

## James Ross Miller

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### **Education**

- Ph.D., December 1979, Purdue University, Computer Science, Thesis Title: *A Computer Graphics System for Macromolecular Model Building*
- M.S., December 1976, Purdue University, Computer Science, Major Areas: Computer Graphics and Languages
- B.S., May 1975, Iowa State University, Computer Science, Graduated With Distinction in Honors Program with Minors in Mathematics, Physics, and German

### **Professional Experience**

- August 1993 - present: Associate Professor, Department of Electrical Engineering and Computer Science, The University of Kansas, Lawrence, Kansas
- August 1987 - August 1993: Associate Professor, Department of Computer Science, The University of Kansas, Lawrence, Kansas
- August 1981 - August 1987: Adjunct Professor, Computer Science Department, University of Minnesota, Minneapolis, Minnesota
- February 1980 - August 1987: Senior Consultant, CIM Division, Control Data Corporation, Arden Hills, Minnesota
- August 1975 - December 1979: Technical Staff, Purdue University Computing Center, West Lafayette, Indiana

### **Research Activities**

James R. Miller has active research and teaching interests in computer graphics, visualization, geometric and solid modeling, image rendering, interactive techniques, object-oriented programming, technology in education, and web-based applications. After receiving his Ph.D., Dr. Miller spent eight years working in industry before returning to academia at the University of Kansas in 1987. Dr. Miller is the co-Director of the eLearning DesignLab (eDL; <http://elearn.design.org>), a research laboratory that is pursuing research related to the development of technology in education. The lab has developed an extensive amount of online and distance education courses and related content.

Miller has active collaborations with faculty in other departments pursuing applications of Scientific Visualization. For example, he has been involved with faculty in geography with expertise in computational climatology models developing associated visualization techniques that allow global climatology results with associated confidence measures (i.e., uncertainty modeling and visualization) to be used in collaborative decision support applications. He is also working with faculty in math on multidimensional visualization projects.

In the area of geometric and solid modeling, Miller has published work on topics including robust geometric representations and analytical techniques, and multiple representation Solid Modeling architectures. Miller has developed a Geometric Modeler called *cryph* that is used as a research and teaching tool. This system maintains a dual representation CSG-Brep model for solid objects defined with quadric surfaces. In addition to solid modeling, *cryph* also includes support for Bezier, rational Bezier and NURBS curves and surfaces.

Dr. Miller has an active interest in the field of Computer Graphics in general. He teaches the Introduction to Computer Graphics course at the senior undergraduate level and has taught various graduate courses in Advanced Graphics, Visualization, and Geometric Modeling.

