

Curriculum Vita — Nicholas F. Polys

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Faculty Appointments

Director of Visual Computing: Advanced Research Computing
Virginia Polytechnic Institute and State University (2007-present)

Affiliate Professor: Department of Computer Science,
Virginia Polytechnic Institute and State University (2007-present)

Member: Interdisciplinary Center for Applied Mathematics (ICAM), Center for Human-Computer Interaction (CHCI), Institute for Creativity, Arts and Technology (ICAT)
Virginia Polytechnic Institute and State University

Education

Ph.D., Computer Science – 2002-2006

Virginia Polytechnic Institute and State University

- Dissertation: Display Techniques in Information-Rich Virtual Environments
- Advisors: Dr. Doug A. Bowman, Dr. Chris North
- Committee: Dr. Scott McCrickard, Dr. Ken Livingston, Dr. Don Brutzman
- GPA: 3.88

B.A., Cognitive Science – 1992-1996

Vassar College

- Thesis: The Universal Shaman and the Modern Mental Ontology
- Advisor: Dr. Ken Livingston

Honors and Awards

- DAAD-Sponsored German Science Tour 2014 – Artificial Intelligence and Visual Computing
- ACM Service Awards for the Web3D Conference:
General Chair (2008, 2014), Program Chair (2007, 2010)
- Outstanding Graduate Research Award, VT Computer Science Department: 2006
- Gamma Beta Phi Honor Society, inducted 2005
- Upsilon Pi Epsilon Computer Science Honor Society, inducted 2004
- Universal Media, Winner “*World Altering Contest*,” 1998
- Advanced Placement Scholar with Distinction, 1992

Research Interests

- Cognitive and Graphical aspects of Scientific Visualization & Medical Imaging
- Information & Interaction Architectures, especially for the Web
- Human Computer Interaction & Usability Engineering Methodology
- Virtual & Augmented Reality & 3D User Interfaces

Funded Research

- NSF IUSE: *Wireless Testbeds for Authentic STEM Learning* with Carl Dietrich, Vuk Marojevic, Teatoung Yang, Mike Beuhrer \$626,655; (2014) responsible for 20%
- NSF Computing Research Infrastructure (CRI II-New): *Living Lab for Asynchronous and Synchronous Investigation of Virtual and Real Environments* with Ben Knapp, Yong Cao, James Ivory, and Doug Bowman \$ 585,510; (2013) responsible for 25%
- NSF Research Experience for Teachers (RET) *New Dimensions in e-Learning* with Richard Goff \$ 25,000; (2012) responsible for 50%
- NSF Fundamental Research: *Visual Interfaces for Engineering Innovation* (2011-present) PI w/ Sundar Krishnamurty, UMass Amherst; \$ 165,000; responsible for 50%
- NSF IUCRC National Center for eDesign Co-Director (2010-2012), with Janis Terpenney and Richard Goff \$ 563,000; responsible for 50%
- NSF *Virtual Environments to Enhance Structures Understanding of Architects* (2009-2012) co-PI with Medhi Setareh, Brett Jones \$ 500,000; responsible for 35%
- The U.S. Department of Energy Hub: *Energy Efficient Buildings* (2010-2013); John Burns, Jeff Borggaard, Herdman \$ 5,000,000; responsible for 5%
- CISCO *Tel e-Design* (2011) \$ 30,000; responsible for 100%
- *A Visual Interface for Smart Vehicle Networks* Institute for Critical Technologies and Applied Science (2008) \$ 65,000; responsible for 100%
- Center for Community Security and Resilience (2010-2011 w/ IBM Research) co-PI with Peter Sforza \$ 15,000; responsible for 30%
- *Medical X3D* (2007) US ARMY TATRC, \$ 120,000; responsible for 10%
- *An X3D Loader for OpenSceneGraph* (2007). Naval Postgraduate School, \$ 6,000; responsible for 100%

Professional & Community Activities

Director

- Web3D Consortium Board of Directors (elected 2000-2014)
 - President (2010-2014), Secretary (2007-2009)
- NSF IUCRC Center for e-Design (2011-2013); VT Site (2011-present) with Richard Goff

