

## CURRICULUM VITAE

Prof. Alexey (Alexei) D. Gvishiani

### Born:

29 October 1948 in Moscow, USSR.

### Education:

- Lomonosov Moscow State University (MSU), Department of Mathematics and Mechanics (1971)
- Postgraduate studies at MSU, Department of Mathematics and Mechanics, chair of the theory of functions and functional analysis, PhD. Scientific advisers : Prof., academician Izrael M. Gelfand, Prof. Mark I. Graev (1974)

### Language skills:

Russian, English, French

### Degrees:

- Doctor Honoris Causa of the National Technological University of Ukraine (2006)
- Doctor of Sciences in geophysics, Schmidt Institute of Physics of the Earth, AS USSR (1984)
- PhD in mathematics, MSU, Department of Mathematics and Mechanics (1974)

### Titles:

- Foreign Member of the Romanian Academy of Engineering and Technical Sciences (2012)
- Full member (academician) of RAS (2011)
- Corresponding Member of the Russian Academy of Sciences (2006)
- Foreign Member of the National Academy of Sciences of Ukraine (2003)
- Professor of the chair of theory of functions and functional analysis, MSU (1992)

### State Awards:

- Order of Friendship (2009)
- Medal "850th Anniversary of Moscow" (1997)
- Medal "50th Anniversary of the Mongolian People's Revolution" (1971)

### Scientific results achieved:

#### *Mathematics and informatics*

- New dichotomy classification algorithms with single learning class (since 2016)
- Pattern recognition system FCAZ (Fuzzy Clustering and Zoning) to determine areas of the highest seismic risk (2014–2015)
- Innovative methods of hierarchical clustering

(since 1998)

- Contribution to creation of the first Internet nodes for informational support of research, education and learning in RF (1991–1994)
- Math modeling results in discrete convex/concave analysis to study fragmentation of geological structures (1980–1990)
- Introduction of a new family of classification algorithms “Voting by the Set of Feature (VFS)” for studying dynamic recognition problems (1979–1985)
- Discrete mathematical model of dynamic recognition problems and development of stability evaluation mathematical theory for limit solutions (1979–1986)
- New properties of non-Archimedean Radon transformation and the following study of representations of the group  $G=SL(2)$  in functional space over Lobachevsky plane (1974–1978)
- Proof of the Gelfand-Graev-Gvishiani formula for the characters of discrete series representations for the group of matrices with elements from a local non-Archimedean field and description of representations of the derived group (1973–1974)

### ***Geophysics and geoinformatics***

- System analysis and geoinformatics in magnetic data studies. Recognition of magnetic activity using magnetic observatories and satellite data (since 2006)
- Research group leader and editor of unique digital “Atlas of the Earth’s Magnetic Field from 1500 till 2010”, developed in collaboration of GC RAS with the European Geoscience Union, Commission for the Geological Map of the World and CODATA (2013)
- Recognition of possible strongest, strong and significant earthquake occurrence locations in seismic regions of the Earth and evaluation of their reliability using the models for dynamic pattern recognition (1978–1990) and FCAZ (since 2013)
- Innovative original automated hardware-software system to monitor and recognize geomagnetic activity using the network of observatories and satellite data (2014–2016)
- Development into a single network of a system of magnetic observatories in the Russian Federation, (the highest quality standard), integrated by a common center for geomagnetic data acquisition and analysis. Technical and logical affiliation of the RF segment with the European part of INTERMAGNET (2009–2012)
- Original algorithms for time series anomaly recognition using fuzzy sets theory and their application to volcano monitoring and to analysis of gravity and geomagnetic data (2001–2006)
- Hierarchic clustering of spatial geophysical and geodynamic objects using discrete mathematical analysis (1999–2006)
- Development of new syntactic pattern recognition methods (SPARS) for studying problems of engineering seismology, along with a research team of the French Atomic Energy Commission (1990–1995)
- Creation of an innovative mathematical model for recognition of possible strong earthquakes epicenters locations and their time stability as a basis for seismic zoning (1981–1985)
- Development of methods for recognition of potential high seismic risk zones in the regions of moderate seismicity, a Russian-French project on recognition of significant earthquakes in the Alps, the Pyrenees and the Caucasus (1979–1984)

- Recognition of areas of possible occurrence of the strongest earthquakes in the Pacific Rim ( $M \geq 8,2$ ) (1979–1982)
- Elaboration of the system principles and development of the first national geophysical data bases (1979–1985)

