

CURRICULUM VITAE

Antonina N. KRAVTSOVA



Born

Azov, Rostov region (Russia) 20 April 1979

Education and Degrees

- 2004 *Ph.D.* in Physics, Rostov State University (Russia) with Thesis “Electronic Structure of Some Compounds of Transition Metals”
- 2001 Distinction Diploma in Physics (specialty – “X-ray spectroscopy”), Rostov State University (Russia)

Position

- 2015–today Senior Researcher at International Research Center “Smart Materials”, Southern Federal University (Rostov-on-Don, Russia)
- 2008-2015 Associated Professor at Physics Department, Southern Federal University (Rostov-on-Don, Russia)
- 2006-2008 Senior lecturer at Faculty of Physics, Southern Federal University (Rostov-on-Don, Russia)
- 2005-2006 Assistant at Faculty of Physics, Rostov State University (Rostov-on-Don, Russia)

Research activity

- 2015-today Senior Researcher at International Research Center “Smart Materials”, Southern Federal University (Russia)
- 2007-2014 Researcher at Research Center for Nanoscale Structure of Matter, Southern Federal University (Russia)
- 2002-2007 Researcher at Laboratory of X-ray spectroscopy, Rostov State University (Russia)

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Fields of interest

- theoretical and experimental investigation of local atomic geometry and electronic structure in various types of condensed matter including:
 - geological materials
 - nanostructures (quantum dots, nanoclusters, nanoalloys)
- effects and properties under the study:
 - 3D local atomic structure of complex condensed materials
 - electronic structure (density of states and fine details of hybridization of electronic states) of condensed materials

Methods:

- Experimental X-ray absorption (X-ray Absorption Near Edge Structure – XANES and Extended X-ray Absorption Fine Structure - EXAFS) studies
- Full multiple scattering XANES/ELNES simulations (**FEFF9**, **G4XANES** program codes)
- Non-muffin-tin finite difference method for XANES simulations (**FDMNES** code)
- Full-potential band structure calculations (**Wien2k** code)
- Density functional theory (DFT) using pseudopotentials (**VASP** code)
- Advanced DFT quantum chemistry calculations (**ADF** code)

Scientific publications

Published **45** papers in refereed journals:

1. **A.N. Kravtsova**, A.A. Guda, A.V. Soldatov, J. Goettlicher, V.K. Taroev, A.A. Kashaev, L.F. Suvorova, V.L. Tauson. X-ray Spectral Diagnostics of Synthetic Lanthanide Silicates. *Optics and Spectroscopy*. **119**, N. 6 (2015) 982-986.

2. **A.N.Kravtsova**, M.A.Soldatov, S.A.Suchkova, V.V.Butova, M.B. Fayn, A.L.Bugaev, A.V.Soldatov. Atomic and electronic structure of CdS Quantum Dots. *Journal of Structural Chemistry* **56**, N. 3 (2015) 578-584.
3. **A.N.Kravtsova**, K.A.Lomachenko, S.A.Suchkova, I.A.Pankin, M.B. Fayn, A.L.Bugaev, A.V.Soldatov. Dopped Quantum Dots of CdTe Family. *Bulletin of the Russian Academy of Sciences. Physics* **79**, N. 11 (2015) 1413-1416.
4. **A.N. Kravtsova**, S.A. Suchkova, M.B. Fayn, A.V. Soldatov. In silico Investigation of Atomic and Electronic Structure of CdTe Quantum Dots Doped by Rare-Earth Elements. *Journal of Structural Chemistry* (2015) (in press).
5. O.E. Polozhentsev, M.A. Bryleva, **A.N. Kravtsova**, V.K. Kochkina, A.V. Soldatov. Icosahedral phase formation in an Al-Cu-Fe quasicrystal. *Bulletin of the Russian Academy of Sciences. Physics* **79**, N. 9 (2015) 1173-1179.
6. **A.N. Kravtsova**, K.A. Lomachenko, A.V. Soldatov, J. Meyer, G. Niedner-Schatteburg, S. Peredkov, W. Eberhardt, M. Neeb. Atomic and electronic structure of free niobium nanoclusters: Simulation of the $M_{4,5}$ -XANES spectrum of Nb_{13}^+ . *Journal of Electron Spectroscopy and Related Phenomena* **195** (2014) 189–194.
7. A. Guda, N. Smolentsev, M. Rovezzi, E.M. Kaidashev, V.E. Kaydashev, **A.N. Kravtsova**, V.L. Mazalova, A.P. Chaynikov, E. Weschke, P. Glatzel, A.V. Soldatov. Spin-polarized electronic structure of the core-shell ZnO/ZnO:Mn nanowires probed by x-ray absorption and emission spectroscopy. *Journal of Analytical Atomic Spectrometry* **28** (10) 2013 1629-1637.
8. I.S. Rodina, **A.N.Kravtsova**, A. V. Soldatov, G.E.Yalovega, Yu.V. Popov, N.I. Boiko. X-ray spectroscopic identification of the gartens from Taman peninsula. *Optics and spectroscopy* **115**, No. 6 (2013) 962.
9. M.A. Kremennaya, M.A. Soldatov, A.P. Chaynikov, Yu.S. Podkovyrina, A.L. Bugaev, K.A. Lomachenko, **A.N. Kravtsova**. X-ray Spectral Investigation and Computer Modeling of Local Atomic Structure of Copper Binding Site in Amyloid-beta. *Don Ingeniering bulletin* N. 2 (2013). (in Russian).
10. M.A. Bryleva, **A.N. Kravtsova**, I.N. Shcherbakov, L.D. Popov, Kogan, Yu.P. Tupolova, S.I. Levchenkov, Y.V. Zubavichus, A.L. Trygub, A.V. Soldatov. Analysis of a Local