Chairs

- Web3D Consortium Working Group Chair:
 - User Interface (2006-present)
 - Medical (2010-present)
- Conferences
 - General Chair: ACM Web3D 2008, Web3D 2014
 - Program Chair: ACM Web3D 2007, 2010, 2011
 - Workshops / Tutorials Chair: IEEE Virtual Reality 2007, Web3D 2006 & 2013
 - Publicity Chair: IEEE Virtual Reality 2008
 - Finance Chair: IEEE Virtual Reality 2009, 2010

Workshop Organizer

- Extending Extensible 3D (X3D) from Haptic-based Medical Training to Clinical Applications (Medicine Meets Virtual Reality 2014)
- Birds-Of-A-Feather: Medical, CAD, AR/MR (SIGGRAPH 2008-2013)

- Medical Virtual Environments (IEEE VR 2010; Web3D Tutorials 2012, 2013)
- Future Standards for Immersive VR (IEEE VR 2007, 2008)
- X3D User Interfaces (ACM Web3D 2004, 2005)
- Medical X3D (ACM Web3D 2005)
- Portable Information Spaces (HCI International 2004)

Key Contributor

- NIH 3D Printing Initiative – Advisory Board (2013-2014)
- ISO Reference Model for Mixed Reality Continuum (JTSC1)
- ISO Extensible 3D (X3D) Specification, esp. Volume rendering, Event utilities (2000-present)
- Web3D Medical Working Group (2006-present)
- Virginia Tech 3D Interaction Research Group
- Web3D Software Development Kit (SDK) (2000-2002)

Member

- Web3D Consortium (2000-present)
- ACM (2003-present)
- IEEE (2004-present)
- SIGGRAPH Online Committee (2000, 2001)

Reviewer

Conferences

(2002-present) Web3D, VIS, VAST, InfoVis, 3DUI, VR, VRST, SVR, SIGGRAPH, CHI, Graphics Interface

Journals

(2004-present) International Journal of Human-Computer Studies, Virtual Reality, Computer Graphics and Applications, Computers & Graphics, Computer Graphics Forum, VIRE, Information Visualization, Computer-Aided Civil and Infrastructure Engineering (Special Issue), Transactions on Applied Perception

Official Liaison

- DICOM medical imaging standards - WGs 11, 17, 23 (2006-present)

Invited Speaker, Juror, Panelist

- “Science in 3D” NIH/NIAID Bioinformatics Festival 2015
- VisTech @ Supercomputing 2014: “High-Performance Visualization”
- VR Hackathon @ Gray Area, San Francisco 2014
- Web3D Conference (2010-2014): “Virtual Worlds on the Web”, “Volume Visualization and Medical Applications”, “Scientific Visualization”, “Augmented and Mixed Reality”
- TERATEC 2011: “High-Performance Visualization” (Paris, France)
- SuperComputing 2009: “3D Internet”
- NSF Student Panel: ‘Making a Career in VR’ IEEE VR 2006
- ACM SIGGRAPH Local Chapters Speaker: Boston, NY, DC, San Francisco (2001-present)
- VR Art: Stuttgarter Filmwinter MultiMedia Festival (2000)

Publications

Book Chapters

Polys, Nicholas F. “Information Visualization in Virtual Environments: Tradeoffs and Guidelines”. In: *Handbook of Virtual Environments, Second Edition* (eds.) Kelly Hale and Kay Stanney. CRC Press, 2014.

Polys, Nicholas F. "Publishing Paradigms with X3D". In: *Information Visualization with SVG and X3D*, (eds.) Chanomei Chen and Vladimir Geroimenko, Springer-Verlag, 2005.

Peer-Reviewed Journals

Setareh, M., Jones, B., Ma L., Bacim, F., **Polys, N.** "Application and Evaluation of Double-Layer Grid Spatial Structures for the Engineering Education of Architects". Journal of Architectural Engineering (*under review*)

Polys, N., Setareh, M., Bacim, F., Jones, B. "SAFAS: Unifying Form and Structure with Interactive 3D Simulation". Engineering Design Graphics Journal, ASEE (*under review*)

Xiao, S., A. Muscente, L. Chen, C. Zhou, J. D. Schiffbauer, A. D. Wood, **N. F. Polys** and X. Yuan (2014). "The Weng'an biota and the Ediacaran radiation of multicellular eukaryotes." National Science Review 1: 498-520.

