

CURRICULUM VITAE

Name: Dr., Prof. Vladimir A. Levchenko

**Address: Taizhou University, Institute of Advanced Coating Materials
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RESEARCH FIELDS:

High-tech materials & hi-tech coatings (microfabrication & deposition), Diamond-like & monocrystalline carbon structure, nanocomposite, cold spray coatings, lubricating properties of boundary layers, Thin films organic liquids and lubricants, NEMS & MEMS, Colloid Chemistry, Applied Surface Science

EDUCATION:

2003 - The degree of Doctor of Science at Lomonosov Moscow State University;

1988 - The degree of Doctor of Physics and Mathematics at Lomonosov Moscow State University;

1985 - Odessa State Mechnicov University, Physics Department.

PARTICULAR EXPERIENCE:

2019 – Distinguished Professor Taizhou University, Director of Institute of Advanced Coating Materials, International Expert of Zhejiang Provincial Key Laboratory

2018 - Professor Taizhou University, Director of Institute of Advanced Coating Materials

**2003 - 2015 – Part time Visiting Professor of Materials Berlin Technic University
The main topic:**

1. High-tech materials & hi-tech coatings (DLC coatings, nanocoating, nanocomposite)

**2001 – 2002 – Visiting Assistant Professor Ohio State University, OH, USA;
The main topics:**

1. Teaching (including lecture)
2. NEMS/MEMS
3. High-tech materials

2000 - 2001 - Postdoctoral Association Rutgers State University, NJ, USA.

The main topics:

1. Molecular Dynamics Simulations of V_2O_5/Li_2SiO_3 Interface
2. Surface phenomena in solid state

**2010 – 2018 - Leading Researcher Lomonosov Moscow State University; Director of nanotri-
bology center LMSU – BIES RAS (Lomonosov Moscow State University – Blagonravov In-
stitute of Engineering Science, Russian Academy of Sciences), CEO at Skolkovo.**

The main topics:

High-tech materials & hi-tech coatings ((DLC coatings, nanocoating, nanocomposite)

Cold spray coatings

Coating of the powder surface with other materials

Carbon Polymer, Linear chain carbon films (carbine), CN films

Boundary friction & lubrication materials & hi-tech coatings (microfabrication & deposition)

Nanoscience & Nanotechnology

NEMS & MEMS

Tribology of new materials

Biomedical Nanotechnology

2002 – 2010 - Principal Researcher Lomonosov Moscow State University;

The main topics:

1. High-tech materials & hi-tech coatings (microfabrication & deposition)
2. Nanoscience & Nanotechnology
3. NEMS & MEMS
4. Liquid Crystals & Epitropic liquid crystals
5. Molecular Dynamics Simulations
6. Diamond-like & monocrystalline carbon structure
7. Tribology of new materials
8. Biomedical Nanotechnology

1992 - 2000 - Senior Researcher Lomonosov Moscow State University;

The main topics:

1. Liquid Crystals & Epitropic liquid crystals
2. Biomedical Nanotechnology
3. The influence of modification surfaces on the properties of liquid crystals, albumens and lubricants.
4. Wetting and wetting transitions
5. Thin films organic liquids and lubricants
6. High-tech materials & hi-tech coatings (monocrystalline, DLC coatings)
7. Tribo-Nanotechnology
8. Molecular Dynamics Simulations

**1990 - 1992 - Senior Researcher Science Research Institute;
The main topics:**

1. MD Simulations of liquid crystals
2. Wetting phenomena
3. Physics of new materials for including liquid crystals
4. Thin films organic liquids and lubricants
5. Lubricant/Overcoating interactions in the boundary

**1988 - 1990 - Science Researcher Science Research Institute of Russian Academy of Sciences;
The main topics:**

1. The influence of the organic basis for molecules.
2. Wetting phenomena.
3. Physics of new materials for including liquid crystals

1985 - Junior Researcher Odessa State University (the branch of the well-known Soviet school on physics of surface headed by the director of Moscow Physics-chemical institute, academician B.V. Derjaguin).

