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- PRESENTATION OF PLENARY, INVITED, PUBLIC, ABEL AND PRIZE SPEAKERS AT THE 8ECM

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PLENARY SPEAKERS

Peter Bühlmann

ETH Zürich

Biosketch

Peter Bühlmann is Professor of Mathematics and Statistics, and Director of Foundations of Data Science at ETH Zürich. He studied mathematics at ETH Zürich and received his doctoral degree in 1993 from the same institution. He was then a Postdoctoral Fellow from 1994–1995 and a Neyman Assistant Professor from 1995–1997 at UC Berkeley. From 2013–2017, he was Chair of the Department of Mathematics at ETH Zürich. He is a Fellow of the Institute of Mathematical Statistics, a Fellow of the American Statistical Association, and was Co-Editor of the Annals of Statistics from 2010–2012. Other honors which he recently received include Doctor Honoris Causa from the Université Catholique de Louvain in 2017; Neyman Lecturer 2018, elected by the Institute of Mathematical Statistics; Rothschild Lecture 2018 at the Newton Institute (Cambridge); and the Guy Medal in Silver 2018 from the Royal Statistical Society. He was an invited speaker at the ICM 2018 in Rio de Janeiro and at the ICIAM 2019 in Valencia.

Xavier Cabré

ICREA and Polytechnic University of Catalonia

Biosketch

Xavier Cabré was awarded his PhD in Mathematics in the area of Partial Differential Equations under his adviser Louis Nirenberg, from the Courant Institute, New York University, 1994. Following his PhD, he has held the positions of Member of the Institute for Advanced Study, Princeton, 1994–95; Habilitation à diriger des recherches, Université Pierre et Marie Curie-Paris VI, 1998; Harrington Faculty Fellow, The University of Texas at Austin, 2001–02; and Tenure Associate Professor, The University of Texas at Austin, 2002–03. Since 2003, he has been an ICREA Research Professor at the Universitat Politècnica de Catalunya. He received the Kurt Friedrichs Prize, New York University, 1995, and is a Fellow of the American Mathematical Society, inaugural class of 2012. He is a former editor of the *Journal of the European Mathematical Society*, 2014-17, and currently of *Calculus of Variations and Partial Differential Equations* and *Publicacions Matemàtiques*.

Franc Forstnerič

University of Ljubljana

Biosketch

Franc Forstnerič received his B.S. degree from University of Ljubljana (1980) and Ph.D. degree from University of Washington in Seattle (1985). He has been a Professor of Mathematics at the University of Ljubljana since 1997. During 1991-2000 he held a professor position at University of Wisconsin in Madison, USA. His research focuses on complex analysis, complex geometry, and the theory of minimal surfaces. He is the author of 125 scientific papers and of two research monographs published by Springer-Verlag (2011 and 2017, 2021). He received Fulbright and Sloan scholarships, a Vilas fellowship (UW-Madison, 1998-2000), a prize of the Republic of Slovenia (1988), and the Stefan Bergman Prize (2019). He is a member of the Slovenian Academy of Sciences and Arts since 1999.

Alice Guionnet

ENS Lyon and CNRS

Bernoulli lecture

Biosketch

Alice Guionnet is a French mathematician, working in the field of probability theory and more especially statistical mechanics and random matrix theory. She entered Ecole Normale Superieure (Paris) in 1989. She defended her PhD at Université Paris-Sud in 1995 under the supervision of Gerard Ben Arous on Langevin dynamics for spin glasses. She did two short post-doctoral internships at Imperial college and Courant institute (NYU). She has held a position at CNRS since 1993, Berkeley 2005–2006, and MIT 2012–2015. She is currently Director of Research (CNRS) at ENS Lyon.

Gitta Kutyniok

LMU Munich

Biosketch

Gitta Kutyniok currently has a Bavarian AI Chair for Mathematical Foundations of Artificial Intelligence at the Ludwig-Maximilians Universität München and an Adjunct Professorship in Machine Learning at the University of Tromso. She received her Diploma in Mathematics and Computer Science as well as her PhD degree from the Universität Paderborn in Germany, and her Habilitation in Mathematics in 2006 at the Justus-Liebig Universität Gießen. From 2001 to 2008 she held visiting positions at several US institutions, including Princeton University, Stanford University, Yale University, Georgia Institute of Technology, and Washington University in St. Louis, and was a Nachdiplomslecturer at ETH Zurich in 2014. In 2008, she became a full professor of mathematics at the Universität Osnabrück, and moved to Berlin three years later, where she held an Einstein Chair in the Institute of Mathematics at the Technische Universität Berlin and a courtesy appointment in the Department of Computer Science and Engineering until 2020.

She has received various awards for her research, such as an award from the Universität Paderborn in 2003, the Research Prize of Gießen and a Heisenberg-Fellowship in 2006, the von Kaven Prize of the DFG in 2007, and an Einstein Chair in 2008. She gave the Noether Lecture at the ÖMG-DMV Congress in 2013 and the Hans Schneider ILAS Lecture at IWOTA in 2016. She also became a member of the Berlin-Brandenburg Academy of Sciences and Humanities in 2017, a SIAM Fellow and an IEEE Senior Member in 2019, received a Francqui Chair of the Belgian Francqui Foundation in 2020, and holds the first Bavarian AI Chair at LMU from 2020. She was Chair of the SIAM Activity Group on Imaging Sciences from 2018–2019 and is Co-Chair of the first SIAM conference on Mathematics of Data Science taking place this year. She was Scientific Director of the graduate school BIMoS at TU Berlin from 2014 to 2020 and is currently Chair of the GAMM Activity Groups on Mathematical Signal- and Image Processing and Computational and Mathematical Methods in Data Science. She is also the main coordinator of the Priority Program of the German Research Foundation on theoretical foundations of deep learning.

Monika Ludwig

TU Wien

Biosketch

Monika Ludwig is a member of the Austrian Academy of Sciences and a University Professor of Convex and Discrete Geometry at the Vienna University of Technology. She earned a Dipl.-Ing. degree from TU Wien in 1990, and a doctorate in 1994 under the supervision of Peter M. Gruber. She remained at the same university as an assistant and associate professor from 1994 until 2007, when she moved to the Polytechnic Institute of New York University. She returned to the Vienna University of Technology as a full professor in 2010. She won the Edmund and Rosa Hlawka Award for Mathematics of the Austrian Academy of Sciences in 1998, and the Prize of the Austrian Mathematical Society in 2004. She also became a fellow of the American Mathematical Society in 2012.

