

Natalia V. Zakharova, Ph.D.

Postdoctoral Research Scientist
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CURRENT RESEARCH

Induced seismicity: in situ stress analysis, risk assessment, wellbore stress modeling

Geologic carbon sequestration: storage potential in basalt, fractured reservoir characterization

Mesozoic Newark Rift Basin: provenance, structure, carbon storage potential

EDUCATION

Columbia University in the City of New York <i>Ph.D., Department of Earth & Environmental Sciences</i> Borehole Geophysics & Carbon Sequestration	2008-2014
Lomonosov Moscow State University, Russia <i>M.S. with Honors, Department of Geology</i> Exploration Seismology	2004-2006
<i>B.S. with Honors, Department of Geology</i> Geology and Geophysics	2000-2004

PROFESSIONAL & FIELD EXPERIENCE

Lamont-Doherty Earth Observatory, Columbia University Postdoctoral Research Scientist	10/2014-ongoing
Lamont Test Wells <i>Lamont-Doherty Earth Observatory, Palisades, NY</i> Assistant during drilling, coring, well logging and hydraulic testing	2010- ongoing
Colorado Plateau Coring Project <i>Petrified Forest National Park, AZ</i> Well logging supervisor	11/2014
IODP Expedition 335 'Superfast Spreading Rate Crust 4' <i>Drilling Vessel JOIDES Resolution, Equatorial Pacific</i> Logging staff scientist and physical properties lab specialist	04-06/2011
Mineralogy Laboratory, Schlumberger-Doll Research <i>Cambridge, MA</i> Trainee in Fourier-Transform Infrared Spectroscopy	03/2010
CO₂ Mitigation and Sequestration Division, Schlumberger-Doll Research <i>Cambridge, MA</i> Intern in seismic modeling for CO ₂ sequestration monitoring	06-08/2009

Geovers Ltd.: Vertical Seismic Profiling (VSP) Division <i>Central Geophysical Expedition, Moscow, Russia</i> Part-time VSP specialist: data processing and interpretation	2004-2006
Center for Analysis and Development, YUKOS <i>Moscow, Russia</i> Intern in 3D seismic interpretation for Western Siberian oilfields	07-08/2004
Well Testing and Completion Services, Schlumberger <i>Chayvo oilfield and Yuzhno-Sakhalinsk, Sakhalin, Russia</i> Field internship	06/2004
UNESCO IOC Expedition 'Training Through Research-13' <i>Research Vessel Professor Logachev, Northern Atlantic</i> Staff scientist, marine seismology and geoacoustics	06-08/2003
Laboratory of Near-Surface Electrical Prospecting <i>Lomonosov Moscow State University, Russia</i> Volunteer for field work, data analysis and interpretation	01-03/2003

PUBLICATIONS

Peer-Reviewed Articles

1. **Zakharova, N.V.,** Goldberg, D.S., Olsen, P.E., Kent, D.V., Morgan, S., Yang, Q., Stute, M., Matter, J., **2016,** New insights into lithology and hydrogeology of the northern Newark Rift Basin, *Geochem., Geophys., Geosyst.*, 17(6), 2070-2094, doi:10.1002/2015GC006240
2. **Zakharova, N.V.,** and D.S. Goldberg, **2015,** Data report: Analysis of shear wave anisotropy in upper oceanic crust, ODP/IODP Hole 1256D, *Proceedings of the Integrated Ocean Drilling Program*, 335, doi:10.2204/iodp.proc.335.202.2015
3. O'Mullan, G.D., Dueker, M.E., Clauson, K., Yang, Q., Umemoto, K., **Zakharova, N.,** Matter, J., Stute, M., Takahashi, T., Goldberg, D., **2015,** Microbial stimulation and succession following a test well injection simulating CO₂ leakage into a shallow Newark Basin aquifer, *PLoS ONE* 10(1), doi:10.1371/journal.pone.0117812
4. **Zakharova, N.,** and D. Goldberg, **2014,** In Situ Stress Analysis in the Northern Newark Basin: Implications for Induced Seismicity from CO₂ Injection, *J. Geophys. Res. Solid Earth*, 119, doi:10.1002/2013JB010492
5. Yang, Q., J. Matter, M. Stute, T. Takahashi, G. D. O'Mullan, K. Umemoto, K. Clauson, M. E. Dueker, N. V. **Zakharova,** and D. Goldberg, **2014,** Groundwater hydrogeochemistry in injection experiments simulating CO₂ leakage from geological storage reservoir, *Int. J. Greenhouse Gas Control* 26, 193-203, doi:10.1016/j.ijggc.2014.04.025
6. **Zakharova, N.,** D. Goldberg, and D. Collins, **2013,** In Situ Stress Constrains from Borehole Data in the Context of CO₂-Storage Site Characterization, Paper #739 *Proceedings of the 47th US Rock Mechanics/Geomechanics Symposium*, 23-26 June 2013, San Francisco, California, USA; ISBN: 978-0-9894844-0-4

