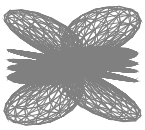

Daniel B. Peter

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ETH Zurich, NO H1.2
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Research Interests

COMPUTATIONAL SEISMOLOGY
Numerical methods for seismic wave propagation, applications to High-Performance Computing

GEOPHYSICAL INVERSE PROBLEMS
Waveform-based seismic adjoint tomography, validation of global and regional seismic models

EARTHQUAKE SEISMOLOGY
Seismic source verification and 3D source inversions

Education

Swiss Federal Institute of Technology, ETH Zurich, Switzerland

Ph.D., Geophysics, Department of Earth Sciences, Institute of Geophysics, May 2008

- Thesis: *Finite-frequency effects in global seismology: forward modeling and implications on tomographic imaging*
- Advisor: Prof. Domenico Giardini

Diploma, Physics, Institute for Atmospheric and Climate Science, August 1998

- Thesis: *Strategies for ensemble predictions*
- Advisor: Prof. Huw C. Davies

Academic experience

Università della Svizzera italiana, USI Lugano, Switzerland
Swiss Federal Institute of Technology, ETH Zurich, Switzerland

Senior scientist, *September 2013 – today*
research activities at the the Department of Computer Science, USI, and Institute of Geophysics, ETH Zurich:

- High-performance computing (HPC) application support for geophysics network "Solid Earth Dynamics"
- 3D multi-scale adjoint tomography
- Implementation of hardware-accelerated computing

Swiss Federal Institute of Technology, ETH Zurich, Switzerland

Research associate, *January 2013 – August 2013*
research activities at the Institute of Geophysics ETH Zurich:

- 3D adjoint tomography
- Implementation of hardware-accelerated computing

teaching activities:

- Assistant, Global seismology, graduate level

Princeton University, Princeton NJ, USA

Associate research scholar, *2011 – 2012*
Post-doctoral research associate, *2008 – 2011*
research activities accomplished at the Department of Geosciences, Princeton University:

- 3D seismic source inversion and adjoint tomography for regional events in the Middle East
- Seismic model validation for the Middle East
- Implementation of a finite-element ray tracing code for optical rays in deformable media

teaching activities accomplished:

- Assistant, Computational geophysics, graduate level
- Assistant, Quantitative seismology, graduate level

Seminar organizer, *2008 – 2010*
for the Department of Geosciences, Princeton University:

- Organization of the Solid-Earth brownbag seminar, weekly cycle

Swiss Federal Institute of Technology, ETH Zurich, Switzerland

Ph.D work, *2004 – 2008*
research activities accomplished at the Institute of Geophysics ETH Zurich:

- Implementation of a finite-difference software package to model the propagation of membrane waves on a spherical shell as an analogue to surface waves
- 2D and 3D sensitivity kernel computations for phase anomaly measurements of surface waves
- Administration of a Linux Beowulf research cluster and an Apple Xgrid supercomputer

Teaching activities, *2004 – 2007*
activities accomplished at the Institute of Geophysics ETH Zurich:

- Assistant, Introduction to seismic networks, undergraduate level
- Assistant, Geothermics, field work for undergraduate level

activities accomplished at the Kantonsschule Zug for the certificate of teaching ability:

- College teacher, Physics, classes taught August 2006 - May 2007, college level

Diploma work, *May 1998 – October 1998*
research activities accomplished at the IACETH (Institute for Atmospheric and Climate Science, ETH Zurich):

- Implementation of a Lorenz-63 model with non-linear dynamics approaches for short- and medium range weather predictions, 6-month research work
- *Snowflake recognition*, software detection algorithms, 2-month course work, Institute for Atmospheric Physics, ETHZ, Mai 1997
- Exchange year studies at the Département de Physique, EPFL (École Polytechnique Fédérale Lausanne), Switzerland, 1995–1996

PUBLICATIONS *Articles in refereed journals:*

Rietmann, M., P. Messmer, T. Nissen-Meyer, **D. Peter**, P. Basini, D. Komatitsch, O. Schenk, J. Tromp, L. Boschi and D. Giardini, 2012. *Forward and adjoint simulations of seismic wave propagation on emerging large-scale GPU architectures*, SC '12 Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis, Article No. 38.

