number theoretic computing, and numerical methods for energy conserving solutions for orbital dynamics.

Plans for a Data and Image Computation Center for Alma College (Summer/Fall 2011)

Part of a grant application in support of innovative, interdisciplinary classroom and research experiences in mathematics and the sciences.

CSC 180 (Winter 2011)—Medical Image Analysis

A 2-credit course on digital image acquisition and analysis with emphasis on biomedical applications. Students learn the theory and practice of x-ray, CT, MRI, and ultrasound imaging, with computer exercises to understand properties of each imaging modality. This course is in support of the Health Care Signature program and is designed for students without prior computing experience.

New Media Studies Major (Winter 2011)

The faculty has approved the creation of a major in New Media Studies, combining the creation and use of digital media—image and video, audio, e-text, mobile communication, social networking, and web and app technology—with the study of its cultural, technical, economic, and artistic impact on society. This was the culmination of several years of work by an interdisciplinary group of art, communication, computer science, and music faculty.

FYS 024 (Winter 2010)—Research in the Natural Sciences, part of PRISM project, supervised laboratory rotations in computer science for students in the seminar.

FYS 021 (Winter 2010)—The Computer as a Mirror of the World: When is a Map the Territory? A Freshman Seminar designed to teach reading, writing and oral presentation skills through study of philosophical, cultural, and economic issues raised broadly by computer simulation as seen in artificial intelligence, virtual reality, computer gaming and the media arts. This course revises the Allegheny College offering from 2003 to take into account advances in social media technology.

CSC 280 (Spring 2009)—Computer Game Programming

A three-and-a-half week Spring Term intensive course on game design and implementation using Python and the Pygame library. Students work individually and then in teams to design and implement mini-projects and then a full game using 2D computer graphics, animation and digital sound. Open to majors and motivated non-majors, the course covers broad issues including the management of complexity in software design, implementation, and testing.

CSC 120 (Fall 2008)—Object-Oriented Programming and Design: A Digital-Media Based Approach

Revision of the introductory computer science course to incorporate digital image, sound, and text processing as a framework for lectures, assignments and laboratory projects. This course has been offered both in Python (2008) and in Java (2010–present).

#### **Additional Study and Scholarship**

Spanish4Faculty Program (Winter/Fall 2009), program of Spanish study for Alma faculty in support of collaborative program with Equatorial University

Visit to Equatorial University (Academia Latin Americana, Quito, Ecuador), June 2009, for language study, cultural immersion, and discussion of collaborative program with Alma College.

#### **Professional Activities (Alma College)**

*XSEDE[13]: Gateway to Discovery*, annual conference for NFS XSEDE (Extreme Science and Engineering Discovery Environment), July 22–25, 2013, San Diego, CA.

*Transforming STEM Education*, Teagle-grant sponsored Workshop, June 1–3, 2013, Augustana College, Rock Island, IL.

Judge and Organizer: Experimental Design Event, *Science Olympiad 2012/2013 Regional Final* held at Alma College, annual competition for Middle and High School students.

New Media Consortium 2011 Annual Conference (NMC '11), attendee and Pre-Conference Workshop presenter, Madison, Wisconsin, June 14–17, 2011.

First Year Seminar Workshop (June 1-2, 2011): a two-day meeting to develop curricular goals for the FYS program.

Judge: Experimental Design Event, *Science Olympiad 2011 State Finals*, annual competition for Middle and High School students.

Asst. coach for Alma Middle School Science Olympiad 2010/11 team

NMC Virtual Symposium for the Future (October 19–21, 2010, online meeting, Second Life)

NMC Virtual Symposium on New Media and Learning (March 23–25, 2010, online meeting, Hakone)

Judge: *A Forty Day Visual Feast*, national competition for scientific and artistic visualizations (March 2010)

Coach: ACM ICPC Programming Competition (November 2008 & 2009)

NMC Virtual Symposium for the Future (October 2009, online meeting, Hakone)

Teagle Meeting, Deep-Learning for Undergraduates (October 2009, Illinois-Weslayan University)

SIGGRAPH 2009 Conference (August 2009, New Orleans)

NMC Virtual Symposium on New Media and Learning (March 2009, online meeting, Second Life)

New Media Consortium Annual Conference (June 2008, Princeton University)

Member: New Media Studies faculty search committee (Fall 2011)

Member: Academic Standards Committee (Fall 2011-present)

Member: Technology Advisory Committee (Fall 2010-present)

Member: Educational Technology Committee (Fall 2009-present)

