

MARY M. POULTON

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EDUCATION

Ph.D. in Geological Engineering, University of Arizona, 1990. Dissertation title: "Neural network pattern recognition of electromagnetic ellipticity images"; Dr. Charles E. Glass, Director.

M.S. in Geological Engineering, University of Arizona, 1987. Thesis title: "Extraction of surface and subsurface geologic information from the proposed Arizona superconducting super collider sites"; Dr. Charles E. Glass, Director.

B.S. with Distinction in Geological Engineering, University of Arizona, 1984. Emphasis in mining and exploration.

Pre-engineering program, Western Illinois University, 1980-1982.

EMPLOYMENT

July 1, 2000 to present: Head, Department of Mining and Geological Engineering, University of Arizona.

2003 to present: Professor, Mining and Geological Engineering, University of Arizona; joint appointment in Geosciences Department; affiliate faculty member in Women's Studies Department. Guest Professor, Chengdu University, China, Spring 2004.

1996 to 2003: Associate Professor, Mining and Geological Engineering, University of Arizona.

1990 to 1996: Assistant Professor, Mining and Geological Engineering, University of Arizona

1989: Adjunct Instructor, Geological Engineering, University of Arizona. Responsible for teaching a 400-level course on the fundamentals of geotechnics, a 400-level course on computer methods and a 100-level course on mineral resources, geotechnology and the environment.

1988, Spring: Graduate Assistant, University of Arizona. Worked on seismic data processing and interpretation for the superconducting super collider site investigation.

Fall: Research Assistant working on neural network applications in geological engineering.

1987, Spring: Teaching Assistant for Computer Methods in Geological Engineering and for Geotechnical Investigations.

1986, Spring, Summer: Graduate Assistant working on digital image processing and analysis for the Arizona superconducting super collider site investigation.

Fall: Teaching Assistant for Geophysical Engineering.

1984 (summer): Mining Engineer, Pittsburgh and Midway Coal Mining Company, Gallup, NM. Assisted in execution of exploration program including drill rig siting and supervision; electrical resistivity, natural gamma ray and gamma ray well logging; core logging; sampling for assays; computer modeling of coal reserves.

1983 (summer): Hydraulic Engineering Technician, US Army Corps of Engineers, Rock Island, IL. Wrote precipitation routing and flood forecasting computer model for the Des Moines River drainage basin.

1982 (summer): Hydraulic Engineering Technician, US Army Corps of Engineers, Rock Island, IL. Assisted in design of low-head hydroelectric power plants for flood control reservoirs at Coralville, Saylorville, and Red Rock dams in Iowa. Wrote a technical appendix for the Federal Hydropower Reconnaissance Report.

1980-81 (summers): Clerk/Typist for US Army Corps of Engineers, Rock Island, IL. Performed secretarial duties for Hydraulics Branch Chief and Chief of the Engineering Division.

CONSULTING EMPLOYMENT

US Bureau of Reclamation – Ground Penetrating Radar survey of Coolidge Dam, near Globe, Arizona

American Geological Institute – Wrote minerals chapters for national middle school earth science curriculum project “EarthWorks” and was team leader for the resources section and wrote the minerals module for the national high school earth science curriculum project “EarthComm: Earth Science in My Community”.

Developed college-level web-based activities for earth science during summer 2000.

World Bank – Evaluation of PRODEMINTA geochemical sampling in Ecuador, December 2000, January 2001.

NOAH, LLC (Neural Optimization Applied Hydrology), Vice President and co-Founder, 2002 to present. NOAH provides water optimization, prediction, and management technologies for mitigation of supply problems, environmental impacts, water quality and water security, and more.

HONORS AND AWARDS

1999 UA nominee for national Carnegie Professor of the Year Award

1999 UA Wakonse Fellow

1998 Excellence at the Student Interface Award

1997 Marquis Who's Who

1997 Strathmore Who's Who

1994 Outstanding Advisor – Center for Off-Campus Students

GRANTS AND CONTRACTS

Co-PIs are shown in parentheses along with their department affiliation if not MGE faculty.

Government Sponsored Technical Research:

Multi-dimensional infiltration and distribution of water of different qualities and solutes related through artificial neural networks: United States-Israel Binational Agricultural Research and Development Fund, 9/1/05-8/30/08, \$130,000. Role=co-PI (A. Warick, SWES PI). 50% Effort.