János Pach

Alfréd Rényi Institute of Mathematics

Biosketch

János Pach is Research Adviser at Rényi Institute, Budapest and Head of the Laboratory of Combinatorial and Geometric Structures at MIPT, Moscow. His main fields of interest are discrete and computational geometry, convexity, and combinatorics. He has written more than 300 research papers. His books, *Research Problems in Discrete Geometry* (with Brass and Moser) and *Combinatorial Geometry* (with Agarwal) were translated into Japanese, Russian, and Chinese. He is co-editor-in-chief of *Discrete & Computational Geometry* and serves on the editorial boards of ten other professional journals. For his scientific achievements, he has received several prizes, including the Lester R. Ford Award from the Mathematical Association of America (1990), and the Rényi Prize and the Academy Award from the Hungarian Academy of Sciences (1993, 1998). He was elected ACM Fellow (2011), member of Academia Europeae (2014), and AMS Fellow (2015). He was an invited speaker at the International Congress of Mathematicians in Seoul (2014).

Alfio Quarteroni

Polytechnic University of Milan

Biosketch

Alfio Quarteroni is Professor of Numerical Analysis and Director of MOX at the Politecnico of Milan (Italy). Formerly, he was Director of the Chair of Modelling and Scientific Computing at the EPFL (Swiss Federal Institute of Technology), Lausanne (Switzerland), from 1998 until the end of 2017. He is the founder (and first director) of MOX at Politecnico of Milan (2002) and MATHICSE at EPFL, Lausanne (2010). He is co-founder (and President) of MOXOFF, a spin-off company at Politecnico of Milan (2010). He is the author of 25 books, editor of 9 books, author of more than 300 papers published in international scientific journals and conference proceedings, a member of the editorial board of 25 international journals and editor-in-chief of two book series published by Springer. He has been an invited or plenary speaker in more than 300 international conferences and academic departments; in particular

he has been an invited speaker at ICM 2002 in Beijing and plenary speaker at ICM 2006 in Madrid. Among his awards and honors are: the NASA Group Achievement Award for pioneering work in Computational Fluid Dynamics in 1992, the Premio Capo D'Orlando 2006, the Ghislieri prize, 2013, the International Galileo Galilei prize for Sciences 2015, and The Euler lecture in 2017. He is the Recipient of two ERC Advanced Grants: "MATHCARD", 2008, and "i-HEART", 2017, and of two ERC PoC (Proof of Concept) grants in 2012 and 2015; Recipient of the Galileian Chair from the Scuola Normale Superiore, Pisa, Italy, 2001; doctor Honoris Causa in Naval Engineering from University of Trieste, Italy, 2003; SIAM Fellow (first row) since 2009; and IACM (International Association of Computational Mechanics) Fellow since 2004. He is a member of the Italian Academy of Science, the European Academy of Science, the Academia Europaea, the Lisbon Academy of Sciences, and the IMU Circle. His research interests concern Mathematical Modelling, Numerical Analysis, and Scientific Computing, and have application to fluid mechanics, geophysics, medicine and the improvement of sports performance. His research group at EPFL has contributed to the preliminary design of Solar Impulse, the Swiss long-range experimental solar-powered aircraft project; his research group at EPFL has carried out the mathematical simulation for the optimisation of performances of the Alinghi yacht, the winner of two editions (2003 and 2007) of the America's Cup.

Karl-Theodor Sturm

HCM and University of Bonn

Biosketch

Karl-Theodor Sturm obtained his PhD in 1989 from the University of Erlangen-Nuremberg under the supervision of Heinz Bauer.

Visiting and research positions led him to the universities of Stanford, Zurich, and Bonn as well as to the MPI Leipzig. In 1994, he was awarded a Heisenberg fellowship of the DFG. Since 1997, he has been a professor of mathematics at the University of Bonn.

From 2012–2019, he was the Spokesperson of the Excellence Cluster Hausdorff Center for Mathematics. He is also PI of the Collaborative Research Center 1060 "The Mathematics of Emerging Effects" at the University of Bonn, funded since 2013. Before that, from 2002–2012, he was Vice-Spokesperson of the Collaborative Research Center 611 "Singular Phenomena and Scaling in Mathematical Models".

The focus of his research is in Stochastic and Geometric Analysis. He gained particular attention with his work on "Analysis on local Dirichlet spaces" as well as with his pioneering work on synthetic Ricci bounds for metric measure spaces.

In 2016, he was awarded an ERC Advanced Grant for his research project "Metric measure spaces and Ricci curvature – analytic, geometric, and probabilistic challenges".

Umberto Zannier

Scuola Normale Superiore di Pisa

Biosketch

Umberto Zannier is a full professor of geometry at Scuola Normale Superiore in Pisa, where he also obtained his PhD in 1980 under the supervision of Fields medalist Enrico Bombieri. From 1983 to 1987, he was a researcher at the University of Padua, from 1987 to 1991 an associate professor at the University of Salerno, and from 1991 to 2003

a full professor at the Università IUAV di Venezia. Since 2003, he has been a full professor in geometry at the Scuola Normale Superiore di Pisa. In 2010, he gave the Hermann Weyl Lectures at the Institute for Advanced Study in Princeton. He has been a visiting professor at several institutions, including the Institut Henri Poincaré in Paris, the ETH Zurich, and the Erwin Schrödinger Institute in Vienna. He was an Invited Speaker at the 4th European Congress of Mathematics in Stockholm in 2004. He was elected a corresponding member of the Istituto Veneto in 2004, a member of the Accademia dei Lincei in 2006, and a member of Academia Europaea in 2012. In 2014, he was an Invited Speaker at the International Congress of Mathematicians in Seoul. In 2005, Zannier received the Mathematics Prize of the Accademia dei XL and in 2011, an Advanced Grant from the European Research Council (ERC). He is chief editor of the *Annali della Scuola Normale Superiore di Pisa, Classe di Scienze* and a member of the editorial board of many journals, including *Acta Arithmetica, Journal of the European Math. Society* and *Journal of Number Theory*.

INVITED SPEAKERS

Andrej Bauer

University of Ljubljana

Biosketch

Andrej Bauer is a professor of computational mathematics at the Faculty of Mathematics and Physics, University of Ljubljana. His research spans foundations of mathematics, constructive and computable mathematics, type theory, homotopy type theory, and principles of programming languages.