- Atomic structure of Cu (II) Complexes with Diacetyl Monooxime 1'-phthalazinylylhydrazone by Means of X-ray absorption spectroscopy and Magnetochemistry. *Journal of Structural Chemistry* **53**, N. 2 (2012) 297-306.
11. Yu.O. Smirnova, O.E. Polozhentsev, D.V. Leontieva, A.P. Chainikov, S.A. Suchkova, A.A. Guda, K.A. Lomachenko, N.Yu. Smolentsev, Yu.S. Podkovyrina, M.A. Soldatov, **A.N. Kravtsova**, A.V. Soldatov. Development of the New Method for Determination of 3D Nano Atomic and Electronic Structure of Materials Based on XAFS, XRD and Raman Techniques. *Don Ingeniering bulletin* (2012) (in Russian).
 12. A.A. Guda, N. Smolentsev, J.Verbeek, E.M. Kaidashev, Y. Zubavichus, **A.N. Kravtsova**, O.E. Polozhentsev, A.V. Soldatov. X-ray and electron spectroscopy investigation of the core-shell nanowires of ZnO:Mn. *Solid State Communications* **151** (2011) 1314-1317.
 13. I.S. Rodina, **A.N. Kravtsova**, A.V. Soldatov, A. Berry. Investigation of Local Atomic and Electronic Structure of Titanium-Bearing Forsterite: X-ray Absorption Spectra Analysis. *Optics and Spectroscopy* **111** (2011) 936-939.
 14. A.V. Soldatov, S.A. Suchkova, M.A. Soldatov, V.L. Mazalova, A.A. Guda, **A.N. Kravtsova**. Personal Supercomputer for Multiscale Computer Modelling of Materials for Nano-bio-medical Technologies. *Izvestiya Vuzov. Severo-Kavkazskii Region. Natural Sciences*. Special issue (2011) 62-65.
 15. V.L. Mazalova, **A.N. Kravtsova**, N.Yu. Smolentsev, A.A. Guda, A.V. Soldatov, Interconnection of Nanoscale Atomic and Electronic Structures of Nanoclusters and Thin Semiconductor Films Irradiated by Ions: Multiscale Computer Modelling. *Izvestiya Uzhnogo Federalnogo Universiteta. Technical Sciences*. Them. issue (2011) 128-133.
 16. **A.N. Kravtsova**, A.A. Guda, V.L. Mazalova, A.V. Soldatov, R.L. Jonston. Electronic Structure of Titanium Nanoclusters: Density Functional Theory Analysis. *Nanostructures: Mathematical Physics and Modeling* **4**, N. 1 (2011) 15-22 (in Russian).
 17. J. Verbeeck, S. Bals, **A.N. Kravtsova**, D. Lamoen, M. Luysberg, M. Huijben, G. Rijnders, A. Brinkman, H. Hilgenkamp, D. H. A. Blank, and G. Van Tendeloo. Electronic reconstruction at *n*-type SrTiO₃/LaAlO₃ interfaces. *Physical Review B* **81** (2010) 085113.
 18. M.A. Evsyukova, **A.N. Kravtsova**, I.N. Shcherbakov, L.D. Popov, Yu.P. Tupolova, S.I. Levchenkov, Y.V. Zubavichus, A.L. Trygub, A.V. Soldatov. The atomic structure of

copper bromide based on benzoin (phthalazin-1-yl)hydrazone: DFT and XANES analysis. *Journal of Structural Chemistry* **51**, N 6 (2010) 1114-1118.