Member: New Media Studies coordinating committee (Summer 2008-present)

Member: (*ad hoc*) Health Care Administration Search Committee (Winter 2010)

Member: (*ad hoc*) Digital Media Commons public lab design committee (Summer/Fall 2008)

### **Professional Activities (pre-2008)**

Co-created a graphics, image and visualization lab at UMM as a venue for student and faculty projects. This includes a workstation with dual quad-core processors, nVidia Quadro graphics, digital projectors, and pen-tablet-based input. Fall 2007

Coached UMM team for ACM Programming Contest and Digi-Key Invitational Competition, Fall 2007

Attended UMN CSE Education and Grad Study Event (October 4, 2007); UMN CSE Open House and Technology Forum (October 5, 2007), Minneapolis

Attended 3-day Media Computation Workshop at Georgia Tech, June 2007, Atlanta.

Attended IEEE Point-Based-Graphics/Volume Graphics (PBG/VG 2006), July 29-31, Boston.

Organized steering committee for promotion of scientific computation at Allegheny College

Contributed to *RICS*, weekly interdepartmental *Research in Computer Science* colloquium

Supervised work on interactive teaching software under Buhl Grant (2004–2005)

Coached Allegheny College's teams for ACM Programming Contest (2004, 2005, 2006)

Member: Finance and Facilities Committee at Allegheny College (2005)



Participated in Allegheny College Teaching Circle program (2003–2004).

Attended the Liberal Arts Computer Science Consortium annual meeting (LACS '05) as an invited speaker

Attended ACM SIGGRAPH annual convention (1993–2006)

Participated in tutoring and computer-science outreach programs for elementary and secondary school students (2003–2007)

### Teaching Summary (pre-2008)

Courses taught at UMN-Morris, August 2007 – May 2008:

- CSci 1001 Introduction to the Computing World (Javascript/Python-based)
- CSci 1201 Digital Media Computation (Python-based introduction to computer science)
- CSci 1301 Introduction to Computer Science (Scheme-based)
- CSci 2101 Data Structures (introducing Java) (Two semesters)
- CSci 4901 Senior Seminar II: adviser on two senior projects

Courses taught at Allegheny College, August 2002 – May 2007:

- CMPSC 101/102 Intro. to Computer Science I/II
- CMPSC 111 Intro. to Computer Science I (Integrated lecture/laboratory) (Three semesters)
- CMPSC 112 Intro. to Computer Science II (Integrated lecture/laboratory)
- CMPSC 220 Programming Language Concepts (Two semesters)
- CMPSC 230 Theory of Computation and Formal Languages (Two semesters)
- CMPSC 250 Analysis of Algorithms (Four semesters)
- CMPSC 390/490 Modern Computer Graphics (Two semesters)
- CMPSC 420 Introduction to Compilers (Two semesters)
- CMPSC 550–551 Internship Seminar
- CMPSC 580 Junior Seminar—Scientific Research, Technical Writing, and Professional Practice (co-taught) (Five semesters)
- CMPSC 601 Senior Thesis (20 advisees, second reader for 18 others)
- FS 101 Freshman Seminar: The Computer as a Mirror of the World

Independent Study Courses (Allegheny College)

- Independent study on compiler design, continued from CMPSC 420 (three students)
- Independent study in computer graphics
- Independent study on GPU-based numerical computation
- Art-major's senior project on Maya 3D modeling, animation and rendering
- Weekly tutorial on C and C++ programming for Computer Graphics (6–10 students)
- Workshop on 3D Modeling, Gaming, and Media Arts (15–20 students) (ongoing)

### New Courses, Course and Curricular Revisions (Allegheny College)

CMPSC 490/390 (Spring 2003, Fall 2005)—Modern Computer Graphics

Computer graphics and interactive techniques taught using modern APIs and object-oriented design. Emphasis is also placed on geometric techniques for visualizing and manipulating objects in 3D. This course replaced CMPSC 390—Human-Computer Interaction in the current catalogue.

FS 101 (Fall 2003)—The Computer as a Mirror of the World: When is a Map the Territory?

A Freshman Seminar designed to teach reading, writing and oral presentation skills through study of philosophical, cultural, and economic issues raised broadly by computer simulation as seen in artificial intelligence, virtual reality, computer gaming and the media arts.

CMPSC 101/111 (Spring 2004, Fall 2004, Fall 2005)—Introduction to Computer Science I  
Devising and incorporating changes in the course to (a) emphasize experimentation in laboratory programming assignments, given the course's reclassification by the college as a lab-science meeting distributional requirements in the sciences; and (b) integrate interactive programming exercises into the lecture periods, given the aims of the new Alden 101 teaching lab and the Buhl Grant.

