# ZORAN JAKŠIĆ

Full member of Serbian Academy of Nonlinear Sciences since April 5, 2018. Since 1991 he has been a member of the IEEE (The Institute of Electric and Electronic Engineers), USA, currently a Senior Member. He has been a member of Optica (previously The Optical Society, OSA) USA since 2005, currently a Senior Member. He is a life fellow of the ETRAN Society, the largest and the oldest professional society in Serbia.

Born on April 14, 1960 in Pančevo, where he attended primary school and gymnasium. He received his diploma-engineer, magister and doctoral degrees from School of Electrical Engineering, University of Belgrade, Serbia. From 1983 to 1987 he was employed in the Avionics Development Department of the aircraft factory "Utva," Pančevo. In 1987 he started working under the affiliation of the Institute of Chemistry, Technology and Metallurgy (ICTM), University of Belgrade. He became the associate research professor in 2001, and he received his tenure as a full research professor of ICTM in 2006.

He has full professional proficiency in English (since 1986 he has been a member of the Society of Literary Translators of Serbia), professional working proficiency in German, limited proficiency in Spanish, elementary proficiency in French, Russian and Italian. He has spent his whole research career in Serbia.

Although in 2017 Dr. Jakšić suffered a heavy hemorrhagic stroke and was forced to withdraw to disability retirement, he continued his research work, even more intensively than before, which resulted in a number of publications, including monographic works and journal papers.

**Research Interests**: Chemical and biological sensors based on electromagnetic optics of mesoscopic and subwavelength structures (nanooptics and nanophotonics), plasmonics and optical metamaterials, photonic crystals, micro and nanoelectromechanical systems (MEMS and NEMS), infrared semiconductor detectors, biomimetic nanomembranes and photocatalysts with plasmonic enhancement.

**Scientific Results**: Up to the end of February of 2023 Dr. Jakšić published 395 peer reviewed research publications, including a book for Springer, two monographs, 4 chapters in monograph books and 101 papers in international research journals, 81 of which are with SCI impact factor. In a majority of these publications Dr. Jakšić is the principal author. He authored or co-authored 19 certified technological innovations. Dr Jakšić has been a reviewer for 38 different journals, including *Nature* publications, *Optics Express*, *Opt. Comm*, etc., with a total of 127 jounal reviews verified by Clarivate Web of Science. He also reviewed several books, including *Elsevier* publications.

Dr. Jakšić introduced into the national science the fields of photonic crystals, metamaterials, plasmonics and freestanding nanomembranes, among others. A list of his selected contributions includes the following:

- Chemical and biological sensors based on metamaterials. Dr. Jakšić published in 2007 a pioneering journal paper dedicated to this topic.
- The first paper on photonic crystals published in Serbia (1997).
- The first paper on metasurfaces published in Serbia (2010).
- Optical noise in plasmonic sensors – optical flicker (1 over f) noise, optical Johnson-Nyquist noise, Casimir (zero-point) noise and adsorption-desorption optical noise.
- Introduction of effective specific detectivity analogous to that of infrared photodetectors as a figure of merit of chemical and biological sensors.
- Alternative materials for plasmonics including transparent conductive oxides (Dr Jakšić's journal paper on this topic had been published at practically the same time as a very similar proposal in *Science* journal), 2D nanomaterials (e.g. MXenes), etc.
- A proposal of fabricating 3D photonic crystals for the optical range as generalized holograms, 2 years before an analogous concept was presented in *Nature* (its authors susequently cited the publication of Dr. Jakšić).
- Achieving super-resolution in photolithography by combining Boolean operation (AND, OR, NAND, NOR) with photoresist overexposure: The method enabled fabrication of nanoantennas with details below 200 nm using an equipment with a highest resolution of 2 μm.

**Response to Research Results**: According to Google Scholar Dr. Jakšić has been cited 1676 times before the end of February 2023, with an h-factor of 21.

He presented 20 plenary, keynote or invited talks at international conferences. The paper Z. Jakšić et al, *J. Nanophotonics*, 5, 051818, 2011 had been chosen as the first among Top 5 articles on plasmonics in 2011 by the International Society for Optics and Photonics – SPIE, USA. The article Z. Jakšić et al, *Phys. Scr*. 149, 014051, 2012 had been included among the Highlights of the year 2012 in *Physica Scripta*.

