



Thirty years of the Russian Society for photobiology (1992 to 2022)

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Photobiology research had been developed very actively in the Soviet Union and is continued not less intensively in modern Russia. However, toward the end of millennium, many new branches appeared. Therefore, there was a need to have an organization which would gather the researchers working in different areas of photobiology and provide them with an opportunity to communicate and exchange ideas.

The Russian Society for Photobiology (RSP) was established in Pushchino at the Constituent Meeting on February 4, 1992. Prof. Valentin I. Kefeli (Director of the Institute of Soil Science and Photosynthesis, Russian Academy of Sciences (RAS), Pushchino, Moscow Region) was elected as the first President of the RSP. Dr. V.K. Gins (All-Russian Scientific Research Institute for Breeding and Seed Production of Vegetable Crops, Odintsovo, Moscow region) was elected as the first Scientific Secretary of the RSP. Since the very beginning, RSP was considered an informal association of researchers that operates on a voluntary non-administrative basis and helps the researchers to coordinate their work. Presidents and vice presidents were selected based on an open vote of the members of the society among Russian scientists with worldwide recognition. Organization of regular congresses on photobiology was considered as the major goal of this society and the major result of its work.

May 27–30, 1996, the first RSP Congress was held (Pushchino, Moscow region), with more than 120 participants. The traditional areas of Russian photobiological research such as photosynthesis and related processes, photosensor systems, and biological effects of ultraviolet radiation were accompanied by the reports from the “Photodynamic

Therapy” session. Although only 19 reports out of 125 items were presented at this session, the active participation of the specialists from scientific and medical centers of Russia was a consequence of the successful development of the research in this field. Academician Vladimir A. Shuvalov (Director of the Institute of Soil Science and Photosynthesis RAS, Pushchino) was elected as President of RSP.

June 8–12, 1998, the second RSP Congress was held in Pushchino, Moscow region (chairs and program organizers were Shuvalov and Gins), with 250 registered participants and 158 reports delivered. It was focused on problems of the photoregulatory action of light of different spectral composition and intensity, including the use of low-intensity laser radiation in medicine and the study of the photodynamic activity of natural and synthetic pigments. Professor Alexander A. Krasnovsky Jr. (Biology Department of Moscow State University (MSU) – A.N. Bach Institute of Biochemistry RAS) was elected as President of the RSP. Professor Alexander Ya. Potapenko was appointed as Vice-President. Dr. Larissa A. Koppel (Biology Department of MSU) was elected as Scientific Secretary.

June 28–July 4, 2001, the third RSP Congress was held in Voronezh (chairs and program organizers were Krasnovsky and Potapenko) with 220 participants and 131 reports delivered. Professor Valery G. Artyukhov (Voronezh State University) and his team brilliantly organized the technical support of the congress and supplementary program for participants. Invaluable contribution was made by Academician Yu.A. Vladimirov, who actively participated in all major events as an adviser and also presented a brilliant plenary lecture “Free radical mechanisms of photobiological processes”. The first School for Young Scientists was held with 20 general lectures covering all areas of modern photobiology. After the difficult “nineties,” the Voronezh meeting became a real festival of Russian Photobiology and gave much hope for the revival of this branch of science. Professor Tiina Y. Karu (Institute of Spectroscopy, Troitsk, Moscow region) was elected as a second Vice-President of the Society.

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September 26–30, 2005, the fourth RSP Congress was organized in Saratov, Institute of Optics and Biophotonics of the Saratov State University (chairs and program organizer were Krasnovsky and Potapenko), with about 200 participants and 150 reports delivered. The brilliant preparation of the Congress venues and events was organized by the Chairman of the Saratov Organizing Committee, Prof. Valery V. Tuchin (Saratov State University) and his team. Modern problems of photosynthesis and photoreception, including the mechanisms of vision, were discussed. New sessions on “Bio- and chemiluminescence,” “Biophotonics,” and “Photomedicine” were added. The Congress included the second School for Young Scientists with over 500 attendees including participants from Armenia, Belarus, Canada, Finland, France, Israel, Ukraine, and the USA. Professor Aleksey Yu. Semenov (A.N. Belozersky Institute of Physico-Chemical Biology, MSU, Moscow) was elected as President of the RSP. Professor V.V. Tuchin was elected as a new Vice-President of the society, and Dr. E.A. Kotova (A.N. Belozersky Institute of Physico-Chemical Biology, MSU, Moscow) as Scientific Secretary. After this congress (October 2006), the RSP website was registered on the top-level domain www.photobiology.ru.

June 2–7, 2008, the fifth RSP Congress and International Conference on “Transformation of light energy during photosynthesis” were organized (Pushchino, Moscow region) with ca. 200 participants including scientists from Belarus, Germany, Sweden, Ukraine, and the USA. The Congress program included sessions: “Primary processes of photosynthesis,” “Regulation of photosynthesis,” “Photoreception,” “Fluorescent proteins and bioluminescence”, “Biophotonics and biomedical applications of photochemistry,” “Photophysics,” that reflected the progress of photobiological research in Russia and the world.

