



## საქართველოს მეცნიერებათა ეროვნული აკადემია



### Personal Data (CV)

<b>Surname</b>	Kavtaradze	<b>First Name</b>	Revaz
<b>Address (work, home)</b>	Rafael Dvali Institute of Machine Mechanics Mindeli St. 10, Tbilisi, Georgia, 0186  Marika Baratashvili St. 8, entrance 1, Ap. 11 Tbilisi, Georgia, 0186	<b>Date and place of birth</b>	30.10.1951. Georgia, Sachkhere, Iwanzminda
<b>Citizenship</b>	Georgian	<b>Telephone number(s)</b>	+995 322 32 11 65 +995 595 51 99 20
<b>E-mail</b>	<a href="mailto:rzkavtaradze@gmail.com">rzkavtaradze@gmail.com</a>		

### 3. Education

Education	Institution	Learning Time
Secondary	Sachkhere, Akaki Tsereteli Secondary School N1	1958-1968
Higher	Georgian Technical InsUniversity, Mechanical Engineering, Diploma with honors	1968-1973
Postgraduate study, doctoral candidacy	Bauman Moscow State Technical University, Power Engineering, Scientific specialty "Heat engines"-05.04.02, Doctoral dissertation.	1975-1978

### 4. Knowledge of Languages

Foreign languages	Level of language proficiency (fluent, intermediate, beginning with the help of a dictionary)
Georgian	native language, Fluent
Russian	Fluent
German	Fluent
English	With the help of a dictionary

### 5. Scientific or Academic Degree and Rank

	<b>Title of the thesis</b>	<b>Date and place of dissertation defense</b>
Ph.D. thesis	Settlement and experimental study of gas parameters in the exhaust system of a combined engine.	20.02.1978 Bauman Moscow State Technical University
Doctor of Technical Sciences thesis	Local heat transfer in the combustion chambers of diesel engines	20.12.1991 Bauman Moscow State Technical University
Academician Doctor		
Professor	Bauman Moscow State Technical University, Power Engineering	06.03.1992

## 6. Work Experience

<b>Date</b>	<b>Institution</b>	<b>Position</b>
1973-1974	Georgian Technical University, Mechanical Engineering, Department of Internal Combustion Engines	Laboratory Assistant, Junior Researcher
1975-1978	Bauman Moscow State Technical University, Piston Engine Department	graduate student, Junior Researcher
1978-1982	N. Muskhelishvili Kutaisi Technical University	Senior Lecturer, Associate Professor
1982-2017	Bauman Moscow State Technical University, Piston Engine Department	Senior Researcher, Associate Professor, Head of Research Laboratory, Professor
2017-to present	Rafael Dvali Institute of Machine Mechanics, Department of Thermal Power Plants	Chief Researcher, Professor, Chairman of the Academic Council of the Institute
2018-to present	Beijing Institute of Technology	Visiting Professor

### 6.1 Teaching Activity

<b>Date</b>	<b>Institution</b>	<b>Position</b>
1978-1982	N. Muskhelishvili Kutaisi Polytechnical Institute	Senior Lecturer, Associate Professor
1982-1992	Bauman Moscow State Technical University, Piston Engine Department	Associate Professor
1992-2017	Bauman Moscow State Technical University, Piston Engine Department	Professor
2018-to present	Beijing Institute of Technology (BIT)	Visiting Professor

## 6.2 Work Abroad

Form of activity	Date	Place and Institution
Conducting research and giving lectures at foreign universities	1982-2017	Russia: Saint Petersburg Technical University, Ural Federal University (Yekaterinburg), Technical Universities in Barnaul, Yaroslavl, Ufa, Nizhny Novgorod, Volgograd, as well as at engine plants in Naberezhnye Chelny (KamAZ), Yaroslavl (YaMZ), Yekaterinburg (UDMZ), etc.
Long-term academic mission to research institutions	1986-1987, 1994-1995, 2000 1990-1991, 1995, 2000, 2004, 2011, 2017 2003, 2008 1998, 2001, 2018, 2019	Germany, Rostock University  Germany, Technical University Munich  Great Britain, Brighton University  Beijing Institute of Technology (BIT)
Short-term visits: at leading US universities	26.04-08.05. 2015	Massachusetts Institute of Technology (MIT, Boston), Harvard University (Cambridge), Cornell University (Ithaca), Yale University (New Haven)
at leading UK universities	18.10-28.10.2008	Oxford University (Oxford), Cambridge university (Cambridge), Imperial College (London)

## 7. Sphere of Scientific Interests

Thermal power engineering, Theory of heat engines, heat transfer theory
Methods for improving the environmental performance of piston engines
The use of alternative sources and alternative fuels (hydrogen, natural gas, synthesis gases) in transport energy
Hydrogen energy, the scientific substantiation of the creation of a hydrogen diesel engine, the experimental and theoretical study of in-cylinder processes in hydrogen engines, the improvement of the environmental characteristics of hydrogen engines
Mathematical modeling of physical and technical processes in thermal power plants (0D and 3D models)
The processes of turbulent flow of gases and liquids in thermal power plants
The theory of hydrodynamic and thermal boundary layers for complex (radiation-convection) heat transfer processes
Experimental methods for studying non-stationary heat fluxes in fast-moving physical processes
The history of physical and technical to (the role of Georgian scientists in solving the fundamental problems of fluid flow and heat transfer theory)

## 8. Publications (Total number, indicating the Citation Index, h- index)

The total number of publications is about 300.

