

## IMU-Net 99: January 2020

A Bimonthly Email Newsletter from the International Mathematical Union

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### 1. EDITORIAL: LADYZHENSKAYA MEDAL IN MATHEMATICAL PHYSICS ANNOUNCED

Olga Alexandrovna Ladyzhenskaya (1922-2004) occupies a very special place in the history of mathematics and mathematical physics in St Petersburg, Russia, and worldwide. Her theorems shaped the modern theory of Partial Differential Equations of mathematical physics. Through her lectures, seminars, and students, she inspired extraordinary advances in many other branches of mathematical physics, including Quantum Field Theory and Statistical Physics.

2022, the year of the St Petersburg ICM, will mark the 100th birthday of Olga Alexandrovna. The National Committee of Mathematicians of Russia, St Petersburg State University, and, for the inaugural prize, the Organizing Committee of the ICM establish a new prize in honor of Ladyzhenskaya to be awarded for the first time at a special event dedicated to the Ladyzhenskaya Centennial during ICM 2022.

The Ladyzhenskaya medal in mathematical physics will be awarded every 4 years to recognize revolutionary results in or with applications to mathematical physics. This includes any existing or future area of research in mathematical physics and neighboring fields of mathematics.

The winner receives a medal and a cash award of 1 million rubles. If the main work is joint among several people, the committee may consider a shared prize. Full statues of the prize may be found at [icm2022.org](http://icm2022.org).

Nominations should be submitted to the Chair of the 2022 Prize Committee, Professor Giovanni Felder at [giovanni.felder@math.ethz.ch](mailto:giovanni.felder@math.ethz.ch). Each nomination should contain a detailed description of the work of the candidate and how it fits in the overall development of the field, and include references. Nominations are confidential and must not be disclosed to the candidate. The deadline for nominations is **December 1, 2021**.

In its decisions, the prize Committee will be guided by the pursuit of excellence as well as attention to the diversity of both the field of mathematical physics and the people who work in it. The winner(s) of the prize will be announced during ICM 2022.

The organizers of the prize invite proposals for the design of the award insignia. Proposal should be submitted to [loc@icm.org](mailto:loc@icm.org). The best proposal will receive an invitation to the OAL Centennial and a modest cash award.

To learn more about the extraordinary life and career of Olga Alexandrovna Ladyzhenskaya, a great resource is the article <https://www.ams.org/notices/200411/fea-olga.pdf> in the Notices of the AMS by S. Friedlander, P. Lax, C. Morawetz, L. Nirenberg, G. Seregin, N. Uraltseva, and M. Vishik; as well as the contribution <https://www.ams.org/journals/bull/2019-56-01/S0273-0979-2018-01656-X/S0273-0979-2018-01656-X.pdf> to the Bulletin of the AMS by S. Friedlander. Further material and references may be found on the site of the St. Petersburg Mathematical Pantheon devoted to O.A. Ladyzhenskaya and on the ICM webpage, see in particular the collection of essays <https://icm2022.yandex.com/blog/newsletter-1-olga-ladyzhenskaya>

Stanislav Smirnov (Head of the ICM 2022 Local Organizing Committee)

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## 2. [CEIC](#): NOTES AND COMMENTS

The last year has had a number of developments in the scholarly publishing landscape. The following two articles by Diana Kwon give a very nice overview of 2019's news and what might be coming in 2020:

<https://www.the-scientist.com/news-opinion/2019-was-big-for-academic-publishing--heres-our-year-in-review-66877>

<https://www.the-scientist.com/news-opinion/what-to-expect-in-the-publishing-world-in-2020--66882>

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## 3. [CDC](#): FELLOWSHIPS AND VISITING SCHOLAR PROGRAM

### a. Nominations for the IMU Breakout Graduate Fellowships solicited

Thanks to a generous donation by the winners of the Breakthrough Prizes in Mathematics – Ian Agol, Jean Bourgain, Simon Donaldson, Alex Eskin, Christopher Hacon, Maxim Kontsevich, Vincent Lafforgue, Jacob Lurie, James McKernan, Terence Tao and Richard Taylor – IMU with the assistance of [FIMU](#) is opening a new call of the *IMU Breakout Graduate Fellowship* program to support postgraduate studies, in a developing country, leading to a PhD degree in the mathematical sciences. *The IMU Breakout Graduate Fellowships* offers a limited number of complete grants, with duration of up to four years, for excellent students from developing countries.

