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EDITORIAL

President's Letter

Dear Members of the European Photochemistry Association (EPA),

Prof. Uwe Pischel has finished his two-year mandate as President of the EPA. I would like to thank him for his commitment to our association. This period was marked by many difficulties which were caused by the pandemic. A new President had to be elected. During the meeting in Geneva on March 18th 2022 the Executive Committee asked me to candidate for this position. On the EPA General Council which was held on the 19th July 2022 during the 28th IUPAC Symposium on Photochemistry, I was elected President for the next term. I am very honored by this election. During the last two terms, I was editor of the EPA Newletter. Furthermore since 2018, I am Associate Editor of our journal Photochemical & Photobiological Sciences.

Our website is an important communication tool of our association. During recent years, it has been considerably improved. Maybe we should use it more systematically to communicate messages concerning photochemistry in Europe and worldwide.

The EPA Newsletter strengthens the corporate identity and the cohesion among the members of our association. There was some debate as to whether we should discontinue the printed version. However, on several occasions, members expressed their interest in the newsletter and particularly in its printed version. During the meeting in Geneva on March 18th 2022, the Executive Committee has decided to edit one issue per year, preferentially in December.

During the last years, our activities were very much hampered by the restriction in connection with the pandemic. In particular many meetings were canceled or converted to online-meetings. As we all know such meetings can only partially replace the personal presence. They should be considered as an additional tool to strengthen our activities. Let's hope that the situation will definitively improve and we can return to normality.

We should continue our efforts to interest younger people for all domains of photochemistry and to support them when they are working in corresponding research domains. This can also be done by reinforcing and

coordinating our activities with the national photochemical associations or scientific societies. We observe that the number of members is high for some countries while it is low for others. Currently the situation seems to change a bit because joining the EPA by our website is principally easy. In this regard, we should try to increase the membership in eastern European countries. Especially in these wartimes, we should express our solidarity with our Ukrainian colleagues and the Ukrainian people. The conditions for scientific cooperation with Ukraine will certainly be improved after the war and European photochemists should participate to such a cooperation. Also many colleagues from Russia have to leave their country due to restriction of freedom rights and because they disagree with the politics of the current government. They should be supported. On this occasion, we should remember that science is free. This freedom is one of the fundamental rights in the European Union and all democratic countries. International cooperation in science contributes to mutual understanding between peoples and states as well as to peace.

The cooperation of the EPA with the sister organizations can be intensified. In this regard, the Inter-American Photochemistry Society (APS) and the Asian and Oceanian Photochemistry Association (APA), the IUPAC Subcommittee on Photochemistry should particularly be mentioned.

The financial situation of the EPA is stable. Thus we can continue to give support especially to younger colleagues with our awards or registration fees for international meetings. The support of summer/winter schools will also be continued.

I hope to continue the beneficial work of the past presidents of the EPA Executive Committee to shape the EPA as a representative, tolerant and transparent Association of all European Photochemists.

Norbert Hoffmann
CNRS, Université de Reims Champagne-Ardenne

AWARDS

EPA Young Investigator Award

The EPA Young Investigator Award recognizes outstanding contributions to the advancement of the photochemical and photophysical sciences made by EPA members during the past ten years.

The Prize consists of a prize certificate, an invitation for a perspective article in the journal *Photochemical and Photobiological Sciences*, and an invitation to the award ceremony at the Central European Conference on Photochemistry 2024, with plenary lecture and coverage of the registration fees.

Candidates must be under 40 years and an EPA member, both at the time of nomination.

Nominations for this prize are now open and all nominations should be sent directly to uwe.pischel@diq.uhu.es. The nomination package (electronic version only) should include:

- Statement of research accomplishments
- Curriculum Vitae
- List of publications
- List of oral communications in national and international conferences
- List of research funding
- Two letters of recommendation.

The closing date for the receipt of nominations: 30th June 2023

The European Ambassador of Photochemistry Award

The European Ambassador of Photochemistry Award recognizes outstanding contributions to the photochemistry community beyond research, including, but not limited to, service to the photochemistry and photophysical community, the diffusion of the relevance of photochemical and photophysical sciences to science students at all levels, and societal or political engagements on behalf of the community.

The Prize consists of a prize certificate, an invitation to contribute a scientific or journalistic piece to the *EPA Newsletter*, and an invitation to the award ceremony at the Central European Conference on Photochemistry 2024, with coverage of the registration fees.

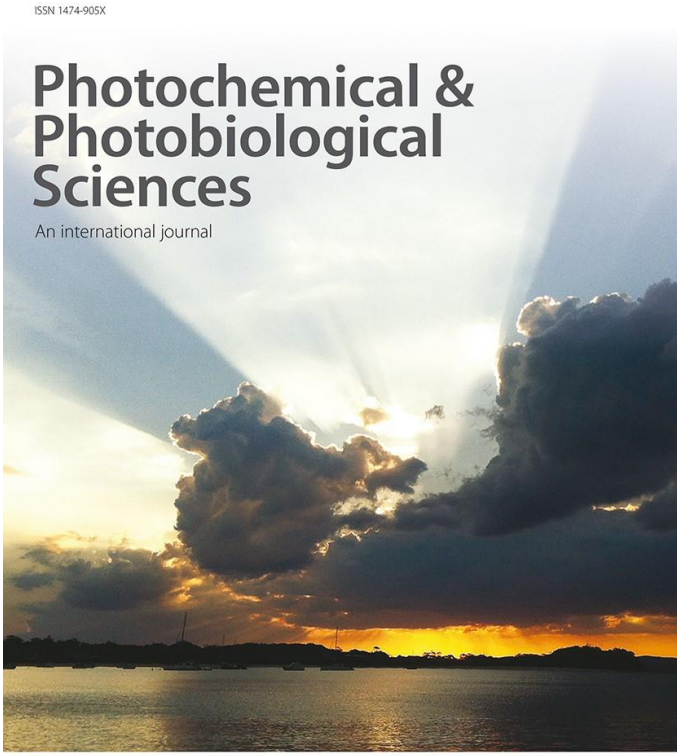
Candidates should be members of the EPA when they are nominated for the award.

Nominations for this prize are now open and all nominations should be sent directly to uwe.pischel@diq.uhu.es. The nomination package (electronic version only) should include:

- Statement describing the merit of the contribution to be recognized as an outstanding service to our community
- Curriculum Vitae
- Supporting letters.

The closing date for the receipt of nominations: 30th June 2023

PHOTOCHEMICAL & PHOTOBIOLOGICAL SCIENCES



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PUBLICATIONS

Research activity report from Laserlab-NSC, University of Jyväskylä, Finland

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https://r.jyu.fi/laserlab-nsc

Laserlab-NSC is a shared laser facility located at Nanoscience Center (NSC) of the University of Jyväskylä. In Finland, Laserlab-NSC has a unique profile that combines laser spectroscopy with nanoscience. Currently, seven groups from Departments of Chemistry, Physics and Biology and Environmental Science use the facility in their research. In this report, we explain about the history of the Laserlab-NSC and highlight the research activities of the different groups.

University of Jyväskylä has a long tradition in laser spectroscopy related research. Time-resolved laser spectroscopy was brought to Jyväskylä by Professor Emeritus Jouko Korppi-Tommola in the 1980's after learning picosecond spectroscopy at the laboratories of the National Research Council in Canada. The first experiments with picosecond time resolution in Finland were carried out in 1984 at the laboratory established by Prof. Korppi-Tommola. This marked the beginning of advanced laser spectroscopy research at the University of Jyväskylä. Since its inception, the laser laboratory has been systematically developed and expanded continuing its activities in interdisciplinary research topics revolving around laser spectroscopy.

The Laserlab-NSC was established in its current form in 2017 when researchers from the Departments of Chemistry, Physics and Biological and Environmental Science decided to join forces to create a shared research facility dedicated to laser spectroscopy. At the time, the vision was to gather researchers from different disciplines under the same roof to facilitate top-level spectroscopy research in a versatile and well-equipped environment supported by permanent staff. The aim was also to integrate better into the

European laser spectroscopy community. The shared facility was also envisioned to lower the threshold for joint planning of large investments, organization of education and conferences as well as to increase the international visibility of the laser lab. These aims have been persistently pursued over the past five years. Currently, Laserlab-NSC is a member of the Laserlab Europe AISBL-consortium and has also received significant research infrastructure funding of over 1M € from the Academy of Finland within the qCSI consortium established together with University of Helsinki and LUT-University. Furthermore, Laserlab-NSC is involved in organization of international conferences, most recently the Nordic Femtochemistry in 2022, and organizes regularly courses related to spectroscopy as a part of the Jyväskylä Summer School. At the moment, a summer school on ultrafast spectroscopy is planned for the summer of 2023.

The core of the research facilities is formed by three amplified laser systems, the most recent Coherent Astrella acquired in 2021, that serve as a light sources for several experimental setups enabling time-resolved and imaging spectroscopy techniques. Most techniques rely on home-built collinear or non-collinear optical parametric amplifiers combined with prism compressors for the control of the laser pulses. The time-resolved techniques include femtosecond broadband transient absorption with UV-Vis and mid-IR detection, coherent time-resolved Raman and four-wave mixing. Most recent addition to the time-resolved setups is the broadband fluorescence up-conversion spectrometer (FLUPS) producing photometrically corrected fluorescence spectra from ca. 400 nm to 800 nm with about 100 fs time resolution. The imaging techniques include four-wave mixing imaging, FTIR and Raman microscopes and nonlinear 2D-laser patterning setup. The flagship imaging instrument is however the Scanning Near-field Optical Microscope (SNOM, Neaspec) facilitating nanospectroscopy and imaging down to 10 nm spatial resolution. The SNOM instrument is equipped with multiple mid-IR laser sources that can be used for imaging and spectroscopy but other light sources can be flexibly integrated into the instrument. Besides the above techniques, Laserlab-NSC is also equipped with several more conventional setups such as steady-state spectrometers, TCSPC, flash photolysis, several Raman spectrometers and methods for performing studies at low temperatures or complex sample architectures such as photonic crystals or cavities exhibiting strong light-matter interactions.

