



March 2017

Mickel Hansen and Michael Lerch selected to participate to the 67th Lindau Nobel Laureate Meeting

Mickel Hansen and Michael Lerch (PhD students in Ben Feringa's group) have been selected to participate to the 67th Lindau Nobel Laureate Meeting.

400 young scientists from 76 countries have been selected to participate in the 67th Lindau Nobel Laureate Meeting. From 25 – 30 June 2017 they will meet with Nobel Laureates at Lake Constance. This year's meeting is dedicated to chemistry. Thus far, 31 Nobel laureates have confirmed their participation.

The young scientists are outstanding undergraduate students, graduate students and post-docs under the age of 35, conducting research in the field of chemistry. They have successfully passed a multi-stage international selection process. 155 scientific institutes, universities, foundations and research-oriented companies contributed to the nominations. The selected young scientists originate from big research nations like the US, the UK, Japan, Israel, and Germany, but also from developing countries such as Bangladesh, Myanmar and Benin.

The proportion of women among the selected young scientists is 45 percent. "For the field of chemistry, that is a substantial number", says Wolfgang Lubitz, Director of the Max Planck Institute for Chemical Energy Conversion, Vice-President of the Council for the Lindau Nobel Laureate Meetings and scientific co-chairperson of this year's meeting.

"The quality of applicants was again extremely high", says Burkhard Fricke, professor emeritus for theoretical physics and coordinator of the selection process. "Some of the young scientists who applied had very impressive CVs. It is highly unfortunate that we can only invite 400 of them."

Due to the ongoing modernisation of the local conference venue, the meeting will once again take place in Lindau's city theatre. Accordingly, the usual number of just under 600 participating young scientists had to be reduced to 400.

The Lindau Nobel Laureate Meetings take place every year since 1951 and are designed as a forum for exchange, networking and inspiration. In Lindau, excellent young researchers meet the most acclaimed scientists of their field.

Bernard Feringa and Jean-Pierre Sauvage, who received the Nobel Prize in Chemistry 2016, together with Sir Fraser Stoddart, for the design of molecular machines, will also participate in this year's meeting. Besides molecular machines, the key topics of the 67th Lindau Nobel Laureate Meeting will include big data, climate change and the role of science in a "post-truth" era.

The selected young scientists may expect a six-day programme with numerous lectures and panel discussions. Some of them will also get the opportunity to discuss their own work at one of the master classes or at the poster session. "This is a unique opportunity for the young scientists to present their research in front of an international audience and receive invaluable feedback from Nobel Laureates.", says Wolfgang Lubitz. In addition to the scientific programme, the meeting offers many opportunities for the young scientists to socialise with the Nobel Laureates, and of course with each other, in a relaxed atmosphere.

