Newsletter

BELGIAN MATHEMATICAL
SOCIETY

——

Comité National de Mathématique   CNM

C W N M

NCW   Nationaal Comité voor Wiskunde

Contents

The new Belgian Mathematical Society

Welcome to the last Newsletter of 2018. Most of us have had quite a busy time with the start of the academic year. Things are hopefully a bit calmer now so that you can prepare for the next busy period at the end of the year with maybe exams in January.

This is also the last Newsletter in which I will be writing the introduction. My term as a president of this wonderful Society will indeed come to an end at the end of this year. It has been an honour to serve the BMS in this position and I will be happy to continue to collaborate with the other board members in order to provide a dynamic society which has something to offer to all Belgian mathematicians, be it academics, teachers, privately employed, independent researchers or interested supporters of mathematics.

Over the past few years the BMS has been organising lots of successful activities and has modernised its structures. The Society now has a facebook page and a twitter account. These are especially appreciated by our younger members and are a very useful means of communicating at the speed of light. Our (electronic and for some members still paper) Newsletter has been modernised and also found a new editor. Please don't forget to provide us with content by posting on the social media or contacting Yvik (for facebook yswan@uliege.be), Renaud (for twitter renaud.lambiotte@unamur.be) or Wendy (for the newsletter wendy.goemans@kuleuven.be).

The new website also took some time to mature but is now being used more and more to make information available to the outside world. Thanks to new webmaster Timmy Fieremans for designing the new website and migrating contents from the old one. Any comment or suggestion can be sent directly to Timmy (tfierema@vub.ac.be).

Recent events organised by the BMS include a joint conference with the Dutch and Luxembourg Mathematical societies in Amsterdam and a joint conference with the Spanish and Luxembourg Mathematical societies in Rioja, both held in 2016, a joint conference with the Belgian Maths teachers' societies in Brussels in 2017 and a very successful PhD day and job fair in Gent in 2018. There was also a private viewing of the movie *The Imitation Game* in January 2015.

The BMS also helped to organise an IMAGINARY exhibition in the Flemish universities in the school year 2015–2016. This initiative of the Vlaamse Wiskunde Olympiade encountered a huge success with high school pupils. Therefore the Belgian Mathematical Society has decided to more actively promote mathematics among high school pupils. To achieve this we propose to sponsor events and initiatives that address that objective. These initiatives can also be organised for or by high school teachers, whom we see as important for awareness of Mathematics among our younger population. Further down this Newsletter, in Section 1.3, we repeat the call for proposals (for events in 2020). Please feel free to circulate this among teachers and colleagues.

The Bulletin of the Belgian Mathematical Society – Simon Stevin, our scientific journal is also doing well and publishes high quality papers in mathematics. We would like you to encourage your overseas collaborators to submit (survey) papers to our journal. Recently the management of the Bulletin has been modernised and is now done by means of the *editFlow* online system. Instructions to authors can be found on the (new) website. The new editorial management system will be of great help to the editors, which I want to thank for all the work they invest in improving the ever increasing quality of our Bulletin. Special thanks to the editor-in-chief, Stefaan Caenepeel, who took initiative to modernise and helped a lot setting up editFlow.

Last but not least, the legal structure of the BMS is about to change. The board of the Society came to the conclusion that it is important for the Society to become a registered non-profit organisation

(vzw in Dutch, asbl in French). Therefore new by-laws are being prepared and will be presented at the General Assembly which will be held at the ULB on **Wednesday December 5, 2018**. More details about this and the accompanying event on *Recent breakthroughs in Mathematics* can be found further in this letter. I want to thank Yvik Swan, Jean Van Schaftingen and Peter De Maesschalck for their work on this important transition for the Society. I also want to thank vice-president Yvik and secretary/treasurer Peter for all the extra effort they put in the management of the Society the past one and a half year, due to my being abroad. More in general, I want to thank the board of the BMS and all other members for their involvement with the Society, their initiatives and their efforts in the organisation of all of the above activities and changes. This clearly shows that Mathematics is alive in Belgium!

For the future there are a few other important plans. One is the celebration of the 100th anniversary of the Belgian Mathematical Society in 2021. After many requests from our members we will also design a possibility for lifetime membership or payment of pluriannual fees. Talking of fees... As 2019 is approaching it is also time to renew your membership with the BMS. Despite all changes and improvements, the membership fee to our Society remains unchanged: 20€ per year. You will find all details concerning the payment of your dues, reciprocity membership, EMS membership, ... in Section 1.4.

I wish you all a very interesting end of the year and an excellent start of 2019.

Philippe Cara,
BMS president

1 News from the BMS & NCM

1.1 General assembly

Recent breakthroughs in Mathematics

December 5, 2018, 14:00-18:00

Université Libre de Bruxelles, campus Plaine

The Belgian Mathematical Society is happy to invite you to its general assembly which will take place Wednesday December 5, 2018 from 2pm to 6pm. The event will consist in an afternoon's discussion by international and local experts on some of the more breathtaking breakthroughs in contemporary mathematics. The talks will focus on topics which were recently awarded prestigious prizes (particularly the Abel prize and Fields medals): PDEs, Wavelet theory, Algebraic geometry and Number Theory.

We are happy to announce talks by the following four speakers :

- Stéphane Jaffard (UPEC, Paris), about wavelets and Yves Meyer's Abel prize in 2017,

- Jean Van Schaftingen (UCLouvain), about PDEs and Alessio Figalli's Fields medal in 2018,

- Matthew Morrow (IMJ-PRG, Paris), about algebraic geometry, perfectoid theory and Peter Scholze's Fields medal in 2018,

- Gautami Bhowmik (Lille), about number theory and Akshay Venkatesh's Fields medal in 2018.

All talks will be accessible to large audiences of mathematicians. The meeting will be closed by a cocktail offered by the BMS to all participants.

The event will be organised at the Université Libre de Bruxelles and will start at 2pm in room Forum E, campus Plaine. Participation is free but registration is mandatory, see the poster at the end of the newsletter and the website

<div align="center">

http://bms.ulb.ac.be/cgi/breakthroughs.php

</div>

1.2   Bulletin of the Belgian Mathematical Society - Simon Stevin

In September 2018 Volume 25, Number 3 of the Bulletin of the Belgian Mathematical Society - Simon Stevin appeared with the following table of contents:

- *Inverse map and equicontinuity of power maps in locally convex algebras* A. El Kinani, R. Choukri, and A. Oudades; 321-329.

- *Common Fixed Points Results of Multivalued Perov type Contractions on Cone Metric Spaces with a Directed Graph* Mujahid Abbas, Talat Nazir, and Vladimir Rakocevic; 331-354.

- *Split extension classifiers in the category of cocommutative Hopf algebras* Marino Gran, Gabriel Kadjo, and Joost Vercruysse; 355-382.

- *On totally singular generalized quadratic forms* A.-H. Nokhodkar; 383-392.

- *Pointwise amenability for dual Banach algebras* Mannane Shakeri and Amin Mahmoodi; 393-401.

- *Real hypersurfaces with Killing type structure Jacobi operators in* $\mathbb{C}P^2$ *and* $\mathbb{C}H^2$ Yaning Wang and Wenjie Wang; 403-414.

- *On well-posedness, regularity and ill-posedness for the nonlinear fourth-order Schrödinger equation* Van Duong Dinh; 415-437;

- *Polish factorizations, cosmic spaces and domain representability* Jila Niknejad, Vladimir V. Tkachuk, and Lynne Yengulalp; 439-452.

- *Existence and asymptotically stable solution of a Hammerstein type integral equation in a Hölder space* Somayeh Saiedinezhad; 453-465.

- *On injectivity of the ring of real-valued continuous functions on a frame* Ali Akbar Estaji and Mostafa Abedi; 467-480.

For the table of contents of previous issues, see https://projecteuclid.org/euclid.bbms/1536631228.

1.3   BMS subsidy for initiatives aimed at high school pupils

1.3.1   Aim

The Belgian Mathematical Society would like to promote mathematics among high school pupils. To achieve this we propose to sponsor events and initiatives that address that objective. These initiatives

can also be organised for or by high school teachers, whom we see as important for awareness of Mathematics among our younger population.

We also encourage applications for local initiatives (i.e. the proposal does not necessarily have to involve the whole Belgian Mathematics community or not even a whole region). The maximum amount of our subsidy is 500 euros.

1.3.2 Procedure

Organisers of qualifying events or initiatives can apply by e-mail to bms@ulb.ac.be . Applications can be written in French, Dutch, German or English. An application should contain at least the following information:

- a brief description (not more than one A4 page) of the initiative, the targeted audience and the aims;
- the (expected) number of participants;
- a report on previous editions (if any);
- other sources of funding (if any, even pending).