Yves Benoist

CNRS and Paris-Saclay University

Biosketch

Yves Benoist is a research director at the CNRS and a member of the LMO (CNRS & Université Paris-Saclay). He completed his PhD in 1983 at Paris 7 University under the supervision of Michel Duflo. He has received many prizes for his work, including the Clay Research Award in 2011 together with Jean-François Quint for their outstanding work on stationary measures and orbit closures for actions of non-abelian groups on homogeneous spaces. He gave the 2012 Takagi Lectures in Kyoto at the Research Institute for Mathematical Sciences (RIMS), and in 2014 he was an Invited speaker at the International Congress of Mathematicians in Seoul.

Robert Berman

Chalmers University of Technology

Biosketch

Robert Berman is a Professor at the Department of Mathematical Sciences, Chalmers University of Technology in Sweden. He completed his PhD in 2006 at Chalmers under the direction of Bo Berndtsson. He then spent one and half years as a postdoc at Institut Fourier in Grenoble with Jean-Pierre Demailly, before moving back to Sweden to take up a research position at Chalmers. Berman has been awarded several major research grants, including an ERC starting grant and a Wallenberg Academy Fellowship. He is a recipient of the Wallenberg prize, the Tage Erlander prize and the Göran Gustafsson prize and has been an elected member of the Royal Academy of Sweden since 2016.

Martin Burger

Friedrich-Alexander University Erlangen-Nürnberg

Biosketch

Martin Burger obtained his PhD in 2000 at the Johannes Kepler University in Linz. After working as an assistant professor at UCLA and in Linz, he moved to a position of full professor in applied mathematics at the WWU Münster in 2006. Since 2018, he has been a professor at the FAU Erlangen-Nürnberg. His research comprises inverse problems, nonlinear mathematical imaging, partial differential equations

and the development of mathematical models in life and social science, which together drive interdisciplinary research developments e.g. in biomedical imaging. Martin Burger has received several awards and honours for his scientific contributions, such as the Calderon prize for distinguished contributions in the field of inverse problems and an ERC consolidator grant in 2013. He serves on the editorial board of several journals and is one of the editors-in-chief of the *European Journal of Applied Mathematics*.

Albert Cohen

Sorbonne University

Biosketch

Albert Cohen obtained his PhD in 1990 under the supervision of Yves Meyer. Since 1995, he has been a full professor at Laboratoire Jacques-Louis Lions, Sorbonne Université, Paris. He is the author of over 100 papers in journals and 3 books. He was an invited speaker at ICM 2002 and plenary speaker at ICIAM 2006. He has been awarded the Vasil Popov, Jacques Herbrant, and Blaise Pascal prizes. He has been a junior and senior member of Institut Universitaire de France, and recipient of an advanced ERC grant.

Marius Crainic

Utrecht University

Biosketch

Marius Crainic is a Full Professor at Utrecht University. He received his PhD in 2000 from Utrecht University under the supervision of Ieke Moerdijk. He was a Miller Research Fellow at UC Berkeley from 2001 to 2002 before returning to Utrecht University as a Fellow of the Royal Netherlands Academy of Arts and Sciences (KNAW). In 2007, he became an associate professor at Utrecht University, and a full professor in 2012. He was elected a member of the KNAW in 2016. In 2008, Crainic was awarded the André Lichnerowicz Prize in Poisson Geometry and in 2016 he was honoured with the first de Bruijn Prize of the Royal Dutch Mathematical Society for two publications that he wrote together with his (now former) student Camilo Arias Abad. According to the jury, these were the most influential publications by Dutch mathematicians during the period 2011-2014.

Mirjam Dür

University of Augsburg

Biosketch

Mirjam Dür received her M.Sc. degree in Mathematics from the University of Vienna in 1996, and her PhD in applied mathematics from University of Trier in 1999. Following her doctoral degree, she worked as an assistant professor at Vienna University of Economics and

Business Administration, a junior professor at TU Darmstadt, an Universitair Docent at the University of Groningen, the Netherlands, and a professor of Nonlinear Optimization in Trier. Since October 2017, she has been a professor of Mathematical Optimization in Augsburg, Germany.

Alexander Efimov

Steklov Institute of Mathematics

Biosketch

Alexander Efimov is currently a Senior Researcher at the Algebraic Geometry Section of Steklov Mathematical Institute of RAS, Moscow, Russia. He is also a member of the International Laboratory of Mirror Symmetry and Automorphic Forms, Higher School of Economics, Moscow.

Efimov graduated from Independent University of Moscow in 2009, and from the Department of Mechanics and Mathematics of the Lomonosov Moscow State University in 2010. He studied in the Graduate School of Steklov Mathematical Institute in 2010–2011, and also in the Graduate School of Independent University of Moscow in 2009–2011. Since 2010, he has worked at Steklov Mathematical Institute, where he defended his PhD in 2011 under the supervision of Dmitri Orlov. Efimov was also a member of the Laboratory of Algebraic Geometry and its Applications (Higher School of Economics, Moscow, Russia) from 2010 till 2017, and a Newton Research Fellow in the University of Warwick from 2013–2014.

Alexander has 16 published papers and 5 preprints.

Alison Etheridge

University of Oxford

Biosketch

Alison Etheridge is Professor of Probability at the University of Oxford where she holds a joint appointment in the Departments of Mathematics and Statistics and a Fellowship at Magdalen College. Over the course of her career, her interests have ranged from abstract mathematical problems to concrete applications. Much of her recent research is concerned with mathematical models of population genetics, where she has been particularly involved in efforts to understand the effects of spatial structure of populations on their patterns of genetic variation.

Rupert Frank

LMU Munich / Caltech

Biosketch

Rupert Frank is working on problems in analysis, calculus of variations and mathematical physics. He defended his PhD thesis in 2007 at the Royal Institute of Technology in Stockholm under the supervision of Ari Laptev. After a post-doctoral internship and assistant professorship at Princeton, in 2013 he became professor at Caltech and in 2016 at LMU Munich.

Aleksey Kostenko

University of Ljubljana and University of Vienna

Biosketch

Aleksey Kostenko completed his master's and PhD studies at Donetsk National University (Ukraine) under the supervision of Professor Mark Malamud. During his postdoctoral career, he received several fellowships (ESI Junior Fellowship, IRCSET Fellowship and Lise-Meitner Fellowship). In 2012, he completed habilitation in the University of Vienna, and in 2017 was appointed an Associate Professor at the Faculty of Mathematics and Physics, University of Ljubljana. Since 2013, Kostenko has been a principal investigator of several research projects funded by the Austrian Science Fund. For his work in spectral theory of linear operators in Hilbert spaces he received several awards, including the Ya. B. Lopatinskii award (2007) and Prize of the Austrian Mathematical Society (2016).

