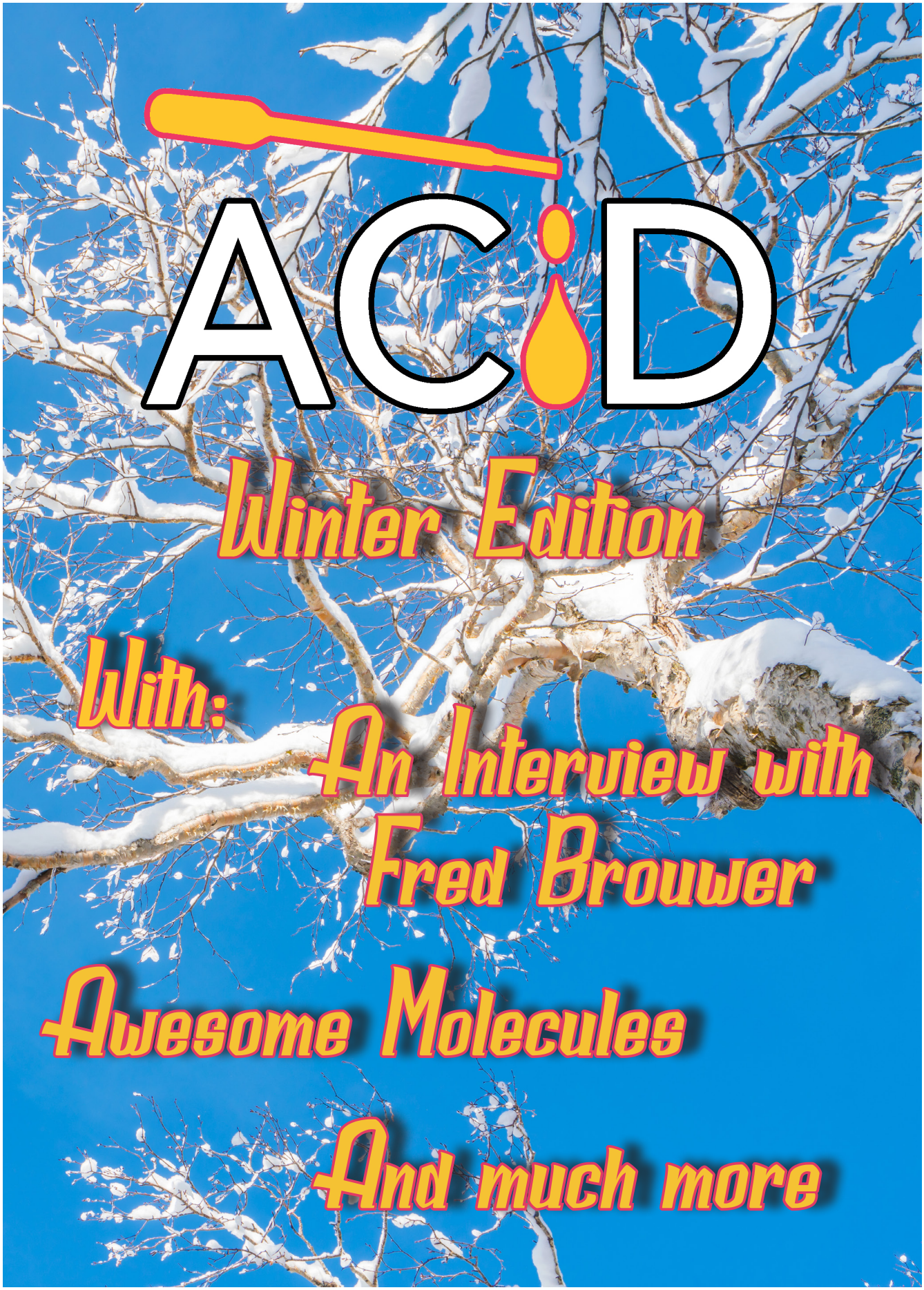
ACID
Winter Edition
With:
An Interview with
Fred Brouwer
Awesome Molecules
And much more

Colophon

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ACiD is the periodical of the Amsterdams Chemisch Dispuut, the study association of chemistry in Amsterdam. ACiD is home delivered to ACD's members and donators and distributed around the department of Chemistry.

Reactions and submissions are always welcome!
Articles can be send to the mail address mentioned above as a Word-document.

From the editor

Winter, the season of the Christmas holidays
and the beginning of a new year.
The season of all Frisians (including me) keeping their fingers
crossed for maybe the first 'elfstedentocht' since 1997.
The season of gathering together with family, having nice dinners
and bulging at the fireplace with some hot chocolate.
The season of surprising the ones you love with gifts
and getting happy of everything you receive yourself.
And of course the season with the only holiday
(apart from the summer break) for university students.
Therefore, we created an ACiD dedicated to
this season full of celebration, relaxation and fun.

In this edition you can find an interview with professor Fred Brouwer specialized in photonics and fluorescence, because what is winter without lights. Also, your favourite winter drinks were analysed so you know exactly which molecules you are consuming during the Holidays. And if you ever wondered what the 'Oliebollenbakker' thinks about Chemistry you are about to find out. This and much more can be found in this ACiD winter special.

Enjoy reading and try to stay warm,

Jelle Hofman

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Jan-Hein Hooijschuur PhD, PAC-bestuur 2010, ACD voorzitter '07-'08, penningmeester '06-'07

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Content

Vacature

Bladcommissie zoekt versterking

Bij het ACD maken wij zoveel mee met al onze activiteiten, borrels, excursies, en lezingen en wat is er nou mooier dan al deze dingen vast te leggen, zodat we hier nog jaren van kunnen nagenieten. Ook willen wij als chemici in spé natuurlijk een beetje op de hoogte blijven van alles wat met scheikunde te maken heeft. Daarom hebben wij jou nodig! Onze bladcommissie zoekt versterking voor het maken van dit prachtige blad. Schrijven is erg belangrijk voor ons blad, maar ook het afnemen van interviews of het doen van research is erg belangrijk. En natuurlijk de opmaak van ons blad met alle grafische aspecten die daarbij komen kijken. Lijken deze dingen jou nou erg leuk om te doen en wilde jij altijd al actief lid worden bij het ACD dan is dit jouw kans!

Stuur een mailtje met jouw motivitatie naar mailacd@gmail.com of spreek Jelle even aan en misschien maak jij binnenkort deel uit van onze prachtige commissie.

The Chair Speaks

Dear ACD'ers,

By the time you'll read this we have passed on to the year of 2017. As I am writing this though, we still live in 2016 and the exams of the second period are just to begin! But let's just pretend we live in the future. A start of a new year is best time to revise the past. 2016 was a year full of wonderful moments:

2016 was the year that 50 members of the ACD went to Budapest on our study trip; it was the year that our beautiful assocation almost became the champions at the Open Nederlandse Chemie Sportdagen (ONCS); it was the year of our 'ACD on beauty' symposium which was followed by a fabulous fashion show; it was the year that the ACD aged another 366 days and turned seventy-one; it was the year of the fastest enrolment for the BEC we've ever had, (it only took eleven seconds to fill all fifty available spots); to cut it short 2016 was a year full of memorable activities, lectures and drinks. But besides all that took place in the last year, it was also a year where you spend hours and hours studying; developing yourself and acquiring new knowledge. It is no more than appropriate that after such a great but exhausting year you went on a well-deserved two week vacation.

