

The main organizer of the 13th ISAAC congress and ISAAC officers want to recall some activities of the ISAAC community from 2019 until its 13th biennial International Congress in Ghent, Belgium, in 2021.

One of the main goals of the work of the ISAAC officers in this election period consisted in an active member recruitment. As a result 29 new members joined our organisation.

Inside of ISAAC the activities of special interest groups formed the core of activities of our society. We were very happy that the special interest group “Integral transforms and reproducing kernels (IGITRK)”

was reorganized after the death of Juri Rappoport. It is chaired by Zouhair Mouayn from Sultan Moulay Slimane University, Morocco.

One of the goals of ISAAC is the support of conferences, workshops, schools and other meetings related to our society.

During the election period 2019-2021 the following scientific events were organized by members of ISAAC and supported by ISAAC:

- International conference on Hypercomplex Analysis in Mathematics and in the Applied Sciences, February 19-21, 2020, Weimar, Germany, <https://www.uni-weimar.de/de/bauingenieurwesen/professuren/angewandte-mathematik/tagungen/hams2020>,
- Conference “Dispersive and subelliptic PDEs”, Centro De Giorgi in Pisa, February 10-12, 2020, Pisa, Italy, <http://www.crm.sns.it/event/464/>
- “Singular problems, blow-up and regimes with peaking in nonlinear PDE”, November 10-14, 2019, RUDN University, Moscow, Russia, <http://sing2019moscow.rudn.ru/rudn/www/homeeng.php>,
- “Inverse and ill-posed problems”, October 2-4, 2019, University of Samarkand, Uzbekistan, <http://iipp.uz>,
- Spectral Geometry and Analysis of Differential Operators, September 9-11, 2019, Padova, Italy,
- International workshop on Harmonic Analysis and Operator Theory, August 26-29, 2019, Istanbul, Turkey.

From March 2020 the Corona virus has spread all over the world. ISAAC members were infected with the virus. The life of our community has changed

fundamentally. Public life has been severely restricted in most countries. Universities are closed. Teaching as a digital transfer of knowledge was certainly a new challenge. But ultimately we can say that our community was still alive at every moment. The following activities of ISAAC are organized during pandemic period:

- International Conference on Generalized Functions GF2020, August 31 - September 4, 2020, Ghent University, Belgium, in hybrid form,
- Online Conferences at the Ghent Analysis & PDE Centre, for example, International Workshop on Fractional Calculus, <https://analysis-pde.org/workshop-fractional-calculus/> International Conference on Pseudo-Differential Operators, <https://analysis-pde.org/pseudo-differentialconference/>
- Ghent Methusalem Junior Seminar in online form,
- Weekly seminar of OTHA special interest group in online form,
- Seminar of PDE special interest group in online form.

During the election period in the collection of ISAAC books in connection with Springer appeared

- Cerejeiras, P., Reissig, M., Sabadini, I., Toft, J. (Eds.), "Current Trends in Analysis, its Applications and Computation", ISAAC 2019, Aveiro, ISBN 978-3-030-87501-5, <https://doi.org/10.1007/978-3-030-87502-2>
- Cerejeiras, P., Reissig, M. (Eds.), "Mathematical Analysis, its Applications and Computation", ISAAC 2019, Aveiro, ISBN 978-3-030-97126-7, <https://link.springer.com/book/10.1007/978-3-030-97127-4>
- Karapetyants, A., Kravchenko, V.V., Liflyand, E., Malonek, H.R. (Eds.), "Operator Theory and Harmonic Analysis, OTHA 2020, Part I - New General Trends and Advances of the Theory", ISBN 978-3-030-77492-9, <https://www.springer.com/gp/book/9783030774929>
- Karapetyants, A., Pavlov, I. V., Shiryaev, A. N. (Eds.), "Operator Theory and Harmonic Analysis, OTHA 2020, Part II - Probability-Analytical Models, Methods and Applications", ISBN 978-3-030-76828-7, <https://www.springer.com/gp/book/9783030768287>

We want to thank all ISAAC members for their activities and permanent support of the ISAAC board within the very special and difficult election period 2019 to 2021, the Covid-period. Moreover, we thank the board members for supporting the activities of the officers.

At the end of the election period, the 13th ISAAC congress took place in online form at Ghent University, Belgium, from August 2 to August 6, 2021. Although the International Society for Analysis, its Applications and Computation (ISAAC) supported between 2019 and 2021 several conferences, workshops, and other events of scientific nature, the ISAAC congress is the congress *per excellence* of the society. This edition continued the successful series of meetings previously held in: Delaware (USA, 1997), Fukuoka (Japan, 1999), Berlin (Germany, 2001), Toronto (Canada, 2003), Catania

(Italy, 2005), Ankara (Turkey, 2007), London (UK, 2009), Moscow (Russia, 2011), Krakow (Poland 2013), Macau (China, 2015), Växjö (Sweden, 2017), and Aveiro (Portugal, 2019).