Jones, B. D., M. Setareh, **N. F. Polys** and F. Bacim (2014). "Application of an Online Interactive Simulation Tool to Teach Engineering Concepts Using 3D Spatial Structures." International Journal of Web-Based Learning and Teaching Technologies (IJWLTT) 9(3).

Michael Bruce Meyer, David Elliott, Andrew D Wood, **Nicholas F Polys**, Matthew Colbert, Jessica A Maisano, Patricia Vickers-Rich, Michael Hall, Karl H Hoffman, Gabi Schneider, Shuhai Xiao. "Three-dimensional microCT analysis of the Ediacara fossil Pteridinium simplex sheds new light on its ecology and phylogenetic affinity." Journal of Precambrian Research, 2014.

Setareh, M., Bacim, F., Jones, B.D., **Polys, N. F.**, Geng, T., Orsa, B. "Integrating Web-based Visualization with Structural System Understanding to Improve the Technical Education of Architects." Journal of Online Engineering Education 3(2).

Hossain, S., Akbar, M., and **Polys, N.** (2012). "Narratives in the Network: Interactive Methods for Mining Cell Signaling Networks." Journal of Computational Biology 19(9): 1043-1059.

Polys, N. and A. Wood (2012). "New Platforms for Health Hypermedia." Issues in Information Systems 13(1): 40-50.

Polys, Nicholas F., Bowman, D.A., and North, C., "The Role of Depth and Gestalt Cues in Information-Rich Virtual Environments." International Journal of Human-Computer Studies, Volume 69, pp. 30-51, Elsevier, 2011.

Polys, Nicholas and Brutzman, Don and Steed, Anthony and Behr, Johannes. Future Standards for Immersive: Report on the IEEE VR 2007 Workshop. *IEEE Computers Graphics & Applications* Vol. 28, Number 2, IEEE Computer Society, 2008.

D.A. Thorley-Lawson, V. H., K. Luzuriaga, A.S. Jarrah, R. Laubenbacher, K. Lee, **N.F. Polys**, E. Delgado-Eckert, M. Shapiro, K.A. Duca (2007). "A Virtual Look at Epstein-Barr Virus Infection: Biological Interpretations." PLOS Pathogens 3(10): e137.

Shapiro, M., K. A. Duca, K. Lee, E. Delgado-Eckert, A.S. Jarrah, R. Laubenbacher, **N.F. Polys**, V. Hadinoto, D. Thorley-Lawson, (2008). "A Virtual Look at Epstein-Barr Virus Infection: Simulation Mechanism." Journal of Theoretical Biology 252(4): 633-648.

Bowman, D., Chen, J., Wingrave, C., Lucas, J., Ray, A., **Polys, N.**, Li, Q., Haciahmetoglu, Y., Kim, J., Kim, S., Boehringer, R., and Ni, T. (2006). "New Directions in 3D User Interfaces". International Journal of Virtual Reality 5, 3-14.

Polys, N. F., Kim, S., and Bowman, D. A. (2007). "Effects of Information Layout, Screen Size, and Field of View on User Performance in Information-Rich Virtual Environments." Computer Animation and Virtual Worlds **18**(1): 19-38.

Polys, Nicholas F. and Bowman, Doug A., "Desktop Information-Rich Virtual Environments: Challenges and Techniques." Virtual Reality **8**(1): 2004, 41-54.

Peer-Reviewed Conference Proceedings

Peter J. Radics, **Nicholas F. Polys**, Shawn P. Neuman, and William H. Lund. "OSNAP! Introducing the open semantic network analysis platform". *Proceedings of Visualization and Data Analysis*, IS&T/SPIE Electronic Imaging; 2015 (to appear).