Improved hydrologic assessment of recharge beneath ephemeral streams: applications in arid areas: NSF, US-Egypt Cooperative Research, 9/1/03-8/31/05, \$24,000. Role=co-PI (P. Ferre, HWR PI). 50% Effort.

Resource characterization and quantification of natural gas-hydrate and associated free-gas accumulation in the Prudhoe Bay – Kuparuk River area on the North Slope of Alaska: DOE (BP subcontract to UA), 11/2002 – 12/2006, \$1,135,033. Role=PI, (R. Johnson, (Geos), R. Casavant, C. Glass, co-PIs). 25% Effort.

Building a partnership for sustainable natural resource development in China: AAAS, 5/1/03-5/12/04, \$5,000. Role=PI. 100% Effort.

UXO classification using a static TEM antenna array: SERDP, 5/29/03-12/31/05 (Zonge subcontract to UA), \$46,893. Role=PI. 100% Effort.

Neural network interpretation of seismic attributes: NSF, 7/1/99-6/30/02, \$74,800. Role=PI. 100% Effort.

Application of geomechanics and geophysics to solve environmental problems: NSF, 6/1/99-5/31/03, \$247,059. Role=PI (co-PI at time of submission, PI after departure from UA by Dr. Harpalani,). 50% Effort.

Geophysical electromagnetic prospecting for groundwater and economic minerals: NSF 9/1/99 - 8/31/01, \$20,000. *This was the US part of a \$50,000 joint proposal from the US State Department US-Egypt Joint Science and Technology Program. I wrote the full proposal. Role=PI. 100% Effort.

Neural network interpretation of TEM data and support for visiting scholar Hesham El-Kaliouby: Funded by Egyptian Government, 10/98-10/00, \$10,500.

Mesoscale predictability and improvement of ensemble forecasts and predictions using neural networks: Funded by Office of Naval Research, 1998-2000, \$51,248. Role=co-PI (S. Mullen (Atmos), PI). 50% Effort.

LASI ellipticity survey of the Nevada Test Site: Funded by Sandia National Lab, 2/1 - 6/30/96, \$23,840. Role=co-PI (B. Sternberg, PI). 50% Effort.

High-resolution subsurface imaging and neural network recognition for non-intrusive buried substance location: Funded by Department of Energy, 10/92 - 1/97, \$681,863. Role=co-PI (B. Sternberg, co-PI). 50% Effort.

Identifying subsidence hazards with a unique high-resolution EM system and neural network interpretation: Funded by US Bureau of Mines, 4/92 - 4/95, \$199,952. Role=co-PI (B. Sternberg, co-PI). 50% Effort.

Subsurface void detection with a unique high-resolution EM system and neural network interpretation: Funded by US Army, 9/92 - 10/94, \$199,885. Role=co-PI (B. Sternberg, PI). 50% Effort.

Study of gold and copper mineral deposit classes using neural networks: Funded by University of Arizona, 1/92 - 12/92, \$3,000. Role=PI. 100% Effort.

Estimation of moisture content of mine tailings from spectral reflectance values for prediction of blowing dust hazard. Funded by US Bureau of Mines, Arizona Mining and Mineral Resources Research Institute, 6/91 - 5/92, \$17,099. Role=PI. 100% Effort.

Study of the pre-processing requirements of neural networks. Funded by US Bureau of Mines, Arizona Mining and Mineral Resources Research Institute, 6/90 - 5/91, \$17,412. Role=PI. 100% Effort.

Industry Sponsored Technical Research:

Neural network approach to seismic crew noise identification in off-shore surveys. Funded by CGG, Houston, TX, 12/28/99-12/27/00, \$33,347. Role=PI (Roy Johnson (Geos), co-PIs). Effort=50%.

Neural network interpretation of wireline logs. Funded by Baker-Atlas Logging Services, 9/1/97-6/15/99, \$42,475. Role=PI. Effort=100%

Neural network feasibility study using Dig-face characterization data: Funded by Lockheed Idaho Technologies Corp. 6/1 - 12/15/94, \$28,222. Role=PI. Effort=100%

Testing the LASI high-resolution subsurface-imaging ellipticity system: Electric Power Research Institute, 8/91-12/92, \$59,894. Role=co-PI (B. Sternberg, PI, M. Sully (HWR), S. Neumann (HWR), co-PIs). Effort=20%

Education Research:

Minerals, Where and Why: Web, Funded by Mining and Metallurgical Society of America, 4/00-4/01, \$5,000. Role=co-PI (J. Kemeny, co-PI). 50% Effort.

