KAVLI NEWSLETTER

Kavli Institute of Nanoscience Delft

No.20
November 2017

IN THIS ISSUE:

Hagan Bayley the 2018 Kavli Chair

We are proud to announce that Hagan Bayley, Professor of Chemical Biology at Oxford University has accepted our offer to become the 2018 Kavli Chair. Hagan Bayley studied chemistry at Oxford, subsequently got a PhD from Harvard in 1979, and after a further career in the US (at MIT, Columbia, and Texas A&M), returned to the University of Oxford 15 years ago.

Hagan Bayley's achievements lie at the interface between chemistry and biology. He has used protein chemistry and biophysics to explore the folding, assembly, and function of transmembrane channels and pores such as alpha haemolysin. These studies have led to the development of protein pores as nanoreactors, with which the chemical reactions of single molecules can be monitored. Based on this work, Bayley has developed stochastic sensing, which has been shown with a wide variety of analytes to reveal both concentration and identity through single-molecule detection.

Bayley is a true pioneer in nanopores for DNA sequencing, an innovative nanoscientist who is currently developing artificial tissues based on 3D-printed vesicles. He also is the co-founder of Oxford Nanopore Technologies Ltd, the leading company in nanopore-based DNA sequencing. He is an elected Fellow of the Royal Society and received numerous awards for his groundbreaking work.

Hagan Bayley will join our Institute for the period March-May 2018. At Delft, he will develop a number of activities including a Kavli Colloquium, a lecture series "Chemistry essentials for biophysicists" for PhD students, and a seminar 'Biochemistry for quantum physicists'. We look forward to stimulating interactions.

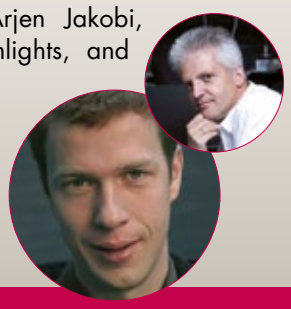
FROM THE DIRECTORS

Several exciting new activities in our institute have taken shape after the arrival of a third donation by the Kavli Foundation. Amir Yacoby of Harvard University was the inaugural Kavli Chair in 2017, leading to lively interactions and collaborations. We are very pleased to already announce that Hagan Bayley of Oxford University will be the 2018 Kavli Chair (see the piece on page 1). We very much look forward to his visit. Furthermore, the first call for applications for prestigious post-doctoral fellowships closed on Sept. 1st, 2017. Successful candidates will implement their own research proposal at the interface of bionanoscience and quantum nanoscience, with involvement of Kavli faculty members from both disciplines.

We look back on a very successful Kavli Day, with a truly inspiring lecture by Robbert Dijkgraaf of the Institute of Advanced Studies at Princeton University, and fun activities in National Park De Biesbosch. On the Kavli Day, Fabai Wu received the 2017 Kavli Delft PhD thesis prize for his work on "Spatial organization in nano-sculptured bacteria, a tale of shape, scale, patterns, and genomes". You can find a photo impression of the day further in this newsletter. Amir Yacoby will return to Delft to deliver a Kavli Colloquium on November 23rd, 2017, with an exciting pre-program on the 2017 Nobel Prizes in Physics, Chemistry and Physiology.

Furthermore in this newsletter: an interview with Robbert Dijkgraaf, columns by Martin Depken and Anton Akhmerov, a self-interview by new faculty member Arjen Jakobi, prizes and publication highlights, and much more. Enjoy!

Lieven Vandersypen



COLUMN

Lessons from my postdoc years

When reflecting on my postdoc years, I look back at a path that requires skill, perseverance, and luck for anyone to navigate. Now, with the initial post-tenure giddiness behind me, but before the peaks and valleys of my path erode into memories of gently rolling foothills, it is a good time to ponder what advice I would give my younger self? I force this advice on you feeling less restricted by what I actually manage to live up to, than by a belief that I might have benefited taking this advice to heart earlier than I did.

The first choice that faced me finishing my *PhD* was between continuing to build on my doctoral work, or to broaden my skillset in another field. I wanted to be closer to experiments than was possible in my *PhD* field, so I was bound for new territories. In the run-up to my transition to biophysics, my main concern was the time it would take to become productive again. By choosing a research direction where my statistical physics skills would still come in handy, I managed to remain reasonably productive during the transition. I now think the bigger challenge might rather be to build a new network, as you no longer have the benefit of being in the scientific community you got to know during your PhD.

If you decide to change fields, my advice would be to draw on the skills you already have, and be prepared to play some serious catchup with your networking. Your network is four years behind that of your less adventurous contemporaries, so start going to topical conferences straight away, even before you have anything to present. Even if you hate networking, it has to be done. It never came easy to me, and though networking can feel forced, I can point to several specific encounters that have opened doors and helped me along my way. In addition, and whether we like it or not, science is a human endeavor, and people take more care to be fair to people they know. We are called upon to evaluate the work and proposals of our peers continuously, so there are additional benefits to getting your face out there.