The 13th ISAAC Congress was an important scientific event that promoted communication of mathematical advances in mathematical analysis, its applications, and its interactions with computation, encouraging further research progress. Mathematicians from different parts of the world had the opportunity to present their results and new ideas. In total, there were 659 participants from all continents who registered to take part in the conference. There were 374 talks, consisting of 6 plenary lectures and 368 contributed talks, contributing to the 16 congress sessions, some of which were organized by the special interest groups of the society. Following a well-established tradition within society, an award is presented to one or various outstanding young mathematicians. The ISAAC award of the 13th ISAAC Congress was given to *Guido De Philippis* (New York University, USA) for his major contributions to calculus of variations, partial differential equations, and geometric measure theory.

The 6 plenary talks given by leading experts in their respective fields:

- Maarten de Hoop (Rice University, USA),
- Stéphane Jaffard (Université Paris-Est Créteil, France),
- Barbara Kaltenbacher (Alpen-Adria-Universität Klagenfurt, Austria),
- Arno Kuijlaars (Katholieke Universiteit Leuven, Belgium),
- Guido De Philippis (Courant Institute of Mathematical Sciences New York, USA),
- Kristian Seip (Norwegian University of Science and Technology, Norway).

During the congress a meeting of the Board of ISAAC took place. During this meeting the board took the following principal decisions:

- Uwe Kähler (University of Aveiro, Portugal) was elected President. He succeeded Professor Michael Reissig (Bergakademie Freiberg, Germany) who finished his 4 years period.
- The election of the officers reconfirmed Professor Irene Sabadini (Politecnico di Milano, Italy) as Secretary and Treasurer.
- Joachim Toft (Linnaeus University, Sweden) was elected Vice-president. He succeeded Professor Uwe Kähler (University of Aveiro, Portugal) who was elected as new President.
- During this meeting, the venue for the next next ISAAC congress was decided. It will be at Nazarbayev University in Nur-Sultan, Kazakhstan (2025).

A traditional volume containing selected contributions of talks delivered at the congress also appeared. As in previous editions, some of the sessions or special interest groups decided to publish independently their own volumes

of proceedings and, therefore, did not contribute to the volume which could only appear thanks to the organizers of the sessions of the congress.

The following sessions contributed to the present volume. The volume also features an article by S. Jaffard et al., originating from Jaffard's plenary lecture *Multivariate Multifractal Analysis* delivered at the congress.

- *Applications of dynamical systems theory in biology*, organized by Torsten Lindström.
- *Challenges in STEM education*, organized by Ján Guncaga and Vladimir Mityushev.
- *Complex analysis and partial differential equations*, organized by Sergei Rogosin, Ahmet Okay Celebi, and Carmen Judith Vanegas.
- *Complex variables and potential theory*, organized by Tahir Aliyev Aze-roglu, Massimo Lanza de Cristoforis, Anatoly Golberg, and Sergiy Plaksa.
- *Constructive methods in the theory of composite and porous media*, organized by Vladimir Mityushev, Natalia Rylko, and Piotr Drygaś.
- *Generalized functions and applications*, organized by Michael Kunzinger and Marko Nedeljkov.
- *Harmonic analysis and partial differential equations*, organized by Vladimir Georgiev, Michael Ruzhansky, and Jens Wirth.
- *Partial differential equations on curved spacetimes*, organized by Anahit Galstyan, Makoto Nakamura, and Karen Yagdjian.
- *Recent progress in evolution equations*, organized by Marcello D'Abbicco and Marcelo Rempel Ebert.
- *Wavelet theory and its related topics*, organized by Keiko Fujita and Akira Morimoto.

We would like to thank the organizers of all sessions of the congress for their invaluable work and efforts. They very much supported the congress organization by inviting participants, planning their sessions, and selecting speakers. During the congress itself, they did an excellent job organizing the chairing of their meetings. The session organizers were also responsible for the refereeing process of the contributions to this proceedings volume.

The ISAAC board and the participants of the congress thank Jasson Vindas and his group for the excellent organization of the 13th ISAAC Congress in online form.

Aveiro, Portugal
 Freiberg, Germany
 Milan, Italy
 Ghent, Belgium

Uwe Kähler
 Michael Reissig
 Irene Sabadini
 Jasson Vindas