Mr. Fort has more than 27 years of experience in field and laboratory testing, data analysis, modeling and instrumentation for the geosciences. Mr. Fort has participated in low permeability packer testing in both deep boreholes and in underground facilities, designing the tests, developing specialized hardware and instrumentation, and analyzing the data. Mr. Fort has extensive experience in data management having developed a comprehensive information management system for Nirex's planned Rock Characterization Facility. As Associate Director of the IRIS/PASSCAL instrument center Mr. Fort was responsible for all aspects of managing a large pool of National Science Foundation owned seismological equipment for use around the world. In the area of environmental restoration Mr. Fort has designed and built data acquisition and control systems for tracer tests and surfactant enhanced recovery of dense non-aqueous phase liquid (DNAPL) contamination as well as developing systems for constant rate pumping tests, conventional slug tests, pneumatic slug tests and foam injection tests. Recently Mr. Fort has developed the PneuSine test procedure that uses a custom data acquisition and control system to generate a pneumatically driven sinusoidal signal for aquifer characterization.

Years of Experience: 27

Education:

- M.S. Hydrology, 1992, New Mexico Institute of Mining and Technology
- B.S. Engineering Science, 1989, New Mexico Institute of Mining and Technology

Languages:

Native English speaker

Fluent conversational German

Professional History:

2011– present	Principal – HydroResolutions
1999 – 2011	Associate Director – IRIS/PASSCAL Instrument Center, Socorro NM
1991– 1999	Hydrologist and project manager – INTERA Inc, Avon France/ Albuquerque and Carlsbad NM
1990 – 1991	Research Assistant – New Mexico Institute of Mining and Technology
1985 – 1988	Servo Systems Technician – National Radio Astronomy Observatory
1978 – 1983	Automated Flight Control Specialist – United States Air Force

Selected Projects

Kennecott Uranium Company: Sweetwater Uranium Project, near Rawlins WY. 2016 - 2017. *Numerical well-test analysis lead*, responsible for design and analysis of multi-frequency sinusoidal well tests using nSIGHTS. Sinusoidal pressure responses of different frequencies were generated pneumatically in deep boreholes (2000 ft) to characterize the aquifer near a uranium mining operation without producing any water to surface. The distance a signal propagates into an aquifer is dependent in part on the frequency of the signal. Multi-frequency tests allow for characterization of differing aquifer volumes to assess heterogeneity.

Ranger Uranium Mine Hydraulic Testing, Jabiru, Australia, 2013. *Data acquisition specialist and team leader.* Responsible for providing aquifer hydraulic test planning and field operations supervision as part of site characterization via boreholes up to 350 m in depth (both vertical and slant) to assess suitability of low permeability formations in support of mine closure. Developed specialized data acquisition and control system for packer testing. Coordinated with client and other contractors to install packers and run tests.

Union Gas Gas Storage Facility Hydraulic Testing, Ontario, Canada, 2013. *Data acquisition specialist and team leader.* Responsible for providing aquifer hydraulic test planning and field operations supervision as part of a site characterization to evaluate the integrity the low permeability cap rock in a reservoir used for natural gas storage. The borehole tested was a 493 meter vertical hole. Developed specialized data acquisition and control system for packer testing. Coordinated with client and other contractors to install packers and run tests.

PASSCAL Instrument Center, Socorro, New Mexico. 1999-2011: *Associate Director* The PASSCAL instrument center has more than 8000 seismological instruments and is funded by the National Science Foundation to provide worldwide support for seismology research. Responsibilities covered all phases of preparing and carrying out both active and passive source seismological experiments and advising principle investigators on experiment design. Duties included planning, preparation and testing of equipment, training of equipment users at the instrument center and in the field, development of field and laboratory procedures, hardware tracking, evaluation of new equipment, design and fabrication of custom circuits. Managerial duties included supervising and providing direction to technical staff, scheduling hardware and personnel for experiments.

NIREX, Cumbria U.K. 1996-1997. *Information systems and data acquisition manager* Responsible for developing an integrated information management system, which incorporated automated data acquisition, forms, notebooks, and QA procedures, for a proposed underground rock characterization facility. Responsibilities included design of an automated data acquisition system, and the data base structure.