Emmanuel Kowalski

ETH Zürich

Biosketch

Emmanuel Kowalski has been a professor of mathematics at the Swiss Federal Institute of Technology (ETH) in Zürich since 2008. His research domain is analytic number theory, taken in a very broad sense, with a focus on interactions with other areas of mathematics, and especially exponential sums over finite fields and with probabilistic ideas. He has written five books in addition to many research papers and surveys.

Daniel Kressner

École polytechnique fédérale de Lausanne

Biosketch

Daniel Kressner received his Diploma and PhD degrees in mathematics from Technische Universität Chemnitz, Germany, and Technische Universität Berlin, Germany, in 2001 and 2004, respectively. After working at the Universities of Umea, Sweden, and Zagreb, Croatia, as a DFG Emmy Noether PostDoctoral Fellow, he became an Assistant Professor at ETH Zurich (2007–2010). Since 2011, he has been with the Ecole Polytechnique Fédérale de Lausanne, Switzerland, where he is currently a Full Professor. His research has been recognized by a John Todd Award and a SIAM Outstanding Paper Prize (jointly with Christine Tobler).

Daniela Kühn

University of Birmingham

Biosketch

Daniela Kühn was awarded a PhD in Mathematics at the University of Hamburg in 2001. She worked as a postdoc in Hamburg and Berlin before beginning

as a lecturer at the University of Birmingham, where she founded a thriving Combinatorics research group together with Deryk Osthus. In 2010, she was appointed as Mason Chair of Mathematics at Birmingham. She has received several research grants from EPSRC and from Europe, including an ERC Starting Grant and an ERC Advanced Grant. Jointly with Deryk Osthus, she has been awarded the European Prize in Combinatorics in 2003 and the Whitehead Prize by the London Mathematical Society in 2014. Further recognition for her research includes an invited lecture at the International Congress of Mathematicians in 2014 as well as a Royal Society Research Merit Award in 2015. Her research interests are Extremal and Probabilistic Combinatorics.

Eugenia Malinnikova

Norwegian University of Science and Technology

Biosketch

Malinnikova earned her PhD in 1999 from St. Petersburg State University under the supervision of Victor Havin. She works as a professor at Norwegian University of Science and Technology, Trondheim, Norway. In 2018–19, she was a von Neumann fellow at IAS, Princeton. Since the fall of 2019 she has also been a full professor at Stanford University.

In 2018, Malinnikova was an invited speaker to ICM, Rio de Janeiro. She won the Clay Research Award in 2017 jointly with Aleksandr Logunov.

Domenico Marinucci

University of Rome Tor Vergata

Biosketch

Domenico Marinucci obtained his PhD from the University of London in 1998, with a thesis on Frequency Domain Analysis of Fractionally Integrated and Cointegrated Stochastic Processes (under the supervision of P.M. Robinson). Currently, he is Professor of Probability and Mathematical Statistics at the Department of Mathematics of the University of Rome Tor Vergata; he was Chairman of the Department from 2007 to 2015.

His main research interests are devoted to random fields and their applications to Cosmology; in particular, he has worked on the characterization of isotropy and Gaussianity for spherical random fields, on angular polyspectra and their relationship with group representations, on spherical wavelets/needlets and their stochastic properties, on tensor-valued random fields (random sections of spin fiber bundles), and on the geometry of random eigenfunctions (nodal lines, critical points, Lipschitz-Killing Curvatures). He is a member of the Planck Mission for the analysis of Cosmic Microwave Background radiation (CMB) and of the Euclid Satellite Collaboration for Weak Gravitational Lensing (both from ESA); currently he is the Vice-President of the International Astrostatistics Association. From 2011–2016, he held the European Research Council grant PASCAL (Probabilistic and Statistical Techniques for Cosmological Applications). From 2016, he has been Editor-in-Chief of the *Electronic Journal of Statistics*.

He has published around 90 papers in major journals in Probability, Mathematical Statistics, Analysis, Mathematical Physics and Astrophysics/ Cosmology, plus a book for Cambridge University Press (with G.Peccati).

As of April 2019, these papers have received more than 12,000 quotations according to Google Scholar and around 6,000 according to Scopus.

Eva Miranda

UPC-CRM-Observatoire de Paris

Biosketch

Eva Miranda is a Full Professor in Geometry and Topology at Universitat Politècnica de Catalunya-IMTech, member of CRM-Barcelona, and Chercheur affilié at Observatoire de Paris. She is the director of the Laboratory of Geometry and Dynamical Systems at UPC and the group leader of the UPC Research group GEOMVAP (Geometry of Varieties and Applications).

Her research is at the crossroads of Differential Geometry, Mathematical Physics and Dynamical Systems. Her area of expertise is Symplectic and Poisson Geometry. She works with objects appearing on the interface of Geometry and Physics such as integrable systems and group actions, acquainting for symmetries of the systems. Her research deals with geometrical and dynamical aspects of the singularities arising in Celestial mechanics and Fluid Dynamics and in Symplectic and Poisson manifolds as well as with mathematical models for their quantization.

She has been distinguished with an ICREA Academia Prize in 2016 and a Chaire d'Excellence de la Fondation Sciences Mathématiques de Paris in 2017.

She is also an active member of the mathematical community as a member of international scientific panels and committees. She served as the EMS-SCM corresponding member in 2011-2017 and since 2017 she is a member of the Scientific Advisory Board of the CRM-Barcelona. Since May 2018 she is a member of the Governing Board of the Barcelona Graduate School of Mathematics and since 2020 she is a member of the Conseil d'Administration de l'Institut Henri Poincaré in Paris.

Richard Nickl

University of Cambridge

Biosketch

Richard Nickl is originally from Vienna, Austria, where he obtained his PhD in 2005 at the University of Vienna. After a postdoc with Evarist Gine in the US he moved to the UK, where he is currently Professor of Mathematical Statistics at the University of Cambridge. His research is on various aspects of high-dimensional and non-parametric statistics, and recently on Bayesian theory for PDE-constrained inverse problems. He is the author of the book *Mathematical Foundations of Infinite-Dimensional Statistical Models* published in 2016 by Cambridge University Press, and recipient of the 2017 Ethel Newbold Prize of the Bernoulli Society, the 2017 PROSE Award of the American Association of Publishers, and an ERC Consolidator Grant (2015).

