

Newsletter

BELGIAN MATHEMATICAL
SOCIETY

106, January 17, 2016

Comité National de Mathématique CNM

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NCW Nationaal Comité voor Wiskunde



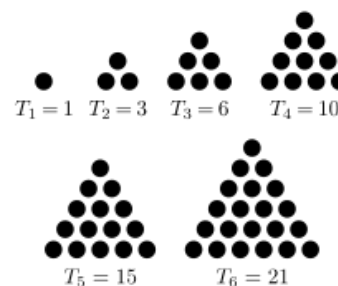
Newsletter of the Belgian Mathematical Society and the National Committee for Mathematics

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Happy T_{63} !

Mathematicians like to make jokes which are understood only by fellow scientists. A new year is always an opportunity for jokes based on the mathematical properties of the new or the old year. For example you could say “Goodbye 11111011111, welcome $1 + 2 - 3 + 4 * 567 * 8/9$ ”, as I saw at the end of the December issue of *PROBLEMATHS*, the problem solving competition of the ULB.

There are websites which collect arithmetical properties of numbers. For example, on the *numberempire* site <http://www.numberempire.com/2016> you will find the properties of this year. One nice property is that 2016 is a *triangular number*. A picture on the cover of this newsletter explains what triangular numbers are. They correspond to the numbers of dots you can arrange in the shape of an equilateral triangle. It is easy to see that the triangular number T_n , which corresponds to the triangle with a side whose length is n dots, is equal to the sum of the first n natural numbers. Hence $T_{63} = 2016$. The next time you can make such a triangular joke will be in $2080 = T_{64} = T_{63} + 64$.

I wish you all a very happy year 2016 and hope it will bring you lots of joy and beautiful mathematical moments.

For the BMS this will be a busy year with two joint conferences and many other activities and plans. The conference with the Spanish and Luxembourg societies now has a website and a list of plenary speakers which you’ll find further down this newsletter. The conference with the Dutch and Luxembourg societies will take place in Amsterdam on 22 and 23 March and will feature a new initiative: the *KWG Prize for PhD students*. Competition for this prize, with a value of 1000 €, is also open to Belgian PhD students. I hope many supervisors will propose candidates. Those who plan to do so should hurry because the deadline is January 22nd (extended by one week especially for us, with my thanks to our Dutch colleagues).

The IMAGINARY exhibition, which is organised by the Flemish Mathematical Olympiad, together with the Flemish universities and with BMS support, can now be visited at the KULAK campus in Kortrijk. The exhibition started in Gent and then went to Leuven. At least 1000 high school pupils have visited the exhibition and in Leuven a total of (at least) 2500 visitors has been counted. This is a big success and certainly helps to raise public awareness of mathematics. Be sure to pay a visit to the exhibition whose next stops are Antwerpen, Diepenbeek and Brussels. In July this year there will be a first IMAGINARY conference in Berlin. Further down this newsletter you will find a call for active participation to this conference on all aspects of mathematics communication.

Looking back at 2015 for just one more paragraph, we can say that the movie “The Imitation Game” attracted more than 200000 people in Belgium. This is a lot. In January last year we had a prescreening for our members. The movie theatre was packed and we are certainly willing repeat such an event. Are there other possible movies for such an activity? Please help us to find inspiration for such events! Also the ULB changed the name of some of the auditoria of their *Campus de la Plaine*. One of the auditoria was named after Jacques Tits. This helps to make mathematics more visible. Maybe you also see an opportunity to name a lecture room or a library after some mathematician in your institution? Don’t hesitate to follow the ULB’s example!

For 2016 the BMS also decided to support the *Brussels Summer School of Mathematics* which will be held during the first week of August. More about this in the next newsletter. Further away we are also planning a three day joint conference with the Mathematics Teacher’s associations in May 2017 and a joint conference with the Polish Mathematical Society in 2018.

Philippe Cara,
BMS president

1 News from the BMS & NCM

1.1 Membership dues for 2016

The new year also brings some duties... One of these is to renew your membership with the BMS.

The basic BMS membership fee remains unchanged: 20€ per year. See [below](#) for reciprocity membership.

You can either pay via bank transfer (**BIC: GEBABEBB / IBAN: BE70 0011 7447 8525**) or via PayPal (see <http://bms.ulb.ac.be/membership/paypal.php>).

Our address is:

Belgian Mathematical Society
Campus de la Plaine, C.P. 218/01
Boulevard du Triomphe
B-1050 Brussels, BELGIUM

As a member,

- you will receive five times a year **BMS-NCM NEWS**, the newsletter of the **BMS** and of the National Committee for Mathematics (**NCM**), containing information on what's going on in Mathematics in Belgium.
- you will receive the "**Bulletin of the BMS - Simon Stevin**", a periodical containing peer reviewed papers as well as book reviews. If you prefer not to receive the Bulletin of the BMS-Simon Stevin on paper, you can get it electronically. See section 5 for details.
- you will benefit from reciprocity agreements with the AMS, EMS, DMV, LMS, RSME, SMF, SBP-Mef, VVWL and KWG. This means you get a reduced membership fee for these societies. In case you are already member of one of these societies, your membership fee for the BMS is reduced to 18€. Details can be found on <http://bms.ulb.ac.be/membership/reciproc.php>
- you give our Society the possibility to develop actions: organizing meetings, promoting Mathematics and lobbying with the authorities.