Productivity indicator according to 22.07.2024 data		
The database	Citation index	h- index
Google Scholar	692	15
Scopus	211	9
Web of science	71	5
eLIBRARY	1976	18
Harzing's Publish or Perish (PoP)	14 176	59

### 8.1 Monographs and encyclopedias

Years	
1986	<b>Manjgaladze A.A., Kavtaradze R.Z., Aptsiauri A.Z., Mgeladze R.A.</b> Investigation of gas exchange and heat transfer processes in diesel engines by mathematical and physical modeling methods. Tbilisi, Publishing House of the Georgian Academy of Sciences "Metsniereba". - 1986. -196 p. (in Russian)
2005	<b>Kavtaradze R.Z.</b> EOLSS-Encyclopedia of Life Support Sestems/Thermal to Mechanical Energy Conversion Engines and Requirements/Chapter l3.11.1.3. Thermodynamic Cycles of Reciprocating and Rotary Engines. Bruxelles, New York, Paris, London. Eolss Publishing. -35 Pp. . <a href="http://www.eolss.net/Eolss- sampleAllChapter.aspx">http://www.eolss.net/Eolss- sampleAllChapter.aspx</a> The largest encyclopedia in the world, is published under the patronage of UNESCO. The electronic version of the encyclopedia today contains 530 volumes, 70 million words, and is growing all the time.
2007	<b>Ivaschenko N., Kavtaradze R., Tschainov N. et al.</b> 100 years of the specialty "Internal Combustion Engines" at the Bauman Moscow State Technical University. Moscow, publishing house of the Bauman Moscow State Technical University. -296 p. (in Russian).
2011	<b>Kavtaradze R.Z.</b> Thermophysical processes in diesel engines converted to natural gas and hydrogen. Moscow, Publishing House of the Bauman Moscow State Technical University. - 238 p. (in Russian)
2013	<b>Kavtaradze R.Z. et al.</b> (79 co-authors in total). The Russian Academy of Sciences (RAS). Mechanical engineering. Encyclopedia in 40 volumes. Section IV (Calculation and design of machines). Volume IV-14 (Internal combustion engines). R.Z. Kavtaradze is the author of section 1.2.2. (Modeling and calculation of the workflow in engines. Single-zone and multi-zone models, pp.102-113). Moscow, publishing house "Mechanical Engineering", 2013.-784 p. (in Russian)
2015	<b>Kavtaradze R.Z., Zelentsov A.A., Natriashvili T. M.</b> Ignition Delay and Emission of the Noxious Substances in Double-Fuel Engines Working on the natural Gas and Syngases//Chahter 15 in the Book: Innovative Methods for Improvement of Technical, Economic and Ecological Efficiency of Motor Cars. NOVA-Publishers. New-York.-138 p.

2016	<p><b>Kavtaradze R.Z.</b> Local heat transfer in piston engines. 3rd edition (first edition- 2001, second edition-2007). Textbook for universities. Moscow, Publishing House of the Bauman Moscow State Technical University. 515p (in Russian).</p> <p>Monographic textbook. The book is written based on the author's doctoral dissertation. Previously, academic discipline in this area did not exist, in 1989 it was first included in the curriculum of Bauman Moscow State Technical University (BMSTU), where the author read this lecture course for 30 years. Currently, the book is a compulsory textbook for technical universities in Eastern Europe. The book was published 3 times. The first edition of the book (2001) received the BMSTU Prize.</p>
2022	<p><b>Kvesitadse G., Khurodze R., Kavtaradze R.</b> Hydrogen energy - the way to solve the global problems of civilization. Tbilisi, Publishing House of the Georgian Academy of Sciences. - 196 p. (In Georgian).</p>
2022	<p><b>Kavtaradze R., Nartriashvili T., Glonti M.</b> Investigation of the working process of a hydrogen diesel engine. Tbilisi, Publishing House "Universal".-152 p. (In Georgian).</p>
2024	<p><b>Kavtaradze R.</b> Iohann Nikuradse. Myth and reality. Second edition (first edition 2023) Tbilisi, Publishing House "Universal".-218 p. (In Georgian).</p>

## 8.2. The main articles are mostly from the Scopus database (no more than 50)

Years	
1977	<p><b>Kavtaradze R.Z.</b> Approximate accounting of losses in the quasi-stationary calculation of the exhaust system of internal combustion engines. Bulletin of the Academy of Sciences of Georgia, vol. 87, No.1. pp.153-156 (in Russian).</p>
1979	<p><b>Kruglov M.G., Kavtaradze R.Z.</b> The influence of physical and structural factors on the change in exhaust gas parameters of a combined engine. Bulletin of the Academy of Sciences of Georgia, vol. 95, N1. -1979 Pp.125-128 ((in Russian)).</p>
1980	<p><b>Kavtaradze R.Z.</b> Some results of the calculation of the gas outlet tract of a combined engine on an ECM. Bulletin of the Academy of Sciences of Georgia, vol. 98, N3. – Pp. 641-644 (in Russian).</p>
1982	<p><b>Kavtaradze R.Z.</b> On the determination of non-stationary heat flow in the cylinders of reciprocating machines. Bulletin of the Academy of Sciences of Georgia, vol. 106, N6. –Pp. 565-568 (in Russian).</p>
1984	<p><b>Kavtaradze R.Z.</b> Calculation of temperature fields of engine parts with reduced heat dissipation from the working fluid. Proceedings of universities of the USSR, Mechanical Engineering. – Pp. 81-84 (in Russian) .</p>
1985	<p><b>Kavtaradze R.Z.</b> Approximate determination of the local heat transfer coefficient in a diesel cylinder with a semi-separated combustion chamber. Proceedings of Universities of the USSR, Mechanical Engineering, N 5. - pp. 86-91 (in Russian).</p>
1988	<p><b>Kawtaradse R.S.</b> Zur Ableitung allgemeiner Beziehungen zur Berechnung der Geschwindigkeit der Gasströmung in einer halbgeteilten Brennkamer. Schiffbauforschung, N 1. -S. 59-62.</p>
1988	<p><b>Kawtaradse R.S.</b> Zur Berechnung Temperaturfelder für Bauteile des Dieselmotors. Schiffbauforschung, N 1.-S. 63-66.</p>

