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MAIN FIELD

Mathematical aspects of Exploration and Global Seismology

RESEARCH INTERESTS

Imaging and Inversion of the Earth's Upper Crust and Mantle.
Modeling of Upper Crust Reflectivity in terms of Depositional Systems.
Modeling of Upper Mantle Reflectivity as a function of Mineralogy.
Application of (multifractal) Scaling Concepts such as Percolation.
Use of Harmonic Analysis (wavelets) in Geophysical Inverse Problems.

EMPLOYMENT

2001 - present	Senior Founding Member Fellow at the Earth Resources Laboratory, EAPS, MIT
1998 - 2001	Founding Member Fellow at the Earth Resources Laboratory, EAPS, MIT
1997 - 1998	NWO Fellow at the Department of Mathematics, Stanford University with George Papanicolaou
Summer 1992	Summer Research Assistant at Schlumberger Cambridge Research, UK
Summer 1988	Summer Research Assistant at SACLANT, NATO, IT

EDUCATION

1997	Ph.D. from Delft University of Technology, Delft, the Netherlands. Graduate advisors: Prof. Dr. A.J. Berkhout and Prof. Dr. C.P.A. Wapenaar
1991	M.Sc. from Delft University of Technology, Delft, the Netherlands. Graduate advisors: Prof. Dr. A.J. Berkhout and Prof. Dr. C.P.A. Wapenaar

AWARDS

1999 - present	Funding from Norsk-Hydro
2001	Top 25 ranked paper at the 2000 SEG Annual Meeting
1998 - 2001	Founding Member Fellow at MIT
1997 - 1998	NWO Fellow at Stanford University
1996	KIVI's Petroleum Techniekprijs (awarded every 4 years by the Royal Dutch Institute of Engineers)

PROFESSIONAL ACTIVITIES

1999 - present	Collaboration with Norsk Hydro on attribute analysis.
1992 - present	Reviewer for Geophysics, Journal of the Acoustical Society of America, Journal of Seismic Exploration, Journal of Computational and Applied Harmonic Analysis.
2001	Invited lecturer at the Physics Department of the Universidade Federal do Rio Grande do Norte, Brazil.
1999	Co-organizer mini-symposium: "Waves in Multiscale Media", 5 th SIAM Meeting on Mathematical and Computational Issues in the Geosciences.

PROFESSIONAL MEMBERSHIP

Society for Exploration Geophysicists, European Association of Geoscientists and Engineers.

TEACHING 2001 Graduate course wavelets, fractals and multiscale analysis in geophysics at Universidade Federal do Rio Grande do Norte, Brazil.
1998 - present Supervision Ph.D. students.
1992 - 1997 Supervision M.Sc. students.

PRESENTATIONS Invited seminars at special SEG session: “Recent advances and the road ahead”; Caltech; UT Texas at Austin; Rice University; St Anthony Fall Lab and IMA, University of Minnesota; UC Santa Cruz; Lawrence Berkeley National Laboratory; Colorado School of Mines; Stanford University; ERL-MIT; Schlumberger Cambridge and Ridgefield; UMASS at Lowell; SHELL Rijswijk and SHELL-US; CWI, Universiteit Amsterdam; Universiteit Wageningen; AMS-meeting Benelux “Wavelets and their applications”, Antwerp, Belgium; NLS-workshop “Analysis of scaling phenomena with multifractals and wavelets”, Doorn, the Netherlands.

PUBLICATIONS **F. J. Herrmann**, S. Chevrot and C. P. Stark
Sharpness characterization of the 410 upper mantle discontinuity by fixed scale singularity analysis of converted phases*, *Geoph. J. Int.*, 2000, in revision.

F. J. Herrmann and Y. Bernarbé
Seismic singularities at upper mantle discontinuities: a site percolation model, 2001, in preparation.

F. J. Herrmann, W.J. Lyons and C. Stark
Seismic facies characterization by monoscale analysis, *Geoph. Res. Lett.*, **28**(19), 3781-3784, 2001.

F. J. Herrmann
Singularity characterization by monoscale analysis: application to seismic imaging, *Appl. Comput. Harmon. Anal.*, **11**, 64-88, 2001.

F. J. Herrmann
Multiscale analysis of well- and seismic data*, *SPIE, Mathematical Methods in Geophysical Imaging V*, **3453**:180-208, 1998.