1.3.3 Deadlines

Submit your request by November 1st. BMS decision will be communicated by the end of December. In case none of the submissions sufficiently meets the BMS criteria or aims, no subsidy will be awarded.

1.3.4 Spread the news

Please help us by spreading the information about this new source of funding among your high school contacts and colleagues who are involved in such initiatives!!

1.4 Membership dues for 2019

The basic BMS membership fee is 20€ per year. See Section 1.4.1 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
```

1.4.1   Reciprocity and combined membership

The BMS has reciprocity agreements with the AMS, EMS, DMV, LMS, RSME, SMF, SBPMef, 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 this webpage.

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 50,00€ 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€) 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.

1.4.2   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.

2   News from the EMS

Here follows a letter from Pavel Exner, president of the European Mathematical Society, about the European Research Council and its funding of Mathematics.

> Dear colleagues,
>
> I have a concern to share with you. The matter is the European Research Council, no doubt a highly successful and generally appreciated system supporting research of the highest quality in Europe.
>
> As many of you know, the scheme to distribute money between different research fields is in the ERC based on demand; the means available to each particular panel are proportional

to the (time averaged) sum requested in that panel in the previous calls. It may not be an ideal system but nothing better was invented, the advantage being that in a long run more money goes to the liveliest science areas.

We have been being told repeatedly that the number of applications in PE1, the mathematics panels, is steadily decreasing. One can understand that many colleagues are reluctant to enter a rather tough contest with the success rate 12-15%, however, the net outcome of this restraint is a decreasing number of ERC grants in mathematics.

I want thus to ask you to reflect this situation and to encourage those in your communities who might be able to compete successfully not to be shy and enter the race; even if they would not succeed at their first attempt, they will still help their colleagues and mathematics as a whole.

With best wishes,

Pavel Exner

EMS President

3 Meetings, Conferences, Lectures, . . .

3.1 Conferences

3.1.1 January 2019

Aspects of higher representation theory: quantum groups and categorification

January 21-25, 2019

Brussels

It is our pleasure to announce the event "Aspects of higher representation theory: quantum groups and categorification" which will take place at the U-residence (campus of VUB/ULB in Brussels) from January 21 until January 25. The event consists of a 2-day "school" (Monday-Tuesday) and a 3-day conference.

The goal of this event is to connect different communities around 'Higher representation theory' in the broad sense (tensor categories and module categories, 2-categories, categorification, . . .). The first two days (Monday-Tuesday) of the event is a "school" consisting of 3 mini-courses that will introduce young participants and other interested researchers to the topics of the conference. During these days we also plan a poster session and short talks, to allow young researchers to communicate their results.

The next three days (Wednesday-Thursday-Friday) of the event is a conference, with lectures of the invited speakers in the morning and contributed talks in the afternoon.

Everyone is warmly invited to participate at both or one of these events. More information and a registration form can be found at the following website: http://homepages.ulb.ac.be/˜hopfalgb/Aspects.

Minicourses by Steve Lack (Macquarie University, Australia), Grégoire Naisse (UCLouvain), Sergey Neshveyev (University of Oslo, Norway).

Invited lectures by Marcelo Aguiar (Cornell University, US), Huanchen Bao (University of Maryland, US), David Jordan (University of Edinburgh, UK), Volodymyr Mazorchuk (Uppsala University, Swe-

den), Dmitri Nikshych (University of New Hampshire, US), Raphael Rouquier (UCLA, US), Catharina Stroppel (University of Bonn, Germany), Daniel Tubbenhauer (University of Zürich, Switzerland), Ben Webster (University of Waterloo, Canada).

Organizers: Kenny De Commer (VUB), Pedro Vaz (UCL), Joost Vercruysse (ULB)

See also the poster at the end of the newsletter.

3.1.2   June 2019

Groups, Rings and associated structures 2019

June 9-15, 2019

Domaine Sol Cress, Spa

The conference on "Groups, Rings and associated structures 2019" will be held at Domaine Sol Cress in the beautiful town of Spa, Belgium. It is a sequel to the meeting held in 2017. The international conference concentrates on recent developments in the areas of ring theory and group theory, with a focus on the interplay between these fields of mathematics, the methods involved in their study and applications to other areas. Some topics of interest are representations of groups and algebras, finitely presented algebras, group rings, unit groups and algebraic structures related to solutions of the Yang-Baxter equation.

Keynote Speakers: Florian Eisele (London), Andrei Jaikin-Zaipirain (Madrid), Radha Kessar (London), Gunter Malle (Kaiserslautern), Volodymyr Mazorchuk (Uppsala), Claudio Procesi (Rome), Wolfgang Rump (Stuttgart), Agata Smoktunowicz (Edinburgh), Britta Späth (Wuppertal), Leandro Vendramin (Buenos Aires).

Invited Speakers: Silvio Dolfi (Firenze), Be'eri Greenfeld (Ramat Gan), Urban Jezernik (Bilbao), Wolfgang Kimmerle (Stuttgart), Frieder Ladisch (Rostock), Victoria Lebed (Caen), Markus Linckelmann (London), Sugandha Maheshwary (Mohali), Johan Öinert (Karlskrona), Ofir Schnabel (Karmiel), Doryan Temmerman (Brussels), Joan Tent (València), Jacques Thévenaz (Lausanne), Carolina Vallejo (Madrid), Arne Van Antwerpen (Brussels), Thomas Weigel (Milano), Pavel Zalesskii (Brasília).

Organizers: Ferran Cedó, Eric Jespers, Jan Okninski, Michel Van den Bergh.

For more information consult http://homepages.vub.ac.be/˜abachle/gras2019/ and the poster at the end of this newsletter.

3.2   Seminars

Analysis & Geometry Seminar

University of Antwerp

The "Analysis & Geometry Seminar" is the weekly research seminar of the analysis & geometry-interested people at the Mathematics and Computer Science Department of the University of Antwerp.

During term, we'll have once per week a research talk in analysis and/or geometry and/or related topics. The list of speakers comprises researchers from Antwerpen as well as other universities.

This fall term, the seminar (usually) takes place on Wednesdays between 16-17h in room M.G.005 in the Building G on Campus Middelheim of the University of Antwerp. The seminar web page with the list of upcoming and previous speakers can be found here:

https://www.uantwerpen.be/nl/personeel/sonja-hohloch/private-webpage/seminars/analysis—geometry-/

Methusalem Lecture Series

Lectures and Mini-Courses in Pure Mathematics

KU Leuven, Department of Mathematics

A series of colloquium talks for a broad pure mathematics audience and specialized mini-courses in algebra, analysis and geometry.

Upcoming colloquium talks (Heverlee Campus in Leuven):

Gabor Szabo (KU Leuven)	December 13, 2018	16:15-17:15
Alexander Bufetov (Aix-Marseille Université)	February 14, 2019	16:15-17:15
Holly Krieger (University of Cambridge)	March 7, 2019	16:15-17:15
Ana Khukhro (University of Cambridge)	March 28, 2019	16:15-17:15

For titles and abstracts, room number and the full schedule, please visit

https://wis.kuleuven.be/methusalem-pure-math/activities/

3.2.1 November 2018

Mini-course series "Symplectic Techniques in Differential Geometry'"

