

## REPORT

### 2023 IET Travel Award for International Travel

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Conference attended: **SPIE. PHOTONICS WEST** 27 January - 1 February 2024  
The Moscone Center  
San Francisco, California, United States

The IET Travel Award gave me the opportunity to attend the SPIE Photonics West 2024 conference held in San Francisco, California, USA from 27 January 2024 to 1 February 2024, and present my recent scientific results. SPIE Photonics West is the world's largest photonics technology event and the industry's most important biophotonics, biomedical optics, and imaging meeting.

The conference featured over 5,000 technical presentations and hosted over 1,500 exhibitors showcasing the latest innovative technologies and discoveries in the diverse optics and photonics community (*Figure 1*). The agenda included presentations by academic and industrial experts, plenary talks, technical courses in various technologies (such as biophotonics, medical imaging and optical systems), social and networking opportunities, and professional development workshops for career skills. The plenary talks were offered by world-class speakers from industry, academia, and government agencies, who provided their insights and answered key questions about the future of biophotonics and imaging. The conference also hosted a networking reception, for those attending the SPIE Photonics West conference for the first time, which was valuable for maximizing the onsite experience of the conference and expanding personal networks that could potentially evolve into future collaborations.



Figure 1 – Over 1,500 companies and suppliers were present at the SPIE Photonics West Exhibition, showcasing their latest technologies.

At the SPIE's conference I presented my latest research work entitled '**Nanowire Mesh Sensor for SERS Breath Analysis**' at the '*Frontiers in Biological Detection: From*

*Nanosensors to Systems XVI* session on 28 January 2024 (Figure 2). My presentation focused on the development of a non-invasive, cost-effective, and fully solution-processed sensor for the early detection of diseases via exhaled breath (<https://doi.org/10.1002/adsr.202300161>). The developed sensor uses nanomaterials which are self-assembled on pre-defined locations for boosting the device's reproducibility and sensing performance. This work utilizes surface enhanced Raman spectroscopy (SERS) as the analytical tool for the detection of Volatile Organic Compounds (VOCs) in exhaled breath, which are associated with diseases. SERS is regarded as an emerging diagnostic technique due to its ultra-sensitivity, rapid detection capabilities, and its potential to improve the understanding of the complex relationship between exhaled VOC profiles and diseases. In my talk, a proof-of-concept study in breath diagnosis was also presented, demonstrating the applicability and potential of the sensor in the development of the next generation of exhaled breath screening assays.

My presented talk and research work in breath analysis received a lot of interest and positive feedback from the audience, including researchers, academics, and industrial experts. I had the opportunity to meet and engage with fellow researchers, engineers, and established professionals in the circles of spectroscopy, such as Prof. Amos Danielli (Bar Ilan University, Israel) and Prof. Anja Boisen (DTU, Denmark), which resulted in productive discussions about the recent trends in Raman spectroscopy. The conference offered a variety of talks in spectroscopy with interesting presentations on the fabrication methods of SERS sensors, new approaches in SERS sensing, SERS systems and equipment, as well as new methods for Raman data analysis using machine learning techniques and artificial intelligence. These gave me a deeper understanding of the future trends in SERS technology, answered key questions about breath screening, and gave me new ideas to explore in my current research work.



Figure 2 – Presenting my work on ‘Nanowire Mesh Sensor for SERS Breath Analysis’ at the 2024 SPIE Photonics West.

Overall, my attendance at the 2024 SPIE Photonics West conference had a positive impact on gathering new ideas, disseminating my scientific findings, developing my technical knowledge in Raman spectroscopy, exchanging various discussion with colleagues in the field of SERS (including fabrication of SERS sensors, data analysis), expanding my personal network that can potentially evolve into fruitful collaborations, and improving my future career opportunities.

I would like to thank the IET for their support through this travel award and for enabling my attendance at the world's largest and most prestigious conference in the field of photonics. I would encourage other members of the IET community to apply for the Travel Award to fund their attendance in conferences or research activities that will benefit their career.



**Project:** Colon Cancer Breath Screening using Nanowire-SERS (Horizon 2020, Marie Skłodowska-Curie grant agreements No. 101024362)



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