One realization of our Society: the **BMS** has conceived and promoted the online access to **Zentralblatt** in the Belgian universities.

1.2 Reciprocity and combined membership

The BMS has reciprocity agreements with the AMS, EMS, DMV, LMS, RSME, SMF, SBP-Mef, VVWL and KWG. In case you are already member of one of these societies, your membership fee for the BMS is reduced to 18€. Details can be found on <http://bms.ulb.ac.be/membership/reciproc.php>

We summarize the most common combined memberships:

BMS	20,00€
BMS with reciprocity	18,00€
BMS + EMS	45,00€
BMS + EMS with reciprocity	43,00€

Note that the EMS (European Mathematical Society) membership fee of 25,00€ is allowed only to persons belonging to an EMS corporate member society, such as the BMS. The individual EMS membership fee is 60,00€ otherwise.

Note that it is now preferred that you pay your EMS membership fee directly to the EMS. See http://www.euro-math-soc.eu/ems_payment_new/ems_payment_new.html for details.

For your convenience however, it is still possible to pay for a combined EMS+BMS membership (i.e. 45,00€ or 43,00€) by bank transfer (BIC: GEBABEBB / IBAN: BE70 0011 7447 8525) or PayPal. We will then forward your EMS membership fee to the European Mathematical Society.

1.3 Checking your membership status

To check whether we have received your dues, go to our [online database](#).

Try typing your family name in the search box. If you agreed to have your institution and e-mail in our public database at the time you became a member, you will see your institution and e-mail address. You will also see the year in which you last paid your dues.

If you forgot to pay for more than one year, you will get no response from our database as you are not a member anymore! In this case we suggest you to re-apply for membership by filling out the online form at <http://bms.ulb.ac.be/membership/appliform.php> and transfer your membership fee asap.

1.4 Address changes

If you would like to alter the information we use to communicate with you (e-mail and/or postal address) or anything else about your membership, you can either fill out the membership form at <http://bms.ulb.ac.be/membership/appliform.php> or simply contact the secretary of the Society at <bms@ulb.ac.be>.

2 Meetings, Conferences, Lectures

2.1 February 2016

Arithmétique en plat pays/Getaltheorie in het vlakke land

Monday February 1, 2016 at the University of Lille, France.

The website <http://www.mathconf.org/app-gvl-winter2016> contains the program and practical information. You also find on this website the link to register for this colloquium.

Looking forward to meeting you at this colloquium,

—Leo Storme

2.2 March 2016

BeNeLuxMC 2016 Amsterdam

March 22-23, 2016

The Koninklijk Wiskundig Genootschap, the Belgian Mathematical Society and the Luxembourg Mathematical Society will jointly organize the BeNeLuxMC 2016 at the Science Park in Amsterdam. This congress will incorporate the 52nd Nederlands Mathematisch Congres. The local organization is in the hands of a team of mathematicians from the University of Amsterdam, the Centrum Wiskunde en Informatica and the Vrije Universiteit.

Also note the *Prize for PhD students* will be awarded during BeNeLuxMC 2016. Details about this prize appear [further](#) in this newsletter.

See the poster at the end of this newsletter and <http://wiskgenoot.nl/bnlmc>

2.3 May 2016

Analysis and beyond

celebrating Jean Bourgain's work and impact

May 21–24, 2016, IAS Princeton, USA

Please note that the Institute for Advanced Studies organizes (at Princeton) a **meeting in honour of Jean Bourgain** next May: see <https://www.math.ias.edu/bourgain16>

Brauer groups, Hopf algebras and monoidal categories

A conference in honour of Stef Caenepeel on the occasion of his 60th birthday

May 24-27, 2016, Turin, Italy

In 2016, Stef Caenepeel (former president of the BMS) will turn 60. To celebrate this joyful event, a conference is organized in Turin, Italy, from Tue 24 - Fri 27 May 2016. Hereby, you are cordially invited to participate in this meeting.

The conference website can be found on the address: <http://homepages.vub.ac.be/~hopfalgb> If you are interested to attend the conference, please fill out the registration form that is available on this site. Feel free to forward this message to everyone who might be interested.

We hope to be welcoming you in Turin next May.

Best wishes, The organizers,
Ana Agore
Alessandro Ardizzoni
Sorin Dascalescu
Isar Goyvaers
Gigel Militaru
Joost Verduyn

2.4 June 2016

**Second joint Conference of the
Belgian, Royal Spanish and Luxembourg Mathematical Societies
June 6–8, 2016, Logroño, Spain**

First announcement

- WEBSITE : <http://bsl.unirioja.es>

- CONFERENCE SITE

The conference will take place at convention centre Riojaforum and at Faculty of Science and Technology in Logroño, Spain

- REGISTRATION

The registration is open now until May 31, 2016. The registration fee is 60 EUR. PhD students have a 40 EUR registration fee. More information is available on the registration page of the website.

