

**Univerzitet u Beogradu – Fakultet za fizičku hemiju**  
**Predavanja u okviru projekta**  
**”Renewable Energy and Water for the US and Serbia“**  
**9. jun, 12-14 časova, Amfiteatar Fakulteta**

**Informacije o projektu**

**University Partnership Program (FY 2022)**  
**U.S. EMBASSY BELGRADE, SERBIA**  
**”Renewable Energy and Water for the US and Serbia“**  
**Dr. Ivana Validzic**  
**Prof. Randall Ellingson**  
**Prof. Dragan Isailovic**

**[UToledo NSM on Twitter: "Congrats to Dr Dragan Isailovic, @ChemistryToledo, Dr Randy Ellingson,@UToledo & Dr Ivana Validzic, Vinca Institute of Nuclear Sciences, who received funding of \\$99,964 from the @StateDept for their project Renewable Energy & Water for US & Serbia! #UToledoRocketScience #UToledo https://t.co/kR8snjpFVR" / Twitter](#)**

**[UToledo's world-class Department of Physics and Astronomy](#)**

**University Partnership Program (FY 2022) U.S. EMBASSY BELGRADE, SERBIA**  
Through mutual exchange visits, workshops, and joint research, principal investigators and students will connect Serbia and America in support of education and communication on the importance of, and conceptual scientific basis of, renewable energy and water sustainability. Academic workshops on critical topics -- renewable energy sources, solar energy, and energy's impact on clean water -- will serve to establish several student experts as ambassadors who, through outreach in Serbia, will raise awareness of solar energy's significance. These academic workshops will be open to all Serbian and American researchers at both institutions. The cross-institution collaboration will create a strong foundation for continued scientific and community endeavours. Unique capabilities at both institutes allow us to engage on topics ranging from materials science to direct community outreach. Developed knowledge of the solar industry, from manufacturing to design, installation, and operation, will enable researchers and students to share their vision with Serbian communities to inspire new solar energy projects.

## **Prof. Ellingson short biography**

The speaker, Randy Ellingson, received his Bachelor of Arts degree (1987) in physics from Carleton College, Northfield, MN, and the Master of Science (1990) and Doctor of Philosophy (1994) degrees in applied physics from Cornell University, Ithaca, NY. He served as a postdoctoral researcher and senior scientist with the National Renewable Energy Laboratory in Golden, CO from 1994 to 2008. He is Professor of Physics and Endowed Chair in Photovoltaics with the Wright Center for Photovoltaics Innovation and Commercialization (PVIC) at The University of Toledo. The Center focuses on advancing the understanding, performance, and commercialization of photovoltaic materials and technologies. His interests include the development of passivating contacts to enable bifacial CdTe solar cells, as well as nanomaterials synthesis and characterization, optical spectroscopy, and modeling PV system performance.



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### **Abstract**

**As the industry and technology of photovoltaics begins to mature and seriously address humanity's low carbon energy needs, thin film PV continues to challenge the dominant c-Si technology. Here, we consider the industry's growth trajectory and the state-of-the-art of CdTe and perovskite PV technologies, and we dig deeper on the recent evolution of CdTe solar cells including: (1) incorporation of Se, (2) transitioning from Cu doping to As doping, (3) the challenges and progress on bifacial CdTe, and (4) the prospects for tandem cells based on CdTe.**

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## Dr. Validzic short biography

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Dr. Ivana Validžić is a research professor at the Vinča Institute of Nuclear Sciences of the National Institute of the Republic of Serbia. After graduating from the Faculty of Physical Chemistry at the University of Belgrade, she obtained her PhD in 2004 at Utrecht University's Van Hoff Laboratory, the Netherlands. She is the author of more than 40 peer-reviewed publications and the books "Reverzibilni sistemi na nanometarskoj skali" (2005) and "Advances in the Photovoltaic Field through Light Manipulation" (2022). Her research interests include the synthesis of  $Sb_2S_3$  semiconductor, the design of new solar cells based on non-doped and doped semiconductor  $Sb_2S_3$ , and the development of optics to improve the photovoltaic response of solar cells generally, through light manipulation.



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### Abstract

The basic function of the water flow lens (WFL) system is to cool, decrease, and increase light intensity with inevitable spectral oscillations, but in reality, that manipulation helps us better understand the possible additional optical and light effects and, thus, the nature of light itself, in the hopes of making significant progress toward the use of solar energy. According to our published research on a variety of solar devices, including commercial monocrystalline and amorphous Si-solar cells, differently designed  $Sb_2S_3$ -based solar cells made of synthesized undoped and doped semiconductors, and dye-sensitized solar cells (Dyesol/Greatcell Solar DSL 30 NRD-T) with varying sensitizers and co-sensitizers, PV performance using the WFL system can show significant improvements in all tested conditions. Based on all of our previous results on different solar devices, many potential explanations for demonstrating common extra-light effects for increases in the performance of solar cells were experimentally compared and discussed. The theoretical history of light nature was reviewed, and our findings were commented on along with new disclosure.

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### **Prof. Isailovic short biography**

Dragan Isailovic received Diploma in Physical Chemistry from the University of Belgrade (Belgrade, Serbia) in 1998, and was teaching and research assistant in the same department (1999-2000). He earned Ph.D. degree in Analytical Chemistry from Iowa State University (Ames, Iowa, USA) in 2005. After performing postdoctoral work related to mass spectrometry at Indiana University (Bloomington, Indiana, USA), he joined the University of Toledo (Toledo, Ohio, USA) in 2008 as an assistant professor. He is currently professor of chemistry in the Department of Chemistry and Biochemistry at the University of Toledo. His research interests include analytical and physical chemistry, biological mass spectrometry, water analysis, and materials for water treatment.



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### **Abstract**

**Every summer cyanobacteria overgrow in western Lake Erie and produce a range of toxic secondary metabolites, such as cyclic hepatotoxic peptides microcystins (MCs). Since these toxic molecules have health advisories in the high ppt to low ppb concentrations, mass spectrometry has played important roles in detection, identification, and quantification of cyanopeptide congeners in water. Our studies involved the identification of novel MC congeners using liquid chromatography (LC)-high-resolution mass spectrometry (HRMS) as well as the development of materials for their removal from water. The presentation will describe LC-HRMS methodology and the results obtained by analyzing cyanobacterial toxins in water samples collected from Lake Erie and its major tributary, the Maumee River.**

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