7. **Zakharova**, N., D. Goldberg, C. Sullivan, M. Herron, and J. Grau, **2012**, Petrophysical and Geochemical Properties of Columbia River Flood Basalt: Implications for Carbon Sequestration, *Geochem., Geophys., Geosyst.*, 13(11), doi:10.1029/2012GC004305
8. Cranganu, C., M. Villa, M. Saramet, N. **Zakharova**, **2009**, Petrophysical characteristics of source and reservoir rocks, Histria Basin, Western Black Sea, *J. Petrol. Geol.*, 32(4), 357-371
9. Gainanov, V.G. and N. **Rykovskaya***, **2005**, The use of reflected waves in crosswell seismic imaging. *Vestnik MGU*, 60(5), 83-85 (*Russian*). English translation available in Moscow University Geology Bulletin, Allerton Press, NY.

Select Abstracts and Presentations

1. **Zakharova**, N., and D. Goldberg, **2016**, In-situ stress and geomechanical properties in the Newark Basin: Implications for induced seismicity and carbon sequestration, *Dept. Earth and Planetary Sci., Rutgers University (colloquium talk)*
2. **Zakharova**, N., D. Goldberg, D. Collins, and N. Malkewicz, **2015**, Geomechanical properties of rift basin mudstones, *AGU Fall Meeting, MR41C-2664 (poster presentation)*
3. **Zakharova**, N., and D. Goldberg, **2015**, Evaluating In Situ Stress and Induced Seismicity Risks for CO₂ Geologic Storage, Gordon Research Conference on Carbon Capture, Utilization and Storage, Stonehill College, MA (*poster presentation*)
4. **Zakharova**, N., A. Slagle, and D. Goldberg, **2014**, Carbon sequestration in unconventional reservoirs: Advantages and limitations, *AGU Fall Meeting, V23A-4771 (poster presentation)*
5. **Zakharova**, N.V., In situ stress in the Northern Newark Basin: Implications for induced seismicity and carbon sequestration, MGG/SGT seminar, Lamont-Doherty Earth Observatory, September 20, **2013** (*oral presentation*)
6. **Zakharova**, N., D. Goldberg, and D. Collins, **2012**, Petrophysical and mechanical properties of fractured aquifers in the Northern Newark Basin: Implications for carbon sequestration, *AGU Fall Meeting, NS51B-1826 (poster presentation)*
7. **Zakharova**, N.V. and Goldberg, D.S., **2012**, Fractures in geologic reservoirs – storage space and leakage pathways?, Gordon Research Seminar and Conference on Flow in Porous Media, Les Diablerets, Switzerland (*poster presentation*)
8. **Zakharova**, N.V., Yang, Q., J. Matter, M. Stute, T. Takahashi, G. D. O'Mullan, K. Umemoto, K. Clauson, M. E. Dueker, N. V., **2011**, Geophysical characterization of fractured-rock aquifers for CO₂ injection in the Newark Basin, *AGU Fall Meeting, GC44A-08 (oral presentation)*
9. **Zakharova**, N., Goldberg, D., Herron, M., Grau, J., **2010**, Sensitivity of geochemical monitoring for CO₂ sequestration in basalts, *AGU Fall meeting, GC24A-04 (oral presentation)*
10. **Rykovskaya***, N.V., Tabakov, A.A., Yakovlev, I.V., Baranov K.V., Kopchikov, A.V., **2005**, Techniques and some results of walkaway and 3D VSP data processing, *Galperin Readings-2005*, Abstracts, p.68-72 – *in Russian, short abstract in English (oral presentation)*
11. Gainanov, V.G. and **Rykovskaya***, N.V., **2004**, High resolution crosswell seismics with spark source. *Galperin Readings-2004*, Abstracts, p.48-51 (*oral presentation*) – *in Russian*
12. **Rykovskaya***, N.V., Common depth point stacking of crosswell seismic data. XI International Scientific Conference Prize for Young Scientists 'Lomonosov – **2004**', Abstracts, vol. 1, p.147-148 (*oral presentation*) – *in Russian*