The main topics:

1. The influence of modification surfaces on the properties of liquid crystals
2. Physics of new materials for including liquid crystals
3. Develop new lubrication

RESEARCH INTERESTS:

Research interests is elaborating, synthesis, research and practical use of nano-constructed materials, high-tech materials & hi-tech coatings (monocrystalline, DLC coatings), Linear chain carbon films (carbide), CN films Coating of the powder surface with other materials, Biomedical Nanotechnology, Nanoscience and nanotribology, Biosensors, Surface phenomena in solid state, X-ray scattering and diffraction method, AFM, STM, SPM, XPS, TEM & ultraviolet spectroscopy investigation, surface phenomena in liquid crystals & liquids, albumen's & surfactants. Supersonic Spray Application in fabrication of Nanostructured Metaloxides Gas Sensors for Monitoring of Combustion Process; Reconditioning of the Aluminium Moulds in Packaging Industry; Freeform Fabrication Equipment for Cold Spray Process; Cold gas dynamic spraying rig design, implementation, and testing; Cold gas dynamic spray process modelling; Liquid shock waves tubes automation; Pulsed cold gas dynamic spray rig design, implementation, and testing.

CURRENT RESEARCH PROJECTS:

- Cold spray coatings
- **Ultrananocrystalline Diamond MEMS: Integration with CMOS Electronics**
- **Internal Dissipation in Diamond Microstructures**
- **Nanocrystalline Diamond Coatings for Micro Tools**
- **Nanomechanical Switches**
- **Diamond-Like Carbon Coatings for Nanomechanical Data Storage**
- **Ultrananocrystalline Diamond Atomic Force Microscope Probes**
- **Nanotribology of Ultrahard Carbon Films**

- **Nanotribology of Self-Assembled Monolayers**
- **Negative Stiffness of Carbon Nanotubes**
- **Growth and Properties of Nanocrystalline Diamond Films**
- **Phononic Contributions to Friction**
- **Surface forces**
- **Orientational ordering lub layers**
- **The influence of modification surfaces on the properties of lubricants**
- **Tribology of new materials for including liquid crystals.**

Major Research Area:

- **High-tech materials & hi-tech coatings ((DLC coatings, nanocoating, nanocomposite)**
- **Cold spray coatings**
- **Coating of the powder surface with other materials**
- **Linear chain carbon films (carbine), CN films**
- **Boundary friction & lubrication**
- **Nanoscience and nanotechnology**
- **Biosensors**
- **Surface phenomena in solid state**
- **X-ray scattering and diffraction method**
- **AFM, STM, SPM, XPS, TEM & ultraviolet spectroscopy investigation**
- **Pulsed laser systems & nonlinear optics**
- **Lytropic liquid crystals**
- **Colloidal suspensions, gels & liquid crystals**
- **Surface phenomena in liquid crystals & liquids**
- **Albumen's, surfactants, water solutions**

SCIENTIFIC PUBLICATIONS:

Monographs:

1. **V.A. Levchenko "Physicochemical theory of Surface", M.1988, 158.**
2. **V.A. Levchenko. Nanotribology. (Ed. K.V. Frolov). Mashinostroenie. Moscow. 2008. p. 485**
3. **Levchenko V. A, Matveenko V. N, Bujanovskij I.A. Methods of hardening of surfaces of details of cars. Mashinostroenie. Moscow. 2008. p .431**
4. **Levchenko V.A., Buyanovsky I.A. Methods of increase of durability of details of cars at the expense of modifying of their surfaces / Ed. G.V. Moskvitin's edition, M: Krasand, 2013, p. 400**
5. **Buyanovsky I.A., Levchenko V. A., Kalugin I.A. Perspective methods of surface treatment of details cars. URSS, M., 2019, p. 448**

Dr., Prof. Vladimir Levchenko has published of more than 20 inventions and 250 scientific research works on nanotechnology in different spheres (medicine, machine engineering, energetic). He did numerous technology transfers and received renowned fellowships and awards for scientific excellence, numerous invited talks at international conferences and universities.