Postdoc work is often exciting, and always demanding. If your goal is to become a professor, then you are aware of the stiff competition, and you are probably OK with putting in long hours to get ahead. Allow yourself to take proper time off though. Regularly allow yourself to relax into life also outside the lab. Guilty time off, time when thoughts of undone work never really leaves, is of little use: it is hardly enjoyable, and it will not help you to prepare for the pressure and long hours that lie ahead. Disconnecting from work can be hard, but I have found it helpful to inject some scheduled off-time into my life. During certain hours I simply do not work. It took some discipline to get into the habit of planning around not working at these times, but once formed, a habit is by definition effortless, and my mind now lingers less on work that I could be doing.

Lastly, I am left to drag out the old trope of "don't worry, be happy!". Not because you should, or need to, but because you might as well. Nothing is gained from worrying about the future further than can be reasonably planned for. Irrespective of where you end up, dropping the heavy baggage of worrying will definitely ease your journey, and might even allow you to climb new heights.

Martin Depken

Fabai Wu wins 2017 Kavli Thesis Award

On the Kavli Day, the 2017 Kavli Delft thesis prize was awarded to Fabai Wu for his thesis ""Spatial organization in nanosculptured bacteria, a tale of shape, scale, patterns, and genomes"". Fabai's thesis, which he defended in October 2015, was of exceptional quality, both in terms of productivity and quality. The Kavli Delft thesis prize is a prize for the best PhD thesis written by a graduate student at our Kavli Institute of Nanoscience at Delft in the previous three years. It consists of an award and an amount of € 3000 that can be freely spent by the laureate.

Vidi grant for Marie Eve Aubin Tam

Congratulations to Marie Eve Aubin Tam who received a Vidi grant! This grant will help her and her group to further explore protein translocation. The threading of proteins through narrow channels is a crucial biochemical process, which is essential for cellular protein trafficking and protein degradation. Such translocation is also used by pathogens, which inject their lethal toxins through the cell membrane (the motor proteins driving this translocation process are called *protein translocases*). The underlying mechanisms remain poorly understood. In the past Aubin-Tan demonstrated the unique capabilities of optical tweezers to reveal information on protein remodeling while being translocated by a soluble translocase. If one could, similarly, use an optical tweezers to hold a protein while being translocated by a membrane translocase, it would contribute tremendously to our understanding of the inner workings of these machines

ERC starting grant and Vidi for Liedewij Laan

Congratulations to Liedewij Laan who was awarded an ERC starting and a Vidi grant! With this ERC, she will study how adaptive mutations improve fitness in yeast cells. She will use fluorescent live-cell microscopy in combination with physical modelling. Liedewij Laan will also create minimal evolvable *in vitro* networks consisting of emulsion droplets containing only the components that are essential for either fitness or evolvability, to find basic rules of network evolution. With her Vidi she will, with her group, investigate how evolutionary processes are affected by the protein networks, which make up an organism.

Tenure for Andrea Caviglia

With great pleasure we would like to announce that our dean, Lucas van Vliet, has decided to grant Andrea tenure and to promote him to associate professor.

KAVLI COLLOQUIUM

'A New Spin on Superfluidity'

Amir Yacoby

School of Engineering and Applied Sciences,
Harvard University

November 23, 2017 will feature a Kavli colloquium by Amir Yacoby

The spin of the electron plays a fundamental role in our understanding of many of the most profound phenomena in condensed matter physics including superconductivity and magnetism. Recently, spin has played a central role in many of the modern topics in condensed matter physics such as the observation and control of topologically protected textures of magnetization known as Skyrmions, topological insulators and superconductors that can host non-Abelian excitations, and perhaps most excitingly in ideas for realizing superfluid transport of spin. Superfluidity describes the property of a fluid to flow unimpeded and without dissipation. In a seminal paper in 1969, Halperin and Hohenberg laid out the foundations for spin superfluidity in magnetic systems and its relation to superfluid Helium. Their theory describes magnetic systems in terms of a condensate of collective spin excitations, however, only now are there concrete ideas of where to search for spin superfluidity and how one might observe unimpeded flow of spins. In this talk I will review some of the underlying physics behind magnetic excitations and spin superfluidity and discuss some of the approaches we have been pursuing to explore them.

15.00 h	Pre-programme
	Pre-programme Chris Van Den Broeck, Nikhef 2017 Nobel prize in physics Pieter Rein ten Wolde, AMOLF 2017 Nobel prize in medicine Andreas Engel 2017, TU Delft 2017Nobel prize in chemistry
15.45 h	Break
16.00 h	Kavli colloquium by Amir Yacoby : A New Spin on Superfluidity

Prof. dr. Amir Yacoby - Professor of Applied Physics at the School of Engineering and Applied Sciences at Harvard University and a visiting Professor at the University of Waterloo. He also holds the Lazaridis Chair in Physics.

