



Frederik J Simons

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- LIFE** 1974–present Born in Antwerp, Belgium. U. S. permanent resident. Married; two children.
- WORK**
- 2006–present *Assistant Professor of Geophysics*, Princeton University;
- 2009 *Visiting Professor*, Institut de Physique du Globe de Paris;
- 2008 *Visiting Professor*, Eidgenössische Technische Hochschule Zürich;
- 2004–2007 *Lecturer of Geophysics*, University College London (UCL).
- 2002–2004 *Beck Postdoctoral Teaching Fellow*, Council on Science & Technology;
Hess Postdoctoral Fellow, Geosciences Department, Princeton University.
- 2002 *Postdoctoral Research Associate*;
- 1996–2002 *Research & Teaching Assistant*, Earth, Atmospheric & Planetary Sciences, Massachusetts Institute of Technology (MIT).
- SCHOOL**
- 1996–2002 Massachusetts Institute of Technology, Cambridge, MA;
Doctor of Philosophy with thesis in Geophysics.
- 1992–1996 Katholieke Universiteit Leuven, Belgium;
Kandidaat & Licentiaat with thesis in Geology;
Grootste onderscheiding (summa cum laude).
- 1980–1992 Onze-Lieve-Vrouwecollege Jesuit School, Antwerpen, Belgium;
Humaniora, Latin & Greek. *Primus perpetuus*.
- RESEARCH** Oceanic instrumentation for global tomography. Regional seismic surface-wave tomography. Seismic, mechanical, and thermal properties of the lithosphere. Spectral analysis of gravity and topography. Theoretical spectral analysis on the sphere. Potential-field analysis and theoretical geodesy. Analysis of stochastic processes on the sphere. Wavelet analysis in seismology. X-ray microtomography of geological materials.
- TEACHING**
- Fall 2009 *Global Geophysics*, Princeton GEO371/PHY371;
- 2007–2009 *Earth's Changing Surface and Climate*, with Adam C. Maloof, Princeton FRS149/5;
- 2007&2008 *Data, Models and Uncertainty in the Natural Sciences*, Princeton GEO422;
- Spring 2008 *Introductory Geophysics*, Princeton GEO320;
- Spring 2008 *Fundamentals of the Geosciences II*, Princeton GEO506, with Lincoln S. Hollister;
- 2005&2006 *Global Seismology*, UCL GEOL3031;
- 2005&2006 *Earth & Planetary System Science*, with Lidunka Vočadlo, UCL GEOL4003;
- 2003&2006 Field Instructor, *Active Tectonics*, with Robert A. Phinney, Princeton FRS 149;
- Spring 2006 *The Deep Earth*, with David P. Dobson, UCL GEOL4005;
- Fall 2005 *Global Tectonics*, with Gerald P. Roberts, Birkbeck College;
- Spring 2004 *Lab Instructor, Earthquakes, Volcanoes, Hazards*, Princeton GEO 210;
- Spring 2001 *Tutor, Advanced Placement Physics*, Cambridge Rindge & Latin School.

SEMINARS

Invited Lectures at Geoscience Departments (asterisks indicate named lectures)

U. Southern Calif., Cornell U. (2×), U. Michigan* (2×) [*William T. Smith Lecture*], U. C. Santa Cruz, SUNY Stony Brook, ETH Zürich, U. Illinois Urbana-Champaign* [*Richard L. Hay Lecture*], U. Cambridge, Imperial College, U. Leicester, Stanford U. (2×), Southampton Oceanography Centre, U. Chicago, Washington U. St. Louis, Harvard U. (2×), U. College London (4×), Lamont-Doherty Earth Observatory (2×), Penn State U., U. C. Berkeley (2×), Calif. Inst. Technology, Scripps Inst. Oceanography (2×), Carnegie Inst. Washington (2×), Princeton U. (4×), Shell Rijswijk, Shell Houston, Woods Hole Oceanographic Inst., Royal Holloway, K. U. Leuven, U. Leeds (2×), Oxford U. (2×), Brown U., U. Québec Montréal (2×), IPG Paris.

