

**Education:**

PhD program – University of California – (1982-2003) Research Area: Noise Sources in Magnetotellurics  
Status: Course Work completed, Advanced to Candidacy (1989)  
Supervisor: Dr. H.F. Morrison

MSc in Geophysics – McGill University, Montreal (1982)  
Thesis: Field Magnetotelluric Phase Instrumentation  
Supervisor: DR. W.M. Telford  
BSc in Math with Honours Program - Mount Allison University (1977)

**Journal Publications**

Wilt, Michael; Um, Evan; Nichols, Edward; Weiss, Chester; Nieuwenhuis, Gregory; MacLennan, Kris,  
*Casing Integrity Mapping using Top-Casing Electrodes and Surface Based Electromagnetic Field:*  
Geophysics submission 2018

Nichols, E. A., Torres-Verdin, C. and Morrison, H. F., 1988, *Transfer function estimation for natural electromagnetic fields:* ASEG/SEG Internat. Geophys. Conf., Extended Abstracts, Expl. Geophys., **19**, 329-330.

Nichols, E.A., Morrison, H.F. and Clarke, J., 1988, *Signals and Noise in the Measurements of Low Frequency Geomagnetic Fields:* JGR v93, 13743-13754.

Nichols, E.A. and Telford, W.M. 1981, *Instrumentation for Direct Measurement of Phase of Audio-Magnetotellurics, in Geophysical Applications of Surface Wave Measurements:* GSC 81-15, 95-02.

**Other Publications or Technical Reports**

Mackie, R.L., Madden, T.R., and Nichols, E.A., 1997, *A magnetotelluric survey of the Loma Prieta Earthquake area: implications for earthquake processes and lower crustal conductivity*, US Geological Survey Professional Paper 1550-D, Paul A. Reasenber, Editor, pp. D289-D312.

Conti, U., Nichols, E. and Takasugi, S. 1988, *The EMI MT-1 System:* Journal of the Geothermal Energy Research & Development Co. Ltd., v13, 20-29.

Morrison, H.F., and Nichols, E.A., 1988, *Transfer-Function Estimation for Natural Electromagnetic Fields*, LBLID-24200, 122-125.

Morrison, H.F., Nichols, E.A., Schenkel, C., 1986, *Magnetic Mapping of a Hydrofracture*, LBLID-20450, 42-46.

Morrison, H.F. Clarke, J. And Nichols E., 1985, *Magnetometer Array Studies of Natural Electromagnetic Fields ( $10^{-4} - 1.0$  Hz)* LBL-18496, 182-186.

Morrison, H.F., Conti, U., Labson, V.F., Nichols, E., and Goldstein N.E. 1984, *Field Tests of Noise in SQUID and Induction Coil Magnetometers:* LBL Report LBID-901

## Conference Papers:

Nichols, E., David, M., Massey, J. – 2 papers EM Workshop 2014 Schlumberger - EMIT

Nichols, E., Vinit, R., and Kohring, J., 2013, *Progress in EMIT Measurements for Well Integrity*, 2013 EM&R Eureka Workshop, Paris

Vinit, R., Nichols, E., Kohring, J., 2013, *Electromagnetic Measurement of Corrosion - Extending EMIT operating envelope*. Schlumberger, REMS Symposium, Paris 2013.

Brill, T.M., Le Calvez, J-L, Demichel, C., Nichols, E., and Bermudez, F.Z., 2011, *Electromagnetic Casing Inspection Tool for Corrosion Evaluation*, SPE Bangkok, Thailand, 15–17 November 2011. IPTC-14865.

Brill, T.M., Le Calvez, J-L, Demichel, C., Nichols, E., and Bermudez, F.Z., 2011, *Quantitative Corrosion Assessment with an EM Casing Inspection Tool*, SPE Al Khobar, Saudi Arabia, 15-18 May 2011. SPE 149069.

Wilt, M. (presented by Nichols, E.), Tracking water and steam floods with Crosswell Electromagnetics, Non-Seismic Geophysics – Modern Methods and Practice Seminar, PSEG, London, 2009.