In the following sections, the group leaders of the Laserlab-NSC focusing on photochemical sciences provide brief summaries and highlights of their research activities reflecting the interdisciplinary profile of the Laserlab-NSC.

Molecular Photochemistry and Photophysics

Group leader: Senior Lecturer Tatu Kumpulainen

Molecular Photochemistry and Photophysics group[1] is a recently established research group headed by Dr. Tatu Kumpulainen. The group relocated to Jyväskylä from University of Geneva in late 2020. The group focuses on investigating ultrafast photochemical processes in condensed media by means of time-resolved spectroscopies and assembles and maintains time-resolved laser setups. The group is also involved in several collaborations within the Laserlab-NSC with regard to femtosecond spectroscopy.

The main research focus of the group is on studying excited-state proton-transfer (ESPT) reactions in homogeneous solutions (aqueous and organic media) and heterogeneous media (lipid membranes). Most of the research is carried out on "super" photoacids, compounds that are weak acids in their ground state but become extremely strong acids in their excited state. The proton dissociation from a photoacid can be thus initiated by excitation with a short laser pulse. The ensuing proton dissociation and diffusion can be followed spectroscopically by monitoring the spectral signatures (fluorescence or transient absorption) of the photoacid

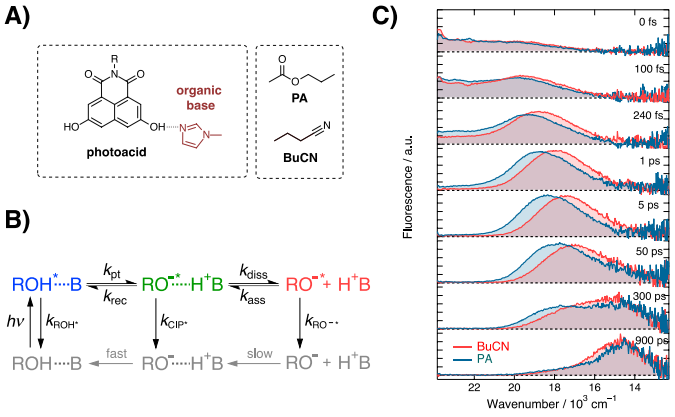

Figure 1. A) Structures of photoacid, base and solvents used in our current study. B) Reaction scheme for ESPT. C) Representative fluorescence spectra at selected time steps in apolar and polar solvent.

chromophore enabling detailed mechanistic and kinetic studies on dissociation of strong acids with femtosecond time resolution.

In recent years, the group has utilized femtosecond broadband fluorescence up-conversion (**FLUPS**) for resolving reaction kinetics and intermediates of ESPT to solvent in protic and aprotic media.[2,3] Such studies rely on the fact that the reaction intermediates, depicted in Figure 1B, exhibit distinct fluorescence bands, the areas of which are related to the populations of the corresponding species. **FLUPS** is particularly well suited for studying ESPT in strong photoacids because the dissociation reaction is typically very fast (sub-ps to ps) and is influenced by solvation dynamics. Hence the spectral evolution contains overlapping contributions from both solvation and population dynamics. Broadband spectra enable disentangling the dynamics because solvation can be monitored from the band positions whereas population dynamics is reflected in the band areas.[2]

Currently, the group is investigating a bimolecular ESPT from photoacids to organic bases in binary solvent mixtures of aprotic organic solvents (Figure 1). The aim is to isolate the effect of a single solvent parameter, e.g. dielectric constant, on the ESPT process.[4] Representative fluorescence spectra demonstrating ESPT from a naphthalimide photoacid to an organic base in polar and apolar solvent is presented in Figure 1C. The spectra show the formation of the intermediate fluorescence species in sub-ps time scale that is then followed by solvation in few ps and eventually diffusion controlled separation into free ions in several hundreds of ps yields the low energy fluorescence band. The evolution of the ground-state species can be monitored using transient absorption techniques thus giving access to the full photocycle (deprotonation and recombination). This provides an ideal playground to develop and test theoretical models. In the future, the group aims to extend such studies to more complex media, such as lipid membranes decorated with photoacids.

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Molecular Electronics and Plasmonic

Group leader: Associate Professor Jussi Toppari

Molecular Electronics and Plasmonics group[1] studies among other things astrong coupling between confined light, like surface plasmon polaritons

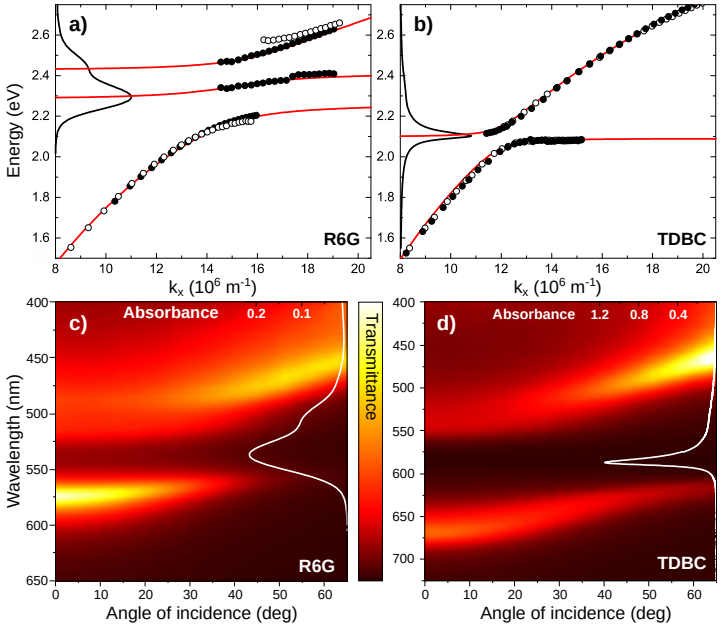

Figure 1. Measured dispersion curve for sample containing (a) R6G or (b) TDBC embedded within a polymer layer on top of a 50 nm thick SPP-supporting silver film (black circles) together with the fitted coupled oscillator model (red solid line). Scattered polariton emission (empty circles) and the molecular absorptions are also shown (black solid line). Angle dependent transmittances of Fabry-Pérot cavities having (c) R6G molecules or (d) J-aggregates of TDBC embedded within them. Absorption spectra of the bare molecular films are shown on the right axis with scale at the top (White solid line).

(SPP) and cavity photons (CP), and molecules. When photoactive molecules interact strongly with confined light modes, new hybrid light–matter states, *polaritons*, are formed, as shown in Fig. 1. The formation of the polariton modes delocalizes the excitation over many molecules and also alters their potential energy surfaces, providing thus a promising paradigm for controlling photochemical reactions within a new area of *polariton chemistry*. The group is involved in several collaborations within the Laserlab-NSC, from which the most important one is to experimentally demonstrate the efficiency of the leading simulation method in polariton theory developed by group of Prof. Gerrit Groenhof.

We have studied the dynamics of polaritons formed between SPPs and organic photoactive molecules[2] as well as CPs and molecules embedded in Fabry-Pérot cavities,[3-5] (Fig. 1). In particular, we have shown that the molecular Stokes shift plays a significant role in the relaxation of polaritons in both cases. While the emission of pure SPP is purely transverse magnetic (TM), the strong coupling with molecules induces transverse electric (TE) component to the emission of the SPP-molecule polariton via the partial molecular nature. The TM/TE ratio of the emission clearly follows the molecular contribution, but also depends on Stokes shift of the molecules due to a symmetry breaking as a result of the unique micro-environments of the molecules.[4]

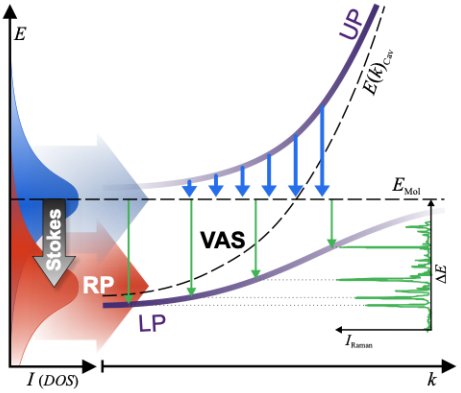

Figure 2. Polariton relaxation routes within a Fabry-Pérot cavity, including radiative pumping (RP) and vibrationally assisted scattering (VAS).

Within the Fabry-Pérot cavities the CP-molecule polariton relaxation is also dictated by the molecular Stokes shift. With Rhodamine 6G (R6G), the excitation of the upper polariton (UP) leads to a rapid decay to the dark states and localization of the energy into the fluorescing state of one of the molecules, from where the energy scatters into the lower polariton (LP) and subsequently emits. This so-called radiative pumping (Fig. 2) is suggested by the experiments[5] as well as the theory.[4] In contrast, for excitonic J-aggregates of TDBC with a negligible Stokes shift, the fluorescing state does not provide an efficient relaxation gateway. Instead, the relaxation is mediated by exchanging energy-quanta matching the energy gap between the dark states and lower polariton, into vibrational modes, i.e., so-called vibrationally assisted scattering, shown also in Fig. 2.[4,5]

We also study the effect of the polariton formation on ultra-fast photochemical reactions like excited-state internal proton-transfer (ESPIT), found for example in 10-hydroxybenzo[h]quinoline (HBQ), and utilization of polariton induced delocalization for ultra-efficient coherent light harvesting.[3]

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NanoCarbon Lab

Group leader: Senior Researcher Docent Andreas Johansson

The NanoCarbon Lab group[1] was established at NSC in 2017, and joined the Laserlab-NSC organisation in 2022. Our focus is on the field of novel nanomaterials, which currently is developing at a rapid pace, and offering new possibilities for electronic, optical and medical applications. In

particular, we study the fabrication and modification of carbon-based nanostructures.[2,3] New synthesis techniques are developed and the resulting nanostructures are incorporated into device geometries, where they can be studied with a range of characterisation methods, such as atomic force microscopy or electronic transport together with different spectroscopy methods. Our projects are often interdisciplinary in nature, with groups from all three branches of biology, chemistry and physics working together here at NSC.