- PROGRAMME

Besides ten special sessions and posters sessions, there will be seven plenary talks. More information on the website.

- PLENARY SPEAKERS

- *Sara Arias de Reyna*
Faculté des Sciences, de la Technologie et de la Communication Université du Luxembourg.
- *María Jesús Carro*
Departamento de Matemática Aplicada y Análisis Facultad de Matemáticas Universidad de Barcelona. (Valdivia Lecture)
- *Raf Cluckers*
Université Lille 1 Sciences et Technologies Laboratoire Painlevé.
- *Sergei Merkulov*
Faculté des Sciences, de la Technologie et de la Communication Université du Luxembourg.
- *Johannes Nicaise*
Imperial College London Department of Mathematics.
- *Jesús María Sanz Serna*
Departamento de Matemáticas Universidad Carlos III
- *Anton Thalmaier*
Unité de Recherche en Mathématiques, FSTC Université du Luxembourg.

2.5 July 2016

First IMAGINARY conference
July 20–23 in Berlin, during ECM



There will be an IMAGINARY Conference (IC16) from July 20-23 in Berlin, partly parallel to the 7ECM conference. We would like to inform you about this, and to invite you to consider active participation.

All IMAGINARY project collaborators of the last years, all active maths communicators and also artists, designers, software developers and journalists who are interested in mathematics communication are invited. We expect a very international participation and a great event!

Please find more info at: <http://ic16.imaginary.org/>

The IC16 conference features next to talks a new format: workshops in form of “co-working activities”, where a small team jointly works on a concrete project with concrete outputs (for several afternoons). The output could be a concept for a maths museum, a new exhibit (software or hands-on), a maths communication web portal, a funding strategy for maths communication activities or a best practices paper, etc. Maybe you have an idea for such a workshop?

Please notice that the deadline is February 1 (the submission is simple) and also that we offer limited travel support, for which you can already apply. We also have child car services at the conference.

3 PhD theses

Will you defend your PhD soon? Do you have a student who is about to obtain his PhD?

Grab the opportunity to announce it in our Newsletter!

Next Newsletter will appear on March 15. The deadline for contributions is March 10. Contact Françoise Bastin <F.Bastin@ulg.ac.be> with title, abstract and defense date/place.

KWG Prize for PhD students, call for proposals

The BeNeLux Mathematical Congress 2016 will be held on March 22 and 23 at Science Park in Amsterdam. During the conference there will be lectures by six candidates for the PhD prize. The PhD prize award ceremony will be part of the closing ceremony of the conference. The winner of the award receives, besides the prestige attached to winning, a monetary reward of 1000 euro. The prize is made available by Bronstee.com

This year the PhD prize competition will be open to PhD students from all universities in Belgium, The Netherlands, and Luxembourg. The selection committee consists of Arjeh Cohen, Jason Frank, Jan van Mill (chairman), Yvik Swan and Anton Thalmaier.

The procedure to select candidates is as follows: **we ask thesis advisors to propose candidates to the selection committee.** This can be done by sending an email with an extended abstract (one or two pages) and a short CV of each candidate to the following email address: kwg.phd.prize@gmail.com. **The deadline for proposals is January 22, 2016.**

The selection committee will then review the proposals and narrow down the list of candidates to six candidates who will be invited to give a presentation of 20 minutes at the BeNeLux Mathematical Congress 2016 on March 23 in the morning. Out of these six candidates the selection committee will then select the prize winner.

André Ran,
chairman local organizing committee BeNeLux MC 2016,
on behalf of the PhD prize committee

4 Jacques TITS Lecture Room at the Université Libre de Bruxelles

On November 10, 2015, at the Campus Plaine, Lecture Room F was given the name of the famous mathematician Jacques Tits, born in 1930.



To be brief, Tits is the author of the monumental theory of buildings that develops in the context of incidence geometry, including projective geometry. The theory of buildings is an elementary counterpart to the concept of a Lie group over a field. A most useful tool indeed. On the way, Tits became the author of the general theory of Coxeter groups. All of this work was realized while he was a Professor at the ULB. Later, he became a Professor at the Universität Bonn and eventually at the Collège de France. He got the Wolf Prize 1993 and the Abel Prize 2008.

He became a student in mathematics at the ULB in January 1945, at age 14. In order to achieve this, he needed to pass an entrance examination for students in engineering together with hundreds of candidates. He ranked first and decided to study mathematical sciences. After an international conference in Paris (1949), Heinz Hopf (Zürich) wrote to Hermann Weyl (Institute of Advanced Study, Princeton) about Jacques Tits: "A star is born!".

One might have thought that the ULB and VUB would put their advantage about buildings to develop an attractive international degree on that field. Strangely enough this was not the case and the elegant theories which Tits invented and made accessible are barely touched in nowadays Brussels math curricula.

Francis Buekenhout

5 Electronic version of the Bulletin

We remind you that it is possible to convert your paper subscription to the Bulletin of the BMS into the electronic version of the Bulletin.

