


## PERSONAL INFORMATION


## Alexander Pogrebnjak



 55 Prokofieva St., Apt. 33, 40000 Sumy (Ukraine)

 +380662376564

 alexp@i.ua

 <http://personal.sumdu.edu.ua/pogrebnjak/en/>

 Skype apogrebnjak

Date of birth 6 Aug 1947

## WORK EXPERIENCE

- 
- 2011–Present **Head of the Department of Nanoelectronics**  
Sumy State University, Sumy (Ukraine)
- 2009–2011 **Professor of the department of Electronics and Computer Technique**  
Sumy State University, Sumy (Ukraine)
- 2008–2009 **Professor**  
Sumy National Agrarian University, Sumy (Ukraine)
- 1994–2008 **Director and chief executive**  
Sumy Institute for Surface Modification, Sumy (Ukraine)
- 2006–2009 **Professor of the Department of Electronics and Computer Technics**  
Sumy State University, Sumy (Ukraine)
- 2001–2006 **Professor of Applied Physics Department**  
Sumy State Pedagogical University, Sumy (Ukraine)
- 1998–1999 **Professor of Electric Department**  
Nagaoka of Technology University, Nagaoka (Japan)
- 1995–1998 **Professor of the Department of Physical Electronics**  
Sumy State University, Sumy (Ukraine)

## EDUCATION AND TRAINING

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- 1990–1994 **D.Sc. in Physics of Solids and Experimental Physics**  
Tomsk Polytechnic University, Tomsk (Russia)
- 1981–1984 **Ph.D. in Solid State Physics**  
Tomsk State University, Tomsk (Russia)
- 1970–1976 **M.Sc. in Solid State Physics**  
Tomsk Polytechnic University, Tomsk (Russia)

- Oct 2014–Oct 2014 **Internship**  
Nanobiomedical Centre, Adam Mickiewicz University, Poznan (Poland)
- Feb 2014–Mar 2014 **Internship**  
University of Poitiers, Pprime Institute, Poitiers (France)
- Feb 2013–Mar 2013 **Internship**  
University of Poitiers, Pprime Institute, Poitiers (France)
- Feb 2012–Mar 2012 **Internship**  
National Institute for Materials Science, Tsukuba (Japan)
- 2006–2006 **Internship**  
National Institute of Materials Science, Tsukuba (Japan)
- 2000–2000 **Internship**  
Los-Alamos Nat. Laboratory, Los-Alamos (United States)
- 1998–1998 **Internship**  
National Research Institute for Metals, Tsukuba (Japan)
- 1996–1996 **Internship**  
Sandia National Laboratories, Albuquerque (United States)
- 1994–1994 **Internship**  
Los-Alamos Nat. Laboratory, Los-Alamos (United States)
- Jan 1992–Mar 1992 **Internship**  
Trento University, Trento (Italy)  
Positron annihilation on  $\alpha$ -Fe exposed HCEB and Ion Implantation
- Sep 1989–Jan 1990 **Internship**  
Helsinki Technology University, Helsinki (Finland)  
Positron Annihilation on Metals Exposed HPIB

PERSONAL SKILLS

Mother tongue(s) Russian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C1	C1	B2
Ukrainian	C2	C2	C1	C1	B2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user  
 Common European Framework of Reference for Languages - Self-assessment grid

#### Organisational / managerial skills

I have been an organizer of the 4th International conference: on Modification of Properties of Surface Layers of Non-Semiconducting Materials Using Particle Beams (MPSL'93; MPSSL'96; MPSSL'99; MPSSL'2001); IEEE International Conference on Nanomaterials: Application & Properties (NAP): 2011-2013 – Alushta, Crimea, Ukraine, 2014-2016 – Lviv, Ukraine, 2017-2018 – Zatoka, Odesa Region, Ukraine, 2019 – Odesa, Ukraine.