I hope that you stuffed yourself with oliebollen and appelflappen and enjoyed the great variety of exploding metal complexes up in the night sky during New Year's eve. Because, the upcoming year will house a great variety of activities.

For the sjaars the beginning of a new year means that they have slowly become used to studying. The second years will have made their entry in the academic world during their first research project. And most of the third years are busy stalking professors in the hope of getting their dream-subject for their bachelor project.

A new year also means that the majority of you will have made new year's resolutions and that a big part of you likely already have broken most of them. The one's that will have frequently passed your minds were: 'I will drink less'; 'I will travel the world' or 'I will spend more time studying'. At the ACD we can support you with at least one of these good intentions. The upcoming year will offer a wide range of lectures, activities and drinks.

In the coming months ACD will go international and travel to many places, starting at the Brainwave with the 'Around the World' theme for the first three friday drinks, where we will visit various continents and learn about their cultures and drinks. In February we will visit the beautiful city of Utrecht where this year's PAC-symposium themed 'Spectrum' will be hosted. Shortly after we will cross the A10 again, and discover a distant province during the Allejaarsweekend (AJW). (Don't forget to bring your passport!). At last it will be time for the biggest and most cultural event of the year: The BEC. This year, Lissabon is the destination, which is a good reason to get your Portuguese in shape again or at least the essentials: for example how to order a beer. So a lot to look forward to!

For me the time has come to end my contribution to this edition of ACiD. Even I have to learn for exams, I wish you good luck to yours and hopefully I will be able to wish you merry christmas during the Christmas-Gala on friday!

Greetings,
Your Chairman, Yol Tio

Breaking News

Hypervalent Nitrogen Under High Pressure

Researchers from Poland have predicted that nitrogen hexafluoride anions can be made at a pressure of 40 GPa.[1] This would be the first hexavalent nitrogen compound ever made.

The researchers of the Institute of Physical Chemistry of the Polish Academy of Sciences, base their research on Density Functional Theory (DFT) calculations, which show that a salt with the formula $(NF_4^+)_2(NF_6^-)(F^-)$ will exist at a pressure of 40 GPa (=400 kbar).

The NF_6^- anion is hypervalent (9 electrons in its valence shell) and is therefore against the golden rule of chemistry — the octet rule. Despite the diversity of nitrogen chemistry (with oxidation states ranging from +5 to -3), and numerous efforts, compounds containing hypervalent nitrogen were not successfully made yet.

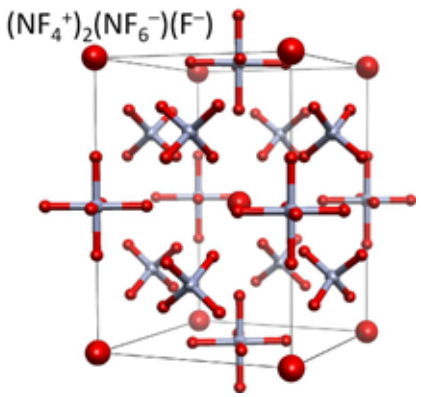

Figure 1: Crystal stacking of the $(NF_4^+)_2(NF_6^-)(F^-)$ salt.[1]

Although NF_5 isn't in conflict with the octet rule, this species also exist only in theory. Because of the steric hindrance of the fluorine atoms, this compound almost immediately decomposes into NF_3 and F_2. NF_4^+ on the other hand, was already synthesized in 1966.[2]

The Polish researchers have theoretical evidence that the salt containing the NF_6^- anion can be synthesized by spontaneous oxidation of NF_3 by F_2 under strong compression, because the reaction enthalpy becomes negative at high pressure. Thereby is F_2 a much better oxidizing agent at high pressure.

The hypervalent nitrogen salts form different crystal structures at different pressure. At a pressure of 40 GPa a stack of alternating layers of NF_4^+, NF_6^- and F^- ions is the most thermodynamically stable structure (Figure 1). But at pressures higher than 151 GPa, no loose F^- ions are present and the crystal structure only exists of NF_4^+ and NF_6^- species. The researchers conclude that a stack of just NF_5 molecules was found to be impossible at every pressure hitherto.

For the experts: the researchers have used the Hybrid HSE06 functional for their DFT-calculations, because this functional reproduces much better the gas-phase thermodynamic stability of nitrogen fluorides compared to the PBE functional.

Antidote Found to CO-Intoxication

Science Translational Medicine published recently an article of researchers from the University of Pittsburgh, who have found the first antidote to carbon monoxide intoxication.[3] This antidote, a mutated protein, expels the gas 1200 times faster from hemoglobin than fresh air.

Carbon monoxide is known to be lethal, because it has a greater binding affinity to hemoglobin (Hb) than oxygen. Victims of CO-intoxication die from an acute lack of oxygen in various tissues. Exposure to pure O_2, sometimes under increased pressure, was until now the only remedy and came often too late.

However, the protein antidote found has a 500 times greater affinity to CO than Hb does. The protein is a derivative of neuroglobin (Ngb), which is as Hb a hemoprotein with an iron-porphyrin core. The difference is that the iron atom in Ngb is clamped between two histidine residues, whereas in Hb only one histidine residue has an interaction with the metal.

Because the iron atom in Ngb is clamped between the two histidine residues, natural Ngb does not bind CO. The natural compound has an protective function in the brains, but the exact manner in which the protein does this, is still unknown.

In order to use Ngb as an antidote to CO-intoxication, some mutations of the protein are needed to create a free iron-ligand position. So the researchers of the group of Mark Gladwin investigated this by replacing one of the two histidine residues by another amino acid, that does not bind to the iron core. The mutated Ngb-variants seemed to bind both O_2 as CO extremely efficient.

Hitherto, the best mutated Ngb-protein appeared to be Ngb-H64Q-CCC, wherein one of the histidine residues is replaced by glutamine. Also, three cysteine residues on the protein surface were replaced by less reactive amino acids to avoid cross-linking and increase protein solubility. With Ngb-H64Q-CCC the researchers managed to keep seven out of eight mice alive after receiving a lethal dose of CO.

It turns out that the Ngb-mutant actually expels CO from Hb, so that Hb can return to normal transport of O_2. Thereafter the Ngb-derivative can be found in the urine with CO and all.

With the cold winter days coming and the fireplaces frequently used again, the potential drug comes just at the right time. However it is unclear how long it will take before the protein drug will be on the market.

