



# Annual Report 2023

*Chemistry  
research  
that matters*

Van 't Hoff Institute  
for Molecular Sciences

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## Executive summary

In this one-page summary you find an overview of the institute's highlights in 2023. A more detailed report of key publications, achievements of our staff, and much more can be found elsewhere in this online Annual Report.

In 2023 we performed the formal 6-year evaluation of our research (2017-2022) according to the Strategy Evaluation Protocol (SEP) of the VSNU, KNAW and NWO. In a concerted effort by many of our staff, we compiled an extensive self-evaluation report assessing our research and reflecting on our strengths and weaknesses. I would like to thank all HIMS staff for their contributions during a fruitful two-day retreat in February and the many very constructive discussions that subsequently followed. The report was presented to the international SEP evaluation committee that visited our institute in November. We were quite satisfied with their preliminary findings and confidently await their final assessment.



*HIMS director Prof. Wybren Jan Buma: "I would like to thank all HIMS staff for their contribution to our extensive self-evaluation report assessing HIMS research and reflecting on our strengths and weaknesses". Photo: FNWI.*

In 2023 we saw many researchers at our institute **acquiring external grants** such as the ERC Synergy Grant for Prof. Joost Reek and colleagues at the University of Leiden and the Netherlands Cancer Institute to develop innovative therapeutic approaches to target glioblastoma, a deadly primary brain tumour. Many other grants underpin the relevance of our research for a transition to sustainability, such as those acquired by Prof. Bob van der Zwaan (next generation of batteries), Dr Chris Slootweg (hydrogen carriers and storage), Gert-Jan Gruter (sustainable plastics), Sonja Pullen (circular solar fuel) and Dr Stefania Grecea (green nanoparticle synthesis). AI is another focal point, illustrated by the novel Research Priority Area (RPA) in "Artificial Intelligence for Sustainable Molecules and Materials" (AI4SMM) that is funded by the UvA Faculty of Science and is

led by Dr Bernd Ensing of our institute. Ensing also acquired an eScience grant for developing deep learning algorithms to generate and design new molecules.

In total, 12 young researchers **obtained their PhD at our institute** of which three received their doctorate with the distinction 'cum laude': Dr Minghui Zhou, Dr Leon Niezen and Dr Ruben Kranenburg. A number of 295 peer-reviewed publications resulted from our research, including 26 joint publications from collaborating HIMS groups, often involving interdisciplinary collaborations across the different HIMS themes.

We have seen a number of noteworthy **changes in the HIMS staff**. Our institute manager Marcel Bartels pursued his career elsewhere at UvA and was temporarily succeeded by Magdaleen Timmermans-Wiersma as interim manager. Prof. Arian van Asten was appointed full professor of Forensic Analytical Chemistry and On-Scene Chemical Analysis after having been affiliated with our institute as professor by special appointment since 2012. We also welcomed AMOLF researcher Esther Alarcón Lladó as professor by special appointment in Nano-electrochemistry and Renewable Energy Materials. Dr Alberto Pérez de Alba Ortíz was appointed assistant professor in Computational Soft Matter, affiliated both to our institute and the Informatics Institute. Finally, Dr Tomáš Šolomek was appointed as tenure track researcher in the Molecular Photonics group.



Photo: AMSIA.

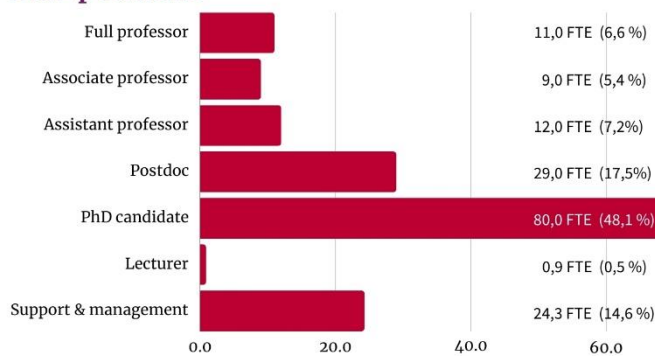
In 2023, HIMS researchers received notable **awards and recognitions**. Prof. Timothy Noël received a Chem. Soc. Rev. Pioneering Investigator Lectureship and was named Fellow of the Royal Society of Chemistry as well as president of the Flow Chemistry Society. Dr Ioana Ilie was elected president of APNet, the Assistant Professor Network Netherlands. Spin-off company Nano Hybrids of former postdoc researcher Olivier Lugier and Functional Materials group leader Dr Stefania Grecea received an Amsterdam Science & Innovation Award 2023 (picture). Associate professor Chris Slootweg was named Editor-in-Chief of the new journal Sustainability & Circularity NWO. PhD candidate Ida Fazlić won the national 3MT competition in her home country of Bosnia and Herzegovina, while Dr Eduard Bobylev was awarded a 2023 IUPAC-Solvay International Award for Young Chemists for his PhD research at our institute.

The **valorisation of HIMS research** and knowledge had several highlights worth sharing. Emphasizing the relevance of AI for chemical discovery, we co-organised the ChemAI event bringing together industry and academia. The Biocatalysis research group headed by Prof. Francesco Mutti contributed to the development of a novel industrial biocatalytic conversion process developed in a cooperation with the Italian companies Olon Group and Biosphere. Prof. Maarten van Bommel contributed to the development of an oxygen-free display case for exhibiting rare textile finds that has received the 2023 Innovator of the Year award of Museums + Heritage. We already mentioned the Amsterdam Science & Innovation Award 2023 for the newly established spin-off company Nano Hybrids. We are also proud of spin-off company SusPhos. Headed by our PhD graduate Dr Marissa de Boer, SusPhos won the 2023 MT/Sprout Challenger50 Award for 'biggest market challenger of 2023'.

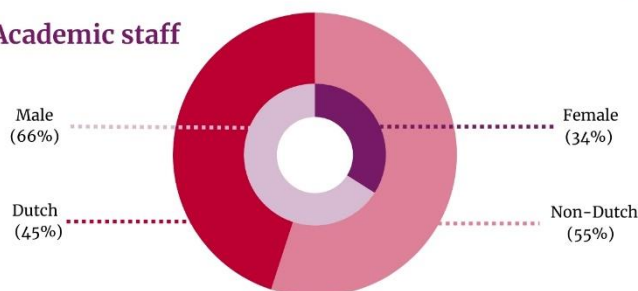
Finally, we would like to mention the successful accreditation of the **new Bachelor's programme** in Science, Technology & Innovation that was developed by a team led by Dr Chris Slootweg. It offers education in the natural sciences from different points of view: theory, experiment, modelling and design thinking. Students will acquire basic knowledge from many fields (physics, chemistry, biology, earth & environmental science, mathematics, data science, and information science) that they will apply and integrate to master complex, real world challenges.

## Van 't Hoff Institute for Molecular Sciences 2023

### Staff positions



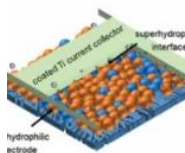
### Academic staff



## Scientific Highlights

A number of 295 peer-reviewed publications resulted from HIMS research, including 26 joint publications from collaborating HIMS groups, often involving interdisciplinary collaborations across the different HIMS themes. Below is a selection of highlights.

### **Superaerophobic electrode boosts alkaline water electrolysis** - 18 January 2023



Researchers at the Heterogeneous Catalysis and Sustainable Chemistry group, in cooperation with researchers at Wuhan University (China), demonstrate the use of so-called superaerophobic electrodes to boost alkaline water electrolysis. In a paper in *Advanced Science*, they report how these electrodes help avoid the formation of gas bubbles at the electrode surface, enabling electrolysis at high current densities and high conversion rates.

Lingjiao Li, Petrus C. M. Laan, Xiaoyu Yan, Xiaojuan Cao, Martijn J. Meekering, Kai Zhao, Le Ke, Xiaoyi Jiang, Xiaoyu Wu, Lijun Li, Longjian Xue, Zhiping Wang, Gadi Rothenberg, Ning Yan: *High-Rate Alkaline Water Electrolysis at Industrially Relevant Conditions Enabled by Superaerophobic Electrode Assembly*. *Adv. Sci.*, **2023**, 202206180. DOI: [10.1002/adv.202206180](https://doi.org/10.1002/adv.202206180)

### **Unusual lead compound found in Rembrandt's Night Watch** - 19 January 2023



An international team of scientists from the Rijksmuseum, the universities of Amsterdam and Antwerp, CNRS/ENS Paris-Saclay and the European Synchrotron ESRF, have discovered lead formate in Rembrandt's masterpiece *The Night Watch*. It is the first discovery of this compound in the history of the scientific study of paintings and provides new insight into 17th-century painting technique and the conservation history of the masterpiece. The study was published in *Angewandte Chemie*.

Victor Gonzalez, Ida Fazlic, Marine Cotte, Frederik Vanmeert, Arthur Gestels, Steven De Meyer, Frédérique Broers, Joen Hermans, Annelies van Loon, Koen Janssens, Petria Noble, Katrien Keune: *Lead(II) Formate in Rembrandt's Night Watch: Detection and Distribution from the Macro- to the Micro-scale*. *Angewandte Chemie*, Accepted paper. DOI: [10.1002/anie.202216478](https://doi.org/10.1002/anie.202216478)

### **Finding evidence in plants for the use of chemical weapons** - 30 January 2023



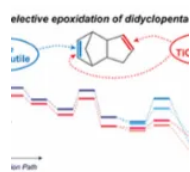
HIMS Analytical Scientists together with colleagues from TNO have demonstrated for the first time that chemical warfare agents react with plant proteins to form stable protein adducts. These 'biomarkers' could still be detected in the living plants, as well as in dried leaves, up to three months after the actual exposure. This enables forensic reconstructions of the use of chemical weapons, which can assist

investigations into alleged use in conflict areas.

Mirjam de Bruin-Hoegée, Latifa Lamriti, René C. M. Olivier, Lai Fun Chau, Marcel J. van der Schans, Daan Noort and Arian C. van Asten: *Verification of exposure to chemical warfare agents through analysis of persistent biomarkers in plants*. *Anal. Methods*, 2023, 15, 142-153. DOI: [10.1039/D2AY01650H](https://doi.org/10.1039/D2AY01650H)

## **Surface crystalline phases of titania catalyst determine selectivity in epoxidation of double bonds**

31 January 2023



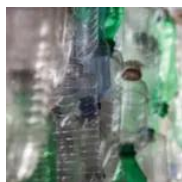
In a recent article in the RSC journal Chemical Communications, researchers of the Catalysis Engineering group show how the surface crystalline phases of titania play a crucial role in the formation of peroxy species and in the selective epoxidation of different double bonds. They performed experimental and computational studies in cooperation with researchers at Sungkyunkwan University, South Korea.

Sang-Ho Chung, G. Hwan Park, Niels Schukkink, Hyoyoung Lee and N. Raveendran Shiju: *Structure-sensitive epoxidation of dicyclopentadiene over TiO<sub>2</sub> catalysts*. Chem. Commun., 2023, Advance Article.

DOI: [10.1039/D2CC05305E](https://doi.org/10.1039/D2CC05305E)

## **Consumers favour bio-based alternatives over traditional fossil-based plastic bottles**

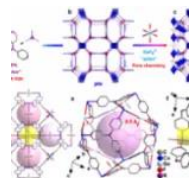
31 January 2023



When it comes to enhancing the sustainability of plastic beverage bottles, consumers are willing to pay a bonus for bio-based alternatives - the more so when the alternative is visually distinctive. This follows from research by PhD candidate Maria Zwicker. Her findings were published in the January issue of the journal Sustainable Production and Consumption.