Including in 2011-2021:

1. Levchenko V.A., Buyanovsky I.A., Ignatyev Z.V., Bolshakov A.N., Matveenko V. N. Carbon diamondlike coatings of details of the greased knots of a friction// Friction and greasing in cars and mechanisms, 2011, No. 11, p. 14-26.
2. Levchenko V.A., Bolshakov A.N., Buyanovsky I.A., Ignatyev Z.V., Matveenko V. N. Laboratory tribology tests of thin coatings in lubricant environments. //Factory laboratory. Diagnostics of materials, 2011, No.11, p.74-82
3. Levchenko V.A., Buyanovsky I.A., Marchenko E.A., Ignatyev Z.V., Matveenko V. N. Researches of tribologichesky characteristics of carbon diamondlike coatings-orientant in the inactive environment. //The Friction and greasing in cars and mechanisms, 2011, No. 11, p. 27-33.
4. Buyanovsky I.A., Levchenko V.A., Marchenko E.A., Ignatyev Z.V., Bolshakov A.N., Matveenko V. N. Lubricant ability of inactive environments in the presence of carbon diamondlike coatings. //News of the Samara Russian Academy of Sciences scientific centre. 2011, volume 13, No. 4 (3), p. 686-691
5. Levchenko V., Matveenko V., Buyanovsky I., Ignatieva Z. New type of nanocomposite coatings. Proceedings of the International Tribology Conference. Oct. 30-Nov.11, 2011, Hirochima, Japan, p.4-11
6. Levchenko V.A., Matveenko V. N., Buyanovsky I.A., Ignatyev Z.V., Bolshakov A.N. Tribologichesky properties of supersolid polymeric coatings-orientant in the inactive environment. – In Proceedings: New and nonconventional technologies in resource- and energy saving. Materials of the International scientific and technical conference. Odessa, 2011, on September 18-21, p. 99-102.
7. Levchenko V.A., Bol'shakov A.N., Buyanovskii, I.A., Ignatieva Z.V., Matveenko V.N. Laboratory Tribotests of thin carbon coatings in lubricants. //Inorganic materials, 2012, vol. 48, No. 15, p. 1359-1363
8. Buyanovsky I.A., Ignatyev Z.V., Bolshakov A.N., Levchenko V.A., Matveenko V. N. The mechanism of increase of lubricant effect of oils at friction steel with a carbon coating-orientant - in book: Physics, chemistry and mechanics tribosystem: The inter-university collection of scientific works - Ivanovo: Publishing house "The Ivanovo state university", 2012, V. 10, p. 156-161
9. Buyanovsky I.A., Ignatyev Z.V., Bolshakov A.N., Levchenko V.A., Matveenko V. N. Management of lubricant ability of oils by regulation of structure and structure of diamondlike coverings of working elements of knots of a friction. - In Proceedings: works II of the international scientific conference "Basic researches and innovative technologies in mechanical engineering" - M: IMASh Russian Academy of Sciences, 2012, p. 133-138
10. V.A. Levchenko, I.A. Buyanovsky, Z.V. Ignatyev, A.N. Bolshakov, K.A. Zakharov, V. N. Matveenko. Diamondlike coatings-orientant, as promising tribological material. In Proceedings: "Physical and chemical bases of formation and updating micro and nanostructures", 2012, Kharkov, Ukraine, volume 1, p. 12-14
11. Levchenko V.A., Buyanovsky I.A., Ignatieva Z.V., Matveenko V.N. Wear-resistant and corrosion-resistant nanocomposite coatings. In: Proceedings of the Nanotechnology, International Conference, Jan. 24-28, 2011; Moscow, Russia, p.8-12

