IMU-Net 88: May 2018
A Bimonthly Email Newsletter from the International Mathematical Union
Editor: Martin Raussen, Aalborg University, Denmark

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1. EDITORIAL: ICM 2018

Dear Colleagues,
After so many months of work and expectation, the year of the Congress has finally arrived!

Preparations are well under way: the bulk of the scientific program has been defined, the proceedings are being finalized (the papers by plenary and invited speakers will be distributed to all the participants at the Congress), travel grants have been awarded to participants from the developing world, communications and posters are being selected as I write, and registration of participants is also taking place right now. Keep in mind that the deadline for early advance registration, with reduced registration fee, is April 27.

Much of our effort over the last couple of years has been geared towards advertising the Congress, domestically and abroad, as we take the occasion as a historic opportunity to popularize mathematics in our society and, especially, amongst the Brazilian youth. I believe we are being very successful.

The Biennium of Mathematics 2017-2018, formally proclaimed by the Brazilian national parliament, encompasses a wide range of outreach initiatives throughout the country, and raised the profile of mathematics in mainstream media to totally unprecedented levels. Thus after hosting the 2014 FIFA World Cup finals, and the 2016 Olympic Summer Games, Rio de Janeiro is now equally proud to receive the 2018 International Congress of Mathematicians.

A welcome video has been produced and posted at the ICM 2018 official YouTube channel (check https://youtu.be/_OT4Vf8hr44) that provides a glimpse at the ICM in the Wonderful City. While much remains ahead of us, I assure you that the Organizing Committee is doing its very best to ensure that the first ICM ever held in the Southern Hemisphere will be a truly memorable event. Come and check!

See you soon in Rio!

Marcelo Viana (Chair, ICM 2018 Organizing Committee)

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2. IMU GENERAL ASSEMBLY MEETING IN SÃO PAULO

The next General assembly (GA) meeting of the IMU will take place on 29–30 July 2018 in São Paulo, Brazil. The venue of the GA meeting will be the Sheraton WTC Hotel in São Paulo. Delegates are expected to arrive on July 28. The GA meeting ends in the evening of July 30. On July 31, the GA organizers offer to all registered GA participants and accompanying persons attending the ICM, a bus tour from São Paulo to Rio de Janeiro.

For additional information, concerning delegations, agenda, voting rights, travel support, registration etc., please consult the secretary's circular letter.

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3. CDC PANEL DISCUSSION AND POSTER SESSION DURING ICM 2018

On Tuesday August 7, 2018 from 6 pm – 8 pm the IMU Commission for Developing Countries (CDC) organizes a panel discussion and poster session on Strengthening Mathematics in the Developing World, included in the discussion panels section of the scientific program of the ICM 2018.

Moderated by CDC member Angel Pineda (USA) the panelists will comprise: Wandera Ogana (IMU-CDC President, Kenya), Marie-Françoise Roy (IMU-CWM Chair, France), Yuri Tschinkel (Simons Foundation Director of Mathematics and the Physical Sciences, USA), Paolo Piccione (President of the Brazilian Mathematical Society, Brazil), Jose Maria Balmaceda (President of the Southeast Asian Mathematical Society, Philippines), Nouzha El Yacoubi (President of the African Mathematical Union, Morocco), and Alejandro Jofre (Secretary of the Mathematical Union of Latin America and Caribe, Chile).

After the panel discussion there will be a poster session at which panelists and representatives of near 20 different organizations and institutions worldwide will present posters with more information about their organizations and development efforts. An open discussion with poster presenters and panelists will take place in the same room as the panel discussion. The goal of this IMU-CDC activity is to share information about mathematical development activities with mathematicians at the ICM and to serve as a catalyst for interactions between mathematicians, organizations and funding agencies.

More information and updates can be found at https://www.mathunion.org/cdc/cdc-panel-discussion-and-poster-session-during-icm-2018

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4. FIELDS MEDALIST ALAN BAKER PASSED AWAY

In 1966 a new era in transcendental number theory was marked by the young British mathematician Alan Baker at Cambridge. In a cascade of papers he published solutions to a series

of outstanding Diophantine problems and thereby revitalizing a theory which had come to stagnation after a golden period between 1930 and 1949 with the solution of Hilbert's 7th problem posed in a plenary lecture at the international congress of mathematicians in Paris in 1900. In 1934, very surprisingly, Theodor Schneider, a student of Siegel, and A. O. Gelfond gave the solution and showed $2^{\sqrt{2}}$ to be transcendental. In the subsequent years they pushed forward the techniques and essentially reached the limits of the method now known as the Gelfond-Schneider method. To much surprise Alan Baker got into this very difficult part of number theory from around 1964 working on it in Britain very much on his own.

