Curriculum vitae
OLEG V. BELOV

Personal information:

Name: Oleg V. BELOV

Date of Birth: 19 May 1986

Citizenship: Russian Federation

Marital Status: Married

Office Address: Joint Institute for Nuclear Research, 6 Joliot-Curie St.,
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Education/Degrees:

2003.09 – 2009.01	Master Degree in Human and Environmental Radiation Safety (Engineer-Physicist qualification), Biophysics Department of Dubna State University, Dubna, Russia. Graduated with honours.
2010.04	Candidate of Sciences (Biology). PhD thesis in Radiobiology (code: 03.01.01): “Mathematical modelling of the induced mutagenesis in *Escherichia coli* cells after exposure to ultraviolet radiation”, supervisor Prof. E.A. Krasavin. Place of defence: Faculty of Biology, M.V. Lomonosov Moscow State University, Moscow, Russia.
2019 – present	Preparation for the defence of a Doctor of Science thesis in Radiobiology: “Neurochemical and cellular mechanisms of radiation damage to the central nervous system”.

Professional career:

2005 – 2007	Laboratory Assistant, Laboratory of Radiation Biology, JINR, Dubna.
2007.05 – 2007.06	Summer Associate, NASA Space Radiation Laboratory (NSRL) of Brookhaven National Laboratory, Long Island, NY, USA.
2007.07 – 2007.09	Summer Associate, Biophysics Department, GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany.
2008 – 2009	Engineer, Laboratory of Radiation Biology, JINR, Dubna.
2009 – 2010	Researcher, Laboratory of Radiation Biology, JINR, Dubna.
2010 – 2015	Deputy Head of Radiobiology Department, Laboratory of Radiation Biology, JINR, Dubna.

2015 – 2017 Head of Radiation Neurochemistry Sector, Laboratory of Radiation Biology, JINR, Dubna.

2017 – present Deputy Head of Science Organization and International Cooperation Office, JINR, Dubna.

Teaching activity:

2011 – present Associate Professor, Dubna State University, Dubna, Russia.
Lecture courses: “Biophysics”, “Mathematical Modelling in Biology and Medicine”, “Bioinformatics”.
Supervisor and co-supervisor of 5 Undergraduate theses.
Co-supervisor of a PhD thesis.

Research interests:

Radiobiology; Radiation Biophysics; Heavy-ion Radiobiology, with applications in space radiation protection, radiation medicine and hadron therapy; Radiation-Induced Mutagenesis.

The main scientific activity has been concentrated on the biological effects of ionizing radiations of different quality, in particular, high-energy charged particles, with applications in the field of radiation protection in long-term space missions and radiation therapy. The studies have been also performed in mathematical modelling of radiation-induced effects in bacterial, mammalian and human cells. Recent research activity concentrates on study of the influence of space radiation on the central nervous system (CNS) with experimental methods and mathematical modelling of CNS-related effects after exposure to different radiation modalities.

- 2005 – 2007, Mathematical modelling of the SOS repair in bacterial cells after exposure to ultraviolet radiation. JINR, Dubna.
- 2007, Project in study of apoptosis in human neuronal progenitor cells induced by high and low-LET radiations. Brookhaven National Laboratory, Long Island, NY, USA.
- 2007, Project in simulation for particle radiotherapy. GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany.
- 2008 – 2010, Modelling of radiation-induced mutagenesis in bacterial cells. JINR, Dubna.

- 2011 – 2015, Simulation of DNA double strand break repair in mammalian and human cells. JINR, Dubna.
- 2013 – 2014, Track structure simulation for space radiobiology and radiotherapy applications. JINR, Dubna.
- 2014, Study of the effect of recombinant manganese superoxide dismutase (rMnSOD) on the hematology in mice irradiated by protons. JINR, Dubna.
- 2014 – present, Simulation of radiation damage to neuronal cells and neural networks in mammals and humans. JINR, Dubna.
- 2014 – 2017, Experimental study of radiation damage to brain monoaminergic systems. JINR, Dubna.
- 2015 – present, Radiobiology application developments for the Geant4-DNA project, JINR.
- 2017 – present, Experimental study of neurochemical effects in the central nervous system; behavioural and cognitive alterations induced by heavy charged particles and sparsely ionizing radiations. JINR, Dubna.