His current interests are in understanding the behaviour of low-dimensional systems and their applications to quantum information technology. His research topics include: Spin based quantum computing and metrology using semiconducting quantum dots and color centers in diamond; Topological quantum computing using HgCdTe quantum wells and fractional quantum Hall states; and interacting electrons in graphene multilayers.

From mid-May through the end of July, Prof. Yacoby visited the Kavli Institute in Delft, as the first Kavli Chair. A detailed interview about his background, research focus and plans for his stay in Delft can be found in the last (June) Kavli newsletter. He interacted and collaborated with multiple researchers from our institute, mainly in QuTech and Quantum Nanoscience. His family joined him during the summer holidays to do some proper sightseeing in the Netherlands. We valued his stay in Delft very much!

KAVLI COLLOQUIUM

Date: November 23, 2017 at 15.00 hours
Location: Building 32, Faculty of Industrial Design, Joost van der Grintenzaal

The first KIND Quantum-Bio PostDoc fellow

We are delighted to announce that Dr.Martin Caldarola will be the first KIND Quantum-Bio postdoctoral fellow. As a fellow, he will carry out his truly exciting research proposal on "Nano-circular-dichroism spectroscopy for single-biomolecule studies", in collaboration with Kobus Kuipers of our Quantum Nanoscience department and Marie-Eve Aubin-Tam of our Bionanoscience department. The project will combine state-of-the-art nanophotonic structures and tailored light fields to develop a new label-free single-molecule optical method. This will enable the real-time study of protein (un)folding dynamics at single-molecule level for extended periods of time, since no labeling is needed. Therefore, it will contribute new insights into the fundamental questions of the behavior of macromolecules, their interaction with the environment and the relationship between structure and function.

The goal is to provide new insights into the fundamental behavior of macromolecules, their interaction with the environment and the relationship between structure and function.

Martin is currently a postdoc with Michel Orrit at Leiden University.

He received his PhD from the University of Buenos Aires, Argentina. The KIND fellowship program is designed to attract the best young researchers to Delft to work at the interface of quantum and bionanoscience.

Julia Cramer wins Minerva Prize 2017

Julia Cramer is the winner of NWO's Minerva Prize for 2017. Cramer will receive the prize for her research in the field of quantum science and technology. Once every two years, the NWO Domain Science (ENW) awards the Minerva Prize for the best physics publication by a female researcher. The committee was very impressed by the quality of an article that appeared in Nature Communications in 2016, of which Cramer was the lead author. In that article, she and her co-authors showed that it is possible to protect certain quantum states against errors. Cramer will be awarded the prize during the annual Physics@Veldhoven conference in January.

SELF-INTERVIEW WITH ARJEN JAKOBI

Capture nature's beauty – be it small or large

Delft has a long history in imaging life at the smallest of scales. Almost 350 years ago, Antonie van Leeuwenhoek discovered that life exists in forms much smaller than anyone had anticipated. A haberdasher in the city of Delft, he was a pioneer of microscopy and the first to describe *animalcules* and *minute eels* – single-celled organisms that we now know as protists and bacteria.

With their "Leeuwenhoekjes" the scientists of the 17th century could reach magnifications of about 270x. With today's most powerful electron microscopes we can zoom in much further and image biomolecules down to the precise three-dimensional arrangement of atoms, allowing us to understand their chemistry and help decipher how they make life possible.

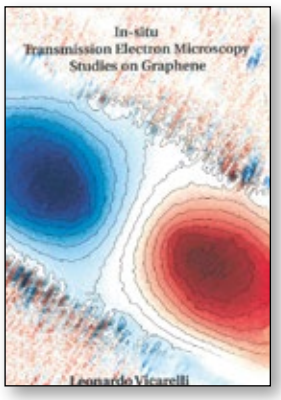
My research focuses on studying biomolecular structure using electron cryo-microscopy (cryo-EM). At the Bionanoscience department we will develop methods to help us and other researchers obtain sharper images of molecular processes involved in the biological questions we try to untangle. I am interest¬ed in macromolecular self-organization: often proteins do not act in isolation, but structures of all sorts and symmetries arise from the orchestrated assembly of parts to collectively perform tasks that would not otherwise be possible. In the defense against pathogens our cells build such assemblies into an armory of nanomechanical levers, wrenches and punch pliers to combat these intruders. Having a molecular picture of such assemblies enables us to learn how they work – and provides the possibility to modify them in a way that may improve or revise their function. My curiosity, however, does not stop at these pictures and this is one of the reasons why I am very excited to join the Kavli Institute of Nanoscience Delft. My Kavli colleagues at the Bionanoscience department build instruments to characterize and manipulate individual molecules, and develop theoretical frameworks to understand the physics of their inner workings. I am very much looking forward to learning from and working with them. *Thinking big about life at the smallest scale* – the motto of the Bionanoscience department could not describe better what we strive to do.