Invited Lectures at Various Other Departments

The College of New Jersey [*Physics*] (2009), Ohio State U. [*Geodesy*] (2009), Imperial College London [*Mathematics*] (2006), U. Stuttgart [*Geodesy*] (2006), U. College London, Astrobiology Seminar (2006, 2005), Cold Spring Harbor Laboratory (2004), Harmonic Analysis & Signal Processing, Courant Institute, NYU (2004), Oberseminar Geomathematik, U. Kaiserslautern (2004), Princeton Program in Integrative Information, Computer & Application Sciences (2003), Princeton Time-Frequency Seminar [*Mathematics*] (2002).

Invited Conference Presentations (asterisks indicate keynote speeches)

MAA-AMS Joint Mathematics Meeting, San Francisco (2010), SPIE Wavelets XIII, San Diego (2009), VII Hotine-Marussi Symposium, Rome (2009), Geomathematics Workshop, U. Kaiserslautern (2008), Seismological Society of America, Santa Fe (2008), International Workshop on Modeling of Mantle Convection & Lithospheric Dynamics*, Carry-le-Rouet (2007), SPIE Wavelets XII, San Diego (2007), International Congress on Industrial & Applied Mathematics, Zürich (2007), Applied Inverse Problems, U. British Columbia (2007), *Undur Veraldar** Public Lecture, U. Iceland (2007), Inverse Problems Workshop, U. Kaiserslautern (2005), European Geosciences Union (2005), Mathematical Geophysics & Uncertainty Summer School, Colorado School of Mines (2004), MYRES I Workshop*, San Diego (2004), Center for Inverse Problems Opening Conference, Rensselaer Polytechnic Institute (2004), GEOTOP-UQÀM-McGill Congrès des Etudiants* (2004), IEEE Computer Aided Seismic Analysis & Discrimination Workshop (2002), MIT/New England Workshop on Anisotropy & Imaging (2002), American Geophysical Union (2007, 2001, 2000).

ORGANIZER *Models of the Deep Earth* (2008), Special session, Fall AGU; with S.-H. Shim (MIT) & Michael Thorne (U. Utah).

Rheological Anisotropy: Geological and Geophysical Perspectives (2007), Special session, Fall AGU; with Einat Lev (MIT), Pascal Audet (UBC) & Th. Thorsteinsson (U. Iceland).

MYRES: *Meeting of Young Researchers in the Earth Sciences*, Workshops, Verbania (2006), with Laurent Montési (WHOI) & Giulio di Toro (U. Padova); La Jolla (2004), with Thorsten Becker (USC) & Jamie Kellogg (UCLA).

Analysis and Representation of Geophysical Data on the Sphere (2005), Special Session, Fall AGU; with M. Wicczorek (IPG Paris), A. Jackson (U. Leeds) & D. Yuen (U. Minnesota).

Wavelet and Time-Frequency Analysis in the Earth Sciences (2005), Special Session, Spring EGU; with Jonathan Lilly (IPG Paris) & Sofia Olhede (Imperial College).

Crust-Mantle Interaction and Lithospheric Deformation (2004), Special Session, Fall AGU; with Corné Kreemer (U. Nevada) & Oliver Heidbach (U. Karlsruhe).

Structure, Composition & Evolution of Deep Continental Lithosphere (2002), Special Session, Fall AGU; with Cin-Ty Lee (Rice U.).

AWARDS

2008	Prix quadriennal <i>Charles Lagrange</i> , Académie Royale de Belgique;
2005	Nuffield Foundation Newly Appointed Lecturer Award;
2004	Editors' Citation for Excellence in Refereeing, JGR-Planets, AGU;
2002	Beck Fellowship, Council on Science & Technology, Princeton;
2001	Outstanding Student Paper Award, Seismology Section, AGU;
1998	Victor J. DeCorte Fellowship, MIT;
1997&1998	Teaching Assistant Excellence Awards, EAPS, MIT;
1997	Biennial prize for an M. Sc. thesis in geology, Katholieke Universiteit Leuven;
1996–2001	Fulbright Fellowship, Commission for Educational Exchange;
1996–1997	Honorary Fellowship, Belgian-American Educational Foundation;
1996–1997	Ambassadorial Scholarship, Rotary International Foundation;
1994	Scholarship, Scottish Universities International Summer School, <i>for summer semester on Postmodern English Literature, Edinburgh;</i>
1993	Scholarship, Katholieke Universiteit Brussel, <i>for summer semester on Modernist English Literature, Edinburgh.</i>