Burak Özbağcı

Koç University

Biosketch

Burak Özbağcı received his Ph.D. degree in Mathematics in 1999, at the University of California at Irvine, under the supervision of Ronald J. Stern. He is currently a professor at Koç University, Istanbul. He held visiting positions at the Michigan State University, Georgia Institute of Technology, Mathematical Sciences Research Institute at Berkeley, and the University of California at Los Angeles.

Throughout his career, he was supported by the Outstanding Young Scientist Grant of the Turkish Academy of Sciences, research grants of the Scientific and Technological Research Council of Turkey, National Science Foundation (USA) Focused Research Group Grant and the Marie Curie International Outgoing Fellowship of the European Research Council. He published in prominent journals, including Geometry and Topology, Transactions of the American Mathematical Society, Bulletin of the London Mathematical Society, and Journal of the European Mathematical Society. He co-authored the book Surgery on contact 3-manifolds and Stein surfaces," with András I. Stipsicz

Ilaria Perugia

University of Vienna

Biosketch

Ilaria Perugia is professor of Numerics of Partial Differential Equations at the University of Vienna, Austria. She graduated in Mathematics at the University of Pavia, Italy, and earned her PhD in Computational Mathematics and Operations Research at the University of Milano, Italy, under the supervision of Franco Brezzi.

She held posts at the University of Pavia (university researcher, associate professor, full professor), as well as visiting positions at the University of Minnesota and at ETH Zürich. She was appointed professor at the University of Vienna in 2013. Since 2016, she has been deputy director of the Erwin Schrödinger International Institute for Mathematics and Physics (ESI) in Vienna.

Gabriel Peyré

CNRS and Ecole Normale Supérieure de Paris

Biosketch

Gabriel Peyré is senior researcher at the Centre Nationale de Recherche Scientifique (CNRS) and professor at the Ecole Normale Supérieure, Paris. His research is focused on developing mathematical and numerical tools for imaging sciences and machine learning. Since 2005, Gabriel Peyré has

co-authored 70 papers in international journals, 75 conference proceedings in top vision and image processing conferences, and two books. He is the creator of the "Numerical tour of data sciences" (www.numerical-tours.com), a popular online repository of Python/Matlab/Julia/R resources to teach mathematical data sciences. His research was supported by an ERC starting grant (SIGMA-Vision, 2010-2015) and is now supported by a ERC consolidator grant (NORIA 2017-2021). He is the 2017 recipient of the Blaise-Pascal prize from the French Academy of sciences, awarded each year to a young applied mathematician.

Yuri Prokhorov

Steklov Institute

Biosketch

Yuri Prokhorov completed his PhD under V. Iskovskikh at Moscow University in 1990. Since 2013, Prokhorov has been a leading researcher at the Steklov Mathematical Institute Moscow. He has been a professor at Moscow University since 1991.

Alexander A. Razborov

University of Chicago and Steklov Mathematical Institute

Biosketch

Alexander Razborov graduated from the Moscow State University in 1985 and completed his PhD at the Steklov Mathematical Institute under the supervision of S.I.Adian. These days he divides his time between the University of Chicago, where he is a Professor at the Departments of Mathematics and Computer Science, and Steklov Mathematical Institute in Moscow (Principal Researcher). Alexander was awarded the Rolf Nevanlinna Prize (IMU, 1990), the Goedel Prize (EATCS & ACM, 2007), and the Robbins prize (AMS, 2013). He is a member of the Academia Europea (since 1990), a member of the American Academy of Arts and Sciences (since 2020), the corresponding member of the Russian Academy of Sciences (since 2000) and serves on Editorial Boards of various journals, including Forum of Mathematics (Pi and Sigma), Sbornik and Combinatorica.

Aner Shalev

Hebrew University

Biosketch

Aner Shalev studied mathematics and philosophy at the Hebrew University of Jerusalem and received a PhD in pure mathematics in 1988. In 1992, after a postdoctoral fellowship at Oxford, he joined the Einstein Institute of Mathematics at the Hebrew University

of Jerusalem where he is now full professor. He served as chairman of the Institute from 1999 to 2001. Shalev has lectured at universities around the world, including Princeton, Yale, Oxford, Paris, Chicago, London, Cambridge and Berkeley. He has been a guest speaker at around 70 international conferences, including the International Congress of Mathematics in Berlin in 1998. He has served as an editor for *Journal of Group Theory, Israel Journal of Mathematics, Journal of Algebra, International Journal of Algebra* and *Computation and Open Problems in Mathematics.* He has been awarded many grants, including the ERC Advanced Grant from the European Community (2010–2014)

László Székelyhidi

Leipzig University

Biosketch

László Székelyhidi, Jr. graduated in 2000 from the University of Oxford and obtained his PhD in 2003 at the Max Planck Institute for Mathematics in the Sciences under the supervision of Stefan Müller. Since 2011, he has been Professor for Applied Mathematics at the University of Leipzig. He has been awarded the Oberwolfach Prize in 2010 and the Gottfried Wilhelm Leibniz Prize in 2018. His main interests are, broadly speaking, partial differential equations and the calculus of variations. In recent years he has been working on mathematical hydrodynamics, specifically questions related to turbulence.

Špela Špenko

Vrije Universiteit Brussel

Biosketch

Špela Špenko graduated in June 2015 from the University of Ljubljana. Following her PhD, she was a postdoc at University of Edinburgh and a PEGASUS Marie Sklodowska-Curie fellow at the Free University of Brussels. Recently she has taken up a lecturer position at Université Libre de Bruxelles. Her research interests lie at the intersection of noncommutative algebra, algebraic geometry and representation theory.

Anna-Karin Tornberg

KTH Royal Institute of Technology

Biosketch

Anna-Karin Tornberg has been a professor in Numerical Analysis at KTH in Stockholm since 2012. Her research concerns the development of numerical methods for the solution of PDEs. One specific focus is on boundary integral methods for fluid flows involving particles and drops, and with that both development and analysis of important components such as fast methods to accelerate the computations and numerical quadrature techniques for evaluation of singular and nearly singular integrals. In 2014, Prof. Tornberg was awarded the Göran Gustafsson prize in Mathematics in Sweden. She is an elected member of both the Swedish Royal Academy of Engineering Sciences

(IVA) and of the Swedish Royal Academy of Sciences (KVA). Earlier awards include the selection as an Alfred P. Sloan research fellow (2006) while Prof. Tornberg was part of the faculty at the Courant Institute of Mathematical Sciences (New York University) as well as the Leslie Fox First Prize in Numerical Analysis (2000).

