

NIKOLAI SHAPIRO

Directeur de Recherche, CNRS
Département de Sismologie
Institut de Physique du Globe de Paris
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75252 Paris cedex 05
France

Citizenship: Russia

Education

- Habilitation à Diriger des Recherches, (Seismology) Université Joseph Fourier, Grenoble, France, 2004
- Ph.D., (Seismology) Université Joseph Fourier, Grenoble, France, 1996
- B.S. & M.S., (Physics) Moscow Institute of Physics and Technology, 1991

Appointments

2006-present Head of the seismology team at the Institute de Physique du Globe de Paris
2005-present DR2, CNRS, France
2003-2005 Lecturer, Center for Imaging the Earth's Interior, Department of Physics, University of Colorado at Boulder
2000-2003 Research Associate, Center for Imaging the Earth's Interior, Department of Physics, University of Colorado at Boulder
1999-2000 Assistant Professor, Instituto de Geofísica, UNAM, Mexico
1997-1999 Post-Doctoral Fellow, Instituto de Geofísica, UNAM, Mexico
1992-1993 Research Fellow, Université Joseph Fourier, Grenoble, France
1991-1993 Research Fellow, Institute of Mathematical Geophysics, Moscow, Russia
1990-1991 Research Fellow, Institute of Spectroscopy, Moscow, Russia

Teaching experience

Teaching of graduate classes:

UNAM, Mexico; Seismology, 1998
UNAM, Mexico; Studies of large earthquakes, 1999
University of Colorado at Boulder, USA; Seismology, 2004
IPGP, France; Seismic noise, 2009

Teaching at international schools:

Workshop on Three-Dimensional modeling of seismic Waves Generation Propagation and their Inversion, Trieste, Italy, 2006.
The fourth SPICE Research and Training Workshop, May 14–19, 2007, Cargese, Corsica, France.
Workshop on Three-Dimensional modeling of seismic Waves Generation Propagation and their Inversion, Trieste, Italy, 2008.

Student supervising

Arturo Iglesias-Mendoza, undergraduate student, UNAM, Mexico, 1999-2000.
Victor Manuel Cruz Atienza, undergraduate student, UNAM, Mexico, 1999-2000.
Garrett Leahy, undergraduate student, CU Boulder, 2001-2002.
William Landuyt, undergraduate student, CU Boulder, 2001-2002.
Brian Laughman, MSc student, CU Boulder, 2002-2003.
Daniel Smith, MSc student, CU Boulder, 2003-2004.
Steve Smith, PhD student, CU Boulder, 2004-2005.
Greg Bensen, PhD student, CU Boulder, 2004-2005.
Morgan Moschetti, PhD student, CU Boulder, 2005.
Laurent Stehly, PhD student, UJF Grenoble, 2004-2007.
Laura Benatti, MSc student, IPG Paris, 2006.
Mattieu Landes, PhD student, IPG Paris, 2006-present
Florian Duret, PhD student, IPG Paris, 2008-present
Daniel Clark, PhD student, IPG Paris, 2008-present
Elodie Rivemal, PhD student, IPG Paris, 2008-present

Postdoc supervising

Yinjie Yang, CU Boulder, 2005.
Florent Brengier, IPG Paris, 2006-2007.
Ueli Meier, IPG Paris, 2008.
Sophie Peyrat, IPG Paris, 2008-present
Benoit Taisne, IPG Paris, 2008-present
Lucia Zaccarelli, IPG Paris, 2009-present

Languages

Fluent in English, French, Spanish, and Russian.

Services/Committees

Head of "FOSFORE" – service d'observatoire de l'INSU, 2006-present
Member of ORFEUS Executive Committee, 2006-present
Member of ad-hoc French Seismology group, 2006-present
Member of "commission des spécialistes de l'IPGP" 2006-2008.
Member of "commission des spécialistes de l'OSUG" 2008.
Member of the evaluation committee of the ANR Blanc program 2008-present.
Member of the scientific committee of the UFR STEP, 2008-present.
Organizing Committee, Structure and Evolution of the Antarctic Plate, 2003, Workshop, Boulder, CO, March 2003.
Member of the Antarctic Seismic Array working group, 2003-2005.
Convener of a special session on the advanced seismic imaging during the 2005 AGU Spring Meeting, New Orleans, USA.
Convener of a special session "Hearing the noise" during the 2005 AGU Fall Meeting, San Francisco, USA.
Organizing Committee, "Colloque Sismologique", Carry le Rouet, France, 2006.
Organizing Committee, "Colloque Sismologique", Nice, France, 2008.
Organizing Committee, "ORFEUS Workshop", Utrecht, Holland, 2008.
Reviewing of numerous manuscripts for high-rank scientific magazines and of numerous NSF and DOE proposals.