SUPERVISOR Dong Wang (Ph. D., Geophysics, 2012), Cristian Proistosescu (A. B. Physics 2009), Princeton. Jonathan Watson, M. Res. (2006), Vahid Abbas-Hashemi & Peter Macaulay, M. Phil. (2006), Birkbeck College. Anthony Bloom, Ben Dando & Gary Hayes, M. Sci. (2006), UCL. Caroline Attwood, Rachael Bayliss, Richard Ford & Neesha Jeshani, B. Sc. (2006), UCL.

COMMITTEE Jessica Hawthorne (Ph. D., Geophysics, 2012), Enning Wang (Ph. D., Geophysics, 2012), Susannah Dorfman, (Ph. D., Geophysics, 2011), Kelly Kearney (Ph. D., Oceanography, 2010), Yves Plancherel (Ph. D., Oceanography, 2009), Yue Tian (Ph. D., Geophysics, 2009), Sarah Johnston (M. Sc., Geology, 2008), Tarje Nissen-Meyer (Ph. D. Geophysics, 2007), Makoto Suwa (Ph. D. Geochemistry, 2007), Princeton.

Abel Amirbekyan (Ph. D., Mathematics, 2007), U. Kaiserslautern; Peggy Vermeesch (Ph. D., Geophysics, 2006), Imperial College; Pascal Audet (*Maîtrise, Sciences de la Terre*, 2004), Université du Québec à Montréal.

SERVICE

- Editorial Editorial Advisory Board, *Earth & Planetary Science Letters*, since 2007; Associate Editor, *J. Geophysical Research (Solid Earth)*, 2004–2009.
- Refereeing *AGU Monographs*, *Czech Science Foundation*, *Comput. Geosci.*, *Earth Planets Space*, *Earth Planet. Sc. Lett.*, *EOS Trans. Am. Geoph. Union*, *Free University Brussels GOA*, *G-Cubed*, *Geology*, *Geophys. J. Int.*, *Geophys. Res. Lett.*, *Geosphere*, *GSA Spec. Pub.*, *IEEE Trans. Sig. Proc.*, *Institut National des Sciences de l'Univers*, *J. Geophys. Res.*, *J. Roy. Stat. Soc.*, *Kentucky Science & Eng. Found.*, *Lithosphere*, *Ocean Modelling*, *Particle Phys. Astr. Res. Council, U. K.*, *Phys. Earth. Planet. Int.*, *Proc. Roy. Soc. Lond. Ser. A*, *U. S. National Science Foundation*.
- Community Co-organizer, Tectonophysics Section, AGU Toronto Joint Assembly, 2009; Member Representative, *Incorporated Research Institutions for Seismology*; Alternate, *CONsortium for Materials Properties Research in Earth Sciences*.
- Princeton Graduate Work & Admissions Committee, Geosciences (2007–present); New Faculty Orientation Panelist, McGraw Center (2009); Senior & Junior Faculty Search Committees, Geophysics (2007–2008); Geosciences Website Committee (2007–2008); Geosciences Colloquium organizer (Spring 2007).

PUBLICATIONS

Frederik J. Simons,

Slepian functions and their use in signal estimation and spectral analysis,
Handbook of Geomathematics, Springer Verlag, eds W. Freeden, M. Z. Nashed &
T. Sonar, under review, 2010.

R. E. Kopp, **Frederik J. Simons**, J. X. Mitrovica, A. C. Maloof and M. Oppenheimer,
Probabilistic assessment of sea level during the Last Interglacial,
Nature, in the press, 2009.