1989	<b>Kavtaradze R.S.</b> Mathematische Modell des komplizierten Wärmeaustausches - Konvektion und Strahlung im Brennraum Dieselmotors. Technische Mechanik, Band 10, Heft N 3.- S.175-177.
1989	<b>Kavtaradze R.S., Strelkow W.P.</b> Berechnung des örtlichen konvektiven Wärmeaustausches in Muldenbrennraum des Kolbens bei Fahrzeugdieselmotoren. Technische Mechanik, Band N 10, Heft 4. -S. 270-272.
1989	<b>Kruglov M.G., Kavtaradze R.Z.</b> Boundary value problems of thermal conductivity for transport power plants and their solution by numerical method. Proceedings of the Academy of Sciences of the USSR, Energy and Transport, No. 5. – pp.149-157 (in Russian).
1991	<b>Kavtaradze R.Z.</b> Solution of Problems of convective and complex heat transfer in a Diesel combustion chamber, taking account of near-wall turbulent flow//High Temperature, March. New-York, Plenum Publishing Corporation. P. 740-748.
1995	<b>Kavtaradze R.Z., Woschni G., Zeilinger K.</b> Dralluntersuchung im Vierventil-Dieselmotor mit Hilfe stationärer Durchströmung. Abschlussbericht-1995. Technische Universität München, -49 S.
1996	<b>Kavtaradze R.Z.</b> Local radiation-convective heat transfer in the combustion chamber of a high-speed diesel engine //Bulletin of the Bauman Moscow State Technical University. Series "Mechanical Engineering", No.1. pp.21-36 (in Russian).
1997	<b>Woschni G., Zeilinger K., Kavtaradze R.Z.</b> Vortex air movement in a high-speed diesel engine with four valves per cylinder// Bulletin of the Bauman Moscow State Technical University. Series "Mechanical Engineering", No. 1. pp.74-84 (in Russian).
1998	<b>Kavtaradze R.Z., Lapushkin N. A., Arapov V.V., Wang Yichun.</b> Effect of the In-cylinder Carbon Deposit and Inlet Swirl Intensity on the Local Transient Heat Transfer//Chinese Internal Combustion Engine Engineering. Vol.19, N 4. Pp.41-45. (Article in Chinese, abstract in Russian).
1999	<b>Kavtaradze R.Z., Lobanov I.E.</b> The Question of Calculating the Boundary Layer and Turbulent Prandtl Number for Combined Radiative and Convective Heat Exchange//Applied Energy. Allerton Press, New York. Vol.37, N1. Pp.162-167.
1999	<b>Kavtaradze R.Z.</b> Exact solutions of the equation of the turbulent boundary layer in radiation-convective heat exchange// . Proceedings of universities of the USSR. No. 5-6. – pp. 123-132 (in Russian).
2001	<b>Kavtaradze R.Z., Wang Yichun.</b> Local heat transfer in the heat-insulating combustion chamber of a high-speed diesel engine. Proceedings of the Russian Academy of Sciences (RAS). Energetics, No. 4. – pp. 149-158 (in Russian).
2002	<b>Leontiev A.I., Kavtaradze R.Z.</b> Outstanding hydromechanic// V. kn. "Research on the history of physics and mechanics. Yearbook of the Russian Academy of Sciences (RAS) 2001. Moscow: Nauka Publishing House, 2002, pp. 153-179 (in Russian)-. An article about the famous Georgian scientist Ivane (Iohann) Nikuradse.
2003	<b>Frolov S.M., Scripnik A.A., Kavtaradze R.S.</b> Modeling of Diesel Spray Ignition. Semenov Memorial. Combustion and Atmospheric Pollution. Moscow: Torus Press Ltd. P. 220-227.
2004	<b>Skripnik A.A., Frolov S.M., Kavtaradze R.Z., Efros V.V.</b> Modeling of ignition in a jet of liquid fuel// The Russian Academy of Sciences. Chemical physics. No. 1, volume 23. pp. 54-61 (in Russian).
2005	<b>Kavtaradze R.Z., Zeilinger R., Zitzler G.</b> Ignition Delay in a Diesel Engine Utilizing Different Fuels. High Temperature. Vol. 43, N6, pp. 951-960.
2007	<b>Kavtaradze R.Z., Gaivoronskii A.I., Fedorov V.A., Onishchenko D.O., Shibanov A.V.</b> Calculation of Radiative-Convective Heat Transfer in the Combustor of Diesel Engine. High Temperature, Vol. 45, No. 5. pp. 673-680.

2009	<b>Kavtaradze R.Z., Onishchenko D.O., Zelentsov A.A., Sergeev S.S.</b> The influence of rotational charge motion intensity on nitric oxide formation in gas-engine cylinder. International Journal of Heat and Mass Transfer 52.Pp. 4308–4316.
2010	<b>Kavtaradze R.Z., Zelentsov A.A., Kavtaradze Z.R., Nikitin Yu.N., Finkelberg L.A.</b> Modeling of local unsteady heat transfer in the combustion chamber and the heat-stressed state of the piston of an aircraft engine. Proceedings of the Russian Academy of Sciences (RAS). Energy. No. 2. – pp. 133-151(in Russian).
2012	<b>Kavtaradze R., Zelentsov A., Gladyshev S., Kavtaradze Z., Onishchenko D.</b> Heat Insulating Effect of Soot Deposit on Local Transient Heat Transfer in Diesel Engine Combustion Chamber. USA. SAE International Paper, N 2012-01-1217. -12 p.
2012	<b>Kavtaradze R.Z., Zelentsov A.A., Onishchenko O.D., Finkelberg L.A., Kostyuchenko A.N.</b> Modeling of the processes of transfer, combustion and formation of nitrogen oxides in an aircraft piston engine with a duplicated ignition system. Proceedings of the Russian Academy of Sciences (RAS). Energy. No. 6, pp. 135-152.
2016	<b>Sergeev S.S., Kavtaradze R.Z.</b> Investigation of combustion processes and formation of harmful substances in the cylinder of a high-speed diesel engine based on a three-dimensional model of the workflow. Journal of the Russian Academy of Sciences "Burning and explosion", No. 1, volume 8. – 2015. pp. 97-105 (in Russian).
2016	<b>Leont'ev A.I., Kavtaradze R. Z., Onishchenko D.O., Golosov A.S., Pankratov S.A.</b> Improvement of piston engine operation efficiency by direct conversion of the heat of exhaust gases into electricenergy. High Temperature, Vol. 54, No. 1, pp. 104–111.
2016	<b>Kavtaradze R.Z., Onishchenko D.O., Zinoviev I.A., Golosov A.S.</b> Effect of alternative fuel injection process on local formation of nitrogen oxides and soot in diesel combustion chamber. Bulletin of the Russian Academy of Sciences (RAS). Power Engineering. No. 5, pp. 152-159 (in Russian).
2016	<b>Kavtaradze R.Z.</b> Improving the Ecological Indices of a Hydrogen Diesel Engine with Direct Gaseous Hydrogen Injection. Allerton Press, Inc. ISSN 1052-6188, Journal of Machinery Manufacture and Reliability, Vol. 45, No. 4, pp. 307–315.
2017	<b>Sakhvadze G. Zh., Kavtaradze R.Z., Nikabadze M.U.</b> Eigenstrain Modeling of Laser-Schock Processing of Materials. Russian Engineering Research, N10, Vol. 38.-2018/ Pp. 755-760.
2018	<b>Kavtaradze R.Z., Zelentsov A.A., Krasnov V.V.</b> Local Heat Transfer in Diesel Combustion Chamber Converted to Operate on Natural Gas and Hydrogen. High Temperature, Vol. 56, No. 6. -2018, pp. 900–909.
2018	<b>Kavtaradze R.Z.</b> Influence of the Rotational Charge Motion on the Processes of Nitrogen Oxide Formation and Nonstationary Heat Transfer in a Hydrogen Diesel. Journal of Machinery Manufacture and Reliability. Vol. 47, № 2.- 2018. Pp.
2019	<b>Wan Rui, Wang Yichun, Kavtaradze Revaz, He Xinglei.</b> Heat transfer and flow characteristics of offset fin and flat tube heat exchangers under low pressure environment. Thermal Science. 2018. OnLine-First Issue 00, Pages: 296-296.
2019	<b>Kavtaradze, R., Natriashvili, T., and Gladyshev, S.</b> Hydrogen-Diesel Engine: Problems and Prospects of Improving the Working Process. USA. SAE Technical Paper 2019-01-0541, 2019.- 15 p.
2019	<b>Wan R., Wang Y.C., Kavtaradze R.</b> Modeling and Performance Testing of Aluminum Non-contact Thermal Resistance Condensers. Huanan Ligong Daxue Xuebao/Journal of South China University of Technology (Natural Science). 47(1).-2019. C. 112-119 (Article in Chinese, abstract in Russian).
2019	<b>Kavtaradze R.Z., Natriashvili T.M., Glonti M.G., Wang Yichun, Sakhvadze G. Zh.</b> Local Heat Transfer in the Combustion Chamber of a Hydrogen Diesel. Russian Engineering Research. Vol. 39, № 10, pp. 831–836.

