

Curriculum Vitae (June 2011)

Chris Harding, Associate Professor

Department of Geological and Atmospheric Sciences (home department)
Human-Computer-Interaction (HCI) program - Virtual Reality Applications Center (VRAC)

Department of Computer Science (courtesy appointment)

1620 Howe Hall, Iowa State University, Ames, IA 50011

515 294-4868 (phone), 515 294-5530 (FAX), Email: charding@iastate.edu

Degree	Date	Institution	Field
Ph.D.	2001	University of Houston, Texas	Geology
Diplom (M.Sc.)	1993	Free University Berlin, Germany	Geology

Professional experience

2009-present	Associate Professor, Iowa State University
2003-2009	Assistant Professor, Iowa State University
2001-2003	Shell Oil (Shell Geoscience Services), Houston
2000-2001	Exxon-Mobil Upstream Research, Houston
1994-1997	Lynx Geosystems Inc. (Vancouver, Canada)

Publications

Journal articles (peer reviewed)

- Harding, C. & Souleyrette, R. (2010) Investigating the use of 3D Graphics, Haptics, and Sound for Highway Location Planning. *Journal Computer-Aided Civil and Infrastructure Engineering* 25 (2010), 20-38
- Nordvik, T., Grøneng, G., Ganerød, G.V., Nilsen, B., Harding, C., Blikra, L.H. (2009) Geovisualization, geometric modelling and volume estimation - a case study of the Åknes rockslide rite, Western Norway. *Bulletin of Engineering Geology and the Environment*, Volume 68, Number 2 / May, 2009, pp. 245-256
- Oren, M., Harding, C. & Bonebright, T. (2008) Audio Platform Game (APG) Design for Players with Visual Impairments. *Journal of Visual Impairment & Blindness*, vol. 102, iss. 12, pp. 761-773
- Harding, C., Cervato C., Larsen, M.D., Windom, K.E., Dawson, J. (2008) Exploring the use of 3-D computer graphics for teaching relative geologic time concepts in large introductory geology classes. *Teaching Earth Sciences (UK)*, Vol. 33, Issue 2, pp 19-22
- Harding, C. (2004) Modeling of geoscience data in a multi-sensory virtual environment. *IEEE Journal on Computing in Science and Engineering (CiSE)*, vol.6, iss. 1, pp. 89-92
- Harding, C., Kakadiaris, I.A., Casey, J.F., Loftin, R.B. (2002) A multi-sensory system for the investigation of geoscientific data. *Computers & Graphics, Special Issue on Data Visualization* 26: pp. 259-269
- Harding C., Kakadiaris, I.A., Casey, J.F., Loftin, R.B. (2000) Using Vision, Touch and Sound for Geoscientific Investigation. *OffShore Magazine*, 60, pp. 64-66
- Harding, C., Loftin, R.B. & Anderson, A. (2000) Visualization and modeling of geoscientific data on the Interactive Workbench. *The Leading Edge*, 19, pp. 506-511

Conference Proceedings (peer reviewed)

- Faeth, A., Harding, C. (2010), A Theoretical Framework for Generating Copious Multi-Sensory Feedback From Virtual Buttons, *Proc. ASME 2010 World Conference on Innovative Virtual*