19. **A.N. Kravtsova**, A.V. Soldatov, M. Nachtegaal, M.W. Tew, J.A. van Bokhoven. Influence of the muffin-tin approximation on the simulation of titanium K-edge X-ray absorption spectra of TiO₂ (rutile and anatase phases). *Physica B: Condensed Matter* **405** (2010) 724-726.
20. I.S. Rodina, **A.N. Kravtsova**, M.A. Soldatov, A.V. Soldatov, A.J. Berry. Electronic Structure of Ilmenite: X-ray Absorption and DFT Study. *Journal of Physics: Conference Series* **190** (2009) 012181.
21. G.B. Sukharina, **A.N. Kravtsova**, A.V. Soldatov, Y.V. Zubavichus, N.A. Kryuchkova, L.N. Mazalov. Analysis of the X-ray Absorption Spectra near the Cobalt K-edge of the Co(2,2'-Bipy)(i-Bu₂PS₂)₂ complex. *Journal of Physics: Conference Series* **190** (2009) 012148.
22. A.V. Soldatov, **A.N. Kravtsova**, G.E. Yalovega, S.Q. Wei, W.S. Yan. The Atomic Structure of Fe_{100-x}Cu_x Nanoalloys: X-ray Absorption Analysis. *Journal of Alloys and Compounds* **469** (2009) 42-49.
23. G.B. Sukharina, A.V. Soldatov, **A.N. Kravtsova**, L.N. Mazalov, S.V. Trubina, S.B. Erenburg, N.V. Bausk, N.A. Kruchkova. Analysis of Ni K-Edge X-ray Absorption Near Edge Structure in Ni((C₂H₅O)₂PS₂)₂. *Journal of Surface Investigation. X-ray, Synchrotron and Neutron Techniques* **3**, N 3 (2009) 457-459.
24. **A.N. Kravtsova**, V.L. Mazalova, G.E. Yalovega, A.V. Soldatov, R.L. Johnston. Analysis of the X-ray Absorption Fine Structure near the Ti L_{2,3}-Edge in Free Titanium Nanoclusters. *Journal of Surface Investigation. X-ray, Synchrotron and Neutron Techniques* **3**, № 1 (2009) 38-40.
25. A.V. Kostenko, M.C. Feiters, **A.N. Kravtsova**, A.V. Soldatov. Determination of Local Atomic Structure of the Active Site of the Bromperoxidase Protein on the Basis of X-ray Absorption Spectra Analysis. *Journal of Surface Investigation: X-ray, Synchrotron and Neutron Techniques* **12** (2008) 85-89.
26. A.V. Soldatov, G. Yu. Smolentsev, **A.N. Kravtsova**, V.L. Mazalova, I.E. Stekhin, T.S. Belikova. X-ray Absorption Spectroscopy for the Analysis of 3D Nanoscale Structure of Matter. *Industrial Laboratory- Diagnostics of the Materials* **10** (2008) 28-31.