Professional mathematicians are invited to nominate highly motivated and mathematically talented students from developing countries who plan to complete a doctoral degree in a developing country, including their own home country. Nominees must have a consistently good academic record and must be seriously interested in pursuing a career of research and teaching in mathematics.

For a nomination to be eligible, the country of citizenship of the student, the country of residency and the country where the study will take place must be contained in the list of Developing

Countries as defined by IMU for the period 2019-2022: <https://www.mathunion.org/cdc/about-cdc/definition-developing-countries>.

The 2020 call will be open from February 1 to May 30, 2020. More information on <https://www.mathunion.org/cdc/scholarshipsgraduate-scholarships/imu-breakout-graduate-fellowship-program>

#### **b. Abel Visiting Scholar program: 2020 deadlines**

The Abel Visiting Scholar program, funded by the Niels Henrik Abel Board (Norway), supports young mathematicians professionally based in developing countries to visit an international research collaborator for a period of one month. Deadlines:

April 30, 2020 for visits between September 1 and December 31, 2020

August 31, 2020 for visits between January 1 and April 30, 2021.

December 31, 2020 for visits between May 1 and August 31, 2021.

For more information: <https://www.mathunion.org/cdc/grantsresearch-travel-grants/abel-visiting-scholar-program>

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#### **4. CWM: RECOMMENDATIONS OF THE GENDER GAP IN SCIENCE PROJECT**

The recommendations stem from the findings of the project tasks and discussions held within the network created around the project.

**Please use them as a tool to reduce the gender gap in mathematics!**

##### **For instructors and parents**

1.1 Avoid gender stereotyping and unconscious gender bias in interactions with female students and children. Adopt practices that encourage girls to participate in STEM activities in schools and non-school settings. Teach boys and girls about gender equity.

1.2 Avoid books and social media that reinforce the gender gap in science. Use books and media promoting gender balance and highlighting the contributions of women in science.

1.3 Develop gender awareness in the classroom and encourage girls in their learning of STEM subjects. Track whom you are engaging in class to ensure that every student has a chance to participate and that girls feel comfortable in speaking up.

1.4 Encourage relevant single-sex activities to raise girls' self-confidence and possibilities for expressing themselves.

##### **For local organizations**

By local organizations we mean scientific or educational organizations of all kinds: science departments at universities, conference centers, research groups in industry, etc.

2.1 Promote a respectful, collegial working atmosphere in your organization. Monitor support, well-being and mentoring of female academics.

2.2 Define best practices to prevent report and address sexual harassment and discrimination in professional spaces.

2.3 Address the impact of parenthood on the careers of women. Introduce proper accounting (18 months per child recommended) for childcare responsibilities when evaluating candidates in hiring

and promotion processes. In practice, this applies mainly to women. Encourage provision of a research-only year after maternity leave or parental leave. Acknowledge and accept the existence of discontinuous careers and family responsibilities and consider these in hiring and funding policies.

2.4 Ensure transparency of statistics on salaries, course loadings, bonuses, hiring and promotion, observing progress or difficulties experienced by female academics. Encourage policies to help reduce gendered salary disparities. Ensure female and male representation on recruitment committees and provide unconscious bias training for all members. Make the gender lens the responsibility of a dedicated person.

2.5 Welcome families and provide child friendly environments. Provide improved support systems for parents. Allocate teaching loads with suitable hours for parents. For conference centres, take care of the issues of families attending with children and equip family rooms in the guest houses to cater for all basic needs (*e.g.*, children's toys, high chairs and changing tables for babies).

2.6 Address gender equality in all institutional policies. Identify a person or a group in charge of gender equality inside the organization, looking at the gender balance in all kind of activities. Put in place initiatives encouraging women. Involve men in identifying barriers and addressing them. Diversity action plans should have financial consequences if not met.

2.7 In all outreach and educational programs, include the aim of reducing the gender gap. Adapt such programs to the region or discipline concerned by the organization and evaluate their effectiveness. Develop gender awareness of future teachers and provide training in critical thinking.

There is a third part with recommendations for scientific unions and other worldwide organizations, including IMU. We do not include them here for lack of space but they will be posted in the next days on the [CWM website](#).

