CURRICULUM VITAE

Last Name	LYESHCHUK
First Name	Oleksandr
Day/Month/Year of Birth	18/11/1958
Occupation in Ukraine	Scientist
Educational Background	
Institution	Bakul Institute for Superhard Materials of the National Academy of Sciences of Ukraine
Type of Degree	Doctor of Technical Sciences
Speciality	Materials Science
Title of thesis	Thermomechanics of the diamond spontaneous crystallization in high-pressure apparatuses
Year of Defence	2004
Institution	Bakul Institute for Superhard Materials of the National Academy of Sciences of Ukraine
Type of Degree	Candidate of Technical Sciences (Equiv. to PhD)
Speciality	Mechanics of Deformable Solids
Title of thesis	Influence of coupling of physico-mechanical processes on the thermostress state of structural components of solid-phase high-pressure apparatuses
Year of Defence	1989
Institution	Kyiv Polytechnic Institute
Qualification	Diploma in Mechanical Engineering
Speciality	Dynamics and Strength of Machines
Years attended	1976–1982
Work History	Head of Department (2006 until now) Head of Laboratory (2005–2006) Senior Researcher (1991–2005) Researcher (1989–1991) Junior Researcher (1984–1989) Apprentice Researcher (1982–1984)
Name of Company	Bakul Institute for Superhard Materials of the National Academy of Sciences of Ukraine 2, Avtozavodska St., 04074 Kyiv, Ukraine Tel./Fax: +380 44 3791102 E-mail: leshchuk@ism.kiev.ua Web: www.ism.kiev.ua
	Visiting Researcher (1993–1994)
Name of Company	High Pressure Research Centre of the Polish Academy of Sciences, Warsaw
	Visiting Scholar (2019)
Name of Company	Zhejiang Jianshang Science and Technology Co., Ltd., Longyou, China
	Distinguished Professor (з 2020)
Name of Company	Quzhou University, China

Awards

1984	Medal of the Ukrainian SSR Academy of Sciences with Prize for Young Scientists
2011	Honorary Diploma of the Charitable Foundation to Promote Diamond Matter (FOSAL)
2011	Honorary Diploma of the Presidium and Central Committee of the Trade Union of the National Academy of Sciences of Ukraine
2013	Bakul Medal of Honour
2018	Award of the National Academy of Sciences of Ukraine "For Professional Achievements"

Main Results:

1. Development of the mathematical models for superhard materials synthesis at high pressure–high temperature static conditions.
2. Development of the mathematical models and investigation of thermomechanical peculiarities of the graphite-to-diamond phase transformation.
3. Development of the FEM model and software for the solution of coupled problems of electrical and heat conduction and thermoplasticity allowing for the phase transformations.
4. Numerical modeling of the thermomechanical state in high-pressure apparatus reaction zone at superhard materials synthesis.
5. Computer-aided design of apparatuses and technological processes for synthesis of materials at high pressure–high temperature static conditions.
6. Computer-aided modeling and optimization of the injection moulding of ceramic materials and hard alloys.
7. Numerical simulation of crack growth and optimization of ceramics structure.

Area of Expertise Computational Mechanics/Materials Science
Mechanics of Materials
Member of the specialized academic council D 26.230.01 for the defense of theses on speciality "Materials Science"

Principal investigator in the following R&D projects:

1997–2000	1.6.7.1168 *"Development of the process equipment breadboard construction and research of regularity of the injection moulding process of ceramic materials and hard alloys to make the complex form products"*, funded by the NAS of Ukraine
2001–2005	1.6.7.1172 *"Technological research of injection moulding regularity of the complex form products from technical ceramics and computer optimization of process"*, funded by the NAS of Ukraine
2004–2006	IV-6-04 (D104) *"Modification and computerization of nondestructive methods of testing the main characteristics of cemented carbides and superhard materials, and devising standard documentations to expertize thereof"*, funded by the NAS of Ukraine
2005–2007	IV-9-05 (1175) *"Evolution of methods of computational materials science on the basis of numerical models of continuum mechanics"*, funded by the NAS of Ukraine
2006–2008	III-47-06 (1176) *"Determination of the dependences of the strength and fracture toughness of novel superhard composite materials, hard alloys and functional ceramics on their composition and structure"*, funded by the NAS of Ukraine
2007–2009	II-14-07 (P8.16/2007) *"Investigation of forming regularities of multilayered erosion-resistive coatings, obtained by means of ion-plasma sputtering of materials, for increasing resources of gas-turbine engines compressor blades and for their repairing"*, funded by the NAS of Ukraine