Maria V. Zwicker, Cameron Brick, Gert-Jan M. Gruter, Frenk van Harreveld: *Consumer attitudes and willingness to pay for novel bio-based products using hypothetical bottle choice*. Sustainable Production and Consumption 35 (2023) 173–183. DOI: [10.1016/j.spc.2022.10.021](https://doi.org/10.1016/j.spc.2022.10.021)

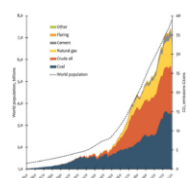
## **A customized MOF for purification of ethylene mixtures** - 2 February 2023



An international team of researchers has developed a method for purifying ethylene mixtures using a dedicated metal organic framework (MOF). Prof. Rajamani Krishna contributed to the research with computer modelling and calculations. The results were published in Nature Communications.

Yunjia Jiang, Yongqi Hu, Binquan Luan, Lingyao Wang, Rajamani Krishna, Haofei Ni, Xin Hu & Yuanbin Zhang: *Benchmark single-step ethylene purification from ternary mixtures by a customized fluorinated anion-embedded MOF*. Nat Commun 14, 401 (2023). DOI: [10.1038/s41467-023-35984-5](https://doi.org/10.1038/s41467-023-35984-5)

## **Sustainable chemistry will not solve CO<sub>2</sub> emissions problem** - 6 February 2023



In a paper in the journal Sustainable Chemistry for Climate Action, Prof. Gadi Rothenberg presents a realistic look at carbon dioxide emissions, climate change and the role of sustainable chemistry. Using simple back-of-the-envelope calculations he shows that the climate goals of the Paris Agreement are beyond reach. According to Rothenberg, humanity should prepare to living in a world where average temperatures are 3-4 °C higher than in pre-industrial times.

Gadi Rothenberg: *A realistic look at CO<sub>2</sub> emissions, climate change and the role of sustainable chemistry*. Sustainable Chemistry for Climate Action, Volume 2, 2023, 100012.

DOI: [10.1016/j.scca.2023.100012](https://doi.org/10.1016/j.scca.2023.100012).

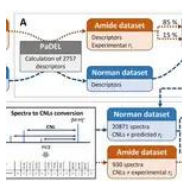
### **Scientists warn: when restoring historical paintings, be careful with polar solvents** - 22 February 2023



Even small amounts of water can lead to rapid formation of metal soap crystals in historical oil paintings. Researchers at HIMS and the Rijksmuseum warn in particular against using polar solvents that often contain traces of water. Especially the combination of water and solvent can have disastrous consequences, they report in the journal *Physical Chemistry Chemical Physics*.

J. Hermans, K. Helwig, S. Woutersen and K. Keune: *Traces of water catalyze zinc soap crystallization in solvent-exposed oil paint*, *Phys. Chem. Chem. Phys.* 2023, 25, 5701-5709. DOI: [10.1039/D2CP04861B](https://doi.org/10.1039/D2CP04861B).

### **Using machine learning to analyse samples with many unknown chemical components** - 28 March 2023



In a paper in the *Journal of Cheminformatics*, HIMS researchers describe how the use of machine learning can help to analyse samples with many unknown chemical components. Their approach can help to identify chemicals of emerging concern in the environment and the human body. The paper results from a collaboration in the AI4Science Laboratory of the UvA's Faculty of Science.

Jim Boelrijk, Denice van Herwerden, Bernd Ensing, Patrick Forré & Saer Samanipour: *Predicting RP-LC retention indices of structurally unknown chemicals from mass spectrometry data*. *J. Cheminform* 15, 28 (2023). DOI: [10.1186/s13321-023-00699-8](https://doi.org/10.1186/s13321-023-00699-8)

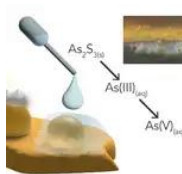
### **Review on Flow Chemistry is Pick of the Week in Chemical Science** - 5 April 2023



A review on flow chemistry written by Luca Capaldo, Zhenghui Wen and Timothy Noël of the Flow Chemistry group has been selected 'Pick of the Week' by *Chemical Science*, the Royal Society of Chemistry's flagship journal.

T. Noel, L. Capaldo and Z. Wen: *A field guide to flow chemistry for synthetic organic chemists*, *Chem. Sci.*, 2023, Advanced article. DOI: [10.1039/D3SC00992K](https://doi.org/10.1039/D3SC00992K)

### **Chemists find new pigment degradation pathway in historical paintings** - 14 April 2023

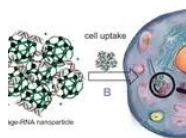


Chemists at HIMS, the universities of Antwerp and Utrecht, the Rijksmuseum, and the Stanford Synchrotron Radiation Lightsource have established a new degradation pathway for the yellow pigment orpiment which is quite common in historical masterpieces. This degradation is independent of incident light and is caused by contact with a medium such as linseed oil or egg tempera.

Frédérique T.H. Broers, Koen Janssens, Johanna Nelson Weker, Samuel M. Webb, Apurva Mehta, Florian Meirer and Katrien Keune: *Two Pathways for the Degradation of Orpiment Pigment (As<sub>2</sub>S<sub>3</sub>) Found in Paintings*. *J. Am. Chem. Soc.*, April 14, 2023. DOI: [10.1021/jacs.2c12271](https://doi.org/10.1021/jacs.2c12271)



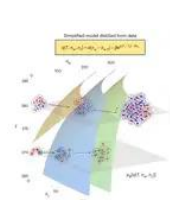
### **Novel nanocages for delivery of small interfering RNAs** - 18 April 2023



Small interfering RNAs (siRNAs) are novel therapeutics that can be used to treat a wide range of diseases. This has led to a growing demand for selective, efficient, and safe ways of delivering siRNA in cells. In a cooperation with the University of Leiden, HIMS researchers have developed dedicated molecular nanocages for siRNA delivery that they present in a paper in the Journal Chem.

Eduard O. Bobylev, Ye Zeng, Kevin Weijgertse, Emma Koelman, Eline M. Meijer, Bas de Bruin, Alexander Kros, and Joost N.H. Reek: *The application of M12L24 nanocages as cell-specific siRNA delivery agents in vitro*. Chem, Published April 18, 2023. DOI: [10.1016/j.chempr.2023.03.018](https://doi.org/10.1016/j.chempr.2023.03.018)

### **Unravelling molecular self-organisation using a machine learning approach** - 25 April 2023



In a paper in Nature Computational Science, a joint team of researchers in Germany, Austria and the Netherlands present a machine learning algorithm that is instrumental in modelling molecular self-organisation processes such as crystallisation and protein folding. HIMS computational chemists Peter Bolhuis and Arjun contributed with their modelling expertise in methane-hydrate nucleation and crystallisation.

Hendrik Jung, Roberto Covino, A. Arjun, Christian Leitold, Christoph Dellago, Peter G. Bolhuis, Gerhard Hummer: *Machine-guided path sampling to discover mechanisms of molecular self-organization*. Nat. Comput. Sci. (2023). DOI: [10.1038/s43588-023-00428-z](https://doi.org/10.1038/s43588-023-00428-z)

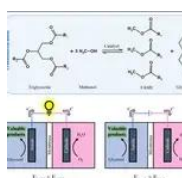
### **Rapid on-scene chemical identification of intact explosives** - 28 April 2023



Combining portable near-infrared (NIR) spectroscopy with multivariate data analysis offers excellent opportunities to identify traces of intact explosive materials. Studying actual forensic casework samples, PhD student Irene van Damme and co-authors show that NIR characterization can handle the chemical diversity encountered in forensic explosive investigations. The results were published in the journal Sensors.

Irene M. van Damme, Pol Mestres-Fitó, Henk-Jan Ramaker, Annemieke W. C. Hulsbergen, Antoine E. D. M. van der Heijden, Ruben F. Kranenburg, and Arian C. van Asten: *Rapid and On-Scene Chemical Identification of Intact Explosives with Portable Near-Infrared Spectroscopy and Multivariate Data Analysis*. Sensors 2023, 23, 3804. DOI: [10.3390/s23083804](https://doi.org/10.3390/s23083804)

### **Electro-oxidation of glycerol for energy conversion and chemical production** - 9 May 2023



A recent paper in 'Current Opinion in Green and Sustainable Chemistry' highlights the research opportunities of electrochemical oxidation of glycerol (GOR) in the context of the transition from fossil to renewable energy resources, with a particular focus on synthesizing GOR products in industrially relevant amounts.

Michael Braun, Cássia S. Santana, Amanda C. Garcia, Corina Andronescu: *From waste to value – glycerol electrooxidation for energy conversion and chemical production*. Current Opinion in Green and Sustainable Chemistry, 2023, 100829 DOI: [10.1016/j.cogsc.2023.100829](https://doi.org/10.1016/j.cogsc.2023.100829).



### **Improving steroid synthesis by merging continuous flow technology, photochemistry and biocatalysis**

22 June 2023

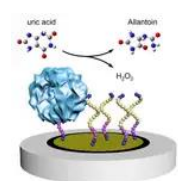


Researchers at the Biocatalysis research group have co-authored a VIP paper in *Advanced Synthesis & Catalysis* describing methods to enable more efficient synthesis of structurally diverse steroids. In a joint effort with Bruno Cerra and Antimo Gioiello at the laboratory of Medicinal and Advanced Synthetic Chemistry of the University of Perugia, Elena Tomarelli and Francesco Mutti showcase recent progresses enabled by continuous flow chemistry and its integration with biocatalysis, photochemistry, and automation.

Elena Tomarelli, Bruno Cerra, Francesco G. Mutti, Antimo Gioiello: *Merging Continuous Flow Technology, Photochemistry and Biocatalysis to Streamline Steroid Synthesis*. *Adv.Synth.Catal*, First published: 16 May 2023. DOI: [10.1002/adsc.202300305](https://doi.org/10.1002/adsc.202300305)

### **High-performance electrochemical biosensor based on an engineered oxidoreductase enzyme**

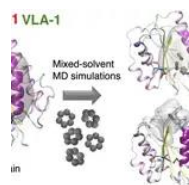
23 June 2023



In a joint effort between three HIMS research groups, a novel biosensor has been developed based on the use of an engineered oxidoreductase enzyme. As a model system, the sensor employs urate oxidase for the detection of uric acid which is a biomarker for gout. In a recent paper in the RSC journal *ChemComm* the researchers show the exquisite selectivity, sensitivity and stability of the engineered oxidoreductase enzyme within the electrochemical device.

Zheng Wei, Tanja Knaus, Yuxin Liu, Ziran Zhai, Andrea F. G. Gargano, Gadi Rothenberg, Ning Yan and Francesco G. Mutti: *A high-performance electrochemical biosensor using an engineered urate oxidase*. *Chem. Commun.*, 2023, Advance Article published 30 May 2023. DOI: [10.1039/D3CC01869E](https://doi.org/10.1039/D3CC01869E)

### **Decrypting integrins by mixed-solvent molecular dynamics simulation** - 28 June 2023



A team of researchers from HIMS and the University of Zurich together with the Swiss company Alloctye Pharmaceuticals have for the first time been able to discover allosteric sites in a type of cell surface receptor called integrin. In a paper in the *Journal of Chemical Information and Modeling*, they describe how this reveals previously inaccessible druggable integrin pockets. At the heart of the research is a novel computational approach for mixed-solvent molecular dynamics simulation developed by Dr Ioana Ilie at the Computational Chemistry group.

