"NATURAL PHOTOPROTECTION: ULTRAFAST EXCITED STATE DYNAMICS IN DNA AND MELANIN"

Prof. Dr. Bern Kohler

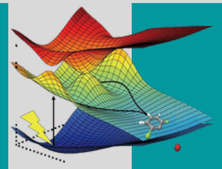
Department of Chemistry & Biochemistry
The Ohio State University,
Columbus, OH 43210 USA
kohler.40@osu.edu

October 22, 2021 (Friday)
12pm (BRT time) - Google Meet

ORGANIZATION:
Prof. Dr. Antonio Carlos Borin
Instituto de Química, Universidade de São Paulo (USP), SP, Brazil

INFORMATION AND REGISTRATION:
ancborin@iq.usp.br

Registration: send a message to ancborin@iq.usp.br
with the words "Bern Kohler– Virtual" on the "subject"
Deadline: October 21, 2021 (Thursday), 06pm (BRT time)



WEBINARS COMPUTATIONAL PHOTOCHEMISTRY

IQ - USP

ABSTRACT

Natural Photoprotection: Ultrafast Excited State Dynamics in DNA and Melanin

Bern Kohler

Department of Chemistry & Biochemistry
The Ohio State University, Columbus, OH 43210 USA

Visible and UV light creates excited electronic states, which can be put to good use, as in natural photosynthesis, but only if damaging photoreactions triggered by these energy-rich species can be avoided. Using femtosecond laser spectroscopy, we study the molecular mechanisms behind photostability in DNA and melanin, ubiquitous biopolymers with remarkable photoproperties that make life possible on a planet bathed in sunshine. Both illustrate how hierarchical assembly leads to emergent photophysical properties not seen in small building blocks. In the case of DNA, subpicosecond excited-state lifetimes are observed in the nucleobase monomers due to readily accessible conical intersections. In contrast, longer excited state lifetimes and rich deactivation mechanisms involving photoinduced electron and proton transfer are encountered in DNA strands. For melanin, its unknown chemical structure has impeded efforts to understand the mechanism behind its sunscreening properties. To gain insight into the chromophores of melanin, femtosecond transient absorption experiments have been carried out on a synthetic eumelanin polymer. Transient spectral hole burning and ultrafast vibrational fingerprinting measurements will be described that are providing new insights into melanin's chromophores and their couplings.