

## CURRICULUM VITAE



### **Roelof K. Snieder**

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#### **Education:**

- Ph.D. (cum laude), Geophysics, Utrecht University, Netherlands, 1987. Thesis title: Surface wave scattering theory, with applications to forward and inverse problems in seismology.
- M.A., Geophysical Fluid Dynamics, Princeton University, Princeton, USA, 1984.
- Drs. degree, Theoretical Physics, Utrecht University, Netherlands, 1982. Thesis title: Inverse scattering in three dimensions.

#### **Positions held:**

- W.M. Keck Distinguished Professor of Basic Exploration Science, Colorado School of Mines, USA (2000-present)
- Visiting professor at the GFZ German Research Centre for Geosciences and the German Federal Institute for Materials Research and Testing (2014)
- Director of the Center for Wave Phenomena at the Colorado School of Mines (2008-2011)
- Visiting professor at the Global Climate and Energy Project, Stanford University (spring 2008)
- Dean of the Faculty of Earth Sciences, Utrecht University, Netherlands (1997-2000)
- Full professor in seismology at the Department of Geophysics of Utrecht University, Netherlands (1993-2000)
- Visiting professor at the Center for Wave Phenomena, Colorado School of Mines (1997), research area: chaotic behaviour of waves.

- Associate professor in seismology at the Department of Geophysics of Utrecht University, Netherlands (1988-1993), research areas: theory of wave propagation and inverse problems, imaging the earth's interior.
- Postdoctoral fellow in the "Equipe de Tomographie Geophysique" of the Institut de Physique du Globe in Paris, France (1988), research area: the application of inverse scattering techniques to seismic inverse problems.
- Research assistant in the Department of Theoretical Geophysics, Utrecht University, Netherlands (1984-1987), research area: development of theory for the propagation and scattering of surface waves in laterally inhomogeneous media and the application for imaging the earth's interior.
- Research assistant in the Geophysical Fluid Dynamics Laboratory, Princeton University, USA (1982-1984), research area: dynamics of the stratosphere.

**Professional honors:**

- Vening-Meinesz award (1989), issued by the Netherlands Organization for Scientific Research (NWO)
- Recipient of a PIONIER grant from the Netherlands Organization for Scientific Research (NWO, 1991-1996)
- Award (1992), issued by the Fund for Science, Technology and Research (Schlumberger)
- Fellow of the American Geophysical Union (2000) for important contributions to geophysical inverse theory, seismic tomography, and the theory of surface waves.
- Faculty Teaching Award, Colorado School of Mines (2007)
- Nominated as "7Hero of the day" by 7News in Denver for work on energy education (2008).
- Corresponding member of the Royal Netherlands Academy of Arts and Sciences (2010-present)
- Excellence in Research Award, Colorado School of Mines, (2011)
- Honorary Member of the Society of Exploration Geophysicist (2011)
- Outstanding Faculty Member of the Order of Omega, Colorado School of Mines (2013)
- Outstanding Faculty Member Award of the Colorado School of Mines (2013)
- Among best 30 papers at the annual meeting of the Society of Exploration Geophysicists (F. Bazargani and R. Snieder, Optimal wave focusing for imaging and microseismic event location, 2013)
- Research Award from the Alexander von Humboldt Foundation (2014)
- Beno Gutenberg medal from the European Geophysical Union (2016)

**Editorships:**

- Associate editor of Geophysical Journal International (1990-1994)

- Guest editor of Physics of Earth and Planetary Interiors for the special issue on 'Structure and evolution of the European lithosphere and upper mantle' (1993)
- Associate Editor of Inverse Problems (1994-1997)
- Editor of Reviews of Geophysics (1997-2001)
- Guest editor of Inverse Problems for the special issue on "Inverse Problems in Geophysics" (1998)
- Associate editor of the book "Scattering and inverse scattering in pure and applied science", published by Academic Press (2002)
- Associate editor of the Journal of Acoustical Society of America (2009-present)
- Associate editor of the European Journal of Physics (2011-present)