In one of our research directions we develop the technique to sort individual nanometer sized objects in solution through optical characterisation within a microfluidic structure.

Our first sorting target is carbon nanotubes (CNT), which are produced in ensembles with a wide variation of optical and electronic properties.[4] The ability to sort them according to chiral identity is an important step towards making CNTs available for scaled-up device fabrication. Our CNT ensemble

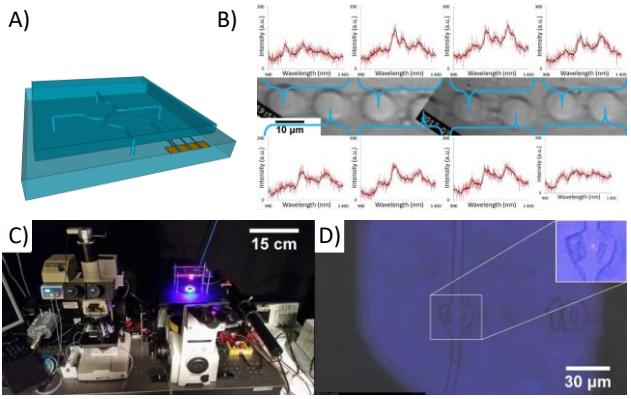

Figure 1. A) Schematic of the microfluidic structure built in glass. The position of the probing laser is drawn in red. Contacts for the dielectrophoretic sorting valve are visible in the front edge. B) Fluorescence spectra from individual droplets containing a few CNTs. C) The full microfluidic fluorescence spectroscopy setup. D) The microfluidic droplet trap. The probing laser spot is visible in the inset.

is dissolved into water with the help of the surfactant SDBS. The procedure is optimised for stable water droplet formation within a flow of hexadecane in the microfluidic system. The channel cross-section is kept close to 10 μm to match the desired diameter of the droplets. A schematic overview of the microfluidic system is shown in Figure 1A. The droplet formation takes place at the left-most Y-junction. The droplets containing CNTs are then caught in a trap (Figure 1D), where the fluorescence spectrum is taken. Examples of fluorescence spectra are shown in Figure 1B. The spectra display peaks in the near-infrared that are unique for specific chiral identities of CNTs and can thus be used as sorting criteria. At the arrival of the next droplet, the former droplet is released and continues down the channel. It enters a region with dielectrophoretic valves with the ability to position the droplet along the left or right edge of the channel. The laminar flow will then take the droplet to the corresponding outlet at the right-most Y-junction. The project has verified functional operation of each step and is currently developing optimisation of the combined flow with a goal to reach sorting frequencies in the kHz regime.

The microfluidic platform also lends itself to organised spectroscopic study and sorting of other types of objects. In a recently started study together with Central Finland Health Care District (KSSHP), the target is to find and isolate circulating tumor cells (CTCs) from blood samples. The concentration of CTCs can be as low as 1ppm, making it extremely challenging to both detect and diagnose the type of cancer. By finding and isolating the CTCs, a diagnose can be made at an early stage and it may even be possible to screen different options for treatment. The CTCs in the blood sample are tagged with fluorescent molecules by utilizing the Warburg effect with a fluorescent glucose derivative. The blood sample is then sorted in a scaled up microfluidic device similar to the one in Figure 1.

Our future goal is to make use of the microfluidic platform in combination with optical spectroscopy to develop characterisation and sorting of nm and μm sized objects. An enticing possibility is to include non-linear optical methods that allow additional characterization and possibly conformational control over the different entities studied.

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Biomolecular Chemistry

Group leader: Professor Gerrit Groenhof

The Biomolecular Chemistry group focusses on understanding light-matter interactions in a wide variety of systems. Because the time and spatial resolution required to acquire atomistic insights into such interactions, are notoriously difficult to achieve experimentally, we use computer simulations to investigate the effect of light on the structure and dynamics of materials at an atomistic level. With such insights we can design and perform experiments to validate our findings, including time-resolved optical spectroscopies or serial femtosecond x-ray crystallography (tr-sfx).

In a nutshell, we rely on a hybrid Quantum Mechanics/Molecular Mechanics (QM/MM) description of a molecular system, in which the atoms that are involved in the absorption of photons are modelled at a suitable level of ab initio theory, whereas all other atoms are modelled with a molecular mechanics force field. Based on this model we solve Newton's equations of motion to compute a Molecular Dynamics (MD) trajectory that describes the positions of all atoms in the system as a function of time, typically femto- to microseconds.

With MD we can track the sequence of events that follow photon absorption at atomic resolution, for example in PYP, a bacterial photoreceptor. As shown in Figure 1, the MD simulation suggest that after photo-excitation, the covalently bound chromophore in this protein undergoes trans-cis isomerization. These results are in good agreement with structures refined from time-resolved sfx experiments.[1] In addition to this isomerization pathway, simulations of the isolated chromophore in water suggest an alternative isomerization pathway that involves a rotation of the single bond adjacent to the double bond. To confirm this finding, we synthesized a chromophore analogue in which the double bond is blocked and used transient absorption spectroscopy to follow the excited state dynamics of this chromophore in water (Figure 2).[2] The results of these

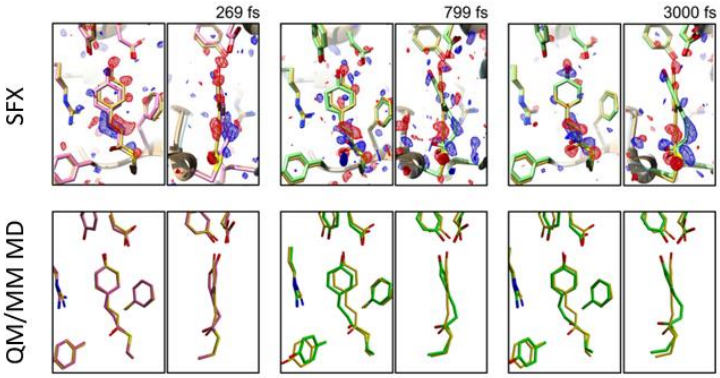

Figure 1. Comparison between time-resolved crystallography (upper panel) and non-adiabatic MD simulation (bottom panel) of of the photo-isomerization process in Photoactive Yellow Protein.

measurements suggest an ultra-fast decay back to the ground state in agreement with the simulations.

More recently, in collaboration with the group of Jussi Toppari, we started exploring the regime of strong light-matter coupling. Recent experiments namely suggest that placing a material inside an optical micro-cavity or near a plasmonic nanostructure, can change its properties, including energy transfer, charge transport, lasing thresholds, and even chemical reactivity. While these changes can be attributed to the hybridization of material and cavity mode excitations into polaritons due to the strong light-matter interaction in such optical structures, a lack of theoretical understanding has so far prevented a systematic exploitation of polaritons for controlling the properties of materials. To overcome this limitation, and realistically model the interaction between molecules and confined light modes in atomistic computer simulations of polaritons, we have introduced a novel approach based on the hybrid quantum mechanics / molecular mechanics ansatz.[3] Using extensive parallel computing (millions of atoms on tens of thousands of CPU cores), we could provide atomistic insights into the dynamics of strongly coupled molecular-cavity systems, including relaxation,[4] energy transport,[5] and reactivity.[6]

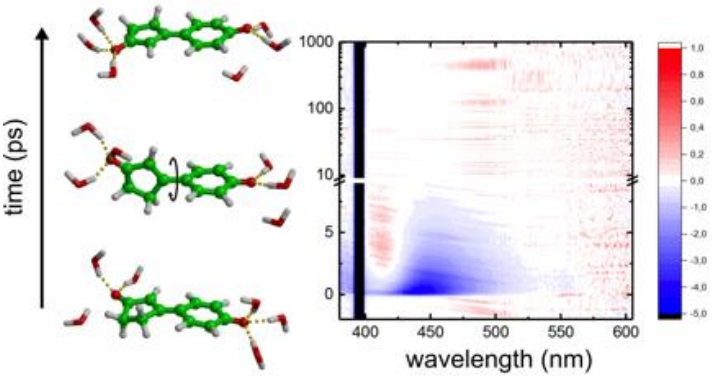

Figure 2. Snapshots from MD simulations, displaying photo-isomerization around the single bond in an analogue of the Photoactive Yellow Protein chromophore, and the time-resolved absorption spectrum after photoexcitation.

