

Kasper van Wijk

CONTACT INFORMATION

1910 University Drive
Department of Geosciences
Boise State University
Boise, Idaho 83725 USA

Voice: (208) 426-4604
Fax: (208) 426-3888
e-mail: kaspervanwijk@boisestate.edu
url: <http://earth.boisestate.edu/pal>

RESEARCH INTERESTS

Wave propagation in disordered media, near-surface geophysics, noncontacting (microwave and laser) geophysical sensor development, laser ultrasonics, physical and numerical modeling of issues related to exploration and global seismology, land mine detection, ice physics, and inverse theory

EDUCATION

Colorado School of Mines, Golden, Colorado USA

Ph.D. in Geophysics (Center for Wave Phenomena), 2003

- Dissertation title: Multiple scattering of surface waves
- Advisor: John A. Scales

Visiting scholar in 1996 and 1997, working on data uncertainty estimation for least squares optimization

Utrecht University, The Netherlands

M.S. in Geophysics, 1997

- Topic: Data and model uncertainty estimation for geophysical data
- Advisor: Kabir Roy-Chowdhury

APPOINTMENTS

- ◇ Associate Professor and Director of the Physical Acoustics Laboratory, Department of Geosciences, Boise State University (2011-)
- ◇ Assistant Professor, Department of Geosciences, Boise State University (2006-2011)
- ◇ Research Assistant Professor, Department of Geophysics, Colorado School of Mines (2004-2006)
- ◇ Postdoctoral Fellow at the Physical Acoustics Laboratory, Department of Geophysics, Colorado School of Mines (2003-2004)
- ◇ Instructor at Colorado Outdoor Education Center and certified high ropes course instructor (1998)

PROFESSIONAL AFFILIATIONS

American Geophysical Union, Society of Exploration Geophysicists, Acoustical Society of America

COURSES TAUGHT

- ◇ **Boise State University:** Field Methods (GEOPH486), Seeing the Unseen (GEOPH201), Processes and Properties of the Earth-II (GEOPH502), Mathematical Physics in Geoscience (GEOPH597), Electromagnetic and Seismic Wave Propagation (GEOPH540)
- ◇ **Colorado School of Mines:** Inverse Theory (GP605), Linear Systems (GP306), Mathematical Physics (PH311), and Field Methods (GP486)

Please visit <http://earth.boisestate.edu/pal/peer-reviewed-publications/> for reprints of:

1. Estimating the Rayleigh-wave impulse response between seismic stations with the cross terms of the Green tensor
Geophysical Research Letters, 38, L16301, 2011
K. Van Wijk, D. Mikesell, V. Schulte-Pelkum and J. Stachnik
2. Theory and laboratory experiments of elastic wave scattering by dry planar fractures
Journal of Geophysical Research, 116, B08218,2011
T. Blum, R. Snieder, K. van Wijk and M. Willis
3. Seismic refraction interferometry with a semblance analysis on the crosscorrelation gather
Geophysics, in press
D. Mikesell and K. van Wijk
4. The establishment of a geophysics field camp in northern Thailand
Liberty L., S. Wood, K. van Wijk, E. Hinz, D. Mikesell, F. Singharajawarapan and J. Shragge
The Leading Edge, 30(4), 414-420, 2011
5. Multicomponent wavefield characterization with a novel scanning laser interferometer
Blum, T. E., K. van Wijk, B. Pouet and A. Wartelle
Review of Scientific Instrumentation, 81,073101, 2010
6. Application of the virtual refraction method for near-surface characterization at the Boise Hydro-geophysical Research Site
Nichols, J., Mikesell, T. D. and van Wijk, K.
Geophysical Prospecting, 58,1011-1022, 2010
7. Observation and modeling of source effects in coda wave interferometry at Pavlof volcano, Alaska
Haney, M. M., van Wijk, K., Preston, L. A., and Aldridge, D. F.
The Leading Edge, 28(5) 554-560, 2009
8. Seismic wave attenuation in carbonates
L. Adam, M. Batzle, K. Lewallen and K. van Wijk
Journal of Geophysical Research 114, B06208, 2009
9. The virtual refraction: useful spurious energy in seismic interferometry
D. Mikesell, K. van Wijk, A. Calvert and M. M. Haney
Geophysics, 74(3), A13-A17, 2009
10. On estimating the impulse response between receivers in a controlled ultrasonic experiment
K. van Wijk
Seismic Interferometry: History and Present Status, SEG reprint series (26), 250-256, 2008
11. The cancellation of spurious arrivals in Green's function extraction and the generalized optical theorem
R. K. Snieder, K. van Wijk, M. M. Haney and R. Calvert
Physical Review E, 78(3),036606, 2008
12. Modified Kubelka-Munk equations for localized waves inside a layered medium
M. M. Haney and K. van Wijk
Physical Review E, 75(3), 036601, 2007
13. Physical modeling and analysis of P-wave attenuation anisotropy in transversely isotropic media
Y. Zhu, I. Tsvankin, P. Dewangan and K. van Wijk
Geophysics, 72(1), D1-D7, 2007
14. PS-wave moveout inversion for tilted TI media: A physical-modeling study
P. Dewangan, I. Tsvankin, M. Batzle, K. van Wijk and M. Haney
Geophysics, 71(4), D135-D143, 2006