- Reality (WINVR2010). pp. 119-125
- Faeth, A., Call, A. & Harding, C. (2010) Bimanual, haptic deformation of meshes for digital 3D art, Proc. of Computer Graphics, Visualization, Computer Vision and Image Processing 2010, pp. 210-214
- Pratelli, A., Souleyrette, R.R. & Harding, C. (2010), Roundabout Perception: review of standards and guidelines for advanced warning, Urban Transport 2010. pp. 122-134
- Faeth, A., Oren, M. & Harding, C. (2009) Supporting Interactive Haptic Shaping of 3D Geologic Surfaces with Deformation Property Painting, Eurographics 2009 – Areas Papers, pp. 11-17
- Faeth, A., Oren, M. & Harding, C. (2008) Combining 3-D geovisualization with force feedback driven user interaction. 16th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS 2008), November 5-7, 2008, pp. 211-218
- Oren, M., Harding, C. & Bonebright, T. (2008) Evaluation of Spatial Abilities within a 2D Auditory Platform Game. ACM SIGACCESS Conference on Computers and Accessibility (ASSETS), Oct. 13-15, 2008
- Nordvik, T. & Harding, C. (2008) Interactive Geovisualization and Geometric Modelling of 3D Data - A Case Study from the Åknes Rockslide Site, Norway, in: Headway in Spatial Data Handling. ed. Ruas, A., Gold, C., Springer Lecture notes in Geoinformation and Cartography, pp. 368-384
- Faeth, A., Oren, M., Sheller, J., Godinez, S., Harding, C., (2008) Cutting, Deforming and Painting of 3D meshes in a Two Handed Viso-haptic VR System. Proc. of IEEE Virtual Reality 2008, Reno NV, pp. 213-217
- Bogges, J. & Harding, C. (2007) Improving Introductory Calculus Education with 3-D Visualization and Virtual Touch (Haptics). Proc. of the International Multi-Symposium of Computer and Computational Sciences IMSCCS 07, 2, pp. 312-318
- Oren, M., Harding, C. & Bonebright, T. (2007) Speeding Sonic Across the Span: a platform audio game. Proceedings of the International Conference on Auditory Display (ICAD), Montreal, Canada, June 26-29, 2007
- Newcomb, M.C. & Harding, C. (2006) A Multi-Modal Interface for Road Planning using Vision, Haptics and Sound. International Symposium of Visual Computing (ISVC) 2006, published as: Springer Lecture Notes in Computer Science (LNCS), 4292, pp. 417-426
- Harding, C. (2005) Multi-Modal Virtual Environments – A Geoscience Perspective. 11th International Conference on Human Computer Interaction, 9, pp. 345-351, Mira Digital Publ.
- Newcomb, M.C. & Harding, C. (2004) Supporting Interactive Data Exploration for GIS Planning Tasks with a Multi-modal Virtual Environment, IEEE Haptic, Audio and Visual Environments (HAVE) 2004, pp. 81-86
- Harding, C. (2002) A Testbed Haptic Particle-Spring-System Tool for Interactive Data Manipulation. Phantom Users Group (PUG) Meeting 2002, pp. 56-63
- Harding, C., Kakadiaris, I.A., Casey, J.F. & Loftin, R.B. (2001) A Case Study in Multi-Sensory Investigation of Geoscientific Data. Data Visualization 2001: Joint Eurographics - IEEE TCVG Symposium on Visualization in Ascona, Switzerland, May 28-30, 2001, ISBN 3211836748, pp. 34-42
- Harding, C., Kakadiaris, I. & Loftin, R.B. (2000) A Multimodal User Interface for Geoscientific Data Investigation, T. Tan, Y. Shi, and W. Gao (Eds.): ICMI 2000, Springer Lecture Notes in Computer Science (LNCS) 1948, pp. 615-623
- Harding, C., Loftin, R.B. & Casey, J.F. (2000) Multi-modal investigation of geoscientific data - adding touch and sound to 3-D visualization of surface based data. Society of Exploration Geophysicists (SEG), Technical Program of the 70th Annual Meeting, pp. 685-688
- Harding, C., Kakadiaris, I.A. & Loftin, R.B. (2000) Multi-sensory data investigation: Adding touch and sound to geoscientific visualization and modeling. Gulf Coast Association of Geological Societies Convention, pp. 67-72
- Harding, C., Ugray, A., Gordon, P., Nesbitt, K., Chuter, C. (1999) Geoscientific Data

Visualization on the Interactive Workbench. Virtual Systems and Multimedia Conference (VSMM 1999), pp. 34-42

Software

Lidar processing software (Python script/tool for ArcGIS)
Hill profile plotting (Python script)
Fourier analysis of Hill profiles (Matlab script)
Transect extraction from NIR raster data (ArcGIS tool/ python script)
Multi-Modal Mesh Manipulation (M4) system (open source software, hosted at sourceforge.org)
Sonification of Climate data (Python, www.vrac.iastate.edu/~charding/)
Software tools for 3D data transformation (OpenDX/Python, www.vrac.iastate.edu/~charding/)
JaMISS – a simple Java MIDI server (Java, www.vrac.iastate.edu/~charding/)
Geo-Time-Machine (GTM) – a 3D computer-graphics learning tool (Digital Library for Earth System Education, www.dlese.org)

Teaching assignments (since 2003)

Course	Credits	Times taught
Geol 553: Computer Mapping	3 cr.	2
Geol 442/552: GIS for Geoscientists I	3 cr.	6
Geol 456/556X: Introd. to Geostatistics using ArcGIS	3 cr.	1
Geol 558: GIS for Geoscientists II	3 cr.	3
Hci 574: Computational Impl. & Prototyping in HCI	3 cr.	2
Hci 558: Introd. to 3D visualization of scientific data	3 cr.	3
Hon 321R seminar: Introduction to HCI	1 cr.	1
Geol 490 CH: Independent study in GIS	1 cr.	1
Geol 590P: Special Problems in GIS	1 cr.	5
Hon 290: Special Problems - Honors program research	1 cr.	6
Hon 490: Special Problems - Honors program project	1 cr.	1