I have been a member of the Organizing Committees of several (13) International Conferences: ION – Ion Implantation and Other Applications of Ions And Electrons (1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018) Poland, Kazimierz Dolny; International Conference on Plasma Surface Engineering PSE-2000, 2006, 2008, 2010, 2012, 2014, 2015, 2016, 2017, 2018 in Garmisch-Partenkirchen (Germany); Nuclear and Radiation Physics (Almaty, Kazahstan 1999, 2001, 2003); AEPSE-2003, Jeju, Korea, AEPSE-2005 (Sixth Asian European Plasma Surface Engineering International Conference - 2005), Qingdao City, China, AEPSE - 2007, Nagasaki, Japan, AEPSE - 2011, Dalian, China; AEPSE – 2013 and 2015, Jeji, Korea; NEET – International Symposium New Electrical and Electronic Technologies and Their Industrial Implementation (Zakopane, Poland, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017); Solid State Physics 2004, Almaty, Kazakhstan; International Conference on Modification of Materials with Particle Beams and Plasma Flows Tomsk, USSR, 1987; Physics and Technology of Thin Films Materials, 8, 9, 10, 11. International Conference (Ukraine, Ivano-Frankivsk 2001, 2003, 2005, 2007, 2009, 2011, 2013); Physic of Low Temperature Plasma International Conference (Kyiv, Ukraine-2003); Interaction of Radiation with Solids BGU, Minsk, (Belarus 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013); International Conference on Nanostructured Materials NANO-2014, (Moscow, Russia), member of Section Program Board "Thin Films and Heterostructures, 2D and 3D"; Films and Coatings, (2011, 2013, 2015, 2017) Kirensky Institute of Physics, Saint Petersburg, Russia; Beam Technologies Dubna, (Russia 1995).

I am the International Deputy Editor-in-Chief of the Editorial Board of the Journal "Voprosy Atomnoj Nauki i Techniki", Kharkiv, Ukraine, Physics and Chemistry of Solid State, Ivano-Frankivsk, Ukraine; Editor-in-Chief of the journal "Proceedings of the International Conference Nanomaterials: Applications and Properties"; Editorial board member «High temperature material processes», Danbury, USA; Deputy editor-in-chief of the Editorial Board of new Journal "Physical Engineering of Surface", Kharkiv, Ukraine., " Journal Nano and Electronic Physics"(indexed in Scopus); Deputy Editor-in-Chief, Sumy, Ukraine; Metallofizika I Noveishie Tekhnologii (indexed in Scopus), Kyiv, Ukraine; Member of European Joint Committee on Plasma and Ion Surface Engineering(EJC/PISE) from Ukraine-2006-2012; Member of Asian Joint Committee on Plasma Surface Engineering (AJC/PISE)-2005-2011; Member of the IEEE Nanotechnology Council and Magnetic Society.

#### Job-related skills

- High-Dose Ion Implantation (metals, alloys, semiconductors, ceramics);
- Modification of Surfaces Using High Power Ion and Electron Beams (HPIB), (HCEB);
- Coating Deposition Using Ablation by High Current Electron Beams (HCEB);
- Coating Deposition Using PVD techniques (vacuum-arc evaporation, magnetron sputtering);
- Deposition of Coatings of Ceramics Al<sub>2</sub>O<sub>3</sub> on Metals and Alloys Using Plasma-Detonation Technology;
- Electrolytic-Plasma Treatment of Alloys and Metals, Hybrid and Combined Protective Coatings, Hard-Superhard nanocomposite coatings.
- Design, development, and study of nanostructured multicomponent coatings with high hardness and thermal stability.
- Biomaterials development, micro- and nanoparticles, surface functionalization, polymeric biomaterials.

#### ADDITIONAL INFORMATION

Supervision Statistics Post-Doc: 5;  
PhD: 20;  
Master: 35;  
Bachelor: 29.

Scientific Metrics and Identification ■ *h*-index by Scopus: **48**;  
■ *h*-index by Web Of Science: **43**.

- Scopus Author ID: [36119198500](#);
- ORCID ID: [0000-0002-9218-6492](#).

Prof. Pogrebnjak A.D. is an author and co-author of more than 300 papers, which are represented in database Scopus, has 72 patents (including 11 international), 2 books in Ukrainian, 8 books in Russian, 7 books and chapters in English, including 2 study guide books.