* maiden name

Theses

1. Carbon Sequestration In Unconventional Reservoirs: Geophysical, Geochemical and Geomechanical Considerations, Ph.D. thesis, **2014**, Columbia University
 2. Processing Techniques for 2D and 3D Vertical Seismic Profiling, M.S. Thesis, **2006**, Lomonosov Moscow State University
 3. Reflection Imaging for Crosswell Seismic Data, B.S. Thesis, **2004**, Lomonosov Moscow State University
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SCHOLARSHIPS AND AWARDS

Research & Academic Prizes

IODP Leg 335 Post-Expedition Research Award <i>Consortium for Ocean Leadership, Washington D.C.</i>	2011
Science Fellowship <i>Department of Earth & Environmental Sciences, Columbia University</i>	2008-2010
Science Fellowship <i>Graduate Center, City University of New York</i>	2006-2008
Schlumberger Prizes for Academic Achievements <i>Lomonosov Moscow State University, Russia</i>	2003, 2004
Prize for Young Scientists ‘Lomonosov-2004’ <i>Lomonosov Moscow State University, Russia</i>	2004

Competitive Travel & Conference Grants

Gordon Research Conference Grant Funding to cover the conference’s registration fee	Spring 2015
Chevron Student Initiative Grant Funding to present at Gordon Research Seminar and Conference on Flow Through Porous Media, Les Diablerets, Switzerland	Spring 2012
Chevron Student Initiative Grant Funding to organize science communication workshop for students	Spring 2011
ARPA-E Energy Innovation Summit Student Participant Grant Funding to cover meeting and travel costs, Washington DC	Spring 2011
Research Experience in Carbon Sequestration (RECS) Full support to participate in RECS summer school, Albuquerque NM	2010
International Energy Agency (IEA) Carbon Capture & Storage Summer School Full support to participate in the IEA summer school, Lorne, Australia	2009

TEACHING EXPERIENCE

Courses

Basics of Drilling, Well Logging and Coring April 2016

Dept. Earth and Planetary Sci., Rutgers University

Guest lecturer in the Introduction to Geophysics class for majors

Global Warming Isn't Cool Fall 2015

Double Discovery Center, Columbia University, science class for high school students

Independently designed and implemented a 16-hour course on weather and climate basics with the focus on active inquiry-based learning, hands-on activities, and real data analysis

Earth: Origin, Evolution, Future, lab section Fall 2009, 2010

Columbia University, undergraduate intro-level course

Independently developed and conducted lab activities on a variety of topics in Earth and Environmental Sci.; required teaching assistantship in 2009, volunteering in 2010

Quantitative Methods of Data Analysis Fall 2008

Columbia University, graduate-level course

Teaching assistantship: grading, help with homework, class material and final project

Introduction to Geophysics Fall 2005

Lomonosov Moscow State University, undergraduate course for majors

Substitute Lecturer

Formal Training

Teaching 2.0 – What You Need to Know to Be a Successful Teacher Spring 2015

Columbia University, postdoctoral course with practicum

Principles of active learning and backward design

Teaching & Learning Concepts in Earth Sciences Spring 2012

Columbia University, graduate-level course

Approaches to inquiry-based learning, identifying misconceptions, promoting spatial and temporal thinking, and developing learning goals, learning performances and grading rubrics