Nick Trefethen

University of Oxford

Biosketch

Nick Trefethen is Professor of Numerical Analysis and head of the Numerical Analysis Group at Oxford University. He was educated at Harvard and Stanford and held positions at NYU, MIT, and Cornell before moving to Oxford in 1997. He is a Fellow of the Royal Society and a member of the US National Academy of Engineering, and served during 2011-2012 as President of SIAM. He has won many prizes including the Gold Medal of the Institute for Mathematics and its Applications, the Naylor Prize of the London Mathematical Society, and the Polya Prize for Mathematical Exposition and the John von Neumann Prize from SIAM.

As an author Trefethen is known for his books including *Numerical Linear Algebra* (1997), *Spectral Methods in MATLAB* (2000), *Spectra and Pseudospectra* (2005), *Approximation Theory and Approximation Practice* (2013), and *Exploring ODEs* (2018). He organized the SIAM 100-Dollar, 100-Digit Challenge in 2002 and is the inventor of Chebfu.

Maryna Viazovska

École polytechnique fédérale de Lausanne

Biosketch

Maryna Viazovska is a full professor at the École Polytechnique Fédérale de Lausanne in Switzerland. Previously, she was a postdoctoral researcher at the Berlin Mathematical School and the Humboldt University of Berlin and a Minerva Distinguished Visitor at Princeton University. Her research interests include number theory and optimal configurations on manifolds.

In 2016, Viazovska solved the sphere-packing problem in dimension 8 and, in collaboration with others, in dimension 24. As well as for her work on sphere packing, Viazovska is also known for her research on spherical designs with Bondarenko and Radchenko. With them she proved a conjecture of Korevaar and Meyers on the existence of small designs in arbitrary dimensions.

Viazovska was an invited speaker at the 2018 International Congress of Mathematicians, and is the recipient of numerous awards. In 2016, she received the Salem Prize and, in 2017, the Clay Research Award and the SASTRA Ramanujan Prize for her work on sphere packing and modular forms. She has also been awarded a 2018 New Horizons Prize in Mathematics, and, in 2019, the Ruth Lyttle Satter Prize in Mathematics and the Fermat Prize.

Stuart White

University of Oxford

Biosketch

Stuart White received his PhD in 2006 from the University of Edinburgh, supervised by Prof Allan Sinclair. Following this, he spent one year at Texas A&M University as a postdoc, returning to Scotland to a position at the University of Glasgow from 2007–2019. In September 2019, White moved to the University of Oxford for a joint appointment as a Professor of Mathematics and Tutorial Fellow at St John's College. He was awarded the Sir Edmund Whittaker Memorial Prize of the Edinburgh Mathematical Society in 2013, and was awarded an Alexander von Humboldt Foundation fellowship for experienced researchers from 2015–2018, visiting the University of Münster for 16 months during this period. White's work focuses on operator algebras, and related fields. He is particularly interested in the interface between the measurable and topological objects in this setting.

THE EMS PRIZES

Alexander Efimov

Algebraic Geometry Section of Steklov Mathematical Institute of RAS, Moscow, Russia

Higher School of Economics, Department of Mathematics, Moscow, Russia

Alexander Efimov is currently a Senior Researcher at the Algebraic Geometry Section of Steklov Mathematical Institute of RAS, Moscow, Russia. He is also a member of the International Laboratory of Mirror Symmetry and Automorphic Forms, Higher School of Economics, Moscow, Russia. His research interests include algebraic geometry, mirror symmetry and quantum algebra.

Efimov was a member of the Laboratory of Algebraic Geometry and its Applications (Higher School of Economics, Moscow, Russia) from 2010 till 2017, completing his PhD in 2011 in the Steklov Mathematical Institute under the supervision of Dmitri Orlov. During this period, he was also a Newton Research Fellow at the University of Warwick (2013–2014). His awards and distinctions include the Moebius Foundation award for Young Scientists (2010), the Moscow Mathematical Society award (2016) and, in 2017, the Russian Academy of Scientists Medal with the Prize for Young Scientists.

In addition to receiving the EMS Prize, Dr. Efimov is an invited speaker at the 8ECM.

Alexandr Logunov

Princeton University

Alexander Logunov specializes in harmonic analysis, potential theory, and geometric analysis. He works at Princeton University.

Assist. Prof. Logunov received, jointly with Eugenia Malinnikova, the 2017 Clay Research Award for their introduction of novel geometric-combinatorial methods for the study of elliptic eigenvalue problems, leading to the solution of long-standing problems in spectral geometry.

Among other results, he proved an estimate (from above) for Hausdorff measures on the zero sets of Laplace eigenfunctions defined on compact smooth manifolds and an estimate (from below) in harmonic analysis and differential geometry that proved conjectures by Shing-Tung Yau and Nikolai Nadirashvili. In 2018 he received the Salem Prize for his work on these conjectures.

Phan Thành Nam

Department of Mathematics at Ludwig Maximilian University of Munich, Germany

Phan Thành Nam is a Professor at the Department of Mathematics at LMU Munich. His research field is analysis and mathematical physics, in particular in many-body quantum mechanics, spectral theory, calculus of variations and partial differential equations and numerical analysis.

Previously, he was an Assistant Professor at the Masaryk University and an IST Fellow at the Institute of Science and Technology in Austria. He has twice been an invited speaker at the International Congress on Mathematical Physics (ICMP). In 2018, he was awarded the IUPAP Young Scientist Prize in Mathematical Physics for young researchers who perform original work of outstanding scientific quality in mathematical physics.

Maryna Viazovska

École Polytechnique Fédérale de Lausanne, Switzerland

Maryna Viazovska is a full professor at the École Polytechnique Fédérale de Lausanne in Switzerland. Previously, she was a postdoctoral researcher at the Berlin Mathematical School and the Humboldt University of Berlin and a Minerva Distinguished Visitor at Princeton University. Her research interests include number theory and optimal configurations on manifolds.

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Joaquim Serra

SNF Ambizione Fellow

ETH Zurich, Switzerland

Joaquim Serra is an SNF Ambizione Fellow at ETH Zurich in Switzerland. His research mainly concerns elliptic and parabolic partial differential equations, alongside reaction-diffusion equations, free boundary problems and integro-differential equations.