Frederik J. Simons, Jessica C. Hawthorne and Ciarán D. Beggan,

Efficient analysis and representation of geophysical processes using localized spherical
basis functions,
Proc. of SPIE, 2009, **7446** (74460G), doi:10.1117/12.825730

Frederik J. Simons, G. Nolet, P. Georgief, J. M. Babcock, L. A. Regier and R. E. Davis,
On the potential of recording earthquakes for global seismic tomography by low-cost
autonomous instruments in the oceans,
J. Geoph. Res., 2009, **114**, B05307, doi:10.1029/2008JB006088

F. A. Dahlen & **Frederik J. Simons**,

Spectral estimation on a sphere in geophysics and cosmology,
Geoph. J. Int., 2008, **174** (3), 774–807, doi:10.1111/j.1365-246X.2008.03854.x

Jeffrey J. McGuire, **Frederik J. Simons** & John A. Collins,

Analysis of seafloor seismograms of the 2003 Tokachi-Oki earthquake sequence for
earthquake early warning,
Geoph. Res. Lett., 2008, **35** (14), L14310, doi:10.1029/2008GL033986

Abel Amirbekyan, Volker Michel & **Frederik J. Simons**,

Parametrizing surface wave tomographic models with harmonic spherical splines,
Geoph. J. Int., 2008, **174** (2), 617–628, doi:10.1111/j.1365-246X.2008.03809.x

Shin-Chan Han & **Frederik J. Simons**,

Spatiospectral localization of global geopotential fields from the Gravity Recovery and
Climate Experiment (GRACE) reveals the coseismic gravity change owing to the 2004
Sumatra-Andaman earthquake,
J. Geoph. Res., 2008, **113** (B1), B01405, doi:10.1029/2007JB004927

Mark A. Wieczorek & **Frederik J. Simons**,

Minimum-variance multitaper spectral estimation on the sphere,
J. Fourier Anal. Appl., 2007, **13** (6), 665–692, doi:10.1007/s00041-006-6904-1

Frederik J. Simons & F. A. Dahlen,

A spatio-spectral localization approach to estimating potential fields on the surface of a
sphere from noisy, incomplete data taken at satellite altitudes,
Proc. of SPIE, 2007, **6701** (670117), doi:10.1117/12.732406

Frederik J. Simons, Ben D. E. Dando & Richard M. Allen,
Automatic detection and rapid determination of earthquake magnitude by wavelet
multiscale analysis of the primary arrival,
Earth & Planet. Sc. Lett., 2006, **250** (1–2), 214–223, doi:10.1016/j.epsl.2006.07.039

Frederik J. Simons & F. A. Dahlen,
Spherical Slepian functions and the polar gap in geodesy,
Geoph. J. Int., 2006, **166** (3), 1039–1061, doi:10.1111/j.1365-246X.2006.03065.x

Frederik J. Simons, F. A. Dahlen & Mark A. Wieczorek,
Spatiospectral concentration on a sphere,
SIAM Review, 2006, **48** (3), 504–536, doi:10.1137/S0036144504445765

Mark A. Wieczorek & **Frederik J. Simons**,
Localized spectral analysis on the sphere,
Geoph. J. Int., 2005, **162** (3), 655–675, doi:10.1111/j.1365-246X.2005.02687.x

Saskia Goes, **Frederik J. Simons** & Kazunori Yoshizawa,
Seismic constraints on the temperature of the Australian uppermost mantle,
Earth & Planet. Sc. Lett., 2005, **236** (1–2), 227–237, doi:10.1016/j.epsl.2005.05.001

Frederik J. Simons & Rob D. van der Hilst,
Seismic and mechanical anisotropy and the past and present deformation of the
Australian lithosphere,
Earth & Planet. Sc. Lett., 2003, **211** (3–4), 271–286, doi:10.1016/S0012-821X(03)00198-5

Frederik J. Simons, Rob D. van der Hilst & Maria T. Zuber,
Spatio-spectral localization of isostatic coherence anisotropy in Australia and its relation
to seismic anisotropy: Implications for lithospheric deformation,
J. Geoph. Res., 2003, **108** (B5), 2250, doi:10.1029/2001JB000704

Frederik J. Simons, Rob D. van der Hilst, Jean-Paul Montagner & Alet Zielhuis,
Multimode Rayleigh wave inversion for heterogeneity and azimuthal anisotropy of the
Australian upper mantle,
Geoph. J. Int., 2002, **151** (3), 738–754, doi:10.1046/j.1365-246X.2002.01787.x