When I came to visit Delft and the Kavli Institute I was immediately struck by the creativity and the enthusiasm of the researchers I spoke to, the vibrant collaborative spirit and the supportive and friendly atmosphere all around. Together with the state-of-the-art infrastructure this convinced me of being a good place to start a laboratory. The support staff have been fantastic in helping me preparing my move and getting started with the lab. I also owe much gratitude to Andreas Engel, who took on the challenge to pioneer cryo-EM at the Bionanoscience department. Much of the equipment is now in place and I cannot wait to start to play with it! Thank you.

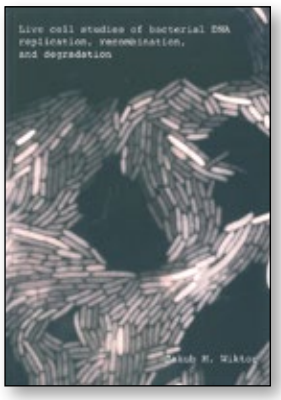
In my free time I like being outdoors on my road bike, hiking, climbing or kayaking. The rough and cold of Patagonia just as much as the labyrinth of creeks and rivers of the Biesbosch help me blow out stress and clear my thoughts from the background noise of the day. Nature and travel have led me to discover spectacular landscapes near and remote that I try to capture with my camera. You might say my spare time somehow resembles my work: trying to capture nature's beauty – be it small or large.

Hello Kavli – I am looking forward to meeting you all in Delft!

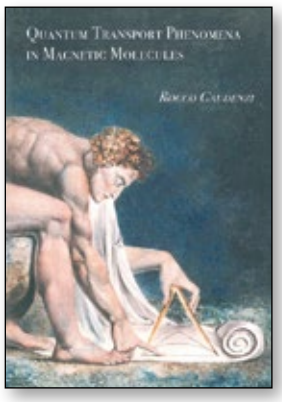
RECENT PHD THESES



Leonardo Vicarelli
17 February 2017



Jakub Wiktor
22 juni 2017

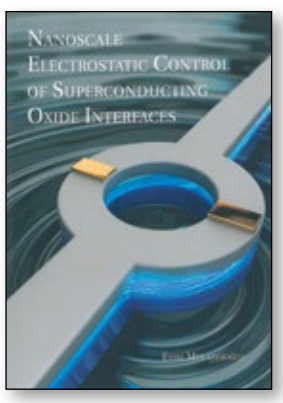


Rocco Gaudenzi
26 June 2017

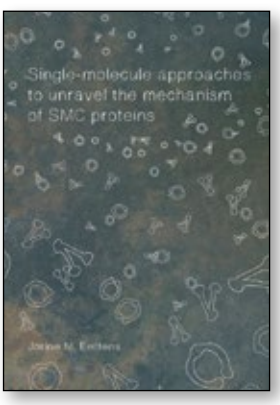
Anastasia Holovchenko
4 July 2017

Aafke van den Berg
29 September 2017

Luuk Loeff
6 October 2017



Emre Mulazimoglu
13 October 2017



Jorine Eeftens
3 November 2017

HIGHLIGHT PAPERS

Hanbury Brown and Twiss interferometry of single phonons from an optomechanical resonator.

Sungkun Hong, Ralf Riedinger, Igor Marinković, Andreas Wallucks, Sebastian G. Hofer, Richard A. Norte, Markus Aspelmeyer, Simon Gröblacher, Science, 21 Sep 2017.

The condensin complex is a mechanochemical motor that translocates along DNA.

T. Terakawa, S. Bisht, J. Eeftens, C. Dekker, C. Haering, E. Greene, Science, 358,672 (2017).

Crowding-induced transcriptional bursts dictate polymerase and nucleosome density profiles along genes.

Aafke A. van den Berg, Martin Depken, Nucleic Acids Research 45, 7623 (2017).