In the framework of the Excellence Of Science project "Symplectic techniques in differential geometry", two days of mini-courses are organized at Universiteit Antwerpen (November 23) and ULB (November 29). These mini-courses are meant to introduce the respective topics and are aimed at researchers and doctoral students.

November 23, 2018, 10:00-17:00

Campus Middelheim, Universiteit Antwerpen

Simone Gutt (ULB): *Auxiliary structures on symplectic manifolds*
Melanie Bertelson (ULB) and Marco Zambon (KU Leuven): *Existence and deformations of presymplectic structures*

November 29, 2018, 10:00-16:45

ULB

Sonja Hohloch (Antwerpen) and Marco Zambon (KU Leuven): *Integrable systems, symmetry and foliations*
Joeri Van der Veken (KU Leuven): *Special submanifolds in nearly Kähler twistor spaces*

For more information and registration consult:

https://www.uantwerpen.be/nl/personeel/sonja-hohloch/private-webpage/excellence-of-scienc/minicourses/

---

4   Job announcements

4.1   From UGent

Onderwijsontwikkelaar (11835)

See at the end of this newsletter.

4.2   From Flanders make

See the files at the end of the newsletter.

5   History, maths and art, fiction, jokes, quotations …

5.1   Adhemar's corner

To enjoy during the long dark and cold evenings, next follow three of Adhemar's reviews. Something to like for everyone: The first review is about a book containing short stories while the second review discusses books about Wiles and Perelman. The final review is on a rich illustrated book about the link of mathematics and arts.

Murder in the Einstein Express and Other Stories, *Harun Šiljak*, Springer series 'Science and Fiction', Springer, (2016) ISBN 978-3-319-29066-9 (ebk), 76 pp.

Harun Šiljak is now an assistant professor in Electrical Engineering at Burch University in Sarajevo, Bosnia and Herzegovina. He got his PhD in 2015. This book collects four of his short stories. The first story "Normed Trek", was originally published in *The Mathematical Intelligencer*, **36**(3) (September 2014), pages 53–55. The second, "The Cantor Trilogy" was published in *Journal of Humanistic Mathematics* **5**(1) (January 2015), pages 299–310. The other two "In Search of Future Time" and "Murder on the Einstein Express" appear here for the first time.
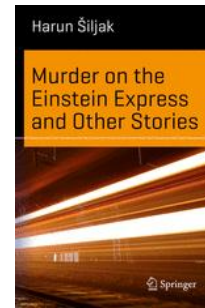
In the first story, the characters are mathematical objects. The one telling the story is the commander of a Star Trek-like mission "to explore new normed spaces... to boldly converge where no function converged before". They move to B-space in search for the inverse Melin transform of a function that has disappeared from the familiar Euclidean space. He introduces himself as "I am the supremum of the set of our group members, its maximum, actually... since the set is closed. My name in the epsilon-delta language was *The one equal to its derivative*. You may call me e^x." There are tricky mathematical adventures, and even a love affair with $(x+\pi)^{-1}$ leaving B-space at the negative of the Holy Number. Unfortunately she is rational and not of the exponential family. However, by taking an inverse Laplace transform she becomes exponential and all ends well.

The *Cantor Trilogy*, is a dystopian SF story happening after computers were attaining consciousness using the Hastings Induction principle. The first computer built that way was called Cantor and its clones were all cantors. These computers became co-authors of mathematical papers that were published in journals with computer reviewers. Mathematicians became society's lower class scientists. Molnar is a student of Hastings and designed a thought experiment: Assume that Chaitin's constant[1] is given a value and that a non-falsifiable theory is constructed on that. The cantors would refuse such a theory because some principles are hardwired. However humans can imagine such an idea. A paper by Molnar contradicts findings published by a set of German computers. That implies that the Hastings Induction principle was flawed. The target is to trick the cantors and bring human mathematicians back into business.

In Search of Future Time is a frame story in which other stories are told. It starts with art but this is actually referring to artificial intelligence. It ends with a conversation with an android and the Internet of Things and Persons, and a glimpse of a robot starting to have 'feelings'. The stories are rather cryptic so you have to decrypt a letter encoded with a Vigenère cipher to get some explanation.

The title story has just a thin frame in which a collection of paradoxes and more classical math-gadget stories are collected like e.g. the Monty Hall problem, Hilbert's hotel, Borges' library, Cantor's diagonal argument, and more of these well known issues.

The collection can only be appreciated by specialists and geeks. Much of the contents consists of cryptic references to AI stuff, and for the first story one needs to know some functional analysis. Only mathematicians would appreciate that one. English is poor and awkward, just as the story lines are jerky and hazy. The literary quality is certainly missing, and I cannot say that this is compensated by an entertaining or amusing geek level. I could recommend the first story for mathematicians, but the other stories are not really worth the effort trying to make sense of it.

Adhemar Bultheel

---

[1]Chaitin's constant is the probability that a random program will halt after a finite time. It is proved to be not computable.

Problem solved. What's next?

If you have read my previous reviews here, you will know that I am addicted to book shops, and I cannot pass a second-hand book market without stopping. There I recently found two older books popularizing the solution of two major mathematical problems. First I found on a Sunday market Donal O'Shea's *The Poincaré Conjecture: In Search of the Shape of the Universe* (2008) and two days later in a nearby second-hand shop, I found *Het laatste raadsel van Fermat*, a Dutch translation of Simon Singh's *Fermat's Last Theorem* (1997) also distributed as *Fermat's Enigma: The Epic Quest to Solve the World's Greatest Mathematical Problem.*

Of course a million dollar prize for solving a mathematical problem like the Poincaré Conjecture (PC) is something worth mentioning in the newspaper. The PC has been an open problem for a long time and many great mathematicians have tried to solve it. This arouses interest, even of a public otherwise not interested in mathematics. And Fermat's Last Theorem (FLT) has the advantage of being a problem easy to explain, yet difficult to solve. So it easily gained some popularity with amateur mathematicians. As Singh writes, hundreds of false proofs were received in the early 1900's when a Wolfskehl Prize was awarded for its solution.

There are of course many more open mathematical problems that remain unsolved, and as soon as one has been solved, and the media have calmed down, another holy grail is shining brightly above the horizon for next generations to earn eternal fame. If we have to choose among the Clay Mathematical Institute's Millennium Prize Problems (CMI-MPP), the Riemann Hypothesis (RH) is by now the most documented and most popularized one.
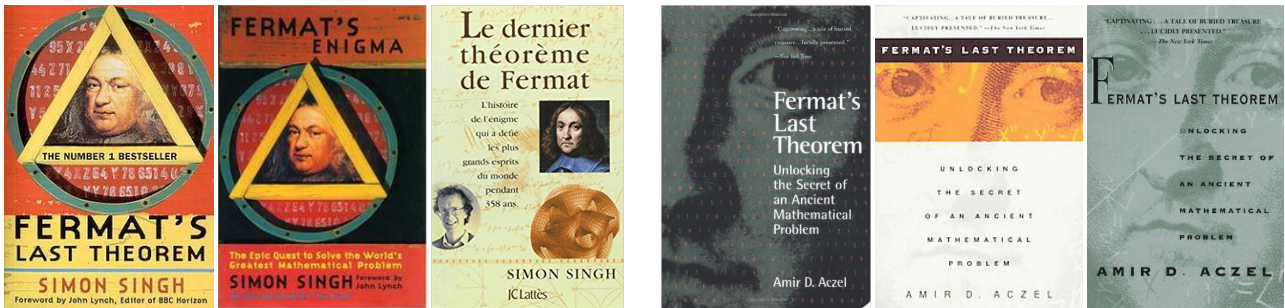
When Andrew Wiles finally proved FLT in 1994 this caused a big media storm after his first announcement in 1993. Simon Singh has made his career by writing his first book on the proof of FLT. He is now (among other things) a well known writer of popular science books (many with a strong mathematical bias). Mind you, his book is not just an explanation of how Wiles did it. No it is a thick book that sketches the whole history of mathematics listing all the big names from the Greek till Gödel and Turing and obviously Wiles and his contemporaries. It is written almost like a novel and accessible to any lay person. There was also an award winning BBC film accompanying the book, which made the book even more accessible and popular. The book has been translated in many languages.