2020	<b>Wan Rui, Wang Yichun, Kavtaradze Revaz, Hongzeng Ji, He Xinglei.</b> Research on the air-side thermal hydraulic performance of louvered fin and flat tube heat exchangers under low-pressure environment. <i>Experimental Heat Transfer</i> , Vol. 33, Issue 1, 2 January 2020.- P. 81-99.
2020	<b>Natriashvili T., Kavtaradze R., Glonti M., Chilashvili G.</b> Ecological Characteristics of the Direct Injection Hydrogen Diesel with the Use of the 3D Model. <i>Bulletin of the Georgian National Academy of Sciences</i> . Vol. 14, № 3, 2020. Pp.56-63.
2021	<b>Kavtaradze R.Z., Kondratev A.M., Rongrong Ch., Citian Ch., Baigang S., Sakhvadze G. Zh.</b> Local Heat Exchange in the Combustion Chamber of a Hydrogen Engine Running on a Lean Fuel. <i>Journal of Machinery Manufacture and Reliability</i> , 2021, Vol. 50, No. 1, pp. 79–87.
2021	<b>Miao L., Wang Y., Kavtaradze R., Guo F., Li Y.</b> Investigation of the heat transfer and flow characteristics in wavy fins of compact heat exchanger in a sand-dust environment. <i>International Journal of Heat and Mass Transfer</i> . Vol. 168, N4. 2021.-16 p.
2021	<b>Kavtaradze R.Z., Natriashvili T.M., Glonti M.G., Baigang Sun, Yichun Wang, Cheng Rongrong, Chang Citian.</b> Influence of the exhaust gas recirculation on formation of NO <sub>x</sub> in the hydrogen engine working on the leaked mixture (Experiment and 3D modeling). <i>IOP Conf. Series: Materials Science and Engineering</i> . 1100 (2021) 012013. Pp.1-7.
2022	<b>Miao Long, Wang Yichun, Kavtaradze Revaz, Liu Shiqun, Zhang Songmao.</b> Experimental and numerical analyses of thermal-hydraulic characteristics of aluminium flying-wing fins. <i>Applied Thermal Engineering</i> , V. 203. 2022. P. 1-18.
2022	<b>Kavtaradze R., Natriashvili T., Glonti M., Chilashvili G., Gelashvili O., Iosebidge J.</b> Flame propagation in a narrow gap between the piston and the cylinder of a hydrogen engine. <i>Scientific Journal Transport Problems</i> , Vol. 18. №3. 2023. P.189-197.
2023	<b>Kavtaradze R., Natriashvili T., Glonti M., Chilashvili G., Gelashvili O., Iosebidge J.</b> Flame propagation in a narrow gap between the piston and the cylinder of a hydrogen engine. <i>Scientific Journal Transport Problems</i> , Vol. 18. №3. 2023. P.189-197.
2024	<b>Kavtaradze R., Wang Yi-Chun.</b> Hydrogen Flame Propagation from a Variable Volume Combustion Chamber in a Narrow Moving annular Gap. <i>Bulletin of the Georgian National Academy of Sciences</i> , vol. 18, №1.-2024. Pp.70-78.

