

Dr. Mark Phillips
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SOFTWARE DEVELOPMENT EXPERIENCE

- Designed and developed Multigraph (<http://www.multigraph.org> (<http://www.multigraph.org>)), a tool for embedding interactive scientific data graphs in web pages. (*March 2008 – present*)
- Co-developed the Severe Weather Data Inventory (SWDI) at the National Climatic Data Center (<http://www.ncdc.noaa.gov/swdi> (<http://www.ncdc.noaa.gov/swdi>)). (*March 2007 – present*)
- Designed and led development of ISIS (Integrated Station Information System), a database-driven web application for managing weather station metadata at the National Climatic Data Center. (*March 2006 – June 2007*)
- Developed an online mapping application for the Mapping The Outdoors (<http://www.mappingtheoutdoors.com>) web site that allows users to design and order custom printed maps of any location in the US. (*2005*)
- Developed an automated ingest and QC system for hourly weather data for the Climate Reference Network (<http://www.ncdc.noaa.gov/oa/climate/uscrn>). The system handles heterogeneous data streams and can be adjusted on the fly to handle new stations, or changes to the data streams from existing stations. (*Feb 2006 – March 2007*)
- Developed a web-based access system for weather data for the Climate Reference Network (<http://www.ncdc.noaa.gov/oa/climate/uscrn>). The system allows users to view temperature, precipitation, and other elements from a network of roughly 80 automated monitoring stations which take hourly measurements. Users have access to different types and amounts of information depending on access privileges they have been granted. Staff log in through a secure administrative interface to control these privileges. (*March – Oct 2003*)
- Designed and wrote the driver that allows GDAL (<http://remotesensing.org/gdal>) to read US Census Bureau TIGER data files. GDAL (Geospatial Data Abstraction Library) is an open source translator library that provides a common API for reading and writing several dozen geospatial data formats. It is used in a wide variety of GIS products, both open source and commercial, including GRASS, OpenEV, UMN Mapserver, FME, ESRI ArcGIS, and Google Earth. (*Jan - Feb 2003*)
- Established the Geomview (<http://www.geomview.org>) open source project, mailing lists, and a web site to transition development and maintenance of Geomview software from Geometry Center staff to the open source community. (*2000*)
- Developed an interactive contest registration system for the Mathematical Contest in Modeling (<http://www.comap.com/undergraduate/contests/MCM>), a college level mathematics contest. Teams of students and their advisors register online, and contest staff use a secure administrative back-end to obtain lists of participants, and to communicate with them. Participants use the web site to submit information about themselves, and to obtain contest results. (*2001*)
- Lead team of 8 people in development and deployment of ScienceU (<http://www.ScienceU.com>), an interactive online science museum with e-commerce and interactive scientific and mathematical graphics. (*1997 – 1998*)
- Worked on the team which developed the Geometry Center web site at the University of Minnesota, which was one of the first 300 web servers on the web, and which pioneered some of the first CGI applications ever. (*1993*)
- Co-founded Geometry Technologies, Inc and co-developed WebEQ (<http://www.webeq.com>), a suite of Java tools for authoring and displaying mathematical notation in web pages. WebEQ was the first commercial product to support MathML, and is now distributed by Design Science, Inc (<http://www.dessci.com>). (*1998 – 1999*)
- Lead a team of 5 programmers over a period of 3 years to design and develop "Geomview", an interactive 3D visualization package at the University of Minnesota's Geometry Center. Specific tasks

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included: overall management of the team, design and implementation of API between computational layer and UI, design and implementation of the package's internal parser and lisp-like language, scheduling and management of software releases, writing users guide and documentation, and designing a process for incorporating user feedback into the development cycle. Geomview is now distributed from the Geomview web site (<http://www.geomview.org>). (1990 - 1993)

- Worked on the team to design and produce "Outside In", a computer-generated animation illustrating a smooth sphere eversion. "Outside In" has won numerous awards, including first prize at Nicograph (Japan), first prize at the London Effects and Animation Festival, and selection into SIGGRAPH's Electronic Theater. It was also featured on the cover of the October 1993 issue of *Scientific American*. (1993)
- Worked on the team to design and produce "The Shape of Space", a computer-generated animation illustrating concepts from geometry and topology as they relate to cosmology and theories of the universe. (1996)

OTHER EXPERIENCE

- Supervised one undergraduate student at UNC Asheville and the National Climatic Data Center in the development of Multigraph, a tool for embedding interactive scientific data graphs in web pages. (March 2008 - present)
- Supervised two undergraduate students at Warren Wilson College in an independent study of database systems. (2002)
- Served for 4 years as the manager of the technical staff of approximately 15 people at the University of Minnesota's Geometry Center. Responsibilities included hiring decisions, purchase and management of computer, networking, and audio-visual equipment, supervision of software and research projects, and aiding in the preparation of funding proposals and presentations. (1994 - 1998)
- Managed equipment budget at University of Minnesota's Geometry Center. Served as central systems administrator for network of 70 workstations, including SGI, Linux, Sun, HP, NeXT, Windows 95/98/NT, and Macintosh. Planned purchase and maintenance of all equipment, oversaw all software installation, and supervised team to provide user support. (1994 - 1998)
- Taught business math, calculus, and linear algebra. (University of Richmond, 1990 - 1991)
- Taught business math and calculus. (University of Minnesota, 1985 - 1990)
- Taught business math and structured programming. (University of Alaska at Fairbanks, 1985)