Applied Computing major (Fall 2003/Spring 2004)

Helping to draft revisions to the major needed to establish the Management and Entrepreneurship track alongside the already established Software Development track. The committee consisted of Profs. Cupper, Roos, Kapfhammer from Computer Science and Onyeiwu and Goldstein from Economics.

CMPSC 230—Theory of Computation and CMPSC 250—Analysis of Algorithms

Designing changes in the established theory courses to better teach these and other mathematically challenging courses in the Computer Science curriculum. The plan in progress (Fall 2005) will create a pair of courses to be taken by majors during their Freshman or Sophomore year placing Discrete Mathematics, Computation, and Algorithms in a unified framework.

CMPSC 580 (Spring 2005)—Junior Seminar

Helping to design and incorporate changes to better prepare students for their Senior Thesis work. These changes included more instruction on research methodology: on hypothesis design and testing; on background research, literature surveying and creation of bibliographies; and on formal document preparation.

CMPSC 360 (Spring 2006)—Scientific Computation

This course is a proposed retasking of an older Numerical Methods course to serve the needs of physical and social science students, introducing them to data structures, algorithms, and scientific methodology required to use computers effectively in scientific experimentation. Part of a general revision of computational science at Allegheny, in coordination with a committee of science, math, and economics professors. Included in this program is a weekly meeting of students and faculty to discuss computational issues in the sciences, and a weekly lecture series planned for Fall 2006 to build interest for the new course in the spring.

#### **Senior Comprehensive Thesis Advisees (Allegheny College)**

Brenda Gruber (2003)—*A Survey of Object-Oriented Software Testing*

David Kay (2003)—*Artificial Text Detection*

Michael Mong (2003)—*Effective Spam Filtering*

John Pigza (2003)—*Using Image-Stitching and Intensity-Analysis to Scan Large Images*

Elizabeth Zehner (2003)—*Using Data Mining to Detect Plagiarism*

Brian McAlister (2004)—*Effective, Realistic Rendering of Water in Interactive, Real-time Applications*

Stacy Monarko (2004)—*Customer Relationship Management: Survey of the Technology and Economic Value* (joint comp with Economics, Dr. Steven Onyeiwu, Second Reader)

Matthew Visyak (2004)—*Dynamic Parallelizing of Computationally Intensive Image Rendering for Animation*

- Joseph Zumpella (2004)—*Texture Synthesis Using Reaction-Diffusion Systems and Genetic Algorithms*
- Anthony Borres (2005)—*An Empirical Evaluation of the Performance of Tuple-Space Monitoring*
- Richard Jones (2005)—*Autostereoscopic Viewing: Surveying Current Art and Implementing Inexpensive Displays*
- Andrew Miller (2005)—*A Conceptual Framework for the Study of Schooling Behavior in Computer-Simulated Fish*
- Brandon Redding (2005)—*Computational Solution of the Antiferromagnetic Potts Model* (joint comp with Physics, Dr. Shafiq Rahman, Advisor) (Senior Prize in Physics)
- Jason Zeleznik (2005)—*Optimizing Genetic Algorithms in the Presence of a Dynamic Fitness Function* (co-advisor with Dr. Robert Roos)
- Jason Johnson (2006)—*A Survey of Game-Based Computer Science Education and Pilot Curriculum for Children*
- Matthew McGettigan (2006)—*Using Ant-Colony Optimization with the Rural Postman Problem*
- Evan Merrill (2006)—*Testing Performance of Feature-Based vs. Eigenface-Based Facial Authentication Systems* (Senior prize in Computer Science)
- Ian Volkwein (2006)—*Particle Swarms for Evolution and Augmentation of Neural Networks*
- Brian Boyle (2007)—*Game Engines as a Platform for 3D Desktop Development*
- Justin Carulli (2007)—*Modeling Terrain Erosion using Particle Systems*

### Second Reader

- (2003)—Tiffany Bennett, Jennifer Hannon, Brian Hunter, Michael McGrath
- (2004)—Jason Betts (joint comp with History, with Profs. Roos and Turk), Leonard Puciata, Matthew Rummel, Brandon Taylor, Brian Woods
- (2005)—Bryan Johnston, Christopher Lauderdale, Thomas Richardson
- (2006)—Kerron Kalloo, Warren Wright
- (2007)—Vahid Azamtarrhian, James Carl, Steven Hazen