**Scientific research and management; advancement and propagation of excellence:**

- Member of the Russian National Committee of Geologists (2017)
- Expert in the field of geology, geophysics, geochemistry and mining sciences and member of the RAS Expert Commission on the assessment of the young scientists scientific projects (2016)
- Russian geographical Society Fellow (2015)
- Member of the RAS Coordinating Council on Forecasting (2015)
- Member of the Scientific Coordinating Council of the Federal Agency of Scientific organizations of Russia (FANO) (2014)
- Member of the Expert Council of the Russian Scientific Foundation (2014)
- Member of the Committee for Nominating President, Vice President and Officials of the International Union of Geodesy and Geophysics (IUGG) (1987, 2011, 2015)
- Member of the Bureau of the RAS Scientific Council on the complex problems of the Eurasian economic integration, modernization, competitiveness and sustainable development (2013)
- Expert of the Federal Roster of Scientific and Technical Spheres of the Ministry of Education of the Russian Federation (from 2013)
- Chair of the scientific program of the RAS Earth Sciences Branch “Geophysical Data: Analysis and Interpretation” (2012–2017)
- President of the Development Fund of the Moscow School of Economics, Lomonosov Moscow State University (MSE MSU) (2012)
- Council member for Technological Breakthrough under the Presidium of Russian Academy of Sciences for coordinating scientific research in the field of space technologies (2009)
- Academic Council member for doctoral and PhD defense of the Institute of Geology of Ore Deposits, Petrography, Mineralogy, and Geochemistry, Russian Academy of Sciences (IGEM RAS) (2009)
- Member of the specialized Academic Council for PhD defense of the Schmidt Institute of Physics of the Earth, RAS (IPE RAS) (2009)
- Member of the Organizing Committee of the Russian Academy of Sciences for the implementation of activities to be held in Russia in 2008 – the International Year of Planet Earth (2008)
- Deputy Academician-Secretary of the RAS Earth Sciences Branch (2008)
- Chairman of the Russian National Committee on electronic Geophysical Year (eGY)(2007–2008)
- Member of the Bureau of the RAS Earth Sciences Division (2007)
- President of the National IUGG Committee (2006)
- Council member of the research program “Geophysics of Interactions between the Geospheres” of the RAS Earth Sciences Division (2006–2008)
- Scientific Council member of the fundamental research program of the Presidium of RAS

“The elaboration of principles of the scientific distributed information- computer medium on the basis of GRID technologies” (2006–2008)

- Director and Chairman of the Scientific Council of the Geophysical Center, RAS (GC RAS) (since 2005)
- Head of the GC RAS Geoinformatics Laboratory (2005–2011)
- Chairman of the National CODATA Committee (Committee on Data for Science and Technology, ICSU) (2005)
- Deputy Director of the Schmidt Institute of Physics of the Earth, RAS (IPE RAS) (2004–2012)
- Member of the RAS Scientific Council of Geoinformatics (2003)
- Deputy Director General of the Schmidt United Institute of Physics of the Earth, RAS (UIPE RAS) (1998–2003)
- Advancement and propagation of the European Union Information Society Technologies (IST) program. Scientific leader of the EU IST program implementation projects in Russia, Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Ukraine, Uzbekistan (1996–2003)
- Expert-evaluator of the EU IST program projects and projects results (1999–2005)
- Head of the UIPE/IPE Department of Mathematical Geophysics and Geoinformatics (1997)
- Head of the Centre of Geophysical Data Studies and e-Applications (CGDS), UIPE, IPE RAS (1991–2005)
- Chairman of the Russian Permanent Network Strategies Committee of UNESCO (1990–1996)
- Researcher, group leader, department head, laboratory head of IPE RAS (1975–1991)

#### **International scientific research:**

##### ***Austria:***

- Visiting researcher at the International Institute for Applied Systems Analysis (IIASA) (2014–2016)

##### ***France:***

- Visiting researcher at the Institute of Physics of the Earth, Paris (1992–2012)
- Visiting researcher at the University of Clermont-Ferrand, the Volcanology Laboratory (2003–2005)
- Visiting researcher at the Institute of Physics of the Earth, Strasbourg (1997–2001)
- Visiting researcher at the European Mediterranean Seismological Centre, Strasbourg (1990–1993)
- Scientific leader of 3 RAS–CNRS (Centre national de la recherche scientifique, France) PICS projects with Paris-7 University, René Descartes Strasbourg University and University of Clermont-Ferrand.

##### ***Spain:***

- Visiting researcher at the National Institute of Geography, Madrid (1986)

##### ***USA:***

- Guest researcher at the National Geophysical Data Center, NOAA, Boulder, Colorado (1980, 1983, 1985)

## **Teaching and lecturing**

### ***Russia:***

- Academic adviser for preparing two Doctor theses and sixteen PhD theses
- Professor, Chair of the theory of functions and functional analysis, Faculty of Mechanics and Mathematics, Moscow State University (1989–2000)
- Assistant lecturer, associated professor, Chair of the theory of functions and functional analysis, Faculty of Mechanics and Mathematics, Moscow State University (1971–1988)

### ***France:***

- Visiting professor at the Institute of Physics of the Earth, Paris (Institut de Physique du Globe de Paris) (1992–2012)
- Visiting professor at the Institute of Physics of the Earth, Strasbourg (Institut de Physique du Globe de Strasbourg) (1992)