Journals:

Referee for:

- *Radiation Biology (Rad.Biol.),*
- *European Journal of Medical Physics (Physica Medica),*
- *PLOS Computational Biology (PLOS Comput. Biol.),*
- *Journal of Theoretical Biology (J.Theor.Biol.),*
- *Bulletin of Mathematical Biology (B.Math.Biol.),*
- *International Journal of Biomathematics (Int.J.Biomath.),*
- *Applied Mathematics & Information Sciences (Appl.Math.Inf.Sci.).*

Committees/Councils:

- Scientific Secretary, Programme Advisory Committee for Condensed Matter Physics, JINR, Dubna (2009 – present).
- Member, Science and Technology Council, Laboratory of Radiation Biology, JINR, Dubna (2010–2017).
- Member of international boards and organizing committees of more than 10 conferences and meetings.

Grants:

- PI of the following cooperation projects:
  - "Neurochemical studies of neurotransmitters in brain tissue after exposure to neutrons, protons, and gamma rays", iThemba LABS-JINR, RSA-JINR cooperation programme (2017–present).
  - "Extending Geant4-DNA for the modeling of late biological end-effects", IN2P3-JINR, France-JINR cooperation programme (2017).
  - "Mathematical modelling of radiation effects in the central nervous system", Cairo University-JINR, ARE-JINR cooperation programme (2015–2016).
  - "Theory and models of radiation damage at molecular level", DRD NPI ASCR-JINR, Grant of Plenipotentiary of Czech Republic (2013).
  - "Theory and models of radiation damage at molecular level", DRD NPI ASCR-JINR, Czech Republic–JINR cooperation programme (2012).
  - "Mathematical modelling of genetic regulatory networks in bacteria and higher eukaryote cells", Cairo University-JINR, ARE-JINR cooperation programme (2011–2014).
- Russian Foundation for Basic Research (RFBR) grant "Experimental study of the influence of interplanetary space flight factors on the activity of modulatory and mediator brain systems as well as on the emotional and motivational states, behaviour, learning and memory of mammals", projects 17-29-01005-OFI_M (2018–present).
- Research grants for JINR's young scientists in 2009 and 2014.

Awards and Honours:

- Moscow Region Governor's Award in the fields of science and innovations for the work "Study of neurochemical mechanisms behind radiation effects in the central nervous system" (2017).
- Honorary Diploma of the winner of the competition of scientific reports within the international conference "Medical and biological problems of toxicology and radiobiology" (2015).

- Diploma of the JINR Programme Advisory Committee for Condensed Matter Physics (2015).
- JINR Prize for the work "Mechanisms mutagenesis in microorganisms under exposure to radiations with different physical characteristics" (2008).
- Honorary Diploma of the All-Russia Exhibition of Youth's Science and Technology Developments (2008).

Publications:

Total number of publications in JINR Personal Information System: **124.**

Of them, in radiobiology and radiation research (peer-reviewed journals only): **30.**

SELECTED PUBLICATIONS BY OLEG V. BELOV IN 2014–2019

1. **O.V. Belov,** K.V. Belokopytova, V.S. Kudrin, A.G. Molokanov, A.S. Shtemberg, A.S. Bazyan. Neurochemical insights into the radiation protection of astronauts: distinction between low- and moderate-LET radiation components // *European Journal of Medical Physics (Physica Medica).* 2019. V. 57. P. 7-16.

2. D. Sakata, N. Lampe, M. Karamitros, I. Kyriakou, **O. Belov,** M.A. Bernal, D. Bolst, M-C. Bordage, V. Breton, J.M.C. Brown, Z. Francis, V. Ivanchenko, S. Meylan, K. Murakami, S. Okada, I. Petrovic, A. Ristic-Firar, G. Santin, D. Sarramia, T. Sasaki, W.-G. Shin, N. Tang, H. N. Tran, C. Villagrasa, D. Emfietzoglou, P. Nieminen, S. Guatelli, S. Incerti. Evaluation of early radiation DNA damage in a fractal cell nucleus model using Geant4-DNA // *European Journal of Medical Physics Physica Medica.* 2019. V. 57. P. 7-16.

3. L. Bayarchimeg, M. Batmunkh, **O. Belov,** O. Lkhagva. Simulation of Radiation Damage to Neural Cells with the Geant4-DNA Toolkit // EPJ Web of Conferences. 2018. V. 173. 05005. P. 1-4.

4. **O.V. Belov,** M.S. Panina, M. Batmunkh, N. Sweilam. Mathematical modeling of the DNA double-strand break repair in mammalian and human cells. In: Korogodina V.L.,

Mothersill C.E., Inge-Vechtomov S.G., Seymour C.B. Eds. Genetics, Evolution and Radiation. Springer International Publishing AG. P. 169-174. 2017.