Quantum simulation of a Fermi-Hubbard model using a semiconductor quantum dot array

T. Hensgens, T. Fujita, L. Janssen, Xiao Li, C.J. van Diepen, C. Reichl, W. Wegschneider, S. Das Sarma, L.M.K. Vandersypen, Nature 548, 70 (2017)

Epitaxy of advanced nanowire quantum devices

S. Gazibegovic, D. Car, H. Zhang, S.C. Balk, J.A. Logan, M.W.A. de Moor, M.C. Cassidy, R. Schmits, D. Xu, G. Wang, P. Krogstrup, R.L.M. Op het Veld, K. Zuo, Y. Vos, J. Shen, D. Bouman, B. Shojaei, D. Pennachio, J.S. Lee, P.J. van Veldhoven, S. Koelling, M.A. Verheijen, L.P. Kouwenhoven, C.J. Palmstrom and E.P.A.M. Bakkers, Nature, 548, 434 (2017)

Entanglement Distillation between Solid-State Quantum Network Nodes

Norbert Kalb, Andreas A. Reiserer, Peter C. Humphreys, Jacob J. W. Bakermans, Sten J. Kamerling, Naomi H. Nickerson, Simon C. Benjamin, Daniel J. Twitchen, Matthew Markham, Ronald Hanson. Science 356, 928 (2017)

Selective high frequency mechanical actuation driven by the VO2 electronic instability.

N. Manca, L. Pellegrino, T. Kanki, W.J. Venstra, G. Mattoni, Y.Higuchi, H. Tanaka, A.D. Caviglia, D.Marré. Advanced Materials. 10.1002/adma.201701618 (2017)

Side gate tunable Josephson junctions at the LaAlO3/SrTiO3 interface.

A. M. R. V. L. Monteiro, D. J. Groenendijk, N. Manca, E. Mulazimoglu, S. Goswami., Y.M. Blanter, L. M. K. Vandersypen, and A. D. Caviglia, *Nano Letters*, 17(2), 715 (2017).

NEW EMPLOYEES

Name	Date of employment	Title	Lab
Eli van der Sluis	01-04-17	technicus	Marileen Dogterom lab/Cees Dekker lab
Takashi Yamamoto	15-06-17	Quantum Engineer	QINC / Hanson lab
Toeno van der Sar	01-08-17	PI	Van der Sar lab
Janis Erdmanis	01-08-17	PhD	Nazarov Group
Willeke Roden	01-08-17	PhD	Otte lab
Chrisitian Volk	01-08-17	Postdoc	Vandersypen lab
Christian Möhle	01-08-17	PhD	Goswami lab
Janis Erdmanis	01-08-17	PhD	Nazarov Group
Conor Bradley	14-08-17	PhD	Taminiau lab
Ivo Severins	01-09-17	PhD	Chirlmin Joo/John van Noort lab
Jiang Gong	01-09-17	PhD	Charbon lab
Sjaak van Diepen	01-09-17	PhD	Vandersypen lab
Thijs Stavenga	01-09-17	PhD	DiCarlo lab
Andreas Papageorgiou	01-09-17	PhD	Bertels lab
Chung Ting Ke	01-09-17	Postdoc	Goswami lab
Hristo Barakov	01-09-17	PhD	Nazarov Group
Irfan Prabudiansyah	01-09-17	Postdoc	Marie-Eve Aubin lab
Makars Šiškins	01-09-17	PhD	Van der Zant/Steeneken lab
Martin Lee	01-09-17	PhD	Van der Zant/Steeneken lab
Kevin Whitley	01-09-17	Postdoc	Cees Dekker lab
Alberto Blanch Jover	01-09-17	PhD	Cees Dekker lab
Sophie Tschirpke	04-09-17	PhD	Liedewij Laan lab
Renu Maan	15-09-17	Postdoc	Marileen Dogterom lab
Arno Bargerbos	01-10-17	PhD	Kouwenhoven lab
Guanzhong Wang	01-10-17	PhD	Kouwenhoven lab
Pascal Gehring	01-10-17	Postdoc	Van der Zant lab
Joe Randall	09-10-17	Postdoc	Taminiau lab
Arjen Jakobi	01-11-17	PI	Jakobi lab
Sergey Amitonov	01-11-17	Postdoc	Bionanoscience
Alexander Lau	01-11-17	Postdoc	Akhmerov Group
Christine Linne	15-11-17	PhD	Liedewij Laan lab
Matteo Pompili	20-11-17	PhD	Hanson lab

On a quest for the open questions

Robbert Dijkgraaf inspires at the Kalvli Day

On September 7th 2017, Robbert Dijkgraaf gave the Kavli Colloquim. He spoke about the smallest and largest scales of the universe and provided some general scientific advice. After his talk, I asked him for tips and tricks on how to drive the academic highway.

Playing for the National Team

Professor Dijkgraaf, as director of the Institute for Advanced Study in Princeton, will always wear his orange shirt. 'For the Dutch team', he says. He has grown up on his path in science much in parallel to our director Cees Dekker (same age, same year of Spinoza Prize, etc), and has followed the growth of the Kavli Institute. 'The Kavli Institute of Nanoscience in Delft grew organically to become one of the world's top institutes,' Dijkgraaf observes, 'and it is encouraging that such an institute is increasingly visible, succeeding in attracting young talent from all over the world.'

Dijkgraaf recognizes a specific Dutch strength in the success and growth of the Kavli Institute: collaboration. 'The Dutch funding agencies funded the right people at the right time and gave a spark to the Institute. I think it is very important to fund such unique initiatives,' says Dijkgraaf.