Nichols, E., 2008, *Motion-Induced Signals in Ocean-Bottom Electromagnetic Measurements*, BCGS 2nd Annual Symposium: "Noise in Geophysics", Vancouver.

Nichols, E., Chen, J., Kaspereit, D., Berard, B., and Guitierrez, P., 2006, *Land and Marine Magnetotelluric Exploration at the Salton Sea Geothermal Field*, GRC Conference, San Diego.

Abubakar, T.M. Habashy, V.L. Druskin (SDR), D. Alumbaugh, P. Zhang, M. Wilt, H. Denacalara, E. Nichols (EMI) and L. Knizhnerman, 2005, *2.5D forward and inversion algorithms for the cross-well electromagnetic applications*, Paper presented at EM, Am & IOU workshop in SDR, Ridgefield, Connecticut, May 17-20, 2005.

Abubakar, T.M. Habashy, V.L. Druskin D. Alumbaugh, P. Zhang, M. Wilt, H. Denacalara, E. Nichols (EMI) and L. Knizhnerman, 2005, *A fast and rigorous 2.5D inversion algorithm for cross-well electromagnetic data*, Paper presented at SEG, in Houston

Jiuping Chen, Ping Zhang, Edward Nichols, and Michael Wilt, 2005, *Application of low frequency crosswell Electromagnetics (EM) for fixing well geometry*, Paper presented at EM, Am & IOU workshop in SDR, Ridgefield, Connecticut, May 17-20, 2005.

Lüling, M., Babour, K., Habashy, T., Nichols, E., Wilt, M. & Zhang, P., 2004. *Crosswell Electromagnetic Surveys for Monitoring Large-Scale Reservoir-Saturation Changes*. Presentation and paper for SPE in Dhahran, Saudi Arabia.

Nichols, E., Conti, U., Morrison, H.F., Wilt, M., Cuevas, N., and Zhang, P., 2003, *A Discussion of Noise in Electromagnetic Measurements*, SEG, Expanded Abstracts, 22, no. 1, 2373-2374.

Zhang, P., Wilt, M & Nichols, E. 2003. *Using an Auxiliary Sensor to Adjust Crosswell EM data for Steel Casing Effects*. Technical presentation for EM induction workshop of EM induction & Resistivity Community in Berkeley, California

Cuevas, N., Nichols, E.A., Hoversten, G.M., and Newman, G.A. 2002, American Geophysical Union, Fall Meeting 2002.

Nichols, E., 2000, *From "Gain Ranging" to Fully Digital Array Acquisition Systems*, SEG Workshop for New Technologies, Annual Meeting, Calgary 2000.

Zhang, P., Wilt M. and Nichols, Ed, 1999. "*Inversion of cross-hole EM data*", 1999 Summer workshop of SEG, Taos, New Mexico, August 2 – 5.

Morrison, H.F. and Nichols, E.A., 1997, *Mineral Exploration with Natural Electromagnetic Fields*, Exploration '97, Toronto, Canada.

Morrison, H.F., Nichols, E.A., Hoversten, G.M., Gasperikova, E., 1997, *Continuous Magnetotelluric Profiling*, EAGO/EAGE/SEG International Geoscience Conference & Exhibition, Moscow, Sept 1997, Section B1.2

Morrison, H. F. and Nichols, Edward A., 1996, *Continuous impedance profiling for mineral exploration: 66th Annual Internat. Mtg., Soc. Expl. Geophys., Expanded Abstracts*, 1286-1289.

Nichols, E.A., Morrison, H.F., Wilt, M., J., Constable et al., 1996 – International Conference on Geology, Changsha, China, Presented papers on *Continuous impedance profiling, Controlled source MT, Crosshole Electromagnetic Tomography, Marine Magnetotellurics*.

Nichols, Edward A., Morrison, H. Frank and Lee, Seunghee, 1994, *Controlled-source magnetotellurics for groundwater: 64th Annual Internat. Mtg., Soc. Expl. Geophys., Expanded Abstracts*, 553-554.

Hoversten, G.M. and Nichols, E., "*Seaborne Electromagnetic Sub-salt Exploration*", 1992, Abstracts, AGU p313.