**Other professional activities:**

- Invited lecturer at the Summer School on Studies of Earthquake Sources and Regional Lithospheric Structure based on Seismic Wave Data, Trieste, Italy (1990)
- Member of the Commission on Wave Propagation of the International Association of Seismology and Physics of the Earth's Interior (1992-1995)
- Member of the scientific organizing committee for the 7th conference of the European Union of Geosciences (1992-1993)
- Member of the sectorcommittee 'Endogene Processen' of AWON, the Earth Science branche of NWO (1992-1993)
- Vice-chairman of the Committee for Mathematical Geophysics (1997-1999)
- General convener of the seismology sector of the XIX-th conference of the European Geophysical Society (1994)
- Chairman of the selection committee of The Netherlands Geoscience Foundation (GOA) (1994-1996)
- Member of the scientific advisory committee for ORFEUS-EMSC (1994-1998)
- Invited lecturer at the Summer School on Three-dimensional modeling of seismic waves, Trieste, Italy (1996)
- Member of the scientific advisory committee the XX-th conference of the European Geophysical Society (1996)
- Invited lecturer at the Summer School on Wave Propagation in Complex Media, Les Houches, France (1998)
- Invited lecturer at the Summer School on Geomatics and Inverse Problems in Geodesy, Chania, Greece (1998)
- Invited lecturer at the Summer School on the Identification of Media and Structures by Inversion of Mechanical Wave Propagation, Udine, Italy, (1998)

- Invited lecturer at the Summer School on Imaging in complex media, Cargese, France (1999)
- Invited lecturer at the Mathematical Geophysics Summer School, Stanford University, USA (1999)
- Invited lecturer at the internal symposium of Schlumberger Research on "Inversion, Optimization and uncertainty Analysis", Cambridge UK (2000)
- Member of NSF-panel (2001)
- Invited speaker at the Optical Society of America Topical Meeting on "Signal Recovery and Synthesis" (2001)
- Organizer of the session "Mathematical Seismology: Summer School and Research Opportunities" at the annual IRIS meeting (2001)
- Chairman of the selection panel of the program "Waves in Complex Media" of FOM (the Physics branch of the Science Foundation of the Netherlands).
- Member of NSF-panel (2002)
- Invited speaker at the GilbertFest (2002)
- Member of the Lehmann Medal Committee of the American Geophysical Union (2002-2004)
- Member of the advisory board of the research Group IMCODE (Imagerie, Communication et Desordre) (2003-2007)
- Member of the Earth Science Council of the Department of Energy (2003-2011)
- Convener of the session "Novel ways for analyzing the seismic coda" at the Fall AGU meeting (2003)
- Director of the NSF-sponsored Summer School on Mathematical Geophysics and Uncertainty in Earth Models (2004)
- Convener of the session "Oil at the core-mantle boundary?: bridging the gap between exploration and global seismology" at the Fall AGU meeting (2004)
- Organizer of the DOE workshop "Advanced noninvasive monitoring techniques" (2005)
- Visiting Fellow at the Research School of Earth Sciences at Australian National University, Canberra, Australia (2006)
- Member of organizing committee and panel leader for the DOE workshop and report "Basic Research Needs in the Geosciences: Facilitating 21st Century Energy Systems" (2007)
- Member of the selection committee for the "Spinoza prize" of the Netherlands Organisation for Scientific Research (2007-2010)
- Founding member and Chair of the committee Geoscientists Without Borders of the Society of Exploration Geophysicists (2008-2013)
- Convener of the session "Innovations in geophysics: a tribute to Rodney Calvert" at the 2008 Annual Meeting of the Society of Exploration Geophysicists.