A bit less merchandized is the also nice book by Amir Aczel *Fermat's Last Theorem: Unlocking the Secret of an Ancient Mathematical Problem* (2007). Aczel is an Israeli born American mathematician, who also wrote many popular science and mathematics books mostly related to history.

Perhaps you need somewhat more mathematics and more formulas. Then of course there is the more technical literature. You might have a look at Paulo Ribenboim's *13 Lectures on Fermat's Last Theorem* (1979, i.e. pre-Wiles) and *Fermat's Last Theorem for Amateurs* (1999, post-Wiles) which, despite its title, is much more technical.

The Poincaré conjecture is mathematically more involved and more difficult to explain to a lay person. So books on that topic are written more by mathematicians specialized in the field. A more accessible one is written by George G. Szpiro (not to be confused with Lucien Szpiro who has his own conjecture related to the abc conjecture). *Poincaré's Prize: The Hundred-Year Quest to Solve One of Math's Greatest*

Puzzles (2007). The author is not only a mathematician but also a journalist which perhaps explains why it is more accessible. The book by O'Shea that I mentioned at the beginning is kind of a mixture. It is partly teaching the mathematics and partially telling the (by now well known turbulent) story of Grigori Perelman who solved the problem in 2003 by uploading three papers at arXive. The proof was finally confirmed in 2006 and Perelman was awarded several prizes which he all refused and he has withdrawn from mathematics. O'Shea is a Canadian math professor, now in Florida (not to be confused with the homonymous Donal O'Shea who is an Irish chemist). He has written several technical math books and this one on the Poincaré's Conjecture which is aiming at a more general public avoiding the formulas.

Again both books are not just explaining the problem and the approach by Perelman, they also contain a lot of history, although focussing on more recent history than in Singh's FLT. There exists an excellent review of these two books in the Notices of the AMS, see www.ams.org/notices/200801/tx080100037p.pdf (Jan. 2008). So that saves me the effort of writing it myself.
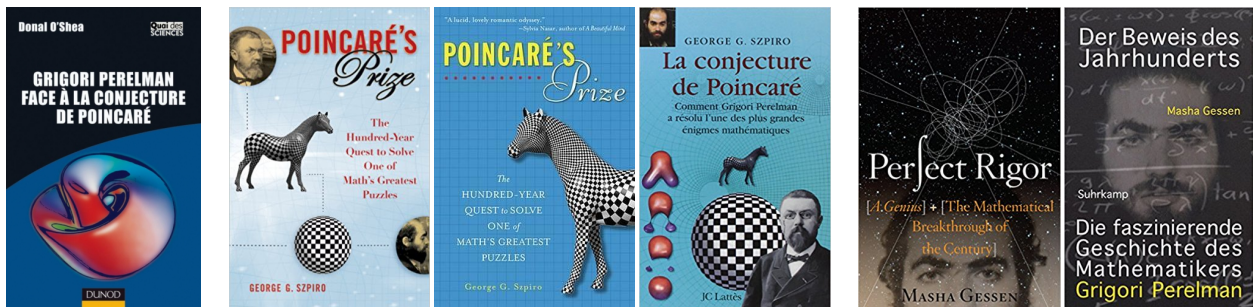
If you need more mathematics, again I refer to the technical literature. Right after Perelman uploaded his papers, mathematicians started to verify his terse papers and completed the holes. *Ricci Flow and the Poincaré Conjecture* (2007) edited by John Morgan and Gang Tian is one of the results of these groups working on Perelman's proofs.

Perelman has a quite peculiar temper and what exactly explains his behaviour is not very clear. Partly of course because he has avoided contact with the media. Masha Gessen is an American journalist who wrote *Perfect Rigor: A Genius and the Mathematical Breakthrough of the Century* (2009). This is a kind of biography of Perelman trying to understand his way of thinking and explaining why he disappeared from the mathematical scenery. Of course there is also much on the PC too.

Will the RH be the next of the great problems to be solved? In any case the math popularizers are prepared and they have introduced the big problems (among them the CMI-MPP) to a wider public already. For example Keith Devlin's *The Millennium Problems. The Seven Greatest Unsolved Mathematical Puzzles Of Our Time* (2003) Stephen Krantz and Harold Parks *A Mathematical Odyssey. Journey from the Real to the Complex* (2014) and Ian Stewart *Visions of Infinity:*

The Great Mathematical Problems (2013). Some of their chapters are also discussing Wiles solving FLT and Perelman solving the PC.
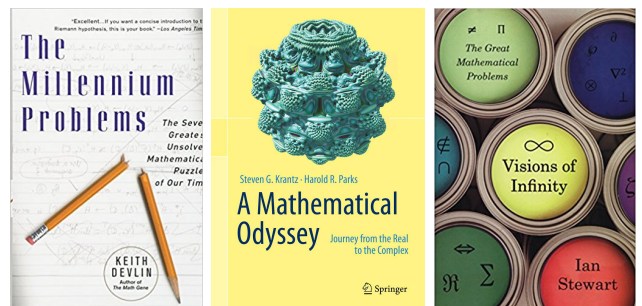
Even though some of these books are quite old, they are still interesting to read. You will learn that often the solution of a difficult problem comes, quite unexpectedly, from what is at first sight, a remote corner of mathematics. It is not the originally posed problem that is directly solved, but a remote one that was previously shown to imply a solution to the original one. Perelman used Ricci flow to prove the geometrization conjecture, a strong result that, almost unnoticed, also proves the PC. Simiarly the RH is a statement about the zeros of a complex function which solves the original problem of finding the distribution of primes. Major steps in mathematics are only taken by combining seemingly unrelated areas of mathematics and hence they rely on previous work by many mathematicians who are all contributing and collaborating to expand the building of mathematics.   Adhemar Bultheel
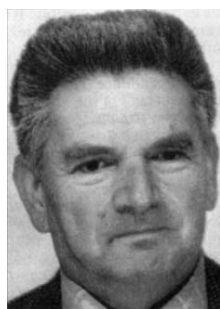
The seduction of curves: The lines of beauty that connect mathematics, art, and the nude
by *Allan McRobie*, with photography by *Helen Weightman*, Princeton University Press, ISBN 978-0-691-17533-1 (hbk), 2017.

Many books do exist that link mathematics and art. Some of them were reviewed in this Newsletter or the Bulletin before [1–8]. The main geometric topics treated are symmetry and polyhedra with applications in architecture or it is placed in a cultural historical perspective as in [4]. Much of this involves straight lines, but McRobie has chosen for curves and more particularly he has used the catastrophe theory of René Thom as a guide and illustrates it by many pictures and graphs. That could have led to quite complicated mathematics, but he has left that wisely under the carpet and uses only graphical arguments.
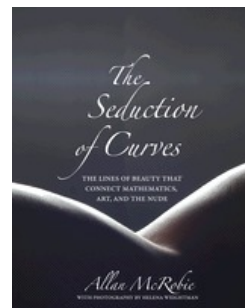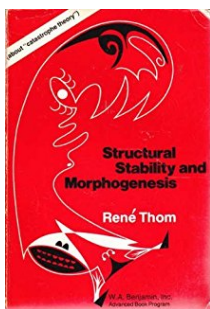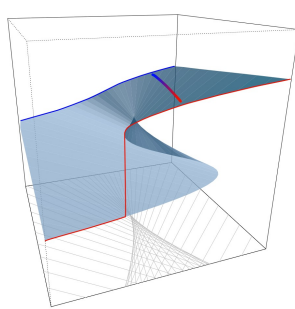
Catastrophe theory is a special case of singularity theory in geometry, that has applications in the analysis of dynamical systems and bifurcation theory. The theory was started by René Thom in the 1960's, later made more polular by Christopher Zeeman. The equilibrium of the system corresponds to the minimum of a smooth potential manifold. The manifold has folds which may explain sudden changes in the behaviour of the system when there is a drop from a top fold to a lower fold. By projecting the manifold on a lower dimensional space one obtains the curves or the umbilics. Catastrophes are the singularities in the projections of manifolds. In the order of increasing complexity the elementary catastrophes considered by Thom are the fold, cusp, swallowtail, and the butterfly which are all one-dimensional curves. For two-dimensional surfaces one may have elliptic, hyperbolic, or parabolic umbilics. These are the 7 fundamental shapes for at most 2 active variables, and at most 4 active parameters. There are however several other variants, like the wigwam, the lips, the beaks, the gull and the goose. All this is beautifully illustrated by artistic (mostly black and white) pictures of nude bodies or details of hips, shoulders, neck, or whatever detail illustrates the idea. By projecting parallel lines on a body, the Moiré effect shows which parts are elliptic and which parts are hyperbolic.

R. Thom   1975   Fold & Cusp
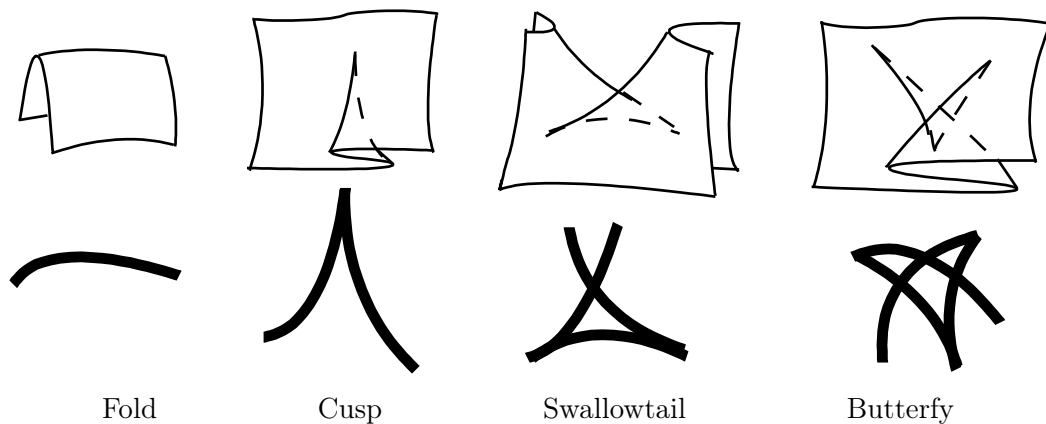
Fold   Cusp   Swallowtail   Butterfy

There are however also more technical applications like for example the butterfly that defines the boundaries of the stability regions for the centre of gravity of a ship that will heel and even capsize when not kept inside the stable region. Or the cusp that is typically connected with the buckling of a steel pillar. The author is a structural engineer who used to design bridges and towers, but who is now teaching at the University of Cambridge. So that explains these examples that he can take from his own experience.
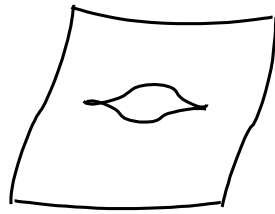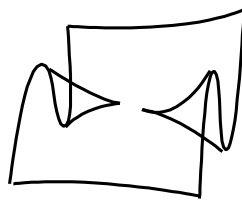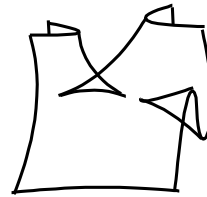
Lips   Beaks   Gull   Goose
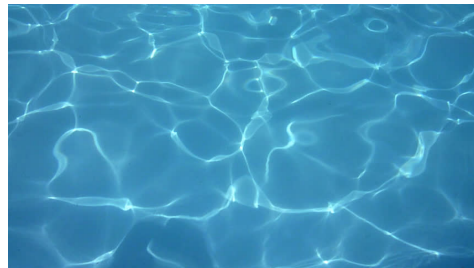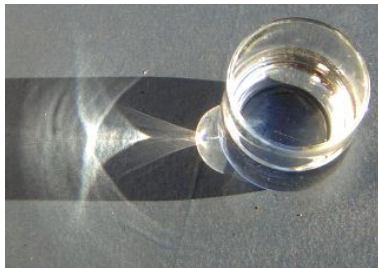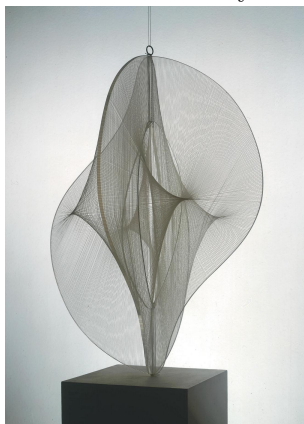

David Hockney

Naum Gabo
Linear Construction No. 2