Research grants

- PI, "Propagación de ondas sísmicas en la corteza de México", proyecto J32308-T, CONACYT, México, ~\$100,000, 2000-2001.
- Co-PI, "Collaborative Research, Active Tectonics at the Aleutian-Kamchatka Corner: A Lithospheric Perspective", National Science Foundation, \$59,790, 05/01/02 - 04/30/04.
- Co-PI, "Modeling the Middle American Lithosphere: Illuminating the Enigma of Cocos Plate Subduction", National Science Foundation, \$60,000, 08/01/02 - 07/31/04.
- Co-PI, "Refinements and Interpretation of Images of the Antarctic Crust and Upper Mantle", National Science Foundation, \$242,215, 07/01/02 - 06/30/05.
- Co-PI, "Structure of the Tibetan Crust and Upper Mantle and Its Geodynamic Implications", National Science foundation, \$239,053, 01/01/04-12/31/06.
- Co-PI, "Seismic and Geodynamic Investigation of the Interaction Between the Oceanic Lithosphere and Upper Mantle", National Science Foundation, \$230,318, 07/01/04-06/31/07.
- Co-PI, "New Method of Calibrating Surface-Wave Path Effects in North Africa, the Middle East, and Central Asia", US Department of Energy National Nuclear Security Administration, \$450,000, 01/03/05-29/02/08.
- Co-PI, "Rayleigh-Wave Attenuation Model for Eurasia and Calibrating New Ms Formula", US Department of Energy National Nuclear Security Administration, \$600,000, 01/03/05-29/02/08.
- Co-PI, "Seismic Observations from the Random Wavefield: A New Tool for High-Resolution Seismology in the Context of EarthScope", National Science Foundation, \$240,000, 01/05/05-30/04/08.
- Participant, "PRECORSIS Application des méthodes de corrélation à la détection de variations temporelles des propriétés sismiques de la croûte et à la mesure de temps absolus entre séismes", ANR, 2005-2008.
- Participant, "SubChile Grands tremblements de terre du Chili aléa sismique", ANR, 2005-2008.
- PI, "COHERSIS", ANR Chaire d'Excellence, 20062009
- PI, "Study of non-volcanic tremors in Mexican subduction zone", ECOS Nord, 2006-2010.
- PI, " Propagation des ondes de surface sismiques dans un modèle 3D", CEA, 2006-2009.
- Co-PI, "G-Gap", ANR, 2008-2011.
- Participant, "UNDERVOLC", ANR 2008-2011.
- Co-PI, "WISPER", European Research Council senior grant, 2009-2013.

Graduate Advisor

Pr. Michel Campillo, Université Joseph Foureir, Grenoble, France

Postdoctoral Advisors

Michael Ritzwoller, University of Colorado

Shri Krishna Singh, Universidad Nacional Autonoma de Mexico

Publications

(reprints are available at: <http://www.ipgp.fr/~nshapiro/PUBLICATIONS>)