- Convener of the Public Affairs session “Increasing the societal impact of geophysics at the 2008 Fall Meeting of the American Geophysical Union.
- Invited speaker at the NATO advanced research workshop on coupled site and soil-structure interaction, Borovets, Bulgaria, 2008
- Director of the Center for Wave Phenomena (2008-2011).
- Visiting professor of the Center of Excellence Program of Tohoku University, Sendai, Japan (2009).
- Member of the Diversity Committee of the Colorado School of Mines (2009-present).
- Visiting Fellow at the Australian National University, Canberra, Australia (2009).
- Member of the steering committee of the Red Rocks Community College Institute for Sustainability Education (RISE) (2010-present).
- Convener at the 2010 annual meeting of the American Geophysical Union.
- Chair of the Committee for Ethics Across the Curriculum of the Colorado School of Mines (2011-present).
- Invited lecturer in the Winter Enrichment Program at King Abdullah University of Science and Technology (KAUST) in Jeddah, Saudi Arabia (2011).
- Keynote speaker in the session “Enhancing graduate education in physics: focus on skills” at the Annual meeting of the American Physical Society in Dallas (2011).
- Invited lecturer for a faculty workshop “Career Development of Academic Faculty” at King Abdullah University of Science and Technology (KAUST) in Jeddah, Saudi Arabia (2012).
- Convener of the session “Solving Geophysical Problems” at the Conference for Mathematical Geophysics in Edinburgh (2012).
- SES Distinguished Speaker at Stanford University (2012).
- Member and of the selection committee for the “Gravitation Program” of the Netherlands Organisation for Scientific Research (2012 and 2013).
- Keynote speaker at the 39th Annual Review of Progress in Quantitative Nondestructive Evaluation (Denver, 2012).
- Invited speaker for four workshops on professional development for the Geo.X lecture series (Berlin, 2014).
- Member of the international advisory committee for the EC training network “Waves and Wave-Based Imaging in Virtual and Experimental Environments” (2015-present).
- Convener at the 31st IUGG Conference on Mathematical Geophysics (Paris, 2016).

**Publications:** see attached lists with 257 internationally refereed publications, 2 textbooks, and 19 other publications.

**Patent:** Snieder, R., System for and method of monitoring properties of a fluid flowing through a pipe, US Patent 8,020,428 (2011)

**Grants:** see attached

**Memberships:**

- Royal Astronomical Society
- Society of Exploration Geophysicists
- American Geophysical Union
- Acoustical Society of America

**Volunteer work:**

- Fire-fighter with Genesee Fire Rescue (2000-2014), officer since 2003, and Fire Chief (2012-2014).

**References:**

- Dr. M. Haney, President of Red Rocks Community College, 13300 West Sixth Avenue, Lakewood CO 80228, tel. +1.303.914.6215, email michele.haney@rrcc.edu
- Prof. K. Larner, Dept. of Geophysics, Colorado School of Mines, Golden CO 80401-1887, tel. +1.720.201.1761, email kenlarner@gmail.com
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## PUBLICATIONS

