KAVLI NEWSLETTER
Kavli Institute of Nanoscience Delft

No.16
June 2016

IN THIS ISSUE:

Kavli Colloquium Charles Kane • Self-interview Sonia Conesa-Boj • Many grants, awards and prizes

A new home for Bionanoscience!

Exciting news: the entire population of the Bionanoscience (BN) has moved to a brand new building. The department was founded in 2010 and as from 2011 onwards, a lot of work has been put in preparing this brand new building that is now almost ready. Main reason for this new building is that it will house the biology/chemistry-related departments of the Faculty of Applied Sciences: Biotechnology, Chemical Engineering, and Bionanoscience. This joint housing will further enable the departments to find each other in bio-related research. Also, some of the former buildings that housed these departments are very old and now ready for demolishment and/or significant renovation.

Everyone of us likely has moved house or gone through renovation processes. You watch the building work closely, are very happy with how beautiful it is going to be, and you get very annoyed with the (sub)contractors. The construction of the new building that will house the three Applied Sciences departments is no different, except for the scale of the work and the building's unique specifications. The building has 17,000 square meters of lab and office space (50/50). The labs are high tech, state of the art, and newly furnished with lab furniture. Bionanoscience has biological wet labs and high-resolution labs for the optics equipment, with extremely high specifications regarding low vibrations, airflow, and tight temperature control. We are eager to move into this new work environment and to leave the years of preparation behind us.

In a sense, it is less than ideal that the Kavli Institute of Nanoscience Delft will now be divided between two buildings at the TU Delft campus. However, the TN building will have a work and preparation spaces for BN colleagues to use of and the quantum nanosciences (QN) colleagues are of course more than welcome to the flex spaces in the new building. And obviously, we will continue meeting during work discussions on joint projects, Kavli colloquia in both buildings, and our yearly Kavli day outings!

The situation regarding housing for the QN part of the Kavli Institute is not yet settled definitely. For the short term, we aim at a reshuffle in the TN building in order to have all office space for QN employees at one floor. Current labs will not be moved and for new labs we will seek the best location within the building. In the long run we hope to have a new building like our BN colleagues, perhaps even just adjacent to the new Applied Sciences building.

IN THIS NEWSLETTER

Lots of actual news in this issue – as it should be in a newsletter! A major development is the physical move of all bionanoscience researchers and setups to a new building. Exciting! And anxiously hoping that all will move smoothly as planned. Read about all the plans, starting at this page.
A highlight looking ahead will be on June 30, when we will host Charles Kane from the University of Pennsylvania for a Kavli Colloquium on 'Symmetry, topology and electronic phases of matter'. Charlie is the Christopher H. Browne Distinguished Professor of Physics at UPenn, and he currently also holds the Lorentz Chair at Leiden University. He made pioneering contributions on topological insulators, which currently is one of the hottest topics in condensed matter physics. We thus look forward to an exciting Kavli Colloquium. We plan to also include an interesting preprogram where the Kavli Prizes 2016 – to be announced on June 2 – will briefly be highlighted.
And there's more in this newsletter: a self-introduction by new faculty member Sonia Conesaw-Boj, a column by Martin Depken, the announcement of the 2016 Kavli Day in Amsterdam, and lots of news. Enjoy!

• Cees Dekker

COLUMN

Rock the bar this summer!

The other week, my calculations kept throwing up silly answers. Though I recognized that I had grappled with similar problems before, this one resisted my efforts for quite some time. But, as always, once viewed from the right angle, the solution became disturbingly obvious: my sample was biased. The joy of an insight gained was quickly punctured by the sting of knowing I had been dull minded.

It was little comfort that my wayward thinking closely parallels that underlying the celebrated friendship paradox. Understanding this apparent paradox is immensely important for our vanity, as it allows us to cope with the objective fact that, on average: our friends have more friends than us; people on the beach are more tanned than us; people in our gym are fitter than us; people in our bed are more experienced than us; scientists we know are better known than us, and so on. In short, understanding the paradox promises to help us cope with that we seem to suck, on average.