Ioana M. Ilie, C. Ehrhardt, A. Caflisch and G. Weitz-Schmidt: *Decrypting integrins by mixed-solvent molecular dynamics simulations*. *J. Chem. Inf. Model.* 2023, 63, 12, 3878–3891. DOI: [10.1021/acs.jcim.3c00480](https://doi.org/10.1021/acs.jcim.3c00480)

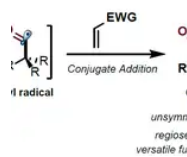
### UvA chemists recycle shrimp waste as catalyst for hydrogen generation - 20 July 2023



Flexible spheres of the biomolecule chitosan, made from shrimp waste, can be used for catalysts that generate hydrogen gas from borohydride salts. In a paper in *Green Chemistry*, a HIMS research team shows how the spheres can “breathe out” hydrogen bubbles without breaking. This is an important step towards practical and safe hydrogen storage and release units.

From shrimp balls to hydrogen bubbles: Borohydride hydrolysis catalysed by flexible cobalt chitosan spheres. F. Pope, J. Jonk, M. Fowler, P.C.M. Laan, N.J. Geels, L. Drangai, V. Gitis and G. Rothenberg, *Green Chem.*, **2023**, 25, 5727-5734. DOI: [10.1039/d3gc00821e](https://doi.org/10.1039/d3gc00821e)

### VIP paper in Angewandte Chemie on photocatalytic carbonylation of C(sp<sup>3</sup>)-H bonds - 21 July 2023

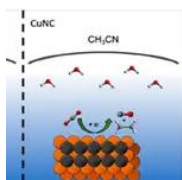


A paper by researchers at the Flow Chemistry group led by Prof. Timothy Noël has been designated as Very Important Paper by the editors of *Angewandte Chemie*. The paper presents a general, mild and scalable protocol that enables the direct C(sp<sup>3</sup>)-H carbonylation of saturated hydrocarbons. This introduces a promising pathway for upgrading light hydrocarbons at ambient temperature.

Fabian Raymenants, Tom Masson, Jesús Sanjosé-Orduna, Timothy Noël: *Efficient C(sp<sup>3</sup>)-H Carbonylation of Light and Heavy Hydrocarbons with Carbon Monoxide via Hydrogen Atom Transfer Photocatalysis in Flow*. *Angew. Chem. Int. Ed.* 2023, e202308563 DOI: [10.1002/anie.202308563](https://doi.org/10.1002/anie.202308563)

### Electrochemical CO<sub>2</sub> reduction in an organic solvent using nanostructured copper electrodes

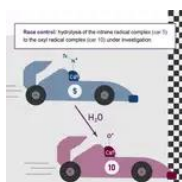
21 July 2023



Researchers at the Heterogeneous Catalysis and Sustainable Chemistry group have established how nanostructured materials behave during electrochemical CO<sub>2</sub> reduction in acetonitrile electrolytes. The research, carried out in cooperation with the Leiden Institute of Chemistry, provides insight into the mechanism of the CO<sub>2</sub> reduction reaction in organic media. The results were published in the *Journal of Physical Chemistry C*.

Connor Deacon-Price, Alisson H. M. da Silva, Cássia S. Santana, Marc T. M. Koper, and Amanda C. Garcia: *Solvent Effect on Electrochemical CO<sub>2</sub> Reduction Reaction on Nanostructured Copper Electrodes*. *Journal of Physical Chemistry C*, 2023, DOI: [10.1021/acs.jpcc.3c03257](https://doi.org/10.1021/acs.jpcc.3c03257)

### Understanding and controlling the reactivity of nitrene radical complexes in water - 31 July 2023



In a paper in *Chem Catalysis*, PhD student Eva Meeus of the Homogeneous, Supramolecular, and Bio-inspired Catalysis group presents a detailed analysis of the reactivity of nitrene radical complexes in water. In particular, she focused on styrene aziridination by means of Co-catalyzed nitrene transfer, where oxo transfer should be avoided. As a result of the mechanistic analysis, it turned out that adjusting the pH is crucial for realizing selective aziridination in water.

Eva J. Meeus, Max T.G.M. Derks, Nicolaas P. van Leest, Caroline J. Verhoef, Jana Roithová, Joost N.H. Reek, Bas de Bruin: *Styrene aziridination with [Co<sup>III</sup>(TAML<sup>red</sup>)]<sup>-</sup> in water: Understanding and preventing epoxidation via nitrene hydrolysis*. *Chem Catalysis* **2023**, 3, 100700. DOI: [10.1016/j.chemcat.2023.100700](https://doi.org/10.1016/j.chemcat.2023.100700)

## **Artificial intelligence helps elucidate the precise spatial structure of complex chiral molecules**

6 August 2023



HIMS researchers developed a powerful machine learning approach to elucidate the absolute configuration and conformational landscape of complex chiral molecules. In a recent paper that features as a cover illustration in *Angewandte Chemie*, they describe how the combination of a genetic algorithm with a hierarchical clustering algorithm can predict and boost the performance of chiroptical spectroscopies

Gabriel Marton, Mark A. J. Koenis, Hong-Bing Liu, Carole A. Bewley, Wybren Jan Buma, Valentin Paul Nicu: An Artificial Intelligence Approach for Tackling Conformational Energy Uncertainties in Chiroptical Spectroscopies. *Angewandte Chemie International Edition*, First published: 19 June 2023. DOI: [10.1002/anie.202307053](https://doi.org/10.1002/anie.202307053).

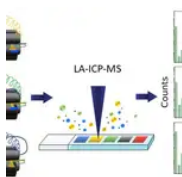
## **“Modern chemistry is rubbish”** - 7 August 2023



In a comment in *Nature Reviews Chemistry*, PhD student Hannah Flerlage and associate professor Chris Sloatweg argue that modern day chemists need to broaden their horizons and consider the effects of chemistry “beyond the reaction vessel and the fume hood”. In order to combat ever worsening environmental crises, and to achieve real sustainability, chemistry needs to develop a combined focus on efficiency, safety, and circularity.

Flerlage, H., Sloatweg, J.C. *Modern chemistry is rubbish*. *Nat Rev Chem* (2023). DOI: [10.1038/s41570-023-00523-9](https://doi.org/10.1038/s41570-023-00523-9)

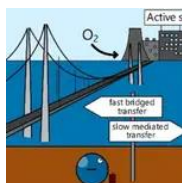
## **Forensic elemental profiling of polymers** - 9 August 2023



In a paper in *Forensic Chemistry*, PhD candidate Mirjam de Bruin - Hoegée and co-workers present research on the forensic profiling of plastics that are often found on a crime scene. They designed a standard to improve quantitative polymer analysis using LA-ICP-TOF-MS, a powerful analytical technology that enables highly sensitive elemental analysis to be performed directly on solid samples.

Mirjam de Bruin-Hoegée, Jorien Schoorl, Peter Zoon, Marcel J. van der Schans, Daan Noort, Arian C. van Asten: *A novel standard for forensic elemental profiling of polymers by LA-ICP-TOF-MS*, *Forensic Chemistry*, Volume 35, 2023, 100515 DOI: [10.1016/j.forc.2023.100515](https://doi.org/10.1016/j.forc.2023.100515)

## **Heterogenization of a molecular catalyst on a carbon electrode yields surprising results** - 29 August 2023

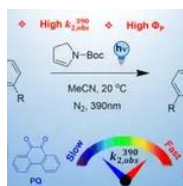


In a VIP paper in *ChemSusChem*, PhD graduate Dr Jasper Biemolt and co-authors present a method for anchoring a organometallic cobalt catalyst to a carbon electrode using diazonium grafting. They report how the formation of a conjugated C-C bond instils a strong electronic interaction, altering the oxidation state of the cobalt. The ‘heterogenization’ of the molecular catalyst on carbon thus opens up new opportunities, in particular in electrochemical applications.

Jasper Biemolt, Eva J. Meeus, Felix J. de Zwart, Jeen de Graaf, Petrus C. M. Laan, Bas de Bruin, Thomas Burdyny, Gadi Rothenberg, Ning Yan: *Creating Conjugated C–C Bonds between Commercial Carbon Electrode and Molecular Catalyst for Oxygen Reduction to Hydrogen Peroxide* *ChemSusChem* 2023, e20230084 DOI: [10.1002/cssc.202300841](https://doi.org/10.1002/cssc.202300841)



### **Taking photoclick chemistry to the next level** - 31 August 2023

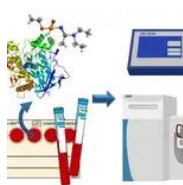


In a cooperation with the University of Groningen and the European Laboratory for Non-Linear Spectroscopy (Italy), HIMS researchers have been able to substantially improve photoclick chemistry. They were able to boost the reactivity of the photoclick compound in the popular PQ-ERA reaction through strategic molecular substitution. In *Chemical Science*, the flagship journal of the Royal Society of Chemistry, they report a superb photoreaction quantum yield, high reaction rates and notable oxygen tolerance. The paper was designated a HOT Article as well as Pick of the Week.

Youxin Fu, Georgios Alachouzos, Nadja A. Simeth, Mariangela Di Donato, Michiel F. Hilbers, Wybren Jan Buma, Wiktor Szymanski and Ben L. Feringa: *Establishing PQ-ERA photoclick reactions with unprecedented efficiency by engineering of the nature of the phenanthraquinone triplet state*. *Chem. Sci.*, 2023, 14, 7465.

DOI: [10.1039/d3sc01760e](https://doi.org/10.1039/d3sc01760e)

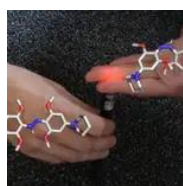
### **Detecting nerve agent biomarkers in dried blood spots** - 11 September 2023



In a paper in *Forensic Chemistry*, PhD candidate Mirjam de Bruin - Hoegée and co-workers present research on the use of dried blood spots for portable detection and laboratory verification of organophosphate poisoning. They were able to identify stable biomarkers in the dried blood and measure the cholinesterase activity using a mobile test kit months after exposure. Both LC-MS/MS and GC-MS/MS were used for unambiguous verification.

Mirjam de Bruin-Hoegée, Alex Fidder, Tomas van Groningen, Marcel J. van der Schans, Daan Noort, Arian C. van Asten: *On-site detection and laboratory verification of the presence of nerve agent biomarkers using dried blood spots*, *Forensic Chemistry*, Volume 35, 2023, 100526, DOI: [10.1016/j.forc.2023.100526](https://doi.org/10.1016/j.forc.2023.100526)

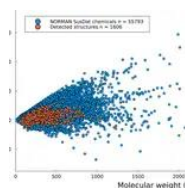
### **Gearing up towards light-switchable drugs** - 21 September 2023



An international team of researchers has resolved the fundamentals of the molecular switching behaviour of a specific class of switchable molecules called azonium compounds. In the high-ranking *Journal of the American Chemical Society* (JACS), they present a quantitative analysis based on advanced laser spectroscopy, quantum chemical modelling and theoretical calculations. It paves the way towards actual application of these compounds in developing light-controlled drugs.