If you are interested, please contact Philippe Cara by e-mail (pcara@vub.ac.be with bms@ulb.ac.be in cc) for details.

You will receive a special "subscriber code" with which you can register for the Bulletin of the Belgian Mathematical Society at Project Euclid (<http://projecteuclid.org>).

6 From the EMS

Together with the national mathematical societies, the European Mathematical Society has the tradition of meeting every year with the aim to share views, hopes and worries concerning all aspects of the life of the European mathematical community.

This year the societies' meeting will be in Budapest over the weekend of April 2–3.

The meeting agenda is traditionally centered on a topic. This time the focus will be on problems of mathematical education.

If you would like to raise a question or have a suggestion, please contact Philippe Cara by e-mail (pcara@vub.ac.be).

7 History, maths and art, fiction, jokes, quotations ...

7.1 Mathematics and Art exhibition in Brussels

will be held at **Maison des Arts**, 102 rue Doyenné, 1180 Uccle, **from 5 till 28 February 2016**.

Various artists and authors show their interaction with mathematics through their art work and writings.

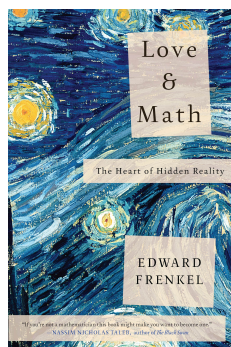


School children as well as adults are welcome. No entrance fee. More information at <http://gatito.be/expo/>

7.2 Book reviews

To read during the long “winter evenings” ...or anytime!!, please find here some reviews from A. Bultheel.

Love & Math, The heart of hidden reality, by *Edward Frenkel*. Basic Books, 2013, ISBN 978-0-465-05074-1 (hbk), 292 pp.



Edward Frenkel

Ever since he grew up as a boy in Kolomna (Russia), Frenkel was fascinated by elementary particles and quantum physics. It was pointed out to him that to understand these, he should start learning mathematics. So he started reading mathematics in his free time. An obvious choice would be to study at the department of Mechanics and Mathematics (*Mekh-Mat*) of the Moscow State University (MGU). However, back in 1984, his father being Jewish, this was made impossi-

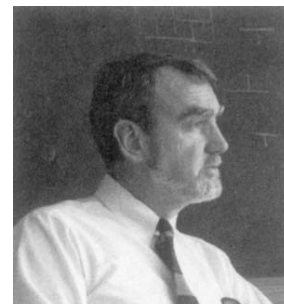
ble by the ruling anti-semitism. So he registered at the Institute of Oil and Gas (*Kerosinka*), his second choice. However he regularly climbed the fence and sneaked into the MGU to attend some courses and seminars by Gelfand. Besides he worked on a problem of braid groups proposed by D. Fuchs which resulted in his first paper published in *Funct. Anal. Appl.* at the age of 20.



Kerosinka (Gubkin Univ. of Oil & Gas)



André Weil



Robert Langlands

This brought him to study symmetry, (braid) groups, and curves over finite fields. Further work introduced him straight into the *Langlands Program* proposed by *Robert Langlands* in 1967 and more formally in 1970. It is based on an earlier idea of *André Weil* who, while imprisoned in 1940 (having a disagreement with the French authorities), wrote a letter to his sister explaining the idea of a mathematical *Rosetta Stone* which would allow to translate results from three seemingly different fields in mathematics into each other: number theory, curves over finite fields, and Riemann surfaces. Exploring this connection has been shown successful by the proof of *Fermat's Last Theorem*. This connection is the mathematical analog of what the theoretical physicist call the *Grand Unifying Theory* in their study of quantum physics.



B. Feigin

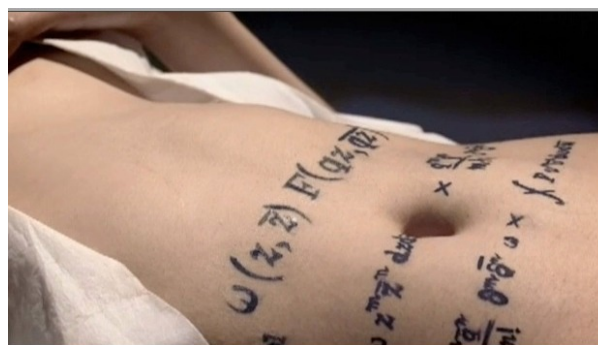
The mathematical or physical aspects are just two different interpretation of the same theory. So quantum physics is like a fourth column to be added to Weil's *Rosetta Stone*. Frenkel's work with B. Feigin on Kac-Moody algebras came just in time because he got an invitation to spend a semester at Harvard in 1989 at the very time that *perestroika* was emerging. Because of the worsening situation in Russia with an unclear outcome, he decided after his 3 months stay, that it was better not to return to Russia. So he stayed at Harvard where he got his PhD in 1991. Later he became professor of mathematics at UC Berkley. In 2003 he got directly involved in a multi-million DARPA grant to work out more elements of Weil's *Rosetta Stone*. Since then, his mathematical career is largely devoted to building the bits and pieces of this Grand Unifying Theory.