Alan Baker was born on 19 August 1939 in Forest Gate in East London. From a very early age on he was showing signs of mathematical brilliance and was encouraged by his parents. He got a first class degree at University College London before he moved to Trinity College to study with Davenport. During this time he published between 1962 and 1965 eight papers which made his very high mathematical potential visible. In 1965 he received his doctorate degree and was elected Fellow of Trinity College as a research Fellow.

In 1970 at the ICM in Nice Alan Baker was awarded the Fields Medal on the basis of his outstanding work on linear forms in logarithms. It had been known for long time that this would solve a number of outstanding problems in number theory like the so-called class number problem of Gauss. The Gelfond-Schneider method could not be applied to general linear forms in logarithms which were needed for these applications. In a completely unexpected and spectacular way Alan Baker succeeded to find a miraculous new approach for dealing with this problem. He received many honors including the Adams prize, the election to the Royal Society, to the Academia Europaea, he was made an honorary Fellow of University College London, a foreign Fellow of the Indian Academy of Science, a foreign Fellow of the National Academy of Sciences India (1993) and an honorary member of the Hungarian Academy of Sciences (2001).

The new theory of transcendental numbers which started from Baker's fundamental insight has been further developed in the last decades and applied in many fields of mathematics quite far away from number theory. Alan Baker passed away on February 4 but his work stays and is part of the mathematical culture.

Gisbert Wüstholz (ETH Zurich, Switzerland)

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5. CWM: FACES OF WOMEN IN MATHEMATICS

Eugenie Hunsicker, chair of the London Mathematical Society's Women in Mathematics Committee, and her sister Irina Linke, a cinematographer, produced a short film for International Women's Day March 8 2018 featuring cameos by women mathematicians around the globe. Each woman gives her name and country and says in her own language "I am a mathematician". Eugenie had contacted the IMU Committee for Women in Mathematics (CWM), who decided to support their project. A request for film clips sent around the world through the 120 CWM Ambassadors list resulted in a phenomenal response—149 clips representing 249 women from 37 countries speaking 32 languages, and collected in less than one month.

The initial plan was for the film to be 3 min long, but Irina and Eugenie wanted to include all the clips (the last one from Agustina, 6 years old, who "wants to be a mathematician") and CWM provided financial support for Irina's heavy editing task.

The film emphasises the international nature of mathematics. There are women in the film speaking Chinese in the US, Greek in the Netherlands. There's a clip of a Russian woman speaking Tatar in Germany; and in one single clip from the UK, Hebrew, Brazilian, German and English are spoken.

The focus of the film is on proud, strong women that are actively doing maths, but it also emphasizes that it's not unusual for women to work in mathematics. The film shows women everywhere who enjoy it and do it as a profession. It is also an opportunity for people to see images of strength and pride from developing countries. It's a film about women, but it's also about expanding people's ideas about countries that are often only heard about in the context of crisis. One aim of the movie is that the next time people hear about Nigeria, Nepal or the Philippines, they think, `Oh, yeah, that is the place with all of those fantastic women mathematicians!'"

The film (14 mn 02 sec) can be seen at: https://vimeo.com/259039018
A trailer (2 mn 40 sec) can be seen at: https://vimeo.com/260633621
There is also a devoted Facebook page:
https://www.facebook.com/facesofwomeninmathematics/
The film has been a huge success since its release on March 8 2018, with more than 26,000 views during the first three days.

Marie-Françoise Roy, chair of CWM,
based on Eugenie Hunsicker's and Irina Linke's press release.

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6. REPORT ON THE ISC GENERAL ASSEMBLY

In July this year, the International Council for Science (ICSU) and the International Social Science Council (ISSC) will take the last step towards the constitution of a single unified Council, already known as the International Science Council (ISC). In fact, the first General Assembly of the ISC is to be held in the period July 3-5 in Paris, where its first Executive Committee will be elected.

This General Assembly will culminate a long process that began in 2015 with an exchange of correspondence between the respective presidents of the ICSU and the ISSC. Intensive work continued until in October, 2016, the two General Assemblies of the ICSU and the ISSC voted in favour of merging the two organizations. The final decision was scheduled the year after. The go-ahead was approved at the joint General Assembly of ICSU and ISSC held in Taipei last year, in October 2017. Throughout this process the two councils maintained full transparency between themselves and their members. Everyone is aware of the enormous difficulties involved in the coordination of this transition.