Nikita Sharakhov, Vuk Marojevic, Ferdinando Romano, **Nicholas Polys**, and Carl Dietrich. "Visualizing real-time radio spectrum access with CORNET3D". In *Proceedings of the Nineteenth International ACM Conference on 3D Web Technologies (Web3D '14)*. ACM, New York, NY, USA, 109-116. 2014.

Sharakhov, Nikita, **Polys, Nicholas**, and Sforza, Peter "GeoSpy: a Web3D Platform for Geospatial Visualization" *MapInteract*, ACM SIGSPATIAL, Orlando, FL, 2013.

Hyungil Kim, Xuefang Wu, Joseph L. Gabbard, and **Nicholas F. Polys**. "Exploring head-up augmented reality interfaces for crash warning systems." In *Proceedings of the 5th International Conference on Automotive User Interfaces and Interactive Vehicular Applications*, pp. 224-227. ACM, 2013.

Nicholas F. Polys, Felipe Bacim, Mehdi Setareh, and Brett Jones. "Building novel Web3D user interfaces: a case study from architecture and structural engineering". In *Proceedings of the 18th International Conference on 3D Web Technology (Web3D '13)*. ACM, San Sebastian ES, 135-138. 2013.

F. Bacim, E. Ragan, S. Serbo, M. Setareh, B. D. Jones, **N. Polys**. "The Effects of Display Fidelity, Visual Complexity, and Task Scope on Spatial Understanding of 3D Graphs." *Proceedings of Graphics Interface*, Regina, 2013. ISBN: 9781482216806; 2013.

Polys, N. (2012). "Publishing the Greatest Common Denominator." CEUR-WS 869 Proceedings of the 1st International Workshop on Declarative 3D for the Web Architecture (Dec3D 2012 @ WWW 2012).

Tilden, D., A. Singh, **N. F. Polys**, and P. Sforza, "Multimedia mashups for mirror worlds", *Web3D '11 Proceedings of the 16th International Conference on 3D Web Technology*, Paris, ACM, 2011.

Ullrich, S., T. Kuhlen, **N. F. Polys**, D. Evestedt, M. Aratow, and N. W. John, "Quantizing the Void: Extending Web3D for Space-Filling Haptic Meshes", *Medicine Meets Virtual Reality (MMVR)*, vol. 163, Newport Beach CA, USA, IOS Press, pp. 670-676, February, 2011.

Bacim, F., **Polys, N.**, Chen, J., Setareh, M., Li, J., and Ma, L. "Cognitive scaffolding in Web3D learning systems: a case study for form and structure". In *Proceedings of the 15th international Conference on Web 3D Technology* (Los Angeles, California, July 24 - 25, 2010). Web3D '10. ACM, 2010.

Henry, James A.G. and **Polys, Nicholas**. "The Effects of Immersion and Navigation on the Acquisition of Spatial Knowledge of Abstract Data Networks". *Proceedings of the International Conference on Computational Science*. Proceedia Computer Science, Volume 1, Issue 1, pp. 1737-1746, Elsevier, 2010.

Hossain, S., Akbar, M., **Polys, N.** "Storytelling and Clustering for Cellular Signaling Pathways". *Proceedings of International Conference on Information and Knowledge Engineering (IKE)*, Las Vegas, NV 2009. 2 Volumes. CSREA Press 2009, ISBN 1-60132-116-3

Polys, Nicholas F., Visamsetty, S., Battarechee, P. Tilevich, E. "The Value of Patterns in Deep Media Scenographs". SEARIS Workshop, *IEEE Virtual Reality 2009*, Shaker-Verlag. 2009. ISBN 978-3-8322-8393-3

Polys, Nicholas F., Visamsetty, S., Battarechee, P., Tilevich, E., "Design Patterns in Componentized Scenographs". SEARIS Workshop, *IEEE Virtual Reality 2009*, Shaker-Verlag. 2009. ISBN 978-3-8322-8393-3

Shyam Visamsetty, Puranjoy Bhattacharjee, and **Nicholas Polys**. 2008. "Design patterns in X3D toolkits". In *Proceedings of the 13th international symposium on 3D web technology (Web3D '08)*. ACM, New York, NY, USA, 101-104.