Girls in the SYSTEM (Sustaining Youth in Science, Technology, Engineering, and Mathematics), Funded by NSF, 9/1/99-8/31/03, \$819,216. Role=co-PI (M. Civil (Math), PI, K. Mangin (EEB), S. Seraphin (MSE), J. Monk (SIROW), co-PIs). Effort=20%

Teaching web skills in a Nats 101 course, Funded by UA New Learning Environments and Instructional Technologies Grants Program, 7/1/99- 6/30/00, \$6,000. Role=co-PI (J. Kemeny, co-PI). Effort=50%.

The teaching teams program: a top-down, bottom-up strategy for improving the delivery of general education faculty-undergraduate collaboration, Funded by FIPSE and Kellogg Foundation, 9/1/98-8/31/00, \$374,000. Role=co-PI (H. Larson (LPL), was sole PI but proposal was written and project was co-managed by myself and R. Mencke (ULC), S. Mioduski (ULC), C. Walker (ASTR), J. Kemeny (MGE), B. Harrison (UTC)). Effort=20%

Development of web-based modules to facilitate learning in a Nats 101 course, Funded by UA New Learning Environments and Instructional Technologies Grants Program, 6/1/98-5/31/99, \$14,683. Role=co-PI (J. Kemeny, co-PI), Effort=50%.

Support for CD conversion to web for Nats101, Funded by UA New Learning Environments and Instructional Technologies Grants Program, 5/98, \$2,000. Role=co-PI (J. Kemeny, co-PI), Effort=50%.

ABET2000 Course upgrade proposal for MGE 200 and 219, Funded by UA College of Engineering and Mines, 8/98, \$15,000, role=PI. Effort=100%.

Building two-way streets: women and scientific literacy, Funded by AAC&U, 1/1/97-12/31/99, \$38,000 (B. Subramanian and L. Briggs, were co-PIs; I was involved in project management and execution but not in the proposal writing. I have not included this in my total funding amount.).

Development of Minerals, Where and Why –South Africa, Funded by South African Institute for Mining and Metallurgy, 12/96-11/99, \$5,000. Role=co-PI (J. Kemeny, co-PI). Effort=50%.

Faculty Development Grant, 1995-96. Develop computer tutorials for G EN 120 class: \$7,980. Role=PI. Effort=100%.

Instructional Technology Grant, 1995-96. Develop multimedia lab for G EN 120 class: \$21,000. Role=co-PI, (J. Kemeny, co-PI). Effort=50%

BHP Minerals. Support for G EN 416 class. 1994 - \$5,000. 1995 - \$6,500. 1996 - \$7,000. Role=PI. Effort=100%.

Mining and Metallurgical Society of America, 1994-95. PC version of “Minerals, Where and Why - USA”: \$6,000. Role=co-PI (J. Kemeny, co-PI). Effort=50%.

US Bureau of Mines, 1992-93. US version of “Minerals, Where and Why” computer program: \$12,000. Role=co-PI (J. Kemeny, co-PI). Effort=50%.

Arizona Mining Association, 1991-92. Arizona version of “Minerals, Where and Why” computer program for K-12: \$3,600. Role=co-PI (J. Kemeny, co-PI). Effort=50%.

SERVICE

National / International Outreach

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| 2001 | Interviews with “Good Morning Egypt” and Nile TV to promote research and education at the University of Arizona |
| 1996,
1998,2000 | Selected by American Geological Institute to author modules on minerals for new middle school textbook. This textbook project is funded by NSF and will be the first textbook to meet the new national science standards. Selected for high school project in |

1998 and university project in 2000.

University

- 2004 Advisory committee for Lowell Professional Master's Program in Economic Geology
Faculty Fellow – WISE program, Gila Hall
VP for Research Intellectual Property Advisory Committee
Department Head Steering Committee
- 2003 Participant joint USGS-UA economic geology workshop on proposed Center for Mineral Resources
Faculty Fellow – WISE program, Gila Hall
- 2002 Chair, Fair Task Force, Millennium Report Oversight Committee
Reviewer for Research Career Development Fund - 13 applications
Hearing Chair, University Hearings Board, 1 hearing
Member, Advisory Committee, Graduate Teaching Certificate Program
Member, Academic Program Review Committee for Institute for Study of Planet Earth
Faculty Fellow – WISE program, Gila Hall
- 2001 Member, Search Committee, Vice President Undergraduate Education (continuing into spring 2002)
Member, Search Committee, Lowell Endowed Chair, Geosciences Department
Feedback participant in preparation for review of Institute for Study of Planet Earth
Faculty Fellow – WISE program, Gila Hall
- 2000 Baird Scholarship Selection Committee
Member, Committee on Remote Sensing and Spatial Analysis (GIP) (appointment continues to date)
- 1999 V.P. for Research advisory committee on technology transfer (appointment continues)
V.P. for Undergraduate Affairs general education assessment committee
Faculty panelist for forum on academic careers for women, 2/3/99
Millennium Project Steering Committee (project on improving campus climate for academic excellence, commissioned by President Likins) (appointment through December 2001)
Web development seminars for FCII faculty gen ed training