### **Refereed Journal Publications**

- [A.1] J. R. Miller, S. S. Abdel-Meguid, M. G. Rossmann, and D. C. Anderson, A Computer Graphics System for the Building of Macromolecular Models into Electron Density Maps, *Journal of Applied Crystallography*, 1981, pp 94-100.
- [A.2] J. R. Miller, Sculptured Surfaces in Solid Modeling: Issues and Alternative Approaches, *IEEE Computer Graphics and Applications*, Vol. 6, No. 12, December 1986, pp 37-48.
- [A.3] J. R. Miller, Geometric Approaches to Nonplanar Quadric Surface Intersection Curves, *ACM Transactions on Graphics*, Vol. 6, No. 4, October 1987, pp 274-307.
- [A.4] J. R. Miller, Analysis of Quadric Surface Based Solid Models, *IEEE Computer Graphics and Applications*, Vol. 8, No. 1, January 1988, pp 28-42.
- [A.5] J. R. Miller, Architectural Issues in Solid Modeling, *IEEE Computer Graphics and Applications*, Vol. 9, No. 5, September 1989, pp 72-87. (Reprinted in entirety in [G.1])
- [A.6] E. Chionh, R. N. Goldman, and J. R. Miller, Using Multivariate Resultants to Find the Intersection of Three Quadric Surfaces, *ACM Transactions on Graphics*, Vol. 10, No. 4, October 1991, pp. 378-400.
- [A.7] J. R. Miller and R. N. Goldman, Using Tangent Balls to Find Plane Sections of Natural Quadrics, *IEEE Computer Graphics and Applications*, Vol. 12, No. 2, March 1992, pp. 68-82.
- [A.8] J. R. Miller, Incremental Boundary Evaluation Using Inference of Edge Classifications, *IEEE Computer Graphics and Applications*, Vol. 13, No. 1, January 1993, pp. 71-78.
- [A.9] J. R. Miller and R. N. Goldman, Geometric Algorithms for Detecting and Calculating All Conic Sections in the Intersection of Any Two Natural Quadric Surfaces, *Computer Vision, Graphics, and Image Processing*, Vol. 57, No. 1, January 1995, pp. 55-66.
- [A.10] J. R. Miller, Vector Geometry for Computer Graphics, *IEEE Computer Graphics and Applications*, Vol. 19, No. 3, May/June 1999, pp. 66-73.
- [A.11] J. R. Miller, Applications of Vector Geometry for Robustness and Speed, *IEEE Computer Graphics and Applications*, Vol. 19, No. 4, July/August 1999, pp. 68-73.
- [A.12] J. R. Miller and A. L. Melott, Integrating Mathematics and Science Education Using the Powers of Ten, *Journal of Technology and Teacher Education*, Vol. 7, No. 2, 1999, pp. 87-96. (Solicited expanded version of [B.10].)
- [A.13] J. R. Miller and J. D. Porter, Using Metaclasses to Support Dynamic User-Defined Parametric Modeling Primitives, *International Journal of Computers and Their Applications*, Vol. 9, No. 4, December 2002, pp. 241-249.
- [A.14] D. C. Cliburn, J. J. Feddema, J. R. Miller, and T. A. Slocum, The Design and Evaluation of a Collaborative Decision Support System In a Water Balance Application, *Computers and Graphics*, Vol. 26, No. 6, December 2002, pp. 931-949.
- [A.15] J. R. Miller, The Remote Application Controller, *Computers and Graphics*, Vol. 27, No. 4, August 2003, pp. 605-615.
- [A.16] T. A. Slocum, D. C. Cliburn, J. J. Feddema, and J. R. Miller, Evaluating the Usability of a Tool for Visualizing the Uncertainty of the Future Global Water Balance, *Cartography and Geographic Information Science*, Vol. 30, No. 4, October 2003, pp. 299-317.
- [A.17] J. R. Miller and E. A. Gavosto, The Immersive Visualization Probe for Exploring  $n$ -Dimensional

Spaces, *IEEE Computer Graphics and Applications*, Vol. 24, No. 1, January/February 2004, pp. 76-85.

- [A.18] K. Schueler, J. R. Miller, R. Hale, Approximate Geometric Methods in Application to the Modeling of Fiber Placed Composite Structures, *ASME Journal of Computing and Information Science in Engineering*, Vol. 4, No. 3, September 2004, pp. 251-256.
- [A.19] J. R. Miller, Attribute Blocks: A Tool for Visualizing Multiple Continuously-Defined Attributes, *IEEE Computer Graphics & Applications*, Vol. 27, No. 3, May/June 2007, pp. 57-69.
- [A.20] J. R. Miller, Multivariate Visualization on Parametric Surfaces, *Computer-Aided Design & Applications*, Vol. 5, Nos. 1-4, 2008, pp. 142-152 (published version of [B.20]).
- [A.21] J. R. Miller and T. Gaskins, Computations on an Ellipsoid for GIS, *Computer-Aided Design & Applications*, Vol. 6, No. 4, 2009, pp. 575-583 (published version of [B.21]).
- [A.22] J. A. Ehrlich and J. R. Miller, A Virtualized Environment for Teaching Social Skills: AViSSS, *IEEE Computer Graphics & Applications*, Vol. 29, No. 4, July/August 2009, pp. 10-16. (This paper was highlighted in the August 2009 issue of *Computing Now*, a web site featuring content from the IEEE Computer Society's 13 magazines.)
- [A.23] J. R. Miller, *freeform*. A Tool for Teaching the Mathematics of Curves and Surfaces, *Computer-Aided Design & Applications*, Vol. 7, No. 2, June 2010, pp. 257-267.