### 8.3 Textbooks, Additional Manuals, and other Methodological Literature and Training means

Years	
1995	<b>Kavtaradze R.Z.</b> Experimental methods for determining nonstationary local thermal loads on the surfaces of diesel combustion chambers. Moscow, Publishing House of the Bauman Moscow State Technical University. – 1995. -50 p. (in Russian)
1997	<b>Ivashchenko N.A., Kavtaradze R.Z.</b> Multi-zone models of the working process of internal combustion engines. A study guide. Moscow. Publishing house of the Bauman Moscow State Technical University, -58 p. (in Russian)
2012	<b>Kavtaradze R.Z., Onishchenko D.O., Zelentsov.</b> Three-dimensional modeling of nonstationary thermophysical processes in piston engines. Moscow: Publishing House of the Bauman Moscow State Technical University, -85 p. (in Russian)
2016	<b>Kavtaradze R.Z.</b> Theory of piston engines. Special chapters. Textbook for universities. 2nd edition (1st edition in 2008) Moscow, Publishing House of Bauman Moscow State Technical University. - 589 p. (in Russian). The main textbook for technical universities in Russia and Eastern Europe



<b>2016</b>	<p><b>Kavtaradze R.Z.</b> Local heat transfer in piston engines. 3rd edition (first edition- 2001, second edition-2007). Textbook for universities. Moscow, Publishing House of the Bauman Moscow State Technical University. 515p (in Russian).</p> <p style="text-align: center;">The main textbook for technical universities in Russia and Eastern Europe (see in this table 8.1)</p>
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#### 8.4 Electronic Publications

Years	Title	Address of Source
<b>2005</b>	<p><b>Kavtaradze R.Z.</b> EOLSS-Encyclopedia of Life Support Sestems/Thermal to Mechanical Energy Conversion Engines and Requirements/Chapter 13.11.1.3. Thermodynamic Cycles of Reciprocating and Rotary Engines. Bruxelles, New York, Paris, London. Eolss Publishing. -35 Pp. (see in this table 8.1).</p>	<p><a href="http://www.eolss.net/Eolss-sampleAllChapter.aspx">http://www.eolss.net/Eolss-sampleAllChapter.aspx</a></p>

#### 8.5 Participation in Scientific Symposiums, Conferences (Main reports last ten years)

Years	Title	Name of Event
<b>2024</b>	<p><b>Kavtaradze R., Natriashvili T., Wang Y., Glonti M., Chilashvili G.</b> Zero-Emission in Wasserstoff- Ottomotoren: Die Wahl einer Strategie.</p>	<p>Vortrag auf dem 2. Dresdner Wasserstoff-Symposium am 26.06. – 28.06.2024. Sammlung von Symposiumsberichten. Dresden, Hochschule für Technik und Wirtschaft Dresden (HTWD). 2024.-23 S</p>
<b>2023</b>	<p><b>Kavtaradze R., Natriashvili T., Glonti M., Chilashvili G.</b> Flammenlöschung und Wärmeübertragung in Wasserstoff-Kolbenmotoren.</p>	<p>Vortrag auf dem 1. Dresdner Wasserstoff-Symposium am 15.06. – 16.06.2023. Sammlung von Symposiumsberichten. Dresden, Hochschule für Technik und Wirtschaft Dresden (HTWD). 2023.-20 S.</p>
<b>2022</b>	<p><b>Kavtaradze R., Natriashvili T., Glonti M.</b> Hydrogen energy as the energy of the near future</p>	<p>XIII Annual International Meeting of the Georgian Mechanical Union. Batumi, 24.08. - 26.08.2022. Book of Abstracts.-P. 85-86.</p>
<b>2021</b>	<p><b>Kavtaradze R.</b> Heat Transfer in the Boundary Layer During the Rotational Motion of Viscous Liquid Over a Flat Surface.</p>	<p>XII Annual International Meeting of the Georgian Mechanical Union. Dedicated to 130 birthday anniversary of academician N. Muskhelishvili. Kutaisi, 09.09. – 11.09.2021. Book of Abstracts. Pp. 70-71.</p>
<b>2021</b>	<p><b>Natriashvili T., Kavtaradze R., Glonti M., Chilashvili G.</b> Reducing the Level of Nitrogen Oxides in Exhaust Gases of a High-Speed Hydrogen-Powered Diesel Engine.</p>	<p>Proceedings of the International Conference on Problems of Logistics, Management and Operation in the East -West Transport Corridor (PLMO), 27-29 October, Baku. 2021. Pp. 36-47.</p>
<b>2021</b>	<p><b>Kasko A.A., Kavtaradze R.Z., Zelentsov A.A.</b> Simulation of Working Process of Aviation Wankel Engine.</p>	<p>AVL Virtual International Simulation Conference 2021. Graz, Austria.22-24 June, 2021.</p>

<b>2019</b>	<b>Zelentsov A.A., Kavtaradze R.Z., Onishchenko D.O., Kozlov A.V.</b> Analysis of Local Heat Transfer in Combustion Chamber and Injector Nozzle of Perspective Dual-Fuel Gas Engine.	AVL International Simulation Conference 2019, October 22 – 23, Graz, Austria.
<b>2019</b>	<b>Kavtaradze R.</b> A Generalization of the Classical Theory of the Boundary Layer for the Problems of Complex (Radiation-Convective) Heat Transfer.	International Meeting of the Georgian Mechanical Union. Georgia, Telavi, 26.09-28.09.2019.
<b>2019</b>	<b>Natriashvili T., Kavtaradze R., Glonti M.</b> Modeling of the burning process in the piston engines with various concepts of the working process.	XI International Conference “Transport Problems”. 24-28 June, 2019. Silesian University of Technology, Katowice, Poland.
<b>2019</b>	<b>Kavtaradze, R., Natriashvili, T., and Gladyshev, S.</b> Hydrogen-Diesel Engine: Problems and Prospects of Improving the Working Process.	Society of Automotive Engineers (SAE), World Congress, 02 April 2019, Detroit, USA (2019-01-0541).
<b>2018</b>	<b>Kavtaradze R.Z.</b> Hydrogen diesel engine of the future.	7th Russian National Conference on Heat Exchange (RNKT-7), October 22-26, 2018, Moscow, Moscow Power Engineering Institute (MEI). (In Russian)
<b>2017</b>	<b>Natriashvili T., Kavtaradze R., Glonti M.</b> Improvement of ecological characteristics of the hydrogen diesel engine.	International Automobile Scientific Forum (IASF-2017) "Intelligent Transport Systems". 18 October 2017, Moscow, NAMI.
<b>2017</b>	<b>Kavtaradze R.Z., Zelentsov A.A., Onishchenko D.O., Skripnik A.A.</b> Simulation of Local Heat Transfer in Combustion Chamber of Aircraft Piston Engine	AVL International Simulation Conference-2017, June 27 – 29, Graz, Austria.
<b>2015</b>	<b>Kavtaradze R.Z., Zelentsov A.A.</b> Modification of intake Port Shape for Increasing of Effective Parameters of Middle – Speed Diesel Engine.	International User Conference Advanced Simulation Technologies (AST), 22-26 June 2015, Graz, Austria.
<b>2014</b>	<b>Sergeev S.S., Kavtaradze R.Z.</b> The influence of the combustion chamber shape on the formation of nitrogen oxides and soot in the diesel cylinder of a passenger car.	6-ая Российская национальная конференция по теплообмену (PHKT-6). 27-31 октября 2014 г. Москва. 6th Russian National Conference on Heat Exchange (RNKT-6), October 27-31, 2014, Moscow, Moscow Power Engineering Institute (MEI). (In Russian)
<b>2013</b>	<b>Kavtaradze R.Z., Zelentsov A. A., Skripnik A.A.</b> . 3D Investigation of Features of Realization of Working Processes of Aircraft Piston Engines. Proceedings International.	International User Conference Advanced Simulation Technologies (AST), 18-20 June 2013, Graz, Austria.