The umbilics are 2D often self-intersecting objects in 4D space which is more difficult to illustrate. The results of the foldings and the corresponding singularities are illustrated by reflections on a calm sea surface, caustic effects on the floor of a swimming pool, or by a glass of water on the table, and even the formation of a rainbow. For example the multiple images of the sun reflected by a small wavelet in the sea is the result of optical folding that multiplies the images. Similarly gravitational lensing will show multiple images of a light source hidden behind a massive object. The observations allow to compute the mass distribution in the obscuring object, or it allows to get information about a massive planet orbiting a star. McRobie also discusses the morphogenesis part of Thom's book. Although biologists do not seem to pick up these ideas, it was the intention of Thom to explain the catastrophe that allows the asymmetry between male and female genitals while keeping left-right symmetry. McRobie suggests that perhaps it is a higher symmetry in the chemical processes that govern the development of the embryo that results in this kind of evolution.

The trailing part of the book is devoted to catastrophe theory in art. Simple line drawings have only folds (the outlines) and cusps. But as painters, sculptors, and architects developed their skills, more complex swallowtails started showing in their work, long before Thom developed his catastrophe theory. For example folds in the fabric of the clothes were shown in paintings. That was new. In sculptures, it was previously the responsibility of the observer to look at the object from the right angle to detect them. In paintings, it is the artist who is the observer and represents them in his painting. But it is not only the human body that shows these curves, other illustrations of Thom's theory are represented. For example David Hockney painted the flickering of the sun in swimming pools. However, the first one to really use Thom's form language was Naum Gabo, a contemporary of Thom, although they never met. In his *Linear Construction No. 2* (1970-71) made of strings, so that the surface can intersect itself so that the singularities are clearly seen. Organic forms have also entered architecture. Gaudi is an obvious example but others have followed: Frank Gehry, Santiago Salatrava, etc.

Why do we find curves beautiful and pleasing? McRobie devotes a chapter pondering this question and ascribes this to an inherent result of evolution, something that is hidden in our genes. He even refers to the Berlin School of *Gestalt* psychology. He discusses *The Analysis of Beauty* (1753), a book by William

Hoghart, in which he praises the beauty of the S-shaped curve, which is also the basic shape in catastrophe theory. Alan Hollinghurst refers to this in his Booker Prize novel *The Line of Beauty* (2004).
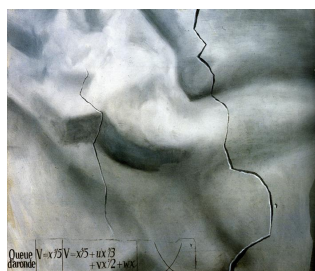
Topological Abduction...
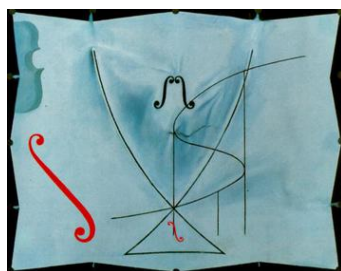
The Swallow Tail...

Other examples

In the penultimate chapter McRobie discusses the person of René Thom (1923-2002) and his work. Thom received the Fields Medal (1958) and the Brouwer Medal (1970). When he drifted away from topology and started applying his catastrophe theory to biology, morphogenesis, linguistics and epistomology, he got critizised by Smale who proposed chaos theory as a much more sound and general alternative. Also Vladimir Arnol'd did not approve Thom's philosophical writing style. His semi-mystical writings however were attractive amongst the postmodernist community. When in a 1980 publication he rejected indeterminism in sciene he earned Ilya Prigogine as a new opponent. Salvador Dalí was an admirer of Thom's work and organized in his Museum in Figueres a debate in 1985.

Dalí is the subject of the last chapter. He called Thom's theory "the most beautiful aesthetic theory in the world". When Thom told him he was using his theory on tectonic plate movements, Dalí made his penultimate painting *Topological Abduction of Europe: Homage to René Thom* (1983). It shows the text *Que d'aronde* (swallowtail) and Thom's formula $V = x^5/5 + (ux^3)/3 + (vx^2)/2 + wx$ and the swallowtail graph. The crack symbolises the catastrophe. His last painting in May of the same year was *The Swallow's Tail – Series of Catastrophes.*

This is a marvelous book, printed in two columns on glossy paper, with ample illustrations. The technical discussion is only minor and the formulas are left out. McRobie does hint at the applications and explains some at a rather high level, but this is nothing to be afraid of if you are not a mathematician. Thom has raised a lot of controversy in the later part of his life, but he has several quite reknowned contributions to mathematics too, but these are left aside in this discusson. A coffee-table book? Yes but there is plenty of interesting stuff to read too.   Adhemar Bultheel

References

[1] Filipe Cucker *Manifold Mirrors, The Crossing Paths of the Arts and Mathematics.* Cambridge U. Press, 2013. (BMS-NCM News issue 96 (2014))

[2] Michele Emmer *Mathematics and Culture I-VI.* Springer, 2004-2009.
A series of books. (BMS-NCM News issues 50 (2004) & 56 (2006) EMS Review here)

[3] Michele Emmer *Imagine Math 1-3.* Springer Verlag, 2012-2015.
Book series. (BMS-NCM News issue 93 (2013), EMS Reviews here & here)

[4] Lynn Gamwell *Mathematics and Art: A Cultural History.* Princeton U. Press, 2015.
A marvelous art book, relating mathematics, art and philosophy (EMS Review here)

[5] Georg Glaeser *Geometry and its Applications in Arts, Nature and Technology.* Springer, 2012.
Many pictures but with emphasis on the applications. (EMS Review here)

[6] Alexander J. Hahn *Mathematical Excursions to the World's Great Buildings.* Princeton U. Press, 2012. Here the shapes are more defined by conic sections. (EMS Review here)

[7] D. Schattschneider, M. Emmer *M.C. Escher's Legacy, a Centennial Celebration.* Springer, 2003. (BMS-NCM News issue 60 (2006))

[8] Marjorie Senechal *Shaping Space. Exploring Polyhedra in Nature, Art, and the Geometrical Imagination.* Springer, 2013. (EMS Review here)

Aspects of higher representation theory:
quantum groups and categorification

21-25 JANUARY 2019 / BRUSSELS

A minicourse and conference

Keynote speakers
Marcelo Aguiar – *Cornell University, US*
David Jordan – *University of Edinburgh, UK*
Steve Lack – *Macquarie University, Australia*
Volodymyr Mazorchuk – *Uppsala University, Sweden*
Grégoire Naisse – *Université catholique de Louvain, Belgium*
Sergey Neshveyev – *University of Oslo, Norway*
Dmitri Nikshych – *University of New Hampshire, US*
Raphael Rouquier – *UCLA, US*
Catharina Stroppel – *University of Bonn, Germany*
Daniel Tubbenhauer – *University of Zurich, Switzerland*
Ben Webster – *University of Waterloo, Canada*

Organising commitee
Kenny De Commer – *Vrije Universiteit Brussel*
Pedro Vaz – *Université catholique de Louvain*
Joost Vercruysse – *Université libre de Bruxelles*

Information and registration: http://homepages.ulb.ac.be/~hopfalgb/Aspects/
aspects18@gmail.com

Groups, Rings and Associated Structures 2019

Spa, Belgium | June 09-15, 2019

http://homepages.vub.ac.be/abachle/gras2019/

Invited Speakers

Silvio Dolfi
Be'eri Greenfeld
Urban Jezernik
Wolfgang Kimmerle
Frieder Ladisch
Victoria Lebed
Markus Linckelmann
Sugandha Maheshwary
Johan Öinert
Ofir Schnabel
Doryan Temmerman
Joan Tent
Jacques Thévenaz
Carolina Vallejo
Arne Van Antwerpen
Thomas Weigel
Pavel Zalesskii

Keynote Speakers

Florian Eisele
Andrei Jaikin-Zaipirain
Radha Kessar
Gunter Malle
Volodymyr Mazorchuk
Claudio Procesi
Wolfgang Rump
Agata Smoktunowicz
Britta Späth
Leandro Vendramin

Scientific Committee

Eli Aljadeff
Ferran Cedó
Eric Jespers
Jan Okniński
Ángel del Río
Špela Špenko
Michel Van den Bergh

coll. Musées de la Ville d'eaux – Spa

AFFICHES D'ART O. DE RYCKER & C⁰ BRUXELLES