EDUCATION

- PhD in Mathematics, University of Maryland, 1990
- MS in Applied Mathematics, Rensselaer Polytechnic Institute, 1984
- BS in Mathematics, Magna Cum Laude, Davidson College, 1982

EMPLOYMENT HISTORY

- 2007-present: Research Associate, National Environmental Modeling and Analysis Center, University of North Carolina Asheville
- 2002-2007: Software Developer, National Climatic Data Center, Asheville NC
- 2001-2008: Consultant, Geometry Technologies LLC
- 1996-2001: Partner, Geometry Technologies, Inc.
- 1995-98: Technical Staff Manager, The Geometry Center, University of Minnesota
- 1991-94: Research Associate, The Geometry Center, University of Minnesota
- 1990-91: Assistant Professor, Department Mathematics and Computer Science, University of Richmond
- 1984-90: Graduate Teaching and Research Assistant, Department of Mathematics, University of Maryland
- 1985: Instructor, Department of Mathematical Sciences, University of Alaska
- 1982-1984: Research Assistant, Center for Interactive Computer Graphics, Rensselaer Polytechnic Institute

PUBLICATIONS

- (with Steve Ansari, Chad Hutchins, Stephen DelGreco, and Nina Stroumentova), The Weather and Climate Toolkit, Proceedings of the 89th Annual Meeting of the American Meteorological Society, January 2009.
- (with Stephen DelGreco and Steve Ansari) Touch Table Supported Climate Services and Applications Developed at NOAA's National Climatic Data Center, Proceedings of the 89th Annual Meeting of the American Meteorological Society, January 2009.
- (with Steve Ansari and Stephen DelGreco) A Geospatial Database and Climatology of Severe Weather Data, Proceedings of the 88th Annual Meeting of the American Meteorological Society, January 2008.
- (with Silvio Levy and Tamara Munzner) Geomview: An Interactive Geometry Viewer, Notices of the American Mathematical Society, October, 1993, pp 985-988.
- Dirichlet Polyhedra for Cyclic Groups in Complex Hyperbolic Space, Proceedings of the American Mathematical Society, Volume 115, Number 1, May 1992.
- (with Charles Gunn) Visualizing Hyperbolic Space: Unusual Uses of 4 x 4 Matrices, Proceedings of the 1992 Symposium on Interactive 3D Graphics, ACM SIGGRAPH, March 1992.
- Mathematica as an Interface to an Interactive Mathematical Graphics Program, The Mathematica Journal, Vol 1 No 2, Fall 1990.
- (with G. M. Odell) An Algorithm for Locating and Displaying the Intersection of Two Arbitrary Surfaces, IEEE Computer Graphics and Applications, Vol. 4 No. 9, September 1984, pp 48-56.

SELECTED TALKS AND CONFERENCES

- The Use of Geovisualization in Presenting Weather and Climate Data to Local Decision Makers, Annual Meeting of the American Meteorological Society, January 2009.
- Workshop on Climate Change for Mathematicians, Mathematical Sciences Research Institute, Berkeley CA, July 2008.
- Computer graphics as a visualization tool in mathematics Workshop on Systems Administration: The Mathematician's Perspective, Geometry Center, December 1994.
- Software tools for visualization at the Geometry Center. SIAM Annual Meeting, San Diego, July 1994.
- Interactive Real-Time Software for Mathematical Visualization; co-organized this special session, with George Francis and Norbert Quien, at the joint meeting of AMS and German Mathematical Society, Heidelberg, Germany, October 1993.
- Geomview: an interactive geometry viewer. Experimental Mathematics seminar at University of Bonn, Germany, October 1993.
- Visualizing non-Euclidean geometry. DEC Systems Research Center, Palo Alto, CA, April 1993.
- Visualizing hyperbolic space. ACM SIGGRAPH Symposium on Interactive Computer Graphics, Boston, MA, March 1992.

COMPUTER SKILLS

Operating Systems:	Languages:	Other:
Linux Windows MacOS Solaris SGI IRIX BSD Unix	HTML Java Javascript C C++ Pascal BASIC FORTRAN COBOL LISP Perl PHP Python Ruby Tcl/Tk Postscript OpenGL JSP XML SQL ActionScript	UMN MapServer ImageMagick Gimp GNU Development Tools Apache Server Tomcat Server Java Servlets Spring Framework CVS Subversion MySQL Oracle PostgreSQL PostGIS ArcGIS