## 9. Organizational Work (Holding of Congresses and Conferences, Editorial Work)

Years	Name
2008 - 2017 2-3 times a year	Joint international scientific seminar of Bauman Moscow State Technical University (BMSTU) and AVL-LIST GmbH (Graz, Austria) "3D mathematical modeling of processes in heat engines". <b>International Seminar Leader.</b>
1993- 2017 held every 2 years	International School-Seminar of the Russian Academy of Sciences "Problems of gas dynamics and heat-mass transfer in power plants" under the guidance of Academician A. Leontyev. <b>Member of the organizational and scientific committees, head of the section "Heat transfer during combustion"</b>
2002 -2017 held every 4 years	International scientific conferences of the Russian Academy of Sciences on heat and mass transfer (PHKT-3, PHKT-4, PHKT-5, PHKT-6, PHKT-7). <b>Member of the organizational and scientific committees, head of the section "Heat transfer during combustion".</b>
2007-2018	International scientific conferences «Engine -2007, 2010, 2017, 2018» in Bauman Moscow State Technical University (BMSTU). <b>Member of the organizational and scientific committees, head of the section " Theory of piston engines"</b>
2013- to the present Annually	International scientific conferences of the Union of Mechanics of Georgia. <b>Member of the organizational and scientific committees, Head of the Hydrodynamics Section.</b>
2005 -2018	International scientific and technical journal "Transport on alternative fuel". , (The magazine is published in Moscow, in Russian). <b>Member of the Editorial Board.</b>
2020 - to present	International scientific journal "Problems of Mechanics (It is published under the auspices of the Rafael Dvali Institute of Machine Mechanics)". <b>Member of the Scientific-Editorial Board.</b>
2012-2017	International scientific and technical journal „Engineering Journal: Science and Innovation” (electronic edition) of Bauman Moscow State Technical University (BMSTU). <b>Member of the Editorial Board.</b>

## 10. Inventions (Author's Certificate, Patents)

Years	Name
1988	<b>Kruglov M.G., Strelkov V.P., Kavtaradze R.Z.</b> Internal combustion engine. USSR Copyright Certificate No. 1183701. The priority of the invention was registered on 01/13/1984 in the State Register of Inventions of the USSR on 06/8/1985.
1988	<b>Anokhin V.D., Benidze D.Sh., Kavtaradze R.Z., Kruglov M.G., Lepkha A.I.</b> Internal combustion engine. USSR Copyright Certificate No. 1460371. The priority of the invention on 07/10/1987 was registered in the State Register of Inventions of the USSR on 10/22/1988.
2015	<b>Kavtaradze R.Z., Onishchenko D.O., Golosov A.S.</b> Numerical method for calculating NOx concentration based on a multi-zone model of the diesel workflow. Certificate of state registration of computer programs No. 2015617793. The date of state registration in the Russian Register of computer Programs is 07.22.2015.
2015	<b>Kavtaradze R.Z., Onishchenko D.O., Golosov A.S.</b> Numerical method for calculating local nonstationary temperatures in a diesel combustion chamber. Certificate of state registration of computer programs No. 2015617794. The date of state registration in the Russian Register of Computer Programs is 07.22.2015.
2024	<b>Chilashvili G. , Natriashvili T., Kavtaradze R., Shamanauri L.</b> Method of neutralization of nitrogen oxides in exhaust gases of a hydrogen engine. Patent P 2024 7589 B. Invention.

	The National Intellectual Property Center of Georgia "Sakpatent". Application date: 06-09-2022, registration date 17-01-2024.
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### 11. International and Local Scientific grants

Years	Name
2005-2007	Scientific Grant of the Russian Foundation for Basic Research (РФФИ) № 05-08-0131 „Разработка и экспериментальная проверка метода расчета нестационарного (периодического) теплообмена в поршневых двигателях“ ("Development and experimental verification of a method for calculating non-stationary (periodic) heat transfer in piston engines"). <b>Scientific leader.</b>
2009-2011	Scientific Grant of the Russian Foundation for Basic Research (РФФИ) № 08-08-00279 „Разработка расчетно-экспериментального метода определения локальных нестационарных температур рабочего тела и концентрации оксидов азота в камере сгорания газового двигателя» (Development of a computational and experimental method for determining the local non-stationary temperatures of the working fluid and the concentration of nitrogen oxides in the combustion chamber of a gas engine). <b>Scientific leader.</b>
2012-2014	Scientific Grant of the Russian Foundation for Basic Research (РФФИ) № 12-08-00702 „Улучшение экологических показателей дизеля, конвертированного на водород” (Improving the environmental performance of diesel converted to hydrogen). <b>Scientific leader.</b>
2015-2017	Scientific Grant of the Russian Foundation for Basic Research (РФФИ) №15-08-01238 «Разработка нового альтернативного (частично-гомогенного) процесса сгорания, обеспечивающего снижение концентрации оксидов азота и сажи в продуктах сгорания дизеля" (Development of a new alternative (partially homogeneous) combustion process that reduces the concentration of nitrogen oxides and soot in diesel combustion products). <b>Scientific leader.</b>  Detailed information on these grants is available on the website: КИАС РФФИ. Официальный сайт.
<b>Grants of the Rustaveli National Science Foundation</b>	
2015-2018	<b>FR/241/3-170/14.</b> Modeling and study of a new alternative burning process for obtaining high ecological indices of the diesel with the use of the 3D non-stationary equations of Navier-Stokes. Main executer. <b>Scientific leader.</b>
2019-2021	<b>FR-18-122 .</b> Researches into the processes of generation of the turbulent movement, combustion products and nitric oxides in the hydrogen diesel cylinder with the use of the 3D model based on the equations of type of Navier-Stokes. <b>Scientific leader.</b>
2024-2026	Forecasting of environmental characteristics of a piston hydrogen engine by 3D mathematical modeling of the turbulent flow and combustion processes. <b>Scientific leader.</b>  Detailed information on these grants is available on the website of the Rustaveli National Science Foundation