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Spectroscopy on Biomolecules

Group leader: Professor Janne Ihalainen

In the Spectroscopy on Biomolecules group,[1] photoactivation of biomolecules are under investigations. Predominantly, we study biological photosensory proteins and/or photosynthetic systems, either in their natural environment or *in vitro*. The key of our research is the combination of fully equipped molecular biological and biochemical laboratory for protein chemistry, including crystallisation facilities, with a state-of-the art laser-spectroscopy laboratory. In particular, combining the spectroscopic signatures with the structural characterisation of the photoactivation processes of phytochrome proteins have captured attention in the photosensory, optogenetics, and protein dynamics communities.[2–4]

Recently, we teamed up with Dr. Riitta Nissinen at JYU to study plant associated aerobic anoxygenic photosynthetic bacteria (AAP bacteria). This novel project – Shared light (https://peda.net/jaettu-valo-shared-light) maps out the commonness of AAP bacteria in arctic and boreal vegetation areas. The project utilizes citizen science as well as field trips to arctic environments. Samples provided by the high-school students, and samples from our own expeditions, allowed us to screen plant foliar samples for AAPB. For the screening we developed a cost-effective NIR-imaging device

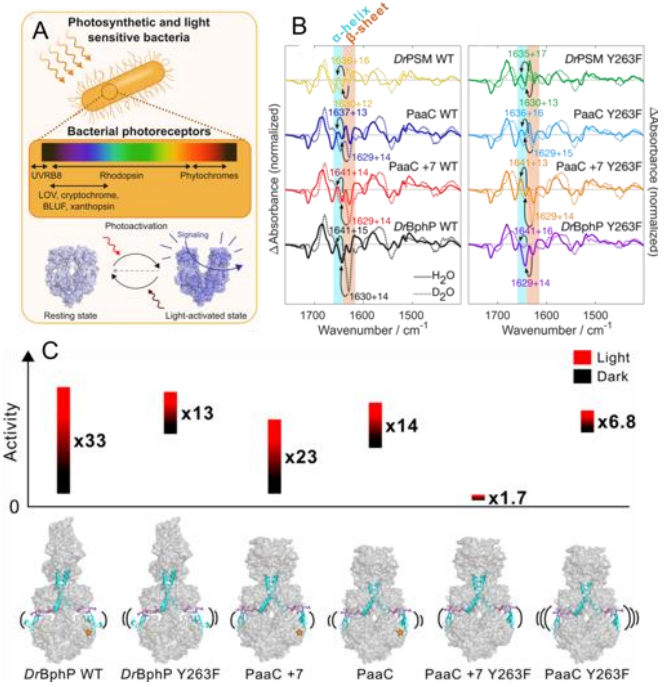

Figure 1. A) Spectral range of microbial photosensors in nature and the structural change of the bacterial phytochrome as a function of light B) FTIR difference spectra between the resting and signalling states of several phytochrome constructs C) The dynamic range of activities of the proteins.

that also school children are able to use. In the project, the high-school students are exposed to a multidisciplinary education project where physics (optics and imaging) is combined with a biological framework (plants and their microbes).

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Spectroscopy and Photodynamics of Nanosystems

Group leader: Professor Mika Pettersson

The Spectroscopy and Photodynamics of Nanosystems group[1] has been active at JYU since 2003 and its research has evolved from nonlinear and time-resolved spectroscopy of molecular systems in low-temperature solids[2] to spectroscopy and imaging of nano-objects[3] and more recently into laser modification of 2D materials.[4] The current portfolio of laser-based techniques that the group uses covers wide range from steady-state spectroscopies and time-resolved spectroscopy and imaging to laser writing.

The main research directions currently involve research on 2D materials and atomically precise gold nanoclusters. The group has developed methods for modifying electronic, optical, mechanical and chemical properties of graphene and other 2D materials with femtosecond laser pulses. These methods are highly interesting as they enable patterning of electronic circuits without using any chemicals or tedious and expensive procedures. The key requirement is to use peak intensities that are just below the ablation threshold, $<10^{12}$ W/cm^2. At these conditions, nonlinear optical effects take place and two-photon oxidation can be performed on graphene leading to incorporation of -OH and C-O-C groups into the carbon lattice.[4] This photochemical process occurs in ambient air but if inert gas atmosphere is used, point defect formation takes place, accompanied with expansion of

the graphene lattice with strain induction, finally leading to bulging out of the graphene film out of the substrate. This method can be used to pattern graphene with 3D structures in microscale.[5,6] Modification of 2D materials by laser writing is a promising method for development of electronic applications. As an example, laser-oxidation of graphene was used for development of area-selective atomic layer deposition (ALD), which has a lot of potential for electronics applications (see Fig. 1 A,B).[7]

Atomically precise ligand-protected gold nanoclusters are interesting because their size covers the range from molecular species to nanoparticles enabling, for example, understanding of transition from molecular to metallic behavior when the size of the system increases.[8] These clusters can be synthesized by wet chemical methods and their structures can be determined by X-ray crystallography. Due to their small size, they can be modelled with atomistic simulations with high accuracy. Recently, the group has studied interaction of fluorescent dye molecules with gold nanoclusters.[9,10] Energy transfer between the dye and the nanocluster leads to quenching of fluorescence. The association constant of the complex is highly dependent on the pH of the solution and thus, the system works as an optical pH sensor (See Fig. 1 C,D). While in many cases adding two constituents of the complex separately into the solution causes no problems for the pH sensing application, an alternative strategy has to be used for live-cell imaging. The group has developed a covalently bound hybrid of the fluorescent dye and gold nanocluster for delivering the complex into cells via endocytosis.[9] After internalization of the hybrid, it ends up in endosomes, where, upon acidification of the solution, the hybrid is hydrolyzed and the dye and the nanocluster are released, after which they act in pair as an intracellular pH sensor. The group continues developing a toolbox of pH sensors by varying the cluster size (Fig. 1 D). The key is to understand properly the factors affecting the interaction between the cluster and the dye and the energy transfer process. Recently, we have measured the rate of energy transfer between the dye and the cluster by femtosecond broadband fluorescence up-conversion methods, in collaboration with the Kumpulainen group. Together with molecular dynamics simulation by the Hannu Häkkinen group, a detailed atomistic picture of the interaction dynamics and energy transfer has been obtained. This gives an excellent

basis for tailoring dye-cluster systems as sensors for specific applications in bioimaging and other fields.

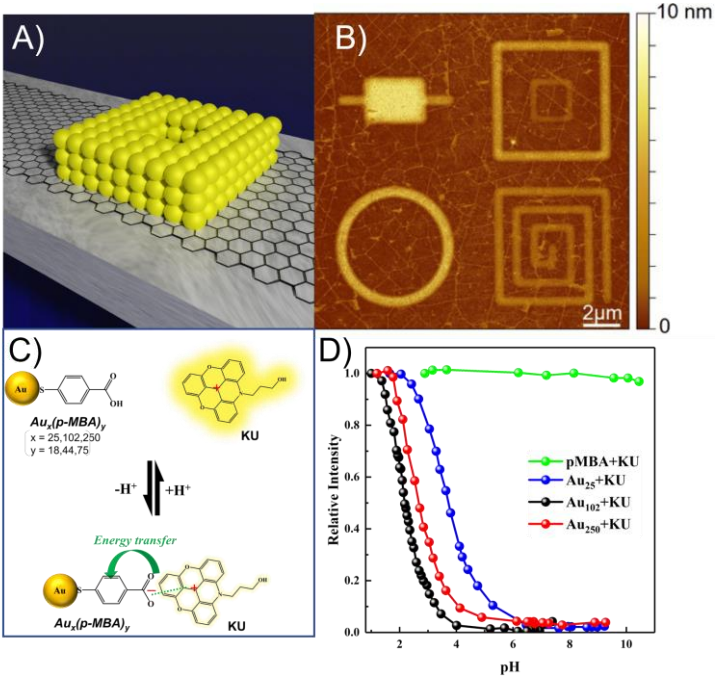

Figure 1. A) Cartoon of area-selective ALD on graphene. The Deposited material (yellow atoms) is localised only on patterns defined by two-photon oxidation of graphene B) AFM image of experimental patterns fabricated by area-selective ALD C) Scheme of the principle of pH dependent quenching of a fluorescent dye (KU) via complexation with the p-MBA ligands of a gold nanocluster D) Experimental fluorescence quenching curves as a function of pH for different size of the nanocluster showing the tailoring of the pH range by varying the cluster size.

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Mat-Light 4.0: a project of Excellences is shaping up at the University of Haute-Alsace

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Our heritage

The University of Haute-Alsace (UHA) is a young university and find its unity and strength on its heritage. In the 1740s, the city of Mulhouse faced a profound change in its overall economic and social framework. These transformations have been heavily influenced by the emergence of the textile printing and the creation of new factories, at a very fast pace for this period. When, in the 1950s, a new project emerged consisting in developing a new university education model in Mulhouse, a "key-idea" arisen as the key to success, that of a "Mulhouse vocation" based on the link between science and industry. At the same time, the challenge for this new university was to overcome its "youngest child" complexes, and to take its full place in the very closed triangle of the several hundred-years-old institutions of the Upper Rhine region, namely the universities of Basel, Freiburg im Breisgau and Strasbourg.

In 1822, on the request of the Textile Industry of Mulhouse, the Chemical School of Mulhouse was created with the aim of training engineers and experts in the domain of reactive dye applications. This was followed in 1861 by the creation of the Theoretical and Practical School of Mechanical Weaving, which would become a few decades later the Superior School of Spinning, Weaving and Hosiery of Mulhouse (now ENSISA). With this new school of engineers, the requirements of textile manufacturers were then completely covered, starting from fibers up to dyed or printed fabrics.

From this point, the link between research, education and industrial demand was recognized as the fingerprint of the university of Mulhouse and all the actors of the ecosystem of Mulhouse continued to work within this framework over many years according to the developments of industrial processes and the needs for new materials. The strategic choices were strongly guided by the Industrial Society of Mulhouse, a local business

combination which is still present today in the territory. Quickly, the university of Mulhouse became nationally well-recognized for its strong interactions with industries, in particular in the domain of Chemistry and Materials.
In 1934, and for the first time in France, courses in "Plastic Materials Chemistry" (and therefore in Macromolecular Chemistry) were introduced in the program of the Chemical Engineering School of Mulhouse (now ENSCMu), a specialty that the engineering school would subsequently continue to develop in all its areas of expertise, mainly in plastics, synthetic resins, natural and chemical fibers.
It is worth noting here that this well-recognized "know-how from Mulhouse" constitutes today the DNA of the Superior School of Physics and Chemistry of Paris (ESPCI) created in 1882 for strategic reasons linked to the conflicts with Germany (https://www.espci.psl.eu/fr/espci-paris-psl/prestige/historique).
Over the years, and according to the politic of the governances, the university of Mulhouse continued to grow and the perimeter was structurally widened, strengthening the leading position of the university in its areas of activity with a strong multidisciplinary aspect: chemistry and functional materials, but also mobilities, risks and interculturalities.