Peer reviewed papers

1. Shapiro N., N. Béthoux, M. Campillo and A. Paul, Regional phases across the Ligurian Sea: Lg blockage and oceanic propagation, *Phys. Earth. Planet. Inter.*, **93**, 1996
2. Campillo M., S. K. Singh, N. Shapiro, J. Pacheco, and R. Herrmann. Crustal structure south of the Mexican volcanic belt, based on group velocity dispersion, *Geofis. Int.*, **35**, 361-370, 1996.
3. Shapiro N. M., M. Campillo, A. Paul, S. K. Singh, D. Jongmans, and F. J. Sánchez-Sesma. Surface wave propagation across the Mexican Volcanic Belt and the origin of the long-period seismic wave amplification in the valley of Mexico, *Geophys. J. Int.*, **128**, 151-166, 1997
4. Shapiro N. M., M. Campillo, S. K. Singh, and J. Pacheco, Channel seismic waves in the accretionary prism of the Middle America Trench, *Geophys. Res. Lett.*, **25**, 101-104, 1998
5. Singh S. K., J. Pacheco, and N. M. Shapiro, the earthquake of 16 november, 1925 (Ms=7.0) and the Reported tsunami in Zihuatenejo, Mexico, *Geofis. Int.*, **37**, 49-52, 1998
6. Shapiro, N. M., Singh S. K., and Pacheco, J., A fast and simple diagnostic method for identifying tsunamigenic earthquakes, to appear in *Geophys. Res. Lett.*, **25**, 3911-3914, 1998
7. Margerin, L., Campillo, M., Shapiro N. M., and Van Tiggelen, B., The time of residence of diffuse waves in the crust and the physical interpretation of coda Q. Application to seismograms recorded in Mexico, *Geophys. J. Int.*, **138**, 343, 1999
8. Shapiro, N.M. and Singh S. K., A systematic error in estimating surface-wave velocity dispersion curves and a procedure for its correction, *Bull. Seism. Soc. Am.*, **89**, 1138-1142, 1999.
9. Singh, S. K., J., Dattatrayam, Shapiro, N. M., Pacheco, R. S., and Mandal, P., Crustal and Upper Mantle Structure of Peninsular India and Source Parameters of the May 21, 1997, Jabalpur Earthquake (Mw=5.8): Results from a New Regional Broadband Network, *Bull. Seism. Soc. Am.*, **89**, 1999.
10. Pacheco, J. F., Mortera, C., Singh, S. K., Valenzuela, R., Shapiro, N., M., Santoyo, M., Hurtado, A., and Barrón, R., Earthquake sequence in the Zacoalco half-graben, Jalisco, Mexico, *Journal of South American Earth Science*, **12**, 557-665, 1999.
11. Shapiro N.M., K. Olsen, and S.K. Singh, Wave-guide effects in subduction zones:

- evidence from three-dimensional modeling, *Geophys. Res. Lett.*, 27, 433-436, 2000.
12. Shapiro, N.M., Gorbatov, A.V., Gordeev, E., and Dominguez, J., Average shear-wave velocity structure of the Kamchatka peninsula from the dispersion of surface waves, *Earth Planets and Space*, 52, 573-577, 2000.
 13. Shapiro, N.M., Singh, S.K., Iglesias-Mendoza, A., Cruz-Atienza, V.M., and Pacheco, J.F., Evidence of low Q below Popocatepetl volcano, and its implication to seismic hazard in Mexico City, *Geophys. Res. Lett.*, 27, 2753-2756, 2000.
 14. Shapiro, N.M., Campillo, M., Margerin, L., Singh, S.K., Kostoglodov, V., Pacheco, J., The energy partitioning and the diffusive character of the seismic coda, *Bull. Seism. Soc. Am.*, 90, 655-665, 2000.
 15. Singh, S.K., M. Ordaz, L. Alcántara, N. Shapiro, V. Kostoglodov, J.F. Pacheco, S. Alcocer, C. Gutierrez, R. Quaas, T. Mikumo, and E. Ovando, The Oaxaca earthquake of September 30, 1999 (Mw=7.5): a normal-faulting event in the subducted Cocos plate, *Seism. Res. Lett.*, 71, 68-78, 2000.
 16. Ritzwoller, M.H., N.M. Shapiro, A.L. Levshin, and G.M. Leahy, The structure of the crust and upper mantle beneath Antarctica and the surrounding oceans, *J. Geophys. Res.*, 106(B12), 30645 - 30670, 2001.
 17. Iglesias, A., V. M. Cruz-Atienza, N. M. Shapiro, S. K. Singh and J. F. Pacheco, Crustal structure of south-central Mexico estimated from the inversion of surface-wave dispersion curves using genetic and simulated annealing algorithms, *Geofísica Internacional*, 40 (3), 181-190, 2001.
 18. Shapiro, N.M., Singh, S.K., Almora, D., Ayala, M., Evidence of the dominance of higher-mode surface waves in the lake-bed zone of the Valley of Mexico, *Geophys. J. Int.*, 147, 517-527, 2001.
 19. Cruz-Atienza, V.M., Pacheco, J.F., Singh, S.K., Shapiro, N.M., Valdes, C., Iglesias, A., Size of Popocatepetl volcano explosions (1997-2001) from waveform inversion, *Geophys. Res. Lett.*, 28, 4027-4030, 2001.
 20. Hennino, R., Tregoures, N., Shapiro, N.M., Margerin, L., Campillo, M., van Tiggelen, B.A., Weaver, R.L., Observation of equipartition of seismic waves, *Phys. Rev. Lett.*, 86, 3447-3450, 2001.
 21. Hernandez, B., Shapiro, N.M., Singh, S.K., Pacheco, J.F., Cotton, F., Campillo, M., Iglesias, A., Cruz, V., Gomez, J.M., Alcantara, L., Rupture history of September 30, 1999 intraplate earthquake of Oaxaca, Mexico (M-w=7.5) from inversion of strong-motion data, *Geophys. Res. Lett.*, 28, 363-366, 2001.
 22. Levin, V., N.M. Shapiro, J. Park, and M.H. Ritzwoller, Seismic evidence for catastrophic slab loss beneath Kamchatka, *Nature*, 418, 763-767, 15 Aug 2002.
 23. Ritzwoller, M.H., N.M. Shapiro, M.P. Barmin, and A.L. Levshin, Global surface wave diffraction tomography, *J. Geophys. Res.*, 107(B12), 2335, 2002.
 24. Shapiro, N.M. and M.H. Ritzwoller, Monte-Carlo inversion for a global shear velocity model of the crust and upper mantle, *Geophys. J. Int.*, 151, 88-105, 2002.
 25. Ottemoller, L., Shapiro, N.M., Singh, S.K., Pacheco, J.F., Lateral variation of Lg wave propagation in southern Mexico, *J. Geophys. Res.*, 107 (B1): Art. No. 2008 JAN 10 2002