F. J. Herrmann
A scaling medium representation, a discussion on well-logs, fractals and waves*. *Ph.D. thesis*, Delft University of Technology, 1997.

C. P. A. Wapenaar and **F. J. Herrmann**
True-amplitude migration taking fine-layering into account*, *Geophysics*, **61**(3):795–803, 1996.

C. P. A. Wapenaar, R. Slot and **F. J. Herrmann**
Towards an extended macro model that takes fine-layering into account, *Journal of Seismic Exploration*, **3**, 245–260, 1994.

REPORTS

Annual DELPHI reports, Delft University of Technology, Delft, the Netherlands, 1992-1996.
MIT Industry Consortia Annual Report, Multi- and monoscale attributes for Well and Seismic data*, 1999.
MIT Industry Consortia Annual Report, Seismic Facies Characterization by Scale Analysis*, 2000.
MIT Industry Consortia Annual Report, Scaling and Seismic Reflectivity: implications of scaling on AVO*, MIT, 2000, to be revised for submission.
Industry Consortia Annual Report, Quantitative tools for seismic stratigraphy and lithology characterization*, 2001, to be revised for submission.

PROCEEDINGS

W. J. Lyons, **F. J. Herrmann** and J. Grotzinger
Lithologic characterization of stratigraphy by singularity analysis of seismic and well data*, in *Expanded Abstracts*, Soc. Expl. Geoph., 2001.

F. J. Herrmann

Fractional Spline Matching Pursuit: a quantitative tool for seismic stratigraphy*, in *Expanded Abstracts*, Soc. Expl. Geoph., 2001.

J. Kane, **F. J. Herrmann** and N. Toksoz

Wavelet domain linear inversion with application to well-logging*, in *Expanded Abstracts*, Soc. Expl. Geoph., 2001.

F. J. Herrmann

Scaling and seismic reflectivity: implications of scaling on AVO*, in *Expanded Abstracts*, EAGE, 2001.

F. J. Herrmann

Fractional Spline Matching Pursuit: a quantitative tool for seismic stratigraphy*, in *Expanded Abstracts*, EAGE, Workshop: Geophysical Applications of the Wavelet Transform, 2001.

F. J. Herrmann

A different perspective on the upscaling problem*, in *Expanded Abstracts*, EAGE/SEG Research Workshop on Reservoir Rocks, Pau, France, 2001.

F. J. Herrmann

Stratigraphy and lithology classification by singularity analysis, in *Expanded Abstracts*, EAGE/SEG Research Workshop on Reservoir Rocks, Pau, France, 2001.

F. J. Herrmann and C. Stark

A scale attribute for texture in well- and seismic data*, in *Expanded Abstracts*, Soc. Expl. Geoph., 2000.

F. J. Herrmann and C. Stark

Monoscale analysis of edges/reflectors using fractional differentiations/integration*, in *Expanded Abstracts*, Soc. Expl. Geoph., 1999.

F. J. Herrmann

Evidence of scaling for acoustic waves in multiscale media and its possible implications*, in *Expanded Abstracts*, Soc. Expl. Geoph., 1998

F. J. Herrmann

A scaling medium representation and its implication for acoustic wave motion*. in *Expanded Abstracts*, Soc. Expl. Geoph., 1997.

F. J. Herrmann

Scaling of the pseudo primary analyzed by the wavelet transform, in *Expanded Abstracts*, Soc. Expl. Geoph., 1994.

F. J. Herrmann and C. P. A. Wapenaar

Wave propagation in finely layered media, a parametric approach. in *Expanded Abstracts*, Soc. Expl. Geoph., 1993

C.P.A. Wapenaar and **F. J. Herrmann**

Macro description of fine layering: A proposal for an extended macro model. in *Expanded Abstracts*, Soc. Expl. Geoph., 1992.

STUDENT PROJECTS

J. Kane, **F. J. Herrmann** and N. Toksoz

Wavelet domain inversion with application to well-logging*, 2001, in preparation.

W. J. Lyons, **F. J. Herrmann** and J. Grotzinger

Singularity analysis: a tool for extracting lithologic and stratigraphic content from seismic data, 2001, in preparation.

*pre/reprints are available at <http://erl.mit.edu/~felix/Preprint>