12. V.A. Levchenko, I.A. Buyanovsky, Z.V. Ignatyev, A.N. Bolshakov, K.A. Zakharov, V. N. Matveenko. Nanotechnologies: nanostructural diamondlike coatings – orientant and their tribologichesky properties in the inactive environment. «Physical and chemical bases of formation and updating micro and nanostructures (FMMN' 2011), volume 1, 12-14 of October 2011, Kharkov, Ukraine, p. 277-280
13. Buyanovsky I.A., Ignatyev Z.V., Levchenko V.A., Matveenko V. N. To a question of protivozadirny properties of carbon nanocoverings-orientantov in a mode of boundary greasing. Works of the International scientific and technical conference “Polymeric composites and tribology’ (POLIKOMTRIB-2011), Gomel. Belarus. On June 27-30, 2011 p. 76-80
14. Buyanovsky I.A., Ignatyev Z.V., Bolshakov A.N., Levchenko V.A., Matveenko V. N. Management of lubricant ability of oils by regulation of structure and structure of diamondlike coatings of working elements of knots of a friction. - In Proceedings: Scientific works of the II international scientific conference "Basic researches and innovative technologies in mechanical engineering" - M: IMASh Russian Academy of Sciences, 2012, p. 133-138
15. Levchenko V.A., Buyanovsky I.A., Ignatyev Z.V., Bolshakov A.N., Matveenko V. N. Engineering of coatings of tribotekhnich appointment. //Works of intern. conf. «Mashinovedeniye problems. Tribology – to mechanical engineering-2012», 29-31okt. 2012, t. 1, p. 50-51
16. Buyanovsky I.A., Ignatyev Z.V., Hrushchov M. M., Levchenko V.A., Matveenko V. N. Research of specifics of destruction of diamondlike coatings at a friction. //Works of Int. conf. «Tribology – to mechanical engineering-2012», 29-31okt. 2012, V. 2, p. 110-112
17. Levchenko V.A., Matveenko V.N., Buyanovsky I.A., Ignatieva Z.V., Bol'shakov A.N. Synthesis of new generation nanocomposite coatings. In: The fifth All-Russia conference (with the international participation) of "Chemistry of a surface and nanotechnology", 24-30 September, Hilovo - Petersburg, 2012, p.71
18. Buyanovsky I.A., Bolshakov A.N., Levchenko V.A., Matveenko V. N. Influence of lubricant oils on a steel friction on a composite covering ceramic + monocrystalline carbon. – In Proceedings: The international scientific and technical conference Polymeric composites and a tribology (Polycomtrib-2013), - Gomel, Belarus, on June 24-27 2013 (an electronic resource)
19. Levchenko V.A., Matveenko V. N., Buyanovsky I.A., Ignatyeva Z.V., Bolshakov A.N. To a question of development and synthesis of nano composite materials. – In Proceedings: New and nonconventional technologies in resource-and energy saving. Materials of the International scientific and technical conference. Odessa, 2013, May 22-24, p. 93-95.
20. Levchenko V.A., Matveenko V. N., Buyanovsky I.A., Ignatyeva Z.V., Bolshakov A.N. Researches of influence of structure and structure of firm carbon coatings of details of tribological knots on lubricant properties of synthetic oil. – In Proceedings: New and nonconventional technologies in resource-and energy saving. Materials of the International scientific and technical conference. Odessa, 2013, p. 95-100