Frenkel makes it crystal clear that he is a passionate lover of mathematics and that his enthusiasm for the *Langlands Program* is immense. This love and passion is what he wants to convey

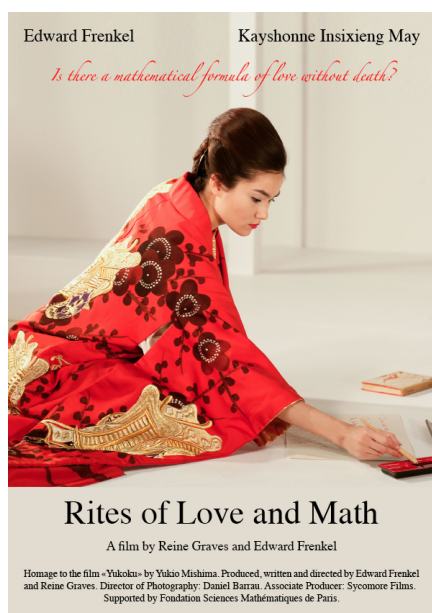
to the reader. The math that most people learn in school is like learning to paint a fence in an art class, while true painting is about creating master pieces like Da Vinci or Picasso did. Mathematics is also a moral duty. Our world is ruled by mathematics that are hidden to most of us. The financial crisis in 2008 was caused because mathematics was applied by people that were not controlled in a democratic way. Mainly because our society does not care about mathematics and most people tend to stay away from it as far as possible. Mathematics should not be restricted to the “initiated few” but it should be shared by everybody. There is nothing more democratic than mathematics. There are no patents for formulas, it is a universal language, and a correct formula can only represent truth, the universal truth.



истина (*istina*) = truth



The formula of love



With this conviction, Frenkel wants to transfer not only his love for mathematics but he also wants to show us the beauty of the mathematics that he is devoting most of his life to, and not just the “fence painting” bits. Of course reading this book will not make you a mathematician, but he succeeds to bring his message by describing his life (at least the part related to his mathematical career) and gradually taking the reader along in his conquest of the mathematics he needs. So he explains symmetries, groups, finite fields, $SU(3)$, manifolds, Galois groups, Lie algebras, sheaves, supersymmetry, strings, branes, etc. All things that are far beyond the low-fi kind of math that one usually finds in popular science books. Of course this is not easy, but I can imagine that his charismatic account will make some readers regret that they are not mathematicians, erasing their usual conviction that mathematics is a habitat where only nerds can survive. Many of the more technical details are removed from the main body of the text and deposited as

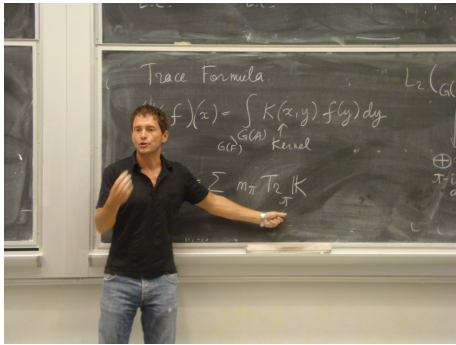
(sometimes quite extensive) notes at the end of the book. For a mathematical reader, they are of course useful, but others may want to skip them and they will still be able to follow the essence of Frenkel’s *Conquest of the Holy Grail*.

But Frenkel is not only a mathematician. The last chapter of the book is still about mathematics and love, but now revealing his artistic talents. After a visit to Paris, he got the idea to make a film about math. With his neighbour, the author Thomas Farber, he wrote a screen-play called *The two-body problem* about two men in the South of France, one is a writer, the other a mathematician. They exchange their experiences, their passion for their profession and for women. It was published as a book in 2010. Before starting on the



E. Frenkel and T. Farber

movie project, he wanted to get some cinematographic experience at a smaller scale and decided to produce a short movie. During another visit to France, Reine Graves, a young film director joined in the project. Inspired by a Japanese film of Y. Mishima *Rites of Love and Death* in which a lieutenant commits a ritual suicide together with his wife, Frenkel and Graves imitate the movie more or less. It shows a man (Frenkel) and a woman (K.I. May) with in the back a poster with the text *istina* (Russian for truth). The man tattoos a mathematical formula (the formula of love) on the body of the woman. The film is called *Rites of Love and Math*. It was well received, and you will find pictures on the Web of Frenkel teaching in Berkeley, but also where he shows up at the Cannes film festival. In fact by different media, Frenkel tries to transmit the same message: a mathematical formula or mathematics in general can be a thrilling thing of beauty, it can give you goose bumps, one may fall in love with it, it represents the ultimate truth, and it is worth committing your life to. The return you get from it is overwhelming.