Building a signature

Today, we are delighted to inform the EPA's members that the UHA has been awarded by €10.7 million for the Mat-Light 4.0 project in order to build a signature focused on Material and Light as announced recently by the French Minister of Higher Education, Research and Innovation. The University of Haute-Alsace's project, Mat-Light 4.0, is based on scientific excellence already recognized internationally in the field of photopolymerization, in order to become the reference university at the international level in this field. Mat-Light 4.0 encompasses pedagogical innovation (project-based training) for which UHA already has recognized expertise (PEPS 2019 award), and the development of the training-research-innovation continuum, by strengthening its academic networks and industrial partnerships, and by bringing together all the training-research-innovation partners in a single building.
With Mat-Light 4.0, the new identity of UHA is consistent with the history of its territory (link between research, education and industrial demand), built from its research worldly recognized, and connected with a LMD

teaching system of a high level. Along with the development of research projects, the role of Mat-Light 4.0 is to train the new generation of scientists, at the License, Master and Doctoral level, by creating the Mat-Light 4.0 graduate school, based on project-based learning.

World class platform and facilities for photopolymers

The photopolymer science opens the door of multiple applications based on controllable predictable stimuli response materials and the possibility to be built with additive manufacturing. Through this project, we have the ambition to participate in the challenges of energy and environmental transition that cross today's society and this on several aspects: the impact on energy production in major industrial processes, reduction of the environmental footprint, the optimization of the energy storage, novel strategy for organic-light harvesting cells, process optimization for waste management and material optimization using artificial intelligence. The research developed in the "Alsace site" in the domain of Photopolymerization and particularly with the very high track record of the University of Haute-Alsace alone, places us at the highest international level. With Mat-Light 4.0, UHA intends to make its contribution to the challenges of energy and environmental transition by the development of a unique research platform which comprises several world class set-ups dedicated to photopolymers for the characterization and the synthesis of novel materials. A characterization platform which will be unique in the world will bring together last generation of time resolved cathodoluminescence, photoluminescences and Raman spectroscopies under a SEM, adapted to polymers allowing *in-operando* measurements such as micro-nano probing to address these materials during the measurements. As in the case of the operation of a beamline on a synchrotron, these equipments will be managed by a dedicated host team, including technical engineers, researchers and teacher-researchers, who will analyze the problem asked by "users" (academics, industrials) and make every effort to find specific analysis solutions, design to implement their systems.

More information will be communicated to EPA's members in the following months.

ABSTRACTS OF THESIS ON PHOTOCHEMISTRY

Postfunctionalization of BODIPY dyes for photonic and biophotonic applications

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In recent decades, fluorescent probes have become one of the most powerful and indispensable tools in areas such as biomedicine, clinical diagnostics, materials and environmental sciences. Although a wide variety of organic chromophores with different photophysical properties are available, most of them have important limitations in labelling strategies in order to cover the high demand in these areas. In this context, recently the BODIPY (4-bora-3a, 4a-diaza-*s*-indacene) fluorophores have attracted great interest due to their excellent photophysical properties and high versatility. In this sense in my PhD project (directed by Dr. J.L. Chiara and Dra. I. Garcia-Moreno, CSIC) we have addressed the challenge of providing innovative solutions by developing simple, versatile and efficient synthetic protocols, using representative *F*-BODIPYs as starting materials, which include the functionalization of the boron atom and the functionalization of methylene positions at C3 and/or C5 (Fig. 1).

According to this methodology, we have developed a modular strategy to achieve the direct incorporation of α- or β-hydroxy acid into the boron atom of *F*-BODIPYs dyes, which provides the corresponding *O*-BODIPYs with rigid *B*-spiranic structure in a single reaction step and in high yield. The orthogonal arrangement of the hydroxy acid subunit with respect to the chromophoric subunit allows combining structural and physicochemical properties, for example:

- Stereoisomeric bichromophoric systems based on a tartaric acid connector, with photophysical and chirooptic properties modulated by steric and stereoelectronic effects.[1]
- Hydrolytically stable BODIPY dyes in biological environments.[2]

- The first functional mitochondria-specific fluorescent probe that internalizes to the interior of the mitochondrial matrix via a specific membrane transporter, enantioselectively and independently of the mitochondrial transmembrane potential (ΔΨm).[3]

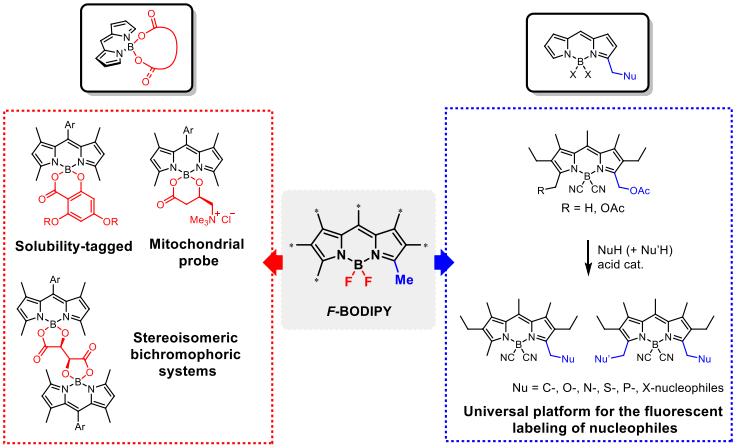

Figure 1. General scheme and examples of derivatization of *F*-BODIPYs.

In addition, a general, highly versatile and efficient post-synthetic methodology has been developed to easily incorporate, and in a single reaction step, C-, N-, P-, O-, S- and/or halo-substituents into the C3/5 methyl groups of the *F*-BODIPY chromophore. The a catalyzed nucleophilic substitution reaction does not significantly affect their unique photophysical properties.[4] This novel methodology allows the easy preparation of a wide variety of novel functionalized fluorescent probes, both mono- and di-functionalized, for advanced applications in biology and technology.

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OBITUARY

Remembering Franco Scandola (1942 - 2022)

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I met Franco Scandola for the first time in 1964. I was a young assistant professor at the Giacomo Ciamician Institute of Chemistry of the University of Bologna. My mentor, professor Vittorio Carassiti, had moved from Bologna to Catania two years before. He left me, as inheritance, a small research group consisting of a very young researcher and three students working on their dissertations. Since my degree in 1960, Professor Carassiti and I worked on the photochemistry of coordination compounds, a new, fascinating research field.

Figure 1. Prof. Franco Scandola (University of Ferrara – Italy)

One day in September 1964 I heard a knock on the door of my office: two students, Franco Scandola and Fabizio Bolletta, entered and told me that they were interested in working with my research group for their experimental thesis. We talked for at least one hour and I understood that they were very clever and strongly motivated. The day after they began to work in my laboratory: Franco Scandola on the photoisomerization of square planar platinum (II) complexes, and Fabrizio Bolletta on the redox decomposition of Co(III) amine complexes. At the end of July 1965, both graduated with top marks.

A few months later, professor Carassiti moved from the University of Catania to the University of Ferrara, where he became director the Photochemistry Center of the National Research Council of Italy. He told me that there was an open permanent position at the Photochemistry Center and asked me if I could suggest a brilliant young researcher for it. At the time, Franco was working in my laboratory while waiting for a permanent job. I asked him if he would have been interested in working in Ferrara with professor Carassiti. Franco was very glad about that opportunity and moved from Bologna to Ferrara. I was happy for him because there was no possibility for him to remain in Bologna with me and also because Bologna and Ferrara are very close, which enabled Franco and I to still meet quite frequently and to work together on several interesting topics.

In the following years, Franco and I published about 30 papers on international journals. We started to make ourselves known in the photochemistry community and we were invited to give lectures at international meetings, research centers and universities in Europe, in the USA, and in Japan. In the late eighties, an English publisher, Ellis Horwood, asked us to write a book on Supramolecular Photochemistry. This marked the transition from molecular photochemistry to the photochemistry of more complex systems, obtained connecting suitable molecular components by covalent bonds or donor-acceptor interactions. Such systems represented a first step towards the study and development of molecular machines and artificial photosynthesis, a theme that Franco always found fascinating. More recently, Franco's group focused primarily on photoinduced electron transfer processes, whereas my group in Bologna moved to the field of photochemical molecular machines. Nevertheless, we continued to meet and collaborate up to the end of his life.

It is difficult to summarize Franco's intense scientific and teaching activity. However, I wish to recall that he is the author of more than 200 publications

on international journals and that he has been invited to present lectures at 70 national and international meetings and research centers. He was one of the founding members of the Italian Photochemistry Group, as well as the chairman of the Italian section of the European Photochemistry Association for six years. Franco founded and directed the Ultrafast Spectroscopy Laboratory at the University of Ferrara and was a member of important international committees, including the International Conference on Photochemical Conversion and Storage of Solar Energy. Solar energy conversion by artificial photosynthesis was indeed the topic that most interested Franco, who became one of the international leading experts of this topic.

Franco was a teacher of exemplary clarity, highly esteemed by his students, pupils, and collaborators. I was very lucky to work with such a talented colleague and to always be able to count on him for help. Even in recent years, whenever I had some experimental results that I could not fully explain, I would make a phone call to Ferrara, to Franco, who often managed to give me significant help using his skills and intuition.

To me, Franco was much more than a very talented colleague. He was, above all, a dear friend with whom I enjoyed discussing many topics, with the confidence that he would always find something to teach me.

There was, however, a topic we never discussed in deep because we knew we had different ideas: the progress of science and its relationship with the faith in God. I am a believer, and I have always found reassurance in a phrase attributed to Albert Einstein: Man meets God behind every door that science can open. Franco has certainly opened many doors in science, the rest remains his secret. Franco would have perhaps liked better a sentence of Stephen Hawking that reads if we are intelligent enough to unify all the theories of physics, we will be able to understand why the universe exists.

In my opinion, science tells us how the world is made and how it works, but it cannot answer our whys. Therefore, in the face of every scientific discovery, one must choose between "it is enough" and "it is not enough": the second alternative, "it is not enough", expresses the desire of man to continue to seek, in the mystery, the ultimate truth of his life. And I think Franco agreed on this too.

