

## GESER DUGAROV, Ph.D.

Senior Researcher at Trofimuk Institute  
of Petroleum Geology and Geophysics SB RAS

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**languages:** English (advanced), Russian (native)  
**age:** 33  
**location:** Novosibirsk, Russia



### SUMMARY

Specialist in the field of multiwave seismic survey, engaged in research of seismic wave propagation theory. Holds a degree of a Doctor of Philosophy (Ph.D.) in Geophysics. Experienced in project management and science advising. Areas of expertise include seismic anisotropy of rocks, wave attenuation, and physical properties of hydrate-bearing media. Currently exploring Data Science area.

### TECHNICAL SKILLS

Python, Matlab, Wolfram Mathematica (symbolic computation), Git.

### EDUCATION

**PhD, Geophysics,**  
**Trofimuk Institute of Petroleum Geology and Geophysics SB RAS,**  
**Novosibirsk, Russia** **X/2009 – XII/2013**  
**(4 years)**

*Thesis:* Estimation of fractured medium effective parameters from seismic wave velocity and attenuation anisotropy data using the linear slip model.

**MSc, Computational and Applied Mathematics,**  
**Novosibirsk State University, Novosibirsk, Russia** **IX/2004 – VI/2009**  
**(5 years)**

*Thesis:* Parallel algorithms for solving the traveling salesman problem.

### WORK EXPERIENCE

**Senior Researcher,**  
**Trofimuk Institute of Petroleum Geology and Geophysics SB RAS,**  
**Novosibirsk, Russia** **X/2009 – current**  
**(11 years)**

*Senior Researcher* (IV/2019 – current)

*Tasks.* Research planning and management of projects on the following topics. Estimation of target object parameters from reflected seismic wave data (AVOAz inversion); physical properties of hydrate-bearing rocks (acoustic measurements, X-ray tomography); 3D printing technology for fractured rock modelling. Supervising research at undergraduate and postgraduate levels.

*Achievements.* Currently ongoing projects. Graduate students: 1 MSc (2020), 1 BSc (2020).

*Python, Matlab, Git, Wolfram Mathematica* (symbolic computation), *OriginLab* (visualization).

*Research Associate (II/2014 – IV/2019)*

*Tasks.* Obtaining experimental measures of acoustic properties of hydrate-bearing samples. Data processing and analysis. Studying attenuation estimation from seismic data (namely from vertical seismic profiling, VSP). Managing of small research projects. Writing project reports and scientific papers.

*Achievements.* Collected data on acoustic properties of hydrate-bearing samples depending on various factors including rock-matrix material, amount and morphology of hydrate content in pores. Developed module for Q factor estimation from VSP data based on modified spectral ratio method.

*Research Assistant (X/2009 – II/2014)*

*Tasks.* Working on the PhD thesis. Studying velocity and attenuation anisotropy of compressional and shear waves, the relationships between anisotropic parameters and physical properties of fractured rocks.

*Achievements.* PhD degree in Geophysics. Developed algorithm for estimation of effective parameters in the linear slip model of fractured media from velocity and attenuation anisotropy data.

**Engineer,  
Nuclear Safety Institute RAS, Novosibirsk Branch,  
Novosibirsk, Russia**

**IX/2013 – V/2017  
(3 years)**

*Tasks.* Development of software (HYDRA-IBRAE/LM/V1) for numerical modelling of flow and heat-exchange of sodium coolant in fast-neutron reactors (including coolant boiling). Development of automation testing.

*Achievements.* Updated closure relationships for two-phase coolant flow. Developed automation testing system with modelling results visualization.

*C++, Python, SVN, OriginLab (visualization).*

**QA engineer,  
ATAPY Software, Novosibirsk, Russia**

**X/2008 – VIII/2009  
(1 year)**

*Tasks.* Testing and identifying deficiencies in document imaging, data capture and document processing solutions.

*Jira (issue tracking), StarTeam (revision control), VirtualBox (virtualization).*

## **PROJECTS**

**Modelling of fractured media using synthetic samples printed on a 3D printer**

**II/2019 – XII/2021  
(3 years)**

*Supported by the Russian Foundation for Basic Research, grant No. 19-05-00730.*

*Role: head of the project.*

*Team size: 4.*

The project is aimed to develop a methodology of fractured media modelling through 3D printing due to the possibility of controlled parameters variations. The project is in progress.

**AVAZ inversion development for estimation of target object anisotropy parameters from 3D seismic data**

**XII/2019 – VI/2021  
(1.5 years)**

*Customer:* NTC NIS-Naftagas, Serbia

*Role:* **team leader.**

*Team size:* 7.