September 16–22, 2011, the sixth RSP Congress was held at a sunny corner of the Black Sea coast (boarding house “Mayak,” Shepsi, Krasnodarsky krai). The congress attracted the attention of many photobiologists because it encouraged and made possible informal and casual scientific discussions. A total of 165 participants delivered 190 oral and poster presentations. Drs. M.D. Mamedov, E.A. Kotova (both from the A.N. Belozersky Institute of Physico-Chemical Biology, MSU, Moscow), and L.G. Vasilieva (Institute of Basic Biological Problems RAS, Pushchino, Moscow region) were elected as Vice-Presidents. Dr. L.A. Koppel was elected as Scientific Secretary.

September 14–20, 2014, the seventh RSP Congress took place in the boarding house “Mayak” (Shepsi, Krasnodarsky krai) and brought together 110 participants. The results of the Congress were published as a special issue *Modern Photobiology in Russia* of the *Biochemistry* journal (Moscow) (2015, vol. 85(6)). Prof. Dr. Anatoly A. Tsygankov (Institute of Basic Biological Problems RAS, Pushchino) was elected as RSP President.

September 10–15, 2017, the eighth RSP Congress was held in the boarding house “Mayak” (Shepsi, Krasnodarsky krai) with 140 participants. The usual areas of discussion were supplemented with a new session on “Microalgae as the converters of solar energy into biofuels and valuable products” reflecting a new direction in the field of photobiology. The first competition between young scientists for the best oral/poster presentation was held. *Functional Plant Biology* published a special issue on the Congress proceedings (2018, vol. 45(2)).

September 12–19, 2021, the ninth RSP Congress took place that was postponed for a year due to the COVID-19 pandemic with 144 participants from 11 regions of Russia and from Belarus. The topics of the Congress included the problems of applied and fundamental photobiology from the molecular to the biospheric level. The traditional sessions of the Congress, “Primary processes of photosynthesis,” “Photosynthesis regulation,” “Photoreception,” “Fundamentals of photodynamic, laser and PUVA therapy,” “Biophotonics,” “Bioluminescence and photonics of fluorescent proteins,” and “Microalgae as converters of solar energy into biofuels,” were expanded to include the session on “Ecological photobiology,” which piqued the interest of the participants. The on-line format also turned out to be successful. Dr. Anatoly A. Tsygankov was re-elected as President of the RSP. Dr. Maria Borisova-Mubarakshina (Institute of Basic Biological Problems RAS, Pushchino) was elected as Vice-President of the RSP.

In addition to congresses, members of the RSP actively participated in or initiated a number of scientific conferences on topical problems of photobiology. Since 1992, regular “Pushchino Readings on Photosynthesis” are held at the Institute of Basic Biological Problems RAS in Pushchino, Moscow region.

In 2013, the International Conference “Photobiochemistry: Problems and Prospects” dedicated to the 100th birth anniversary of Academician Alexander A. Krasnovsky was held at the A.N. Bakh Institute of Biochemistry RAS.

In 2015, an International Conference of the RSP on “Primary Electron Transfer in Photosynthetic Reaction Centers” was held in Pskov region. Presentations were made by leading scientists in the field of primary charge separation reactions in photosynthesis. The same year the V Congress of Biophysicists of Russia (Rostov-on-Don, Russia) included several photobiology sessions.

Green Christmas Session 2021 on “Photosynthetic microorganisms for sustainable development” was held in Pushchino in December 2021 with the participation of European scientists. The President of the European Photobiological Society (ESP) Prof. Massimo Trotta delivered a keynote lecture. Organizer was the actual Vice-President of RSP Dr. Maria Borisova-Mubarakshina.

Seminars and schools for young scientists are held on a regular basis under partnership of RSP. Since 2000, the International School for Junior Scientists and Students in Optics, Laser Physics and Biophotonics (Saratov Fall Meeting) has been held annually. This meeting is organized at Saratov State University and typically includes ca. 500 participants from Russia, USA, Europe, and Asia. Selected papers have been published in *SPIE Journal*, *Journal of Biomedical Photonics & Engineering*, and in *Quantum Electronics*.

Currently, the Russian Society for Photobiology includes regional branches (in Krasnoyarsk, St. Petersburg, Volga region, and Voronezh) and has about 200 members. During the last 30 years, the RSP members have published hundreds of scientific papers and completed many innovative projects. The following fields of research are developing most actively: bacterial rhodopsins and optogenetics, photoprotective mechanisms in plants and cyanobacteria, photobiology of vision, nanobiophotonics and biomedical spectroscopy, biophotonics of singlet and triplet oxygen, photodynamic action and therapy, biological action of lasers and laser therapy, free radical processes, superfast (femtosecond and picosecond) photobiology in photosynthesis and vision, directed mutagenesis in the reaction centers of photosynthesis, biological functions of carotenoids and mechanisms of charge transfer in the photosynthetic reaction centers and organelles, mechanism of water

splitting and oxygen reduction in chloroplasts, biochemiluminescence, and optical properties of biological tissues. New drugs for photodynamic therapy and diagnostics of cancer, including modular nanotransporters for drug delivery into nuclei of pathological cells, new generations of bioluminescent sensors for environmental monitoring, and new methods for hydrogen productions based on microalgae cultivation, have been developed.

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