At first, it seems paradoxical that we are not average, on average, but below average, on average. As summer is around the corner (!), let me illustrate the apparent paradox by considering your upcoming trips to the beach. For the sake of argument, imagine yourself an average Dutch beachgoer, with an average tan among your typical Dutch beach-going friends. Still, every time you arrive at the beach, you stick out like a lantern. In the bar at night though, it is clear that you have an average beachgoer tan after all!

Though it took until the 90s before the paradox was formulated, once grasped, the paradox is easily undone: the probability that a person is on the beach when you turn up is proportional to the time they spend tanning on the beach. In other words, your sample is biased towards tanned people when on the beach, but not so when in the bar! Similarly, and as the paradox was originally formulated, people on average have fewer friends than their friends do. Though there are people without friends, you would never find them in your friend group. The social butterfly though, you will find her in many friend groups, raising many averages.

I suspect we also often make things worse by unconsciously biasing our samples by the very criteria we want to compare ourselves to others with. Looking on the bright side though, we have ample opportunity to learn from our peers and partners! After all, they are typically doing better than us. If you feel average, chances are you are actually above average! Best of all, if you have good tan on the beach, you know you will just rock the bar that night!

• **Martin Depken**

INTERVIEW

Interview with Charles L. Kane

Charles Kane is Christopher Browne Distinguished Professor of Physics at the University of Pennsylvania and the 2016 Lorentz Professor Chair at Leiden University. He wrote seminal papers on the theory of the quantum spin Hall effect alongside with key contributions that lead to the discovery of topological insulators.

Humble Charlie

Charles Kane feels that he was in the right place and in the right moment when making his ground-braking research on Topological Insulators and the Quantum Spin Hall Effect. "Ten years ago, I never thought that the impact of my research would be so big", he says humbly from his office at the University of Pennsylvania, now as a Christopher H. Browne Distinguished Professor of Physics and owning a Dirac Medal, a Physics Frontiers Prize, a Membership at the National Academy of Sciences, and recently a Benjamin Franklin Medal, among other honors.

Research guided by experiments

Charles Kane made fundamental contributions to the field of Condensed Matter Theory and Electronic Transport, especially in the past decade with his research on the Quantum Spin Hall Effect in graphene and three-dimensional Topological Insulators. Closely related, are his theoretical predictions of Majorana fermions appearing at the surface of a Topological Insulator with induced superconductivity. Symmetries and topology are at the core of our current understanding of matter and electronic phases. He sees himself as a translator between the abstract mathematical world, where theoretical physics take place, and the physical consequences that can be measured in the experiment. He believes that research in physics should be LED by reality and experimental feasibility. Charles Kane says that "there are key experiments, such as Majoranas at Delft that drives the agenda for research in physics".

His goal is to design experimental setups that can make use of Majorana bound states to process quantum information, and to design new devices that put the fascinating aspects of quantum physics TO work. "What really drives me is to come up with materials or experimental systems that get at the fundamental issues [of Quantum Mechanics]. This is one of the things that makes Topological Insulators so interesting", claims Charles Kane, with the focus on gaining control on the electronic properties of mesoscopic systems.

Two ways to researching on topological states of matter

HAVING RECEIVED many awards, he keeps on working hard to discover of new phases of matter. According to Charles Kane, there are two ways OF doing this. One way relies on the single particle picture, the topological band theory that now we understand. This way aims AT EXPLORING the generalizations of Topological Insulators to many systems, and address the topological properties arising from different conserved symmetries. In this sense, we can find topological states in one, two, and three dimensions (and more), and also in many physical systems such as electrons, phonons, and photons.

The other way, aims AT ANALYZING many-body physics. It is a hard problem that involves strong interactions. The easier approach to deal with strongly-correlated systems is using effective fields, but the more difficult approach of fully addressing many-body interactions is a way to find and understand new materials with topological degenerate ground states that can be used to store quantum information. This approach is more connected to reality, where defects, temperature, and strong interactions are present in a physical experiment.

His favorite minus sign

There is a particular minus sign in Quantum Mechanics that is Charles Kane's favorite, and is the same that appears when looking at the Berry phase of a Topological Insulator. When making a 2π rotation (360 degrees) of a particle with half-integer intrinsic angular momentum, for example an electron with spin ½, it acquires a minus sign. Surprisingly, one must rotate the particle again to recover the original state. "This has to do with the fact that rotations are not simply connected", explains Charles Kane, and with the fact that "a 2π rotation cannot be continuously undone".