Highlights by Prof. dr. Jan B.F.N.Engberts

- A novel beautiful study by Prof. Feringa and three coworkers, performed in the Stratingh Institute, describes the design, synthesis and application of two photo-responsive bifunctionalised catalysts based on an overcrowded alkene core. Upon irradiation with 312 nm light, both E- and Z-switches show properties of photoswitchable catalytic activity control in the Michael addition reaction between (E)-3-bromo- β -nitrostyrene and 2,4-pentanedione. It is clearly shown that both isomers undergo a decrease in catalytic activity upon irradiation to the metastable state. Obvious reasons for this finding, such as steric effects on hydrogen-bonding interactions, could be excluded. Attempts have been made, and will be continued, to understand the effects of switching on the catalytic efficiency. Computational studies were initiated to see whether the substantial alteration of the electronic properties upon switching to the metastable state could be the origin for the detrimental impact on the catalytic efficiency. The present work on bifunctional molecular photoswitches will be important for creating and understanding catalytic photoswitches. *Pizzolato, S.F., Collins, B.S.L., van Leeuwen, T., Feringa, B.L., Chem.Eur.J., 2016, DOI 10.1002/chem.201604966.*
- Zhao and a colleague at Iowa State University, in Ames, USA, found a general method for selective recognition of monosaccharides and oligosaccharides in aqueous solution. This process is of great importance in biology but has been difficult to achieve using synthetic receptors. But now nanoparticle receptors were prepared for a wide variety of mono- and oligosaccharides by covalent imprinting of carbohydrates in boroxole-functionalised cross-linked micelles. Cis-1,2-diol, cis-3,4-diol, and trans-4,6-diol moieties are responsible for binding of the sugar templates to the boroxole functional monomer. Excellent selectivities were predicted and were observed, as, for example, for the three biological important hexoses (glucose, mannose, and galactose). Oligosaccharides are distinguished on the basis of their monosaccharide building blocks, glucoside linkages, chain lengths, and additional functionalized functional groups which could interact with the nanoparticles. *Gunasekara, R.W., Zhao, Y., J.Am.Chem.Soc. 2016, DOI 10.1021/jacs.6b10773.*
- Four synthetic chemists from the University of Ottawa reported an efficient and stereoselective Au1-catalyzed Diels-Alder reaction leading to angular carbocycles. The method was applied in a relatively short (11-steps) synthesis of the natural alkaloid magellanine. This molecule contains a tricyclic angular carbon framework with six contiguous stereogenic centers. The novel methodology enables a rapid access to a variety of complex angular cores in high yields and with excellent diastereoselectivities. Further applications of the novel method in natural product synthesis are being investigated. *McGee, P., Bétournay, G., Barabé, F., Barriault, L., Angew. Chem.Int.Ed., 2016, DOI 10.1002/anie.201611606.*
- Waller and a coworker (University of Münster, Germany) published a paper that starts with a remarkable sentence: “The ability to reason beyond established knowledge allows organic chemists to solve synthetic problems and invent novel transformations”. They proposed a model that mimics chemical reasoning, and formalizes reaction prediction as finding missing links in a knowledge graph. In a mathematical approach, they have constructed a knowledge graph containing 14.4 million molecules and 8.2 million binary reactions, representing the bulk of all chemical reactions ever published in the scientific literature. Their model was able to perform a reaction prediction task for 180 000 randomly selected binary reactions. It was shown that new transformations could be detected and that their model can be employed as a high-throughput generator of reaction hypotheses for reaction discovery. *Segler, M.H.S., Waller, M.P., Chem.Eur.J., 2016, DOI 10.1002/chem.201604556.*
- Chemists from the Universities of Chengdu and Beijing (China) reported a novel technique for the lactonization of heteroaryl and alkenyl C-H bonds with CO₂ under transition-metal-free and redox-neutral conditions to produce important coumarin derivatives. The yields are moderate to excellent (53-93 percent). Mechanistic studies are in progress. These reactions feature a large substrate scope, good functional group tolerance, facile scalability, and easy product derivatization. Since coumarins are quite important in the pharmaceutical industry, the authors expect broad applications of the new findings. *Zhang, Z., Ju, T., Miao, M., Han, J-L., Zhang, Y-H., Zhu, X-Y., Ye, J-H., Yu, D-G., Zhi, Y-G. Org.Lett. 2016, DOI 10.1021/acs.orglett.6b03601.*
- Scientists from Evanston University (USA) and Yokohama University (Japan) made an important step forward to achieve high-performance lead-free perovskite solar cells. They developed an effective process involving a reducing vapor atmosphere during the preparation of Sn-based halide perovskite solar cells using the absorbers MASnI₃, CsSnI₃ and CsSnBr₃. This process results in a more than 20% reduction of Sn⁴⁺/Sn²⁺-ratios leading to a substantially suppressed carrier recombination, comparable to their lead-based

counterparts. New avenues of experimentation have been opened for realizing competitive and environmentally friendly alternatives to the prevalent Pb-based systems. *Song, T-B., Yokoyama, T., Stoumpos, C.C., Logsdon, J., Cao, D.H., Wasielewski M.R., Aramaki, S., Kanatzidis, M.G., J.Am.Chem.Soc., 2016, DOI 10.1021/jacs.6b10734.*