26. Shapiro, N.M., Olsen, K.B., Singh, S.K., On the duration of seismic motion incident onto the Valley of Mexico for subduction zone earthquakes, *Geophys. J. Int.*, 151, 501-510, 2002.
27. Tregoures, N., Hennino, R., Lacombe, C., Shapiro, N.M., Margerin, L., Campillo, M., van Tiggelen, B.A., Multiple scattering of seismic waves, *Ultrasonics*, 40, 269-274, 2002.
28. Ritzwoller, M.H., N.M. Shapiro, A.L. Levshin, E.A. Bergman, and E.R. Engdahl, The ability of a global 3-D model to locate regional events, *J. Geophys. Res.*, 108, no. B7, 2353, ESE 9-1-ESE 9-24, 2003.
29. Ritzwoller, M.H., N.M. Shapiro, and G.M. Leahy, A resolved mantle anomaly as the cause of the Australian-Antarctic Discordance, *J. Geophys. Res.*, 108, No. B12, 2559, 10.1029/2003JB002522, 2003.
30. Shapiro, N.M. and M. Campillo, Emergence of broadband Rayleigh waves from correlations of the ambient seismic noise, *Geophys. Res. Lett.*, 31, L07614, doi:10.1029/2004GL019491, 2004.
31. Shapiro, N.M. and M.H. Ritzwoller, Thermodynamic constraints on seismic inversions, *Geophys. J. Int.*, 157, doi:10.1111/j.1365-246X.2004.02254.x, 2004.
32. Shapiro, N.M. and M.H. Ritzwoller, Inferring surface heat flux distributions guided by a global seismic model: particular application to Antarctica, *Earth and Planetary Science Letters*, 223, 213-224, doi:10.1016/j.epsl.2004.04.011, 2004.
33. Yang, X., I. Bondar, J. Bhattacharyya, M. Ritzwoller, N. Shapiro, M. Antolik, G. Ekstrom, H. Israelsson, and K. McLaughlin, Validation of regional and teleseismic travel-time models by relocation of GT events, *Bull. Seism. Soc. Am.*, 94, 897-919, 2004.
34. Shapiro, N.M., M.H. Ritzwoller, P. Molnar, and V. Levin, Thinning and Flow of Tibetan Crust Constrained by Seismic Anisotropy, *Science*, 305, 233-236, 2004.
35. Shapiro, N.M. M.H. Ritzwoller, J.C. Mareschal, and C. Jaupart, Lithospheric structure of the Canadian Shield inferred from inversion of surface-wave dispersion with thermodynamic a priori constraints, *Geol. Soc. Lond. Spec. Publ.*, Geological Prior Information, ed. R. Wood and A. Curtis, in press.
36. Ritzwoller, M.H., N.M. Shapiro, S. Zhong, Cooling history of the Pacific lithosphere, *Earth Planet. Sci. Lett.*, 226, 69-84, doi:10.1016/j.epsl.2004.07.032, 2004.
37. Smith, D.B., M.H. Ritzwoller, and N.M. Shapiro, Stratification of anisotropy in the Pacific upper mantle, *J. Geophys. Res.*, 109, B11309, doi:10.1029/2004JB003200, 2004.
38. Levshin, A.L., M.H. Ritzwoller, and N.M. Shapiro, The use of crustal higher modes to constrain crustal structure across Central Asia, *Geophys. J. Int.*, 160, 961-972, doi:10.1111/j.1365-246X.2005.02535.x, 2005.
39. Levin, V., N.M. Shapiro, J. Park, and M.H. Ritzwoller, The slab portal beneath the Western Aleutians, *Geology*, 33, 253-256, doi: 10.1130/G20863.1, 2005.
40. Shapiro, N.M, M. Campillo, L. Stehly, and M.H. Ritzwoller, High resolution surface wave tomography from ambient seismic noise, *Science*. 307, 1615-1618, 2005.