He demonstrates this counterintuitive minus sign using an analogy with an everyday object. Imagine a cup of coffee that you hold in the palm of your hand. If you make a 2π rotation by passing your hand above your shoulder (and without flipping the cup of coffee!), you end up with your arm twisted and the cup impossible to drink. "But if you rotate again, 4π, [this time passing the cup near your waist] then your arm is not twisted anymore", he says, and two complete rotations are needed recover the original state. His pedagogical demonstration reflects his enthusiasm for teaching. "Teaching is something that I love!", he says. He likes helping motivated students to realize things and adds "students are very smart, even though they don't know things yet.", and he highlights that scientist have a role in the hard task of educating the larger part of the population.

• **Pablo M. Pérez Piskunow**

KAVLI COLLOQUIUM

'Symmetry, topology and electronic phases of matter'

Charles Kane

University of Pennsylvania

June 30, 2016 will feature a Kavli colloquium by Charles Kane

Symmetry and topology are two of the conceptual pillars that underlie our understanding of matter. While both ideas are old, over the past several years a new appreciation of their interplay has led to dramatic progress in our understanding of topological electronic phases. A paradigm that has emerged is that insulating electronic states with an energy gap fall into distinct topological classes. Interfaces between different topological phases exhibit gapless conducting states that are protected and are impossible to get rid of. In this talk we will discuss the application of this idea to the quantum Hall effect, topological insulators, topological semimetals and topological superconductors. The latter case has led to the quest for observing Majorana fermions in condensed matter, which opens the door to proposals for topological quantum computation. We will close by surveying the frontier of topological phases in the presence of strong interactions.


Charles Kane

15.00 h	Pre-programme
	Jan Willem van Holten: 2016 Kavli Prize in Astrophysics (Gravitational waves) Chris de Zeeuw: 2016 Kavli Prize in Neuroscience (Remodelling the brain) Allard Katan: 2016 Kavli Prize in Nanoscience (Atomic Force Microscopy)
15.45 h	Break
16.00 h	Kavli colloquium by Charles Kane: 'Symmetry, topology and electronic phases of matter'
17.15 h	Drinks & time to meet

KAVLI COLLOQUIUM

Date: June 30, 2016 at 15.00 hours

Location: Joost van der Grintenroom, Faculty of Industrial Design

NEW EMPLOYEES

Name	Date of employment	Title	Lab
Ewa Spiesz	01/03/16	Postdoc	Marie-Eve Aubin lab, Anne Meyer lab
Duco Blanken	01/04/16	Promovendus	Christophe Danelon lab
Anthony Birnie	01/04/16	Promovendus	Cees Dekker lab
Pablo Caballo Hernandez	15/04/16	Promovendus	Van der Zant lab
Dmytro Afanasiev	01/05/16	Postdoc	Caviglia lab
Aleksandre Japaridze	15/05/16	Postdoc	Cees Dekker lab
Stan Brouns	01/06/16	Faculty member	Bionanoscience
Eduardo Olimpio Pavinato	01/08/16	Promovendus	Hyun Youk lab
Hirad Daneshpour	01/10/16	Promovendus	Hyun Youk lab
Diego Gomez Alvares	01/10/16	Promovendus	Hyun Youk lab

A grown-up version of constructing a Lego toy

Ten years ago, I was making a living by teaching physics in a high school in Barcelona, a city of great sun and even better food, culture and football. And here I am now, about to start a new group in the Quantum Nanoscience department in Delft! My career path has been highly non-standard: I joined a master in nanoscience with the original idea to motivate myself to become a better teacher, but unexpectedly I ended up the course being a PhD student. Much as I loved teaching, I decided to enter the fascinating world of research, and a couple of postdocs afterwards, I am now enjoying setting up my new laboratory in Delft. Having lived in Spain, Switzerland and the UK, I am now more than happy to call the Netherlands my new home.