#### Recent Publications

1. O.V. Maksakova, S. Simoēs, A.D. Pogrebnjak, O.V. Bondar, Ya.O. Kravchenko, T.N. Koltunowicz, Zh.K. Shaimardanov "Multilayered ZrN/CrN coatings with enhanced thermal and mechanical properties" *Journal of Alloys and Compounds* 2019, vol. 776, pp. 679-694.
2. L.G. Zhurerova, B.K. Rakhadilov, N.A. Popova, M.K. Kylyshkanov, V.V. Buranich, A.D. Pogrebnjak "Effect of the PEN/C surface layer modification on the microstructure, mechanical and tribological properties of the 30CrMnSiA mild-carbon steel" *Journal of Materials Research and Technology* Volume 2020, vol. 9(1), pp. 291-300.
3. A.D. Pogrebnjak, C.-H. Kong, R.F. Webster, R. Tilley, Y. Takeda, K. Oyoshi, O.V. Bondar, V. Buranich, S. Konstantinov, L. Baimoldanova, M. Opielak, P. Zukowski, P. Konarski "Antibacterial effect of Au implantation in ductile nanocomposite multilayer (TiAlSiY)N/CrN coatings" *ACS Applied Materials & Interfaces* 2019, vol. 1151.
4. O.V. Maksakova, A.D. Pogrebnjak, G. Yerbolatova, V.M. Beresnev, A.I. Kupchishin, L.S. Baymoldanova "Triple sandwich design of multilayered (CrN/ZrN)/(Cr/Zr) hard coating with nanoscale architecture: Microstructure and composition" *Materials Research Express* 2019, vol. 6(10), article number 106438.
5. A.D. Pogrebnjak, V.M. Beresnev, O.V. Bondar, B.O. Postolnyi, K. Zaleski, E. Coy, S. Jurga, M.O. Lisovenko, P. Konarski, L. Rebouta, J.P. Araujo "Superhard CrN/MoN coatings with multilayer architecture" *Materials and Design* 2018, vol. 153, pp. 47-59.
6. A.D. Pogrebnjak, V.I. Ivashchenko, P.L. Skrynskyi, O.V. Bondar, P. Konarski, K. Załęski, S. Jurga, E. Coy "Experimental and theoretical studies of the physicochemical and mechanical properties of multi-layered TiN/SiC films: Temperature effects on the nanocomposite structure" *Composites Part B: Engineering* 2018, vol. 142, pp. 85-94.
7. Y.O. Kravchenko, L.E. Coy, B. Peplińska, I. Iatsunskyi, K. Załęski, M. Kempniński, V.M. Beresnev, P. Konarski, S. Jurga, A.D. Pogrebnjak "Nano-multilayered coatings of (TiAlSiY)N/MeN (Me=Mo, Cr and Zr): Influence of composition of the alternating layer on their structural and mechanical properties" *Journal of Alloys and Compounds* 2018, vol. 767, pp. 483-495.
8. A.A. Bagdasaryan, A.V. Pshyk, L.E. Coy, P. Konarski, M. Misnik, V.I. Ivashchenko, M. Kempniński, N.R. Mediukh, A.D. Pogrebnjak, V.M. Beresnev, S. Jurga "A new type of (TiZrNbTaHf)N/MoN nanocomposite coating: Microstructure and properties depending on energy of incident ions" *Composites Part B: Engineering* 2018, vol. 146, pp. 132-144.
9. A.D. Pogrebnjak, V.M. Beresnev, K.V. Smyrnova, Y.O. Kravchenko, P.V. Zukowski, G.G. Bondarenko "The influence of nitrogen pressure on the fabrication of the two-phase superhard nanocomposite (TiZrNbAlYCr)N coatings" *Materials Letters* 2018, vol. 211, pp. 316-318.
10. A. Pogrebnjak, V. Ivashchenko, O. Bondar, V. Beresnev, O. Sobol, K. Załęski, S. Jurga, E. Coy, P. Konarski, B. Postolnyi "Multilayered vacuum-arc nanocomposite TiN/ZrN coatings before and after annealing: Structure, properties, first-principles calculations" *Materials Characterization* 2017, vol. 134, pp. 55-63.