Miroslav Medved', Mariangela Di Donato, Wybren Jan Buma, Adèle D. Laurent, Lucien Lameijer, Tomáš Hrivnák, Ivan Romanov, Susannah Tran, Ben L. Feringa, Wiktor Szymanski, and G. Andrew Woolley: *Mechanistic Basis for Red Light Switching of Azonium Ions* *J. Am. Chem. Soc.* 2023, 145, 36, 19894–19902 DOI: [10.1021/jacs.3c06157](https://doi.org/10.1021/jacs.3c06157)

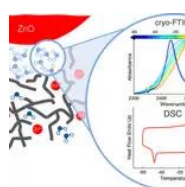
### **There is much to improve in identifying all the chemicals around us** - 22 September 2023



Non-targeted analysis (NTA) is an emerging field of analytical science that aims to identify all chemicals around us. In a meta-analysis of NTA results published over the past six years, researchers at HIMS and the University of Queensland (Australia) estimate that less than 2% of all chemicals have yet been identified. They published their results a paper in *Environmental Science and Technology*.

Tobias Hulleman, Viktoriia Turkina, Jake W. O'Brien, Aleksandra Chojnacka, Kevin V. Thomas, and Saer Samanipour: *Critical Assessment of the Chemical Space Covered by LC–HRMS Non-Targeted Analysis*. *Environ. Sci. Technol.* 2023 Publication Date: September 13, 2023, DOI: [10.1021/acs.est.3c0360](https://doi.org/10.1021/acs.est.3c0360)

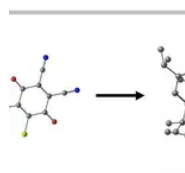
### **Nanoconfined water clusters observed in zinc white oil paint** - 25 September 2023



In a paper recently published in the *Journal of Physical Chemistry C*, Jorien Duivenvoorden points out the relevance of aqueous chemistry when studying oil paint ageing and degradation. Duivenvoorden, a PhD student with Dr Joen Hermans and Prof. Katrien Keune, demonstrates that even though oil and water do not mix, oil paints can contain liquid nanodroplets of water.

Jorien R. Duivenvoorden, Federico Caporaletti, Sander Woutersen, Katrien Keune, and Joen J. Hermans: *Nanoconfined Water Clusters in Zinc White Oil Paint*. *J. Phys. Chem. C* 2023, First published September 15, 2023, DOI: [10.1021/acs.jpcc.3c04720](https://doi.org/10.1021/acs.jpcc.3c04720)

### **Homolytic C–H bond activation by phosphine–quinone-based radical ion pairs** - 16 October 2023



In a paper in *Angewandte Chemie*, researchers led by Dr Chris Sloatweg of the research group Synthetic Organic Chemistry show how phosphine–quinone-based radical ion pairs can be used for C–H bond activation. Their study presents key mechanistic insights, underpinning the synergistic action of the radical ion pairs.

Christoph Helling, Lars J. C. van der Zee, Jelle Hofman, Felix J. de Zwart, Simon Mathew, Martin Nieger, Chris Sloatweg: *Homolytic C–H Bond Activation by Phosphine–Quinone-Based Radical Ion Pairs*. *Angewandte Chemie International Edition*, First published: 13 October 2023. DOI: [10.1002/anie.202313397](https://doi.org/10.1002/anie.202313397)

### **Shedding light on Leonardo's painting methods** - 26 October 2023



Ida Fazlic, a PhD student with Prof. Katrien Keune at HIMS and the Rijksmuseum, contributed to research shedding light on the painting methods of Leonardo da Vinci. The results, published earlier this month in the chemistry journal *JACS*, show the presence of a very uncommon compound in both the Mona Lisa's ground layer and the Last Supper's ground and paint layers.

Victor Gonzalez, Gilles Wallez, Elisabeth Ravaud, Myriam Eveno, Ida Fazlic, Tiphaine Fabris, Austin Nevin, Thomas Calligaro, Michel Menu, Vincent Delieuvin, and Marine Cotte: *X-ray and Infrared Microanalyses of Mona Lisa's Ground Layer and Significance Regarding Leonardo da Vinci's Palette*. *J. Am. Chem. Soc.*, Publication Date: October 11, 2023. DOI: [10.1021/jacs.3c07000](https://doi.org/10.1021/jacs.3c07000)

### **Photochemical uncaging of large biomolecules in high vacuum** - 26 October 2023



In an international cooperation, researchers at HIMS and the Universities of Basel and Vienna have redesigned fluorinated boron-dipyrromethene (BODIPY) photocages to efficiently release their cargo, including large biomolecules, in high vacuum. Their work enables new experiments that require a high degree of spatiotemporal control over molecular properties and dynamics determined by charge in a high vacuum, such as protein folding or probing the quantum-mechanical wave characteristics of large biomolecules. The results were published in JACS Au.

Yong Hua, Marcel Strauss, Sergey Fisher, Martin F. X. Mauser, Pierre Manchet, Martina Smacchia, Philipp Geyer, Armin Shayeghi, Michael Pfeffer, Tim Henri Eggenweiler, Steven Daly, Jan Commandeur, Marcel Mayor, Markus Arndt, Tomáš Šolomek, and Valentin Köhler: *Giving the Green Light to Photochemical Uncaging of Large Biomolecules in High Vacuum*. JACS Au 2023, 3, 10, 2790–2799 Publication Date: October 16, 2023. DOI: [10.1021/jacsau.3c00351](https://doi.org/10.1021/jacsau.3c00351)

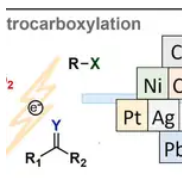
### **Integrating the power of photons and electrons** - 29 November 2023



In a VIP paper in Angewandte Chemie, HIMS researchers present a novel flow reactor for electrophotocatalysis (EPC) that uniquely integrates the power of photons and electrons. It was developed in a cooperation between the groups of Homogeneous, Supramolecular and Bio-Inspired Catalysis (Prof. Joost Reek) and Flow Chemistry (Prof. Timothy Noël). The reactor represents a significant advancement in electrophotocatalysis, providing a framework for its application in flow for complex synthetic transformations.

Dimitris I. Ioannou, Luca Capaldo, Jiri Sanramat, Joost N. H. Reek, Timothy Noël: Accelerated Electrophotocatalytic C(sp<sup>3</sup>)-H Heteroarylation Enabled by an Efficient Continuous-Flow Reactor. Angew. Chem.Int. Ed. 2023, e202315881, 16 November 2023. DOI: [10.1002/anie.202315881](https://doi.org/10.1002/anie.202315881)

### **How to find the best electrode for electrocarboxylation reactions** - 30 November 2023



In a paper in Current Research in Green and Sustainable Chemistry, researchers at the Heterogeneous Catalysis and Sustainable Chemistry group present a strategy for optimizing electrodes for electrocarboxylation reactions. This will enhance the efficiency of these reactions, that allow the direct conversion of carbon dioxide into valuable organic compounds.

Didjay F. Bruggeman, Charlotte Graefin von Quadt, Cássia S. Santana, Amanda C. Garcia: *Enhancing electrocarboxylation reactions efficiency by cathode material selection*. Current Research in Green and Sustainable Chemistry, Volume 7, 2023, 100380 DOI: [10.1016/j.crgsc.2023.100380](https://doi.org/10.1016/j.crgsc.2023.100380).



### **Iron impurities affect electrochemical oxidation of glycerol on nickel-based electrodes**

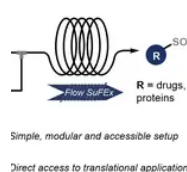
30 November 2023



Researchers at the Heterogeneous Catalysis and Sustainable Chemistry group of the Van 't Hoff Institute for Molecular Sciences (University of Amsterdam) have performed a systematic investigation into the influence of iron (Fe) impurities on the electrochemical oxidation of glycerol (EOG) on Ni(OH)<sub>2</sub>/NiOOH electrodes. In a paper in ChemElectroChem, they describe the impact of these impurities on the activity, mechanism, and the interplay between the EOG and the oxygen evolution reaction (OER). Their comprehensive analysis furnishes a robust framework for comprehending the intricate mechanisms governing glycerol oxidation on Ni-based electrodes within alkaline media.

Cássia S. Santana, Elviona Gjonaj, Amanda C. Garcia: *Effect of Iron Impurities on the Electrochemical Oxidation of Glycerol on Ni(OH)<sub>2</sub>/NiOOH Electrodes*. ChemElectroChem, Early View e202300570, first published 27 November 2023. DOI: [10.1002/celec.202300570](https://doi.org/10.1002/celec.202300570)

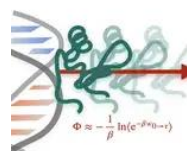
### **New modular flow platform for improved SuFEx click chemistry** - 4 December 2023



Researchers at the Flow Chemistry group developed a modular flow chemistry platform for a safe and efficient execution of SuFEx (Sulfur(VI) Fluoride Exchange) click chemistry. In a paper in Nature Synthesis, they describe how their platform generates the toxic gaseous reagent sulfonyl fluoride in a safe and controlled manner, and how it facilitates the subsequent fast and selective functionalization of small molecules, peptides, and proteins for therapeutic purposes.

Miguel Bernús, Daniele Mazzarella, Jelena Stanić, Ziran Zhai, Alejandro Yeste Vazquez, Omar Boutoureira, Andrea F. G. Gargano, Tom N. Grossmann, Timothy Noël: *A modular flow platform enables selective and fast SuFEx ligation of small molecules, peptides, and proteins*. Nature Synthesis, publication date 4 December 2023. DOI: [10.1038/s44160-023-00441-0](https://doi.org/10.1038/s44160-023-00441-0)

### **Decoding the dissociation of sequence-specific protein–DNA complexes with non-equilibrium simulations** - 5 December 2023

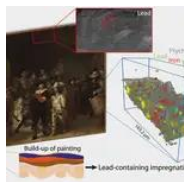


In a paper in the journal Nucleic Acids Research, researchers at the Computational Chemistry group present non-equilibrium simulations to quantify the sequence specificity of protein–DNA complexes. The molecular simulation approach developed by Thor van Heesch, Peter Bolhuis and Jocelyne Vreede yields results fast, and is generally applicable to any protein–DNA complex.

Thor van Heesch, Peter G Bolhuis, Jocelyne Vreede: *Decoding dissociation of sequence-specific protein–DNA complexes with non-equilibrium simulations*, Nucleic Acids Research, 2023, gkad1014. DOI: [10.1093/nar/gkad1014](https://doi.org/10.1093/nar/gkad1014)

## **Rembrandt broke new ground with lead-based impregnation of canvas for The Night Watch**

15 December 2023

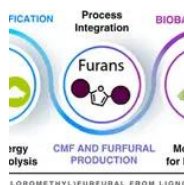


New research has revealed that Rembrandt impregnated the canvas for his famous 1642 militia painting 'The Night Watch' with a lead-containing substance even before applying the first ground layer. Such lead-based impregnation has never before been observed with Rembrandt or his contemporaries. The discovery, published today in *Science Advances*, underlines Rembrandt's inventive way of working, in which he did not shy away from using new techniques.