### **Published Refereed Conference Papers**

- [B.1] J. R. Miller, D. R. Starks, M. D. Hastings, and D. C. Anderson, An Evolving Volume-Modeling Based CAD/CAM System, *MIT Conference on CAD/CAM Technology in Mechanical Engineering*, March 24-26, 1982, pp. 33-53.
- [B.2] D. Dori and J. R. Miller, Dynamic 3-D Visualization of Dimensions and Tolerances on Solid Models Using ANSI Standard, *Proceedings ASME Conference on Design Automation*, Chicago, September 16-19, 1990, pp. 137-143.
- [B.3] J. R. Miller, On Feature-Based Modeling in a Dual CSG-BRep Solid Modeling Environment, *Proceedings Ausgraph '90*, Melbourne, Australia, September 10-14, 1990, pp. 393-402.
- [B.4] R. N. Goldman and J. R. Miller, Combining Algebraic Rigor With Geometric Robustness For the Detection and Calculation of Conic Sections in the Intersection of Two Natural Quadric Surfaces, *Proceedings ACM Symposium on Solid Modeling Foundations and CAD/CAM Applications*, Austin, Texas, June 5-7, 1991, pp. 221-231.
- [B.5] J. R. Miller, Incremental Boundary Evaluation For Nonmanifold Partially Bounded Solids, *Graphics Interface '95*, Québec City, 15-19 May 1995, pp. 187-195.
- [B.6] C. Deniau, M. Swink, R. Aust, J. Evans, S. Gauch, J. Miller, and D. Niehaus, The UNITE Project: Distributed Delivery and Contribution of Multimedia Objects Over the Internet, *Proceedings INET '95: The Fifth Annual Conference of the Internet Society*, Honolulu, Hawaii, June 27-30, 1995, pp. 91-99.
- [B.7] K. R. Demarest, J. R. Miller, J. A. Roberts, and C. Tsatsoulis, Electrical Engineering vs. Computer Engineering vs. Computer Science: Developing Three Distinct but Interrelated Curricula, *Proceedings of the 1995 IEEE Frontiers in Education Conference*, Atlanta, GA, November 1-5, 1995, pp. 4b2.1-4b2.4.
- [B.8] J. R. Miller, Class Relationships and User Extensibility in Solid Geometric Modeling, *Proceedings Second Conference on Object-Oriented Technologies and Systems*, Toronto, June 1996, pp. 209-218.
- [B.9] J. R. Miller and M. R. Raje, User Tailorability in Computer-Aided Geometric Modeling, *Proceedings of the ISCA 12th International Conference on Computers and Their Applications*, Tempe, Arizona, March 1997, pp. 280-283.

- [B.10] J. R. Miller and A. L. Melott, Integrating Mathematics and Science Education Using the Powers of Ten, *Technology and Teacher Education Annual: Proceedings of SITE 97*, Orlando, Florida, April 1997, pp. 1250-1253. (Earned a “Best Paper” award.)
- [B.11] E. A. Gavosto, J. R. Miller, and J. Sheu, Immersive 4D Visualization of Complex Dynamics, *Workshop on New Paradigms in Information Visualization and Manipulation (NPIV '98)*, Bethesda, Maryland, November 1998, pp. 96-99.
- [B.12] J. R. Miller and J. D. Porter, Interactive Construction and Use of Part Family Models, *Proceedings of the Seventeenth IASTED International Conference, Applied Informatics*, M. H. Hamza, editor, February 1999, pp. 569-571.
- [B.13] J. R. Miller and J. D. Porter, Object-Oriented Techniques for Parametric Modeling Primitives, *Proceedings of the ISCA 14th International Conference on Computers and Their Applications*, R. Y. Lee, editor, April 1999, pp. 305-308.
- [B.14] J. R. Miller, The Design of an Object-Oriented Toolkit for Geometric Operations, *Proceedings 3rd Annual IASTED International Conference on Software Engineering and Applications*, October 6-8, 1999, Scottsdale, Arizona, pp. 385-390.
- [B.15] J. R. Miller, D. C. Cliburn, J. J. Feddema, and T. A. Slocum, Modeling and Visualizing Uncertainty in a Global Water Balance Model, *Proceedings ACM Symposium on Applied Computing (SAC 2003)*, March 9-12, 2003, Melbourne, Florida, pp. 972-978. (38% acceptance)
- [B.16] J. R. Miller, S. Yengulalp, and P. L. Sterner, A Framework for Collaborative Control of Applications, *Proceedings ACM Symposium on Applied Computing*, March 2005, pp. 1244-1249. (36% acceptance)
- [B.17] E. L. Meyen and J. R. Miller, A System for Creating and Managing Reusable Learning Objects, *Proceedings of the Sixth IASTED International Conference on Web-Based Education*, March 14-16, 2007, Chamonix, France, pp. 353-358.
- [B.18] J. R. Miller, Multivariate Visualization with Attribute Block Displays, *Proceedings WSCG '2008, 16th International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision*, February 4-7, 2008, Plzen, Czech Republic.
- [B.19] J. R. Miller, Visualizing Multiple Uncertainty Sources, *Proceedings 10th IASTED International Conference on Computer Graphics and Imaging (CGIM 2008)*, February 13-15, 2008, pp. 255-260, Innsbruck, Austria.
- [B.20] J. R. Miller, Multivariate Visualization on Parametric Surfaces, *CAD '08*, Florida, June 2008, (published as [A.20]).
- [B.21] J. R. Miller and T. Gaskins, Computations on an Ellipsoid for GIS, *CAD '09*, Reno, Nevada, June 2009, (published as [A.21]).
- [B.22] J. R. Miller, *freeform*: A Tool for Teaching the Mathematics of Curves and Surfaces, *CAD '10*, Dubai, UAE, June 2010, (published as [A.23]).