15. On estimating the impulse response between receivers in a controlled ultrasonic experiment
K. van Wijk
Geophysics, 71(4), SI79-SI84, 2006
16. Toward noncontacting seismology
K. van Wijk, J. A. Scales, T. D. Mikesell and J. R. Peacock
Geophysical Research Letters, 42, L01308, 2005
17. Radiative transfer in 1D, and its connection to the O'Doherty-Anstey formula
M. M. Haney, K. van Wijk and R. K. Snieder
Geophysics, 70(1), T1-T11, 2005
18. Surface-wave inversion limitations from laser-Doppler physical modeling
L. Bodet, K. van Wijk, A. Bitri, O. Abraham, P. Côte, G. Grandjean and D. Leparoux
Journal of Environmental and Engineering Geophysics, 10(1), 13-24, 2005
19. Imaging and suppressing near-receiver scattered surface waves
X. A. Campman, K. van Wijk, J. A. Scales and G. C. Herman
Geophysics, 70(2), V21-V29, 2005
20. Imaging scattered seismic surface waves
X. Campman, K. van Wijk, C. D. Riyanti, J. A. Scales and G. Herman
Near Surface Geophysics 2(4),223-230, 2004
21. Surface wave dispersion from small vertical scatterers
K. van Wijk and A. L. Levshin
Geophysical Research Letters, 31, L20602, 2004
22. Analysis of strong scattering at the micro-scale
K. van Wijk, D. Komatitsch, J. A. Scales and J. Tromp
Journal of the Acoustical Society of America, 115(3), 1006-1011, 2004
23. 1D energy transport in a strongly scattering laboratory model
K. van Wijk, M. Haney and J. A. Scales
Physical Review E, 69(3), 036611, 2004
24. Multiple scattering of surface waves
K. van Wijk
PhD Thesis, Department of Geophysics, Colorado School of Mines, 2003
25. Data uncertainty analysis and error estimation for linear inversion problems
K. van Wijk, J. A. Scales, W. Navidi and L. Tenorio
Geophysics Journal International, 149, 625-632, 2002
26. Tunable multiple-scattering system
J. A. Scales and K. van Wijk
Applied Physics Letters, 79(14), 2294-2296, 2001
27. Multiple scattering attenuation and anisotropy of ultrasonic surface waves
J. A. Scales and K. van Wijk
Applied Physics Letters, 74(25), 3899-3901, 1999

EXTERNAL FUNDING

From my arrival at BSU in 2006 until now, I have been Principle Investigator or a Co-Principle Investigator on grants totaling around \$3M (US):