INTERNATIONAL FOUNDATION OF PHOTOCHEMISTRY

International Foundation for Photochemisty

What is IFP ?

- A non-profit foundation (under the German law) providing financial support for the organization of scientific conferences in the field of photochemistry.

How it works?

- Upon a written request by the conference Chair, IFP advances a certain amount of money in order to facilitate organization of the conference.
- At the end of the conference, the Chair pays back to IFP the conference budget surplus, which will be retained for the organization of future events.
- The IFP logo is shown in the list of the sponsors

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CONFERENCE REPORT

30th International Conference on Photochemistry (ICP2021) – July 19-23, 2021

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The 30th International Conference on Photochemistry (ICP2021) was held online on July 19–23, 2021. Guided by the ICP's international advisory board, the aim of the local organizing committee of the conference was to provide a platform for the leading scientists and companies from all over the world to share their latest findings in photochemical, photophysical and photobiological sciences. The conference was originally planned to take place in Geneva, Switzerland, but due to concerns over the global health situation, the conference was eventually held virtually using a professional online conference platform. The event was financially supported by the University of Geneva, the Swiss Chemical Society, the European Photochemistry Association (EPA), the International Foundation of Photochemistry, together with several international companies and scientific journals including *Photochemical & Photobiological Sciences* (PPS).

ICP is one of the oldest and most established conference series dedicated to photosciences. It is organized biennially alternating with the other large conference in the field, the IUPAC Symposium on Photochemistry. The 30th ICP, chaired by Prof. Eric Vauthey (University of Geneva), was announced during the preceding conference in Boulder Colorado in 2019 and planning for the physical meeting in Geneva started soon after. Unfortunately, the emergence of the covid-19 pandemic shook the scientific world resulting in cancellation or postponement of nearly all scientific meetings in 2020. In response to the prolonged tense global health situation, the local organizing

committee decided to organize ICP2021 as a fully virtual event instead of postponing it by two years. Hopefully, the 31st ICP, to be organized in 2023 in Sapporo, Japan, will take place as planned as an in-person meeting (https://icp2023.jp/).

ICP2021 gathered over 450 participants from 36 countries in five continents in front of their computers. Over 70% of participants were from European countries, with particularly high attendance from Germany, Switzerland, and France. Despite the inconvenience caused by the time difference, close to 50 participants attended the meeting from Japan and 30 from the USA, Asia representing 17% and North America 7% of the total participants.

The scientific program consisted of 9 plenary and 35 invited lectures in addition to 160 short oral contributions and nearly 140 virtual posters. Five parallel sessions grouped into 13 separate themes featured a vast range of topics from fundamental photochemistry and solar energy conversion to plasmonics and light-responsive materials. The plenary lectures given by leading scientists in their fields showcased the breadth of areas in which photosciences are particularly influential. Prof. Michel Orrit (Leiden University) reminded the audience how photochemical sciences enabled the field of single-molecule spectroscopy and imaging and featured how plasmonics influence the photophysical behavior of particles and molecules in a way that enables unprecedented probing of the nanoscale. Prof. Katja Heinze (JGU Mainz) proposed several avenues to efficiently achieve earth-abundant metal-centered spin-flip emission of molecular coordination complexes, which find applications in circularly polarized luminescence or as molecular thermometers. Prof. Hiroko Yamada (NAIST, Japan) demonstrated various strategies for the synthesis of large acenes utilizing light and temperature sensitive precursors. Prof. Kris McNeill (ETH Zürich) detailed how the triplet states of dissolved organic matter play key roles in natural photodegradation processes of pollutants. Prof. Roberta Croce (VU Amsterdam) explained how plants and bacteria can utilize far-red light for oxygenic photosynthesis. Prof. Chi-Ming Che (HKU Hong Kong) described how to take advantage of the photophysics and photochemistry of d^6 and d^8 metal complexes with open coordination sites for photocatalysis, biomedical applications or for making improved OLEDs. Prof. Garry Rumbles (NREL Colorado) showed how dielectric spectroscopy can be utilized to investigate the generation and mobility of free charge carriers in organic photovoltaic materials. Prof. Leticia González (Uni Vienna) demonstrated how ultrafast

dynamics in transition metal complexes can be accurately modelled using surface-hopping molecular dynamics simulations. Last, Prof. Johan Hofkens (KU Leuven) focused on how looking at single molecules has changed the way science is performed and introduced revolutionary ways of achieving DNA sequencing by optical super-resolution mapping.

In addition to the regular scientific program, the meeting also featured an award ceremony to congratulate the laureates of several prizes awarded by the EPA, who all delivered outstanding prize lectures. The EPA PhD Prize 2020 for the best thesis in photochemistry was awarded to Dr. Bogdan Dereka (University of Geneva, supervisor: Prof. Eric Vauthey) for his work on symmetry-breaking charge separation. The EPA PPS Prize 2020 was awarded to Prof. Bo Albinsson (Chalmers University of Technology) for his highly cited article on increasing the efficiency of triplet-triplet annihilation photon upconversion by oxygen scavenging.[1] Dr. Haining Tian (Uppsala University) was the recipient of the newly established EPA Young Investigator Award 2021 for his research on molecular devices for artificial photosynthesis. Finally, the first European Ambassador of Photochemistry award (2021) was given to Prof. Silvia Braslavsky for her relentless and intercontinental service to the photoscience community. At the end of the meeting, with the support of commercial sponsors including PPS, the six best oral and poster contributions presented by PhD students and postdocs during the meeting were also recognized, with Alex Cravcenco (University of Gothenburg) and Emilie Renouard (Ecole Normale Supérieure) collecting the top prizes for the best oral and poster contributions, respectively.

EPA did not only support the meeting financially by providing discounted registration fees to its members, but also sponsored the plenary lecture given by an EPA member, Prof. Katja Heinze. In addition, PPS and its publisher Springer were represented at a booth throughout the meeting by Dr. Sabine Malzkuhn. Moreover, the editor-in-chief for chemistry, Dr. Dario Bassani, advertised the journal and shared its latest news during the introduction to Prof. Heinze's lecture. Dr. Bassani also invited all participants of the meeting to submit a paper to PPS as part of a topical collection of papers (virtual special issue) related to the ICP2021 meeting. A large part of the present article was originally published as an editorial[2] to the virtual special issue which is available online at the following address: https://link.springer.com/collections/jjdeaecgcf.

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CECP 2022 Conference Report

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From Sunday, February 13 to Thursday, February 17, 2022, 88 photochemists from 13 different countries came together to share their results and experiences at the Congress Centre of Bad Hofgastein/Austria. It was a wonderful atmosphere and all participants enjoyed the meeting. The scientific organization has been done by the international scientific committee: Petr Klán, Brno, Czech Republic, Loredana Latterini, Perugia, Italy, Xavier Allonas, Mulhouse, France, Bernd Strehmel, Krefeld, Germany, Ottó Horváth, Veszprém, Hungary, Tamás Solomek, Bern, Switzerland and as a guiding member: Stephan Landgraf, Graz/A for EPA Austria (ZVR: 050416508). The conference started on Sunday with a get-together including a buffet and an opening lecture.
From Monday to Wednesday there were two sessions per day with short and long talks, and a poster session every evening (in sum 39 poster presentations). In order to facilitate the preparation of the meeting, no plenary lectures have been included.
To keep a high scientific level at the meeting the scientific committee selected 6 long talks (out of 9 applications) and 32 short talks (out of 43 applications). One additional talk on the activities of EPA has been

presented on Wednesday morning. All poster applications were accepted after checking by the local committee.
The local organizing committee has been formed by: Stephan Landgraf (local organizer from EPA Austria) and Sabine Richert. Additional help from Heidi Schmitt (also for the conference photos), Charlie Thompson, and Maximilian Mayländer is also gratefully acknowledged. A variety of different accommodations is available in Bad Hofgastein from private rooms up to hotels with high comfort. A contingent of 46 rooms (single to triple) had been available for early booking until December 15, 2021. This year most accommodations were not booked out. Contact person for accommodation: Anna Lenz, tourist office. The official website of the meeting: www.cecp.at

Figure 1. Long talks have been given by H. Ottossen, Uppsala, S, T. Slanina, Prague, CZ; J.S. Lewis, Cambridge, UK, M. Mayländer, Freiburg; D, X. Allonas, Mulhouse, F, and A.L. Sobolewski, Warsaw, PL

The key idea of the CECP meeting is to bring together young and experienced photochemists from all fields of photochemistry. Therefore, everything was done to remove all hindrances to join the meeting.

Additionally, the evening should be undisturbed by the dinner. So, four evening buffets were organized for all participants. The costs were included in the conference fee. Young researchers up to 4 years after PhD, all attendees from Eastern European countries, and retired researchers could join for a reduced fee, too. A special price for EPA members has also been offered (-30 € for full members and -15 € for students). Although we tried our best the COVID-19 pandemic was a significant problem during the organization of the conference. In autumn 2021 it was not clear if we were able to hold a meeting in presence or not. Infection numbers and measures changed rapidly and unpredictably. Finally, in October we decided to make it in Bad Hofgastein. Together with the tourist office and the district authority in St. Johann im Pongau we developed hygiene measures for the meeting and collected the entry regulations for the participants. Due to infections and local rules, many applications had to cancel and the conference program had to be adapted many times. In the end, the conference was a great success and all participants were glad to meet colleagues again after a two-year break.

The location of the Conference Centre of Bad Hofgastein allows perfect access to physical activities during the afternoon break. Downhill and cross-country skiing, as well as the thermal bath and spa, offer a variety of possibilities to enjoy the region or simply relax.