### 12. Research contracts, completed projects, implementations

Years	Name
1996	Project of Forschungsvereinigung Verbrennungskraftmaschinen, (FVV): „Bereitsstellung von brennraumseitigen örtlichen thermischen Randbedigungen für Verbrennungsmotoren. Dralluntersuchung im Vierventil-Dieselmotor mit Hilfe stationärer Durchströmung“ . The project the project was commissioned by an automobile company Daimler-Benz. leader Prof. G. Woschni. <b>Main executer.</b>

<b>2002</b>	The project of the Zavolzhsky Motor Plant (ZMZ, Zavolzhye, Russia) "The influence of design and adjustment parameters on the environmental performance of the ZMZ diesel engine". The results are implemented on the ZMZ. <b>Scientific leader.</b>
<b>2004</b>	Project of Forschungsvereinigung Verbrennungskraftmaschinen, (FVV):: „Grundlagenuntersuchungen einen Großdieselmotor mit Wasserstoff-Direkteinspritzung in den Brennraum mit hoher Leistungsdichte und geringen Abgasemissionen“. The project the project was commissioned by an company MAN. leader Prof. Woschni und Dr. K. Zeilinger. <b>Main executer.</b>
<b>2005-2006</b>	The project of the All-Russian Research Institute of the Gas Industry (VNII GAZ) "Modeling the workflow of the KamAZ-740.13-260 gas-liquid engine. Modeling of the thermal and stress-strain state of the parts of the cylinder-piston group of the KamAZ-740.13-260 gas-liquid engine". The results have been implemented on KAMAZ. <b>Scientific leader.</b>
<b>2007-2008</b>	The project of the Federal Agency for Science and Innovation of the Russian Federation "Development of the working cycle of a diesel engine with improved environmental characteristics". State contract No. 02.516.11.6131 dated 09/28/2007). The results have been implemented in IMASH RAS. <b>Scientific leader.</b>
<b>2010-2012</b>	The project of the Ministry of Education and Science of the Russian Federation. State contract No. 16.740.11.0065 dated 09/01/2010. Development of a methodology for the use of natural gas and biogas as promising fuels for transport engines. The results have been implemented on KAMAZ. <b>Scientific leader.</b>
<b>2013-2015</b>	The project of the Ministry of Industry and Trade of the Russian Federation. State contract No. 13411.1370399.20.011 dated 06/18/2013. Conducting exploratory and experimental studies to reduce harmful emissions of NOx, CO, HC and particulate matter for basic samples of medium- and high-speed diesel engines and promising diesel engines with a capacity of more than 400 kW. The results were implemented at the Kolomna Diesel Locomotive Plant (KTZ). <b>Scientific leader.</b>
<b>2014-2016</b>	The project of the Ministry of Education and Science of the Russian Federation. Grant Agreement No.14.577.21.0113 dated 09/23/2014 Bauman Moscow State Technical University. Direct conversion of the heat of the exhaust gases of the transport engine into electrical energy based on highly efficient thermogenerator batteries. The section "Intensification of heat transfer in a device with thermoelectric generators (TEG)" of the research work on the subsidy. The results have been implemented on KAMAZ. <b>Scientific leader.</b>

### 13. Participation in industry projects

<b>Position</b>	<b>Project name</b>	<b>year</b>
<b>Scientific leader</b>	The project of the KamAZ automobile plant: "Experimental study of non-stationary heat flows in the combustion chamber of a diesel engine"	<b>1986-1993</b>
<b>Scientific leader</b>	Vladimir Tractor Plant (VTZ) project "Experimental and theoretical study of unsteady pressures in diesel engines"	<b>1997-1999</b>
<b>Scientific leader</b>	The project of the Zavolzhsky Motor Plant (ZMZ): "The influence of design and controlled parameters on the environmental performance of diesel"	<b>2002</b>
<b>Scientific leader</b>	The project of the Kama Automobile Plant (KamAZ): "Conversion of serial diesel to natural gas"	<b>2005-2006</b>
<b>Scientific leader</b>	Project of the Central Aviation Engine Institute (CIAM): "Mathematical modeling of the processes of three-dimensional unsteady flow and local heat transfer in aircraft piston engines"	<b>2010-2014</b>

<b>Scientific leader</b>	A joint project of the Kama Automobile Plant (KamAZ) and the Scientific Automotive Institute (NAMI): "Development of single-fuel gas and dual-fuel gas-diesel engines based on KamAZ-910. Modeling of heat transfer in the nozzle part and the heat-stressed state of the nozzle"	<b>2016-2018</b>
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**14. Dissertation work Management [Candidate of Technical Sciences (PDh), Doctor of Technical Sciences (Habilitation), Academic Doctor]**