2009–2011 III-91-09 (1180) *"Designing and development of the model of multi-anvil two-step high pressure apparatus for research of nanostuctured superhard materials synthesis"*, funded by the NAS of Ukraine

2010–2012 II-30-10 (P8.6-2010) *"Improvement of operational reliability of gas turbine engines by means of using the multilayer metal-ceramic coatings obtained by ion-plasma spraying of materials"*, funded by the NAS of Ukraine

2012–2014 III-116-12 (1183) *"Study of boron carbide- and aluminium nitride-based materials sintering with additions of refractory compounds of V, Ti, Mo, Si and optimization of structure and physico-mechanical properties"*, funded by the NAS of Ukraine

2013–2015 III-128-13 (1184) *"Investigation of regularities of structure formation of ceramic materials based on system B–C–N–Al–Si and doped with conductive inclusions diamond single crystals at high pressure"*, funded by the NAS of Ukraine

2021–2023 III-5-21 (1187) *"Development of methods for computer modeling of stress-strain and boundary conditions of structural elements of six-punch AVT and determination of optimal conditions for generating pressure in it"*, funded by the NAS of Ukraine

Conference activities:
Chairman of Orgcommittee of the *International Conference "High Pressure Effects on Materials", Kyiv, ISM NASU, June 28 – July 1, 2011*

Editorial board:
Co-Editor of the *International Conference "High Pressure Effects on Materials", Kyiv, ISM NASU, June 28 – July 1, 2011, Abstr's & Prst's, Ed. M. V. Novikov, V. Z. Turkevych, O. O. Lyeshchuk, NAS of Ukraine, Bakul Inst. Superhard Mater., Kyiv, EPC ALCON, 2012, 400 p.*

Publications: 129
LIST of English-language publications:

1. N. V. Novikov, V. I. Levitas, S. I. Shestakov, A. A. Leshchuk, G. V. Dushinskaya, Simulation of electrical, temperature and thermal-stress fields in a high-pressure apparatus by the finite-element method, in Soviet J. Superhard Mater., 1983, Vol. 5, No. 3, p. 1.
2. N. V. Novikov, V. I. Levitas, A. A. Leshchuk, Numerical simulation of material stability zones in the working volumes of high pressure equipment, Ibid, 1984, Vol. 6, No. 4, p. 1.
3. A. S. Tsybenko, V. I. Levitas, S. I. Shestakov, A. V. Idesman, A. A. Leshchuk, A. G. Sokolov, Elastoplastic state in high-pressure apparatus dies, in Strength Mater., 1988, Vol. 20, No. 9, p. 1236.
4. V. I. Levitas, A. V. Idesman, A. A. Leshchuk, S. B. Polotnyak, Numerical modelling of thermomechanical processes in high pressure apparatus applied for superhard materials synthesis, in High Pressure Science and Technology, Proc. XIth AIRAPT Int. Conf., Vol. 4, Kiev, Naukova Dumka, 1989, p. 38.
5. N. V. Novikov, V. I. Levitas, A. A. Leshchuk, A. V. Idesman, Mathematical modelling of diamond synthesis process, in High Pres. Res., 1991, Vol. 7, p. 195.
6. V. I. Levitas, A. A. Leshchuk, Thermomechanical model of diamond nucleation, in Soviet J. Superhard Mater., 1991, No. 3, p. 67.
7. N. V. Novikov, V. I. Levitas, A. A. Leshchuk, A necessary thermomechanical condition for diamond nucleation, in XXIX Annual Scientific Meeting of the EHPRG "Physics of Materials under High Pressure", 21–25 Oct. 1991, Thessaloniki, Aristotle University of Thessaloniki, 1991, p.123.
8. N. V. Novikov, V. I. Levitas, A. A. Leshchuk, A model of graphite-diamond phase transition allowing for inhomogeneity of the stress-strain state and interface motion resistance, in XXX Annual Meeting of the EHPRG, Azerbaijan Republic, Baku, Oct. 5–9, 1992, p. 75.