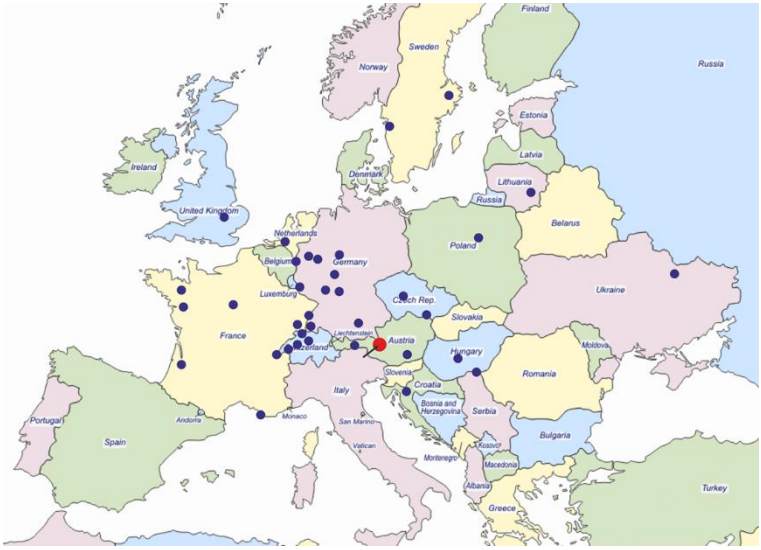

Figure 2. Participants of CECP 2022 located on a Europe map.

This time 108 persons registered for the conference. Since 2006 there have been some fluctuations in the distribution of participants with a mean value of slightly above 100. In 2022 most of the participants came from Germany, but there was also significant attendance from France, Hungary, Austria, Switzerland, and the Czech Republic (with 5 participants and more). Unfortunately, no one from Italy could arrive due to travel regulations.

CECP 2024 outlook: Feb. 4 to 8 or Feb. 18 to 22, 2024.
Please share your opinion => info@cecp.at.

Annual Meeting of the Photochemistry, Photophysics and Photoscience Subdivision (SP2P'2022) from 7th to 8th June 2022 in Paris-Saclay, France.

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The Annual Meeting of the Subdivision of Photochemistry, Photophysics and Photoscience (SP2P) was held on June 7th and 8th 2022 at the École Normale Supérieure (ENS) Paris-Saclay in Gif-sur-Yvette (Fig. 1). The SP2P group forms part of the Physical Chemistry Division, which itself is a unit within the French Chemical Society (Société Chimique de France, SCF) and the French Physical Society (Société Française de Physique, SFP). The two-day conference covered various current topics in photochemistry, photophysics and spectroscopy, demonstrating France's leading role and long tradition in these truly exciting research areas.[1,2] The event was organized and hosted jointly by the SP2P board and the local organizing committee (Table 1) at ENS Paris-Saclay.

Figure 1. Banner of the *SP2P'2022* Annual Meeting.

By bringing together photochemists and photophysicists, the meeting offered an interdisciplinary platform for students and young researchers to present their research achievements in a relaxed, constructive and stimulating atmosphere (Fig. 2).

SP2P Board Members
Julien Boixel – CNRS, Université de Rennes 1

Jérôme Chauvin – Université Grenoble Alpes
Stefan Haacke – Université de Strasbourg
Karine Loubière – CNRS, Université de Toulouse
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Michel Sliwa – CNRS, Université de Lille
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Anne Zehnacker – CNRS, Université Paris-Saclay
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Nicolas Bogliotti – ENS Paris-Saclay
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Christian Jean-Baptiste – ENS Paris-Saclay
Guillaume Laurent – CNRS, ENS Paris-Saclay
Rémi Métivier – CNRS, ENS Paris-Saclay
Keitaro Nakatani – ENS Paris-Saclay

Table 1. Members of the SP2P board and local organizing committee.

Figure 2. Snapshots of the *SP2P'2022* Annual Meeting.

The event also presented an opportunity to listen to four experienced national and international researchers as keynote or invited speakers. The conference ran in five sessions with a total of twenty-one scientific oral

presentations (Table 2). The meeting included two separate poster sessions with fourteen poster presentations and allowed for lively discussions among participants. The topics presented included, among others, fundamental concepts, organic synthesis, novel technologies, photocatalysis and applications in photoscience.[3] A highlight and emotional event was the special session in memory of the late Professor Jean Faure (1935-2017), the founding director of the Laboratoire de Photophysique et de Photochimie Supramoléculaires et Macromoléculaires (PPSM). He is well-known and remembered for his contributions to the French photochemistry community, promoting links between teaching and research.[4] On the second day of the conference, interested participants could furthermore join a tour of the new and state-of-the-art facilities and laboratories of the PPSM Laboratory.

Day 1: Tuesday, June 7th 2022
Keynote – **Michael Oelgemöller** – Fresenius Univ. Applied Sciences (Germany) *"Green chemistry with light – from lab-scale photochemistry to the solar production of chemicals and continuous-flow photochemical synthesis*
Stéphane Rigaut – Univ. Rennes *"Photo-control of NIR emission"*
Aurélie Djian – ENS Paris-Saclay *"Highlighting photophysical properties of a new negative photochromic class"*
Aude Bouchet – Univ. Lille *"A new tool for time-resolved hyperspectral nano-imaging of up-converting nanoparticles"*
Zhouyun Chen – Univ. Clermont Auvergne *"The association between polycarbonate photoageing and oxygen permeability"*
Invited Talk – **Marie-Claire Schanne-Klein** – École Polytechnique *"Structural imaging of collagen in biological tissues using Second Harmonic Generation microscopy"*
Mario Andrés Gomez Fernandez – Univ. Reims Champagne-Ardenne *"Application of the Paternò-Büchi reaction to the synthesis of novel fluorinated scaffolds"*
Anam Fatima – Univ. Paris-Saclay *"Tracing the photo-driven electron transfer efficiency between octahedral molybdenum halide cluster $[Mo_6I_8Cl_6]_2$- and different polyoxometalates"*
Best oral Presentation – **Eva Pugliese** – Univ. Paris-Saclay *"Light-induced CO_2 reduction catalysis with urea-modified iron porphyrin"*
Robert Pansu – ENS Paris-Saclay *"De l'analyse des déclins de luminescence en phase solide"*
Various speakers *"Hommage to Professor Jean Faure (1935-2017)"*
Day 2: Wednesday, June 8th 2022
Cassandre Quinton – Univ. Rennes

"[4]-Cyclo-2,7-carbazole as host material in high-efficiency red phosphorescent OLEDs: a new perspective for molecular nanohoops in organic electronics"
Émilie Renouard – ENS PSL *"Time-resolved spectroscopic study of the ON → OFF photoswitching reaction pathway of the fluorescent protein Dreiklang"*
Invited Talk – **Guillaume Schull** – Univ. Strasbourg *"From single-molecule fluorescence to photosynthesis with an STM"*
Auriane Perrin – École Polytechnique *"Photo-control of G-quadruplexes folding and unfolding with azobenzene derivatives"*
Philipp Gotico – CEA, Univ. Paris-Saclay *"The curious case of a Ru-Fe sensitizer-catalyst dyad for CO_2 reduction"*
Céline Molinaro – Univ. Haute Alsace *"Thermopolymerization induced through the plasmonic excitation of gold nanoparticles"*
Minh-Huong Ha-Thi – Univ. Paris-Saclay *"Broadband light-absorbing BODIPY-C_{60}-distyryl BODIPY triad as heavy-atom-free organic triplet photosensitizers"*
Invited Talk – **Aurélie Perrier** – Univ. Paris Cité / Univ. PSL *"Photoinduced processes under constraints: a theoretical insight"*
Jonathan Piard – ENS Paris-Saclay *"Universal buffer: a powerful tool to investigate the impact of pH on photophysical and (photo)chemical properties from pH 1.9 to 12"*
Valéria Lepère – Univ. Paris-Saclay *"Conformation isomerism of 1–indanol probe by PhotoElectron Circular Dichroism"*
Jean-Sébastien Lauret – ENS Paris-Saclay *"Investigation of the optical properties of single nanographene"*

Table 2. Program and speakers of the *SP2P'2022* Annual Meeting.

The winners of the best presentation awards were announced and honored during the conclusion session of the event. Mrs. Eva Pugliese (CNRS, Université Paris-Saclay) received the best oral presentation award for her talk entitled "light-induced CO_2 reduction catalysis with urea-modified iron porphyrin". The best poster presentation award went to Dr. Lorenzo Casimiro (ENS Paris-Saclay) for his poster "4,4'-dimethylazobenzene: a new chemical actinometer".

Figure 3. Group picture of the *SP2P'2022* Annual Meeting.

The *SP2P'2022* meeting was well attended with a total of 100 registered participants (Fig. 3). While the majority of the attendees naturally came from France, other participants came from Germany, Brazil or Australia, respectively.

Overall, the *SP2P'2022* Annual Meeting was a huge success with exciting presentations, active discussions and engaging interactions between participants and speakers. The next annual meeting *SP2P'2023* will be held in May 2023 in Mulhouse. In the meantime, a two-day international virtual conference, *PhotOnline'2023*, organized by and for young photochemists and photophysicists (PhD students, post-docs) and supported by the SP2P board, will take place in February 2023.[5]

Acknowledgements. The authors thank all members of the SP2P board and especially the local organizing committee for their generous help and support.

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4. Homage: https://ppsm.ens-paris-saclay.fr/fr/actualites/hommage-au-professeur-jean-faure-1935-2017 (last accessed November 15th 2022).
5. Official homepage: https://photonline2023.sciencesconf.org/ (last accessed November 15th 2022).