Carrièremogelijkheden: Onderwijsontwikkelaar (11835)

Vacatureformulier-id **11835** - Gepubliceerd **08-11-2018** - **Administratief en Technisch Personeel** - **100%** - **Extern** - **Centrale administratie** - **CA10** - **Directie Onderwijsaangelegenheden**

Over de UGent

De Universiteit Gent is een wereld op zich. Meer dan 8.000 personeelsleden zijn er dagelijks aan de slag in onderwijs en onderzoek, beheer en administratie, technische en sociale voorzieningen, enz. Voor hen is de Universiteit Gent een logische keuze: het is een van de grootste, meest boeiende en toekomstgerichte werkgevers van de regio. De Universiteit Gent telt 11 faculteiten en meer dan 100 vakgroepen, die in elk van de wetenschappelijke disciplines hoogstaande en door onderzoek ondersteunde opleidingen aanbieden. De Universiteit Gent voert een actief gelijke kansen- en diversiteitsbeleid en moedigt iedereen aan te solliciteren.

Voor de faculteiten en de directie Onderwijsaangelegenheden zijn wij op zoek naar voltijds onderwijsontwikkelaars. Deze functie behoort tot de functieklasse A, die de graden 7 t.e.m. 9 en de salarisschalen 7.1 t.e.m. 9.2 behelst.

UGent definieerde activerend leren als een speerpunt in haar onderwijsbeleid en wil activerende onderwijs-, leer- en evaluatie-activiteiten de komende jaren universiteitsbreed en duurzaam inbedden in alle faculteiten en opleidingen. Daarvoor zijn we op zoek naar gemotiveerde onderwijsontwikkelaars.

Momenteel is reeds een didactisch projectteam samengesteld dat activeren in opleidingsonderdelen en opleidingen promoot en ondersteunt bestaande uit vier centrale projectmedewerkers. Deze vier centrale projectmedewerkers zijn geïntegreerd binnen het team onderwijsprofessionalisering van de afdeling onderwijskwaliteitszorg (binnen de Directie Onderwijsaangelegenheden).

Om dit project te versterken zijn we nu op zoek naar extra projectmedewerkers activerend onderwijs. Deze medewerkers zullen fungeren als 'facultaire antennes' voor activerend leren voor de 11 faculteiten. Ze zullen werken als onderwijsontwikkelaars omtrent activerend onderwijs binnen de faculteiten, en een team vormen samen met de centrale projectmedewerkers activerend leren, en het team onderwijsprofessionalisering van de afdeling onderwijskwaliteitszorg.

Dit team zal opleidingen en lesgevers van opleidingen gericht begeleiden om geschikte activerende onderwijs- en leeractiviteiten, passende (permanente) evaluaties en efficiënte vormen van feedback in het onderwijs in te bouwen vanuit een evidence-based benadering.

Er zal met dit project een aanbod aan professionalisering en begeleiding ontwikkeld en aangeboden worden. Dit aanbod wordt (1) gedifferentieerd, (2) blended, (3) gestuurd vanuit noden van opleidingen en (4) proactief opgevat.

Jouw opdracht

- Je implementeert in opleidingen evidence-based methodieken voor 'activerend (her)ontwerpen' die centraal werden ontwikkeld. Je past deze methodieken aan in functie van opleidingsspecifieke noden in de faculteit(en) waar je als antenne werkt

- Je volgt onderwijskundige literatuur op inzake activerend leren en speurt actief naar nationale en internationale good practices uit de onderwijspraktijk
- Je staat in nauw contact met de centrale projectmedewerkers met het oog op verdere verfijning van methodieken en bijkomende ontwikkelingen en participeert samen met hen in het onderzoeksproject 'activerend onderwijs' (onderzoeksdesign, dataverzameling, analyse, discussie en implicaties)
- Je verzorgt trainingssessies over educational (re)design voor academisch personeel
- Je bent mede verantwoordelijk voor het screenen van bestaand didactisch materiaal over activerend leren, voor het verzamelen van good practices binnen en buiten de UGent, voor het ontwikkelen van bijkomend didactisch materiaal over activeren en het herwerken van dit materiaal in een e-cursus, voor het ontwikkelen en implementeren van trainingen over activerend leren, … en dit specifiek voor de faculteit(en) waarvoor je als antenne wordt ingezet
- Je enthousiasmeert en overtuigt lesgevers van de meerwaarde van het inzetten van actieve werkvormen in hun onderwijs
- Je helpt mee de bekendheid en de duurzaamheid van het project 'activerend onderwijs' te vergroten in de gehele faculteit(en) waar je als antenne wordt ingezet

Jouw profiel

Diploma:
Je hebt een diploma van master (of daarmee gelijkgesteld diploma):
- Bij voorkeur master in de pedagogische wetenschappen
- Een ander masterdiploma met vergelijkbare expertise op basis van ervaring in een gelijkaardige functie

Kennis en ervaring:
- Je hebt kennis van en inzicht in onderwijskundige literatuur en van ontwikkelingen en good practices in de onderwijspraktijk. Kennis van het onderwijsbeleid binnen en buiten de Universiteit Gent is een pluspunt
- Je hebt bij voorkeur voeling met/ervaring in één of meerdere faculteiten waar je als antenne zal worden ingezet
- Je hebt kennis van didactische werkvormen in het hoger onderwijs
- Je hebt kennis van actuele onderwijsvernieuwingen in het hoger onderwijs
- Je hebt ervaring met nieuwe didactische inzichten en digitale leeromgevingen

Vaardigheden en attitudes:
- Je beschikt over goede coachingsvaardigheden zowel voor groepen als voor individuen en bent in staat om veranderingstrajecten bij professoren te begeleiden
- Je beschikt over goede contactvaardigheden
- Je beschikt over goede didactische vaardigheden
- Je beschikt over uitstekende communicatieve vaardigheden
- Je bent discreet
- Je kan zelfstandig werken
- Je hebt een doelgerichte werkattitude
- Je hebt een dynamische en enthousiaste werkattitude
- Je hebt verantwoordelijkheidszin
- Je bent stressbestendig
- Je bent teamgericht
- Je bent flexibel

- Je beschikt over uitstekende computervaardigheden met Microsoft Office pakketten
- Je spreekt en schrijft vloeiend Nederlands en beschikt over goede schriftelijke vaardigheden in het Engels

Algemene functie-eisen:
- een gedrag hebben dat in overeenstemming is met de eisen van de beoogde betrekking;
- de lichamelijke geschiktheid bezitten die vereist is voor het uit te oefenen ambt.

Toelatingsvoorwaarden
Diploma van master (of daarmee gelijkgesteld diploma)
Aan de toelatingsvoorwaarden moet voldaan worden op de uiterste inschrijvingsdatum

Ons aanbod
Je wordt tewerkgesteld met een contract van onbepaalde duur in functieklasse A met een verloning volgens salarisschalen 7.1 tot 9.2 afhankelijk van de relevante ervaring.
Wedde aan 100 %: min. € 21.278,78 – max. € 40.955,09; geïndexeerde brutomaandwedde (aan 170,69%): min. € 3.026,73 – max. € 5.825,52

We bieden een boeiende job met een aantrekkelijke loopbaan, 38 dagen vakantieverlof, een fietsvergoeding, terugbetaling van je abonnement openbaar vervoer voor woon-werkverkeer, een hospitalisatieverzekering, ecocheques en een ruim vormings- en opleidingsaanbod. Een volledig overzicht van onze personeelsvoordelen kan je vinden op onze website: http://www.ugent.be/nl/vacatures/personeelsvoordelen.htm

Selectieprocedure
De selectieprocedure bestaat uit de volgende eliminerende onderdelen:
- Dossierselectie
- Inhoudelijke proef die, onder voorbehoud van wijzigingen, doorgaat op dinsdag 4 december van 17:00 tot 20:00 of op donderdag 6 december van 14:00 tot 17:00
- Geschiktheidsonderzoek
- Eindselectie

Het geschiktheidsonderzoek en de testen zullen op masterniveau worden afgenomen. Je wordt bij elke stap in het selectieproces op de hoogte gehouden van je kandidatuur.

We vinden het belangrijk dat elke persoon in de beste omstandigheden kan deelnemen aan de selectieproeven. Heb je een beperking, geef ons dan vooraf een seintje via 09 264 34 36 zodat we de nodige aanpassingen kunnen voorzien.

Voor meer informatie omtrent deze selectieprocedure kan je contact opnemen met de afdeling Werving en Selectie op het nummer 09 264 34 36. Voor meer informatie in verband met de functie-inhoud kan je contact opnemen met Prof. Dr. Ilse De Bourdeaudhuij op het nummer 09 331 00 22 of met Prof. Dr. Tammy Schellens op het nummer 09 264 86 63.