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## 5. INSIDE THE IMU: CENTENNIAL CONFERENCE

The IMU was officially established on 20 September 1920 in Strasbourg, France, just prior to the ICM in Strasbourg. The conference **Mathematics without Borders, Strasbourg, 28–29 September 2020**, will celebrate the centennial of this historic event. The opening of the conference will take place in the same building in which the 1920 ICM was held in Strasbourg.

More information, including a list of speakers: <https://indico.math.cnrs.fr/event/5375/>.

Registration will open very soon.

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## 6. INTERNATIONAL DAY OF MATHEMATICS

**a. Launch** at UNESCO on March 13 2020. The preliminary program is now online at <https://www.idm314.org/resources/files/idm-launch-program.pdf>.

Attendance is by invitation only.

**b. Call for video submission:** we are putting together a collective video for the first official International Day of Mathematics centered on this year's topic "Mathematics is Everywhere" and showing that mathematics is celebrated all around the world. Individually submitted clips from all over the world will illustrate the manifold places where math can be found. The final video will be presented during the two launch events at the UNESCO headquarters and at the African launch NEF 2020 on March 13, 2020 and shared online.

Join in and take part! Please send us a short recording of 15 seconds following the instructions at <https://www.idm314.org/math-everywhere-video.html> before February 21, 2020.

c. Explore on the **website** <http://everywhere.idm314.org> how "Mathematics is everywhere".

d. If you have not yet done so and plan to organize an event, then **pre-announce** your event at <http://www.idm314.org>. Your event will then join the many other dots on the map.

e. If you have not done so, **register** to the IDM newsletter at <http://www.idm314.org>. This is how you will be made aware of the new developments.

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## 7. JOHN T. TATE (1925 – 2019)

The American mathematician John Torrent Tate passed away on October 16, 2019. He was known worldwide for his work in number theory and algebraic geometry.

His influence in these areas is reflected in the many concepts bearing his name: Tate torsion, Tate-Shafarevich group, Tate module, Tate algebras, Tate cohomology, Tate duality theorem, Tate trace, Hodge-Tate theory, and Sato-Tate conjecture, are some examples.

After completing a master's degree in mathematics at Harvard University and a PhD at Princeton on "Fourier analysis in number fields and Hecke's zeta function", under the supervision of Emil Artin, Tate taught at Harvard for 36 years. In 1990, he joined the University of Texas at Austin, from which he retired in 2009.

Throughout his career, John T. Tate developed strong connections with the French mathematical community. From the 1950s, and for about ten years, he was part of the Bourbaki group. He gave seminars at Collège de France and was a visiting professor at IHES on several occasions. He is co-author, together with J.-P. Serre, of the theory that now bears their names, the Serre-Tate theory. From the 1950s onwards, they maintained a long scientific correspondence, which was partly published in 2015 by the Société mathématique de France.

After having circulated as a preprint for years, Tate's article *Rigid Analytic Spaces* was finally published in the mathematical journal *Inventiones Mathematicae* in 1971; it served as a basis for the development of rigid geometry. Tate came up with the idea that his p-adic uniformization of elliptic curves indicated the existence of a general theory of p-adic analytical spaces. This idea was so radically new that even Grothendieck was very skeptical at first; changing his mind once Tate began to develop his theory in 1961.

John T. Tate was a member of the National Academy of Sciences (USA), the Norwegian Academy of Sciences and Humanities, an associate foreign member of the French Academy of Sciences, and an honorary member of the London Mathematical Society.

In 2010, he was awarded the Abel Prize, one of the two most prestigious awards in mathematics, for "his vast and lasting impact on the theory of numbers". The Wolf Prize (2002), the Steele Prize

(1995), and the Cole Prize in Number Theory (1956), are some of the several other honours he received throughout his career.

(Abridged version of an [obituary](#) from the website of the Institut des Hautes Études Scientifiques, Bures-sur-Yvette, France; reproduced with permission)

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## 8. SUBSCRIBING TO IMU-NET

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2. Send an e-mail to [imu-net-request@mathunion.org](mailto:imu-net-request@mathunion.org) with the Subject-line:  
Subject: subscribe

In both cases, you will receive an e-mail to confirm your subscription so that misuse will be minimized. IMU will not use the list of IMU-Net emails for any purpose other than sending IMU-Net, and will not make it available to others.

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