E. Frenkel in Berkley

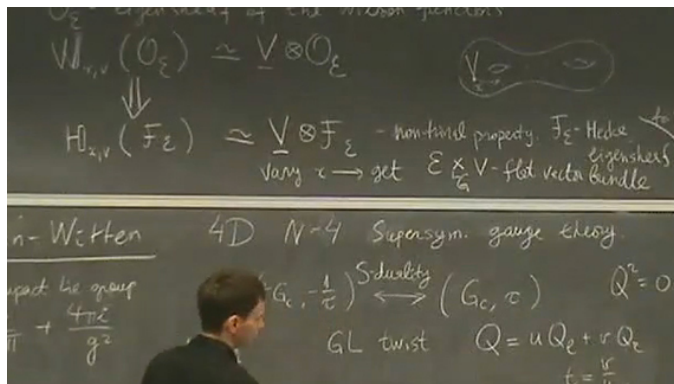


E. Frenkel in Cannes



Reine Graves

One final remark. It is of course a side remark after Frenkel's plea for beauty, but I do not think that the cover design of the book is a success. It shows text in slightly tilted rectangles on a background image that is a detail of Van Gogh's *Starry Night* painting. The symbolism is obviously well chosen, but it looks terribly chaotic, and I would have preferred a more stylish design representing the mathematical purity and beauty of its contents.



Frenkel lecturing on
Langlands-Type Dualities in Quantum Field Theory

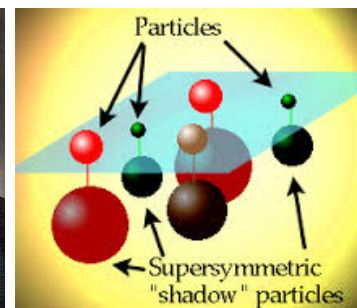


Van Gogh's starry night

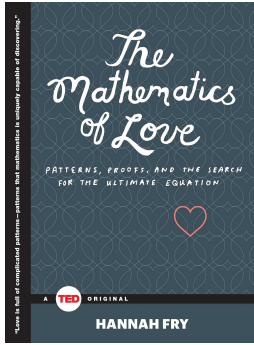
Two of Frenkel's collaborators:

Vladimir Drinfeld
(quantum groups)

Edward Witten
(quantum field theory supersymmetry)



The Mathematics of Love, by *Hannah Fry*. Simon & Schuster/TED, 2015, ISBN 978-1-476-78488-5 (hbk), 120 pp. TEDx video: www.youtube.com/watch?v=N37x4GgDVBM



Hannah Fry

This book is a completely different story, although the titles are similar. TED (Technology, Entertainment, Design) is organizing since 1990 under the slogan *Ideas Worth Spreading* their famous annual conferences in Vancouver, Canada. They are available on their website www.ted.com. For example the 2015 lecture was given by *Rajiv Maheswaran* and had the title *The math behind basketball's wildest*

moves. But they are not restricted to mathematics. A broad set of cultural, social, and academic subjects are covered in general. The TEDx events are smaller siblings of the general TED talks. They are planned and organized independently by a local community in the usual TED style and using their licence. Hannah Fry's TEDx lecture of March 2014 organized by Binghamton University, NY, was about the *Mathematics of love* and now, one year later, also a related book with the same title is available.

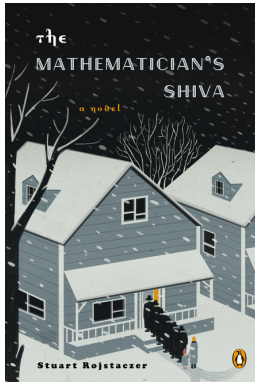
Hannah Fry is a mathematician at the University College London's Centre for Advanced Spatial Analysis and her book follows loosely the talk (which is only about 18 minutes) with some extra chapters added. Since these lectures are for a general public, you cannot expect that deep mathematics are involved. In facts besides showing some spread sheets and a rare graph all she says is that 'some mathematics has been or can be used'.

In the book she goes through the whole process from finding a partner to marriage and living happily ever after. The first chapter is about how many potential candidates you have for courting. By estimating the number of people and taking percentages that satisfy your constraints and preferences, you may end up with some number to choose from. About beauty, she tells not much more than that on facial photographs it is a matter of symmetry, but that in personal contact, slight asymmetries and body language are more important, and that to be chosen it suffices to look only slightly better than somebody standing next to you. Some game theory is involved in selecting a partner when going out with friends and your goal is to maximize the good of the group over the good of the individual. *OKCupid* is a dating site which was started by some mathematicians that use a score of how important you think certain properties are to find a possible match for you. Your popularity on the web depends on how diverse the score is that is attributed to you by others and there are some more ideas on social (and sexual) networks. E.g., an exponential distribution may give an unexpected average. To settle down you have the well known rule that you should reject the 37% first candidates and select the first one after that that is better than all the previous ones. Spreadsheets are advised to select the number of people to invite for the wedding and how you may come up with a distribution of the expected number of people that will actually show up. To arrange people on the tables to avoid rows and optimize the overall happiness (NP hard), you need some software to solve that approximately. Conflicting situations (for example marriage) can be described by a simple dynamic nonlinear system of two coupled difference equations¹. She gives some very useful common sense advice too, but if you want to learn about the mathematics, you will not be much wiser after reading the book. All you learn is that you can model many things also in a social context, but quotes like 'mathematics learns that...' do not make you per se wiser on a mathematical level.