H.J. Zhu, E. Bozdag, **D. Peter** and J. Tromp, 2012. *Seismic wavespeed images across the Iapetus and Tornquist suture zones*, Geophys. Res. Lett., 39 (18), doi:10.1029/2012GL053053.

H.J. Zhu, E. Bozdag, **D. Peter** and J. Tromp, 2012. *Structure of the European upper mantle revealed by adjoint tomography*, Nature Geoscience, 5, 493-498, doi:10.1038/NGEO1501.

Epstein, M., **D. Peter** and M.A. Slawinski, 2012. *Combining ray-tracing techniques and finite-element modelling in deformable media*, QJMAM, 65 (1), 87-112.

Peter, D., D. Komatitsch, Y. Luo, R. Martin, N. Le Goff, E. Casarotti, P. Le Loher, F. Magnoni, Q. Liu, C. Blitz, T. Nissen-Meyer, P. Basini and J. Tromp, 2011. *Forward and adjoint simulations of seismic wave propagation on unstructured hexahedral meshes*, Geophys. J. Int., 186 (2), 721-739.

Savage, B., **D. Peter**, B.M. Covellone, A.J. Rodgers and J. Tromp, 2011. *Next Generation, Waveform Based Three-Dimensional Models and Metrics to Improve Nuclear Explosion Monitoring in the Middle East*, in Proceedings: 33rd Monitoring Research Review (MRR 2011), 1-17, p. 161-167.

Tromp, J., Y. Luo, S. Hanasoge and **D. Peter**, 2010. *Noise Cross-Correlation Sensitivity Kernels*, Geophys. J. Int., 183 (2), 791-819.

Tromp, J., D. Komatitsch, V. Hjörleifsdóttir, Q. Liu, H. Zhu, **D. Peter**, E. Bozdag, D. McRitchie, P. Friberg, C. Trabant and A. Hutko, 2010. *Near real-time simulations of global CMT earthquakes*, Geophys. J. Int., 183 (1), 381-389.

Savage, B., **D. Peter**, B. Covellone, A. Rodgers and J. Tromp, 2010. *Next Generation, Waveform Based Three-Dimensional Models and Metrics to Improve Nuclear Explosion Monitoring in the Middle East*, in Proceedings: 32nd Monitoring Research Review (MRR 2010), 2-20, p. 207-213.

Savage, B., **D. Peter**, B. Covellone, A. Rodgers and J. Tromp, 2009. *Progress towards next generation, waveform based three-dimensional models and metrics to improve nuclear explosion monitoring in the Middle East*, in Proceedings: 31th Monitoring Research Review of Ground-Based Nuclear Explosion Monitoring Technologies (MRR 2009), LLNL-PROC-414451, 1-21, p. 194-200.

Peter, D., L. Boschi and J.H. Woodhouse, 2009. *Tomographic resolution of ray and finite-frequency methods: a membrane-wave investigation*, Geophys. J. Int., 177, 624-638.

Peter, D., L. Boschi, F. Deschamps, B. Fry, G. Ekström and D. Giardini, 2008. *A new finite-frequency shear-velocity model of the European-Mediterranean region*, Geophys. Res. Lett., 35, L16315, doi:10.1029/2008GL034769.

Peter, D., C. Tape, L. Boschi and J.H. Woodhouse, 2007. *Surface wave tomography: global membrane waves and adjoint methods*, Geophys. J. Int., 171, 1098-1117.

Boschi, L., J.-P. Ampuero, **D. Peter**, P.M. Mai, G. Soldati and D. Giardini, 2007. *Petascale computing and resolution in global seismic tomography*, Phys. Earth planet. Inter., doi:10.1016/j.pepi.2007.02. 011

PUBLICATIONS *Articles in non-refereed journals, non-refereed reports, abstracts:*

Peter, D., M. Rietmann, J. Charles, P. Messmer, D. Komatitsch, O. Schenk, J. Tromp, 2012. *Accelerating forward and adjoint simulations of seismic wave propagation on large GPU-clusters*, AGU, poster presented in San Francisco, USA.