Conference Report on the 24th International Symposium on the Photochemistry and Photophysics of Coordination Compounds (ISPPCC), Vancouver, BC, Canada

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The 24th edition of the International Symposium on the Photochemistry and Photophysics of Coordination Compounds, also known as ISPPCC, has been held in Vancouver, BC, Canada, from July 24 to July 29, 2022. As for many other scientific conferences, it was moved to 2022 from its original date of 2021, due to the pandemia crisis. ISPPCC, started the early 70s, along the years has been the home of many important developments in the area of photochemistry, including fundamental definition of photochemistry of coordination compounds (e.g., classification of metal-to-ligand charge-transfer – MLCT - excited states), intervalence transfer excited states, photoinduced electron transfer in metal complexes, supramolecular photochemistry, as well as applicative aspects such as solar energy conversion by photoinduced water splitting, dye-sensitized solar cells, and OLED based on transition metal complexes. The 24th ISPPCC followed the tradition of high scientific level of these conferences. The Chair of 24th edition was Michael Wolf, who organized a wonderful edition within the Vancouver campus near the Pacific ocean coast. In spite of the perduring pandemia of COVID-19, which limited the participation of Asian scientists (particularly from China and Japan, where traveling restrictions and quarantine rules are still effective), almost 200 participants from the Americas, Europe, Asia and Oceania attended the meeting, sharing the enthusiasm of finally meeting again after 2 hard years (see Figure 1).

Figure 1. A group photo of the 24th ISPPCC.

The scientific program covered a broad range of topics, including the most advanced research fields of the photochemistry of coordination coumpounds. A non-exhaustive list ranged from recent results on: the luminescence of earth-abundant transition metal complexes (e.g., the plenary lectures of Castellano and Wenger, plus several contributions including those by Herbert and Troian-Gautier); the self-assembly of luminescent metal complexes in vitro and in vivo, with outstanding results presented by De Cola; spin-flip emitters for sensing and upconvertion (plenary by Heinze); nanostructured, multimetallic assemblies photophysics (e.g., Yam, Shustova); vibronic coherence and ultrafast spectroscopy (e.g., McCusker, Weinstein, Cannizzo); applications of advanced theoretical methods (e.g., Daniel, Reber); solar energy conversion and artificial photosynthesis (e.g., Rau, Pryce, Majewski, Morris, Moore, Sakai); luminescent metal complexes for bio-imaging (e.g., Lo, Dietzek-Ivansic, McClenaghan); luminescent MOF (e.g., Howarth); the problem of encounter complex formation in bimolecular photochemistry (plenary by Meyer); highly luminescent metal complexes for OLED applications via delayed fluorescence, with the outstanding Cu(I) complexes illustrated by Thompson, exhibiting emission quantum yields close to 100%. But all talks were extremely interesting and stimulating, although they cannot be mentioned here for space reason. Two highly attended poster sessions, spanning more than 4 hours in two days, allowed to give the warranted time to discuss the almost 60 poster communications, mainly presented by young researchers. Yam and Lo delivered their plenaries online, because of traveling restriction in China.

The atmosphere during the conference was extremely relaxed, as usual for ISPPCC, and large time was allowed for informal discussions, including the boat excursion in the Vancouver harbour area, and this surely was instrumental for sharing ideas and planning collaborations.

Finally, at the end of the conference the 25th ISPPCC was announced: it will be hold in Ulm, Germany, in July 2023, organized by Benjamin Dietzek-Ivansic, Sven Rau and Katja Heinze.

28th Lecture Conference on Photochemistry, Düsseldorf

Christoph Kerzig, Department of Chemistry, *Johannes Gutenberg University Mainz,* ***55128 Mainz,*** *Germany*
Heiko Ihmels, Department of Chemistry-Biology, University of Siegen, 57068 Siegen, Germany

From September 19 to 21, 2020, the *28th Lecture Conference on Photochemistry* of the GDCh Division of Photochemistry was held in Düsseldorf. After the last meeting had to be held online, this time, more than 120 participants from universities, research institutes and industry joined this meeting again in physical presence to discuss the recent results and developments of photochemical and photophysical research.
The scientific program of the meeting, which was organized by Peter Gilch and Thomas Müller (University of Düsseldorf) and the board of the GDCh Division of Photochemistry, documented impressively the variety of photochemistry in 5 plenary lectures, 7 invited lectures, 29 short oral presentations, 10 poster flash-talks, and more than 50 poster presentations. The broad spectrum of topics ranged from basics and methods to materials and applications, and the program was divided in the sessions "Fundamental Photophysics and Single Molecules", "OLED", "Photobiology and Photomedicine", "Photochemistry of New Materials", "Photocatalysis and Solar Fuels, "Synthetic Photochemistry", "Technological und Industrial Processes", "Theoretical Chemistry and Quantum Chemistry", and "Ultrafast Photochemistry".
The scientific program started with a lecture from Chihaya Adachi (University of Kyushu) on the subject of thermally activated delayed fluorescence (TADF), which was one main recurring motif of the conference. He reported on the development of highly efficient, blue-emitting hyperfluorescence-OLEDs (HL-OLEDs) with small FWHM and high luminescence quantum yields. In another plenary lecture from the OLED field, Paloma dos Santos (University of Warwick) discussed strategies to avoid aggregation of fluorophores for the optimization of the efficiency of resonance-TADF materials. To add to that, Stefan Bräse (Karlsruhe Institute of Technology) presented syntheses and developments

of novel organic TADF materials with a special focus on planar-chiral paracyclophanes.
The subject area of photobiology and photomedicine was introduced with a plenary lecture from Ilme Schlichting (MPI for Medical Research, Heidelberg) on studies of the mechanism of the enzyme-catalyzed photodecarboxlation of fatty acids with time-resolved spectroscopic analysis of cryogenic probes and with time-resolved fs-crystallography. This session was complemented by a report from Mathias Senge (Trinity College Dublin) about atropisomerism as design principle for photosensitizers, sensors, and photoactive drugs. This session was closed by Daria Berdnikova (University of Siegen) who presented and discussed several aspects of photoswitching as a future approach in the RNA-targeting therapy.
New developments from the field of synthetic and organic photochemistry were also presented. In this context, Hendrik Frisch (Queensland University of Technology, Brisbane), showed how synergies between macromolecular structures and photochemistry may be used to control polymer properties and to control the formation and fission of complex molecular architectures. Thomas J. Penfold (Newcastle University) reported from the field of theoretical chemistry and quantum chemistry. He presented recent results on the understanding of excited state non-Born-Oppenheimer dynamics. And he discussed their influence on the communication between singlet and triplet states and their key role in the functional properties of TADF materials. Spectroscopic methods with high time resolution were the main focus in the session on ultrafast photochemistry, in which Pascale Changenet (Institut Polytechnique de Paris) presented studies on multiscale conformational dynamics of (bio)molecules probed by time-resolved circular dichroism. Fundamental photophysics were addressed by Stephan Landgraf (Technical University of Graz) in his lecture about the use of tertiary solvent mixtures to study solvent effects.
In the session about technological und industrial processes Philipp Schütz (Merck KGaA, Darmstadt) described the research on a new generation of blue OLEDs in the HyperOLED project and provided insights in kinetic aspects of the energy transfer and emission mechanisms in TADF materials. After that, Dirk Ziegenbalg (University of Ulm) discussed the contribution of reaction engineering to the optimization of the efficiency of photochemical processes.
Traditionally, the highlight of the conference is the awards ceremony that includes the "Theodor Förster Memorial Lecture", a prize that is awarded

by the *Gesellschaft Deutscher Chemiker* and the *Deutsche Bunsen-Gesellschaft für Physikalische Chemie*. This year, Thorsten Bach (Technical University of Munich) received this award in appreciation of his seminal, outstanding contributions to the development and application of organic photochemistry and asymmetric photocatalysis. In the subsequent "Förster Lecture", Thorsten Bach gave an overview of his groundbreaking studies on the application of organic photochemistry in synthesis.
Subsequently, the best dissertations from the field of photochemistry and spectroscopy were honored with the "Albert Weller Award". The prize was awarded to Carolin Müller (University of Jena) for her dissertation entitled "*Towards Operando Spectroscopy of Supramolecular Photocatalysts – A Case Study on Ru-dppz-derived Systems"* and to Felix Strieth-Kalthoff (University of Münster) for his dissertation "*Systematische und computergestützte Verfahren zur Entdeckung und Entwicklung chemischer Reaktionen*". Afterwards, the awardees presented her research results in short lectures.
Last, but not least, prizes for the most outstanding posters were awarded to Novitasari Sinambela (University of Ulm), Michelle Rademacher (University of Düsseldorf) und Seyma Bozkus (University of Cologne).
The *29th Conference on Photochemistry* will be held in September 2024 at the University of Mainz.

Group picture of the 28th Lecture Conference on Photochemistry, Düsseldorf. Picture credits: David Klaverkamp

CONFERENCE ANNOUNCEMENT

PhotOnline 2023


IS2M
PhotOnline'2023
SP2P web-conference organized by and for young researchers – 2nd edition
SAVE THE DATE!
1-2 February 2023
Photosciences
Photochemistry
Photophysics
Invited speakers:
Prof. Serena SILVI - Univ. of Bologna
Dr. Adèle LAURENT - Univ. of Nantes
Prof. Karl BORJESSON - Univ. of Gothenburg
Prof. Peter DEDECKER - KU Leuven
Abstract submission deadline: 9th December 2022
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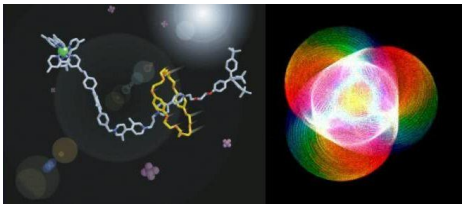

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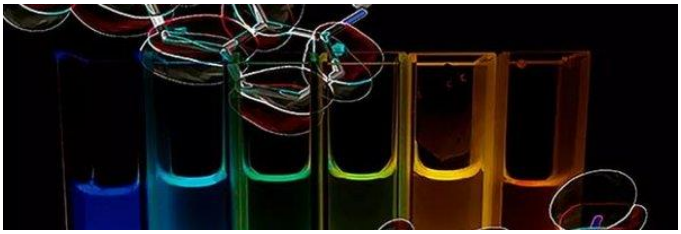

MEMBERSHIP APPLICATION

If you are interested in joining the European Photochemistry Association or would like to renew your membership, please visit our website: www.photochemistry.eu.