My research is focused on understanding the structure of new materials with atomic resolution, using electron microscopy. That is, my everyday work is looking at individual atoms, understanding how they click among them, and how real materials differ from the ideal picture so beloved by theorists. In some sense, my job is the grown-up version of constructing a big Lego toy and then deconstructing it piece by piece to understand how to build even better and funnier ones.

I often spend long hours seated in a dark room trying not to become mad operating the microscope, searching for the proverbial needle in the haystack, with the only problem that the needle is now composed only by a few atoms! While in the microscope, I tend to lose track of time, and once I spent more than ten hours there, until someone came to look for me, worried that I might have had an accident or something worse, since I had completely disappeared from the office! In this respect, I think that my sports background helps me to endure these challenges: I was involved in skating competitions until I started the university. Since it seems that skating is one of the national sports in the Netherlands, I look forward to resume my old hobby and motivate my children to follow their mum.

The environment at the Kavli institute is ideal for the cross talk between researchers, creating the conditions for fruitful collaborations. Moreover, its excellent laboratory facilities allow to easily exploring new and exciting research directions. In particular, in Delft we can enjoy state-of-the art electron microscopes, and I cannot wait to start to play with them! Indeed, the core area of my research in QN will be the use of electron microscopy to investigate the fascinating properties of low-dimensional nanomaterials and of recently discovered quantum materials in order to optimize their performance as building blocks of nanodevices. Most of these materials are rather new, and we are only now starting to understand their true potentialities. One of my science drivers will be to explore new methodologies in order to perform a direct correlation between the structural characterization of nanomaterials with the resulting physical properties.

KAVLI DAY

Save the date! September 8, 2016

Workshop “Combatting fraud in science”

With former Kavli nanoscientists Derek Stein and Wilfried van der Wiel

ERC Starting Grant for Sander Otte

Arrays of coupled spins are some of the most basic, elegant representations of many-body quantum physics. Through his ERC grant, Sander Otte will build large spin arrays out of individual atoms using STM, and look for signs of collective spin dynamics, attempting to trap particle-like excitations as they zip through the lattice.

Nicolas Kurti Science Prize for Andrea Caviglia

Oxford Instruments announced the winner of the 2016 Nicholas Kurti Science Prize as Dr Andrea Caviglia, he is recognised for his contribution to the field of complex oxide films and structures, in particular the electric field control of superconductivity at the $LaAlO_3/SrTiO_3$ interface, and the dynamic control of the metal-to-insulator transition in nickelates.

Vici grant for Ronald Hanson

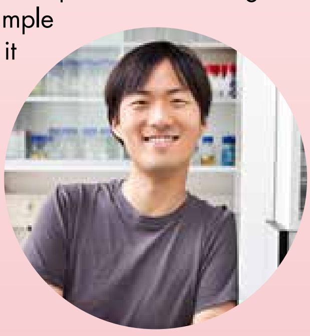
Quantum internet: making interception impossible
Ronald Hanson has been awarded a Vici grant for the development of internet connections based on quantum mechanics. According to quantum theory, particles like electrons can be in two places at the same time, and be intertwined in such a way that they lose their identity. Hanson will research this schizophrenic behaviour over massive distances using lots of particles simultaneously, answering fundamental questions and investigating applications such as communications whereby interception is impossible.

ERC Advanced Grant for Yuli Nazarov

Other dimensions
Topological materials are in focus of modern research. It seems that they are restricted to three dimensions of our world. Yuli thinks it is possible to go to other dimensions and study topology over there: the magic wand required is a superconducting junction with more than 4 terminals. With this grant he will form a team of young theorists to elaborate on concrete suggestions for experiments and possible applications of higher dimensions in electronic devices.

Vidi Grant for Hyun Youk

Hyun Youk will receive a prestigious Vidi grant from the Netherlands Organisation of Scientific Research (NWO). This grant enables his group to gain a deeper understanding on how complexity arises from simple molecules and individual cells. As it is a mystery how physics allows complex life forms to emerge from simple components, his group will address this question by joining together yeasts and embryonic stem cells, one-by-one, to build complex and multicellular living systems.