He received a number of awards, including *Lotfi Zadeh Memorial Award* (2021, Applied Computer Technology, Colcata, India), several *Outstanding Reviewer Awards* from IoP Publishing (Bristol, England, United Kingdom), "*27 June" Best Innovation Award* (City Council of Pancevo, Serbia), several best paper awards from various international conferences, Fellow Award from the ETRAN Society, Serbia, etc.

**Educational activities**: As a full research professor of the ICTM he established and lectured several courses at the School of Electrical Engineering, Belgrade, including *MEMS Systems* (undergraduate), *Elements of Nano-Optics and Nanophotonics* (master) and *Photonic Crystals and Metamaterials* (doctoral). Dr. Jakšić supervised three doctoral dissertations, a number of master and diploma engineer theses. He had been a member of a number of doctoral thesis defense committees, at the ETF Belgrade, FTN Novi Sad, Twente University and Indian Institute Of Technology Kanpur.

**Organizational**: Dr. Jakšić had been the science director of the Department of Microelectronic Technologies within the ICTM and the deputy director of the Department (2011–2018). He established the Center for Microsystems and Nanosystems (with Dr. Dana Vasiljević Radović) which has been accredited since 2014 as a national center of excellence. Dr. Jakšić established

the first national group for plasmonics and nanophotonics. He was one of the principal 7 founders of the Optical Society of Serbia and its president in the period 2016–2018.

He organized a number of international and national science conferences. Since 2002 he has been engaged in organization of annual conference series ETRAN, where he had been the Chair of the Program Committee, chief editor of the annual full paper proceedings, and initiator and organizer of the series of annual workshops on nanoscience nanoETRAN. He had been the only committee member from the Western Balkans of the series of Mediterranean conferences on nanoscience MediNano. He has been elected an EU expert. He is an editorial board member of the journal *Biomimetics* (5-Year Clarivate Impact Factor: 3.877, 2021), one of the associate editors of international journals *Electronics* and *Facta Universitatis: Series Electronics and Energetics*.

Dr Jakšić participated as a chair, co-chair or participant in 14 international projects, including 3 EU framework projects, as well as in 12 national projects. He established scientific cooperation with teams from Austria, Israel, Spain, Sweden, Croatia, Turkiye, Germany and U.S.A.

**Contribution to Nonlinear Sciences:** Until now, the complete research work of Dr Jakšić has been dedicated to nonlinear sciences, more specifically the fields of microelectronic, microsystem and nanosystem sensors, detectors and other devices, with an accent on nanophotonics and nanoplasmonics. It can be said that Dr Jakšić dedicated his whole opus to nonlinear sciences in micro and nanotechnologies and their use in solving practical technical and technological problems.

**List of 5 Selected Research Publications**


1. Z. Jakšić, *Micro and Nanophotonics for Semiconductor Infrared Detectors: Towards an Ultimate Uncooled Device*, Springer Verlag, Cham, ISBN 978-3-319-09673-5, doi: 10.1007/978-3-319-09674-2, 2014.
2. Z. Jakšić, O. Jakšić, "Biomimetic Nanomembranes: An Overview," *Biomimetics*, vol. 5, art. no. 24, pp. 1-46, doi: 10.3390/biomimetics5020024, 2020.
3. Z. Jakšić, O. Jakšić, Z. Djurić, C. Kment, "A consideration of the use of metamaterials for sensing applications: field fluctuations and ultimate performance," *J. Opt. A*. 9, S377–S384, doi: 10.1088/1464-4258/9/9/S16, 2007.
4. Z. Jakšić, S. Vuković, J. Matović, D. Tanasković, "Negative Refractive Index Metasurfaces for Enhanced Biosensing," *Materials*, 4 (1), pp. 1-36; doi:10.3390/ma4010001, 2011.
5. Z. Jakšić, "Optical metamaterials as the platform for a novel generation of ultrasensitive chemical or biological sensors," in *Metamaterials: Classes, Properties and Applications*, ed. E. J. Tremblay, Nova Science Publishers, Hauppauge, New York, pp. 1-42, 2010, ISBN: 978-1-61668-958-2.


**Link to Extended CV**: http://www.nanosys.ihtm.bg.ac.rs/english/staff/jaksic.htm