41. Van Hunen, J., S. Zhong, N.M., Shapiro, and M.H. Ritzwoller, New evidence for dislocation creep from 3-D dynamic modeling the Pacific upper mantle structure, *Earth Planet. Sci. Lett.* 238, 146-155, 2005.
42. Perry, H.K.C., C. Jaupart, J.-C. Mareschal, and N. M. Shapiro, Upper mantle velocity-temperature conversion and composition determined from seismic refraction and heat flow, *J. Geophys. Res.*, Vol. 111, No. B7, B07301, 10.1029/2005JB003921, 2006.
43. Lin, F., M. H. Ritzwoller, and N. M. Shapiro, Is ambient noise tomography across ocean basins possible?, *Geophys. Res. Lett.*, 33, L14304, doi:10.1029/2006GL026610, 2006.
44. Shapiro, N. M., M. H. Ritzwoller, and G. D. Bensen, Source location of the 26 sec microseism from cross-correlations of ambient seismic noise, *Geophys. Res. Lett.*, 33, L18310, doi:10.1029/2006GL027010, 2006.
45. Stehly, L., M. Campillo, and N.M. Shapiro, A Study of the seismic noise from its long range correlation properties, *J. Geophys. Res.*, 111, B10306, doi:10.1029/2005JB004237, 2006.
46. Larose, E., L. Margerin, A. Derode, B. van Tiggelen, M. Campillo, N. Shapiro, A. Paul, L. Stehly, M Tanter, Correlation of random wave fields: an interdisciplinary review, *Geophysics*, 71 (4), S111-S121, 10.1190/1.221.3356, 2006.
47. Brenguier, F., N.M. Shapiro, M. Campillo, A. Nercessian, and V. Ferrazzini, 3-D surface wave tomography of the Piton de la Fournaise volcano using seismic noise correlations, *Geophys. Res. Lett.*, 34, L02305, doi:10.1029/2006GL028586, 2007.
48. Yang, Y., M.H. Ritzwoller, A.L. Levshin, and N.M. Shapiro, Ambient noise Rayleigh wave tomography across Europe, *Geophys. J. Int.*, 168(1), page 259, 2007.
49. Bensen, G.D., M.H. Ritzwoller, M.P. Barmin, A.L. Levshin, F. Lin, M.P. Moschetti, N.M. Shapiro, and Y. Yang, Processing seismic ambient noise data to obtain reliable broad-band surface wave dispersion measurements, *Geophys. J. Int.*, 169, 1239–1260, doi:10.1111/j.1365-246X.2007.03374.x, 2007.
50. Levshin, A.L., J. Schweitzer, C. Weidle, N.M. Shapiro, and M.H. Ritzwoller, Surface wave tomography of the Barents Sea and surrounding regions, *Geophys. J. Int.*, 170, 441–459, doi:10.1111/j.1365-246X.2006.03285.x, 2007.
51. Zhong, S., M.H. Ritzwoller, N.M. Shapiro, W. Landuyt, J. Huang, and P. Wessel, Bathymetry of the Pacific Plate and its implications for the thermal evolution of the lithosphere and mantle dynamics, *J. Geophys. Res.*, 112, B06412, doi:10.1029/2006JB004628, 2007.
52. Moschetti, M.P., M.H. Ritzwoller, and N.M. Shapiro, Surface wave tomography of the western United States from ambient seismic noise: Rayleigh wave group velocity maps, *Geochem., Geophys., Geosys.*, 8, Q08010, doi:10.1029/2007GC001655., 2007.
53. Stehly, L., M. Campillo, and N.M. Shapiro, Travel time measurements from noise correlations: stability and detection of instrumental errors, *Geophys. J. Int.*, 171, 223–230, doi: 10.1111/j.1365-246X.2007.03492.x, 2007.