Celine Nieuwland

References:

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2. Christe, K. O., Guertin, J. P.; Pavlath, A. E. *Inorg. Nucl. Chem. Lett.* **1966**, *2*, 83—86.
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Interview Fred Brouwer

It's still all a bit Science Fiction

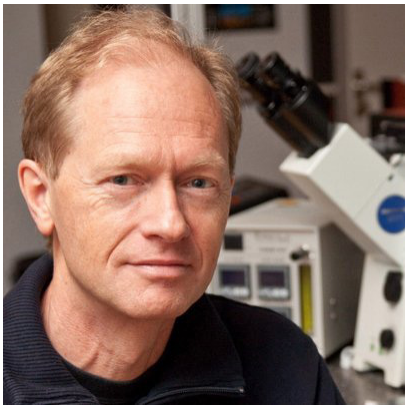
The Golden Age might return once again, Ben Feringa (Professor at the University of Groningen) proved to us this year. The Nobel prize of chemistry was handed to Jean-Pierre Sauvage, Sir J. Fraser Stoddart and Bernard (Ben) L. Feringa "*for the design and synthesis of molecular machines*". Molecular Machines, that, according to the Class of Chemistry of the Royal Swedish Academy of Science are defined as "*an assembly of a distinct number of molecular components that are designed to perform machinelike movements (output) as a result of an appropriate external stimulation (input)*". ACiD wasn't satisfied with but a royal publication by one of the most well-regarded scientific sources on earth, so we decided to go to no one other than professor A. M. (Fred) Brouwer of the Molecular Photonics research group at the UvA to find out what it was really all about.

What is your research about?

We are working on different projects. We have studied rotaxanes for several years, and there are still a few articles that need finishing. We are not actively working on this research anymore due to a lack of funds. We are also working with Joost Reek on solar fuels. Another important topic is fluorescence, aimed at the use of molecules as fluorescing probes. It is possible and useful to literally detect one molecule at a time because this helps us see how the average of billions of molecules in the bulk emerges from the behavior of all the different individual molecules. Moreover, it gives the possibility to follow molecules in time and to see things that are otherwise hidden. We want to apply this in organic chemistry to learn more about organocatalysis and catalysed reactions. This is a very difficult project but we are getting there.

We are working together with physicist Daniel Bonn on material applications of fluorescence. We made molecules that are able to measure the contact between two different objects using fluorescence. Think of any object lying on a surface, the object's surface is never actually flat. It exists out of small dents where contact takes place. If you press the object down on a table, the contact surface increases because these dents are deformed. What we did is come up with a method to make these surfaces visible by using fluorescence. You can use a microscope to look up from the bottom at the contact and to make an image of the spots where the object is in contact with the surface. For physicists, it was a real eye opener that we could do this, and also chemists thought of it as very surprising.

How do you determine where the molecules contact the surface?

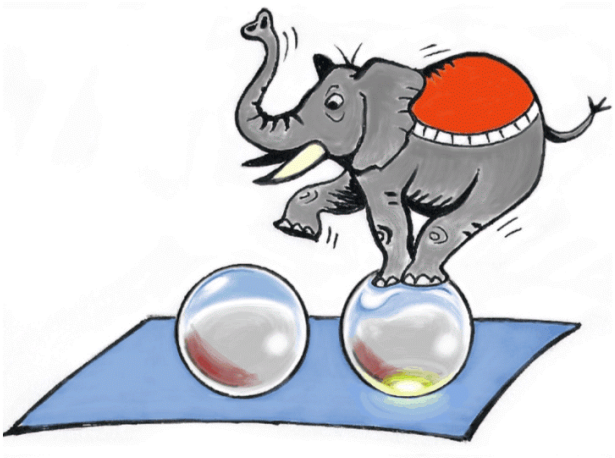


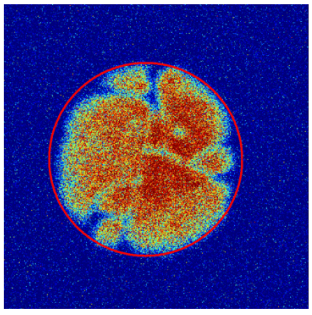
You can do this simply by watching the fluorescence with a microscope. The molecules are attached to a flat surface and brought into an electronically excited state by absorption of light. When they are free to move, they can easily release the excitation energy in the form of heat. However, if they aren't able to move around because they are in a mechanical contact they stay put in this excited state and cannot do anything but emit light. So, fluorescence is detected in the contact points. This project is very promising and we currently have a new PhD working on it.

One of the new directions consists of optimising the image resolution to overcome the diffraction limit. Another method of observing the surface of an object is to look at the fluorescence of a liquid between a flat glass slide and the object. According to the well-known Lambert-Beer law the absorption is proportional to the path length, and the fluorescence increases when more light is absorbed. Where the object touches the surface, the distance between the surface of the object and the sheet of glass it is on nears zero. In that way, you'll get an absorbance of zero, so there can be no fluorescence. In other places the fluorescence intensity will be proportional to the distance between the surfaces.

What is the connection between your Rotaxane research and Fraser Stoddart's and how did you get there?

We started in the rotaxane research because Wybren Jan Buma was in contact with David Leigh, who synthesized mechanically interlocked molecules. This led to a successful series of European networks. Stoddart had been working on them for a while and I had already seen him a few years before on a congress where I thought he showed very eccentric but beautiful things. I never thought that I would be doing something similar.



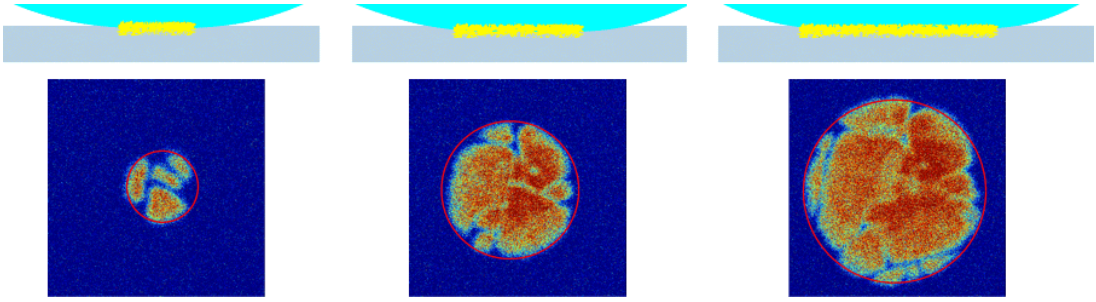


Why is this research important?

Mainly because people find it incredibly cool. This is very fundamental and we should not ask too much for applications at this time. Feringa and Stoddart have shown several applications for their machines but they are often a bit far-fetched and not really useful yet. Of course it is possible to let something turn around by molecular machines. People have, for example, made a surface with molecular machines on it and put a drop of liquid on it that then started to move around under control by light. But that's as far as the application goes. I have no idea what you can do with it on the long term and if you look deep into the hearts of the Nobel prize winners they probably also don't know. Don't take the stories too seriously about little robots that fix our cells, inspired by a science fiction movie from the sixties!

A big problem is finding a real essential application for these machines on the scale of the molecular size. Molecular machines are essential in biology. All cell processes that cannot go spontaneously by means of diffusion, use molecular machines. But the length scale on which this works is larger and the control of the processes is more subtle than we are able to make in the lab. There have been attempts to make synthetic molecular machines more complex or let them do some tricks, like picking up a compound and dropping it again after moving it. People claim to have done this but they often use acids or bases [to either bind or unbind], which isn't particularly convenient for a reversible process that one would expect from a machine. The picking up and dropping off also does not depend on position and that is what we really want. In a way, molecular machines are also molecular switches. Switches have different states, and different physical or chemical properties depending on the state they are in. People often associate the molecular machine with some type of work done through force. A real application of force on the nanoscale has yet to be found, but that is something for the next generation.