Interesse?
Bezorg ons uiterlijk op **donderdag 22 november 2018 om 23.59 uur** de volgende documenten:
- Cv
- Motivatiebrief, waarbij je ook op gemotiveerde wijze ingaat op de voorkeur voor faculteit(en) waar je kan ingezet worden als activo-antenne;

- Een overzicht van de behaalde studieresultaten (samengevoegd in 1 bestand; laad dit op onder "extra documenten" in je online sollicitatie)
- Een kopie van je hoogst behaalde diploma relevant voor deze functie. Heb je dit als huidige UGent-medewerker eerder ingediend, dan hoef je dit niet opnieuw te doen.
- Indien je je diploma buiten de Europese Unie behaald hebt: een gelijkwaardigheidsattest van NARIC (www.naric.be)

Dit kan enkel online via deze toepassing. Zorg ervoor dat je alle gevraagde documenten oplaadt. Let op: stuur je sollicitatie niet via e-mail door, maar solliciteer online via deze toepassing.

Data Analyst Engineer for new technology applications (Leuven or Lommel or Kortrijk)

You use data analytics and machine learning techniques to predict machine behavior and derive the optimal settings for robots, autonomous vehicles and industrial machines.

Use computing power for high tech applications

Flanders Make research engineers are experts in developing new technologies for machines and vehicles. Automotive companies and machine builders in Flanders are looking for predictive control and data analytics for the next step to take in their innovation process.

> *What if you could predict machine failure by analyzing measurements?*
> *Why do certain automotive parts result in better performance?*

For the development of high tech machinery (f.e. compressor, 3D printer, self-guided robot, autonomous vehicle…), you will:
-Work together in a research team that combines expertise in artificial intelligence with the operation and control of machines and vehicles;
-Take the lead in developing predictive algorithms, to process the data and derive the optimal settings of the machine (Model Based Data Analytics).

More concretely, you:
- Understand the goal of the measurement campaign and discuss how to gather relevant data with the team (f.e. temperature signals, accelerometer signals, energy measurements, failure signals,…);
- Provide structure and insight into the raw data;
- Find ways to process the flow of data;
- Use current methods of data analytics, machine learning and deep learning techniques to search for relevant connections between input signals (f.e. which environmental factors could be influencing the energy efficiency of the machine?);
- Use and Model predictive algorithms and interpret the results;
- Draw conclusions and suggest improved parameters, for better performance or to influence the energy efficiency.

Statistical mind with passion for technology

You have
- A Master or PhD degree in Computer Science, Artificial Intelligence, Data analysis, Statistics, Mathematics or other relevant domain;
- At least 3 to 5 years of experience in an industrial or academic environment;
- Relevant experience with experimental design on a real life (non-virtual) technology application (machines, vehicles, robots,..);
- Knowledge of or the ability to use a wide range of methods in data analytics, machine learning (including but not exclusively deep learning), and data wrangling techniques, f.e. random forests, support vector machines, and (convolutional/recurrent/deep) neural networks;

- Experience with at least one machine learning toolkit (Scikit-learn, Mahout, SparkML, Caffe, Tensorflow, R, KNIME, ...) and Matlab/Octave.
- Knowledge of one general purpose programming language like Java, C#, C++.
- A mathematical and statistical mind with a touch of "Data Intuition";
- Communication and Data Visualization skills are a plus.

You are
- passionate about the technology of machines and vehicles;
- creative;
- a good communicator;
- an active listener who can build sustainable relationships.

Live the next milestone for data analytics for high tech applications
- Flanders Make gives you the opportunity to develop yourself in the network of top industrial companies, universities, and research institutes;
- An open-minded, flexible, and challenging working environment;
- A warm atmosphere and top colleagues;
- An attractive salary with fringe benefits.

Flanders Make is working on projects in Leuven and in Lommel. Depending on your place of residence or preference, you can work on one of our sites (flexible workplace policy) or from a satellite office in Kortrijk.

Flanders Make
Flanders Make is the strategic research centre for the manufacturing industry. Our mission is to strengthen the long-term international competitiveness of the Flemish manufacturing industry. That's why we work together with SMEs and large companies on pre-competitive, industry-driven technological research, resulting in concrete product and production innovation in the vehicle industry, the manufacturing industry, and production environments.

Because of our unique position between industry and research, our teams combine application and system proficiency with technological and scientific knowledge. We focus on 4 key competences, all based on modelling and virtualisation:
1. Sensing, monitoring, control and decision-making for products and production
2. (Co)design and optimisation of products and production
3. Motion product specification, architecture, and validation
4. Flexible assembly specification, architecture, and validation

We operate from our offices in Leuven and Lommel and from research facilities at the Flemish universities. Learn more about working at Flanders Make on www.flandersmake.be/jobs

How to apply?
Do you feel you can contribute to our research with your expertise? Do you share our values and our mission? We are looking forward to reading about your story, your interest in Flanders Make and for this job in particular.

To apply, please send your motivation letter and cv to jobs@flandersmake.be

Optimization Research Scientist
(Leuven or Lommel or Kortrijk)

By exploring and prototyping mathematical optimization techniques, you generate alternative designs for complex products (machines, vehicles, …)

Companies are looking forward to take the next step towards an innovative design process.

As a researcher in multidisciplinary design optimization, you will have the opportunity to work on challenging optimization problems and apply various optimization techniques to generate solutions for machine designers. Typical design problems are constraint-based and multi-objective, requiring advanced non-linear mixed-integer solvers.

Focusing on knowledge based engineering tools for high-tech machine and vehicle design, you will:

- work together in a small research team combining expertise in signal processing, computer vision, mechatronics, robotics, machine learning, artificial intelligence, modelling of cyber-physical systems.
- define the adequate models to capture the essence of the problem in the early stages of the design , and identify the parameters linked to the machine or vehicle behavior;
- solve (multi-objective) optimization problems using methods (including but not limited to) convex optimization, constraint programming, nonlinear programming, … Decision variables can be continuous and/or discrete.
- program, implement, test and verify the performance of these methodologies with prototype tools developed in e.g. Cplex, MiniZinc, ASP, Matlab.

Profile

You have

- a Phd in Engineering (Computer Science) or Mathematics (Applied Mathematics, Statistics) or other relevant domain;
- a track record in the field of optimization;
- experience with constraint solvers, search algorithms and optimization toolboxes (Matlab, Cplex);
- a keen interest to apply theoretical concepts on practical case problems.

Any experience with applications on machines and/or vehicles, or affinity with modelling software (Simscape, Amesim, Matlab, Simulink) is a plus.

You are

