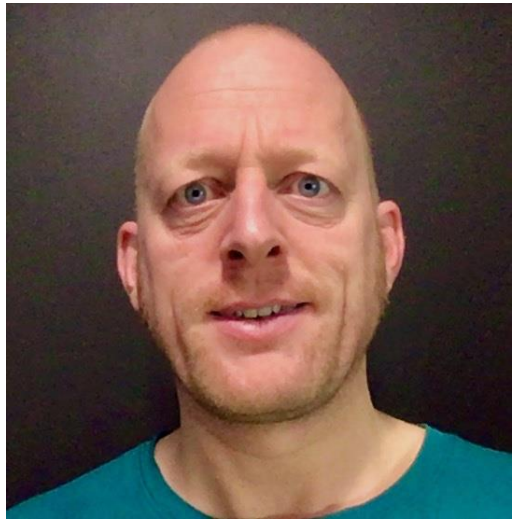
SCIENTIFIC WEBINARS OF **DIVISION OF BIOMEDICAL PHYSICOCHEMISTRY,**
INSTITUTE OF LOW TEMPERATURE AND STRUCTURE RESEARCH, POLISH ACADEMY OF SCIENCES



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Time-resolved & multiplexed FRET for advanced biosensing and bioimaging

The investigation of biomolecular recognition via Förster Resonance Energy Transfer (FRET) plays an important role for quantifying concentrations and distances in many fields of the life sciences. Application of time-resolved photoluminescence spectroscopy and microscopy for the analysis of FRET offers several advantages concerning versatility, sensitivity, and specificity. The combination of nanoparticles (NPs), such as quantum dots (QDs), upconversion NPs (UCNPs), or gold NPs (AuNPs), molecular fluorophores, such as organic dyes or lanthanide complexes, and biological fluorophores, such as fluorescent proteins, provides almost unlimited possibilities for the design of advanced energy transfer systems. The same versatility applies for biological recognition molecules, including antibodies, aptamers, nucleic acids, and peptides. Therefore, the FRET-bioanalysis toolbox presents a boundless source for designing fluorescent probes for biosensing and bioimaging. The presentation will explain time-resolved and time-gated FRET and the specific benefits for spectral and temporal muminescence multiplexing with different materials and instruments. Then, recent applications concerning multiplexed FRET biosensing and bioimaging in solution, in-vitro, in-situ, and in-vivo will be discussed.

Recent reviews concerning our work: *Accounts of Chemical Research* **2022**, 55(4), 551-564; *Analytical Chemistry* **2022**, 94 (1), 193–224; *TrAC – Trends in Analytical Chemistry* **2020**, 125, 115819; *TrAC – Trends in Analytical Chemistry* **2020**, 123, 115748; *Nature Methods* **2019**, 16 (9), 815-829; *Expert Review of Molecular Diagnostics* **2019**, 19 (9), 767-771; *ACS Sensors* **2017**, 2 (1), 31-45; *Chemical Reviews* **2017**, 117 (2), 536-711.

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