What might be the most real application is that when you have a pore, which is an ion transport channel, you can use such a movement to mechanically open or close it. You can imagine that it is good to do this with controlled release. So, there's this channel, closed with a rotaxane that has his rings on the openings of the channel. The rings can then move away from the channel on command for controlled molecular release. What plays the main role here is the switching of state and the pure mechanical force is still not the essential factor.



We already talked a bit about getting funds but how did this change the past years?

Getting funds for research has become more difficult these years because more money tends to go to bigger programs leaving little for smaller project applications. If you want to do a project in the open competition of Chemical Science, the chance of success has gone down to ten percent and you can only try it once a year. Ben Feringa was already very famous many years ago and when there was a project NanoNed, he got a chance to do something on molecular machines. Because we had nice results with the rotaxanes at that time we profited from this too. You can sometimes get money by being at the right place at the right time, but to come up with a completely new research idea and get money for it on your own is really difficult.

The Advanced Research Center on Nanolithography (ARCNL) is a similar case. The hard work was done by a group of people who convinced ASML to co-fund this. I was lucky to become part of it, but I did not have to write a heavy research proposal for it. Nanolithography is the core business of ASML and they are interested in seeing the science behind it being developed further. Therefore, they pay half of the bills. Although I found myself in this research by coincidence, I feel a great passion for the subject. It is very defiant, new and fun. Photochemistry has been done for years with visible light and “normal” UV (> 190 nm).

Extreme UV, in our case around 13 nm, is unexplored territory. There is not a lot known about what actually happens when light at this energy is absorbed by materials. If you want to make a better photoresist, you have to get the chemistry behind it and that chemistry is still unknown. There are materials that, when irradiated with extreme UV light at 13 nm, become soluble or insoluble in certain solvents. But why it is like that, or how to make it more efficient is still a question. In contrast to molecular machinery this is research with a direct application since the photoresists are essential to make computer chips.

How did the research change these past few years?

The research on rotaxanes and molecular machines is very fundamental and for me it is mainly about understanding interactions, especially the non-covalent ones, how they work. How can we influence the movements in such molecular machines? It is a fundamental chemical question and that is the most interesting thing about it and for me the most motivating. Applications are still barely real and the switching in characteristics of different surfaces can be done in different ways. This does not have to be per se with a molecular machine. To get a measurable effect you can make multiple molecular machines do the same trick all at once but the real fun thing is to let a molecule fulfil a function and do something unique on the nanoscale.

Why did you choose chemistry and when did you get interested in light?

The reason I chose chemistry is simply because I, like many other chemistry students, had a very enthusiastic chemistry teacher. Chemistry was fun and molecules where very intriguing, and I still think that way. Another important part is that I was good at it and that gives a positive feedback. I thought chemistry was fascinating. I chose the direction of chemistry and light, because when I did research as a student on one of the organic reactions with light I immediately loved it. Especially the UV light ring closure reactions. Since then I prefer light with about everything. The combination light and chemistry speaks to me since light helps to trigger reactions whenever you want to. If you turn off the light the reaction finishes within seconds. The fun thing is that you can use chemistry and light everywhere. Another side of this subject is fluorescence. The timescale is very impressive, phosphorescence can take up to hours, whilst simple fluorescence happens within nanoseconds.

Why did you become professor and how?

If you work at the university this happens almost on its own. It has benefits over the UD (Universitair Docent) or UHD (Universitair Hoofddocent) positions because you get a bit more reputation being a professor and this makes it somewhat easier to raise money for research. For me it was just a logical career step, but I enjoy it and I hope to go on being a professor for a couple more years.

What did you do for your PhD and do you still use that knowledge?

For my PhD I did research on photochemical reactions where I isolated products and identified them mainly with 1H-NMR. I tried to analyse the conformations of the molecules using all spectroscopic methods that I could think of. Photochemical reactions are still important and I still use the knowledge especially when I'm teaching. But besides still using this knowledge I do not do anything with the subject anymore. Photochemical reactions themselves are still there, for example in the molecules that we talked about before: when they do not fluoresce they undergo a photochemical isomerization reaction. I also wrote a few papers about azobenzenes which I first met in my second year organic chemistry lab course. I still remember doing that experiment. Cis and Trans Azobenzene are easy to separate with TLC. They have different characteristics because one of them has a small dipole moment and the other one does not. So we could take the absorption spectra of the pure isomers.

Are there still research questions that you would like to see answered?

Yes there are, I would like to know more about how the world of extreme UV works especially for the materials that are being used as photoresist. I would also like to find new applications for fluorescent molecules, see if we can make up something useful in physics and materials science. I would also like to use individual molecules to use their characteristics to learn more about chemical reactions. But if I read a chemical journal it's hard to finish it because there are so many interesting subjects.

Is there something you would like to tell our young chemists?

Have fun! What I see is that many students get very enthusiastic with the idea to do research themselves, which is great, but at some point they think that that is the only thing that counts in the world. You have to be aware that the future is more than just chemical research. Doing research you learn a way of thinking that can mean a lot in society. The chemical way of thinking can be very useful, because we do not think as formalised and precise as physicists do. Chemistry has a more qualitative way of thinking, that deals with some uncertainty naturally, which can be useful in for example politics or negotiations. That is how chemist often end up in certain positions you may not have expected. It makes the chemical way of thinking more than just the knowledge of facts. That said, while you are still studying just think of the subjects you like, the rest will come later. Think for yourself and try not to believe everything you are told. I learned not to instantly believe anything that's printed. There is room for interpretation. Also, publications are just a selection of the whole story because a researcher cannot tell all his doubts if he or she wants others to believe in his research. The facts are of course facts, but what's written often contains a lot of interpretation.

Awesome Molecules

Winter drinks special…

Some people like a glass of mulled wine near their fireplace, others a cup hot chocolate with their favorite rum and there are people who prefer a bottle of special beer. No matter which person you are, we've got you covered.

ACiD

THE CHEMISTRY OF RUM

RAW MATERIALS
Molasses, sugar cane juice, or cane syrup

FERMENTATION
Usually at 30–33°C and pH 5.5–5.8 for 1–3 days

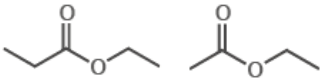
DISTILLATION
Using either continuous or pot-still distillation

AGEING
Often carried out in charred oak barrels

MIXING
Different distillates blended for consistency

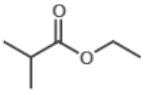
Distilled rum originates from sugar cane plantations in the Caribbean. It was a useful way of disposing of molasses, a by-product of refining sugar cane. There is not a single standard for rum, with different countries having different regulations for the spirit, but it can be loosely split into dark, gold, light, and spiced rums.