Frédérique T.H. Broers, Ige Verslype, Koen W. Bossers, Frederik Vanmeert, Victor Gonzalez, Jan Garrevoet, Annelies van Loon, Esther van Duijn, Anna Krekeler, Nouchka De Keyser, Ilse Steeman, Petria Noble, Koen Janssens, Florian Meirer, Katrien Keune: *Correlated x-ray fluorescence and ptychographic nanotomography on Rembrandt's The Night Watch reveals unknown lead "layer"*. *Science Advances*, 15 December 2023.

DOI: [10.1126/sciadv.adj9394](https://doi.org/10.1126/sciadv.adj9394)

## **Utilizing lignocellulose from biomass for PEF production** - 18 December 2023



In a paper in *ACS Sustainable Chemistry & Engineering*, PhD student Jorge Bueno Moron at the Industrial Sustainable Chemistry group describes the optimization of the integrated acidic hydrolysis of lignocellulose into chloromethylfurfural (CMF). CMF is the building block for furan dicarboxylic acid (FDCA), the monomer for the production of polyethylene furanoate (PEF). The process thus contributes to an economically viable conversion route of biomass into PEF polyester.

Jorge Bueno Moron, Gerard van Klink, and Gert-Jan M. Gruter: *Production and Downstream Integration of 5-(Chloromethyl)furfural from Lignocellulose*. *ACS Sustainable Chemistry & Engineering* Article ASAP.

DOI: [10.1021/acssuschemeng.3c05525](https://doi.org/10.1021/acssuschemeng.3c05525)

## **How a single monolayer can have a big impact on catalysis** - 21 December 2023



In a recent article published in *ChemCatChem*, researchers at the Heterogeneous Catalysis and Sustainable Chemistry group describe a way to optimize the electrochemical synthesis of glycine. They deposited a single atomic monolayer of lead on a copper electrode, which significantly inhibited the parasitic hydrogen evolution reaction. Such small modifications to an electrocatalyst can thus have a big impact on catalytic performance. The paper also shows that development of the catalyst in operando causes the formation of microparticles. These are likely to be the active catalytic species.

Pim Broersen, Thijs de Groot, Didjay Bruggeman, Emma Caarls, Jamie Trindell, Dimitra Anastasiadou, Marta Figueiredo, Gadi Rothenberg, Amanda C. Garcia, *Enhancing Electrocatalytic Synthesis of Glycine with CuPb1ML Electrode Synthesized via Pb UPD*. *ChemCatChem* 2023, e202301370. DOI: [10.1002/cctc.202301370](https://doi.org/10.1002/cctc.202301370)

## Prizes and honours

The quality of HIMS scientists is reflected in the prizes and honours they receive. Noteworthy examples are the Amsterdam Science & Innovation Award for Olivier Lugier and Stefania Grecea who started their spin-off company Nano Hybrids; the KNCV Golden Master Award for Milo Cornelissen; Ida Fazlić who won the national 3MT competition in Bosnia and Herzegovina; the Chem Soc Rev Pioneering Investigator Lectureship for Timothy Noël and the IUPAC-Solvay Young Chemist award for Eduard Bobylev. Below is a list of news items reporting on these and other honours for HIMS staff members and students.

### **IUPAC-Solvay Young Chemist award for Eduard Bobylev** - 9 May 2023



Dr Eduard Bobylev, a PhD graduate of the Van 't Hoff Institute for Molecular Sciences, was awarded a 2023 IUPAC-Solvay International Award for Young Chemists. He received the award during the Opening Ceremony of the 49th IUPAC World Chemistry Congress held 20-25 August 2023 in The Hague, The Netherlands.

### **Cum laude for Leon Niezen and Ruben Kranenburg** - 18 May 2023



Within one week, two PhD candidates of the Analytical Chemistry research group received their doctorates with the distinction Cum Laude. On 10 May Dr Leon Niezen defended his thesis on 'New methods for the characterization of essential distributions'. Two days later, Dr Ruben Kranenburg defended his thesis on 'Novel approaches for illicit-drug identification in forensic investigations'.

### **Timothy Noël appointed president of the Flow Chemistry Society** - 14 June 2023



The Flow Chemistry Society appointed Prof. Timothy Noël as its next president. Noël, professor of Flow Chemistry at HIMS, succeeds Dr Ferenc Darvas, founder and first president of the society.

### **Minghui Zhou obtains doctorate cum laude** - 20 June 2023



Dr Minghui Zhou successfully defended her PhD thesis on the metalloradical synthesis of medium-sized ring systems and their applications. She received his doctorate with the distinction 'cum laude', in recognition of the outstanding quality of her research under supervision of Prof. Bas de Bruin at the Homogeneous, Supramolecular and Bio-Inspired Catalysis group.

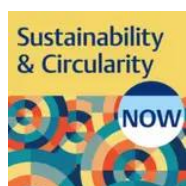


### **Chem Soc Rev Pioneering Investigator Lectureship for Timothy Noël** - 21 June 2023



The Royal Society of Chemistry awarded Prof. Timothy Noël a 2022/23 Chem Soc Rev Pioneering Investigator Lectureship. Members of the Editorial Board of the RSC journal Chemical Society Review selected Noël because of his 'outstanding and innovative contributions to chemistry research'. Noël holds the chair of Flow Chemistry at HIMS.

### **Chris Slootweg heads new sustainability journal** - 30 June 2023



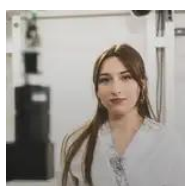
Associate professor Chris Slootweg was named Editor-in-Chief of the new journal Sustainability & Circularity NOW, published by Thieme. The journal tackles serious sustainability challenges and aims to shape an ambitious and genuinely interdisciplinary agenda for resolving current global environmental crises. As part of the launch of the journal, Slootweg chaired a Thieme Chemistry WebCheminar on Sustainable Plastics.

### **Prizes for Hannah Flerlage at European meeting** - 30 June 2023



PhD student Hannah Flerlage enjoyed a successful week in Switzerland, where she visited the European Meeting on Fire Retardant Polymeric Materials in Zürich. She received a poster prize (2nd place) and won a Travel Grant.

### **Ida Fazlić wins 3MT competition** - 30 June 2023



PhD student Ida Fazlić won the national 3MT competition in Bosnia and Herzegovina. She beat her fellow PhD contestants and also won the public vote, presenting her research into the drying of paint, in particular analysing how painters' drying methods affect historic masterpieces.

### **Milo Cornelissen wins KNCV Golden Master Award** - 8 October 2023



Former UvA chemistry student Milo Cornelissen won the Golden Master Award 2023 of the Royal Netherlands Chemical Society KNCV for his thesis "Incorporation of Directional and Quinone-Functionalized Macrocycles in Covalently Synthesized Rotaxanes". The award was presented to him during the national festive Evening of Chemistry held 5 October.

### **Ioana Ilie elected president of Assistant Professor Network Netherlands** - 24 October 2023



Dr Ioana Ilie, assistant professor in Computational Chemistry, was elected president of APNet, the Assistant Professor Network Netherlands. Ilie will lead the young network organisation in its growth towards maturity, representing all assistant professors in the Netherlands in policy and decision-making at the national level.

### **Spin-off company SusPhos wins 'Challenger50'** - 20 November 2023



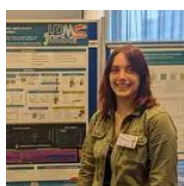
Marissa de Boer and SusPhos have won the 2023 MT/Sprout Challenger50 Award. The HIMS spin-off company can now present itself as the 'biggest market challenger of 2023'. The company founded by Marissa de Boer, Chris Slootweg and Bas de Jong developed a technique based on research at HIMS to recover phosphate from various waste streams.

### **Nano Hybrids wins Amsterdam Science & Innovation Award 2023** - 23 November 2023



Spin-off company Nano Hybrids won an Amsterdam Science & Innovation Award 2023 in the category Environment & Climate. During the finals held 21 November at NEMO Science Museum, co-founder and HIMS postdoctoral researcher Olivier Lugier beat his fellow contestants with a convincing pitch of the eco-friendly Nano Hybrids approach to nanoparticle production.

### **Denice van Herwerden wins poster prize at ISEAC-41** - 1 December 2023



During the 41st International Conference on Environmental & Food Monitoring (ISEAC-41) held in Amsterdam, PhD student Denice van Herwerden presented a poster describing the open-access, open-source and modular jHRMS toolbox for the processing of HRMS data. It earned her the prize for best poster in the environmental category.

### **Prof. Timothy Noël named Fellow of the Royal Society of Chemistry** - 19 December 2023



Timothy Noël, professor of Flow Chemistry, was named Fellow of the Royal Society of Chemistry. It acknowledges his experience and expertise and his commitment to promoting the value of chemical science.

## Grants and funding

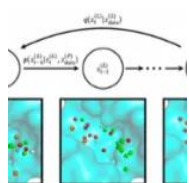
In 2023 we saw many researchers at our institute acquiring external grants such as the ERC Synergy Grant for Prof. Joost Reek and colleagues at the University of Leiden and the Netherlands Cancer Institute to develop innovative therapeutic approaches to target glioblastoma, a deadly primary brain tumour. Many other grants underpin the relevance of our research for a transition to sustainability. AI is another focal point, illustrated by the novel Research Priority Area (RPA) in "Artificial Intelligence for Sustainable Molecules and Materials" (AI4SMM) that is funded by the UvA Faculty of Science and is led by Dr Bernd Ensing of our institute. Below is a selection of notable grants and funding.

### **Towards the next generation of batteries** - 16 January 2023



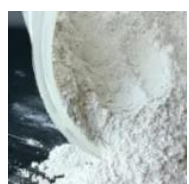
Thursday 12 January saw the kick-off of the BatteryNL consortium that aims to develop the next generation of batteries within eight years. Prof. Bob van der Zwaan of UvA's Sustainable Energy Technology group is one of the members of this €9.3 million consortium led by Prof. Marnix Wagemaker of TU Delft. The aim is to develop innovative batteries that are safer, possess higher energy densities, and have a longer life-cycle than present-day batteries. These improved battery features are crucial for a society based on sustainable energy sources.

### **Bernd Ensing receives eScience grant** - 1 February 2023



Associate professor Bernd Ensing was awarded a grant by the Netherlands eScience Center. As part of the Small-Scale Initiatives in Machine Learning, the grant provides for the deployment of an eScience software engineer to work with the Ensing group on developing deep learning algorithms to generate and design new molecules with desired properties.

### **Towards circularity in calcium carbonate** - 16 February 2023



Dr Stefania Grecea, lead of the Functional Materials has been awarded a KIEM GoChem grant of 40,000 euro to investigate and enhance the applications of circular calcium carbonate. The project will be carried out in a partnership with the company Alucha Works BV. Amsterdam Chemistry Network and

### **Automatic detection of hidden chemical information in drug samples** - 21 March 2023



The numerous samples that are analysed daily by Dutch forensic laboratories for the presence of drugs often have a characteristic chemical fingerprint, from which useful information can be obtained about the raw materials used, the production, and the transport of the drugs. The new FIDBID consortium aims to make better use of this hidden information. Three PhD students will, together with the Netherlands Forensic Institute and the Dutch police, develop a system that enables the laboratories to extract this information in a fully automated manner. For this, the consortium has received a grant of more than 1 million euros from the Dutch Research Council (NWO).