### ***Papers Accepted and/or In Press***

[C.1]

### ***Unpublished Conference Presentations***

- [D.1] D. Dori and J. R. Miller, Dynamic 3-D Visualization of Dimensions and Tolerances on Solid Models Using ANSI Standard, *SIAM Conference on Geometric Modeling*, Tempe, Arizona, November 1989.
- [D.2] J. R. Miller, Solid Modeling: Architectures and Boundary Representations, *SIAM Conference on Geometric Modeling*, Tempe, Arizona, November 1989.

- [D.3] J. R. Miller, Aspects of Nonmanifold Boundary Evaluation on Partially Bounded Solids, *IFIP WG 5.2 Workshop on Geometric Modeling*, Rensselaerville, New York, June 17-21, 1990.
- [D.4] J. R. Miller, Feature-Based Modeling Using a Dual CSG-BRep Engine, *SIAM Conference on Geometric Modeling*, Tempe, Arizona, November 1991.
- [D.5] J. R. Miller, Using Boundary Evaluation for Partially Bounded Solids and C++ Class Hierarchies for User Extensibility, *Third SIAM Conference on Geometric Design*, Tempe, Arizona, November 1993.
- [D.6] T. A. Slocum, J. J. Feddema, D. C. Cliburn, and J. R. Miller, Visualizing Uncertainty in Global Water Budget Simulations, North American Cartographic Information Society, Portland, Oregon, October 3-6, 2001.

### **Technical Reports and Other Publications**

- [E.1] J. R. Miller, D. R. Starks, M. D. Hastings, and D. C. Anderson, A System for Modeling and Analyzing Complex Parts and Assemblies, *Industrial Research and Development*, January 1983.
- [E.2] R. N. Goldman and J. R. Miller, *Detecting and Calculating Conic Sections in the Intersection of Two Natural Quadric Surfaces, Part I: Theoretical Analysis*, University of Kansas, Department of Computer Science Technical Report TR-93-1, January 1993, 35 pages.
- [E.3] J. R. Miller and R. N. Goldman, *Detecting and Calculating Conic Sections in the Intersection of Two Natural Quadric Surfaces, Part II: Geometric Constructions for Detection and Calculation*, University of Kansas, Department of Computer Science Technical Report TR-93-2, January 1993, 28 pages.
- [E.4] J. R. Miller, *Some Notes on Ray Tracing Planes, Polygons, and Solids*, DesignLab Technical Report DL-1997-02, January 1997.
- [E.5] J. R. Miller, *The Mathematics of Graphical Transformations: Vector Geometric and Coordinate-Based Approaches*, DesignLab Technical Report DL-1997-03, January 1997 (Current revision: May 2, 2003), 103 pages.

### **Papers Submitted and/or in Progress**

- [F.1] J. R. Miller, metaview: An Interactive 3D Visualization Tool for Learning About Viewing in 3D, submitted to *ASEE Advances in Engineering Education*, December 2010.
- [F.2] E. A. Gavosto and J. R. Miller, Visualization of Data on Unfolded Hypercubes, submitted to *Journal of Visualization*, April 2011.

### **Books and Book Chapters**

- [G.1] J. R. Miller, Architectural Issues in Solid Modeling, book chapter in *Visualization*, W. E. Rodriguez, McGraw-Hill, 1990. (reprinted from A.5)

### **M.S. Student Supervision As Major Advisor and Committee Chair**

1. Patrice Jean-Luc Lahouze, *Efficient Ray Tracing of Bezier Patches Using Resultants*, Computer Science, University of Minnesota, May 1989.
2. Nezar Gharbia, *Parameterization of Cubic Algebraic Surfaces: A Practical Implementation*, Computer Science, University of Kansas, May 1992.
3. Charles McKinley, *An Efficiency Technique for Solid Modeling*, Computer Science, University of Kansas, May 1991.
4. Chingchi Billy Hsu, *Automatic Restructuring of CSG Trees Based on Active Zone*