Projects ■ 2018-2020 National Government Project "Implantation of high-energy and low-energy ions into

multilayer and multicomponent coatings: microstructure and properties”

- 2018-2019 Project of Science and Technology Center of Ukraine “New principles and design of superhard nanocomposite coatings using first-principles calculation methods”.
- 2016-2017 Research grant project of the Belarusian Republican Fund for Fundamental Research “Development of physical bases of vacuum obtaining of multilayer functional coatings based on nitrides of transition and refractory metals”.
- 2013-2015 "Physical principles of plasma processing technology for complex multicomponent materials and coatings", National Government Project of Ministry of Education and Science of Ukraine № 0113U000137 .
- 2012-2014 "Development of bases of forming of superhard nanostructured multicomponent coverages with high physical and mechanical properties", National Government Project of Ministry of Education and Science of Ukraine № 0112U001382.
- 2011-2012 Project for the implementation of research and design work with concern Ukrrosmetall № 61.03.01.11 with Dr. G.V. Kirik.
- 2010-2011 Project with Research Institute of Applied Physical Problems A.M. Sevchenko at Belarusian State University, № F41.1/020 "Development of physical and technological foundations of multicomponent nano-microstructural coatings based on Ti-Hf-Si-N; Zr-Ti-SiN with high hardness  $\geq 40$  GPa, the thermal stability  $\geq 1000^{\circ}\text{C}$  and high physical/mechanical properties".
- 2006 – 2008 Project of Academy of Science of Ukraine "Production of Nanomaterials, Nanocomposites and Nanotechnologies Using Non-traditional Technologies, namely Ion, Plasma, and Electron Beams.
- 2007 – 2008 Production of Nanocomposite Materials with High Mechanical Characteristics and Corrosion Resistance with Kazakhstan and Ministry of Education and Science of Ukraine.
- 2006 – 2009 Project ISTC K-1198 with South Korea, USA, European Union. Project "Application of Plasma-Detonation Hardening Technology and Deposition of Oxide and Metal Coatings on Low-Doped Steels for the Purpose to Improve their Mechanical and Corrosion Properties".
- 2004-2006 STCU Project N 3078 "Development of New Technologies for Deposition of Coatings Having High Corrosion Resistance in Seawater "with Seiji Kuroda and Naoki Kishimoto, Tsukuba, Japan.
- 2000-2002 "Investigation Structure and Properties of Modified Surfaces and Coatings Obtained with Use of Pulsed Plasma, Ion, Electron Beam", 2M/0145-2001 with Indore, India, Dr. Kane.
- 2000-2002 "Oxidation and Corrosion Behaviour of Pulse Plasma Modified Metallic Alloys", the Project PST.CLG.978157 with Greece Aristotle University, Department of Chemistry, Thessaloniki, Prof. Misaelides.
- 1999-2000 Project "Application of High-Power Ion Beams for Improving Servicing Characteristics of Metals and Alloys, Ceramics". Its number is 2M/076-2000. This project is fulfilled together with the Institute of Heavy Ion Physics, Peking University, Beijing, China, Prof. Zhao Weijiang; "Oxidation and Corrosion Behaviour of Pulse Plasma Modified Metallic Alloys", the Project PST.CLG.978157 with Greece Aristotle University, Department of Chemistry, Thessaloniki, Prof. Misaelides.
- 1999-2001 STCU Program, Project N 1472 "Implantation and Deposition from Vacuum-Arc Plasma Sources of Adherent Diamond-Like Carbon (DLC), Metal, Metal-Oxide and Metal-Nitride Coatings on the Inside Surfaces of Pipes", which will be fulfilled in the cooperation with Los-Alamos National Lab, USA headed by Dr. B. Wood.

#### Other Present Activities

- Guest editor to the journal "Vacuum", North-Holland;
- Member of the joint European committee JEC/PISE, also a member of the organizational committee of international conferences PSE, AEPSE, ION, NEET, IRS, and many other conferences. A member of the scientific committee of the international conference "Films and coatings".
- Expert in the “HARMONIA” program within the National Science Center, Poland.
- Membership in the IEEE Nanotechnology Council and IEEE Magnetic Society.
- Member of the editorial board to the journal Current Nanobiotechnology, Bentham Science Publishers.
- Invited professor at Lublin University of Technology (Politechnika Lubelska), Lublin, Poland.
- Honorary Professor of D. Serikbayev East Kazakhstan State Technical University.