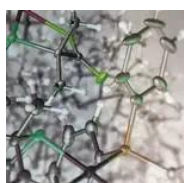


### **Improving the on-site detection of chemical warfare agents** - 30 March 2023



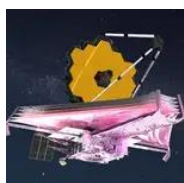
In a joint project, TNO Defense, Security and Safety, the University of Amsterdam (UvA), and Wageningen University and Research (WUR) set out to develop novel methods for detecting chemical warfare agents in the field. At the heart of the cooperation is research by Jelle de Koning as a special PhD student with Prof. Arian van Asten at HIMS. He will work on innovative instrumental methods as well as data analysis strategies, to enable rapid and robust on-site detection and provisional identification of a broad spectrum of chemical warfare agents (CWAs).

### **Tati Fernández receives funding to develop new synthetic methods** - 5 June 2023



Associate Professor Tati Fernández-Ibáñez of the research group Synthetic Organic Chemistry received funding through the Open Competition Domain Science-M programme from the Dutch Research Council NWO. This is intended for curiosity-driven fundamental scientific research with impact.

### **Funding for astrochemistry research with James Webb Space Telescope** - 17 July 2023



Dr Alessandra Candian (Anton Pannekoek Institute for Astronomy) and Prof. Wybren Jan Buma (Van 't Hoff Institute for Molecular Sciences) have obtained funding through the Dutch Astrochemistry Network (DAN) as part of its research programme 'Dutch Astrochemistry in the era of the James Webb Space Telescope'.

### **Andrea Gargano receives NWO grant for immunoglobulin analysis** - 22 September 2023



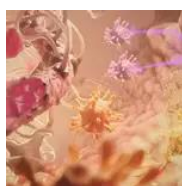
Dr Andrea Gargano of the research group Analytical Chemistry together with Dr Elena Dominguez Vega of the Center for Proteomics and Metabolomics at Leiden University Medical Center have been awarded an NWO Open Competition M2-grant. Together they receive about € 740,000 for their four-year HYPE-IMMUNE research project involving two PhD students.

### **Substantial funding for research into hydrogen storage** - 6 October 2023



As part of the €18 million HyTROS research and development programme announced by the Dutch organisation GroenvermogenNL, associate professor Chris Sloopweg of HIMS will co-lead a research line into large-scale hydrogen storage. This will involve, amongst others, a PhD student at HIMS assessing the technology readiness of suitable hydrogen carriers.

### **€10.6 million for innovative toolboxes to tackle brain cancer** - 26 October 2023



Together with the University of Leiden, the Netherlands Cancer Institute (Amsterdam) and OncoCode Institute (Utrecht), Prof. Joost Reek received a €10.6 million ERC Synergy Grant to target glioblastoma, a deadly primary brain tumour for which no curing therapy is yet available. The new approach of the 'Cat4CanCenter' research coordinated by Reek could potentially solve many of the difficulties associated with the current treatment of glioblastoma. At the heart of the proposed method are enzyme-mimicking molecular catalysts capable of producing anti-cancer drugs within the tumour tissue itself.

### **Four projects kick-start the AI4SMM research programme** -31 October 2023



To kick-start the new Research Priority Area (RPA) of the Faculty of Science in "Artificial Intelligence for Sustainable Molecules and Materials" (AI4SMM), four projects were launched. AI4SMM aims to develop and use machine learning techniques for the design of molecules and materials for a sustainable future. The projects cover topics as diverse as metamaterials for sustainable steel, and protein mixtures for sustainable food design. Programme director is Dr Bernd Ensing.

### **Electrochemical conversion of CO<sub>2</sub> into sustainable plastic materials** - 28 November 2023



The Industrial Sustainable Chemistry group is among twelve partners in seven countries that will cooperate in the four-year HICCUPS project funded by the EU with 5 million euro. Its aim is to demonstrate the full value chain of producing PLGA packaging plastics from biogenic CO<sub>2</sub> obtained from wastewater treatment.

### **A circular solar fuel for sustainable energy storage** - 29 November 2023



Dr Sonja Pullen of the research group for Homogeneous, Supramolecular and Bio-Inspired Catalysis was awarded € 105.000,- as a 'PPS-allowance' from the Ministry of Economic Affairs and Climate Policy. The funding supports research into photochemical recycling of CO<sub>2</sub> to formic acid as a liquid hydrogen carrier, which will be carried out in cooperation with the company DENS (Helmond, the Netherlands).

### **Stefania Grecea receives funding for feasibility study on sustainable nanoparticle synthesis**

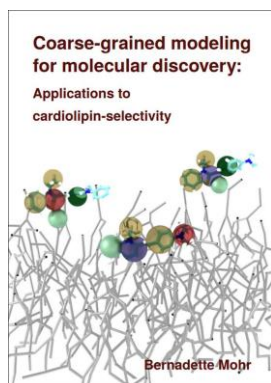
20 December 2023



Dr Stefania Grecea of the Functional Materials group received €40,000 'Take-off' funding from the Dutch Research Council NWO. With this, she will investigate the commercial feasibility of a novel method for the controlled, green synthesis of nanoparticles for biomedical applications. The method will improve reproducibility and accuracy in toxicity evaluation, enhance risk assessment and create new opportunities for innovation in biomedicine.

## Dissertations

In 2023, a total of 12 students received their PhD at HIMS. Dr Minghui Zhou, Dr Leon Niezen and Dr Ruben Kranenburg were granted the distinction 'cum laude'. All theses are listed below; a link is provided to download each thesis from the UvA repository.



### **Coarse-grained modeling for molecular discovery Applications to cardiolipin-selectivity**

*20 December 2023*

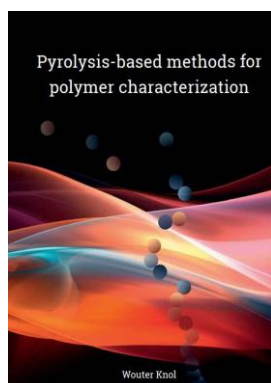
Author: B. (Bernadette) J. Mohr

Supervisor: P.G. Bolhuis

Co-supervisor: T. Bereau

Group: Computational Chemistry

[Read or download this thesis](#)



### **Pyrolysis-based methods for polymer characterization**

*28 September 2023*

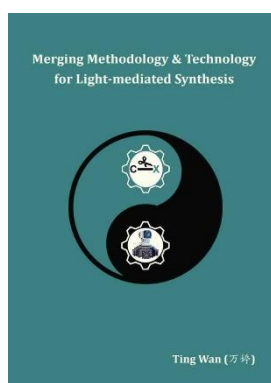
Author: W. (Wouter) C. Knol

Supervisors: R.A.H. Peters, G.W. Somsen

Co-supervisor: B.W.J. Pirok, P.J. Schoenmakers

Group: Analytical Chemistry

[Read or download this thesis](#)



### **Merging methodology & technology for light-mediated synthesis**

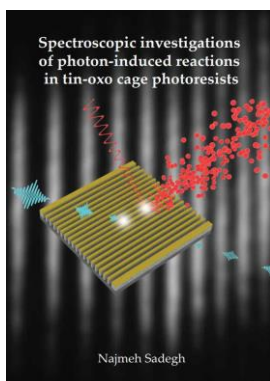
*26 September 2023*

Author: T. (Ting) Wan

Supervisors: T. Noël, L. Capaldo

Group: Flow Chemistry

[Read or download this thesis](#)



## **Spectroscopic investigations of the photon-induced reactions in tin-oxo cage photoresists**

*20 September 2023*

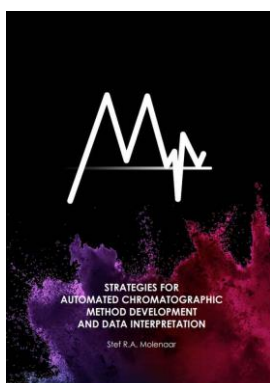
Author: N. (Najmeh) Sadegh

Supervisors: A.M. Brouwer

Co-supervisor: P.M. Kraus

Group: Molecular Photonics

[Read or download this thesis](#)



## **Strategies for automated chromatographic method development and data interpretation**

*13 September 2023*

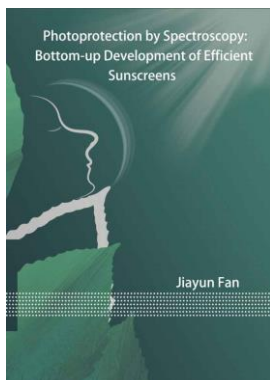
Author: S. (Stef) R.A. Molenaar

Supervisors: P.J. Schoenmakers, G.W. Somsen

Co-supervisor: B.W.J. Pirok

Group: Analytical Chemistry

[Read or download this thesis](#)



## **Photoprotection by spectroscopy - The bottom-up development of efficient sunscreens**

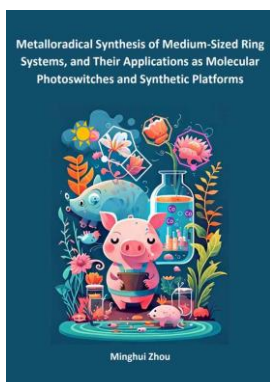
*21 June 2023*

Author: J. (Jiayun) Fan

Supervisors: W.J. Buma, J. Oomens

Group: Molecular Photonics

[Read or download this thesis](#)



## **Metalloradical synthesis of medium-sized ring systems and their applications as molecular photoswitches and synthetic platforms**

*15 June 2023*

Author: M. (Minghui) Zhou

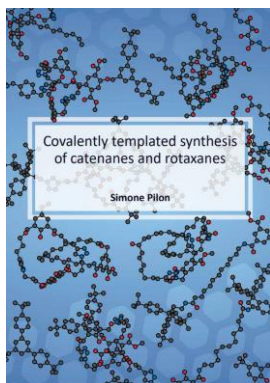
Supervisor: B. de Bruin

Co-supervisor: J.N.H. Reek

Group: Homogeneous, Supramolecular and Bio-Inspired Catalysis

[Read or download this thesis](#)





### **Covalently templated synthesis of catenanes and rotaxanes**

*21 March 2023*

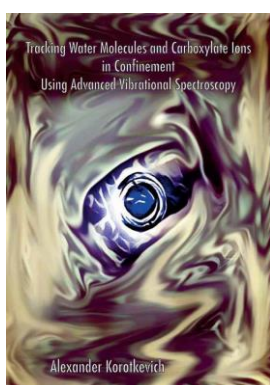
Author: S. (Simone) Pilon

Supervisor: J.H. van Maarseveen

Co-supervisor: M.A. Fernández Ibáñez

Group: Synthetic Organic Chemistry

[Read or download this thesis](#)



### **Tracking water molecules and carboxylate ions in confinement using advanced vibrational spectroscopy**

*27 May 2023*

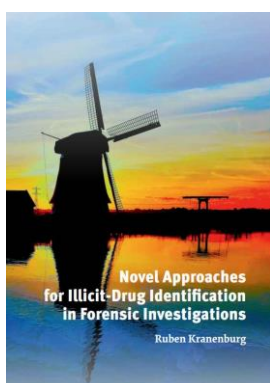
Author: A. (Alexander) Korotkevich

Supervisor: H. Bakker

Co-supervisor: S. Grecea

Group: Molecular Photonics

[Read or download this thesis](#)



### **Novel approaches for illicit-drug identification in forensic investigations**

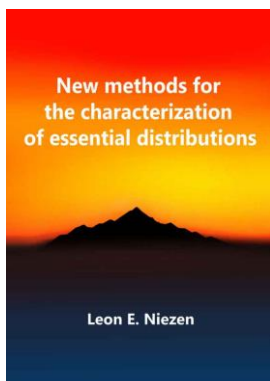
*12 May 2023*

Author: R. (Ruben) F. Kranenburg

Supervisors: A.C. van Asten, P.J. Schoenmakers

Group: Analytical Chemistry

[Read or download this thesis](#)



### **New methods for the characterization of essential distributions**

*10 May 2023*

Author: L. (Leon) E. Niezen

Supervisors: P.J. Schoenmakers, G.W. Somsen

Co-supervisors: B.W.J. Pirok, B.B.P. Staal

Group: Analytical Chemistry

[Read or download this thesis](#)



## Higher-order-structure analysis of proteins by native size-based separations coupled to optical and mass-spectrometric detectors

6 Februari 2023

Author: I. (Iro) K. Ventouri

Supervisors: P.J. Schoenmakers, G.W. Somsen

Co-supervisor: A. Astefanei, R. Haselberg

Group: Analytical Chemistry

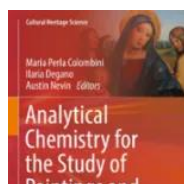
[Read or download this thesis](#)

## Valorisation

Knowledge transfer to industry and society is in the DNA of our institute. We are always looking for partnerships with industry to identify research questions that matter, transfer our knowledge and turn innovative ideas into reality. Below is an overview of valorisation news items in 2023.