- Analysis*, Computer Science, University of Kansas, May 1991.
5. Yin Tan, *Polygonalization of Implicit Algebraic Surfaces*, Computer Science, University of Kansas, January 1993.
  6. See Wai Fu, *Intersections of Implicit Surfaces*, Computer Science, University of Kansas, May 1993.
  7. Biren Kadakia, *A Comparison of Destructive and Non-destructive Compression Schemes Used in Computer Graphics*, Computer Science, University of Kansas, Spring 1993.
  8. Gary Shea, *Radiosity Rendering With Specular Shading*, Computer Science, University of Kansas, May 1994.
  9. John Miller, *Generating CSG Representations of Connected Faces on Solids*, Computer Science, University of Kansas, May 1994.
  10. Yong Zuo, *A Refined Algorithm for Parametric Surface Intersection*, Computer Science, University of Kansas, Spring 1996.
  11. Chris Raile, Computer Science, University of Kansas, ABD.
  12. Jeff Porter, *Using Metaclasses for the Dynamic Generation of Parametric Modeling Primitives*, Computer Science, University of Kansas, April 1997.
  13. Milind Raje, *Application of Parametric Modeling Techniques to User-Defined Modeling Primitives*, Computer Science, University of Kansas, August 1997.
  14. Daniel Cliburn, Computer Science, University of Kansas, May 1999.
  15. Courtlan Telford, *Kansas Precipitation Visualization Information System*, Computer Science, University of Kansas, June 2000.
  16. Wayne Miller, *Exploiting Coherency to Perform Efficient Rectangle Intersections in Two Dimensions*, Computer Science, University of Kansas, December 2001.
  17. Tyler Palmer, *The Application of a Distribution Object Infrastructure to Heterogeneous Enterprise Computation of Continual Queries*, Computer Science, University of Kansas, December 2001. (originally Ambler)
  18. Kurt Schueler, *Approximate Geometric Methods for the Modeling of Offset Curves and Laminate family Curves in Application to Fiber Placed Composite Structures*, Computer Science, University of Kansas, May 2002.
  19. Joe Shannonhouse, *A Framework for Building High Performance Computing Environments*, Computer Science, University of Kansas, May 2002.
  20. Johnny Tabash, *Towards a Framework for Distributed Scientific Visualization*, Computer Science, University of Kansas, May 2002.
  21. Serhan Yengulalp, *A Robust Collaborative Distributed Application Framework*, Computer Science, University of Kansas, May 2002.
  22. Mary Heimovics, *A Visual Query User Interface for the Specification and Scientific Analysis of Continual Queries*, Computer Science, University of Kansas, July 2002. (originally Ambler)
  23. Kenny Conklin, *The Sticky Push: An Interactive Pointing Guide Used to Maximize Utilization of Screen Space on Handheld Devices*, Computer Science, University of Kansas, May 2003.
  24. Patrick Sterner, *Using XML to Distribute User Interfaces*, Computer Science, University of Kansas, June 2003.
  25. Anthony Neumann, *Enhanced Water Balance Model Application*, Computer Science, University of Kansas, May 2005.
  26. Mark Adams, M.S., Computer Science, December 2006.
  27. Ganta Viswanath Chowdary, M.S. Computer Science, July 2007.
  28. Jyothermayee Dass, M.S., Computer Science, January 2008.

29. Adnan Chaudhry, M.S. Computer Science, April 2008.
30. Arif Joarder, M.S. Computer Science, December 2008.
31. Andrew Ozor. M.S. Computer Science, 2009.

**Ph.D. Student Supervision As Major Advisor and Committee Chair**

1. Daniel Cliburn, *Representing Multiple Uncertainties and Evaluating Usability in a Spatial Decision Support System*, Computer Science, University of Kansas, August 2001.
2. Richard Brownrigg, *Data Visualization with Space-Time Maps*, Computer Science, University of Kansas, May 2005.
3. Serhan Yengulalp, Computer Science, University of Kansas, (on hold; left program after passing qualifier).
4. Johnny Tabash, Computer Science, University of Kansas, (on hold; left program after passing qualifier).
5. Bryan Banz, Computer Science, University of Kansas, (in progress).
6. Justin Ehrlich, *The Effect of Desktop Illumination Realism on a User's Sense of Presence in a Virtual Learning Environment*, Computer Science, University of Kansas, May 2010.