Adhemar Bultheel

¹See also *The Mathematics of Marriage* by J.M. Gottman et al, MIT Press, 2005.

A mathematician's shiva. A novel by *Stuart Rojstaczer*. Penguin Books, 2014, ISBN 978-0-1431-2631-7 (pbk), 384 pp.



Stuart Rojstaczer

The Clay Mathematical Institute formulated seven open mathematical problems in 2000 and awarded a prize of 1 million dollar for a scientist solving one of them. Among these problems are for instance the P vs NP problem and the Riemann hypothesis that have tantalized mathematicians for decades. The CMI has not spent too much money on it because only the the Poincaré conjecture was solved by Grigoriy Perelman in two arXive papers of 2002 and 2003, but he refused the prize (as well as several others). One of the remaining open problems is the Navier Stokes equation. It describes the flow

of water, air, or any other fluid. Engineers solve these equations numerically, but fairly little is known about the solutions in theory. Are solutions guaranteed to exist, and when they do, are they unique, can solutions blow up, etc. The Kazakh professor Mukhtarbay Otelbaev claimed to have cracked the problem in 2013. Soon an error was detected, but he claimed that could be easily fixed. He is still trying.

The author of this novel was trained as a geophysicist and has been professor at Duke University, but has now retreated from academia to have more time for music and writing fiction. He was born in the US but his parents are Jews, that immigrated from Poland because of WW II. All this explains the setting of this novel.

The story is told by Alexander 'Sasha' Karnokovitch whose mother Rachela Karnokovitch is a famous mathematician, who dies at the beginning of the novel. In fact the story is told ten years later, but with flash-backs and a couple of chapters written by Rachela, we learn the family history. Being Jewish, her family originally lived in Poland but after annexation by Russia, they traveled to Odessa in Ukraine, but were soon banned to a mine somewhere above the Arctic Circle. However, they survived starvation and Rachela, excelling in mathematics, got well educated in Moscow as a student of Kolmogorov. She started publishing at 16, but defected to the West after a lecture in Berlin in 1951. Later she moved to the USA where she was offered a professorship but she refused an offer from Princeton, because she considered a colder climate to be essential for creativity. Sasha became a geophysicist taking measurements in the eyes of hurricanes (experiencing Navier Stakes very physically). Sasha's father was also a mathematician, but living in the shadow of his genius wife. Both the father and the son were divorced from their respective wives.

When Rachela dies, the family gathers at her house: Sasha, his father, an uncle Shlomo (who is the most American of all). Also Anna, a Russian ballerina that Rachela had helped to defect, is as good as part of the family. This family history is told in a typical Jewish melancholic way, as if detached from all the suffering, uprooted and alienated, yet with warm personal affectionate bonds, which reminds me of the books by Bernard Malamud and Saul Bellow, or more recently of Michael Chabon. However, Rachela is an exceptionally strong woman,



Navier and Stokes

resisting all opposition and well aware of her status as a well respected mathematician that she thinks well deserved. Five foot eight inches (172 cm) she was a tall woman, and her character becomes clear from the first pages. When she calls her son on his way speeding home, she tells him to drive faster, and when he says that he is driving 95 m/h (152 km/h) she answers “I didn’t ask how fast you were driving. Drive faster”.

When Rachela dies, the idea, according to Jewish custom, is to sit the shiva, which is a week’s mourning period of the first degree relatives. That is usually held in the house of the deceased, and in that period they are visited by people who come to pay their respect. Food is provided by friends and other family. However whisper goes that Rachela has solved or perhaps ‘almost solved’ the Navier Stokes Millennium problem, but has kept it secret. This brings in the mathematical aspect and also the fun component à la Woody Allen. A swarm of mathematicians consisting mainly of Polish and

Russian emigrants flies in from all over the world, and settle down in and around the house. They insist on sitting the seven days of the shiva together with the family. They are banned to the only unattractive hotel in the neighborhood to spend the night, but they arrange on coming to the house during daytime. Secretly they hope to find somewhere in the house some hidden snippet of paper or some information whatever concerning the solution of the Millennium problem. They search all drawers and cupboards, even start breaking up the floor and try to convince the parrot to disclose something useful. They sit together in long meetings and have endless discussions hoping to be able to solve the problem, summoning the spirit of Rachela. The Russian mathematician Yakov Epshtein from Nebraska is especially excited about the good original Russian food that is being prepared. Memories are recalled from Rachela’s time in Russia and how she has been treated there. Alcoholic beverages are amply available also in a Russian tradition. At the end of the shiva, the funeral of Professor Rachela Karnokovitch took place with the Governor present and Dolly Parton singing.



Sitting shiva



Pelmeni, typical Russian food
A favorite dish of Yakov Epshtein
during the shiva

It is clear that Rojstaczer knows what he is writing about. Even without any mathematics, the reader gets some idea about what the Navier Stokes problem really is. The way Jews were treated in Russia and how Russia reacted after Rachela defected is close to reality. Also how Kolmogorov published some result that Rachela had unsuspectingly disclosed is not unfamiliar. Why she never got the Fields Medal. How she had to struggle as a woman in a masculine environment to stand her ground. All these historical and modern problems are accurately described.