### **Book chapter on Microchemical Imaging of Oil Paint Composition and Degradation**

14 February 2023



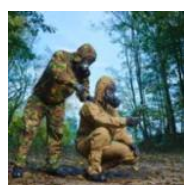
Prof. Katrien Keune and her former PhD student Dr Selwin Hageraats have contributed a chapter to a book on analytical chemistry for the study of paintings and the detection of forgeries. Titled 'Microchemical Imaging of Oil Paint Composition and Degradation: State-of-the-Art and Future Prospects', the chapter not only provides a comprehensive review of the state-of-the-art in this research field, it also provides a shared vision on the future prospects.

### **Towards circularity in calcium carbonate** - 16 February 2023



Dr Stefania Grecea, lead of the Functional Materials has been awarded a KIEM GoChem grant of 40,000 euro to investigate and enhance the applications of circular calcium carbonate. The project will be carried out in a partnership with the company Alucha Works BV. Amsterdam Chemistry Network and Spark904 have been involved in bringing the parties together and in the project design.

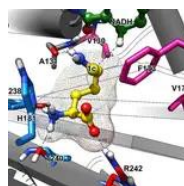
### **Improving the on-site detection of chemical warfare agents** - 30 March 2023



In a joint project, TNO Defense, Security and Safety, the University of Amsterdam (UvA), and Wageningen University and Research (WUR) set out to develop novel methods for detecting chemical warfare agents in the field. At the heart of the cooperation is research by Jelle de Koning as a special PhD student with Prof. Arian van Asten at HIMS. He will work on innovative instrumental methods as well as data analysis strategies, to enable rapid and robust on-site detection and provisional identification of a broad spectrum of chemical warfare agents (CWAs).

### **Amsterdam biocatalysis research advances novel industrial-scale enzymatic conversion process**

10 May 2023



The Biocatalysis research group headed by Prof. Francesco Mutti has contributed to the development of a novel industrial biocatalytic conversion process. Developed in a cooperation with the Italian companies Olon Group and Biosphere, it employs an enzymatic conversion that renders the production of an important starting material for pharmaceutical synthesis more efficient and sustainable.

### **Innovator of the year award for museum case displaying textiles from 17th century shipwreck**

8 June 2023



A special type of oxygen-free display case for exhibiting rare textile finds from a 17th-century shipwreck in museum Kaap Skil in Texel has received the 2023 Innovator of the Year award of Museums + Heritage. The case was developed based on research led by Prof. Maarten van Bommel, professor of Conservation Science both at the Faculty of Humanities and the Faculty of Science (HIMS).

### **Spin-off Plantics enables most sustainable 'no-waste' kitchen** - 15 August 2023



The Dutch company NoWa Kitchen presented its newest kitchen featuring only bio-based materials and a sustainable cradle-to-cradle design. A key enabler for the kitchen are plant-based polymers and materials brought to market by spin-off company Plantics, stemming from a discovery made by HIMS chemists. The kitchen development was supported by the EU project Sustainable Wood Panels.

### **ChemAI 2023** – 16 November 2023



At the successful ChemAI 2023 event, co-organized by HIMS, the huge potential of Artificial Intelligence for the chemistry domain was explored and discussed with participants from academia, industry and government. It showcased successful examples of Machine Learning in the broad field of chemistry, focusing on molecules, proteins, and materials.

### **Nano Hybrids wins Amsterdam Science & Innovation Award 2023** - 23 November 2023



Spin-off company Nano Hybrids won an Amsterdam Science & Innovation Award 2023 in the category Environment & Climate. During the finals held 21 November at NEMO Science Museum, co-founder and HIMS postdoctoral researcher Olivier Lugier beat his fellow contestants with a convincing pitch of the eco-friendly Nano Hybrids approach to nanoparticle production .

### **Electrochemical conversion of CO2 into sustainable plastic materials** - 28 November 2023



The Industrial Sustainable Chemistry group is among twelve partners in seven countries that will cooperate in the four-year HICCUPS project funded by the EU with 5 million euro. Its aim is to demonstrate the full value chain of producing PLGA packaging plastics from biogenic CO<sub>2</sub> obtained from wastewater treatment.



**A circular solar fuel for sustainable energy storage** - 29 November 2023



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# Outreach

## Lectures and other contributions in 2023

- **Luchtige moleculen. Over stikstof, zuurstof en CO<sub>2</sub>.**  
28 March 2023, Lions Club Nijmegen, Brabantse Poort  
Jan van Maarseveen
- **Jury member Akademikus/AkademiX**  
1 January 2023,  
Ioana Ilie

## HIMS researchers appearing in the media in 2022

**Much attention for the research of Frédérique Broers and Katrien Keune discovering Rembrandt's special preparatory treatment of the Night Watch**

The results were published in Science Advances.

- ▶ Rembrandt gebruikte een loodhoudend laagje voor de Nachtwacht. [NRC, 15 December 2023.](#)
- ▶ Rembrandt gebruikte speciale techniek om Nachtwacht te beschermen tegen vocht. [NOS, 15 December 2023.](#)
- ▶ Diepere laag in De Nachtwacht ontdekt. [Podcast Kennis & Co, 15 December 2023.](#)
- ▶ Rembrandt beschermde Nachtwacht tegen vocht met speciale laag. [RTLnieuws 15 December 2023.](#)
- ▶ Rembrandt beschermde de Nachtwacht met loodhoudende laag tegen vocht. [Het Parool, 16 December 2023.](#)
- ▶ Rembrandt beschermde 'Nachtwacht' tegen vocht en schimmel. [De Telegraaf, 15 December 2023.](#)
- ▶ Geavanceerde combinatie van röntgentechnieken onthult onverwachte loodlaag op De Nachtwacht van Rembrandt. [EOS Wetenschap, 15 December 2023.](#)

- ▶ Study shows how Rembrandt broke new ground with lead-based impregnation of canvas for The Night Watch. [Phys.org, 15 December 2023.](#)
- ▶ X-ray imaging of *The Night Watch* reveals previously unknown lead layer. [ArsTechnica, 15 December 2023.](#)
- ▶ Rembrandt Used a Lead-Containing Layer to Protect the Night Watch from Moisture. [ArtDependence Magazine, 16 December 2023.](#)
- ▶ Previously Unseen Painting Technique Was Used by Rembrandt in 'The Night Watch,' New Study Reveals. [ARTnews, 18 December 2023.](#)
- ▶ X-rays reveal unusual technique hidden in Rembrandt's 'The Night Watch'. [CNN, 19 December 2023.](#)

### **Pim Linnebank and Mimi den Uijl on Kassa TV programme**

Pim and Mimi featured on the consumer programme "Kassa" on Dutch television, where they explained about "vegan" nail polish and "natural" nail polish. They also explored whether it makes sense to opt for these variants from an environmental perspective.

- ▶ Kassa Test: Welke vegan nagellak is het beste en blijft het langste zitten? [Kassa, 9 December 2023.](#)



### **Rembrandt gebruikte loden laagje voor de Nachtwacht**

Het loodhoudend laagje zit onder de grondverf laag en is waarschijnlijk bedoeld om het doek tegen vocht te beschermen. Het is de eerste keer dat een 3D-onderzoekstechniek...



...de laag van het monster of te breken. Dit kan mogelijk worden met een...  
...de laag van het monster of te breken. Dit kan mogelijk worden met een...  
...de laag van het monster of te breken. Dit kan mogelijk worden met een...

Het laagje onder de grondverf moet het doek beschermen tegen vocht

Rembrandt maakte de keuze voor het nieuwe materiaal waarschijnlijk omdat het beter vochtwerend was. ...  
...de laag van het monster of te breken. Dit kan mogelijk worden met een...  
...de laag van het monster of te breken. Dit kan mogelijk worden met een...

**Lotte Metz in explanatory video for Universiteit van Nederland**

Lotte presented the video about (the colour of) gold #nanoparticles and how these are used (in Dutch).

► Goud in je test. [Universiteit van Nederland / YouTube, 4 December 2023](#).



**Pim Linnebank at Editie NL explaining designer drugs**

The municipality of Zaandam had to return 6 to 8 million worth of designer drugs to the owner because the drug was not included in the opium law. Pim indicates how the chemicals are easy to adjust, enabling the maker of the drugs to evade the law.

The item starts at 0.39.

► Vrij spel voor designer drugs. [RTL Nieuws Editie NL Aflevering 329, 25 November 2023](#)

**Research of chemical weapons to quickly conclude if nerve agents were involved. Mirjam de Bruin-Hoegée in C2W**

Even after three months, you can still find biomarkers of nerve agents in dried blood spots.

In [Forensic Chemistry](#) Dutch researchers show that you can also demonstrate a greater variety of substances than previously assumed.

► Oude bloedvlek spreekt boekdelen. [C2W 30 October 2023](#)

**ERC Synergy Grant: Joost Reek in C2W**

The ERC Synergy Grants 2023 have been announced. Several KNCV and NVBMB members saw their applications honored. Synergy Grants are intended for ambitious research projects in which two to four principal investigators from different disciplines work together.

► Moleculair succes bij ERC Synergy Grants [C2W, 27 October 2023](#)

**Viktoriia Turkina and Saer Samanipour on harmful substances in Folia**

Only two percent of the chemicals to which people are exposed daily are known, UVA researchers estimate. "That lack of knowledge is a danger to public health."

► Schadelijke stoffen zoals PFAS zijn topje van de ijsberg: 'Slechts 2% van chemicaliën is bekend'. [Folia 17 October 2023](#)

**Ruben Kranenburg and Arian van Asten in C2W**

They are interviewed on the FIDBID project, aiming for automated analysis of fingerprints from drug samples. FIDBID is short for *Forensic Illicit Drug intelligence through Big and Intelligent analysis of chemical and criminological Data*.