- Organic chemists from Dartmouth College, Hanover, USA and Nankai University, Tianjin, China, have shown that the isomerization rate of a novel visible light induced Azo-BF₂ switch can be effectively controlled using aggregation. The switch, with an extended π -system, self-aggregates into large assemblies in concentrated solutions as well as in the solid state through head-to-head π - π interactions between its phenanthridinyl groups. Interestingly, it was found that the Z→E isomerization rate displays a linear dependency on the degree of aggregation in solution. Higher concentrations lead to a larger size of the aggregates and a slower isomerization rate. It is argued that these properties can have an important relevance for the design of light-activated switchable drugs. *Qian, H., Wang, Y-Y., Guo, D-S., Aprahamian, I., J.Am.Chem.Soc., 2016, DOI 10.1021/jacs.6b10982.*
- David Leigh and six coworkers at the University of Manchester devised and produced the most tightly knotted physical structure ever known. They assembled four building blocks into three braided ligand strands. The relative positions of the three strands at each crossing point are positioned in a circular triple helicate by octahedral iron(II) ions, whereas structural constraints on the ligands determine the braiding connections. In a two-step assembly this leads to a molecular 819 knot containing eight nonalternating crossings in a 192-atom closed loop with a length of about 20 nm. The 819 knot is intrinsically chiral and both enantiomers have been separated. This property as well as the tightness of the knotting are useful in possible applications of knotting in molecular tools and materials. *Danon, J.J., Krüger, A., Leigh, D.A., Lemonnier, J-F., Stephens, A.J., Vitorica-Yrezabal, I.J., Woltering, S.L., Science 2016, DOI 10.1126/science.aal1619.*

Jan Engberts

New Stratingh Logos

The logos for the Stratingh Institute with the new faculty's name are now available at

http://myuniversity.rug.nl/infonet/medewerkers/fse/onderzoek/logos_research_institutes/

An explanation on the type of logo files is available at the above mentioned URL. Files in the zip file named DS.store can be ignored; these were added in the zipping process. As the Faculty bears only an English name, only English logos are available.

From the folders with logos one can successively choose for:

- the horizontal or the vertical logo
- colour: red, black or white
- file type: eps or png (png is comparable to jpg)

Open access and the University of Groningen: ACS Journals become Open Access

Open access is one of the University of Groningen's strategic focus areas. For the University of Groningen and the University Medical Center Groningen (UMCG) it is very important that research results, particularly if the research has been publicly funded, are freely available to the public. This is why the University of Groningen and the UMCG encourage open access publishing.

ACS is an important publisher in chemistry for the Netherlands. It has now been agreed that, effective 2017, open access will become an integral part of the contract between the Dutch research institutions and ACS. This means that ACS has granted the request of the Dutch universities to cooperate with the irreversible development toward open access. You can read more about Open Access at the University of Groningen by following this link:

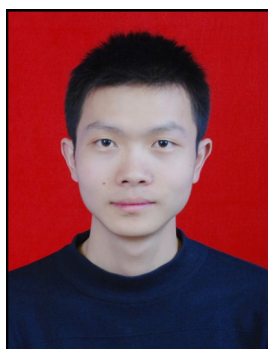
<http://www.rug.nl/library/open-access/>

New Appointments



Frederiek Reijneveld

PhD student as of 16/2/2017
Group Minnaard



Yong Ai

PostDoc as of 17/2/2017
Group Chiechi



Sander Wezenberg

Assistant professor as of
1/2/2017
Group Feringa

PhD Defences

Friday, March 3rd

@ **12:45 Duenpuen Unjaroen** will defend her PhD thesis. **Title:** "Mechanisms in Ruthenium(II) photochemistry and Iron(III) catalyzed oxidations—Photochemical, Electrochemical and Spectroscopic studies". **Promotor:** Prof. dr. W.R. Browne

Friday, March 10th

@ **12:45 Yun Liu** will defend his PhD thesis. **Title:** "DNA-based drug carriers and dynamic proteoids with tunable properties". **Promotores:** Prof. dr. A.K.H. Hirsch, Prof. dr. A.J. Minnaard

@ **16:15 Sureshbabu Guduguntla** will defend his PhD thesis. **Title:** "Exploring asymmetric catalytic transformations". **Promotores:** Prof. dr. B.L. Feringa

Werkbespreking: Thursday morning 8.30 hrs, room 5111.0080

March 16th— **Tao Yan** (PhD Barta) "Catalytic N-alkylation of unprotected amino acids with alcohols"

March 23rd—**Alwin Hartman** (PhD Hirsch) "Application of DCC in protein-protein interactions: targeting 14-3-3 proteins"

March 30th— **Paul Dockerty** (PhD Witte)"Synthesis and biological characterisation of enolcyclocarbamates"

If you have items for the next issue of this Newsletter, please send an e mail to the Stratingh Institute office: Stratingh@rug.nl