ESTERS



ETHYL PROPANOATE & ETHYL ACETATE
caramel-like, fruity aroma; pear drops-like aroma

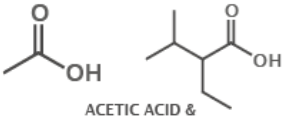
The levels of short-chain carboxylic acids are higher in rum than in other spirits like whiskey, which may explain its higher ester content when compared to other alcohols.



ETHYL ISOBUTYRATE
butterscotch-like aroma

Esters are important contributors to the aroma of rum, and are responsible for fruity notes. Ethyl acetate is typically the most abundant, though a large number of other esters are also present.

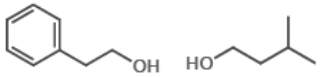
ACIDS & ALCOHOLS



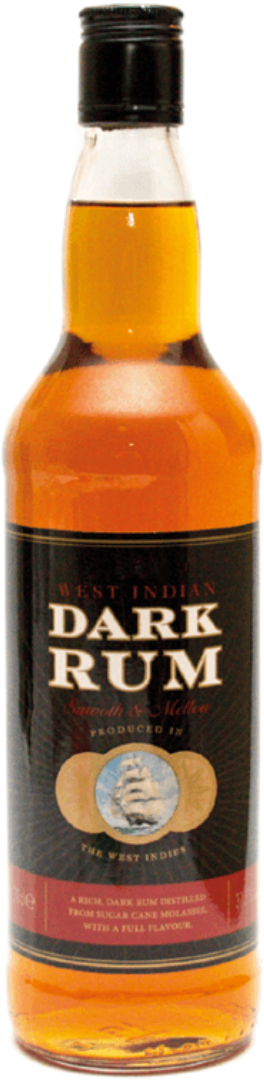
ACETIC ACID & 2-ETHYL-3-METHYL BUTYRIC ACID

Acids in rum are important for production of esters, but also contribute to flavour. Acetic acid is the main volatile acid in rum, whereas 2-ethyl-3-methyl butyric acid is characteristic of rums.

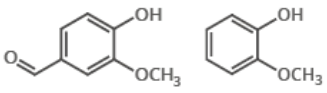
Strong smelling higher alcohols are also important odorants.



PHENETHYL ALCOHOL & ISOAMYL ALCOHOL
floral aroma; malty aroma

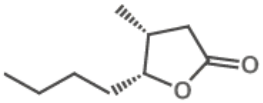


OTHER COMPOUNDS



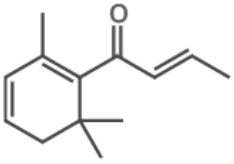
VANILLIN & GUAIACOL
sweet, vanilla-like aroma; smoky aroma

A number of compounds originate from the barrels that the rum is aged in. These include phenolic compounds, and also oak lactones. These are found in lower quantities than in whiskey, as rum is not aged in barrels for as long.



(Z)-OAK LACTONE
woody aroma

DARK VS. WHITE RUM



β-DAMASCENONE
apple-like, floral aroma

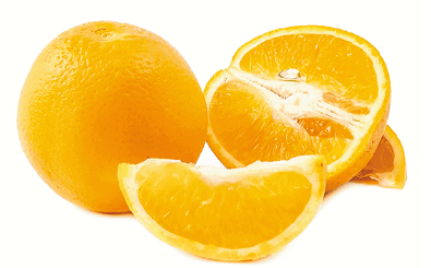
To remove any colouration, white rums are generally filtered through charcoal. As well as removing any colour-causing compounds, this also removes some aroma and flavour molecules.

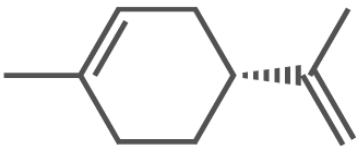
β-damascenone is a potent odorant in dark rum due to its low odour threshold. However, it is much less apparent in white rum, due to loss during filtration.

THE CHEMISTRY C

A range of ingredients go into making mulled wine - and chemicals in each contr

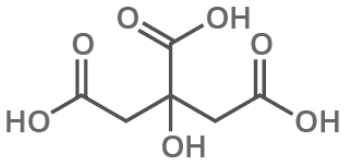
ORANGE - LIMONENE





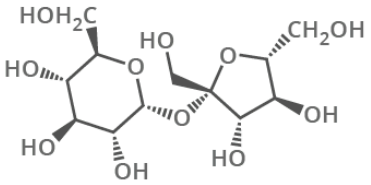
D-limonene is a key contributor to the aroma of oranges.

LEMON - CITRIC ACID



Responsible for the sour taste of lemons and their acidity.

SUGAR - SUCROSE



The sweet compound commonly known as table sugar.

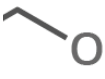
WINE - ETH

Produced by ferm
sugars by y

OF MULLED WINE

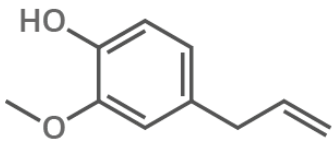
contribute to the final product. This graphic looks at a selection of key chemicals.

- ETHANOL



y fermentation of
s by yeasts.

CLOVES - EUGENOL

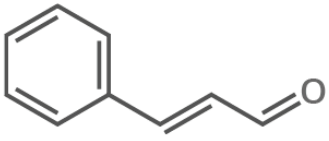


Primary compound in cloves, imparting an spicy, aromatic flavour.

NUTMEG - SABINENE

Major constituent of nutmeg essential oil & contributor to flavour.

CINNAMON - CINNAMALDEHYDE



The main contributing compound to cinnamon's aroma & flavour.

THE CHEMISTRY OF BEER

MILLING
Dried barley added and ground

MASHING
Water added to produce wort

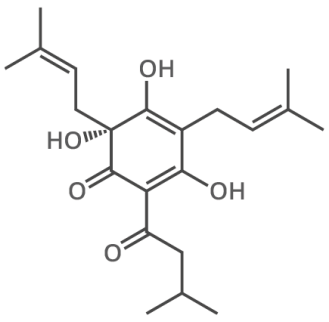
BREWING
Hops added, mixture boiled

COOLING
Mixture cooled to around 10-20˚C

FERMENTING
Yeast added, alcohol produced

MATURING
Left to mature then filtered & bottled

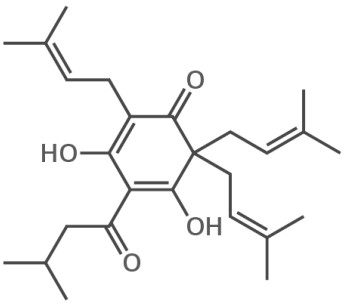
ALPHA ACIDS



HUMULONE

Found in the hops used for brewing; they degrade and form iso-alpha acids, which contribute bitterness. The five main alpha acids are humulone, cohumulone, adhumulone, posthumulone & prehumulone. Humulone is the primary alpha acid in the majority of hops.

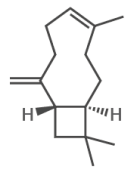
BETA ACIDS



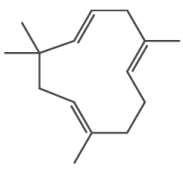
LUPULONE

Beta acids also originate from hops, and add bitterness during fermentation of the beer as they are slowly oxidised. They are considered to have a harsher bitterness than alpha acids. The ratio of alpha acids to beta acids varies from hop to hop, with different ratios preferred by different brewers.