54. Brenguier, F., N.M. Shapiro, M. Campillo, V. Ferrazzini, Z. Duputel, O. Coutant, and A. Nercessian, Towards forecasting volcanic eruptions using seismic noise, *Nature Geosciences*, 1, doi:10.1038/ngeo104, 126-130, 2008.
55. Shapiro, N.M., M.H. Ritzwoller, and E.R. Engdahl, Structural Context of the Great Sumatra-Andaman Islands Earthquake, *Geophys. Res. Lett.*, 35, L05301, doi:10.1029/2008GL033381, 2008.
56. Payero, J.S., V. Kostoglodov, N. Shapiro, T. Mikumo, A. Iglesias, X. Pérez-Campos, and R.W. Clayton, Nonvolcanic tremor observed in the Mexican subduction zone, *Geophys. Res. Lett.*, 35, L07305, doi:10.1029/2007GL032877, 2008.
57. Gouédard, P., L. Stehly, F. Brenguier, M. Campillo, Y. Colin de Verdière, E. Larose, L. Margerin, P. Roux, F. J. Sánchez-Sesma, N. M. Shapiro, and R. L. Weaver, Cross-correlation of random fields: mathematical approach and applications, *Geophysical Prospecting*, 56, 375–393, doi:10.1111/j.1365-2478.2007.00684, 2008.
58. Bensen, G.D., M.H. Ritzwoller, and N.M. Shapiro, Broad-band ambient noise surface wave tomography across the United States, *J. Geophys. Res.*, 113, B05306, doi:10.1029/2007JB005248, 2008.
59. Brenguier, F., M. Campillo, C. Hadziioannou, N.M. Shapiro, R.M. Nadeau, E. Larose, Postseismic Relaxation Along the San Andreas Fault at Parkfield from Continuous Seismological Observations, *Science*, 321, 1478-1481, 2008.
60. Yang, Y., M.H. Ritzwoller, F.-C. Lin, M.P. Moschetti, and N.M. Shapiro, The structure of the crust and uppermost mantle beneath the western US revealed by ambient noise and earthquake tomography, *J. Geophys. Res.*, 113, B12310, doi:10.1029/2008JB005833, 2008.
61. Vallée, M., M. Landès, N. M. Shapiro, and Y. Klinger, The 14 November 2001 Kokoxili (Tibet) earthquake: High-frequency seismic radiation originating from the transitions between sub-Rayleigh and supershear rupture velocity regimes, *J. Geophys. Res.*, 113, B07305, doi:10.1029/2007JB005520, 2008.
62. Poupinet, G. and N.M. Shapiro, Worldwide distribution of ages of the continental lithosphere derived from a global seismic tomographic model, *Lithos*, 109, 125–130, 2009.
63. Duputel, Z., V. Ferrazzini, F. Brenguier, N. Shapiro, M. Campillo, and A. Nercessian, Real time monitoring of relative velocity changes using ambient seismic noise at the Piton de la Fournaise volcano (La Reunion) from January 2006 to June 2007, *J. Volcanol. Geotherm. Res.*, 184, 164-173, doi:10.1016/j.jvolgeores.2008.11.024, 2009.
64. Stehly, L., B. Fry, M. Campillo, N. Shapiro, J. Guilbert, L. Boschi, and D. Giardini, Tomography of the Alpine region from observations of seismic ambient noise, *Geophys. J. Int.*, 178, 338-350, 2009.