- [1] D. Alsina and R. Snieder. Small-scale sublithospheric continental mantle deformation: Constraints from SKS splitting observations. *Geophys. J. Int.*, 123:431–448, 1995.
- [2] D. Alsina and R. Snieder. Constraints on the velocity structure beneath the Tornquist-Teisseyre zone from beamforming analysis. *Geophys. J. Int.*, 126:205–218, 1996.
- [3] D. Alsina, R. Snieder, and V. Maupin. A test of the great circle approximation in the analysis of surface waves. *Geophys. Res. Lett.*, 20:915–918, 1993.
- [4] D. Alsina, R. Snieder, and V. Maupin. Reconstructions of phase fronts of surface waves recorded during the iliha project. In J. Mezcua and E. Carrreno, editors, *Iberian Lithosphere Heterogeneity and Anisotropy ILIHA, Monografia No. 10*, pages 75–83. Instituto Geografico Nacional, Madrid, 1994.
- [5] D. Alsina, R. Woodward, and R. Snieder. Shear-wave velocity structure in north america from large-scale waveform inversions of surface waves. *J. Geophys. Res.*, 101:15969–15986, 1996.
- [6] B. Anderson, J. Douma, T. Ulrich, and S. R. Improving spatio-temporal focusing and source reconstruction through deconvolution. *Wave Motion*, 52:151–159, 2015.
- [7] R. Avendonk, H. vanand Snieder. A new mechanism for shape induced seismic anisotropy. *Wave Motion*, 20:89–98, 1994.
- [8] S. Bannister, R. Snieder, and M. Passier. Shear-wave velocities under the transantarctic mountains and terror rift from surface wave inversion. *Geophys. Res. Lett.*, 27:281–285, 2000.
- [9] F. Bazargani and S. R. Optimal source imaging in elastic media. *Geophys. J. Int.*, 204(1134-1147), 2016.
- [10] M. Behm and R. Snieder. Love waves from local traffic noise interferometry. *The Leading Edge*, 32:628–632, 2013.
- [11] M. Behm, R. Snieder, and G. Leahy. Retrieval of local surface wave velocities from traffic noise - an example from the LaBarge basin (Wyoming). *Geophys. Prosp.*, 62:223243, 2014.
- [12] J. Behura and R. Snieder. Virtual real source: source signature estimation using seismic interferometry. *Geophysics*, 78:Q57–Q68, 2013.
- [13] J. Behura, K. Wapenaar, and R. Snieder. Autofocus imaging: Image reconstruction based on inverse scattering theory. *Geophysics*, 79:A19–A26, 2014.
- [14] T. Blum, R. Snieder, K. van Wijk, and M. Willis. Theory and laboratory experiments of elastic wave scattering by dry planar fractures. *J. Geophys. Res.*, 116:B08218, 2011.
- [15] T. Blum, K. van Wijk, and R. Snieder. Scattering amplitude of a single fracture under uniaxial stress. *Geophys. J. Int.*, 2014.
- [16] T. Blum, K. van Wijk, R. Snieder, and Willis. Laser excitation of a fracture source for elastic waves. *Phys. Rev. Lett.*, 107:275501, 2011.

- [17] M. Bostock, J. VanDecar, and R. Snieder. Modelling teleseismic p-wave propagation in the upper mantle using a parabolic approximation. *Bull. Seismol. Soc. Am.*, 83:756–779, 1993.
- [18] A. Brandenburg and R. Snieder. The attenuation of surface waves due to scattering. *Geophysical Journal*, 98:183–194, 1989.
- [19] F. Brogini and R. Snieder. Connection of scattering principles: a visual and mathematical tour. *Eur. J. Phys.*, 33:593–613, 2012.
- [20] F. Brogini, R. Snieder, and K. Wapenaar. Focusing the wavefield inside an unknown 1D medium: Beyond seismic interferometry. *Geophysics*, 77:A25–A28, 2012.
- [21] F. Brogini, R. Snieder, and K. Wapenaar. Data-driven wavefield focusing and imaging with multidimensional deconvolution: Numerical examples from reflection data with internal multiples. *Geophysics*, 79:WA107–WA115, 2014.
- [22] F. Brogini, K. Wapenaar, J. van der Neut, and R. Snieder. Data-driven Green’s function retrieval and application to imaging with multidimensional deconvolution. *J. Geophys. Res. Solid Earth*, 119:425–441, 2014.
- [23] S. Chevrot, J. Montagner, and R. Snieder. The spectrum of tomographic earth models. *Geophys. J. Int.*, 133:783–788, 1998.
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- [25] A. Curtis and R. Snieder. Reconditioning inverse problems using the genetic algorithm and revised parameterisation. *Geophysics*, 62:1524–1532, 1997.
- [26] A. Curtis and R. Snieder. Probing the earth’s interior with seismic tomography. In W. Lee, H. Kanamori, P. Jennings, and C. Kisslinger, editors, *International handbook of earthquake and engineering seismology*, pages 861–874. Academic Press, Amsterdam, 2002.
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- [31] J. Diaz, J. Gallart, A. Hirn, and H. Paulssen. Anisotropy beneath the iberian peninsula: the contribution of the iliha-nars broad-band experiment. *Pure Appl. Geophys.*, 151:395–405, 1998.



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## GRANTS

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- R. Snieder, Geophysical application of synthetic aperture techniques to electromagnetic fields, Shell Gamechanger program, \$387,674, 2011-2014.
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