Marileen Dogterom elected as member of KNAW

Congratulations to Marileen Dogterom, who has been elected as one of sixteen new members to the Royal Netherlands Academy of Arts and Sciences (KNAW). Members of KNAW, leading scientists and scholars from every discipline, are elected from nominations submitted by their peers within and outside of the Academy.
The KNAW has around 500 members, spread across the Humanities and Social Sciences Division and the Science Division. Members are elected for life. The new Academy members will be installed on Monday 12 September 2016 in the Trippenhuis, the official seat of the KNAW.

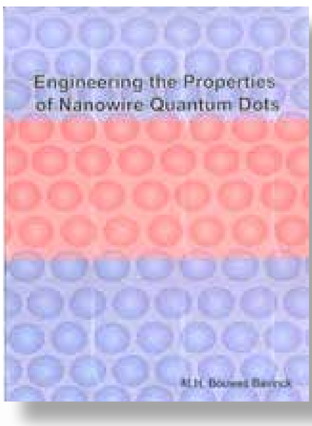
Vidi Grant for Simon Gröblacher

Mechanical vibrations on a quantum chip
Simon Gröblacher is awarded a Vidi Grant. This grant enables his group to have a better understanding of obtaining full quantum control over phonons.
Although mechanical vibrations (phonons) are a promising candidate to store and transmit quantum information, obtaining full quantum control over them remains an elusive goal. By using specially designed optomechanical crystals Groeblacher and his team are trying to overcome these limitations and couple phonons to optical and microwave light particles (photons) on a chip.

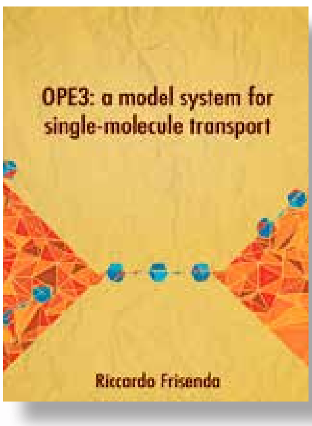
Tenured Professors

In 2010, the Kavli Institute of Nanoscience Delft appointed the first tenure track assistant professors, according to the Kavli tenure track policy. For the department of Quantum Nanoscience this resulted in tenure and promotion to associate professor for Gary Steele per 1 September 2015, Sander Otte 1 October 2015 and Leo di Carlo 1 October 2015. For the department of Bionanoscience this resulted in tenure for Bertus Beaumont per 1 May 2016 and Christophe Danelon per 1 January 2015 and for tenure and promotion to associate professor for Chirlmin Joo per 1 December 2015. Also, Christophe Danelon was promoted to associate professor per 1 May 2016.