Nichols, E., 1992, *New data acquisition and processing techniques*, 11<sup>th</sup> Workshop on Electromagnetic Induction in the Earth, Wellington, New Zealand.

Morrison, H. Frank, Nichols, E. A., Torres Verdin, C., Booker, J. R. and Constable, S. C., 1990, *A comparison of magnetotelluric inversion techniques on a mineral prospect in Nevada: 60th Annual Internat. Mtg., Soc. Expl. Geophys., Expanded Abstracts*, 516-519.

Nichols, E. and Morrison, H.F., 1989, *Magnetotellurics for Mineral Exploration*, 1<sup>st</sup> Congress of the Brazilian Geophysical Society at Rio de Janeiro, Nov 20-24, 1989.

Nichols, E.A. and Morrison, H.F., 1989, *Real Time tensor AMT for Gold Exploration: Canadian Geologic Union, Montreal, May 17-19*.

Nichols, E. A., Morrison, H. F. and Clarke, J., 1985, *Signals and noise in magnetotellurics: 55th Annual Internat. Mtg., Soc. Expl. Geophys., Expanded Abstracts, Session:MT.1*.

### **Special Conferences**

"*Instrumentation*", Participant, NSF Workshop - "Low Frequency Electrical Precursors: Fact or Fiction?" at Lake Arrowhead, California, June 14-17, 1992.

## Patents

6294917, Nichols, E., 1999, Electromagnetic induction method and apparatus for the measurement of the electrical resistivity of geologic formations surrounding boreholes cased with a conductive liner.

6393363, Nichols, E., Wilt, M., 2000, Method and apparatus for the measurement of the electrical resistivity of geologic formations employing modeling data.

6534986, Nichols, E., 2001, Permanently emplaced electromagnetic system and method for measuring formation resistivity adjacent to and between wells.

6597178, Nichols, E., Conti, U., Omeragic, D., 2003, Sensor for detecting the magnetic field in the area of downhole casing.

6842006, Conti, U., Nichols, E., 2004, Marine Electromagnetic Measurement System

7295013, Conti, U., Nichols, E., 2007, Remotely operable measurement system and method employing same.

7565244, Alumbaugh, D., Zhang, P. Nichols, E., Morrison, F., Abuakar, A., Habashy, T., Method and system for removing effects of conductive casings and wellbore and surface heterogeneity in electromagnetic imaging surveys.

7633296, Safinya K, Nichols E., Babour K., Neelan, P., Besson, C., 2009, Receivers and Methods for Electromagnetic Measurements.

7659724, Alumbaugh, D. Chen, J., Eyl, K., Horne, S., Nichols, E, Surveying Method Using an Arrangement of Plural signal Sources

7795872, Clark, B., Morrison, F., Nichols, E., Zhang, H., Rosthal, R. 2010, Determining correction factors representing effects of different portions of a lining structure.

7825664, Homan, D., Nichols, E., Wilt, M., Seydoux, M. 2010, [Resistivity tool with selectable depths of investigation](#)

7826972, [Babour](#), K., Besson, C., Safinya, K., Heelan, P., Nichols, E., Methods of electromagnetic logging using a current focusing receiver.

7880469, Alumbaugh, D., Chen, J, Eyl, K., Surveying Method using an arrangement of plural signal sources.

7928732, Nichols, E., 2006, Subsurface Conductivity Imaging Systems and Methods.

7949470, Alumbaugh, D., Chen, J, Eyl, K., Horne, S., Nichols, E., Processing measurement data in a deep water application.

7991553, Alumbaugh; D, Zhang; P., Nichols; E., Morrison; F., Abubakar; A., Habashy; T., Method and System for removing effects of conductive casings and wellbore and surface heterogeneity in electromagnetic imaging surveys.

8008921, Alumbaugh, D., Zerilli, A. Morrison, H.F., Blornmenholm, H., Brady, J.P., Combee, L., Nichols, E., Cuevas, Surveying using vertical electromagnetic sources that are towed along with survey receivers.