The project is aimed to develop technology and software for AVAZ inversion of target object anisotropy parameters from 3D seismic data. The project is in progress.

**Studying of the acoustic properties and internal structure of methane-hydrate-bearing coal samples**

**VII/2019 – VI/2021  
(2 years)**

*Supported by* the Russian Science Foundation, grant No. [19-77-00068](#).

*Role:* **head of the project.**

*Team size:* 5.

We study acoustic properties of coal samples with different methane hydrate saturation. In-situ 3D X-ray tomography during hydrate formation was used for hydrate microstructure analysis. The results show a more complicated behavior that differs from similar experiments with sand samples. A competitive sorption of methane and water in the coal pore space was revealed, which leads to a stronger change of acoustic properties during gas-hydrate formation than during freezing.

**Laboratory experiments on the formation of gas hydrates in coal samples**

**II/2017 – XI/2018  
(2 years)**

*Supported by* the Russian Foundation for Basic Research, grant No. 17-35-80023.

*Role:* **head of the project.**

*Team size:* 4.

We did a series of experiments on formation of methane hydrate in crashed bituminous coal samples. As a result, the methodology of gas hydrate formation from different types of water in coal samples was developed. Also, a dependence of acoustic properties from temperature and stress was revealed.

### **HONORS AND AWARDS**

- “The best young researcher in Earth science organizations” from the Government of Novosibirsk (2019).
- Winner of the contest among young researchers with PhD degree in Earth sciences from the Council for grants of the president of the Russian Federation (2019).

### **PUBLICATIONS**

Author and coauthor of more than 50 scientific publications. A publication track record in databases: [WoS](#) (D-4183-2014), [Scopus](#) (56910226400). Main publications are the following.

- [Dugarov G.A.](#), Duchkov A.A., and Manakov A.Yu. (2021) Acoustic properties of hydrate-bearing coal samples depending on temperature and water saturation type. *Geophysics*, 86(3), U31-U37, doi: 10.1190/geo2020-0117.1

- Nikitin V.V., Dugarov G.A., Duchkov A.A., Fokin M.I., Drobchik A.N., Shevchenko P.D., de Carlo F., and Mokso R. (2020) Dynamic in-situ imaging of methane hydrate formation and self-preservation. *Marine and Petroleum Geology*, 115, 104234, doi: 10.1016/j.marpetgeo.2020.104234
- Dugarov G.A., Duchkov A.A., Duchkov A.D., and Drobchik A.N. (2019) Laboratory validation of effective acoustic velocity models for samples bearing hydrates of different type. *Journal of Natural Gas Science and Engineering*, 63, 38-46, doi: 10.1016/j.jngse.2019.01.007
- Usov E.V., Butov A.A., Dugarov G.A., Kudasov I.G., Lezhnin S.I., Mosunova N.A., and Pribaturin N.A. (2017) System of closing relations of a two-fluid model for the HYDRA-IBRAE/LM/V1 code for calculation of sodium boiling in channels of power equipment. *Thermal Engineering*, 64(7), 504-510, doi: 10.1134/S0040601517070102
- Usov E.V., Pribaturin N.A., Kudashov I.G., Butov A.A., Dugarov G.A., Mosunova N.A., Strizhov V.F., and Ivanov E.N. (2015) A step in the verification of the HYDRA-IBRAE/LM/V1 thermohydraulic code for calculating sodium coolant flow in fuel-rod assemblies. *Atomic Energy*, 118(6), 382-388, doi: 10.1007/s10512-015-0012-8
- Chichinina T., Dugarov G., and Obolentseva I. (2013) Fracture-induced Q-anisotropy: Inversion for fracture parameters. *SEG Technical Program Expanded Abstracts*, 32, 335–340, doi: 10.1190/segam2013-0590.1
- Obolentseva I., Dugarov G., and Chichinina T. (2011) Estimation of complex-valued weaknesses from velocity-attenuation anisotropy data in linear-slip TI model of fractured media. *SEG Technical Program Expanded Abstracts*, 30, 4393–4398, doi: 10.1190/1.3658767
- Tarkov M.S., Dugarov G.A. (2010) A parallel algorithm for solving the traveling salesman problem by a recurrent neural network. *Bulletin of the Novosibirsk Computing Center. Series: Computer Science*, 30, 89-94.

#### ADDITIONAL INFORMATION

- Field practice in near-surface vertical seismic profiling (Novosibirsk Region, Russia, VI/2015, VI/2014) and near-surface seismic and electromagnetic surveys (Novosibirsk Region, Russia, VI/2011)

*Last update: 15.06.2021*

The latest version of CV could be found on <https://geserdugarov.github.io>