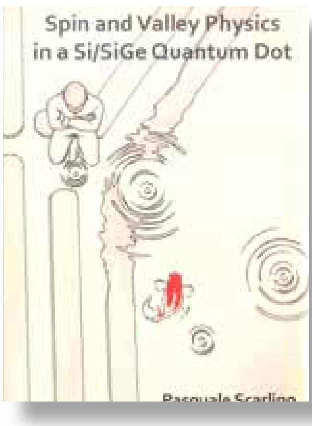
RECENT PHD THESES



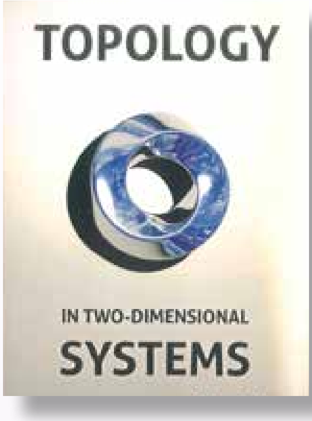
Maaike Bouwes Bavinck
7 January 2016



Riccardo Frisenda
22 January 2016



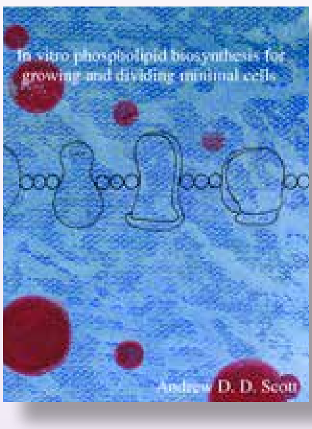
Pasquale Scarlino
1 February 2016



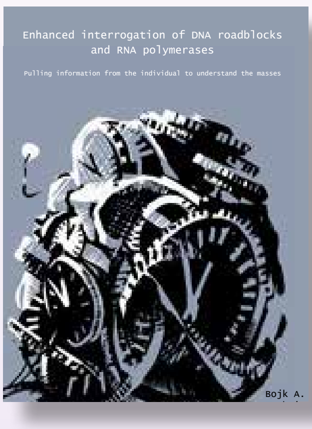
Arjan Beukman
19 February 2016

Vincent Mourik and Kun Zuo
26 February 2016

Maarten van Oene
11 March 2016

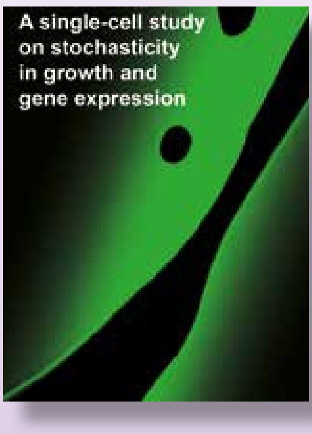


Andrew Scott
4 April 2016



Bojk Berghuis
5 April 2016

Bas Hensen
9 April 2016



Noreen Walker
22 April 2016

HIGHLIGHT PAPERS

Atomic spin chain realization of a model for quantum criticality
Phase transitions in materials are very complex but can also be very intriguing, especially when they are driven by quantum fluctuations. In this paper we create a 'material' out of individual atoms, that is designed such that it shows the first signs of a quantum phase transition between an antiferromagnetic and a paramagnetic phase at a critical magnetic field.

Ranko Toskovic et al. Nature Physics 2016 (AOP)
DOI: 10.1038/nphys3722

Mechanical Resonators for Quantum Optomechanics Experiments at Room Temperature
We demonstrate mechanical resonators with outstanding optical and mechanical properties, reaching quality factors of 10^8, reflectivities exceeding 99% and attonewton force sensitivity. Such resonators will allow to experimentally observe massive, mechanical quantum effects at room temperature.

R. A. Norte, J. P. Moura, and S. Gröblacher
Phys. Rev. Lett. 116, 147202 (2016)

Non-classical correlations between single photons and phonons from a mechanical oscillator

Simon Gröblacher and colleagues demonstrate a quantum interface between non-classically correlated pairs of single photons and phonons, generated and read-out from a nanomechanical resonator. This proof-of-principle experiment illustrates the practicality of on-chip solid-state mechanical resonators as light–matter quantum interfaces.

R. Riedinger, S. Hong, R. A. Norte, J. A. Slater, J. Shang, A. G. Krause, V. Anant, M. Aspelmeyer, and S. Gröblacher
Nature 530, 313–316 (2016)

Visualizing the motion of Graphene Nanodrums

Membranes of suspended two-dimensional materials show a large variability in mechanical properties, in part due to static and dynamic wrinkles. As a consequence, experiments typically show a multitude of nanomechanical resonance peaks, which make an unambiguous identifi cation of the vibrational modes difficult

D. Davidovikj, J.J. Slim, S.J. Cartamil-Bueno, H.S. J. van der Zant, P.G. Steeneken, and W.J. Venstra
Nanoletters 2016

Condensin Smc2–Smc4 dimers are flexible and dynamic

A single human cell contains two metres of DNA molecules but is somehow able to fold them neatly into chromosomes measuring just a few micrometres. The protein condensin is known to play a crucial role, but the details of the process are still largely a mystery. We imaged the condensin protein with high speed atomic force microscopy, and witnessed that condensin is an extremely dynamic and flexible molecule.

J.M. Eeftens, A.J. Katan, M. Kschonsak, M. Hassler, L. de Wilde, E.M. Dief, C. Haering, C. Dekker
Cell Reports, 2016 Mar 1; 14(8): 1813–1818

Single-spin CCD

Spin-based electronics or spintronics relies on the ability to store, transport and manipulate electron spin polarization with great precision. We have demonstrated the manipulation, transport and readout of individual electron spins in a linear array of three semiconductor quantum dots an approach analogous to the operation of a charge-coupled device (CCD). We term this device the Single-spin CCD and expect a diverse range of applications from quantum information to imaging and sensing.