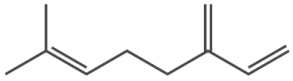
ESSENTIAL OILS



CARYOPHYLLENE



HUMULENE

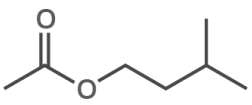


MYRCENE

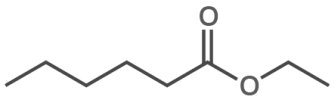
These contribute the majority of hop flavour and aroma. As they are volatile, they were traditionally obtained by adding hops late in the brewing stage, although modern techniques vary. Though there are 3 key oils, there are 22 known to give aroma and flavour, and over 250 in hops in total.

OVER 800 DIFFERENT COMPOUNDS

ESTERS



ISOAMYL ACETATE (BANANA AROMA)



ETHYL HEXANOATE (APPLE AROMA)

Esters are formed via the reaction of alcohol in beer with organic acids and a molecule called acetyl coenzyme from the hops. They contribute fruity flavours to beers. Different styles of beer require different levels of esters; their production is controlled in ways including the yeast used and fermentation temperature.

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ABC

Lieve scheikundigen,

Terwijl ik dit schrijf zit ik in een wit besneeuwd Athene en is het over een dag 2017, de frisse start van het nieuwe jaar komt eraan en dat is te merken. Alle commissies zijn nu lekker op gang gekomen en er staan een heleboel leuke activiteiten en borrels voor jullie klaar!

In januari gaan we de wereld rond en beginnen we die frisse start wel erg letterlijk met een borrel in Antarctica. Eigenlijk gewoon in de Brainwave, maar onze versierskills (decoreren en sjans, deze abc is van alle markten thuis) en de winterse drankjes zullen je doen vergeten dat je in de brainwave staat. De weken daarna zullen we wat warmere continenten bezoeken zoals Azië, Zuid-Amerika en daarna weer even naar huis in Europa.

Omdat de zaterdagochtenden vaak wat minder fris voelen heeft de sportcommissie gezorgd dat je je op een hele leuke manier wat levendiger kan voelen door te gaan trampolinespringen op 11 januari.

Omdat het blad waarschijnlijk wat later dan dat op jullie deurmat valt zal ik nog wat activiteiten spoileren: op 17 januari nemen we het voor de tweede keer op tegen de via en NSA tijdens de LAN-party, en op 9 februari gaan we bierproeven met NSA in de Brainwave. Het AJW staat ook gepland dus blok ook 10 t/m 12 maart alvast vrij in je agenda, want zoals voorgaande jaren gaat shit Bart.

Maar er is nog veel meer leuk nieuws. Het pofsysteem is vernieuwd! Je kunt nu gemakkelijk je aankoopgeschiedenis zien en wanneer je saldo voor het laatst is bijgewerkt. Je hoeft alleen maar rechtsboven te klikken en in te loggen met je code. Ook de puntentelling van de ACD'er van het Jaar verkiezing is een beetje aangepast, die komt binnenkort op onze prachtige website te staan en hangt al in het hok.

De commissies hebben er overduidelijk zin in, ik ook, en ik hoop jullie allemaal te zien bij de borrels!

x Anna Borrels

Interview Raoul Eljon

Raoul is samen met zijn tweelingzus de eigenaar van café Maslow waar wij met het ACD geregeld een activiteit organiseren. Richard Broersen is hier namens de bladcommissie langsgegaan om wat meer te weten te komen over de vriendelijke eigenaar, die we uiteraard ook als barman vaak genoeg zijn tegengekomen.

Heb je gestudeerd?

Ik heb rechten gedaan, aan de UvA in Amsterdam. Ik vond het niet per sé zwaar, maar ik wist eerst niet wat ik wilde doen. Maar uiteindelijk heb ik gekozen voor media en informatierecht. En ik werkte daarnaast voor, SALTO, de lokale omroep van Amsterdam, waar ook AT5 onder valt. Daar was ik verantwoordelijk voor de radioprogrammamering.

Doe je nu nog iets met je studie?

Betrekkelijk weinig eigenlijk. Maar met vergunningen en dergelijke heb ik er toch wat aan gehad, vooral met regelgeving. Af en toe geef ik nog wel eens wat adviezen, maar dat is maar heel weinig. Misschien dat ik er in de toekomst nog wat meer mee ga doen.

Waarom ben je begonnen met Maslow?

Ik had hiervoor een prima baan bij als jurist bij net Nederlands Uitgeversverbond (NUV), maar ik was toe aan iets nieuws. De droombaan kwam niet echt voorbij en toen heb ik samen met mijn zus besloten om een pop-up winkeltje te beginnen op de Zuidas. Toen kwam deze ruimte op ons pad en zijn we begonnen met de opzet van Maslow.

Iedereen vond het eerst een wild plan, maar we hebben het toch doorgezet omdat we de potentie zagen. We hebben het pand van binnen helemaal zelf op moeten bouwen en met beperkte middelen hebben we het gemaakt tot de huiskamer van het Science Park. We zijn twee jaar geleden geopend op 18 juni, toen het WK begon.

Hoe ziet je gemiddelde dag eruit?

Mijn zus en ik verdelen de krachten en we houden rekening met onze thuissituatie. We hebben dan een ochtend/middagshift of een avondshift. ’s Ochtends begin ik dan om 9 uur met werken en ’s avonds sluiten we vaak laat meestal tussen 00.00 en 01.00 uur, net hoe druk en gezellig het is.

Wat vind je zelf het lekkerste gerecht?

We proberen natuurlijk variatie aan te brengen in ons menu, door bijvoorbeeld een weekschotel aan te bieden. Maar wat ik echt het lekkerste vind zijn de falafelballen, deze maken we zoals vrijwel alles echt helemaal zelf. Hier krijgen we veel positieve reacties op terug. Voor het personeel koken we altijd een gezonde hap.

Wat vind je het leukste aan een studentencafé?

Ik vind de gezelligheid en de omgang met jonge mensen altijd heel leuk. Een nadeel is wel dat ik 's avonds soms lang moet opruimen en ik geregeld pas om tegen 4 uur naar huis ga. De volgende dag zijn dan mijn kinderen alweer vroeg wakker, dus het slapen schiet er soms bij in. Maar echt het allerleukste vind ik het achter de bar staan als het lekker druk is. En dit werk houdt me jong.

Waarom heb je gekozen voor de naam Maslow?

We zochten een naam die kort en pakkend is en de hele lading dekt. We wilden ook een link leggen met food en science en toen is deze naam er eigenlijk uitgekomen. Het is ook een bekende naam, de theorie van de behoeftepiramide wordt onder andere veel in de marketing gebruikt en is dus voor veel studenten herkenbaar.

Wat is het allerbelangrijkste aan een café?

Het is een totaalplaatje, de beleving, maar ook de lekkere producten zijn heel belangrijk. Uiteindelijk moet je er een goed gevoel aan over houden.

Wat zou je nog willen verbeteren aan Maslow?