9. V. I. Levitas, A. A. Leshchuk, Thermomechanics of phase transitions in the graphite-melt-diamond system with regard for stress state inhomogeneity, in Bull. Amer. Phys. Soc., 1993, Vol. 38, No. 6, p. 1595.
10. N. V. Novikov, A. A. Leshchuk, Physico-mechanical model of the reaction medium in synthesizing superhard materials in high pressure apparatus, in EMRS 1993 Fall Meeting, 4th European East-West Conf. & Exibithion on Materials and Process, St-Petersburg, Oct. 17–21, 1993, Vol. II, 1993, p. 41.
11. N. V. Novikov, A. A. Leshchuk, Thermomechanical model of graphite-to-diamond phase transition, in XXXII Annual Meeting of the European High Pressure Research Group "High Pressure in Material Science and Geoscience", 29th Aug. – 1st Sept. 1994, Brno, Tech. Univ. Brno, 1994, p. 37.
12. N. V. Novikov, A. A. Leshchuk, Modelling of thermomechanical parameters of diamond mass crystallization process at high pressures and temperatures, in ICCGXI, The Eleventh Int. Conf. on Crystal Growth, The Hague (The Netherlands), June 18–23, 1995, p. 260.
13. A. A. Leshchuk, Thermomechanical conditions of nucleation and growth of diamond crystals from graphite, Ibid, p. 456.
14. A. A. Leshchuk, Thermomechanical model of the graphite-to-diamond phase transformation, in Int. Conf. "The Current State and Future of High Pressure Physics", Troitsk, Russia, Sept. 7–9, 1995, Inst. for High Pres. Phys., Rus. Ac. Sci., 1995, p. 38.
15. N. V. Novikov, A. A. Leshchuk, A. V. Idesman, Thermomechanical state of a HPA reaction cell in diamond synthesis, Ibid, p.47.
16. A. A. Leshchuk, N. V. Novikov, A. P. Maydanyuk, Thermomechanical state of a HPA reaction cell at the graphite-to-diamond phase transition, in High Pressure Science and Technology, Proc. Joint XV AIRAPT & XXXIII EHPRG Int. Conf, Singapore, World Sci. Publishing, 1996, p. 225.
17. A. A. Leshchuk, Thermomechanical description of a process of diamond synthesis from graphite-metal mixture, in 3rd EUROMECH Solid Mechanics Conference, KTH, Royal Institute of Technology, Stockholm, Sweden, Aug. 18–22, 1997, p. 168.
18. A. A. Leshchuk, Thermomechanical conditions of nucleation and growth of diamond crystals from graphite, Ibid, p. 169.
19. N. V. Novikov, A. A. Leshchuk, S. B. Polotnyak, A. V. Idesman, V. I. Levitas, Numerical modelling of thermomechanical processes in solid-phase high and ultra-high pressure apparatuses, in IUTAM Symposium "Micro- and Macrostructural Aspects of Thermoplasticity", Bochum, Germany, Aug. 25–29, 1997, Ruhr-Universitat Bochum, p.66.
20. A. A. Leshchuk, N. V. Novikov, A. P. Podoba, S. V. Shmegera, A. Witek, Modeling of diamond spontaneous crystallization process for obtaining crystals with high thermophysical properties, in J. High Pres. School, Proc. High Pres. School'3, 3rd Int. School on High Pressure Techniques and Advanced High Pressure Research Topics, Warsaw, Poland, Sept. 13–16, 1999, Vol. 1, p. 88.
21. J. V. Kopan, V. S. Kopan, A. A. Leshchuk, A. P. Podoba, The influence of Laplace pressure in the diameter distribution of diamond nanoparticles and the compaction of nanostructural diamond material, Ibid, p. 129.
22. A. Leshchuk, Two-level thermomechanical model of a diamond crystallization in a graphite-metal mixture at high pressure and temperature, in Mater. Res. Soc. Symp. Proc., 2000, 653, p. 502.
23. A. Leshchuk, Numerical modelling of coupled processes of electrical and heat conduction and thermoplasticity with account of phase transitions of materials, in Book Abst. Annual Sci. Conf. GAMM 2001 at the Swiss Fed. Inst. Technol. in Zürich, Feb. 12–15, 2001, p. 80.
24. A. A. Leshchuk , N. V. Novikov , V. I. Levitas, Computer simulation of physical and mechanical processes running in the reaction cells of high-pressure installations in the course of synthesis of diamonds, in Strength Mater., 2001, Vol. 33, No. 3, p. 277.
25. A. A. Leshchuk, A. I. Borimsky, N. V. Novikov, Computer-aided modelling of diamond crystallization regions in high pressure apparatus, in Superhard tool materials on the turn of the centuries: production, properties, applications: Materials Int. Conf., 4–6 July 2001, Kiev, p. 107.