program for each week-long training session during summer
Member, working group on technology integration for ILC building

1998 NCA Accreditation – UA Self study team (Team 8 on Institutional Integrity) (fall 1998-Feb 2000)
Appointed Faculty Fellow for Coronado Hall, with emphasis on Women in Science and Engineering wing (appointment continues to date at Gila Hall) see details under mentoring section
Faculty advisor to women's lacrosse team

1997 Commission on the Status of Women – Chair (August 1997-June 1999) see description in Appendix A for accomplishments and responsibilities
Tri-University Commission on the Status of Women – Organizer (1997-99)
University Hearings Board (3 year term)
ILC classroom planning committee

Extramural

2005 American Geological Institute Workforce Committee
US House of Representatives Subcommittee on Energy and Mineral Resources staff assistance for federal research support for mining and petroleum engineering

Editorial Board, Mining Foundation of the Southwest

2004 Congressional Testimony to House Subcommittee on Energy and Mineral Resources Oversight Hearing, July 8

Prepared White Paper for House Subcommittee on Energy and Mineral Resources pertaining to support of mining engineering programs in the US at request of Committee Staff

National Research Council Committee on Geological and Geotechnical Engineering

National Research Council Committee on geological and geotechnical engineering in the new millennium: opportunities for research and technological innovation

American Geological Institute Advisory Panel for Environmental Science textbook project

Vice President SAGEEP, Engineering and Environmental Geophysics Society – term ends spring 2004

Vice-chair, Mining and Geothermal Committee, Society of

Exploration Geophysicists – become Chair in fall 2004
Steering Committee for Arizona Department of Commerce on Mining Industry of the Future program
Member, Board of Directors, Arizona Conference of SME
Member, Women in Engineering Leadership Institute

2003 National Research Council Committee on Geological and Geotechnical Engineering
National Research Council Committee on geological and geotechnical engineering in the new millennium: opportunities for research and technological innovation
American Geological Institute Advisory Panel for Environmental Science textbook project
Vice President SAGEEP, Engineering and Environmental Geophysics Society
Vice-chair, Mining and Geothermal Committee, Society of Exploration Geophysicists
Steering Committee for Arizona Department of Commerce on Mining Industry of the Future program
Promotion and Tenure External Review for SUNY Buffalo and University of Missouri Rolla

2002 Vice-chair, Mining and Geothermal Committee, Society of Exploration Geophysicists
Vice-President Elect for SAGEEP, Engineering and Environmental Geophysics Society
Technical Chair, SAGEEP2002, Las Vegas, NV, Feb 10-15
Session Chair, Society of Exploration Geophysicists Annual Meeting
Member, Board of Directors, Arizona Conference of SME
Member, AAPG Academic Liaison Committee
Member, Organizing Committee, Computer Applications in the Minerals Industry, International Conference on the Applications of Computers in the Minerals Industries, Sept 8-10, 2003
Member, Arizona Department of Commerce organizing committee for statewide Industries of the Future program and proposal to DOE

- 2001 Session Chair, SAGEEP2001, Denver, CO
- 2000 Vice-President, Near Surface Geophysics Section, Society of
Exploration Geophysicists
Director at Large, Arizona Conference Society of Mining,
Metallurgy, and Exploration (elected appointment, continues to
date)
Member, Board of Governors, Mining Foundation of the Southwest
(appointment continues to date)
Selected to attend NSF sponsored Women in Engineering
Leadership conference, Oct 11-16
Founding member, Women in Engineering Leadership Institute
World Bank – Evaluation of PRODEMINTA geochemical sampling
in Ecuador, December 2000, January 2001.
American Geological Institute: “Minerals, Foundation of Society”,
Chair, NSF Instrumentation and Laboratory Improvement Panel,
2/5-2/8/97
- 1997