8010291, Chen, J., Alumbaugh, D., Nichols, E., Horne, S., and Eyl, K., Processing Measurement Data that involves computing a derivative of the measurement data that represents a subterranean structure.

8181057, Nichols, E., Hosoda, Y., Johnsen, T., Vytla, V., Zhang, H., DePavia, L., Time Synchronization in Units at Different Locations

8289025, Deriving An Electromagnetic Field In One Direction Based On Measurement Data Of One Or More Sensing Elements For Measuring An Electromagnetic Field In Another Direction

8326539, Morrison, F., Nichols, E Rosthal, R., Zhang, H., DePavia, L., Characterizing At Least One Property Of A Liner That Lines A Well

9,377,556, Alumbaugh, D., Nichols, E, Esmersoy, C., Systems and methods for electromagnetic detection of a formation anomaly from a near bit location while drilling.

9,587,485, Jannin; Gaele, Legendre, Emmanuel and Nichols, Edward, Methods and apparatus to detect fluid distributions. Granted 2017

9,746,309, Nichols, E., Remote Field Testing Using a Permeable Core

#### **Partial List of patent applications filed**

2009, ELECTROMAGNETIC DETECTION OF BASE OF SALT WHILE DRILLING, David Alumbaugh, Edward Nichols, Cengiz Esmersoy US 2010/023 1220 A1

Cuevas, N., Nichols, E., 2007, 7800373, METHOD FOR CORRECTING MAGNETIC BASED ORIENTATION MEASUREMENTS FOR LOCAL BIASING FIELDS.

RESERVOIR CHARACTERIZATION USING SURFACE AND BOREHOLE MEASUREMENTS OF NATURAL EM FIELDS, filed 13<sup>th</sup> March, 2009 (23.0696). Alumbaugh, Nichols, Cuevas

**ELECTROMAGNETIC LOGGING BETWEEN BOREHOLE AND SURFACE** filed on October 21, 2009, Application Serial Number 12/603053

INSULATING OR MODIFIED CONDUCTIVITY CASING IN CASING STRING US 2011/0315378 A1, Homan, D. and Nichols

"WATER FRONT DETECTION USING LOW FREQUENCY ELECTROMAGNETIC TELEMTRY SYSTEM" US Patent application - - Mars 2011 Jannin Gaele, Legendre Emmanuel, Nichols Edward

Schlumberger Docket No. IS10.0961, EP13305497.3, "Measurement Compensation Scheme using Multiple EM Transmitters

Cuevas, N., Alumbaugh, D.L., Nichols, E., Equivalent Dipole Source for Casing Correction in Surface to Borehole Measurements

## **Awards**

Chevron Fellowship, 1987

Jane Lewis Scholarship, 1983-85

Harry A Scheffield Prize, Highest Undergraduate Average in Mathematics, 1977

Mt. Allison University Undergraduate Scholarships (1974-1976)

N.B. Assoc. Of Prof. Engineers, Highest First Year Grades in Engineering, 1974

## **Memberships**

SEG, AGU, (Ex - ASEG, EEGS)

Schlumberger Eureka: EM & Resistivity, Geophysics, Electrical, Deep EM, Signal Processing, Sensor Technology

## **Employment History**

2016-Present	Lawrence Berkeley Laboratory – Research Affiliate – EM Field Surveys
2014-2015	Schlumberger Technology, Houston – EM specialist – EM Specialist working from Berkeley
2009-2013	Etudes et Productions, Clamart, France – EM specialist working on EMIT corrosion logging technology
2004-2009	Schlumberger Technology Corp – EM Discipline Manager responsible for Land and marine geophysical instrumentation products, borehole physics Schlumberger Technical rank: Principle
1985-2004	Electromagnetic Instruments Inc. 1998-2004: Vice President R&D, 94-98 President, 91-94 Operations Manager, 85-91 Consultant Geophysicist
1988	Berkeley Engineering Research Group – Graduate Student Consultants Group
1982-1991	Capital Resources – President (Consulting Group Founded in Canada)
1977-1981	Amax Minerals Exploration – Geologist/Geophysicist
1973-1981	Amax – Summer Field Assistant