21. Levchenko V.A., Matveenکو V.N., Buyanovsky I.A., Ignatieva Z.V., Bol'shakov A.N., Zakharov K. A. Nanocomposite on the basis of carbon polymer – new promising material. In Proceedings: Physics and technology of thin films and nanosystems. Ivano-Frankovsk, Ukraine, 2013, p. 562-565
22. Buyanovsky I.A., Drozdov Yu.N., Ignatyev, Z.V., Levchenko V.A., Matveenکو V. N. Carbon coatings-orientant and efficiency of lubricant effect of oils. //Construction Mechanization, 2013, No. 6 (828), p. 41-44.
23. Buyanovsky I.A., Levchenko V.A., Bolshakov A.N., Zelensky M of N, Ignatyev Z.V., Matveenکو V. N. Influence of structure and structure of carbon coatings on lubricant properties of synthetic oil. // Friction and wear, 2013, T. 34, No. 5, p. 362-366.
24. Buyanovsky I.A., Ignatyev Z.V., Hrushchov M. M., Levchenko V.A., Matveenکو V. N. Research of specifics of destruction of diamond like coatings at a friction. //The Friction and greasing in cars and mechanisms, 2013, No. 7, p. 43-47.
25. Buyanovsky I.A., Levchenko V.A., Bolshakov A.N., Matveenکو V. N. Monocrystalline carbon coatings and lubricant ability of oils. //Mechanical engineering and automation Problems, 2013, №3, p. 97-101
26. Buyanovsky I.A., Levchenko V.A., Pervushin A.N., Bolshakov A.N. Application of diamondlike coatings-orientant for increase of lubricant ability of oils. // World of oil products, 2013 № 6, p. 21-28
27. Vladimir Levchenko, Iliа Buyanovsky, Andrej Bolshakov, Vladimir Matveenکو. Green Tribology: Influence of New DLC Coatings-Orientants and Amorphous on Antifric-tion Properties of Lubricants. // Journal of Electrical Engineering, 2014, V.2, № 1, p. 39-48
28. Buyanovskii I.A., Bolshakov AN, Levchenko V.A., Matveenکو V.N. Effect of Lubricat-ing Oils on Friction of Steel over Ceramics + Monocrystalline Carbon Composite Coating. // Journal of Friction and Wear, 2014, Vol. 35, № 2, p. 129-132
29. Drozdov Yu N., Buyanovskii I.A., Levchenko V.A., Bol'shakov A.N., Sipatrov A.G., Zelenskaya M.N., Bartko R.V. and V.N. Hard Carbon Coatings and Boundary Lubri-cation of Steel Parts. Journal of Machinery Manufacture and Reliability, 2014, Vol. 43, № 4, p. 298-305
30. Levchenko Vladimir A. Engineering new carbon materials. *Journal of Materials Sci-ence and Engineering*, 2014, Vol. 3, № 3, p. 121.
31. Buyanovsky I.A., Ignatieva Z.V., Bolshakov A.N., Levchenko V.A., Matveenکو V. N., Kovalenko E.V. Influence of a two-layer coating-orientant on lubricant ability of oils. Friction and greasing in machines and mechanisms, No. 4, p. 11-15
32. Buyanovsky I.A., Bolshakov A.N., Pravotorova E.A., Matveenکو V. N., Levchenko V.A. A technique of an assessment of antifrictional properties of carbon coatings in the mode of boundary greasing. In: Physics, Chemistry and Mechanics Tribosystem, Iva-novo state university, Ivanovo, volume 12, pp. 82-87
33. V. Levchenko, Buyanovsky I., Zakharov K., Bol'shakov A., Matveenکو V. New gener-ation carbon coatings with monocrystalline structure as the promising new method of oil lubricity increasing. In: Proceedings of Malaysian International Tribology Confer-ence 2015, MYTRIBOS, Kuala Lumpur, 2015, MALAYSIA, p.7-81.

34. Buyanovsky I.A., Ignatyeva Z.V., Bolshakov A.N., Levchenko V.A., Matveenkov V. N., Kovalenko E.V. Influence of a two-layer coating - orientants on lubricant ability of oils. //Friction and greasing in machines and mechanisms, 2015, N 4, p. 11-15
35. Levchenko V.A., Dotsenko A.I., Ignatieva Z.V., Buyanovsky I.A. A new method of oil lubricity increasing. //Mechanics Transport Communications, 2016, Vol. 13, № 3, p. 1-3
36. I.A. Buyanovskii, E.A. Pravotorova, A.N. Bolshakov, V.A. Levchenko. Minimizing the Number of Experimental Tribological Tests on the Friction Machine of Reciprocating Motion. Journal of Friction and Wear, 2017, Vol. 38, No. 3, pp. 190–194
37. Vladimir A. Levchenko, Ilia A. Buyanovskii, Vladimir N. Matveenkov. To the New Concept of Green Tribology. Journal of Materials Science and Chemical Engineering, 2017, No. 5, pp. 175-187
38. Buyanovskii I.A., Bol'shakov A.N., Levchenko V.A. The Effect of Orienting Carbon Coatings Alloyed with Carbide-Forming Elements on the Antifriction Properties of Lubricants. Journal of Friction and Wear, Vol. 39, № 5, p. 371-375.
39. I.A. Buyanovskii, R. V. Bartko, V. A. Levchenko, A. N. Bol'shakov, V. D. Samusenkov, M. N. Zelenskayaa, and V. N. Matveenkov. Friction Wear on a Counter body from a Carbon Coating–Orientant in Lubricants. Journal of Machinery Manufacture and Reliability, 2018, Vol. 47, No. 3, pp. 266–270
40. I.A. Buyanovskii, V. A. Levchenko, A. N. Bol'shakov, and V. D. Samusenkov. A Molybdenum-Containing Carbon Coating for Tribotechnical Use and Antifriction Properties of Oils under Boundary Lubrication. Journal of Machinery Manufacture and Reliability, 2019, Vol. 48, No. 1, p. 73–78.
41. Levchenko, V.A., Buyanovskii, I.A., Samusenkov, V.D. et al. Antifriction Properties of Diamond-Like Coating and Titanium Aluminum Nitride in Model Lubricant Media. J. Frict. Wear, 2019, Vol. 40, 536–540.
42. Levchenko, V.A., Buyanovskii, I.A., Bol'shakov, A.N. et al. Green Tribology: Orientation Properties of Diamond-Like Carbon Coatings of Friction Units in Lubricating Media. Russ J Appl Chem, 2019, Vol. 92, 1603–1615.
43. Puyou Ying, Ping Zhang, Jianbo Wu, Min Huang, Changhong Lin, Tianle Wang, Yihang Fang, Vladimir Levchenko. Effect of applied load on the tribological properties of MoS₂-TiL/MoS₂-TiH nano-multilayer coating. AIP Advances 10, 105303 (2020).
44. A.Yu. Albagachiyev, I.A. Buyanovsky, V.D. Samusenkov, V.A. Levchenko, Antifriction coating. Patent for invention No. 2728449. 29.07.2020, Bulletin No. 22
45. I.A. Buyanovsky, M.M. Khrushchev, V.A. Levchenko. Hard carbon coatings antifriction properties improvement by alloying. Journal of Physics: Conference Series. 2020. V. 1431. 012064. p.1-8.
46. Buyanovskii I. A., Samusenkov V. D., Levchenko V. A., Antifriction Properties of a Diamond-Like Coating and Titanium Nitride in Model Lubricating Media. Journal of Machinery Manufacture and Reliability. 2020. V. 49. No. 5. p. 389 – 394
47. Buyanovskii I. A., Samusenkov V. D., Levchenko V. A. Application of titanium nitride and titanium alum nitride as intermediate layer for diamond-like coatings of steel parts. IOP Conference Series: Materials Science and Engineering. IOP Publishing, 2020. – V. 996. – No. 1, 012008
48. Levchenko, VA.; Panfilov, Yu.V. The strengthening coatings on the tool. Journal of the strengthening technologies and coatings. N. 5, 2020, p. 234-240