- PI with Liberty Geothermal Reservoir Characterization at Neal Hot Springs, OR (DOE, 2011, \$184k)
- Co-PI with Marshall *et al.* on Remote Sensing of the Cryosphere: Calibration and Validation (NASA-EPSCOR, 2011-2014, \$1,126,348)
- PI on Microseismic monitoring of CO₂ injection (Schlumberger Cambridge, 2009-2011, \$194k)
- PI with Adam on Suitability for Layered Basalt Deposits as Targets of Industrial Carbon Dioxide Sequestration (INL LDRD, 2009-2011, \$159k)
- Co-PI with Liberty on Humanitarian geophysics: establishment of a new undergraduate sub-discipline at Boise State University (Boise State University International Program, 2009-2010, \$10k)
- Co-PI with Liberty and Wood on Northern Thailand Environmental and Engineering Geophysics Field Camp (SEG Foundation, 2008-2010, \$100k)
- Co-PI with Revil, Batzle and Liberty on Component Technologies R&D: Joint inversion of electrical and seismic data for Fracture characterization and Imaging of Fluid Flow in Geothermal Systems. (DOE, 2008-2010, \$868k)
- PI on Suitability for Layered Basalt Deposits as Targets of Industrial Carbon Dioxide Sequestration (INL LDRD, 2007-2009, \$60k)
- PI on Reservoir monitoring with multiply scattered seismic waves (ConocoPhillips, 2008-2013, \$321k)
- PI on Geophysical Field Camp (SEG Foundation, 2007-20011, ~\$20k)
- PI on Surface waves for exploration geophysics (GXT, 2007-2009, \$90k)

SERVICE

- Instructor in Thailand for Geoscientists Without Borders (2011)
- Geophysics representative on the Graduate Program Committee (2008-)
- Program coordinator for Geophysics Graduate Program (2008-)
- Faculty adviser to the Geophysics Club (2007-)
- Associate Editor for Geophysics, first Near-Surface, now Letters section (2009-)
- mentor for McNair student Randi Walters. Randi has won a number of awards for her research. Among them: 2010 Top Ten Scholars at BSU, speaker at the 7th Annual Undergraduate Research & Scholarship Conference, and a nomination for undergraduate speaker at her graduation
- Outreach to community via two appearances in January and February of 2010 on the local ABC and FOX affiliates, NPR radio and Channel 2 regarding earthquake in Haiti, Chile and the possibility of large earthquakes in the Boise area.
- SEG workshop Presenter and participant at the Seismic Interferometry workshop during the 79th Annual international meeting of the Society of Exploration Geophysicists, 2009
- Organizer and presenter at the 2008 annual meeting of the Society of Exploration Geophysicists of the technical session Innovations in Geophysics: a tribute to Rodney Calvert
- Organizer at the American Geophysical Union's Fall 2007 Meeting of a session titled Multiple wave scattering across length scales in the Earth
- Organizer at the AGU Fall 2006 Meeting of a session titled Someone's Noise is another person's signal
- Advising graduate and undergraduate students:

- chair committee: Murari Khatiwada (MS, 2009), Mikesell (PhD), Lamb (PhD), Blum (PhD), Fagan (PhD), Morrison (PhD), Otheim (MS) and Colwell (MS)
- committee member: Brosten (PhD, 2008), Brown (PhD), Nichols (MS, 2010), Hinz (PhD)
- mentor for Geoscience undergraduate Kara Ferguson: she is a work-study for our BSU seismographs, who won a best student presentation award in Seismology at the 2010 AGU meeting in San Francisco
- Created and maintain a Colorado School of Mines and Boise State University graduate thesis template for L^AT_EX
- Presenter and panel member in Society of Exploration Geophysics workshop Seismic Interferometry, Daylight Imaging and Time Reversal, 2005
- Both publications Dispersion of surface waves from small vertical scatterers and Toward noncontacting seismology were released to the press as American Geophysics Union Highlights. The resulting publicity has led to a featured articles in Livescience.com and on the radio program Science Update from the American Association for the Advancement of Science
- Imaging and predicting near-field scattered surface waves received honors as a Geophysics Bright Spot by the Society of Exploration Geophysicists
- Author of a collection of answers to the problems in Electrodynamics is posted by Samizdat Press and receives between 3000 and 4000 hits per month: Solutions to problems from Jackson's classical electrodynamics
- Author of Matlab package to invert for P-wave speed in Vertical Seismic Profiling, available at <http://acoustics.mines.edu/contrib>
- Presenter and panel member in Society of Exploration Geophysicists workshop Near-surface problems and solutions, 2003
- Reviewer for Society for Industrial and Applied Mathematics, National Science Foundation, American Geophysical Union, European Geophysical Society, Journal of Applied Geophysics and Society of Exploration Geophysicists