27. A.V. Soldatov, **A.N. Kravtsova**, L.N. Mazalov, S.V. Trubina, N.A. Kruchkova, G.B. Sukharina. Analysis of the Fine Structure of XANES Spectra over Ni *K*-Edge in Ni(EtOCS₂)₂. *Journal of Structural Chemistry* **48** (2007) 1061-1065.
28. V. Mazalova, **A. Kravtsova**, G. Yalovega, A. Soldatov, P. Piseri, T. Mazza, C. Lenardi, G. Bongiorno, P. Milani. Free Small Nanoclusters of Titanium: XANES Study. *Nuclear Instruments and Methods in Physics Research A* **575** (2007) 165-167.
29. A. Soldatov, G. Yalovega, G. Smolentsev, **A. Kravtsova**, D. Lamoen, C. Balasubramanian, A. Marcelli, G. Cinque, S. Bellucci. Nanophases of AlN: Atomic and Electronic Structure. *Nuclear Instruments and Methods in Physics Research A* **575** (2007) 85-87.
30. A.V. Soldatov, G. Smolentsev, **A. Kravtsova**, G. Yalovega, M.C. Feiters, G.A. Metselaar, Y. Joly. X-ray Absorption Near-Edge Spectroscopic Study of Nickel Catalysts. *Radiation Physics and Chemistry* **75** (2006) 1866–1868.
31. A.V. Soldatov, A. Guda, **A. Kravtsova**, M. Petracic P.N.K. Deenapanray, M.D. Fraser, Y.-W. Yang, P.A. Anderson, S.M. Durbin. Nitrogen Defect Levels in InN: XANES Study. *Radiation Physics and Chemistry* **75** (2006) 1635-1637.
32. A.V. Soldatov, **A.N. Kravtsova**. Analysis of the Polarization Dependence of the N *K*-edge X-ray Absorption Fine Structure in InN. *Optics and Spectroscopy* **101** (2006) 260-262.
33. M.C. Feiters, G.A. Metselaar, B.B. Wentzel, R.J.M. Nolte, S. Nikitenko, D.C. Sherrington, Y. Joly, G.Yu. Smolentsev, **A.N. Kravtsova**, A.V. Soldatov. X-ray Absorption Spectroscopic Studies on Nickel Catalysts for Epoxidation. *Industrial and Engineering Chemistry Research* **44** (2005) 8631-8640.
34. A.V. Soldatov, **A.N. Kravtsova**, E.N. Fedorovich, A. Ankudinov, A. Moewes, E.Z.Kurmaev. Analysis of the Electronic Structure of Human Hemoglobin from Soft X-ray Emission. *Journal of Electron Spectroscopy and Related Phenomena* **144-147** (2005) 279-282.
35. **A.N. Kravtsova**, I.E. Stekhin, A.V. Soldatov, M.E. Fleet, S.L. Harmer. Local and Electronic Structure of FeS, CoS, NiS: Ultrasoft Sulfur *L*_{2,3} X-ray Absorption Spectra Analysis. *Journal of Electron Spectroscopy and Related Phenomena* **144-147** (2005) 525-527.

36. A.V. Soldatov, **A.N. Kravtsova**, M.E. Fleet, X. Liu. Unoccupied Electronic States of MgS, CaS, FeS: X-ray Absorption Fine Structure Theoretical Analysis. *Physica Scripta* **T115** (2005) 323-325.
37. **A.N. Kravtsova**, I.E. Stekhin, A.V. Soldatov, X. Liu, M.E. Fleet. Electronic Structure of MS ($M = \text{Ca, Mg, Fe, Mn}$): X-ray Absorption Analysis. *Physical Review B* **69** (2004) 134109.
38. A.V. Soldatov, **A.N. Kravtsova**, I.S. Rodina, A.N. Mansour. Study of the Local Structure of the Cathode Material Li_xNiO_2 ($x= 0.7$): Analysis of the Near-Edge Fine Structure of the X-ray Absorption Spectra. *Optics and spectroscopy* **96** (2004) 929-932.
39. A.V. Soldatov, **A.N. Kravtsova**, M.E. Fleet, S.L. Harmer. Electronic Structure of MeS ($\text{Me} = \text{Ni, Co, Fe}$): X-ray Absorption Analysis. *Journal of Physics: Condensed Matter* **16** (2004) 7545-7556.
40. **A.N. Kravtsova**, A.V. Soldatov, I.E. Stekhin, S.Q. Wei, W.S. Yan. Local Structure of $\text{Fe}_{100-x}\text{Cu}_x$ Nanoalloys: X-ray Absorption Spectra Analysis. *Crystallography Reports*. **49**, Suppl. 1 (2004) S148-S152.
41. **A.N. Kravtsova**, I.E. Stekhin, A.V. Soldatov, X. Liu, M.E. Fleet. Sulfur K -edge XANES Study in Iron Sulfide. *Frascati Physics Series* **XXXII** (2003) 173-178.
42. **A.N. Kravtsova**, I.E. Stekhin, A.V. Soldatov, X. Liu, M.E. Fleet. Fine Structure Analysis of X-ray Absorption at S $L_{2,3}$ -edge in MgS, CaS, MnS. *Surface investigation: x-ray, synchrotron and neutron techniques* **N 11** (2003) 73-76.
43. W. Drube, T.K Sham, **A. Kravtsova**, A.V. Soldatov. Fine Structure of Unoccupied Ag d -states near the Fermi Level in Ag and AgPd Studied by High-Resolution Partial Auger Yield Spectroscopy at the Ag L_3 -edge. *Physical Review B* **67** (2003) 035122.
44. **A.N. Kravtsova**, I.E. Stekhin, A.V. Soldatov, X.Liu, M.E. Fleet. B1 Phase of FeS in $\text{Mg}_{1-x}\text{Fe}_x\text{S}$ Solid Solution: X-ray Absorption Study. *Physica Status Solidi (b)* **234**, No. 2 (2002) R4-R5.
45. S.P. Farrel, M.E. Fleet, I.E. Stekhin, **A. Kravtsova**, A.V. Soldatov. Evolution of Local Electronic Structure in Alabandite and Niningerite Solid Solutions [(Mn,Fe)S, (Mg,Mn)S, (Mg,Fe)S] using Sulfur K - and L -edge XANES Spectroscopy. *American Mineralogist* **87** (2002) 1321-1332.

