

KONSTANTIN MOTOVILOV

PERSONAL INFORMATION

March 24th, 1984 Born in Arkhangelsk, Russia, 38 years old
Marital status married, four children
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EDUCATION

2006-2009 **Moscow State University, Department of Chemistry**
Ph.D. student Ph.D. thesis title: *Reactions of hydrophilic analogues of coenzyme Q in the mitochondrial respiratory chain.*
Advisor: Prof. Lev YAGUZHINSKY

06-08.2005 **University of Minnesota Duluth**
summer Synthesis of organic oxidants based on hypervalent iodine compounds and
undergraduate synthesis of "multi-deck" derivatives of porphyrins and phthalocyanines with
student various *d*-elements.
Advisor: Prof. Viktor ZHDANKIN

2001-2006 **Moscow State University, Department of Chemistry**
B.S./M.S. student Theoretical and practical studies in **Laboratory of gas catalysis and**
electrochemistry, Laboratory of the structure and function of membranes,
Laboratory of organic synthesis.
Advisors: Prof. Lev YAGUZHINSKY, Assist. Prof. Nadezhda AVERINA, Prof. Sergei SAVILOV

1991-2001 **Studies in schools of St. Petersburg and Dubna**
pupil School 411, School 415, School 8, Lyceum *Dubna*.

SCIENTIFIC INTERESTS

water and bioelectronics influence of water organization on electronic and protonic conductivity in bioorganic systems

stability and interfacial mobility of aqueous proton cations

low-barrier hydrogen bonds and proton delocalization in bioorganics

water and mixed-valence bioorganic compounds

development of high-frequency organic electrochemical transistors

water and disorder/disorder balance in bioorganics influence of water on disorder-associated phenomenology in bioorganics: boson peak, percolation transport, the linear component in specific heat dependence on temperature; nearly-constant loss behavior of AC-conductivity, etc

the use of disorder-associated phenomena parameters for applied tasks

magnetic and dielectric ordering phenomena in bioorganics

*soft and green
lithography*

development of gentle lithography methods that allow the use of sensitive bioorganic systems in the fabrication of bioelectronic devices

replacement of environmentally hazardous substances used in lithographic practices with biodegradable and low-toxic ones

governing radical reactions of polymerization or decomposition of the photoresist through various dynamic spin chemistry techniques

*electrohydrody-
namics in living
systems*

relationship of water electrohydrodynamic phenomena with high-voltage proton transmembrane energetics of living systems

features of effective proton transfer in bioorganic materials manifested in the optical frequency range (THz-IR-Vis-UV)

EXPERIENCE

2014-present

Laboratory of Terahertz Spectroscopy, Moscow Institute of Physics and Technology

*leading research
fellow - head of
research group*

Successful organization from scratch of a multidisciplinary, international team of scientists and engineers aiming to study the mechanisms of electron and ion transportation in biological materials and synthetic supramolecular complexes employing modern techniques of solid-state physics. Responsibility for setting tasks and planning team workflow, staff motivation, data analysis, negotiations with partners, writing scientific articles, making conference presentations, and giving an interview and comments to the mass media.

2021-present

Landau Phystech School of Fundamental and Applied Physics, Moscow Institute of Physics and Technology

associate professor

Development of a unique training course on bioelectronics and biological sensory systems.

Summer 2015

Summer biological field practice of MIPT in the White Sea

*head of
quartermasters
team*

Planning, construction, and setting of the base camp, managing of quartermasters team, navigation of the motorboats, negotiations with volunteer organizations and local officials.

2010-2013

Laboratory of Biophysics of Excitable Systems, Moscow Institute of Physics and Technology

*senior researcher,
deputy head of
laboratory, team
builder*

The complete management of an extensive laboratory (about 40 employees and 1.5 mln USD budget per year): search for new employees, purchase and launch of equipment, formulation and detailing of new tasks, organization, and maintenance of laboratory seminars, preparation of grant proposals and reports, writing of scientific articles and press releases, organization of joint research projects with the other laboratories, making conference reports and interaction with mass media and government officials.

2009-2015

Department of General and Applied Physics, Moscow Institute of Physics and Technology

*assistant professor,
teaching assistant*

Preparing and delivering lectures in two courses: inorganic and coordination chemistry, biophysics of membrane, and mitochondrial processes.

2006-2009

Department of Bioenergetics, Moscow State University.

junior researcher

Synthesis of new uncouplers of oxidative phosphorylation. Studies of

biochemical kinetics of the newly synthesized CoQ-based antioxidants.

KEY PUBLICATIONS

1. Infrared Fingerprints of Water Collective Dynamics Indicate Proton Transport in Biological Systems, *Physcial Review E*, 105 (2022), 044409
2. Gentle Patterning Approaches toward Compatibility with Bio-Organic Materials and Their Environmental Aspects, *Small*, (2022), 2200476
3. Green Lithography for Delicate Materials, *Advanced Functional Materials*, 31 (2021), 2101533
4. Interfacial water morphology in hydrated melanin, *Soft Matter*, 17 (2021), 7940-7952
5. Water-Activated Semiquinone Formation and Carboxylic Acid Dissociation in Melanin Revealed by Infrared Spectroscopy, *Polymers*, 13 (2021), 4403
6. Redox chemistry in the pigment eumelanin as a function of temperature using broadband dielectric spectroscopy, *RSC Advances*, 9 (2019), 3857-3867
7. Impedance spectroscopy of single bacterial nanofilament reveals water-mediated charge transfer, *PLOS ONE*, 13 (2018), e0191289
8. Observation of dielectric universalities in albumin, cytochrome C and *Shewanella oneidensis* MR-1 extracellular matrix, *Scientific Reports*, 7 (2017), 15731
9. The formation of metastable bond between protons and mitoplast surface, *Doklady Biochemistry and Biophysics*, 438 (2011), 127-130.
10. Properties and new methods of non-equilibrium membrane bound proton fraction research under conditions of proton pump activation, *Biochemistry (Moscow) Supplement Series A: Membrane and Cell Biology*, 3 (2009), 478-487

OTHER INFORMATION

Spoken languages

- Russian (native speaker)
- English (full professional proficiency)
- French (limited working proficiency)

Driver's licenses

- Russian driver's license, category B, issued on September 1st, 2010
- Russian skipper's license, motorboat/launch, issued on October 16th, 2014

Hobbies

- Connection of art, science, and archeology: nondestructive methods of structural analysis of objects (NMR, μ SR, neutron scattering, etc.)
- Mathematics in art and music
- Long-term traveling by car, by foot, by boat

April 22, 2022