[https://doi: 10.36652/1813-1336-2020-16-5-234-240](https://doi.org/10.36652/1813-1336-2020-16-5-234-240)

49. Changhong Lin, Huan Ge, Tianle Wang, Min Huang, Puyou Ying, Ping Zhang, Jianbo Wu, Shibin Ren, Vladimir Levchenko. A self-healing and recyclable polyurethane/halloysite nanocomposite based on thermoreversible Diels-Alder reaction, *Polymer*, Volume 206, 2020, 122894, ISSN 0032-3861, <https://doi.org/10.1016/j.polymer.2020.122894>
50. Puyou Ying, Ping Zhang, Jianbo Wu, Min Huang, Changhong Lin, Tianle Wang, Yihang Fang and Vladimir Levchenko. Effect of applied load on the tribological properties of MoS₂-TiL/MoS₂-TiH nano-multilayer coating. *AIP Advances* 10, 105303 (2020); doi: 10.1063/5.0022712
51. Changhong Lin, Puyou Ying, Min Huang, Ping Zhang, Tao Yang, Gang Liu, Tianle Wang, Jianbo Wu & Vladimir Levchenko. Synthesis of robust and self-healing polyurethane/halloysite coating via in-situ polymerization. *J. Polym. Res.* 28, 375 (2021). <https://doi.org/10.1007/s10965-021-02742-4>
52. Zhang, P.; Ying, P.; Lin, C.; Yang, T.; Wu, J.; Huang, M.; Wang, T.; Fang, Y.; Levchenko, V. Effect of Modulation Periods on the Mechanical and Tribological Performance of MoS₂-TiL/MoS₂-TiH Multilayer Coatings. *Coatings* 2021, 11, 1230. <https://doi.org/10.3390/coatings11101230>
53. Changhong Lin, Puyou Ying, Min Huang, Ping Zhang, Tao Yang, Gang Liu, Jianbo Wu, Vladimir Levchenko. Processable and recyclable polyurethane/HNTs@Fe₃O₄ solid-solid phase change materials with excellent thermal conductivity for thermal energy storage. *Polymer Composites*, 2021, doi: 10.1002/pc.26342
54. Miao Wang, Gang Liu, Xian Luo and Vladimir A. Levchenko. Effect of interface orientation on the adhesion strength and fracture toughness of Ni/CrN interfaces by first-principles study. 2021, *Mater. Res. Express*, 8, 096507.