Conference proceedings

1. Shapiro, N., Frequency-time analysis of surface waves. *Workshop on Three-Dimensional modeling of seismic Waves Generation Propagation and their Inversion*, Trieste, Italy, 1992.
2. Campillo, M., Margerin, L., and Shapiro N. M., Seismic wave diffusion in the Earth lithosphere, in *Wave diffusion in complex media*, ASI Series, J. P. Fouque (Editor), Kluwer Academic Publishers, 1999.
3. McLaughlin, K., I. Bondar, X. Yang, J. Bhattacharyya, H. Israelsson, R. North, V. Kirichenko, E.R. Engdahl, M. Ritzwoller, A.Levshin, N. Shapiro, E. Bergman, M. Antolik, A. Dziewonski, G. Ekström, H. Ghalib, I. Gupta, R. Wagner, W. Chan, W. Rivers, A. Hofstetter, A. Shapira, and G. Laske, Seismic location calibration in the Mediterranean, N. Africa, Middle East, and W. Eurasia, *Proceedings of the 23rd Seismic Research Review: Worldwide Monitoring of Nuclear Explosions*, 270-279, Oct 2-5, 2001.
4. Ritzwoller, M.H. and N.M. Shapiro, Lithospheric inversions and the assimilation of complementary information: Some examples relevant for EarthScope, *Proceedings of the EarthScope Workshop*, 383-387, Snowbird, Utah, Oct 10-12, 2001.
5. Shapiro, N.M., M.H. Ritzwoller, M. Barmin, P. Weichman, L. Tenorio, W. Navidi, Capturing uncertainties in source-specific station corrections derived from a 3-D model, *Proceedings of the 23rd Seismic Research Review: Worldwide Monitoring of Nuclear Explosions*, 395-403, Oct 2-5, 2001.
6. Engdahl, E.R., E.A. Bergman, M.H. Ritzwoller, N.M. Shapiro, and A.L. Levshin, A reference data set for validating 3-D models, *Proceedings of the 24rd Seismic Research Review -- Nuclear Explosion Monitoring: Innovation and Integration*, 261-270, 2002.
7. McLaughlin, K., I. Bondar, X. Yang, J. Bhattacharyya, H. Israelsson, R. North, V. Kirichenko, E.R. Engdahl, M. Ritzwoller, A.Levshin, N. Shapiro, E. Bergman, M. Antolik, A. Dziewonski, G. Ekström, H. Ghalib, I. Gupta, R. Wagner, W. Chan, W. Rivers, A. Hofstetter, A. Shapira, and G. Laske, Seismic location calibration in the Mediterranean, North Africa Middle East, and Western Eurasia, *Proceedings of the 24th Seismic Research Review -- Nuclear Explosion Monitoring: Innovation and Integration*, 320-329, 2002.
8. Ritzwoller, M.H., N.M. Shapiro, M.E. Pasyanos, G.D. Bensen, and Y. Yang, Short period surface wave dispersion measurements from the ambient seismic noise in North Africa, the Middle East, and Central Asia, *Proceedings of the 27th Seismic Research Review -- Ground-Based Nuclear Explosion Monitoring*, 2005.
9. Ritzwoller, M.H., M.E. Pasyanos, Y. Yang, A.L. Levshin, and N.M. Shapiro, Progress toward broad-band ambient noise tomography in Eurasia, *Proceedings of the 28th Seismic Research Review -- Ground-Based Nuclear Explosion Monitoring*, Orlando, FL (Sept 19 - 21), 2006.
10. Perry, H.K.C., C. Jaupart, J.-C. Mareschal, A.M. Forte, and N.M. Shapiro, Upper-mantle velocity-temperature conversions and composition at regional and continental scale, *16th Annual V.M. Goldschmidt Conference*, Melbourne, Australia, GEOCHIMICA ET COSMOCHIMICA ACTA, 70, 18, 484, 2006.

Complete Publication list:

- 64 research articles.
- 10 conference proceedings.
- >100 presentations (25 invited) in International meetings.