Altijd proberen te blijven verassen en nieuwe dingen bedenken. Vorig jaar hadden we een keer een hottub, gewoon om te laten zien dat je ook lol moet maken. Laatst hebben we een jazzsessie gehad en een halloweenfeestje.

Maslow was ook een keer in een tv-programma, hoe kwam dat?

Een van de producenten van Dokter Deen woonde in de buurt, dus zo is hij bij ons terecht gekomen. Het heeft wel wat extra publiciteit opgeleverd, wat natuurlijk heel leuk is.

Wat doe je nog buiten het werken om?

Ik reis heel graag met het gezin en ik hou van sporten. Maar natuurlijk wil ik er ook zijn voor mijn kinderen, want die vind ik heel belangrijk, ik wil graag een leuke vader voor ze zijn.

Wat hoop je in de toekomst nog te bereiken?

Ik hoop Maslow nog verder te perfectioneren en heel misschien ooit een keer een uitbreiding, maar dat is echt iets voor de toekomst. Wat ik ook heel belangrijk vind zijn mijn kinderen, maar ook bijvoorbeeld dingen doen met mijn vrienden. Die komen hier vaak over de vloer even een drankje doen.

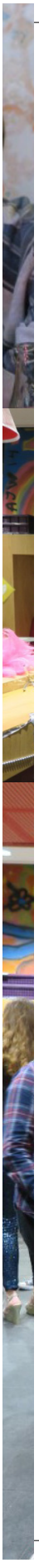
Wat vind je van het ondernemerschap?

Bazen boven me vind ik niet heel fijn, maar juist zelf de touwtjes in handen hebben maakt het ook heel leuk. Een nadeel aan zelf ondernemen is dat je nooit de deur dicht doet, soms moet ik er gewoon zijn. Ik merk wel aan studenten dat ze deze tijd zelf ook veel meer ondernemend zijn, vroeger was het tamelijk vanzelfsprekend dat je in loondienst ging, maar die zekerheid van een vaste baan is toch een beetje weg.

Wat vind je van het ACD?

Het is een gezellige club mensen die netjes en beschaafd zijn, al kunnen grenzen soms vervagen als er flink wordt gedronken. Vooral bij scheikunde valt het op dat er steeds meer meisjes dan ik had verwacht de studie volgen.

Jullie zijn als scheikundestudenten altijd welkom om bij mij te komen voor eten of drinken! Wij zijn altijd in voor nieuwe ideeën of feestjes!



Vanuit de Opleiding

Deze keer in Vanuit de Opleiding een korte blog van de opleidingscommissie

Opleidingscommissie? Wat is dat? Een commissie, daarvan weet je natuurlijk wel wat het is. De opleidingscommissie is niet opgericht door het ACD, maar door de universiteit zelf. Binnen een opleiding zijn de docenten verantwoordelijk voor de inhoud van de vakken en de lesstof en de opleidingsdirecteur regelt met een aantal mensen veel voor de opleiding. Om te zorgen dat het altijd goed blijft gaan met de opleiding en dat scheikunde nog beter wordt, is er de opleidingscommissie, afgekort ook wel de OC.

Wanneer je dus een evaluatieformulier invult, bespreekt de OC die in zijn vergadering en zorgen we voor een reactie of als het erg negatief is zelfs een gesprek met de docenten samen met de opleidingsdirecteur. Verder bespreken we het Onderwijs- en ExamenReglement (OER) waar in staat welke rechten studenten hebben en wat voor vakken er allemaal zijn, formele documenten waar je eigenlijk niet heel snel mee te maken krijgt.

Wie zitten er dan in die OC? Vier studentleden en vier docentleden. De studenten zijn Danny Kroon, Celine Nieuwland en Richard Broersen, die je vast wel kent. Je kan ons altijd aanschieten voor vragen. Verder kan je ook altijd een mailtje sturen naar ocs-science@uva.nl.

Maar waar kun je ons vragen over stellen? Eigenlijk alles wat te maken heeft met het onderwijs en de problemen waar je tegenaan loopt met vakken, roostering of andere zaken. Wij kunnen je altijd doorverwijzen naar de juiste personen.

Wij zijn daarnaast op dit moment op zoek naar een nieuwe bachelorstudent die plaats wil nemen in de OC. Lijkt dit je wat, stuur dan een mail naar Sape Kinderman (S.S.Kinderman@uva.nl) en Matthias Bickelhaupt (f.m.bickelhaupt@vu.nl).

Richard Broersen

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Scheikunde vs Marktkoopmannen

DAPPERMARKT, AMSTERDAM Langzamerhand kent de hele UvA ons wel. ACiD heeft namelijk al flink wat universitaire studenten geïnterviewd: pedagogiek, geschiedenis en rechten om maar een paar te noemen. "Van die Breaking Bad gasten," zeggen ze dan, "ze maken explosies en drugs", is wat ze zeggen over ons. Maar niet meer! Lars Overwater en Jonah Norbury zijn op stap geweest om de mening van mensen buiten de universiteit te vragen.

Tijdens onze zoektocht langs de Dappermarkt komen we een aantal verschillende mensen tegen, waaronder Dmitri (bakker), Jerry (oliebollenbakker), Adir (schoenverkoper), Kees (notenboer) en Daniel (poelier). Al deze marktkoopmannen hebben we onderworpen aan een rits van vragen over scheikundigen. Dit zijn een paar van hun antwoorden:

Wat is scheikunde?

Dmitri: "Leer van reacties. Chemisch denken."
Jerry: "Wetenschap. Dat klinkt erg breed, maar scheikunde is ook erg breed."
Kees: "Proefjes doen. CO_2 wat vrijkomt enzo bij reacties."
Adir: "Weet ik niet." - en hij begint te lachen.

Wat doet een scheikundige?

Jerry: "Testjes. Vast wel ook andere dingen, want het is niet alleen op een lab staan."
Daniel: "Een scheikundige doet onderzoek. En probeert de wereld een betere plek te maken, met medicijnen enzo." - Daniel hakt op dit moment twee hele kippen in stukjes.
Adir: "Geen idee." - en hij gaat verder met lachen.

Wat voor mensen studeren scheikunde?

Kees: "Slimme mensen. Minder sociaal wordt gedacht, maar je kan ze niet allemaal over één kam scheren. Het blijft toch een groep vol individuen."
Jerry: "Mensen die graag veel willen weten. Mensen die het interessant vinden om alles uit te zoeken."
Dmitri: "Jongens met een groene jas, zwarte handschoenen en een spijkerbroek [Jonah] en jongens met een leren jas en een skibrilmuts [Lars]."

Wat wil jij wat scheikundestudenten hebben?

Dmitri: “Geld voor brood.”
Daniel: “De wil om te leren. Door te leren, ook. Ze gaan de grens over om te kijken hoe het zit. Net als die natuurkundige van vorige maand [Erik Verlinde, UvA-Hoogleraar Natuurkunde]. Progressief denken en niet bang zijn om stappen te maken.”
Kees: “Mooie oplossingen voor de wereld van nu.”

Waar overschatten scheikunde studenten zich in?

Kees: “Niet alles gebeurt in een laboratorium: communicatie met je medemens waardevoller dan zij misschien zich voorstellen. De waarde van samenwerken moet ook altijd prioriteit krijgen.”
Dmitri: “Chemie van de liefde.”