Published **1 monograph**:

1. V.L. Mazalova, A.N. Kravtsova, A.V. Soldatov. Nanoclusters: X-ray Spectral Investigation and Computer Modeling. – Moscow: Physmatlit. – 2012. – 230 pp. – ISBN 978-5-9221-1457-8.

Awards

- 2009 Winner (Third Prizes) at The Second International Competition of Scientific Papers in Nanotechnology for Young Researchers (The Second Nanotechnology International Forum, October 6 – 8, 2009, Moscow)

Attracting of external funding

- 2014-2015 Nanodiagnostics of microelements environment in geological materials: X-ray Investigation and computer modeling, Russian Foundation for Basic Research, grant 14-05-00580.
- 2012 Nanoscale atomic and electronic structure of geological materials: XANES, DFT and MD Insight, DAAD G-RISC P-2012a-13 (Germany).
- 2011 Local and electronic structure of multivalently bound amino ligands on noble metal nanoparticles: XANES and DFT analysis, DAAD G-RISC P-2011b-x2 (Germany).
- 2010-2011 Local atomic, electronic and magnetic structure of nanoclusters of magnetic materials: multiscale computer modeling and nanodiagnostics using synchrotron radiation, President of Russian Federation, grant MK-4283.2010.2
- 2010 Investigation of atomic geometry, electronic and magnetic structure of some diluted magnetic semiconductors and molecular magnets, German Academic Exchange Service, grant A/10/01056
- 2007-2008 Local 3D atomic and electronic structure of free nanoclusters of Ti atoms within size range starting from several atoms up to one thousand of atoms, grant INTAS YSF 06-1000014-6562
- 2006-2007 Ti nanoclusters: Local and electronic structure, President of Russian Federation, grant MK-4486.2006.2

2005-2006 Visiting postdoctoral fellowship, Research Foundation-Flanders, number GP.067.05N

Conference and workshop participation

- 2015 The International Joint School “Smart Nanomaterials and X-ray Optics 2015. Modeling, Synthesis and Diagnostics” (IWSN 2015) (September 27-30, 2015, Rostov-on-Don, Russia)
- 2015 16th International Conference on X-ray Absorption Fine Structure (XAFS16) (August 23-28, 2015, Karlsruhe, Germany)
- 2015 International Conference on “Physics and Mechanics of New Materials and Their Applications” (PHENMA 2015) (May 19-22, 2015, Azov, Russia)
- 2014 The International Joint School “Smart Nanomaterials and X-ray Optics 2014. Modeling, Synthesis and Diagnostics” (September 22-25, 2014, Kaliningrad, Russia)
- 2014 XX Russian Synchrotron Radiation Conference SR-2014 (July 7-10, 2014, Novosibirsk, Russia)
- 2013 XXI Russian Conference “X-ray and electron spectra and chemical bond” (October 7-11, 2013, Novosibirsk, Russia)
- 2012 German-Russian Conference on Fundamentals and Applications of Nanoscience (May 19-21, 2012, Berlin, Russia)
- 2011 VIII National Conference “X-ray Synchrotron Radiation, Neutrons and Electrons for Investigation of Nanosystems and Materials” (November 14-18, 2011, Moscow, Russia)
- 2011 IV International Conference “Actual Problems of Biology, Nanotechnology and Medicine” (September 22-25, 2011, Rostov-on-Don, Russia)
- 2010 Interdisciplinary Seminar “Information and Communication Technology” (May 25 – June 1, 2010, Novorossiysk, Russia)
- 2009 The Second Nanotechnology International Forum (October 6 – 8, 2009, Moscow)
- 2009 The Seventh Russian Scientific Conference “Youth of XXI Century: the Future of Russian Science” (May 18-21, 2009, Rostov-on-Don)

