13:00 **Welcome**
Prof. Dr. Wolfgang Eisenreich
Bayerisches NMR Zentrum, TU München / Vorsitzender der Hans-Fischer-Gesellschaft

13:30 **Dr. Steffen Pooth**
Zentrum für Notfall- und Rettungsmedizin, Universitätsklinikum Freiburg / Resuscitec GmbH, Freiburg
Messung von oxidativem Stress in der klinischen Praxis – Einblicke einer Freiburger Arbeitsgruppe

14:00 **Prof. Dr. Christiane Timmel**
Centre for Advanced Spin Resonance (CAESR), University of Oxford, UK
tba

14:45 **Coffee-break**

15:15 **Hans-Fischer-Memorial-Award 2023**
Laudatio by **Prof. Dr. Thorsten Bach (online),** *Lehrstuhl für Organische Chemie, TU München*
Speech of the 2023 awardee **Dr. Johannes Großkopf,** *Frick Chemistry Laboratory, Princeton University, USA*
Breaking the Mirror: New Pathways for Photochemical Deracemization Reactions

15:45 **Prof. Dr. Elena Giménez-Arnau**
Institute of Chemistry, UMR7177, CNRS, University of Strasbourg, France
Electron paramagnetic resonance and spin trapping to detect free radicals from allergenic xenobiotics in contact with the skin: from the molecule to the tissue

16:15 **Prof. Dr. Yvain Nicolet**
Institut de Biologie Structurale, Atomic Energy Commision (CEA), Grenoble, France
Radical chemistry in the assembly of the [FeFe]-hydrogenase H-cluster

16:45 **Prof. Dr. Gunhild Layer**
Institut für Pharmazeutische Wissenschaften, Pharmazeutische Biologie, ALU Freiburg
Radical SAM enzymes in heme biosynthesis

17:15 **Social Event (Beer and Brezels)**

Hans-Fischer-Gesellschaft e.V.
https://Hans-Fischer-Gesellschaft.de/

Hans Fischer (1881–1945), Nobel Prize for Chemistry 1930

The Hans-Fischer Society was founded in 1950. The non-profit society has the objective of advancing science and research in chemistry and biochemistry in the spirit of the chemist and Nobel laureate, Prof. Dr. Hans Fischer.

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Albert-Ludwigs-Universität Freiburg
Fakultät für Chemie und Pharmazie
Institut für Physikalische Chemie
Apl. Prof. Dr. Erik Schleicher
Prof. Dr. Stefan Weber

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Venue:
Albert-Ludwigs-Universität Freiburg
Hörsaal Anatomie
Albertstraße 17

Information:
Institut für Physikalische Chemie
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The
Institute of Physical Chemistry
welcomes you to the

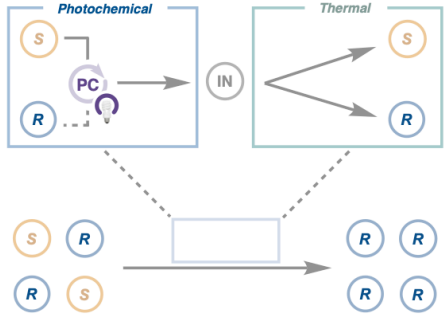
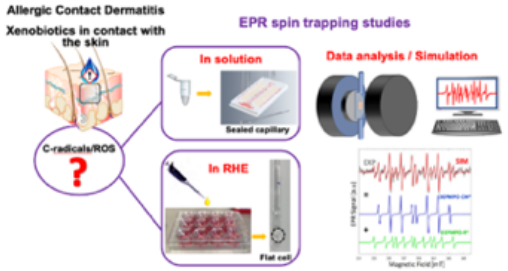
27th Hans-Fischer-Symposium

10th November 2023
13:00 – 18:00

Topic:

Good or Bad?
Radicals in Natural Sciences

universität freiburg

Steffen Pooth ***Messung von oxidativem Stress in der klinischen Praxis – Einblicke einer Freiburger Arbeitsgruppe***	Oxidativer Stress, der durch ein Ungleichgewicht zwischen reaktiven Radikalspezies und Antioxidantien gekennzeichnet ist, hat sich als bedeutender Faktor für die Entstehung und das Fortschreiten verschiedener Herz-Kreislauf-Erkrankungen erwiesen. In der klinischen Praxis wird diesem Umstand aktuell jedoch noch wenig Aufmerksamkeit gewidmet. Im Rahmen einer inter-professionellen Arbeitsgruppe wird in Freiburg unter der Leitung von Prof. Schleicher und Prof. Beyersdorf bezüglich des Auftretens von oxidativem Stress bei herz- und gefäßchirurgischen Patientinnen und Patienten geforscht. Im Rahmen dieses Vortrages sollen Einblicke in aktuelle Forschungsvorhaben und deren Ergebnisse gegeben werden. 
Christiane Timmel	
Johannes Großkopf ***Breaking the Mirror: New Pathways for Photochemical Deracemization Reactions***	In response to the growing demand for synthetic building blocks with defined chirality in industry and drug research, there is an everlasting need for efficient methods in enantioselective synthesis. Despite extensive efforts in advancing the field of organic and metal chiral catalysis, converting racemic compounds into homochiral forms has remained an unsolved challenge until recently. The emergence of photochemical deracemizations fills this synthetic gap, enabling direct conversion of racemic mixtures into enantiopure compounds in up to quantitative yield through the formation of short-lived, achiral intermediates. Unlike reactions proceeding in the ground state, photochemistry offers means to overcome thermodynamic constraints by combining a photochemical step with a decoupled thermal step along distinct reaction pathways. By developing new activation and differentiation modes, a variety of stereogenic centers becomes addressable, leading to the tremendous expansion of the available chemical space for photochemical deracemizations. Our research has demonstrated the viability of two distinct modes of action for achieving efficient deracemization across a wide range of substrate classes: selective triplet energy transfer and hydrogen atom transfer. Both enabled the precision tailoring of the absolute configuration of complex molecular scaffolds by editing their point or axial chirality. 
Elena Giménez-Arnau ***Electron paramagnetic resonance and spin trapping to detect free radicals from allergenic xenobiotics in contact with the skin: from the molecule to the tissue***	A major research topic consists of revealing the contribution of radical-mediated reactions in dermatological diseases related to xenobiotic-induced stress, to succeed risk assessment procedures protecting producers and consumers. Allergic contact dermatitis is the clinically relevant consequence of skin sensitization, one of the most critical occupational and environmental health issues related to xenobiotics exposure. The first key event identified for the skin sensitization process to a chemical is its aptitude to react with epidermal proteins and form antigenic structures that will further trigger the immune response. Many chemical sensitizers are suspected to react through mechanisms involving radical intermediates. This presentation focuses on progress we have accomplished over the last few years studying radical intermediates derived from skin sensitizing chemicals by electron paramagnetic resonance in combination with the spin-trapping technique. Our work is carried out “from the molecule”, performing studies in solution, “to the tissue”, by the development of a methodology on a reconstructed human epidermis model, very close in terms of histology and metabolic/enzymatic activity to real human epidermis, that can be used as suitable biological tissue model. The benefits are to test chemicals under conditions close to human use and real-life sensitization exposures and benefit from the 3D microenvironment. 
Yvain Nicolet ***Radical chemistry in the assembly of the [FeFe]-hydrogenase H-cluster***	[FeFe]-hydrogenases are enzymes that perform the remarkable task of catalyzing the reversible oxidation of molecular hydrogen. These enzymes rely on a sophisticated organometallic complex called the H-cluster, which is intricately embedded within their protein framework. The biosynthesis and integration of this complex require the coordinated action of a multipart protein machinery, involving at least three essential metalloproteins. Within this intricate assembly, two key players, namely HydG and HydE, belong to the radical *S*-adenosyl-L-methionine (SAM) enzyme super-family. They harness the reduction of a $[Fe_4S_4]$-cluster to initiate the formation of a 5´-deoxyadenosyl radical (5´-dA•). This radical species then triggers a radical reaction within the protein, enabling access to complex chemical reactions that are often unattainable through conventional synthetic routes. In this presentation, we will delve into the structural and functional aspects of these two proteins, HydG and HydE, and explore their interactions within the context of H-cluster biosynthesis.
Gunhild Layer ***Radical SAM enzymes in heme biosynthesis***	The iron-containing porphyrin heme is enzymatically synthesized by either one of three different routes: the protoporphyrin-, coproporphyrin- or siroheme-dependent pathway, named after the respective key intermediate. All three pathways rely on the action of Radical *S*-adenosylmethionine (SAM) enzymes at certain stages for the accomplishment of the most challenging chemical reactions. These are the oxidative decarboxylation of propionate groups under anaerobic conditions catalyzed by either copro-porphyrinogen III dehydrogenase (CgdH, HemN) or coproheme dehydrogenase (ChdH, AhbD), and the removal of acetate groups, catalyzed by AhbC. Moreover, the biosynthesis of the dioxo-iso-bacteriochlorin heme d_1 requires the removal of two propionate groups, which is accomplished by the Radical SAM enzyme NirJ, a close relative of AhbC. This presentation summarizes the heme and heme d_1 biosynthesis pathways and compares the structural, biochemical and mechanistic properties of the Radical SAM enzymes involved.