Serra counts several working experiences from his post-docs in Zurich and Berlin, as well as private sector experience working with big data. He was awarded the 2016 Josep Teixidó Prize from the Catalan Mathematical Society, the 2018 Jose Luis Rubio de Francia Prize from the Royal Spanish Mathematical Society, and the 2019 Antonio Valle Prize from the Spanish Society of Applied Mathematics.

Jack Thorne

University of Cambridge

Jack Thorne is a Professor of Mathematics at the University of Cambridge. He is a British

mathematician working in number theory and arithmetic aspects of the Langlands Program, and specialises in algebraic number theory. His research is currently supported by a Horizon 2020 grant from the ERC.

After completing his PhD at Harvard University in 2012, Thorne was a Clay Research Fellow. He was an invited speaker at the International Congress of Mathematicians in 2018. In 2017, he received the Whitehead Prize, followed in 2018 by the 2018 SASTRA Ramanujan Prize for his contributions to the field of mathematics, which he shared with Yifeng Liu.

Ana Caraiani

Royal Society University Research Fellow and Reader

Imperial College London

Ana Caraiani is a Royal Society University Research Fellow and Reader at Imperial College London. Her research interests include classical and p-adic Langlands programs, Shimura varieties, and arithmetic geometry.

Caraiani received her PhD at Harvard University and held positions at University of Chicago, Princeton University, and the University of Bonn before moving to Imperial.

In 2007, the Association for Women in Mathematics granted Caraiani their Alice T. Schafer Prize for excellence in mathematics. Among more recent honours, she was one of the winners of the Whitehead Prize of the London Mathematical Society in 2018, and was elected as a Fellow of the American Mathematical Society in the Class of 2020, for "contributions to arithmetic geometry and number theory, in particular the p-adic Langlands program".

In addition to receiving the EMS Prize at the 8ECM, Dr. Caraiani will speak in a minisymposium "A journey from pure to applied mathematics (MS - ID 53)", organized by European Women in Mathematics.

Kaisa Matomäki

University of Turku, Department of Mathematics and Statistics, Turku, Finland

Kaisa Matomäki is an Academy Research Fellow at the Department of Mathematics and Statistics, University of Turku, who specializes in number theory. Her research includes results on the distribution of multiplicative functions over short intervals of numbers; for instance, she showed, along with Maksym Radziwiłł of Caltech University, that the values of the Möbius function are evenly divided between +1 and –1 over almost all short intervals.

Matomäki, along with Radziwiłł, was awarded the SASTRA Ramanujan Prize in 2016 for "their deep and far reaching contributions to several important problems in diverse areas of number theory and especially for their spectacular collaboration which is revolutionizing the subject". Also with Radziwiłł, she received the 2019 New Horizons Prize for Early-Career Achievement in Mathematics, which is associated with the Breakthrough Prize in Mathematics.

Karim Adiprasito

Hebrew University of Jerusalem, Jerusalem, Israel

University of Copenhagen, Copenhagen, Denmark

Karim Alexander Adiprasito is a Professor at the University of Copenhagen and the Hebrew University of Jerusalem who works in the field of combinatorics, but combines methods from algebra, geometry and topology in innovative ways, solving problems in a wide range of areas.

Adiprasito is the recipient of numerous prizes, including the European Prize in Combinatorics in 2015 for "his wide-ranging and deep contributions to discrete geometry", as well as the Klachky prize of the Hebrew University in 2017. He has been selected as a Wallenberg academy fellow in 2018. His work is supported by a grant from the Israel Science Foundation and a 2016 ERC starting grant. Most recently, he was awarded the prestigious New Horizons Prize in Mathematics (2018) for the development of combinatorial Hodge theory leading to the resolution of the log-concavity conjecture of Heron-Rota-Welsh.

Simion Filip

University of Chicago

Simion Filip studies the interactions between dynamical systems, especially on locally homogeneous and Teichmuller spaces, and algebraic geometry, particularly Hodge theory and complex geometry.

At present he is an Associate Professor at the University of Chicago. Previously he was a Clay Research Fellow at the Institute for Advanced Study (2018–2019) and held a Junior Fellowship at Harvard University (2016–2018). In 2016, he was awarded the first Dynamical Systems Prize for Young Mathematicians by the Center for Dynamics and Geometry at Penn State. He is also the recipient of a Clay Research Fellowship (2016–2021) awarded by the Clay Mathematics Institute.

THE FELIX KLEIN PRIZE

Arnulf Jentzen

University of Münster (WWU)

Arnulf Jentzen is a full professor in the Faculty of Mathematics and Computer Sciences at the University of Münster (WWU) and a member of the Cluster of Excellence "Mathematics Münster" at the University of Münster.

The core research topics of his research group at the University of Münster are machine learning approximation algorithms, computational stochastics, numerical analysis for high-dimensional partial differential equations, stochastic analysis, and computational finance. He is particularly interested in deep learning based algorithms for high-dimensional approximation problems and different kinds of differential equations.

Arnulf Jentzen serves on the editorial boards of several mathematical journals such as the *Annals of Applied Probability*, *Communications in Mathematical Sciences*, the *Journal of Complexity*, the *Journal of Mathematical Analysis and Applications*, the *SIAM Journal on Numerical Analysis*, and the *SIAM Journal on Scientific Computing*.

THE OTTO NEUGEBAUER PRIZE

Karine Chemla

Centre National de la recherche scientifique (CNRS)

Karine Chemla is a Senior Researcher at the Centre National de la recherche scientifique (CNRS) and belongs to the research group SPHERE (Science—Philosophy—History, Université de Paris & CNRS). Her research interests include the history of mathematics within ancient China, geometry in France in the first half of the 19th century, and the theory of the history of mathematics, with a focus on the relationships between mathematics and the cultures in relation to which they are produced.

Professor Chemla has co-edited the monographs *Cultures without Culturalism: The Making of Scientific Knowledge* (Duke, 2017) and *The Oxford Handbook of Generality in Mathematics and the Sciences* (OUP, 2016). She also co-authored *Les neuf chapitres. Le classique mathématique de la Chine ancienne et ses commentaires* (Dunod, 2005), a French translation and critical edition of the book that was considered for centuries in China to be the most important text in the mathematical canon. This book received the 2006 Prix Ikuo HIRAYAMA from the Académie des inscriptions et belle lettres.