**M.S. Student Supervision As Committee Member**

1. James Shelton, *The G Graphics Programming Language*, Computer Science, University of Kansas, 1986.
2. Kok-Lau Lee, *Portable Asynchronous X.25 Protocol and Bridge Design*, Computer Science, University of Kansas, April 1988.
3. Mohideen Nordeen, *Clustering Using Rough Set Theory*, Computer Science, University of Kansas, July 1988.
4. Ashwin Rao, *Speech Recognition Using Rough Sets*, Computer Science, University of Kansas, 1989.
5. Thomas Magliery, *An Interactive Graphics Editor and Simulator for Power Tier Automata*, Computer Science, University of Kansas, August, 1989.
6. James D. Johnston, *An Analytical Comparison of the Butterfly Switch and Hypercube Architectures*, Computer Science, University of Kansas, December 1990.
7. Arif A. Sheikh, *A Persistent Computer Network Simulator*, Computer Science, University of Kansas, December 1990.
8. Hai-Ying Vincent Yu, *Dynamic Segment Generation and Event Handling in the G Graphics Programming Environment*, Computer Science, University of Kansas, May 1991.
9. Joseph Dowell, *Detection of Arrows in Engineering Drawings: A Self-Supervised Approach to Pattern Recognition*, Computer Science, University of Kansas, December 1991.
10. Cheng-Jen Gwo, *Compiling G for IRIS Workstations*, Computer Science, University of Kansas, December 1991.
11. Patricia E. Spencer, *Kasten's Attribute Evaluation Algorithm: An Implementation of a Theoretical Model*, Computer Science, University of Kansas, Spring 1992.
12. Ravindra K. Aithal, *Virtual Color Mapping in Windowing Environments*, Computer Science, University of Kansas, May 1992.
13. Nilesch Desai, *The Genetics of Form*, (M.F.A.), Department of Design, Spring 1993.
14. Charles R. Denneler, *A Visual Editor for Formulate*, Computer Science, University of Kansas, Spring 1993.
15. Susan Siegler, *Partition Triples as a Tool For Decision Table Compression in Machine Learning*, Computer Science, University of Kansas, Summer 1993.

16. Richard Brownrigg, *A Comparative Study of Three Optimization Techniques for ray Tracing*, Computer Science, University of Kansas, Summer 1993.
17. Jun Chen, *A Comparison of Interconnection Topologies in Virtual Shared Memory Multi-Processors*, Computer Science, June 1995 (advisor: Wallace).
18. Cedric Deniau, *UNITE*, Electrical Engineering, University of Kansas, July 1995 (advisor: Evans).
19. Janell Haskins, *On Security for Personal Computers/Workstations*, Computer Science, University of Kansas, July 1995 (advisor: Schweppe).
20. Felix Fernandes, Computer Science, University of Kansas, 1995.
21. Jay Peterson, Computer Science, University of Kansas, 1996 (advisor: J. Gauch).
22. Brett Close, *Load-Balanced Parallelized Image-Processing Using Heterogeneous Workstation Clusters*, Computer Science, University of Kansas, August 1996 (advisor: J. Gauch).
23. Kathy Coggins, Computer Science, University of Kansas, August 1997 (advisor: Ambler).
24. Sylvain Bouix, *VISION: Segmentation, Indexing and Retrieval of Digital Videos*, Computer Science, 1998 (advisor: J. Gauch).
25. Aaron Johnson, Mathematics, November 1998. (advisor: Gavosto)
26. Todd Smith, Computer Science, January 1999. (advisor: J. Gauch)
27. Enlian Chong, University of Kansas, anticipated February 1999.
28. Yan Wang, University of Kansas, April 1999.
29. Alexander Pretschner, Computer Science, June 1999 (advisor: J. Gauch).
30. Eshwar Rao Yedavalli, Computer Science, December 1999.
31. Daniel Collins, Computer Science, December 1999 (advisor: Agah).
32. Ipshita Chakrabarti, December 1999.
33. Christopher Brull, Mathematics, September 2002 (advisor: Gavosto).
34. Jennifer Parkinson, Computer Science, September 2002 (advisor: Kong).
35. Tzvetelina D. Maneva, Computer Engineering, February 2005 (advisor: J. Gauch).
36. Robert (Babak) Yeganeh, Computer Science, University of Kansas, June 2006 (advisor: J. Gauch).
37. Erin Carmody, M.S. Math, June 2007 (advisor: Gavosto).
38. Manjunath Narayana, M.S. Computer Engineering, July 2007 (advisor: Haverkamp).
39. Matthew Cook, M.S. Computer Science, August 2007 (advisor: Agah).
40. Vinay Reddy, M.S. Computer engineering, August 2007 (advisor: S. Gauch).
41. Lijun Guo, M.S. Computer Science, March 2008 (advisor: Grzymala-Busse).
42. Mark Soenen, M.S. Computer Science, July 2008 (advisor: Agah).