► Automatische chemische 'vingerafdruk' van drugs moet recherche helpen. [C2W, 12 October 2023](#).

**Wybren Jan Buma at Enginersonline.nl**

Molecules that change shape under the influence of light can be used as switches for medical applications. An international research team, including Wybren Jan Buma, investigated the precise effect of azonium compounds.

► Met licht schakelbare medicijnen een stap dichterbij. [Enginersonline.nl 27 September](#)

### **Hannah Flerlage en Chris Slootweg write an op-ed in C2W**

Referring to their recent paper in Nature Reviews Chemistry titled 'Modern chemistry is rubbish', they make the case for a more responsible approach of chemistry and chemistry research. Their contribution was adopted by other publications:

- ▶ 'Chemie maakt er nog steeds een zootje van'. [C2W, 27 September 2023](#).
- ▶ 'Chemie maakt er nog steeds een zootje van'. [Beste-id, 27 september 2023](#).
- ▶ 'Chemici: kijk verder dan je reageerkolf'. [De Ingenieur, 7 oktober 2023](#).

### **Folia reports on the GoGreen project with Katrien Keune, Sander van Lith and Han Zhou**

They are featured in a short video, explaining the project and their research.

- ▶ How can we preserve our cultural heritage sustainably? [Folia, 20 September 2023](#).

### **Pim Linnebank at Editie NL about the danger of "chlorine" bombs**

A high school was recently evacuated because high school students had made a "chlorine" bomb. In Editie NL Pim Linnebank explain that this is dangerous.

The item starts at 4:07.

- ▶ De Chloorbom. [Editie NL 5 September 2023](#)

### **Peter Schoenmakers interviewed by The Analytical Scientist**

Schoenmakers reflects on the most significant developments across analytical science over the past decade.

- ▶ Ten Year Views: With Peter Schoenmakers. The Analytical Scientist, [25 August 2023](#)

#### Ten Year Views: With Peter Schoenmakers

Peter Schoenmakers reflects on the most significant developments across analytical science over the past decade

Georgia Hulme, Frank van Geel | 08/25/2023 | 4 min read | Interview



### **Hannah Flerlage and Chris Slootweg in various online media**

A [HIMS news item](#) published on the occasion of their "Modern chemistry is rubbish" paper in Nature Reviews Chemistry was published by many online media.

- ▶ Chemists Need To Think Beyond the Reaction Vessel. [Technology Networks, 9 August 2023](#).
- ▶ Opinion: Modern Chemistry Is Quite Literally Rubbish. [SciTechDaily, 15 September 2023](#).
- ▶ Danish Professor Says 'Modern Chemistry is Rubbish,' Calls for Change. [Laboratory Equipment, 9 August 2023](#).
- ▶ Chemists need to consider the effects of chemistry beyond the lab to combat environmental crises, say researchers. [Phys.org, 7 August 2023](#).

### **C2W interviews Gadi Rothenberg**

About the flexible spheres of the biomolecule chitosan, made from shrimp waste, that can be used for catalysts that generate hydrogen gas from borohydride salts.

- ▶ Katalysator in een flexibele schaal. [C2W, 26 July 2023](#).

### **Pim Linnebank at RTL Nieuws - Editie NL about the risks for deliverers of food using dry ice in vans**

Dry ice is used to cool products, but if used incorrectly it can cause burns and suffocation.

- ▶ News article - Droogijs risico voor bezorgers: 'Brandwonden en verstikking' [RTL Nieuws Editie NL 14 July 2023](#)
- ▶ Watch the item - [Editie NL episode 196](#) (starting at 7:50)

### **De Telegraaf reports on the biobased resin developed in the Rothenberg group, produced by spin-off company Plantics, and applied by furniture manufacturer Vepa.**

- ▶ Glansrol voor hennep. [De Telegraaf, 11 Juli 2023](#) (or view the [PDF](#)).



### **Mirjam de Bruin-Hoegée was interviewed about her research on fentanyl attribution**

In CBRNe World, the international magazine on professionals working in the field of chemical, biological, radiological, nuclear or explosives (CBRNe) threats or incidents.

- ▶ I sing the body fentanyl. [CBRNe, June 2023](#).

### **Sander Woutersen in De Volkskrant about the surprising results of his worm research**

▶ Sander and his colleagues Daniel Bonn and Antoine Deblais (both UvA-IoP) conducted a study with worms, which turned out to move very differently than standard physics predicts. [De Volkskrant, 30 juni](#)

### **Gert-Jan Gruter about the problem of wet wipes blocking sewers**

- ▶ Rioleringen regelmatig verstopt door vochtige doekjes: 'Vallen niet uit elkaar'. [RTL Nieuws, 23 mei](#).
- ▶ Vochtige doekjes wel of niet doorspoelen? Zo zit het. [Margriet, 23 mei](#).

### **Gadi Rothenberg at Radar**

Gadi Rothenberg is one of the experts who comment on the fact that some biodegradable plastic turn out to be non-degradable, for the Dutch consumer TV programme Radar.

- ▶ Biologisch afbreekbaar plastic dat niet afbreekbaar blijkt: hoe kan dit? [Radar, 16 May](#)



### **Lotte Metz en Marie Brands at VNCI**

During King's Day, PhD students Lotte Metz and Marie Brands performed everyday science experiments for everybody to enjoy. This was mentioned by the Dutch chemical industry association VNCI on their website and in their magazine.

- ▶ 'Chemiekusjes' op Koningsdag. [VNCI, 2 May](#)

### **Research of Frédérique Broers into orpiment degradation in C2W**

- ▶ De gele roos en zijn glans, deel II. [C2W, 18 April](#)

### **Maarten van Bommel features in a documentary series of 3 episodes**

The series are about the find in the 'Palmhout wreck', where, among other things, 'the dress', many other textiles and silverware dating from the 17th century were found.

- ▶ The episodes aired at [NPO 2, on 3, 10 and 17 April, at 22.20](#).
- ▶ More information in the [trailer](#), the [podcast](#) and the [interactive website](#).
- ▶ At the Faculty of Humanities a podcast was made in which Maarten van Bommel provides his views on the research and the TV series. [De Goede Gesprekken #16: De bijzondere vondsten uit het Palmhoutwrak](#).
- ▶ Nachtmerrrie voor archeologen: een 17de-eeuws mouwtje op 30 graden in de wasmachine. [Parool, 11 April](#).
- ▶ The documentary was [nominated for the Nipkow prize](#), an important Dutch television award.

### **Jan van Maarseveen comments on novel chiral molecule in C2W**

C2W reported on research at Oxford University, published in Nature, and asked the opinion of Jan van Maarseveen.

- ▶ Helix vangt chirale zuurstof. [C2W, 5 April 2023](#).



**Jan van Maarseveen in KIJK about the use of hydrogen**

- ▶ Waar kunnen we waterstof écht voor gebruiken? [KIJK, 1 April](#).

**Katrien Keune in C2W, featuring her lecture about Operation Nightwatch at Lab Technology**

- ▶ Keynote lezing: Katrien Keune over Operatie Nachtwacht. [C2W, 22 March](#).

**Gert-Jan Gruter in C2W, featuring his lecture about renewable plastics at Lab Technology**

- ▶ Keynote lezing: Gert-Jan Gruter over hoogwaardige polyesters uit biomassa en CO<sub>2</sub>. [C2W, 22 March](#).

**Timothy Noël in C2W on the PhotoScale project and the scaling up of photocatalysis**

- ▶ Nieuwe draai aan fotokatalyse [C2W, 17 March](#)

**Gadi Rothenberg featured at the Amsterdam Science Park website**

- ▶ Professor Rothenberg's work shows the potential for research at the Amsterdam Science Park to provide real-life solutions for businesses. [Website Amsterdam Science Park, 14 March](#)

**Giulia Giubertone interviewed by ScienceNews.dk**

- ▶ Revealing the molecular structure of unpurified silk and other biomaterials. [ScienceNews.dk, 5 March](#)

Revealing the molecular structure of unpurified silk and other biomaterials

**Wybren Jan Buma about coral friendly sunscreen**

- ▶ Koraalvriendelijke zonnebrandcrème beschermt nog beter [De Ingenieur 2 March](#)

**Gadi Rothenberg warns that the Paris goals will not be met**

- ▶ UvA-hoogleraar: 'We gaan de klimaatdoelen van Parijs niet halen' [Folia, 1 February](#)
- ▶ Sustainable chemistry will not solve CO<sub>2</sub> emissions problem, claims paper [Phys.org, 6 February](#)
- ▶ Een realistische kijk op CO<sub>2</sub>-uitstoot en klimaatverandering [C2W, 15 February](#)



**Joost Reek articulates concerns about breaking ties with fossil-based companies**

In an open letter in university magazine Folia, some thirty professors of the Faculty of Science turn against an UvA moratorium on new collaborative projects with partners from fossil-based industries. Joost Reek spoke to NOS on behalf of the group, which included 15 colleagues from HIMS.

- ▶ Acties tegen fossiel op universiteiten: wel of geen samenwerking? [NOS, 15 February](#)
- ▶ UvA-moratorium vertraagt energietransitie en is inbreuk op academische vrijheid [Folia, 13 February](#)

**Mirjam de Bruin-Hoegée about finding evidence in plants for the use of chemical weapons**

- ▶ Planten snuiven mosterdgas [C2W, 2 February](#)
- ▶ Plant biomarkers provide evidence of nerve agent attacks [ChemistryWorld, 6 March](#)

**Katrien Keune and Joen Hermans about the discovery of lead formate in The Night Watch**

- ▶ UvA chemists discover new lead compound in The Night Watch [Folia, 1 Februari](#)
- ▶ Vreemde verbinding ontdekt in de Nachtwacht van Rembrandt [Scientias, 3 Februari](#)
- ▶ Opmerkelijke chemische verbinding in De Nachtwacht gevonden [BNR Radio, 22 Januari](#)

**Katrien Keune about sustainable strategies for conservation of cultural heritage**

- ▶ GoGreen: Culturele laboratoria voorop in vergroening [LabInsights, 1 February](#)

**GoGreen: Culturele laboratoria voorop in vergroening**

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'GoGreen' is het motto van laboratoria binnen het Europese culturele erfgoed om te vergroenen en te verduurzamen. Katrien Keune, Hoofd Science bij het Rijksmuseum en bijzonder hoogleraar Moleculaire Spectroscopie aan de Universiteit van Amsterdam is coördinator van dit project en verwacht dat de voorgenomen vergroeningsslag voor de hele labsector een stimulans kan zijn om milieuvriendelijker te gaan opereren.

**Ron Wever on effective enzyme design with AI**

- ▶ AI ontwerpt nieuwe werkzame enzymen [KIJK, 27 Januari](#)

**Ruben Kranenburg developed the 'powder puck' for rapid 'on-scene' identification of drugs**

- ▶ Ruben Kranenburg ontwikkelde een detector om ter plaatse drugs te analyseren [Folia, 12 januari](#)
- ▶ 'IJschockepuck' kan drugs opsporen [De Ingenieur, 29 maart](#)

**Joost Reek on sustainable production of hydrogen with sunlight and air**

- ▶ Duurzame productie van waterstof uit zonlicht en lucht dichterbij door Zwitserse vinding [NRC, 9 January](#)

**Timothy Noël speaks about his expectations for 2023**

- ▶ 2023 wordt het jaar van ...? [C2W, 9 January](#)