INVITED
PRESENTATIONS

- PBS TV show D4K on Earthquakes on April 19th, 2011
- Stanford University, departmental colloquium on May 4th, 2011
- Listen-In on Earthquake risk in Meridian, organized by the IGS, 2010
- Emergency response team of ADA county, 2010
- Exploiting multiply scattered waves with Seismic Interferometry and Modified Radiative Transfer Theory, MIT, 2009
- National teach-in Climate Change, the Energy Challenge and what does Geophysics at BSU have to do with it? Boise State University, 2009
- New and Continuing Opportunities in Near-Surface Geophysics, CSM, 2008
- Passive Imaging and Monitoring Using Random Wavefields, at the 153rd meeting of the Acoustical Society of America in Salt Lake City, 2007
- Wave and Energy propagation in disordered media in the department of Mathematics at Boise State University, 2006
- Jackson School of Geosciences, University of Texas, 2006
- Shell Research in Houston, 2006
- ExxonMobil Upstream Research Company in Houston, 2006
- Near-surface session The target-in-Earth Signal-to-Noise problem at the combined Spring meeting in for the American Geophysical Union and the Society of Exploration Geophysicists Baltimore, 2006

- Golden's Lions Club, 2006
- Colloquium Physics department of the University of Alberta, 2003 and 2006
- Mile High Chapter of the Association of Information Technology Professionals, 2005
- Keynote speaker at the Gates Science Fair at Graland Country Day School, 2004

SELECTED OTHER
PUBLICATIONS

- ◇ Surface wave isolation with the interferometric Green tensor
van Wijk, Mikesell, Blum, Haney and Calvert
Annual SEG Meeting in Denver, 2010
- ◇ Advances in laboratory modeling of wave propagation
Blum and van Wijk
Annual SEG Meeting in Denver, 2010
- ◇ Passive Icemology: fracture and model characterization using microseismicity
Mikesell, van Wijk, Haney and Bradford
Annual SEG Meeting in Denver, 2010
- ◇ Preliminary results for a near surface 3-D seismic survey of a geothermal system in Colorado
Lamb, van Wijk, Liberty, Revil, Richards and Batzle
Annual SEG Meeting in Denver, 2010
- ◇ Using SVD for improved interferometric Green's function recovery
Melo Silva, Malcolm, Mikesell and van Wijk
Joint AGU/SEG meeting of the Americas, Sao Paolo, 2010
- ◇ Capturing fracture propagation in a glacier using passive seismology
Smith, Mikesell, van Wijk, Walters and Bradford
AGU Fall meeting, 2010
- ◇ CO2 sequestration in basalts: laboratory measurements
Otheim, Adam, van Wijk, McLing and Podgorney
AGU Fall meeting, 2010
- ◇ Raising seismic awareness on-and off-campus with class-built seismometers
Ferguson, van Wijk, Channel, and Nuxoll
AGU Fall meeting, 2010
- ◇ Exploiting head-wave artifacts in seismic interferometry
Mikesell, van Wijk, Nichols, and Calvert
AGU Fall meeting, 2010
- ◇ Surface-Wave Isolation with the Interferometrically Obtained Green Tensor
van Wijk, Blum, Lamb and Mikesell
AGU Fall meeting, 2010
- ◇ Preliminary scanning measurements of combined in- and out-of-plane components with laser interferometry
Blum, van Wijk, Pouet and Wartelle
Laser Ultrasonics 2010 Meeting in Bordeaux, France
- ◇ Refraction interferometry for numerical surface seismic experiments
Mikesell, van Wijk, Calvert and Haney
Annual SEG meeting, 2009
- ◇ A numerical sensitivity analysis to monitor CO₂ sequestration in layered basalt with coda waves
Khatriwada, van Wijk and Adam
Extended abstract for the 79th Annual SEG Meeting, 2009
- ◇ Characterization of a geothermal system in the Upper Arkansas Valley, CO
Blum, van Wijk, Liberty, Batzle, Krahenbuhl, Revil and Reynolds
Extended abstract for the 79th Annual SEG meeting, 2009

