



When Nature meets Nanotechnology: Development of Novel Bio-composites from Renewable Resources

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151 Wellington Road, Clayton, 3168

Zoom link: [click here](#)

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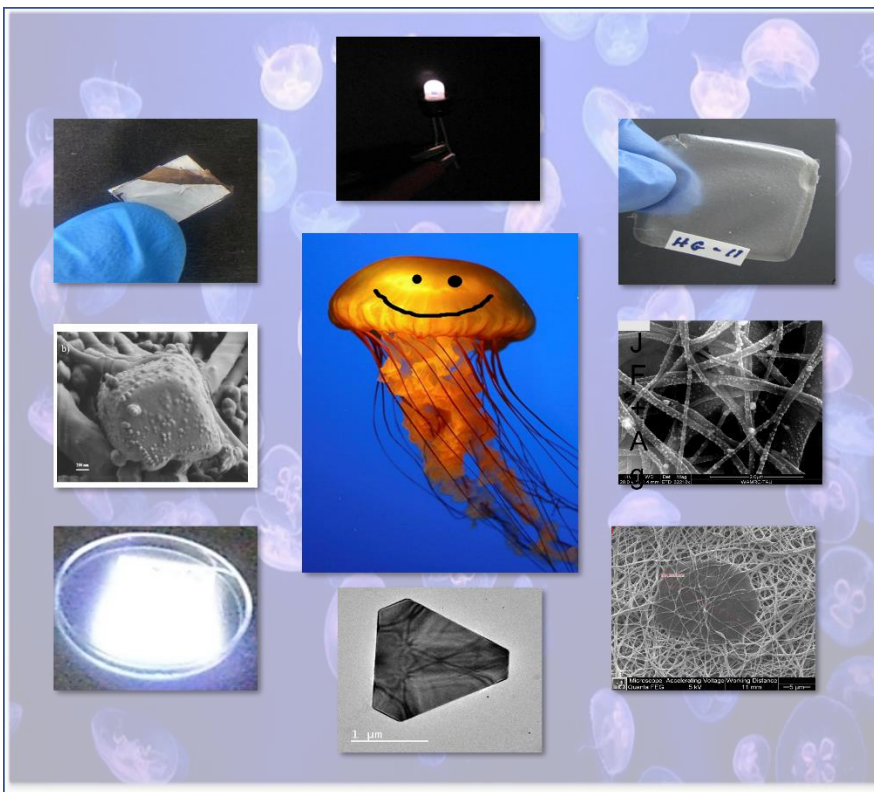
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Abstract:

Proteins form the very basis of life. They regulate various activities in all known organisms, from replication of the genetic code to transporting oxygen, and are responsible for regulating the cellular machinery and determining the phenotype of an organism. From a material science point of view, proteins can serve as excellent building blocks for developing new structures, composites, and novel materials. In this talk, I will cover some of our efforts in this direction, demonstrating our bottom-up technology to form various new materials, including light-emitting devices, photothermal materials, smart-wound dressing, antibacterial coating, heavy-metal sorption materials, and more. The role of Jellyfish, an important renewable resource for many of our applications, will be discussed.



1. Nudelman, R. et al. Jellyfish-Based Smart Wound Dressing Devices Containing In Situ Synthesized Antibacterial Nanoparticles. *Adv. Funct. Mater.* 29, 1902783 (2019).
2. Nudelman, R. et al. From nanoparticles to crystals: one-pot programmable biosynthesis of photothermal gold structures and their use for biomedical applications. *J. Nanobiotech* 20, 1–13 (2022).
3. Gotta, J. et al. Light-Emitting Biocomposites: Stable White Light-Emitting Biocomposite Films. *Adv. Funct. Mater.* 28, 1870167 (2018).
4. Carmeli, I. et al. Spatial modulation of light transmission through a single microcavity by coupling of photosynthetic complex excitations to surface plasmons. *Nat Commun* 6, 7334 (2015).
5. Gavriely, S., et al. One-Pot Bio-Assisted Synthesis of Stable Ag–AgCl System Using Jellyfish-Based Scaffold for Plasmonic Photocatalysis Applications. *Adv. Sust. Sys.* 5, 2100099 (2021).

Prof. Shachar Richter (Ph.D. in Materials Science and Chemical Physics, Weizmann Institute of Science, Israel) is the head of the Bio and Molecular Electronics Lab and a faculty member at the Department of Materials Science and Engineering at Tel Aviv University. After graduation, Prof. Richter was a post-doctorate fellow and was later appointed as an independent staff member (MTS) at Bell Laboratories and Agere Systems (NJ, USA).

In 2001 he joined Tel Aviv University, where he established the Nanoelectronics lab at the Centre for Nanoscience and Nanotechnology, where he serves as a core member. In 2003 he joined as a faculty member at the School of Chemistry, and in 2013 he moved to the Department of Materials Science and Engineering. In 2017 he was a sabbatical professor at Monash University (Australia), and In 2019 he won the "distinguished visiting scientist award" of The Commonwealth Scientific and Industrial Research Organisation (CSIRO).

His current research interests are jellyfish-based composites for medical and cosmetics applications, molecular and bioelectronics, bio-nano composites, and novel patterning technologies. Prof. Richter held several public roles, including heading the MSc in Materials Science and Engineering at Tel Aviv University, serving as the President of the IVS (Israel Vacuum Society focusing on nanotechnology and surface science), Chair of the chemistry committee of the Standards Institute of Israel and more. He also serves on the editorial board of several journals. Some of his patents were licensed to companies and are in the commercialization process.

In 2022 Prof. Richter was appointed as the founder director of the TAU's Asbestos analytical labs.