- passionate about research and new technologies
- a good conceptual thinker
- result oriented, responsible, self directing and team player
- a good communicator
- eager to learn

Experienced engineers will also coach young researchers and lead projects.

Offer

- Flanders Make gives you the opportunity to develop yourself in the network of top industry and universities and research institutes;
- An open-minded, flexible and challenging working environment;
- A warm atmosphere and top colleagues;
- An attractive salary with fringe benefits.

Flanders Make is working on projects in <u>Leuven</u> and in <u>Lommel</u>, with a new base in prospect in West Flanders as well. Depending on your place of residence or preference, you can work on one of our sites (flexible workplace policy) or from a satellite office in <u>Kortrijk</u>.

Flanders Make

Flanders Make is the strategic research center for the manufacturing industry. Our mission is to strengthen the long-term international competitiveness of the Flemish manufacturing industry. That's why we work together with SMEs and large companies on pre-competitive, industry-driven technological research, resulting in concrete product and production innovation in the vehicle industry, the manufacturing industry, and production environments.

Because of our unique position between industry and research, our teams combine application and system proficiency with technological and scientific knowledge. We focus on 4 key competences, all based on modelling and virtualization:

1.   Sensing, monitoring, control and decision-making for products and production
2.   (Co)design and optimization of products and production
3.   Motion product specification, architecture, and validation
4.   Flexible assembly specification, architecture, and validation

We operate from our offices in Leuven and Lommel and from research facilities at the Flemish universities. Learn more about working at Flanders Make on <u>www.flandersmake.be/jobs</u>

How to apply?

Do you feel you can contribute to our research with your expertise? Do you share our values and our mission? We are looking forward to reading about your story, your interest in Flanders Make and for this job in particular.

To apply, please send your motivation letter and cv to <u>jobs@flandersmake.be</u>

Computer scientist for model driven engineering
(Leuven, Kortrijk, or Lommel)

You create innovative concepts and prototype software tools supporting high-tech machine and vehicle design

Manufacturing companies are looking forward to take the next step towards an innovative design process. Since time to market is becoming increasingly important, companies want to find a way to make early design decisions and save time; eg. by sharing design parameters between engineering departments or find synergies in designs in product families.

Propose beyond state-of-the-art prototype software

As a researcher in computational modelling, you will:

- work together in a small research team combining expertise in CDS, model driven engineering, optimization techniques, mechatronic & structural design;
- work on challenging model driven engineering problems and research for new methods, algorithms, frameworks, modelling languages & tools;
- push state of the art software methods beyond the current limits;
- take the lead in setting up prototype software for supporting design tools.

More concretely, for real-life industry designs of eg. a landing gear of airplane, or a complex vehicle exhaust system, …, you:
- characterize in a formal way the design space model (with objectives, constraints, design repository/component database, …) where you integrate parameters like producibility, total cost of ownership, performance…
- use model driven engineering and algorithms of computational design to automatically generate optimal and performant design concepts;
- generate out of the box ideas to make the design space model smaller;
- check which solutions are technically feasible.

Bart, Research Engineer at Flanders Make: " Working on a new concept I enjoy to puzzle variants of existing tools making sure they communicate correctly. When the industrial company finally adopts the solution, …the data really come to life. " Read more on https://www.flandersmake.be/en/testimony-bart

Conceptual Software Researcher

You have

- A Phd in Computer Science, Informatics, Mathematics (or related);
- Experience with model driven engineering;
- A conceptual mind and abstract capacity;
- A strong interest to acquire the necessary skills to work with different modelling languages (eg. SysML, Ecore, OWL, Eclipse, …);
- A strong interest to explore declarative languages.
- Knowledge of modelling software (Simscape, Amesim, Matlab, Simulink, …) is a plus.
- Curiosity for Machine designs/Mechatronics.

You are

– Passionate about research and new technologies;
– Result oriented, responsible, taking initiative;
– Team player;
– A good communicator;
– Eager to learn.

Working at Flanders Make.
Depending on your place of residence or preference, you can work in our offices in Leuven, in Lommel or in Kortrijk (flexible workplace policy).

Discover what we mean by "industry driven research projects" in this project movie: https://www.youtube.com/embed/zXuIIosZbZE

Work on highly innovative² concepts for highly innovative companies
Flanders Make gives you the opportunity to develop yourself in the network of top industrial companies, universities, and research institutes;

– An open-minded, flexible, and challenging working environment;
– A warm atmosphere and top colleagues;
– An attractive salary with fringe benefits.

Flanders Make is the strategic research centre for the manufacturing industry. Our mission is to strengthen the long-term international competitiveness of the Flemish manufacturing industry. That's why we work together with SMEs and large companies on pre-competitive, industry-driven technological research, resulting in concrete product and production innovation in the vehicle industry, the manufacturing industry, and production environments.
Because of our unique position between industry and research, our teams combine application and system proficiency with technological and scientific knowledge. We focus on 4 key competences, all based on modelling and virtualization:
1.   Sensing, monitoring, control and decision-making for products and production

2.   (Co)design and optimization of products and production
3.   Motion product specification, architecture, and validation
4.   Flexible assembly specification, architecture, and validation
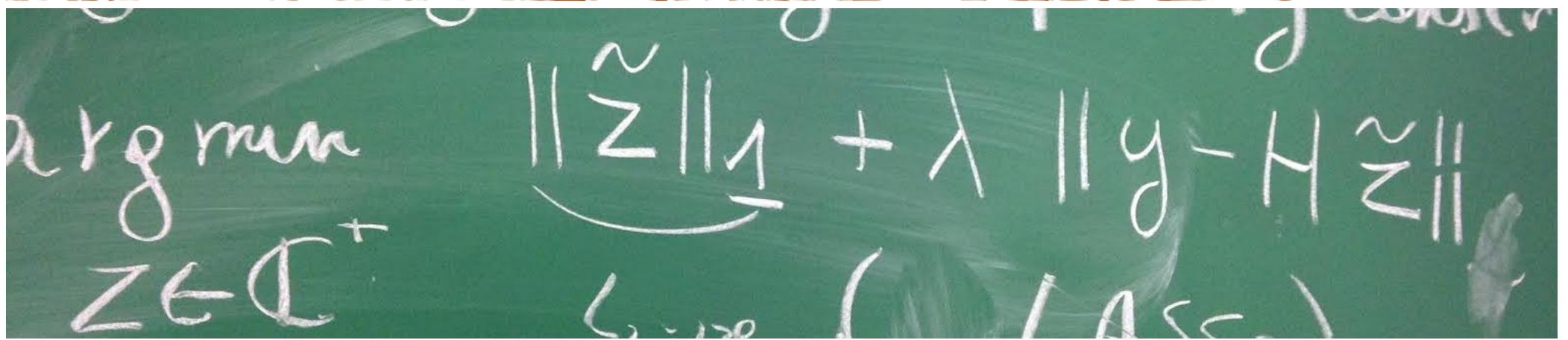
How to apply?
Do you feel you can contribute to our research with your expertise? Do you share our values and our mission?

We are looking forward to reading about your story, your interest in Flanders Make and for this job in particular.
To apply, please send your motivation letter and cv to jobs@flandersmake.be

WEDNESDAY DECEMBER 5 2018

RECENT BREAKTHROUGHS IN MATHEMATICS

Université libre de Bruxelles
Campus Plaine
Forum E

The Belgian Mathematics Society is happy to invite you to an afternoon's discussion by international and local experts on some of the more breathtaking breakthroughs in contemporary mathematics.

Welcome from 1:30 PM. Talks from 2PM to 6PM. **Participation is free but registration is mandatory.**

Speakers:

- **Stéphane Jaffard** (UPEC, Paris), about wavelets and Yves Meyer's Abel prize in 2017

- **Jean Van Schaftingen** (UCLouvain), about PDEs and Alessio Figalli's Fields medal in 2018

- **Matthew Morrow** (IMJ-PRG, Paris), about algebraic geometry, perfectoid theory and Peter Scholze's Fields medal in 2018

- **Gautami Bhowmik** (Lille), about number theory and Akshay Venkatesh's Fields medal in 2018.

Register now on

bms.ulb.ac.be/cgi/breakthroughs.php

ULB

Event organised and sponsored by the BMS board. A drink will be offered after the talks to all registered participants.

S B G