N.W. John, M. Aratow, J. Couch, D. Evestedt, A.D. Hudson, **N. Polys**, R.F. Puk, A. Ray, K. Victor, Q. Wang, "MedX3D: Standards Enabled Desktop Medical 3D." *Medicine Meets VR (MMVR) 2008*.

Polys, Nicholas F., Shapiro, Michael, Duca, Karen, "IRVE-Serve: A Visualization Framework for Spatially-Registered TimeSeries Data". *The Web3D 2007 Symposium*, ACM SIGGRAPH.

Polys, Nicholas F., & Ray, Andrew, "Supporting Mixed-Reality Interfaces through X3D Specification". Workshop on Mixed-Reality Interface Specification, *Proceedings of IEEE Virtual Reality*, IEEE Press. 2006.

Murthy, U., Burbey, I., Kwon, G., **Polys, N.**, Vincent, P., and Pérez-Quñones, M. (2006). "Re-finding from a Human Information Processing Perspective". *SIGIR Workshop on Personal Information Management*, Seattle, ACM Press.

Polys, Nicholas F., Kim, S., Bowman, D.A. "Effects of Information Layout, Screen Size, and Field of View on User Performance in Information-Rich Virtual Environments." *Proceedings of ACM Virtual Reality Software and Technology 2005*. Monterey, CA: ACM SIGGRAPH. 2005.

McCrickard, S., Wahid, S., Lee, J., **Polys, N.** "Use and Reuse in Information and Interaction Design." *Proceedings of HCI-International 2005*, Las Vegas, Nevada. LEA Associates. 2005.

Polys, Nicholas F., Bowman, Doug A., North, Chris. "Information-Rich Virtual Environments: Challenges and Outlook". *Proceedings of NASA Virtual Iron Bird Workshop (Day 2, paper, ppt & video)*, NASA Ames 2004. <http://ic.arc.nasa.gov/vib/>

Polys, Nicholas F., Bowman, D., North, C., Laubenbacher, R., Duca, K., "PathSim Visualizer: An Information-Rich Virtual Environment for Systems Biology". *Proceedings of the Web3D 2004 Symposium*, ACM SIGGRAPH 2004.

Polys, Nicholas F., North, C., Bowman, D., Ray, A., Moldenhauer, M., Dandekar, C., "Snap2Diverse: Coordinating Information Visualizations and Virtual Environments". *Proceedings of Visualization and Data Analysis*, International Society for Optical Engineering (SPIE) 2004.

Bowman, D., North, C., Chen, J., **Polys, N.**, Pyla, P., and Yilmaz, U., "Information-Rich Virtual Environments: Theory, Tools, and Research Agenda". In *Proceedings of ACM Virtual Reality Software and Technology*. 2003. Osaka, Japan: ACM SIGGRAPH. 2003.

Polys, Nicholas F. "Stylesheet Transformations for Interactive Visualization: Towards a Web3D Chemistry Curricula". *Proceedings of the Web3D 2003 Symposium*, ACM SIGGRAPH. 2003.

Brutzman, Don, Kass, Michael, **Polys, Nicholas F.** “X3D Content Examples, Editing, Conformance Suite and Software Development Kit”. *Sketches and Applications*, ACM SIGGRAPH 2001.

Posters

Apostolellis, P., Bortz, B., Peng, M., **Polys, N.**, Hoegh, A. “Exploring the Integrality and Separability of the Leap Motion Controller for Direct Manipulation 3D Interaction”. *IEEE Symposium on 3D User Interfaces (3DUI) 2014*, 153-154. 2014.

Zetiz, K., Zeitz R., Tao, C., **Polys, N.** “ A Comparative Study of Metaphors for Investigating Augmented Reality Artifacts”. *IEEE Symposium on 3D User Interfaces (3DUI)*, 179-180. 2014.

Nikita Sharakhov, **Nicholas Polys**, and Peter Sforza. “SpeedSpy: a mobile Web3D platform for visualizing broadband data”. In *Proceedings of the 18th International Conference on 3D Web Technology (Web3D '13)*. ACM, New York, NY, USA, pg. 208. 2013.