The new Council now faces a crucial task in its role as the single voice for science. Unilateral solutions are insufficient for the serious challenges facing humanity, such as sustainability, climate change, the new migratory waves caused by this change, the search for alternative energy sources, etc.. These are problems for which an interdisciplinary approach is vital, and in which the social

sciences will play an important role. There is no doubt that mathematics will also form an essential part of the new council. The IMU must continue its already growing collaboration with this body.

Furthermore, science cannot be regarded as an asset that belongs to only a few; it is a force for the common good that should be enjoyed by all citizens of the world and from which they should all profit. Hence, one of the main tasks is to convey this message to the heart of society. The IMU should make the most of this opportunity to emphasize the key role played by mathematics across the board in science and technology.

A General Assembly such as the one to be held in Paris is not only a constituent assembly, but also the presentation to the world of a Scientific Council that, for the first time in history, includes almost all sciences. It is also a magnificent opportunity for attracting considerable media attention. We at the ISC are fully aware of this opportunity and it will be reflected in the programme. To that end, the event will take place at a very special venue, the Oceanography Institute *Maison des Océans* in the centre of Paris, a historic monument opened by Prince Albert I of Monaco in 1911. The ISC encourages all the national members, unions and associates to attend this General Assembly, which will undoubtedly constitute a historical milestone.

Manuel de Leon (ICMAT, Madrid, Spain, Regular Member of the ICSU Executive Board)

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7. ICIAM 2019 CONGRESS

The ICIAM 2019 congress will take place in Valencia (Spain) on 15-19 July 2019.

The call for mini-symposia for congress is now open. The deadline for submissions is November 5th, 2018.

Professor Françoise Tisseur (University of Manchester) will give the 2019 Olga Taussky-Todd Lecture.

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8. ABEL PRIZE 2018 TO ROBERT LANGLANDS

The Norwegian Academy of Science and Letters has decided to award the Abel Prize for 2018 to Robert P. Langlands of the Institute for Advanced Study, Princeton, USA, “for his visionary program connecting representation theory to number theory.” The mechanisms he suggested to bridge these mathematical fields led to a project named the *Langlands program*. The program has enlisted hundreds of the world’s best mathematicians over the last fifty years. No other project in modern mathematics has as wide a scope, has produced so many deep results, and has so many people working on it. Its depth and breadth have grown and the Langlands program is now frequently described as a grand unified theory of mathematics.

Robert P. Langlands will receive the Abel Prize for his work from His Majesty King Harald V at an award ceremony in Oslo on 22 May.

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9. 2018 WOLF PRIZE IN MATHEMATICS TO BEILINSON AND DRINFELD

The jury panel of the 2018 Wolf Prize in Mathematics has unanimously decided to award the prize in equal parts to two laureates: Professor Alexander Beilinson and Professor Vladimir Drinfeld, both from the University of Chicago, "for their groundbreaking work in algebraic geometry, representation theory, and mathematical physics".

Alexander Beilinson made deep contributions to representation theory and algebraic geometry. Among his major achievements are proofs of conjectures of Kazhdan-Lusztig and Jantzen, the formulation of far-reaching conjectures (Beilinson conjectures) about motivic cohomology and special values of L-functions, and his joint work with Vladimir Drinfeld on the geometric Langlands program which stimulated major progress at the interface of geometry and mathematical physics: in the theory of vertex operator algebras, conformal field theory, and string theory.

Vladimir Drinfeld introduced fundamental concepts in arithmetic geometry, the theory of algebraic groups, and their representations, which had an enormous impact on modern mathematics. Among his contributions to arithmetic geometry are the notions of Drinfeld module, Drinfeld upper half-plane, and Drinfeld shtukas. His theory of quantum groups is central to many problems in algebra and mathematical physics; here, the notion of Drinfeld associator plays a major role. Jointly with Alexander Beilinson, he geometrized the theory of vertex operator algebras, which led to the creation of foundations of the geometric Langlands program, connecting central results in arithmetic geometry and the theory of automorphic forms to quantum field theory and the theory of integrable systems.

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10. MSC 2020: REVISION OF MATHEMATICS SUBJECT CLASSIFICATION

Mathematical Reviews (MR) and zbMATH cooperate in maintaining the Mathematics Subject Classification (MSC), which is used by these reviewing services, publishers, and others to categorize items in the mathematical sciences literature. They have initiated the process of revising the current MSC2010 with an expectation that the revision will be used beginning in 2020. No changes are planned at the two-digit level; however, it is anticipated that there will be refinement of the three- and five-digit levels.

At this point, zbMATH and MR welcome additional community input into the process. Comments should be submitted through the Web by creating an account at https://msc2020.org/# .

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