26. A. A. Leshchuk, Computer-aided modeling of diamond crystallization regions in high-pressure apparatus, in Int. Appl. Mech., 2001, Vol. 37, No. 7, p. 941.
27. A. A. Leshchuk, N. V. Novikov, V. I. Levitas, Thermomechanical model for graphite-to-diamond phase transformation, in J. Superhard Mater., 2002, Vol. 24, No. 1, p. 49.
28. N. V. Novikov, A. A. Leshchuk, A. I. Borimskii, Computer-aided modeling of the crystallization regions of diamonds of different habits in cylindrical high-pressure apparatuses, in J. Superhard Mater., 2002, Vol. 24, No. 2, p. 3.
29. I. A. Borimsky, A. A. Leshchuk, Studies of the temperature fields in recessed anvil-type high-pressure apparatus in synthesis of cubic boron nitride, in J. Superhard Mater., 2003, Vol. 25, No. 5, p. 22.
30. N. V. Novikov, A. A. Leshchuk, L. I. Aleksandrova, A. I. Borimsky, A. N. Vashchenko, Experimental studies of diamond crystallization zones in a recessed anvil-type high pressure apparatus, in J. Superhard Mater., 2003, Vol. 25, No. 6, p. 21.
31. O. O. Leshchuk, O. P. Antonyuk, T. O. Prikhna, V. E. Moshchil, Modeling of temperature fields and temperature stresses in high pressure apparatus used for treating samples of high-temperature superconductors, in J. Superhard Mater., 2004, Vol. 26, No. 1, p. 1.
32. N. V. Novikov, A. I. Borimskiy, A. A. Leshchuk, S. B. Polotnyak, A. P. Antonyuk, Modeling of thermomechanical state of components of a high pressure apparatus for synthesis of diamond grits with a well-developed specific surface, in J. Superhard Mater., 2004, Vol. 26, No. 4, p. 1.
33. N. V. Novikov, V. V. Ivzhenko, A. A. Leshchuk, V. A. Popov, G. F. Sarnavskaya, A. P. Antonyuk, Experimental studies and simulation of injection-induced molding of intricate products from engineering ceramics, in J. Superhard Mater., 2004, Vol. 26, No. 5, p. 1.
34. N. V. Novikov, V. V. Ivzhenko, V. A. Popov, A. A. Leshchuk, G. F. Sarnavskaya, Equipment for injection molding of thermosetting materials based on ceramic and metal-ceramic powders, in Powder Metall. Met. Ceram., 2004, Vol. 43, Nos. 9–10, p. 538.
35. O. Lyeshchuk, Computer-aided modeling of diamond crystallization zones in HPA, in Book Abst. GAMM Annual Meeting 2006, Berlin, Technische Universitat Berlin, 2006, p. 211.
36. O. O. Lyeshchuk, Computer-aided modeling of high-pressure/high-temperature processing of materials, in 8th World Congress on Computational Mechanics WCCM8, 5th European Congress on Computational Methods in Applied Sciences and Engineering ECCOMAS 2008, Venice, Italy, 30 June – 4 July 2008, Eds.: B. A. Schrefler and U. Perego, Barcelona, CIMNE, 2008, e-Edition.
37. A. A. Leshchuk, T. O. Tsysar', V. V. Ivzhenko, Computer modeling of the heat transfer processes in injection molding, in J. Superhard Mater., 2009, Vol. 26, No. 2, p. 97.
38. O. Lyeshchuk, Computational modeling of superhard materials synthesis, in Int. Conf. on Materials for Advanced Technologies 2009 (ICMAT 2009) and Int. Union of Materials Research Societies – Int. Conf. in Asia 2009 (IUMRS – ICA 2009), 28 June – 3 July 2009, Singapore, Abs. Symp. Q. Computational Materials Design at All Scales: From Theory to Application, Singapore, 2009, p. 52.
39. O. Lyeshchuk, Multiphysics problems in superhard materials synthesis, in IV Europ. Conf. on Computational Mechanics: Solids, Structures and Coupled Problems in Engineering (ECCM 2010), Paris, France, May 16–21, 2010, e-Edition.
40. O. Lyeshchuk, Computational modeling of superhard materials synthesis, in Comp. Mater. Sci., 2010, Vol. 49, No. 1S, p. 85.
41. O. O. Lyeshchuk, S. B. Polotniak, M. V. Novikov, Thermomechanical approach to the modeling of HP–HT material processing, in Int. Conf. on High Pressure Science and Technology AIRAPT-23, Sept. 25–30, 2011, Bhabha Atomic Research Centre, Mumbai, India, 2011, p. 227.
42. Int. Conf. "High Pressure Effects on Materials", Kyiv, ISM NASU, June 28 – July 1, 2011: Abstr's & Prst's / Ed. M. V. Novikov, V. Z. Turkevych, O. O. Lyeshchuk; NAS of Ukraine. Bakul Inst. Superhard Mater. – Kyiv: EPC ALCON, 2012. – 400 p.
43. O. O. Lyeshchuk, S. B. Polotniak, M. V. Novikov, Thermomechanical approach to the modeling of HP–HT material processing, in Int. Conf. "High Pressure Effects on Materials", Kyiv, ISM NASU, June 28 – July 1, 2011, Abstr's & Prst's, Kyiv, EPC ALCON, 2012, p. 213.