Polys, N.F., Duca, K.A., North, C., Bowman, D. , Laubenbacher, R. “Information-Rich Virtual Environments for Biomedicine.” Poster. *Computational Cell Biology*, Lennox MA, 2005.

Polys, N. F., Duca, K. A., Laubenbacher, R., Bowman, D. A., North, C. “Interactive Visualization of Biological Databases using Information-Rich Virtual Environments”, Poster. *Digital Biology: The Emerging Paradigm*, NIH 2003.

Other Publications

Schutt, K., **Polys, N.** and Sforza, P. (2013). “Accessing Parallel Computing Resources from ArcGIS 10.0”. Processing Large Datasets session. *ESRI International User Conference*, San Diego, CA.

Polys, N. F., Wood, A., Ullrich, S., Evestedt, D., & Aratow, M. (2013). [A fresh look at Immersive Volume Rendering: Challenges and Capabilities](#), in IEEE VR Workshop on Immersive Volume Rendering 2013: Orlando.

Polys, N. F., A. Singh, P. Sforza (2012). “Extended LOD Concept for X3D, 3DBlackburg”. 3D Portrayal Interoperability Experiment (3DPIE) Final Report, Eds. Schilling, Hagedorn & Coors. OGC Public Engineering Reports. <http://www.opengeospatial.org/standards/per>

Polys, Nicholas F., Shupp, Lauren , Volpe, J., Glina, V. and North, Chris (2006). “The Effects of Task, Task Mapping, and Layout Space on User Performance in Information-Rich Virtual Environments“. Technical Report TR-06-12, Computer Science, VT.

Burbey, I., Kwon, G., Murthy, U., **Polys, N.** and Vincent, P. (2005). “Human Information Processing with the Personal Memex”, CORR-the Computing Research Repository: <http://arxiv.org/abs/cs.HC/0606107>.

Harris, Sally, “PathSim: Scientists model interaction of viruses and immune system”, Virginia Tech Research Magazine Fall 2004. <http://www.research.vt.edu/resmag/fall2004/PathSim.html>.

Polys, Nicholas F. “Techniques of Perception in VRML”, “European Web3D- Company Profiles” “The X3D Initiative”. 3DeZine, 2000-2001.

Polys, Nicholas F. “Supplying your XML Toolkit” – IBM DeveloperWorks online feature 1999

Teaching Experience

Courses Taught

Virginia Polytechnic Institute and State University Instructor:

- 2013: CS 5754, *Virtual Environments* (CS Graduate Level)
- 2010: CS 3724, *GUI & Graphics Programming* (CS Junior/Senior Level)
- 2008: CS 5784, *Information Visualization* (CS Graduate Level)
- 2007: CS 2984, *Media Computation* (CS Freshman/Sophomore Level)
- 2006: CS 3724, *Introduction to Human-Computer Interaction* (CS Junior/Senior Level)
- 2002: TA for CS 2204 *UNIX* for sophomore CS majors

Short Courses

- 2014: AOE 5984, *Introduction to Parallel Computing* (Team taught)
- *New Dimensions in eLearning* NSF Research Experience for Teachers (RET)
- *High Performance Computing Bootcamp* (w/ UVa 2008-2010)
- *High Performance Computing & Visualization, Deep Media* Virginia Tech Faculty Development Institute (FDI 2006-2015):
- Graduate short course (GEDI): *Introduction to Computational Science* (2007)
- Web3D & SIGGRAPH: *Engineering Virtual Environments with X3D, Techniques of Perception with X3D* (2003-2005); *X3D Architecture & Overview*, *Web3D Graphics Publishing with X3D* (2000-2002); *Introducing X3D* (2000)

Mentoring

Student Mentoring (as VT CS Faculty)