T. Baart, M. Shafiei, T. Fujita, C. Reichl, W. Wegscheider and L. Vandersypen
Nature Nanotechnology, doi:10.1038/nnano.2015.291, 2016

Physical and Mathematical Modeling in Experimental Papers: The Why, Which, and How

As an experimental scientist in the life sciences, should your publications contain models? (Un)surprisingly the answer might often be no. Overwhelming progress has been made in the biological sciences without explicit quantitative modeling. In our Primer we discuss in which cases modeling is useful, what a good model looks like, and last but not least, how to present a model.

W. Moebius and L.Laan (2015)
Physical and Mathematical Modeling in Experimental Papers.
Cell, 163-7, 1577–1583

Chimera proteins with affinity for membranes and microtubule tips polarize in the membrane of fission yeast cells

In this paper we engineer a minimal molecular system for the polarisation of fission yeast cells. The spatial organisation of the interior of cells
often depends on reaction-diffusion mechanisms. In fission yeast, however, dynamic cytoskeletal polymers are required for the establishment of
non-homogeneous protein distributions. Our work shows that a complex interaction network that is responsible for polarity in these cells,
can be reduced to one single molecule that retains only two essential molecular functions.

P.Recouvreux, T.R. Sokolowski, A. Grammoustianou, P.R. ten Wolde, M. Dogterom
PNAS vol. 113 no. 7 1811–1816, doi: 10.1073/pnas.1419248113

An Ising model describes hysteresis in the process of DNA compaction by Dps

A team of researchers at Delft have found a surprising inspiration for modeling DNA dynamics: magnets. The researchers used single molecule techniques to directly observe how a protein called Dps can wrap DNA into a condensed biocrystal, protecting the DNA from damage. This bound state turned out to exhibit hysteresis, or a tendency to become locked into long-lived configurations, which could be modeled with the same equations developed to understand how refrigerator magnets work. This newly identified behavior might help chromosomes lock themselves in long-lived states that protect bacteria from antibiotics.

N. N. Vtyurina, D.Dulin, M.W. Docter, A.S. Meyer, N.H. Dekker, and E.A. Abbondanzieri

Graphene nanodevices for DNA sequencing

Owing to its unique structure and properties, graphene provides interesting opportunities for the development of a new DNA sequencing technology. In this review we discuss the different approaches to using graphene nanodevices for DNA sequencing, which involve DNA passing through graphene nanopores, nanogaps, and nanoribbons, and the physisorption of DNA on graphene nanostructures. We emphasize that controlled atomic-scale engineering of graphene will be key to success in realizing such devices, and that given the significant efforts on single-molecule sequencing and graphene fabrication techniques we are optimistic that a graphene-based DNA sequencer will materialize in the future.

S.J. Heerema and C. Dekker
Nature Nanotechnology 11,127–136 (2016)
doi:10.1038/nnano.2015.307

Chimera proteins with affinity for membranes and microtubule tips polarize in the membrane of fission yeast cells

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PNAS vol. 113 no. 7 1811–1816, doi: 10.1073/pnas.1419248113