44. O. O. Lyeshchuk, S. B. Polotniak, M. V. Novikov, Thermomechanical approach to the modeling of HP–HT material processing, in J. Phys.: Conf. Ser., 2012, Vol. 377, art. 012095.
45. Tetiana Tsysar, Oleksandr Lyeshchuk, Computer-aided simulation of ceramic injection moulding, in E-MRS Fall Meeting, 2013, E4, e-Edition.
46. I. N. Ievdokymov, A. A. Leshchuk, O. N. Kaidash, The finite element analysis of the crack growth in ceramic materials based on B_4C, in 4th Int. Samsonov Memorial Conf. "Materials Science of Refractory Compounds", Conf. Abst., May 21–23, 2014, Kyiv, Ukraine, p. 51.
47. V. V. Ivzhenko, A. O. Kryl', Ya. A. Kryl', O. N. Kaidash, A. A. Leshchuk, S. N. Dub, G. F. Sarnavskaya, Study of aeroabrasive wear of hot-pressed materials of the $B_4C–TiB_2$ system, in J. Superhard Mater., 2014, Vol. 36, No. 3, p. 187.
48. I. P. Fesenko, V. I. Chasnyk, O. F. Kolomys, O. M. Kaidash, N. K. Davydchuk, T. B. Serbenyuk, E. F. Kuz'menko, M. P. Gadzyra, O. O. Lyeshchuk, V. V. Strel'chuk, V. B. Galyamin, S. V. Tkach, E. I. Fesenko, P. S. Shmegera, Yu. I. Azima, H. Recht, H. Vollstädt, Studies of the ceramic material produced by pressureless sintering from the $AlN–Y_2O_3–(SiC–C)$ powder composition using electron microscopy, Raman spectroscopy and measurements of the thermal conductivity and microwave radiation, in J. Superhard Mater., 2015, Vol. 37, No. 2, p. 73.
49. T. S. Panasyuk, O. O. Lyeshchuk, V. V. Lusakovs'kyi, V. A. Kalenchuk, O. O. Zanevs'kyi, Modeling of temperature fields in the growth volume of the high-pressure cell of the six-punch high pressure apparatus in growing of diamond crystals by *T*-gradient method, in J. Superhard Mater., 2017, Vol. 39, No. 6, p. 390.
50. O. V. Bovsunovskyi, S. B. Polotnyak, V. V. Lusakovskyi, O. O. Lyeshchuk, S. O. Ivakhnenko, Computer-aided simulation of the stress-strain and limit states of the pyrophyllite cell and punches of a six-punch high-pressure apparatus, in J. Superhard Mater., 2020, Vol. 42, No. 2, p. 58.