- Ph.D.: Ryan McMahon (2012), Kriti Sensharma (2013), Bireswar Laha (2014), Felipe Bacim, Peter Radics, Jessie Mann, Ayat Mohammed (Chair)
- Masters: Ankit Singh (Chair, 2012), Shyam Visamsetty (2010), Andy Wood, Nikhita Sharakhov (2014)
- Numerous graduate and undergraduate interns and independent study students in the Visionarium Lab [vis.arc.vt.edu]

Professional and Research Experience

2008-present Virginia Polytechnic Institute and State University – Blacksburg, VA

Director of Visual Computing

- Develop Visual Computing solutions with research scientists
- Design, build, manage and develop cutting-edge visualization hardware and software stack (The Visionarium Lab)
- Conduct research to improve visual analysis methods and informatics services for high-performance computing (see Funded Research above)
- Build partnerships to improve the competency and impact of High Performance Computing and Visualization

Selected Projects

- Network visualization: cell-signaling pathways, ontologies
- Scientific visualization: medical imaging, molecular dynamics, fluid dynamics, geospatial data, cluster and remote rendering
- Structural engineering: web-based architectural design

- 2006 – 2007 Virginia Polytechnic Institute and State University – Blacksburg, VA**
Postdoctoral Associate: Research Computing
- Developed Visual Computing solutions for research scientists
 - Ran faculty and graduate development workshops for 3D visualization
- Selected Projects
- Mathematics - generated VR, images, and movies of large space structure energetics simulations
 - Biochemistry - generated VR, images, and movies of Myoglobin Oxygen transport mechanism (molecular dynamics simulations)
- 2005 – 2006 Virginia Polytechnic Institute and State University – Blacksburg, VA**
Graduate Research Assistant
- Virtual Reality Assessment of Independent Living Skills and Mild Cognitive Impairment in Elderly Populations - Interface and Content Developer: built stimuli and testbed system for immersive CAVE assessment tool (Carilion Biomedical Institute funding)
- Selected Projects
- Personal Memex – expert interviews and prototype for personal digital memory system for high-functioning and disabled populations
 - Intelligent Document Filtering - implemented multiple AI evaluators for machine learning in text retrieval
- 2003 – 2005 Virginia Bioinformatics Institute – Blacksburg, VA**
Graduate Research Assistant
- PathSim project - Visualization and Deployment Lead: designed and developed data processing and information-rich virtual environment interfaces for a large, agent-based immunological simulation (NIH funding)
 - Mblast – Software Engineer: analyzed and optimized a Formal Concept Lattice Algorithm for gene expression analysis
- Selected Projects
- STKE Cellular Signaling – Project Lead, Interface Programmer: designed and developed graphical interface for direct manipulation of Boolean queries using Java Swing and MySQL database populated by web crawler agent
 - Usability Engineering project for design of an online notification system; highest user subjective evaluations among class projects
- 1999-2002 VirtuWorlds LLC – New York, NY; Amsterdam, NL**
Chief Technical Officer, Founder
- Designed and implemented content management and delivery systems for Web3D assets and environments
 - Technology adapted and used by Merck, Pfizer, and Georgia State U.
 - Editor-In-Chief the 3D-eZine online Web3D industry portal
- 2000-2001 Yoe Studio – Peekskill, NY**
Web Programmer, Designer
- Implemented and maintained commercial, data-driven, personalized websites
- 1996-1999 Transcendent Recordings – Poughkeepsie, NY**
Vice-President of Production, Webmaster
- Led digital productions for numerous artists w/ independent record label
- 1992-1996 Vassar College Computer Center – Poughkeepsie, NY**
Information Technology Consultant
- Worked with faculty, staff, and students to support computing and networking

Technical skills

- **Certified by:** VT IRB board for Human Subjects Research and Ethics
- **Fluent in:** X3D, VRML, Java, C++, Perl, UNIX/Linux, SQL, XML & XSLT, (x)HTML, PHP, Python, ECMA, *numerous* commercial and open-source applications for modeling and visualization

Personal Information

- Happily married to Katherine Mills Polys since 1996
- Performing musician and songwriter since 1992: guitar, banjo, vocals
- Hobbies: fly-fishing, canoeing, hiking, camping
- Other Interests: mathematics of natural forms, evolutionary computation, presence