Towards the centre of the scale bar

In his Kavli Colloquium, Dijkgraaf explained the various length scales in physics. One extreme is the smallest scale, at 10^{-35} m. This is the typical length scale for string theory, Dijkgraaf's own expertise. The other extreme is the Hubble scale, the scale of the universe: 10^{25} m. Both are very interesting: extremely zoomed-in or zoomed-out. The Kavli Institute focuses on the middle of the bar, around 10^{-5} m, in quantum nanoscience and bionanoscience.

'Scientific research is like a puzzle: first we understand the edges and build the boundaries. It is simplified because the details are invisible at these edges,' Dijkgraaf explains, 'now the beauty of physics is that we grow organically to the centre, building upon the great successes in the past.' We need our fundamental laws of quantum mechanics, we need the periodic table to understand the centre of the scale bar and to add new layers of complexity.

Putting puzzle pieces together with the equal sign

In earlier lectures, professor Dijkgraaf pointed out the beauty and importance of the equality sign (=). In his Kavli Colloquium, he elaborated further: 'no wiggle, no almost, but a strong equality sign,' Dijkgraaf strongly believes, 'we know that quantum theory and gravity are connected, but there is no equal sign yet. Only then will the puzzle fit, and the next levels of complexity open up.' The equal sign is essential, both in experimental physics, as well as in theory.

In experimental physics, it is the confirmation of the experiment: the equality sign becomes official. 'The most beautiful success in theory is the connection of two worlds,' says Dijkgraaf, 'where experiments explore and understand the worlds, theory tries to connect them.'

Intrinsic fear and bravery

A scientist, according to Dijkgraaf, is often brave, but also afraid to make errors. He mentioned this anecdote of Dirac as an example: 'He trusted his theories, truly believed in the power of his equations, but made one big mistake,' explains Dijkgraaf, 'when his equations predicted anti-particles, he didn't dare to propose a new particle (the positron), and coupled it to the proton.'

'I think that within the applied sciences, the intrinsic fear to be wrong is strong,' says Dijkgraaf, 'the exact sciences imply that you can even be exactly wrong.' On the other hand, in social sciences, argumentation can play an important role, and the truth is found through discussion. 'This seems a downside for the exact sciences, but the result is an absolute truth, an absolute victory,' Dijkgraaf says, 'for me, this is the ultimate goal. However, I believe all great scientists have this intrinsic fear of being wrong. There are no guarantees in science, especially in the quest to answer open questions.'

Never in a hurry

Both in his lecture, as well as in this interview, Dijkgraaf seems relaxed, with no sense of hurry. 'I believe we have a mission, an assignment given by our predecessors, to understand the world,' he answers, 'we must assertively aim for long-term research goals.' However, we should always watch out for a shutdown, the end of a road. 'We do need excitement for this, we need to move,' Dijkgraaf explains, 'driven either by new insights, surprising results, even by disappointments.'

Throughout his career, Dijkgraaf found these excitements in string theory. 'When I started, the field was new. It worked very well for my generation, we jumped in,' he smiles, 'it was like catching the right wave in surfing.' This analogy is a wise lesson: science is like surfing. Sometimes you need to let the first wave pass to find a better one. You need to recognize the right wave for you, and surf it at the right time.

Breathing cycles

For young researchers, it sometimes feels like there is only one straight road towards scientific success. Robbert Dijkgraaf however took a curved road, even via an art academy. 'I feel that science, and even life, have breathing cycles,' Dijkgraaf explains, 'I have always felt these cycles. There is a time when you breathe in, pick up everything you can learn and explore. Allow yourself to go shopping.'

But there is a tipping point. 'You arrive at the phase in which only a single topic becomes important to you, in which you narrow down. I have never met a successful scientist who isn't both extremely passionate about her or his own topic, and at the same time uninterested in another topic.' Dijkgraaf believes you should feel self-propelling your research. Then, you own the topic.

When you realize you have pushed it to the limits, you can switch back to breathing in. 'Go topic-shopping again, perform seemingly useless tasks, have no goal in mind.' The best example of such a cycle for Dijkgraaf was the moment he realized he was only painting; he didn't like physics anymore. He decided to study art; afterwards, he fully committed to his PhD. 'What sounds like a detour was a shortcut for me.'

One-at-a-time

Robbert Dijkgraaf is a writer, an artist, a researcher, a manager, and probably there are many more hats for him to wear. 'I like many things,' he says, 'but I never do them at the same time.' He can switch between worlds and concentrate on the moment. 'When I am at a physics conference, I want to dive in; I don't want to think about music. But when I play music, I don't think about physics.'