EXTRAMURAL INTERNATIONALE AND GOVERNMENT RESEARCH GRANTS

- 1993-1995 Principal Investigator:
ISF Research Grant, Moscow, Russia (\$50,000)
- 1996-1998 Principal Investigator:
ISF Research Grant, Moscow, Russia (\$50,000)
- 1998-2000 Co-Principal Investigators:
Government Research Grant, Moscow, Russia (\$60,000)
- 2002-2004 Co-Principal Investigators:
Government Research Grant, Moscow, Russia (\$60,000)
- 2004-2006 Principal Investigator:
Government Research Grant, Moscow, Russia (\$80,000)
- 2006-2008 Principal Investigator:
Government Research Grant, Moscow, Russia (\$200,000)
- 2008-2010 Principal Investigator:
Government Research Grant, Moscow, Russia (\$200,000)
- 2010-2012 Principal Investigator:
Government Research Grant, Moscow, Russia (\$200,000)

- 2012-2015 Principal Investigator:**
Government Research Grant, Moscow, Russia (\$200,000)
- 2015-2018 Principal Investigator:**
Government Research Grant, Moscow, Russia (\$200,000)
- 2019-2022 Principal Investigator:**
Government Research Grant, Taizhou, China (\$600,000)

HONOURS, FELLOWSHIPS, MEMBERSHIP OF PROFESSIONAL SOCIETIES

Member of "Russian Physical Society & IPS"

Member of "Russian Liquid Crystals Society & ILCS"

Member of "Russian Tribological Society & Internationale Tribological Society"

Member of American Society of Mechanical Engineers (ASME) Fellow

Member of American Academy of Mechanics (AAM) Fellow

International Association for Computational Mechanics (USACM) Fellow

Member of International society for nanotechnologies and nanomaterials.

The diploma and GRAND PRIX for workings out «Anticatricial material» and «Implants of new generation» IV International salon of inventions and new technologies, 2008.

2007-2019 Listed in Who's Who in the World

Member of Materials Research Society (MRS of USA).

The honorary professor the International University of the European Union, "In contribution in international education", 2010

The Order of honorary officer of the European Union "For development of inventions" Europe Aid, Belgium.

Medal of a name the 1st astronaut of Earth of Yu.A. Gagarin - For development of coatings of a dual purpose, 2014, Federation of Russia Astronautics, Russia

Medal "Hippocrates" - for development of new medical materials, 2014, Government of Russia.

Gold Medals and special Prize of the European Community of Inventors "For development of technology on production of multipurpose coatings", 2015

Science Society of British, United Kingdom, winner of the prize "Innovation Leader".

Medal of the British scientific community "top 100 in science".

Gold Medal and Special Prize of the European Community of Inventors for development: "Antifrictional coating", 2016

Awards Zhejiang Provincial 1000 Talent, 2017

Awards China's National 1000 Talent, 2019

Gold Medal and Special Prize of the IFIA Executive Committee for development: "Production technology of anticovid Masks-respirators IACMTU-ffp3+", 2021

TEACHING COURSES:

- a). Introduction to Surface Science
- b). Nanoscience and Nanotechnology

c). Functional coatings

CAREER HIGHLIGHTS

Experience:

More than 30 years of extensive work and experience in the areas of surface engineering and tribology

- **Pioneered development of nearly frictionless carbon films and high-temperature carbon-based composites for severe tribological applications**
- **Directed and conducted fundamental and experimental research on boric acid-based solid lubricants and surface engineered tribomaterials**
- **Developed and implemented new solid lubricants for extreme pressure applications, such as aluminum forming**
- **Conceived and carried out research toward the realization of fuel-efficient automotive and turbine engines**
- **Recent tribological research activities include super-hard, multifunctional coatings (such as diamond and related materials), cold spray coatings, ceramics and composites, lubricious oxides, metal-forming lubricants, nanocrystalline diamond and diamondlike carbon films, and hard nitride, carbide and boride coatings.**