Frederik J. Simons & Rob D. van der Hilst,
Age-dependent seismic thickness and mechanical strength of the Australian lithosphere,
Geoph. Res. Lett., 2002, **29** (11), 1529, doi:10.1029/2002GL014962

Frederik J. Simons, Maria T. Zuber & Jun Korenaga,
Isostatic response of the Australian lithosphere: Estimation of effective elastic thickness
and anisotropy using multitaper spectral analysis,
J. Geoph. Res., 2000, **105** (B8), 19163–19184, doi:10.1029/2000JB900157

Frederik J. Simons, Alet Zielhuis & Rob D. van der Hilst,
The deep structure of the Australian continent from surface-wave tomography,
Lithos, 1999, **48**, 17–43, doi:10.1016/S0024-4937(99)00041-9

FORUM

Frederik J. Simons, Frédéric Verhelst & Rudy Swennen,
Quantitative characterization of coal by means of microfocal X-ray Computed Microtomography (CMT) and Color Image Analysis (CIA),
Intern. J. Coal Geol., 1997, **34** (1-2), 69–88, doi:10.1016/S0166-5162(97)00011-6

Laurent G. J. Montési, Giulio di Toro, **Frederik J. Simons** and 5 others,
Young scientists focus on the dynamics of the lithosphere,
Eos Trans. AGU, 2006, **87** (44), 482, doi:10.1029/2006EO440005

Frederik J. Simons, Guust Nolet, Jeff M. Babcock, Russ E. Davis & John A. Orcutt,
A future for drifting seismic networks,
Eos Trans. AGU, 2006, **87** (31), 305 & 307, doi:10.1029/2006EO310002

Malcolm S. Sambridge, Caroline Beghein, **Frederik J. Simons** & Roel Snieder,
How do we understand and visualize uncertainty?
The Leading Edge, 2006, **25** (5), 542–546, doi:10.1190/1.2202654

Frederik J. Simons, Thorsten W. Becker, James B. Kellogg and 5 others,
MYRES: A program to unite young solid Earth researchers,
Eos Trans. AGU, 2005, **86** (5), 48–49, doi:10.1029/2005ES000928

Frederik J. Simons, Thorsten W. Becker, James B. Kellogg and 6 others,
Young solid Earth researchers of the world unite!
Eos Trans. AGU, 2004, **85** (16), 160, doi:10.1029/2004EO160011

MEDIA

Afloat in a sea of noise,
Planet Earth, 2009, in the press.

Seismic stations could help catch tsunami waves,
Interview, *Nature*, 02/25/2008 (web), doi:10.1038/news.2008.618

Energy Efficient Mermaid (Mobile Earthquake Recorder in Marine Areas)
Green Data Center Blog, www.greenm3.com, 02/19/2008 (web)

Plumbing the depths: A new generation of mermaids looks at oceanic earthquakes,
The Economist, 02/09/2008

For geoscientist Simons, Earth's deepest secrets may come from the sea,
Princeton Weekly Bulletin, 2008, **97** (19), 7–8
Top Stories, *News@Princeton*, 01/28/2008 (web)
GeologyTimes.com, 01/29/2008 (web)
Underwatertimes.com, 01/29/2008 (web)

Around the world in seven days of Fall Break,
Interview, *The Daily Princetonian*, 12/10/2007

Fyrirlestur um jarðskjálftabylgjur: Dr. Frederik J Simons,
Morgunblaðið, 04/20/2007 (in Icelandic)

Under veraldar: Sneiðmyndun jarðar,
Rannsóknir, 03/28/2007 (in Icelandic)

MERMAIDS detect earthquakes,
Top Stories, *UCL Homepage News*, 06/27/2006 (web)

Discovery Channel / WagTV,
Interview, TV broadcast, 2005

Hoe gaat het nu met... Frederik Simons,
Interview, *Science@Leuven*, 2005, **3** (8), 7–9 (in Dutch)

Neutrinos to spy on planet's core,
Interview, *New Scientist*, 2005, **185** (2488)

Earth Structure,
ORION Puerto Rico Workshop Report, 2004, 28–34

A seismic look under the continents,
Science, 1999, **285** (5432), 1365-1366, doi:10.1126/science.285.5432.1365