'At the same time, I will always be conscious that there are other interesting things surrounding me', he seeks to explain, 'I would really regret if I would not be able to switch to other worlds, because I love them all.' A great analogy Dijkgraaf uses is the difference between a frog, which jumps between different ponds, and an eagle, flying high above everything. 'I enjoy details, I love the craft in many fields.'

Social science

'I feel extremely privileged to have worked with the people I first explored string theory with, we pioneered the field together,' professor Dijkgraaf recalls, 'I was among like-minded people.' The right place and the right people are cru-

cial for your career. 'Not because of the name, not because of the connections, but because of the spark.' Kavli is a good place, according to Dijkgraaf. 'Whenever you feel you are at the wrong place, move to the right place, don't stay!'
According to Dijkgraaf, no one can be a lone wolf in science. 'Even the greatest soloists are continuously fed by the ideas of others,' Dijkgraaf says, 'physics is a social phenomenon; it is always a team effort. The beauty of science is that a group of people, from all over the world, share a culture. They share the problem they want to solve.'

Common goal

At the Kavli Institute, we are often competing with other top research groups in science. We might even compete with others within the institute. How do we balance competition and collaboration? 'There is tension, but I believe that it is always better to hold hands than to sprint alone,' Dijkgraaf thinks, 'you need the others. There is competition but every individual has his or her own niche, which is different from yours.'
'I don't care about competition; I think such fear is an error of the novice.' Dijkgraaf believes it is a fact of life, that most people will find their niche, as long as they follow their personal direction. 'The scientific path is no universal path', Dijkgraaf claims, 'we don't want to train model scientists. We should fit the system to the scientist, rather than trying to fit the scientist to the system.'

Julia Cramer

Lorenzo de Angelis wins Emil Wolf Award

The Emil Wolf Award was granted to Lorenzo de Angelis (QN, Kuipers lab). This Award was established in 2008 to honor Emil Wolf for his many contributions to science and the Optical Society. Lorenzo de Angelis was the winner during the Frontiers in Optics competition (FiO) 2 category (Optical Interactions), whose committee chair was Prof. dr. Kishan Dholakia (University of St. Andrews, UK).

Michael Perrin wins Steven Hoogendijk Award

The Steven Hoogendijk Award-for the best Delft dissertation 2016-2017- was granted to Michael Perrin (QN, Van Der Zant lab) Physicist Steven Hoogendijk (Rotterdam, 1698-1788) was one of the founders of this Bataafsch Society in 1769. The society aims to promote the physics and medical science. Twice a year, this prize is awarded to a TU Delft PhD student, by the Rotterdam Bataafsch Society to promote the Experimental Philosophy. Prerequisite for the prize is that the winner is promoted cum laude. The prize was awarded by the Praeses Magnificus of the Bataafsch Society of Experimental Philosophy, Mayor Ahmed Aboutaleb.

COLUMN

Adopt a wiki

Here is something new you could try: become a maintainer of a Wiki page. Wikipedia is a great tool of familiarizing yourself with essentially any topic, and therefore it is interesting to understand how it functions and rewarding to contribute to it.

In order for my story to be concrete, I invite you to do a simple exercise. Find a wiki page about something you are working on, something you have learned at a recent Summer school, or perhaps the topic of that review you were reading–in other words some obscure research topic. As an example, for me such an article is "Majorana fermion".
You will likely be pleasantly surprised with how advanced the article is, and how it refers to recent research literature. Let us investigate what is happening and how Wikipedia articles about ongoing research are written.