#### **Ph.D. Student Supervision As Committee Member**

1. Margaret Burnett, *Data Abstraction in Declarative Visual Languages*, Ph.D., Computer Science, University of Kansas, August 1991.
2. George F. Frazier, *Formal Models for managing Spatiotemporal Data*, Ph.D., Computer Science, University of Kansas, Spring 1993.
3. Guijun Wang, Ph.D., Computer Science, University of Kansas, October 1996 (advisor: Ambler).
4. Lindsey Spratt, Ph.D., Computer Science, University of Kansas, December 1996 (advisor: Ambler).
5. Jennifer Pauls, Ph.D., Physics, December 1997 (advisor: Melott).
6. Chien-Hsiung Chen, *Color in Human-Computer Interaction*, Ph. D., Interdisciplinary Studies, University of Kansas, April 1998.

7. Yong Duk Lee, Ph. D., Computer Science, University of Kansas, 1999. (advisor: Wallace)
8. Wehnsiang Lai, Ph.D. Mechanical Engineering, April 1999. (advisor: Faddis)
9. Jennifer Leopold, Ph.D., Computer Science, May 1999 (advisor: Ambler).
10. Robert Juliano, Ph. D., Computer Science, University of Kansas, January 2000 (advisor: Wallace).
11. Kusol Prommul, Ph.D., Mechanical Engineering, July 2000 (advisor: Faddis).
12. John Dreher, Ph.D., Mechanical Engineering, December 2000 (advisor: Faddis).
13. Hugh Howard, Ph.D., Geography, 2003. (advisor: Slocum)
14. David-Michael Allen, Ph. D. Theater/Fine Arts, December 2004.
15. Feiqi Zhang, Ph.D. Mechanical Engineering, December 2005. (advisor: Faddis)
16. Bryce Baker, Ph.D., Mechanical Engineering, in progress. (advisor: Faddis)
17. Min Hou, Ph. D., Mechanical Engineering, December 2008. (advisor: Faddis)
18. Daniyal Alghazzawi, Ph.D. Computer Science, June 2007 (advisor: J. Gauch).
19. Kabe Moen, Ph.D. Mathematics, April 2009 (advisor: R. Torres).
20. Yaling Liu, Ph.D. Computer Science, expected July 2009, (advisor: Agah).

### **Some Recent External Research Grants and Contracts**

- **08/06-08/09:** NSF; Preparing Students with Learning Disabilities for Careers in Math and Science by Achieving Curriculum Standards; \$299,867
- **08/06-07/09:** NSF; A Virtual Reality Laboratory and Curriculum for Undergraduates, \$103,490.
- **08/07-07/09:** U.S. Department of Education, *Animated Visual Supports for Social Skills (AViSSS): Steppingstones of Technology Innovation*, \$400,000.

### **Major Courses Taught**

EECS 168:	Programming I ("CS1")
EECS 268:	Programming II ("CS2")
EECS 368:	Programming Language Paradigms
EECS 672:	Introduction to Computer Graphics
EECS 690:	Object-Oriented Programming
EECS 773:	Advanced Graphics
EECS 774:	Geometric Modeling
EECS 775:	Visualization

### **Major Teaching Tools Developed**

- I developed an interactive tool illustrating properties and various construction and editing techniques for a variety of curves and surfaces including Bezier, rational Bezier, and NURBS curves and surfaces. I use this tool regularly in class for my graphics and geometric modeling classes.
- I have developed a tool called *metaview* that I use in my graphics classes to teach how graphics systems define views and view coordinate systems in 3D. For example, it shows a 3D representation of a graphical object along with a representation of the eye coordinate system and view volume, showing the resulting projected image in a separate window. The various objects can be interactively adjusted so that the effects on the view can be immediately seen. The system can be accessed at <http://people.eecs.ku.edu/~miller/Courses/JOGL/metaview.jnlp>.
- The low-level point, vector, and matrix utilities used by both *cryph* and *metaview* have been released as open source tools.