Introduction to Pedagogy 2004-2005

Lomonosov Moscow State University, undergraduate level

Introductory courses on teaching methods and learning cognition; part of unfinished second major in teaching

Mentoring

Lab work with college-level summer interns 2015

Lamont-Doherty Earth Observatory, Columbia University

Rock shop and lab training for U-Pb and Ar/Ar geochronology, part of Secondary School Field Research Program (SSFRP) at LDEO

Research project with volunteer post-undergraduate student	2014-2015
<i>Lamont-Doherty Earth Observatory, Columbia University</i>	
Rock shop and geochronology lab training, U-Pb and Ar/Ar measurements and data analysis	
One-to-one mentor to high-school interns	2014
<i>Lamont-Doherty Earth Observatory, Columbia University</i>	
Informal mentorship to 2 students from public schools in a summer research program (SSFRP)	
Peer mentor to incoming Ph.D. students	2012-2013
<i>Lamont-Doherty Earth Observatory, Columbia University</i>	
Research mentor for high-school student's science project	2012
<i>Lamont-Doherty Earth Observatory, Columbia University</i>	
Advising on project design, lab measurements, data analysis and reporting; the student received several awards at local science and engineering fairs	
Student supervisor at summer internship in active-source seismology	June 2005
<i>Lomonosov Moscow State University, Russia</i>	

SERVICE TO COMMUNITY

Leadership Roles

Inter-University Student Initiative in Carbon Sequestration (ISICS)	2010-2013
Co-founder and co-chair of the initiative; lead organizer of two ISICS events: a student research conference and a science communication workshop	
Chief Editor for Storke Memorial Expedition Field Guides	2010, 2011, 2013
<i>Lamont-Doherty Earth Observatory, Columbia University</i>	

Outreach

American Geophysical Union (AGU) Fall Meeting	December 2015
<i>San Francisco, CA</i>	
Outstanding Student Paper Award (OSPA) judge	
NYC Science & Engineering Fair	Spring 2015
<i>The City College of New York & American Museum of the Natural History</i>	
Volunteer judge at the preliminary and final rounds	
Girls' Science Day	2013, 2014
<i>Columbia University</i>	
Co-leader of hands-on activity 'Earth-Science Application of Sound in Water'	
Annual Lamont Open House	2008, 2010-2013
<i>Lamont-Doherty Earth Observatory, Columbia University</i>	
Co-leader of hands-on activities and games on porosity, carbon cycle, and carbon sequestration	

AGU Fall Meeting Press Communication 12/2011
San Francisco, CA
Press interview resulting in coverage in Popular Mechanics
(www.popularmechanics.com/science/energy/a7483/could-the-northeast-store-its-co2-right-beneath-its-feet/, last access 8/25/15)

Councils and Committees

Columbia University Postdoctoral Society <i>Columbia University</i>	2014-ongoing
Postdoctoral Advisory Council <i>Columbia University</i>	2014-2015
Organizing Committee for Graduate Student Symposium <i>Lamont-Doherty Earth Observatory, Columbia University</i>	Spring 2013
Earth Institute Student Advisory Council <i>Columbia University</i>	2011-2012
Chevron Student Initiative Fund Committee <i>Lamont-Doherty Earth Observatory, Columbia University</i>	Spring 2009

ADDITIONAL SKILLS

Certificates and Summer Schools

HeDWAZ 2014: Multichron - Geochronology and Thermochronology Workshop <i>University of Arizona, Tucson, AZ</i>	2014
Reservoir Geomechanics, <i>Stanford University</i> , online course	2014
Research Experience in Carbon Sequestration (RECS), <i>Albuquerque, NM</i>	2010
International Energy Agency CCS Summer School, <i>Lorne, Australia</i>	2009
Production Geology course, YUKOS, <i>Moscow, Russia</i>	2004

Geophysical Software

Experience with GeoFrame (Schlumberger), WellCAD (ALT), GMI (GeoMechanics International/BakerHughes)

GIS & Programming

Basic knowledge of MatLab, C and ArcGIS

Languages

English, Russian (native speaker), French (reading knowledge)

CONTACT INFORMATION

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