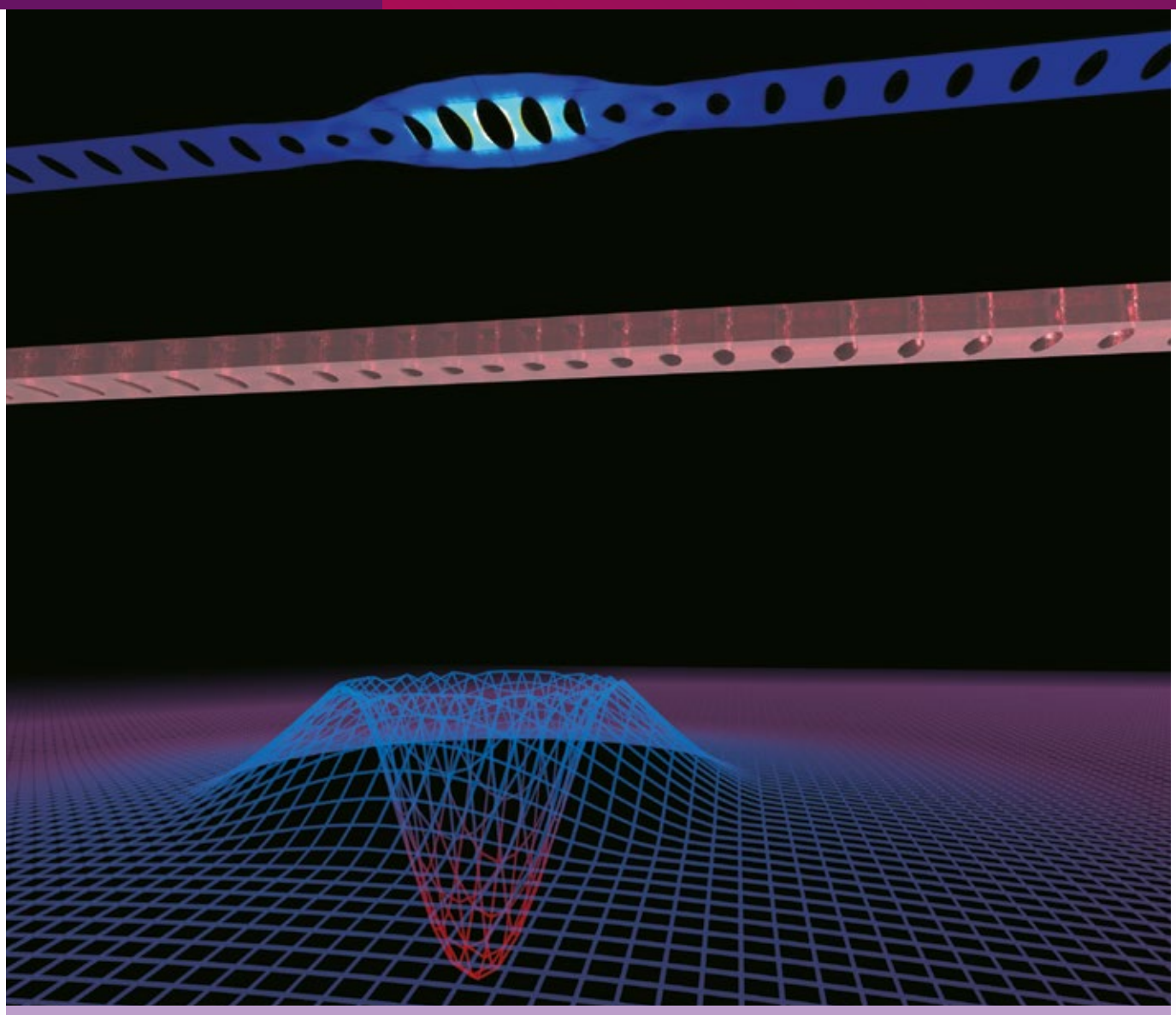
On Wikipedia anyone may edit all articles, however the edit history is public and preserved forever. Look at the edit history of an article: there you see a table with the changes all the way back to its creation. For each edit you see the date when it was made, the username or IP address of the author, and the edit summary. You can also check the history of the user's contributions to Wikipedia, which allows you to understand their engagement level and role in Wikipedia community.

If you look at all the contributors, you will find several types of users. Perhaps the most visible group by sheer amount of edits is bots: they do automated corrections to the article style, reference formatting, and similar mindless tasks. Curiously, these bots are not centrally organized, being instead implemented by motivated community members. Bot contributions are not interesting though; a much more important visible group of contributors is active Wikipedia users.

Their contribution history will contain a large range of articles, often research-related, but frequently they will also edit completely arbitrary topics (e.g. "Squirrel attacks").
These users form the core of Wikipedia community, however they do not have the expertise required to write about a specialized topic. Often the regular contributors extend the article by recapping a press-release about a publication in a high impact factor journal. Unfortunately these summaries may do more harm than good because of being very vague or even contradicting the surrounding text.

Finally there are researchers like you and me. Some people have a bad habit of citing themselves and promoting their own work (never do that): if the user's contributions mainly consist of adding references to a single researcher, you can right away guess who the user really is.
If, however, there is one person investing a bit of time to maintain the article in good shape, review or remove self-citations, and provide appropriate context for recent discoveries, then the article may turn into a useful tool introducing both the general public and new researchers to the topic better than any news article while being more accessible than any review. That person could be you.

Anton Akhmerov



An artist's impression of a quasi-probabilistic distribution of the quantum state.
Image credits: Moritz Forsch. Kavli Institute of Nanoscience, Delft University of Technology.

Hanbury Brown and Twiss interferometry of single phonons from an optomechanical resonator
Sungkun Hong, Ralf Riedinger, Igor Marinković, Andreas Wallucks, Sebastian G. Hofer, Richard A. Norte, Markus Aspelmeyer, Simon Gröblacher, Science 358, 203 (2017).
*These authors contributed equally to this work.

UPCOMING KAVLI COLLOQUIUM

Amir Yacoby

November 23, 2017

Harvard University

UPCOMING KAVLI COLLOQUIUM

Hagan Bayley

March 15, 2018

University of Oxford

COLOFON

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