Graduate students (since 2003)

Mitch Cline (Geology), M.S. (co-advising with Neal Iverson)
Rachel Lishansky (Geology), M.S. co-advising with Carl Jacobson)),
Jim Koopman (HCI), M.S.
Adam Faeth (HCI), Ph.D.
Matt Newcomb (HCI), M.S.
Mike Oren (HCI), M.S. (graduated May 08)
Henry Huang (Geology), M.S., graduated Dec. 06
Andy Menz (Computer Science), graduated Dec. 05

Service on masters and doctoral (POS) committees (since 2003)

M.S. Students: 25 students (5 as major professor)
Ph.D. Students: 18 students (1 as major professor)

Research Funding

Title: Designing Touch-Sound Interfaces to Geospatial Information for Visually-Impaired Users
Lead-PI: Chris Harding
Agency: National Science Foundation – CISE – IIS – HCC (EAGER grant)
Amount Awarded: \$ 118,000

Dates of Award: November 2010

Title: Modeling 3D Geologic Structures in a Multi-sensory (Touch and Sound) Virtual Environment

Lead-PI: Chris Harding

Co-PIs: Carolina Cruz-Neira (ISU/LU), Carl Jacobson (ISU)

Agency: National Science Foundation – CISE – IIS - HCC

Amount Awarded: \$302,000 (+ \$30,000 supplemental REU grant)

Dates of Award: November 2005 – November 2010 (3 year grant with 2 year no-cost extension)

Title: Distributed Volume Rendering for High-Quality Display and Interaction

PIs: Dirk Reiners (ISU), Chris Harding (ISU)

Agency: ISU - University Research Grant

Amount Awarded: \$18,000

Dates of Award: June 2004 – June 2005

Title: Virtual Phacoemulsification Station

Lead-PI: Chris Harding

Co-PIs: Carolina Cruz-Neira (ISU), Nicolas Hamouche (McFarland Clinic), Thomas Oetting (University of Iowa)

Agency: ISU - IPRT Grant

Amount Awarded: \$30,000

Dates of Award: January 2005 – May 2006

Title: Using 3D-computer graphics to improve geoscience learning for non-science undergraduate Students

PIs: Chris Harding

Co-PIs: Cinzia Cervato (ISU), Kenneth Windom (ISU) and Jane Pedrick Dawson (ISU)

Agency: ISU - Miller Educational Research Grant

Amount Awarded: \$25,000

Dates of Award: July 2005 – July 2006

Professional Practice

Invited Talks

- Euresco Geovisualisation workshop (2004)
- M2Vis 05 symposium in London (2005)
- Minnesota Geological survey (2006)
- Iowa Geological survey (2006)
- US Geological Surveys (2007)
- Iowa Department of Transportation (2008)
- UC Santa Barbara (2008)

Reviewer (Conferences, Journals, Books, Funding Agencies)

- IEEE Conference on Information Visualization
- IEEE Conference on Visualization
- IEEE Conference on Virtual Reality

- ASME Conference on Computers and Information in Engineering
- IEEE Journal Transactions on Systems, Man and Cybernetics
- The PSI Handbook of Virtual Environments for Training and Education, chapter on Multi-Modal Display Systems: Haptic, Olfactory, Gustatory, Vestibular
- Cartographica: The International Journal for Geographic Information and Geovisualization
- National Science Foundation
- Journal of Computer-Aided Civil and Infrastructure Engineering
- American Society of Mechanical Engineers (ASME) (2009, 2010, 2011)
- Qatar National Research Fund 2009 and 2010

Positions held on organizations

- Panels co-chair, IEEE Virtual Reality 2009
- Editorial advisory board, Open Virtual Reality Journal.

Institutional Service

Departmental

- Member of the dept. governance committee
- Member of the faculty evaluation committee
- Member of the graduate student evaluation committee
- Chair and Member of the lecturer renewal committee
- Organizer of the geology seminar and lecture series
- Co-organizer of the 2005 Tristate Field conference

University/College

- University Senate (2010-)
- LASCAC (educational technology) committee (2010-)
- Member of GIS certificate committee
- Member of the Environmental Sciences Program
- Mentor, seminar organizer and discussion facilitator to the Honors program
- Guest lecturer in six HCI related courses
- Provided visitors of the Virtual Reality Applications Center with technology demonstrations
- Involved in “Science bound” (supporting minority high-school students)
- Honors discussion group (feedback for Mentor program)
- Honor undergrad research conference session moderator