Department of Materials Science and Engineering

Iby and Aladar Fleischman Faculty of Engineering Tel Aviv University

הפקולטה להנדסה ע"ש איבי ואלדר פליישמן אוניברסיטת תל אביב

המחלקה למדע והנדסה של חומרים

You are cordially invited to attend this seminar to be held on

Wednesday, January 31st, 15:00

Room 118, Wolfson Mechanical Engineering Building

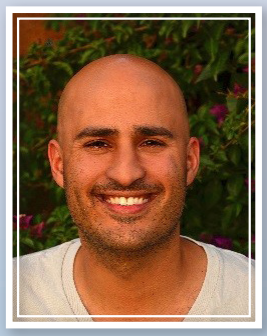
Tunable Structural Colors in Fish and Copepods

Dr. Dvir Gur

Dept. of Physics of Complex Systems and the Dept. Molecular Cell Biology, Weizmann Institute

Some of the most striking and vivid colors in nature are produced from guanine-based structural colors. Such systems are widespread and can be found in many organisms across different phyla including fish, spiders, lizards, and crustaceans[1]. Some of these organisms have the amazing ability to change their color in response to external stimuli. The copepods are small planktonic shrimps that reflect brilliant and vivid colors. We have discovered that the males can change their colors[2]. We have identified the color change mechanism, and showed that this change is entirely reversible[2,3]. Fish are utilizing guanine-based reflectors in both their eyes and skin. Using synchrotron-based micro X-ray diffraction, together with cryo-electron microscopy and optical analyses, we have demonstrated that color change in fish is due to tilting of intercellular guanine crystals[4] and that the complex optical response of the fish iris is facilitated by the development a high-order organization of multilayered guanine-based crystal reflectors and pigments.

1. Gur, D., Palmer, B., Weiner, S., and Addadi, L. (2017). Light Manipulation by Guanine Crystals in Organisms: Biogenic Scatterers, Mirrors, Multilayer Reflectors and Photonic Crystals. Adv.Func. Mat.
2. Gur, D., Leshem, B., Farstey, V., Oron, D., Weiner, S., and Addadi, L. (2016). Light-induced color change in the sapphirinid copepods: tunable photonic crystals. Adv.Func. Mat. 26.(9), 1393-1399.
3. Gur, D., Leshem, B., Pierantoni, M., Farstey, V., Oron, D., Weiner, S., and Addadi, L. (2015). Structural Basis for the Brilliant Colors of the Sapphirinid Copepods. J. Am. Chem. Soc. 137, 8408-8411.
4. Gur, D., Palmer, B.A., Leshem, B., Oron, D., Fratzl, P., Weiner, S., and Addadi, L. (2015). The Mechanism of Color Change in the Neon Tetra Fish: a Light-Induced Tunable Photonic Crystal Array. Angew. Chem. Int. Edit. 54, 12426-12430.



Dvir Gur received his Ph.D. in chemistry from the Weizmann Institute in 2016, under the supervision of Professors Lia Addadi and Steve Weiner, working on tunable structural colors. He then moved to the Dept. of Physics of Complex Systems and the Dept. Molecular Cell Biology and he is currently a Clore Postdoctoral Fellow with Professors Dan Oron and Gil Levkowitz. His current research focuses on biological reflectors used in natural optical devices, vision in animals and bio-inspired crystal growth and engineering.