Peter, D., B. Savage, A. Rodgers, C. Morency and J. Tromp, 2011. *Adjoint tomography of the Middle East*, AGU, invited presentation, San Francisco, USA.

Peter, D., M. Rietmann, D. Komatitsch and J. Tromp, 2011. *Advances in high-performance spectral-element solvers for seismic tomography*, AGU, invited presentation, San Francisco, USA.

Peter, D., B. Savage, A. Rodgers and J. Tromp, 2010. *Adjoint tomography of the Middle East*, AGU, paper presented in San Francisco, USA.

Peter, D., B. Savage, B. Covellone, A. Rodgers and J. Tromp, 2010. *Adjoint tomography of the Middle East for nuclear explosion monitoring*, QUEST workshop, poster presented in Alghero, Italy.

Peter, D., 2010. *Toward seismic adjoint tomography for local to global scale problems*, IPRPI Workshop, invited presentation, Troy, USA.

Savage, B., **D. Peter**, B. Covellone, A. Rodgers, and J. Tromp, 2009. *Progress towards next-generation, waveform-based, three-dimensional Models and Metrics to Improve Nuclear Explosion Monitoring in the Middle East*, in Proceedings of the 31th Monitoring Research Review of Ground-Based Nuclear Explosion Monitoring Technologies, poster presented in Tucson, USA.

Peter, D., A. Rodgers, B. Savage and J. Tromp, 2008. *Adjoint tomography for the Middle East*, AGU, paper presented in San Francisco, USA.

Savage, B., B. Covellone, **D. Peter**, A. Rodgers, and J. Tromp, 2008. *Initial steps towards next-generation, waveform-based, three-dimensional Models and Metrics to Improve Nuclear Explosion Monitoring in the Middle East*, Proceedings of the 30th Monitoring Research Review of Ground-Based Nuclear Explosion Monitoring Technologies, poster presented in Portsmouth, USA.

Peter, D., L. Boschi and J.H. Woodhouse, 2007. *Surface wave tomography: where does ray theory break down on a global scale?*, AGU, paper presented in San Francisco, USA.

Peter, D., L. Boschi and Y. Capdeville, 2007. *Finite-frequency kernels for surface waves based upon adjoint methods*, SPICE workshop, paper presented in Cargèse, France.

Peter, D. and L. Boschi, 2006. *Surface wave tomography: membrane waves and adjoint methods*, SPICE workshop, paper presented in Kinsale, Ireland.

Awards

American Geophysical Union (AGU)
Outstanding Student Paper Award, Fall meeting 2007

Professional Profile

Independent programmer with training and expertise in feed-forward backpropagation networks and genetic algorithms, 3D-visualisations of complex user interfaces and Computer Telephony Integration

Possess solid understanding of non-linear dynamics with Runge-Kutta and finite-difference solving algorithms and Monte Carlo ensemble generation especially with consideration of probabilistic densities and singular vectors

Experienced in international projects of software development, strong team worker with troubleshooting and problem-solving skills

Professional experience

Petersvild, St.Gallen, Switzerland

Software Programmer, *2001 – 2004*

- Implemented genetic algorithms for optimisation of feed-forward backpropagation neural networks in Econophysics,
- 3D-visualisation applications for corporate communication.

Enterprise Communications AG / Ansid AG, Winterthur, Switzerland

Software Programmer, *2000 - 2001*

- Performed trouble shooting in the development of Computer Telephony Integration (CTI) software products, mainly in system-analysis and program design.
- Implemented core components and test environments.

Enterprise Communications AG, Zurich, Switzerland

Software Programmer, *1999 – 2000*

- Researched system-analysis and modelled telephony interfaces of Microsoft (TAPI) and ECMA (TSAPI).
- Analyzed and designed core modules of the application package within outsourcing projects, studied technical feasibility and controlled the implementation in collaboration with the quality management.

Additional Information

Languages: German (mother language), English fluent, French fluent

Programming & Scripting Languages: Fortran, C/C++, CUDA, Python, Perl, Matlab