ANDRA (French National Radioactive Waste Management Agency), Avon, France. 1995 – 1996. *Project Manager and lead technical consultant* Responsible for providing aquifer hydraulic test planning and field operations supervision as part of site characterization to assess suitability of low permeability formations for radioactive waste disposal. Responsibilities included test design, test equipment review, coordination of field activities with other contractors, data acquisition, data analysis, and reporting. The analysis of the field data was performed using GTFM a numerical well test simulator capable of simulating dual porosity systems, composite systems, and non-radial flow systems. The analysis package included Latin Hypercubed Sampling (LHS) of the parameters used in the model to assess the sensitivity of the model to those parameters.

Sandia National Laboratories, Waste Isolation Pilot Plant (WIPP), Carlsbad, New Mexico. 1991- 1993. *Technical consultant* Respnsible for all phases of the low permeability testing program at the WIPP site. Responsibilities included test design, development of test procedures, selection and purchasing of equipment; design, fabrication and testing of specialized equipment, data analysis and reporting. Tests performed included permeability tests, gas threshold pressure tests, and hydro-frac tests. In addition to analyzing the tests described above Mr. Fort performed analysis of sinusoidal pumping tests performed in the Culebra. All equipment calibrations, field testing, data documentation, and data-interpretation activities were implemented under Quality Assurance Procedures that address ANSI/ASME NQA-1. Mr. Fort participated in preparing the GTFM 6.00 validation document (WPO#40246) for Sandia National Laboratory.

Selected Publications, Presentations, and Reports

Sayler, C., Cardiff, M., Fort, M. Understanding the Geometry of Connected Fracture Flow with Multiperiod Oscillatory Hydraulic Tests. Ground Water 2017 Aug 15

Fort M.D., R.M. Roberts, D.A. Chace 2013. The Use of Pneumatically Generated Water Pressure Signals for Aquifer Characterization. AGU 2013 Fall Meeting, San Francisco, California, December, 2013.

Fort M.D., R.M. Roberts, P.S. Domski, 1998. Using the Deconvolution Approach for Slug Test Analysis: Theory and Application – Discussion. Ground Water v.36, no. 2, p. 198.

Fort M.D., 1997. RCF Science Design Contract RPPR/2304 Deliverable D7: Information Management. Prepared for United Kingdom Nirex Limited.

Roberts R.M., M.D. Fort, R.L. Beauheim, 1997. Application of Flow Dimensions to Well-Test Analysis and Repository Site Modeling. AGU 1997 Fall Meeting, San Francisco, California, December, 1997.

Fort, M.D., L.D. Parisot, B. Paris, and A. Laurent, 1996. Rapport final des tests hydrogéologiques sur le site de forage d'exploration MAR203 du Gard. Prepared for ANDRA, B RP1GSV 95-042/A, Chatenay-Malaboz, France.

Fort, M.D., L.D. Parisot, B. Paris, and A. Laurent, 1996. Rapport final des tests hydrogéologiques sur les sites de forage d'exploration CHA112, CHA113 et CHA115 de la Vienne. Prepared for ANDRA, Chatenay-Malaboz, France.

Fort, M.D., L.D. Parisot, and A. Laurent, 1995. Rapport final des tests hydrogéologiques sur le site de forage d'exploration HTM102 de Haute Marne. Prepared for ANDRA, B RP 1GSV 95-002, Chatenay-Malaboz, France.

Fort, M.D., L.D.Parisot, and A. Laurent, 1995. Rapport final des tests hydrogéologiques sur le site de forage d'exploration MSE101 de la Meuse. Prepared for ANDRA, B RP 1GSV 95-024/A, Chatenay-Malaboz, France.

1994. Site-Wide Hydrogeologic Characterization Project: Calendar Year 1994 Annual Report, Sandia National Laboratories.

Fort M.D., 1994 Safe Operating Procedure for Hydraulic Aquifer Testing in Support of the Site-Wide Hydrogeologic Characterization Project, Sandia National Laboratories.

Fort M.D., R.M. Roberts, 1994. The Effects of Variable Test-Zone Compressibility in Low-Permeability Hydraulic Testing. AGU 1994 Spring Meeting, Baltimore, Maryland, May, 1994.

Beauheim R.L. , R.M. Roberts, T.F. Dale, M.D. Fort, W.A. Stensrud, 1993. Hydraulic Testing of Salado Formation Evaporites at the Waste Isolation Pilot Plant Site: Second Interpretive Report, SAND92-0533, Sandia National Laboratories.