### **Courses Taught By Semester Starting Fall 1993**

Fall 1993: EECS 672, EECS 773  
Spring 1994: EECS 672, EECS 774  
Fall 1994: EECS 672, EECS 773  
Spring 1995: EECS 288, EECS 672  
Fall 1995: EECS 288, EECS 774  
Spring 1996: EECS 288, EECS 672  
Fall 1996: *sabbatical*  
Spring 1997: EECS 288, EECS 774  
Fall 1997: EECS 288, EECS 672  
Spring 1998: EECS 288, EECS 288 lab, EECS 773  
Fall 1998: EECS 288, EECS 774  
Spring 1999: EECS 268, course release  
Fall 1999: EECS 268, EECS 672  
Spring 2000: EECS 672, EECS 808  
Summer 2000: EECS 268  
Fall 2000: EECS 774, EECS 804  
Spring 2001: EECS 672, EECS 808  
Summer 2001: EECS 804  
Fall 2001: EECS 168, EECS 773  
Spring 2002: EECS 168, EECS 672  
Summer 2002: EECS 672  
Fall 2002: EECS 268, EECS 774  
Spring 2003: EECS 268, [EECS 498: Honors Research; 1]  
Summer 2003: EECS 672  
Fall 2003: EECS 268, EECS 773  
Spring 2004: EECS 672, EECS 700  
Fall 2004: EECS 774  
Spring 2005: EECS 672, EECS 700  
Fall 2005: EECS 773  
Spring 2006: EECS 672, EECS 774  
Fall 2006: EECS 268, EECS 368  
Spring 2007: EECS 672, EECS 700  
Fall 2007: EECS 268, EECS 773  
Spring 2008: EECS 168, EECS 672  
Fall 2008: *sabbatical*  
Spring 2009: EECS 672, EECS 775

### **Selected External Professional Activities**

- Senior Member, Association for Computing Machinery (ACM)
- Senior Member, IEEE
- Member, ACM SIGGRAPH
- Member, International Program Committee for *CSG '96 - Set Theoretic Solid Modeling: Techniques and Applications*, April 17-19, 1996, Winchester, UK.
- Member, International Program Committee for 1997 *Fourth ACM Symposium on Solid Modeling and Applications*

- Member, International Program Committee for *CSG '98 - Set Theoretic Solid Modeling: Techniques and Applications*, April 1-3, 1998, Winchester, UK.
- Member, International Program Committee for 1999 *Fifth ACM Symposium on Solid Modeling and Applications*

### **Recent Department Activities**

- Chair, PhD Qualifying Exam Committee (1999 – present)
- Chair, ad hoc C.S. Curriculum Review Committee (2004 – 2006)
- Member, EECS Undergraduate Committee (1994 – present)
- Member, Departmental Awards Committee (1999 – present)
- Scheduling Officer (2007 – present)

### **Recent School & University Activities**

- Member, GIS Steering Committee (2003 – present)
- Treasurer, Phi Kappa Phi Scholastic Honorary
- School of Engineering Computer Committee (1999 – 2003)
- Member University Senate and its Academic Procedures and Policies Committee (1998 – 1999)

### **Selected Invited Talks**

- Multivariate Visualization and Applications to Uncertainty, invited seminar for Department of Geological and Atmospheric Sciences, Virtual Reality Applications Center, Iowa State University, Ames, Iowa, September 26, 2006.
- Building a Collaborative Visualization Environment, invited seminar for the Kansas Center for Advanced Scientific Computing, January 26, 2001.
- Graphics Applications Programming, Seminar for the Kansas Center for Advanced Scientific Computing, March 6, 1998.
- Science, Technology, and Computers, University of Missouri-Kansas City, November 12, 1995.
- Information Systems, University of Missouri-Kansas City, November 11, 1995.

### **Service to Community and State**

- Board of Directors, The Arc of Douglas County (board member since 1989; Vice President, 1994-1995; President January 1996 - December 1999)
- Board of Directors, The Arc of Kansas (January 1996 - December 1999)  
The Arc is an organization that provides advocacy, education, and referral services to individuals with developmental disabilities and their families. It has local ([www.arc.lawrence.com](http://www.arc.lawrence.com)), state, and national presence ([www.thearc.org](http://www.thearc.org)).
- Board of Directors, Lawrence Partnership for Children and Youth (2000-2003)

### **Honors and Awards**

- Boeing A. D. Welliver Faculty Summer Fellowship Awardee, Summer 2004. (Six week on-site program)
- Phi Beta Kappa Scholastic Honorary
- Phi Kappa Phi Scholastic Honorary
- Pi Mu Epsilon mathematics scholastic honorary society