SCIENCE ART

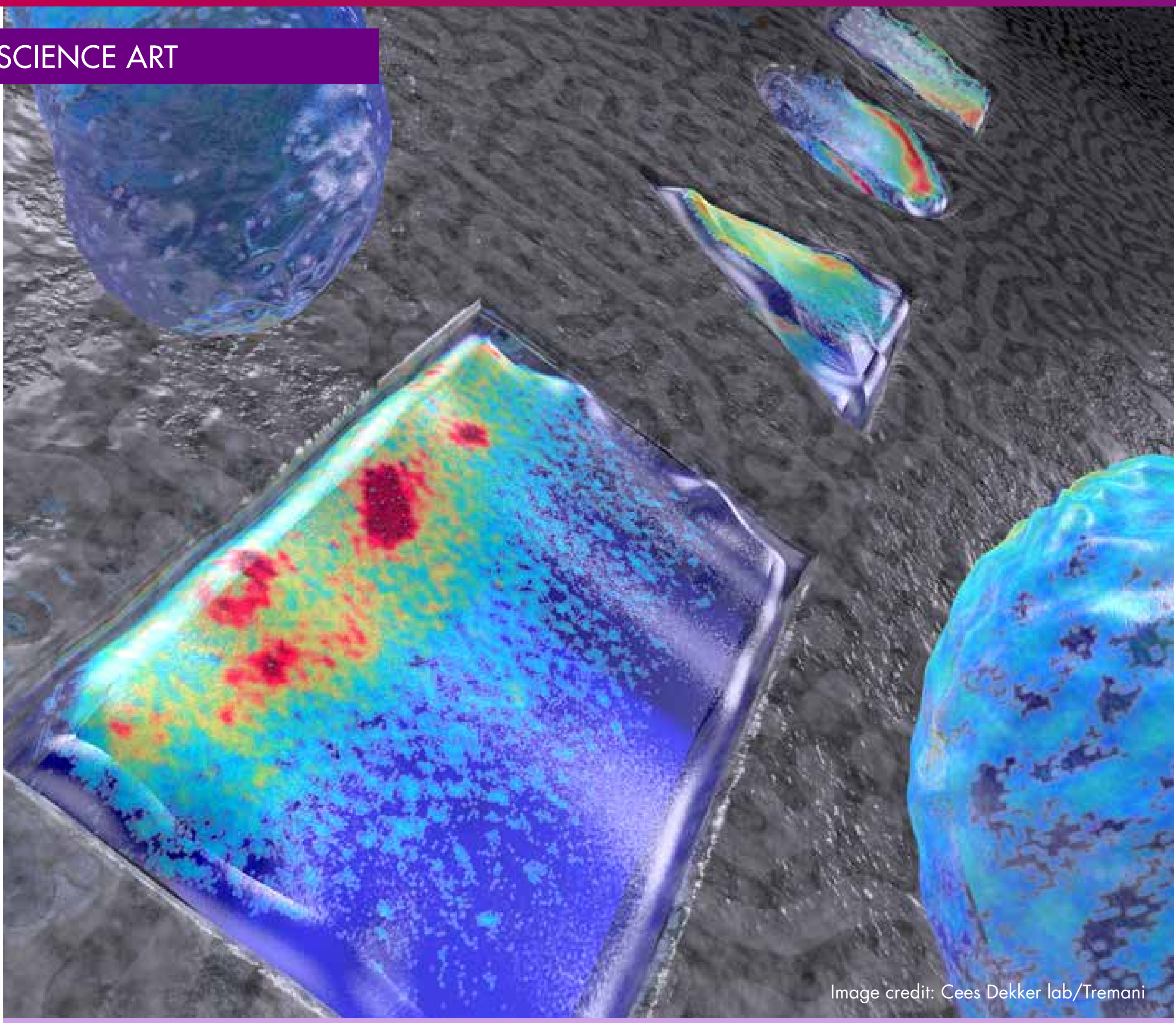

Image credit: Cees Dekker lab/Tremani

Artist's impression of living bacteria sculptured into different shapes defined by nano-fabricated structures. Highlighted in these bacteria are oscillating patterns of cell division proteins sensing and adapting to cell shapes through a Turing reaction-reaction mechanism.
Read more about this research from the Cees Dekker lab in Nature Nanotechnology 10, 719-726 (2015)

Please send suggestions for 'Science Art' to Amanda van der Vlist, A.vanderVlist@tudelft.nl

UPCOMING KAVLI DAY

Derek Stein and Wilfried van der Wiel

September 8, 2016

Workshop Combatting fraud in science

UPCOMING KAVLI COLLOQUIUM

Steven Block

December 1, 2016

Stanford University

CONTRIBUTE TO THIS NEWSLETTER

Input to forthcoming newsletters is very welcome. Please send any relevant material to Amanda van der Vlist **(A.vanderVlist@tudelft.nl)**. If you like to contribute to this newsletter as an editor, please contact **Cees Dekker.**

COLOFON

The Kavli Newsletter is published three times a year and is intended for members of the Kavli Institute of Nanoscience Delft and those interested. PDF versions of all Kavli Newsletters can be found at www.kavli.tudelft.nl

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