5. K.V.Belokopytova, **O.V. Belov,** V.N. Gaevsky, V.B. Narkevich, V.S. Kudrin, E.A. Krasavin, A.S. Bazyan. Neuromediator Exchange Dynamics in Rats at Late Periods after Exposure to ^{60}Co y-Rays // *Medical Radiology and Radiation Safety.* 2017. V. 62 (2). P. 5–12.

6. **O. Belov,** K. Belokopytova, A. Bazyan, V. Kudrin, V. Narkevich, A. Ivanov, Yu. Severiukhin, G. Timoshenko, E. Krasavin. Exposure to ^{12}C particles alters the normal dynamics of brain monoamine metabolism and behaviour in rats // *European Journal of Medical Physics (Physica Medica).* 2016. V. 32. No 9. P. 1088-1094.

7. **O. Belov,** M. Batmunkh, S. Incerti, O. Lkhagva. Radiation damage to neuronal cells: Simulating the energy deposition and water radiolysis in a small neural network // *European Journal of Medical Physics (Physica Medica).* 2016. V. 32. No 12. P. 1510-1520.

8. K.V. Belokopytova, **O.V. Belov,** E.A. Krasavin, G.N. Timoshenko, V.S. Kudrin, V.B. Narkevich, A.S. Bazyan. The dynamics of monoamine metabolism in rat brain structures in the late period after exposure to accelerated carbon ions // *Neurochemical Journal.* 2016. V. 10 (2). P. 137-143.

9. M. Batmunkh, **O.V. Belov,** L. Bayarchimeg, O. Lkhagva. Radiation effects in the central nervous system: Simulation technique and practical applications. *Mongolian Journal of Physics.* 2016. V. 2. P. 317-323.

10. H. Fourie, J.P. Slabbert, **O. Belov,** R. Newman, M. Panina, N. Rossouw. Estimating the effectiveness of high LET radiations to induce damage to DNA in human lymphocytes and modelling the repair thereof // *European Journal of Medical Physics (Physica Medica).* 2016. V. 32. S2. P. 155.

11. L. Bayarchimeg, **O.V. Belov,** M. Batmunkh, O. Lkhagva. Modeling of synaptic receptors under irradiation with charged particles // *Mongolian Journal of Physics.* 2016. V. 2. P. 470-474.

12. K.V. Belokopytova, **O.V. Belov,** E.A. Krasavin, G.N. Timoshenko, V.S. Kudrin, V.B. Narkevich, P.M. Klodt, A.S. Bazyan. The distribution of monoamines and their metabolites in the brain structures of rats at later periods after exposure to ^{12}C ions // *Neurochemical Journal.* 2015. V. 9(3). P. 214-220.

13. **O. Belov,** E. Krasavin, M. Lyashko, M. Batmunkh, N. Sweilam. A quantitative model of the major pathways for radiation-induced DNA double-strand break repair // *Journal of Theoretical Biology.* 2015. V. 366. P. 115-130.

14. **O.V. Belov,** D.L. Boyda, I. Plante, S.Eh. Shirmovsky. Simulation of the charge migration in DNA under irradiation with heavy ions // *Bio-Medical Materials and Engineering.* 2015. V. 26. P. S1937-S1944.

15. M. Batmunkh, **O. Belov,** L. Bayarchimeg, O. Lhagva, N. Sweilam. Estimation of the spatial energy deposition in CA1 pyramidal neurons under exposure to ^{12}C and ^{56}Fe ion beams // *Journal of Radiation Research and Applied Sciences*. 2015. V. 8. P. 498-507.

16. H. Fourie, **O.V. Belov,** M.S. Panina, J.P. Slabbert. Theoretical modelling of γ-H2AX foci kinetics in human lymphocytes after exposure to fast neutrons // *European Journal of Medical Physics (Physica Medica).* 2015. V. 31. S4.

17. M. Batmunkh, **O. Belov,** O. Lhagva, L. Bayarchimeg, M. Minjmaa, P. Battogtokh. Simulations of radioactive decays: an application of low-energy electromagnetic packages for the nuclear medicine // *Mongolian Journal of Biological Sciences.* 2015. V. 13. P. 55-64.

18. F.S. Ambesi-Impiombato, A.A. Ivanov, A. Mancini, **O.V. Belov,** A. Borrelli, A.G. Molokanov, T.M. Bulynina, S.V. Vorozhtsova, A.N. Abrosimova, E.A. Krasavin. Effect of recombinant manganese superoxide dismutase (rMnSOD) on the hematologic status in mice irradiated by protons // *Medical Radiology and Radiation Safety.* 2014. V. 59(6). P. 5-17.