- 2006 International Conference on Density Functional Theory (DFT) and Transmission Electron Microscopy (TEM) (Vienna, Austria)
- 2006 12th WIEN2k workshop (Vienna, Austria)
- 2003 International Conference on Using of X-rays, Synchrotron Radiation, Neutrons and Electrons for Materials Study (Moscow, Russia)

Joint works abroad

- 2012 Helmholtz Center Potsdam, German Research Center for Geosciences (Potsdam, Germany)
- 2011 Free University of Berlin (Berlin, Germany)
- 2010 Ludwig-Maximilians-University of Munich (Munich, Germany)
- 2007, 2008 Milan University (Milan, Italy)
- 2005, 2006 University of Antwerp (Antwerp, Belgium)
- 2004 University of Science and Technology of China (Hefei, China)
- 2003 European Synchrotron Radiation Facility (Grenoble, France)

Participation in scientific grants:

- 2014-2015 Researcher for the project of the Ministry of Education and Science of Russia “Computer design, Synthesis and Diagnostics of quantum Nanostructures” (No. 16.148.2014/K)
- 2014-2015 Researcher for the mega-grant of the Government of Russian Federation for state support of the research conducting under supervising of leading scientists “From nanodesign to nanodiagnostics: development of “full cycle laboratory” (contract 14.Y26.31.0001 from 04 March 2014)
- 2014-2015 Researcher for the project of Russian Foundation for Basic Research “Local Atomic and Electronic Structure of Al-Fe-Cu Quasicrystals” (RFBR 14-02-31514-mol_a)
- 2014 Researcher for the project of Russian Foundation for Basic Research “X-ray Spectral Diagnostics and Multi-Scale Computer Modeling for the Study of Heavy Metals Compounds and Actinides in the Soils” (RFBR 14-05-31488-mol_a)

- 2011-2012 Researcher for the project (Monograph Publishing) of Russian Foundation for Basic Research “Nanoclusters: X-ray Spectral Investigation and Computer Modeling” (RFBR 11-02-07050-d)
- 2009-2011 Researcher for Ministry of Science and Education (Russia) project “Fundamental relationships of nanoscale 3D atomic, electronic and magnetic structures of dilute magnetic semiconductors: x-ray absorption analysis and multiscale modeling of spintronics and nanophotonics materials” (RNP 2.1.1.5932)
- 2006-2008 Researcher for Ministry of Science and Education (Russia) project “3D local geometry and electronic structure of nanomaterials (AlN nanoparticles and nanotubes): x-ray absorption analysis” (RNP 2.1.1.1038)
- 2003-2005 Researcher for joint NWO (Netherlands) - RFBR (Russia) project "X-Ray absorption spectroscopic studies of changes in the Ni environment of polymerization and epoxidation catalysts during turnover (03-03-89010_NWO)
- 2003-2004 Researcher for joint NSCF (China) – RFBR (Russia) project "Local and electronic structure of quantum nano-objects Ge/Si Fe/Cu: analysis of x-ray absorption" (02-02-39015-a)

Pedagogic activity

Awards

The winner of the competition “The best young teacher of the South of Russia” organized by the “Center-invest” Bank and “Education and Science of Southern Federal District” Foundation (2015).

Raising the level of pedagogical skill

Successfully completed studies at Excel English School (30.11.2009 – 18.12.2009) (London, Great Britain) attending an English for Academic Purposes Course (72 hours).

Lecture courses

- 2009-2015 Nanoscale Structure of Matter (36 hours program)
- 2011-2015 Concepts of Nanomaterials Synthesis and Microscopy (33 hours program)
- 2011-2015 X-ray Spectral Nanodiagnostics (51 hours program)

Practical courses

- 2012-2015 Multiscale Computer Modeling (36 hours program)

- 2009-2015 Laboratory of Specialization (for students specializing in the field of Solid State Physics) (72 hours program)
- 2009-2011 Current State of Electronic Communications (42 hours program)
- 2005-2009 Laboratory for General Physics (36 hours program)
- 2005-2009 Problem Solving for General Physics (17 hours program, 36 hours program)
- 2005-2009 Informatics and Calculating Physics
- 2007 Calculus of Approximations (36 hours program)

Publishing of Methodological Materials for Teaching Courses

15 methodological publications including publications for teaching courses at Southern Federal University.