<b>Nº</b>	<b>Title of the dissertation, scientific degree</b>	<b>Date of dissertation defense</b>
<b>1</b>	<b>Benidze D.</b> The influence of the design of the inlet and outlet channels on the boundary conditions of heat exchange in the cylinder and the thermal state of the diesel engine <b>DPh</b>	<b>20. 01.1992</b>
<b>2</b>	<b>Lapushkin N.</b> Thermodynamic analysis of actual processes in combined internal combustion engines <b>DPh</b>	<b>21.03.1995</b>
<b>3</b>	<b>Lobanov I.</b> Local radiation-convective heat transfer in a turbulent boundary layer in the combustion chambers of high-speed diesel engines <b>DPh</b>	<b>12.10.1998</b>
<b>4</b>	<b>Lobanov I.</b> Mathematical modeling of turbulent flow in channels during heat transfer intensification <b>Doctor of Technical Sciences</b>	<b>28.04.2005</b>
<b>5</b>	<b>Wang Yichun.</b> Local heat transfer in a thermally insulated combustion chamber of a high-speed diesel engine. <b>DPh</b>	<b>07.02.2000</b>
<b>6</b>	<b>Onishchenko D.</b> Investigation of the thermal state of diesel engine parts in a three-dimensional formulation using experimental boundary conditions (3-dimensional problems). <b>DPh</b>	<b>26.02.2003</b>
<b>7</b>	<b>Onishchenko D.</b> Improving the efficiency and environmental performance of diesel and reducing thermal loads on its main parts <b>Doctor of Technical Sciences</b>	<b>20.02.2013</b>
<b>8</b>	<b>Goloso A.</b> Development and experimental verification of a method for calculating nitrogen oxide concentrations in diesel engines based on a multi-zone workflow model <b>DPh</b>	<b>26.02.2003</b>
<b>9</b>	<b>Skripnik A.</b> - The effect of the intensity of the vortex motion of the charge on the local parameters of the working process in engines with direct fuel injection. <b>DPh</b>	<b>07.10.2004</b>
<b>10</b>	<b>Fedorov V.</b> Development and experimental verification of a method for calculating local periodic thermal loads in piston engines <b>DPh</b>	<b>07.10.2004</b>
<b>11</b>	<b>Shibanov A.</b> The influence of design and regulatory factors on the formation of harmful substances in a high-speed diesel engine converted to natural gas. <b>DPh</b>	<b>13.11.2007</b>
<b>12</b>	<b>Aripdzhanov M.</b> Scientific bases of improvement of the transport diesel engine with reduced heat dissipation <b>Doctor of Technical Sciences</b>	<b>17.10. 2007</b>
<b>13</b>	<b>Zelentsov A.</b> Investigation of local heat transfer in the combustion chamber of diesel converted to natural gas	<b>17.02.2011</b>

	<b>DPh</b>	
14	<b>Sergeev S.</b> Reducing the concentration of nitrogen oxides and soot in diesel exhaust gases by improving the workflow <b>DPh</b>	10.11.2011
15	<b>Kostyuchenkov A.</b> Development of a methodology for the comprehensive improvement of physical processes in the intake duct-cylinder system in order to increase the efficiency of aircraft piston engines <b>DPh</b>	23.04.2012
16	<b>Krasnova E.</b> Improving the environmental characteristics of hydrogen diesel by improving the workflow <b>DPh</b>	02.07.2015
17	<b>Krasnov V.</b> Investigation of local heat transfer in the combustion chamber of a hydrogen diesel engine <b>DPh</b>	25.10.2016
18	<b>Cheng Rongrong.</b> Local heat transfer in the combustion chamber of a hydrogen engine running on a depleted mixture. <b>DPh</b>	14.12.2021
19	<b>Zhang Citian.</b> Reducing the concentration of nitrogen oxides in the exhaust gases of a hydrogen engine running on a depleted mixture <b>DPh</b>	14.12.2021
20	<b>Chilashvili G.</b> Investigation of the possibility of improving the environmental friendliness of an automobile hydrogen engine using a 3D model of the occurrence of nitrogen oxides <b>DPh</b>	27.07.2022

#### 15. Awards and Prizes, Honorary Title

Date	Name of Awards, Prizes, Honorary Title
1987	Jubilee Medal of Rostock University (Germany)
1900-2000	Three-time DAAD (Deutsche akademische Austauschdienst ) Fellow: Technical University of Munich (1990-91, 2000); Rostock University (1994-95)
2002	Prize of the Bauman Moscow State Technical University (see table 8.1)
2005	Jubilee Medal of Bauman Moscow State Technical University,
2007	Member of the National Heat Transfer Committee of the Russian Academy of Science
2010	Honorary Citizen of Sachkhere
2022	Certificate of Honor of the National Academy of Sciences of Georgia for scientific achievements in the field of mechanical engineering
2024	The Georgy Nikoladze Prize of the National Academy of Sciences of Georgia for cycle of works: "Forecasting and improving environmental feature of a hydrogen engine using 3D mathematical models"

#### 16. Family Status

<p>Father Zurab Kavtaradze (1925-2016), railway engineer;  Mother Natela Tsereteli (1929-2022) teacher;  Wife Nino Kavtaradze (1958-2020), Doctor-Cardiologist;  Son Zurab Kavtaradze (1981) Doctor of Technical Sciences, Bauman Moscow State Technical University;  Daughter Ekaterine Kavtaradze (1990), Economist, Ludwig-Maximilian University, München;  Grandchildren: Ivane (2013), Eva (2018), Nino (2020), Zurab (2024) Kavtaradze.</p>
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Additional information about **R. Kavtaradze** can be found in

**Online Sources:**

(<https://ka.wikipedia.org/wiki/>; <http://www.nplg.gov.ge/bios/ka/00016277/>; Google-Scholar (<https://scholar.google.com/scholar?q=kavtaradze+r.z.+&hl=en7btnG=Search>), Google, yandex, Skopus, Web of science, e-LIBRARY, Harzing's Publish or Perish (PoP); mathnet.ru, piston-engines.ru et al.

**as well as in books:**

1. Scientific schools of the Bauman Moscow State Technical University. Edited by I.B. Fedorov and K.S. Kolesnikov. Moscow: 2005.-464 p. (in Russian);
2. Ivashchenko N.A., Chinov N.D., etc. 100 years of the specialty "Internal Combustion Engines" at Bauman Moscow State Technical University. Moscow, publishing house of the Bauman Moscow State Technical University. 2007.-296 p(in Russian);
3. Leeuwen T., Yang V., Yetter R. Synthesis Gas Combustion. Fundamentals and Applications. CRC Press, New York (2010);
4. Bauman Moscow State Technical University: 150 years of power engineering. Moscow, publishing house of Bauman Moscow State Technical University, 2018.-278 p. (in Russian);
5. Research Institute of Power Engineering of Bauman Moscow State Technical University-30 years: history and modernity/V.I. Krylov, V.A. Markov, A.N. Arbekov, etc. Moscow, SIC Engineer LLC (Soyuz NIO), Oniko-M LLC, Halley-Print LLC.-2018.-512 p. (in Russian).

**The newspaper:** "Republic of Georgia" №190 (9309), 20.10.2021;