There are a lot of Polish, Russian, and Yiddish words and phrases that the reader should get used to. These of course contribute to create the atmosphere and climate of this subculture of the many scientists that have fled the former USSR and rebuilt their lives in the USA.

I will not disclose the eventual outcome of whether Rachela did or did not solve the Navier Stokes problem, and also in the personal life of Sasha there is some conclusive change after this shiva. It’s not an hilariously funny story, but it certainly is fun to read, and although the mathematicians are all fictitious, most situations are pretty close to reality. Warmly recommended.

A. Bultheel

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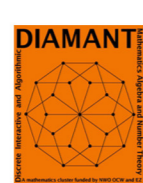
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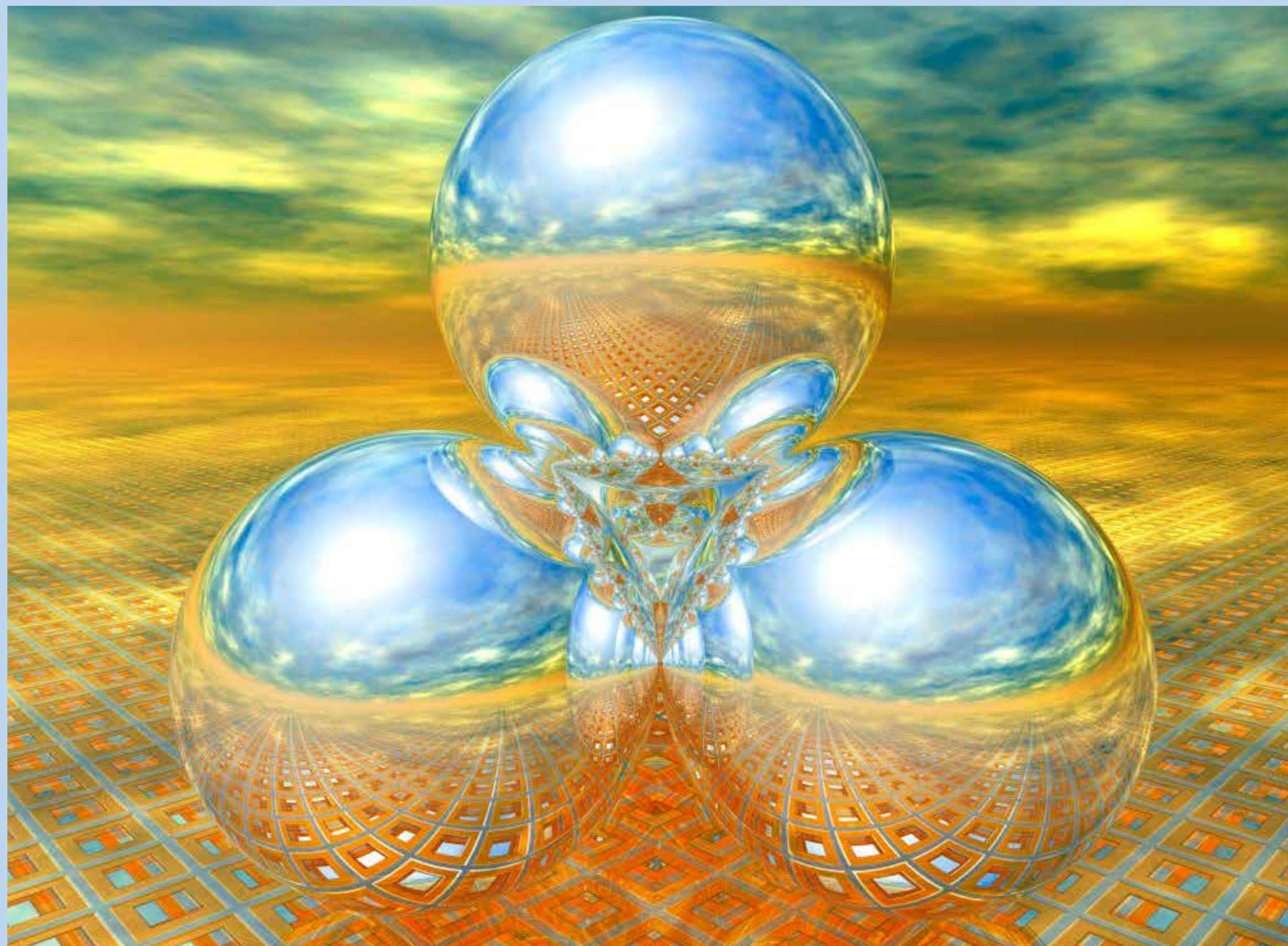
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Leuven, Centrale Bibliotheek,
7 november t.e.m. 28 november 2015

Kortrijk, Kulak, 4 januari t.e.m. 22 januari 2016

Antwerpen, Campus Middelheim,
1 februari t.e.m. 19 februari 2016

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