## **International activity:**

### ***Geophysics:***

- Principal researcher of the joint project of RAS, RFBR and Scientific Research Center of France (CNRS) “International Program of Scientific Cooperation (Programme International de Coopération Scientifique – PICS)” (2009–2011)
- Principal researcher of the joint project of RAS, RFBR and CNRS (France) “Monitoring of basalt volcanoes with the use of artificial intelligence methods” (2000–2006)
- Principal researcher of the joint project of RAS, RFBR and CNRS “Identification of areas of earthquake possible occurrence in regions of moderate seismicity” (1980–1986, 1998–2001)
- Vice President of the European Mediterranean seismological center (EMSC/CSEM) (1996–2003)
- Vice President of the International Association “World Data Network for Education and Scientific Exchange” (1993)

### ***International Council for Science (ICSU):***

- IUGG liaison officer to CODATA ICSU (2011–2019)
- Member of the ICSU Strategic Committee on Information and Data (SCID) (2007–2008)
- Chairman of CODATA Task Group “eGY Earth and Space Science Data Interoperability” (2007–2014)
- Delegate of RAS in IUGG (2007)
- Vice President of CODATA (2002–2006)
- Chairman of CODATA WG “Data Management and Virtual Laboratories” (2000–2002)
- Chairman of CODATA WG “Comparative Mathematical Methods of Data Analysis and Interpretation of Knowledge” (1998–2000)
- Vice-Chair of the World Data Centers Panel of the International Council for Science (ICSU) (1996–2006)
- Chairman of the coordinating Committee “Data Centers and Data Exchange” and Bureau

member of the International Program “Lithosphere” (1985–1995)

***International Institute for Applied Systems Analysis (IIASA):***

- Acting chair of the IIASA Governing Council (since June 2017)
- Vice-president of the IIASA Scientific Council (2014–2018)
- IIASA Program Committee Chair (2010–2014)
- IIASA Program Committee Vice-Chair (2009–2010)
- Representative of RAS for the IIASA Scientific Council (since 2008)
- Member of the IIASA Science Advisory Committee (2006–2008)

***United Nations agencies:***

- Lecturer of the UNIDO courses on e-collaboration in Hungary (1995) and the Czech Republic (1996)
- Head of the UNESCO project on introduction of CD-ROM technology for advancement of research in Morocco, Kenya and Zambia (1992–1994)
- Leader and participant of UNESCO environmental, informatics and e-collaboration projects in Russia and in CIS countries (1991–1999)

***Editorial and publishing activity:***

- Member of the Editorial Board of the journal “Geochemistry International” (since 2017)
- Member of the Editorial Board of the journal “Izvestiya, Atmospheric and Oceanic Physics” (since 2017)
- Member of the Editorial Board of the journal “Institute of Geology Newsletters of Komi Scientific Center of the Ural Branch of RAS” (since 2015)
- Member of the Editorial Board of the journal “Geodesy and Aerophotography” (since 2015)
- Member of the Editorial Board of the journal “Geology and Geophysics of the South of Russia” (since 2015)
- Member of the Editorial Board of the journal “Izvestiya, Physics of the Solid Earth” (since 2013)
- Member of the Editorial Board of the journal “Cybernetics and System Analysis” (since 2005)
- Chairman of the Editorial Board of the online magazine “Geophysical Research” (since 2004)
- Member of the Editorial Board of the international science and technology journal “System Research and Information Technologies”
- Member of the Editorial Board of the “Russian Journal of Earth Sciences”
- Deputy-Chief Editor of the online magazine “Herald of Earth Sciences Branch of RAS”

***Publications:***

- Author of five books published in Russian, English, French, Hungarian, and Italian

languages. More than 170 research papers were published in international and Russian scientific peer-reviewed journals

- Works by A.D. Gvishiani were co-authored by outstanding scientists, RAS academicians I.M. Gelfand, M.A. Sadovsky, V.N. Strakhov, V.I. Keilis-Borok, I.F. Obraztsov, V.I. Osipov and members of the French Academy of Sciences Jean-Louis LeMouél and Jean Coulomb

#### **Interviews:**

- "ORT" TV Channel. Program "Big Science. Great in Small" – "Earth's magnetism. Why the origin of the planet's magnetic field is still a mystery?"
- Interview to a weekly journal of "Poisk" – "The Russian field. Practice of geoinformatics"
- Interview to the online journal "SCIENCE AND TECHNOLOGY of RUSSIA – STRF.RU"
- TV Company "Channel Five". Participation in M.V. Kovalchuk's program "Stories of the Future" – "The Earth's Magnetic Field"
- "Voice of Russia". Interview "IIASA builds bridges between East and West"
- First channel. Program "Good morning"
- Channel "Russia 24". Program "Opinion: Volcanic Eruption in Iceland"
- Channel "Russia 24". Program "Opinion: Earthquake in Japan"
- Radio "Vesti FM". Program "Morning with Anatoly Kuzichev: Earthquake in Japan"