Nog tips voor scheikunde studenten?

Daniel: “Blijf zo door gaan.”
Dmitri: “Zorg dat je jezelf niet opblaast.”
Jerry: “Zorg dat jullie meer bekendheid krijgen; chemie moet tot een zekere zin begrepen worden door de mensheid. Mensen snappen de scheikunde niet, maar ze snappen het belang er ook niet van. Op de middelbare krijgt men onvoldoende te leren over de scheikunde. En op het MBO doen ze misschien een testje. Daar houdt het alweer bij op. Kortom er moet meer aandacht komen voor de scheikunde!”

Adir gaf jammer genoeg aan ook hierop geen antwoord te weten, voordat hij weer met lachen begon. Gelukkig was zijn antwoord ook niet nodig, aangezien zijn tip overduidelijk is, namelijk: “Altijd blijven lachen.”


HAPPY NY
HAPPY NY


Damaged

Studentenrecept

Hamburgers

Door Richard Broersen

Hamburgers? Wie lust ze niet?
Of zoals de liedjes zeggen: hamburgers met korting, oh oh oh oh oh,
of meer in kerst/wintersfeer: hamburgers met korting ho ho ho ho ho.
Maar nu zonder grappen, want jullie willen eten; en lekker eten,
dus dat is met vleesch. Hier komt ie dan he:

Je hebt nodig:

- Gehakt: half ons
- Een paar eieren
- Ketjap naar smaak
- 3 theelepels Sambal of meer natuurlijk
- 1 zak Doritos (die zwarte zak)
- 1 Ui (fijn gesneden)

En verder voor op de broodjes:

- Tomaat
- Cheddar
- Sla
- Broodjes
- Saus

Bereiding Hamburgers:

Eerst maak je de zak Doritios open en maak je de inhoud helemaal fijn. Dit meng je dan met het gehakt, de eieren, ketjap, sambal en de ui tot een mooi mengsel gekneed met je handen. Dan kneed je dit brouwsel tot hamburgers, bak je ze in de pan en vlak voor ze klaar zijn leg je de cheddar op de burgers in de pan. Je maakt je broodje klaar met alles wat je wilt, legt je hamburger er op en smullen maar!

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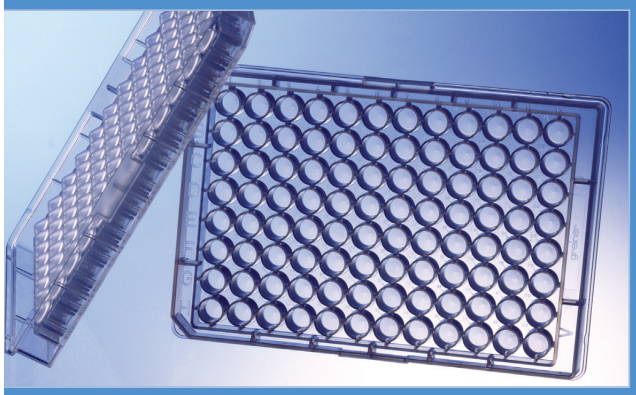
voor suspensie en spheroïde kweken



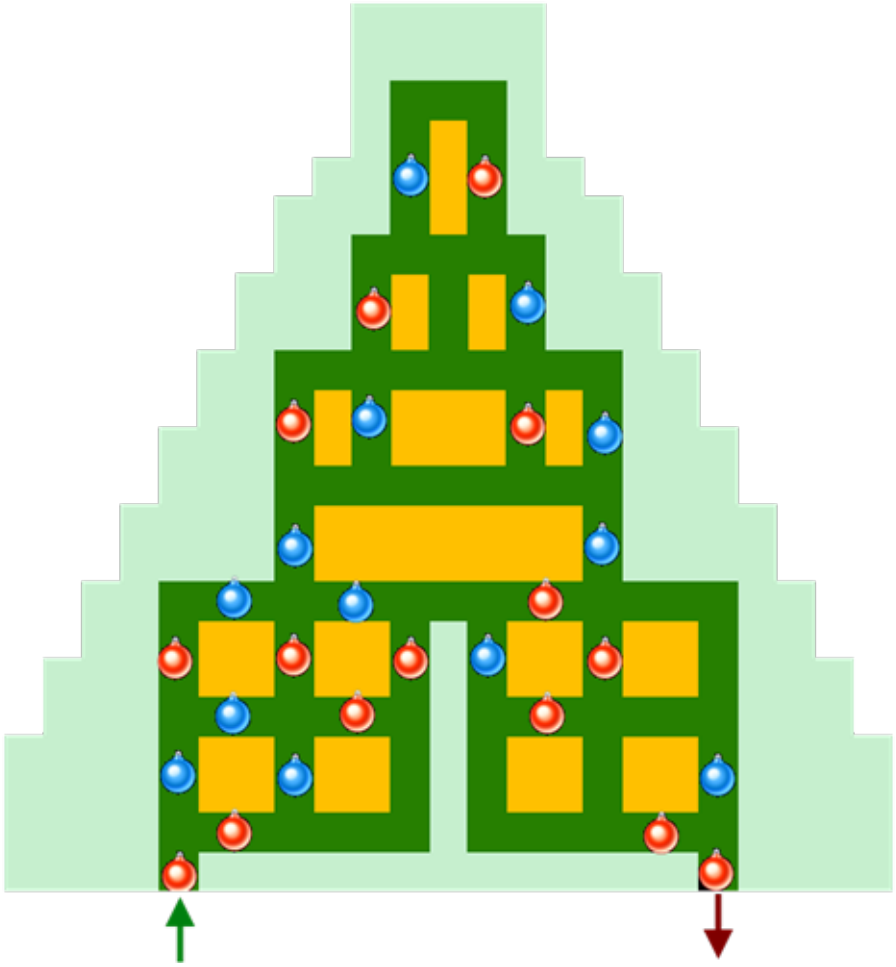
- Remt zeer effectief de celhechting
- Kweken van spheroïden, bijvoorbeeld tumorcellen
- Kweken van semi-hechtende cellen en hechtende cellen in suspensie
- Vorming van “embryoïd bodies”
- Vrij van detecteerbare DNase, RNase en humaan DNA
- Vrij van pyrogenen en non-cytotoxisch
- Beschikbaar in 100 mm Petrischaal, 6 en 96 wellplaat

Greiner Bio-One B.V.
A. Einsteinweg 16 Postbus 280 2400 AG Alphen a/d Rijn
Tel: (0172) 42 09 00 Fax : (0172) 44 38 01 e-mail: info@nl.gbo.com

www.gbo.com/bioscience

Puzzel

Vind het pad van de groene pijl naar de rode pijl. Je moet om en om langs de kerstballen gaan (rood, blauw, rood, blauw, rood, blauw, rood, blauw, etc). Je mag meerdere keren langs ballen gaan. Stuur het uiteindelijk gevormde pad op of stuur een ingescande versie van het antwoord naar acdblad@gmail.com en maak kans op een leuke prijs!



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1098 XH Amsterdam

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