- ◇ The virtual refraction: A case study at the Boise Hydrogeophysics Research Site
Nichols, Mikesell and van Wijk
Annual SEG meeting, 2009
- ◇ The Virtual Refraction for Noisy Data and Elastic Media
K. van Wijk, D. Mikesell and A. Calvert
EAGE Meeting, 2009
- ◇ The critical angle in seismic interferometry
K. van Wijk, A. Calvert, M. M. Haney, D. Mikesell and R. K. Snieder
Annual SEG Meeting, 2008
- ◇ Numerical modeling of time-lapse monitoring of CO₂ sequestration in a layered basalt reservoir
M. Khatiwada, K. van Wijk and M. M. Haney
Annual SEG Meeting, 2008
- ◇ Dynamic aspects of apparent attenuation and wave localization in layered media
M. M. Haney and K. van Wijk
Annual SEG Meeting, 2008
- ◇ On the relationship between the Modified Kubelka-Munk equations and the Self-Consistent theory of Anderson localization in randomly layered media
M. M. Haney and K. van Wijk (In preparation, 2009)
- ◇ Ice Core Tomography with Laser Ultrasonics
T. D. Mikesell, K. van Wijk, A. V. Kurbatov and P. A. Mayewski
Environmental Sensing Symposium, 2007
- ◇ Towards a Noncontacting Multi-Component Laser-Ultrasonic System for Geophysical Applications
T. Blum, K. van Wijk, and B. Pouet
Extended abstract for the Environmental Sensing Symposium, 2007
- ◇ New developments toward noncontacting seismics
J. Peacock and K. van Wijk
Annual SAGEEP Meeting, 2006
- ◇ Radiative transfer in 1D, and the connection to the O'Doherty-Anstey formula
K. van Wijk, M. Haney, R. K. Snieder and J. A. Scales
Annual SEG Meeting, 2003
- ◇ Multilevel 3D VSP travelt ime inversion in VTI media, Weyburn Field, Canada
L. Adam, K. van Wijk and T. Davis
Annual SEG Meeting, 2003
- ◇ Unknowns in Multiple Scattering
K. van Wijk and J. A. Scales
Annual EAGE Meeting, 2002
- ◇ Uncertainty estimation and error analysis for linear inversion problems
K. van Wijk, J. A. Scales and W. Navidi
Annual EAGE Meeting, 2001
- ◇ Multiple scattering in the laboratory
K. van Wijk and J. A. Scales
Brazilian Geophysical Society Meeting, 2001
- ◇ Multiple scattering attenuation and anisotropy of ultrasonic surface waves
J. A. Scales and K. van Wijk
Journal of the Acoustical Society of America 107, 2848 (2000)
- ◇ Answers to a selection of questions from Jackson's Classical Electrodynamics
K. van Wijk, Samizdat Press, 1999
- ◇ Mountaineering curriculum for Colorado Outdoor Education Center
K. van Wijk, Colorado Outdoor Education Center, 1998