

Dynamic Materials and Systems Inspired by Cephalopods

Prof. Alon A. Gorodetsky

Department of Chemical and Biomolecular Engineering

Department of Materials Science and Engineering

Department of Chemistry

University of California, Irvine, Irvine, CA

Abstract:

Cephalopods (e.g., squids, octopuses, and cuttlefish) have captured the imagination of both the general public and scientists alike due to their sophisticated

neurophysiologies, visually stunning camouflage displays, and complex behavioral patterns. Given such unique characteristics, it is not surprising that these marine

invertebrates have emerged as exciting technological paradigms in bioinspired photonics and biomolecular electronics. Within this context, our laboratory has focused on the development of cephalopod-inspired systems and cephalopod-derived materials with unique capabilities and functionalities. In one research thrust, we have leveraged the cephalopod protein reflectin for engineering the optical properties of human cells to emulate those of squid skin cells, while recently extending these efforts to new types of biomedically-relevant bioelectronic devices. In another research thrust, we have designed and validated new concepts for adaptive infrared camouflage and tunable thermal management platforms, while recently building upon this work for the manufacturing of sustainable food packaging. The understanding of structure-optical function relationships gained from our studies has pointed to exciting new scientific opportunities in materials science and bioengineering.