Among other distinctions, Professor Chemla has been awarded a CNRS Silver medal (2008) and held the Sarton Chair of History of Science at Ghent University (2013-14). In addition, she has been a plenary and invited speaker at numerous international conferences, including the Seventh European Congress of Mathematics (Berlin 2016) and the International Congress of Mathematicians in 1998. She is a Doctor Honoris Causa of the Vrije Universiteit Brussel and a member of several academic societies, including the Deutsche Akademie der Naturforscher Leopoldina, Section History of Science and Medicine, the Academia Europaea and the American Philosophical Society. Since 2011, she has served as the president of the French National Committee for History and Philosophy of Science and Technology (CNFHPST).

ABEL LECTURE

László Lovász

Alfred Rényi Institute of Mathematics

Lovász is a Hungarian-American mathematician, a research professor at the Alfred Rényi Institute of Mathematics and professor emeritus at Eötvös Loránd University, best known for his work in combinatorics and graph theory. One of the major impacts of Lovász's work has been to establish ways in which discrete mathematics can address fundamental theoretical questions in computer science.

In the 1970s, Lovász developed complementary methods to Erdős's existing probabilistic graph theory techniques in collaboration with Paul Erdős himself, who introduced him to graph theory. This included the Lovász local lemma, now a standard technique for proving the existence of rare graphs. Lovász also proved Kneser's conjecture and helped formulate the Erdős–Faber–Lovász conjecture, which is to this day an unsolved problem about graph colouring.

In the course of his work on the foundational underpinning of computer science, Lovász has also devised powerful algorithms with wide-ranging applications. One of these, the LLL algorithm, discovered in 1982 with the brothers Arjen and Hendrik Lenstra, has led to breakthroughs in diverse fields, including cryptology, algorithmic number theory and computer algebra. Currently, the only known encryption systems that can withstand a quantum computer attack are based on the LLL algorithm.

Lovasz is the author and co-author of ten, widely-praised, research monographs and textbooks, including *Combinatorial Problems and Exercises* (1979, 1993), *Matching Theory* (1986, with Michael D. Plummer), *Discrete Mathematics: Elementary and Beyond* (2003, with Josef Pelikan and Katalin L. Vesztergombi), and *Large Networks and Graph Limits* (2012).

During his long career, Lovász has received numerous prizes and honours, including the 1999 Wolf Prize "for his outstanding contributions to combinatorics, theoretical computer science, and combinatorial optimization", the 1999 Knuth Prize, the 2001 Gödel Prize and the 2010 Kyoto Prize for his impact on "the advancement of both the academic and technological possibilities of the mathematical sciences". He was elected a foreign member of the Royal Netherlands Academy of Arts and Sciences in 2006, the Royal Swedish Academy of Sciences in 2007, and an honorary member of the London Mathematical Society in 2009. In 2012, Lovász was elected as a member of the U.S. National Academy of Sciences and became a fellow of the American Mathematical Society. In addition, he has served terms as President of the International Mathematical Union (2007–2010) and President of the Hungarian Academy of Sciences (MTA) from 2014–2020.

PUBLIC LECTURES

Sir Vaughan F. R. Jones

Vanderbilt University

In memoriam (1952–2020)

A Fields medallist, Sir Vaughan F. R. Jones was to deliver a public lecture at the 8th European Congress of Mathematics.

Sir Vaughan F. R. Jones was a New Zealand-born mathematician based in the USA, renowned worldwide for his remarkable work on von Neumann algebras and knot polynomials.

He was awarded a Fields medal in 1990 for his discoveries in the mathematical study of knots – including an improvement on the Alexander polynomial (now called the Jones polynomial) – working from an unexpected direction with origins in the theory of von Neumann algebras, an area of analysis already much developed by Alain Connes. These discoveries led to the solution of a number of classical problems in knot theory, and to increased interest in low-dimensional topology.

His work on polynomial invariants of knots also had remarkable implications in the field of molecular biology, where new insight was gained into how DNA can remove the tangles that result when replication and cell division firstly duplicates the DNA and subsequently has to pull the chromosomal mass into different cells. The result represents a landmark in modern mathematics whose ramifications still remain to be fully explored.

Prof. Jones was Professor Emeritus at University of California, Berkeley, where he was on the faculty from 1985, as well as Stevenson Distinguished Professor of Mathematics at Vanderbilt University (from 2011). He was also a Distinguished Alumni Professor at the University of Auckland.

Andrei Okounkov

Columbia University, Skoltech, Higher School of Economics

Andrei Okounkov is a Russian mathematician who works in mathematical physics and neighboring areas of representation theory and algebraic geometry.

Enumerative geometry lies at the crossroads of all these fields of mathematics, and a lot of Okounkov's recent work focuses on K-theoretic generalizations of classical questions in enumerative geometry. In particular, a K-theoretic generalization of the Donaldson-Thomas-style counting of curves in algebraic threefolds is an exciting area at the forefront of current research with a conjectural relation to counting membranes of M-theory put forward by Nekrasov and Okounkov, and a geometric representation theory description of its basic building blocks obtained by Okounkov and A.Smirnov. Earlier conjectures of Maulik-Nekrasov-Okounkov-Pandharipande connecting cohomological DT counts with Gromov-Witten theory of algebraic threefolds in many ways shaped the developments of both fields. The proof of the MNOP conjectures for toric varieties by Maulik-Oblomkov-Okounkov-Pandharipande, and the work that followed, extends, among other things, the representation-theoretic understanding of the Gromov-Witten theory of curves (and also of the point) obtained in the early 2000s by Okounkov and Pandharipande.

In 2004, Okounkov was awarded an EMS prize for work that "contributed greatly to the field of asymptotic combinatorics." In 2006, at the 25th International Congress of Mathematicians in Madrid, Spain, he received the Fields Medal "for his contributions to bridging probability, representation theory and algebraic geometry."

Andrei Okounkov is a professor at the Columbia University in the city of New

York and at the Skolkovo Institute of Science and Technology in Moscow; he also serves as the academic supervisor of HSE International Laboratory of Representation Theory and Mathematical Physics. His previous positions include the University of Chicago, University of California at Berkeley, and Princeton University.

He is taking an active part in the organization of the ICM2022 in St. Petersburg, which will directly follow the 8ECM.

Stanislav Smirnov

University of Geneva, St Petersburg University, Skoltech

A Fields medalist Stanislav Smirnov will deliver a public lecture at the 8th European Congress of Mathematics.

Stanislav Smirnov is a Russian mathematician whose research involves complex and geometric analysis, dynamical systems, probability theory and mathematical physics. He received his doctorate at Caltech in 1996 under the supervision of Nikolai G. Makarov.

Smirnov has worked on percolation theory, where, in 2001, he proved the formula for the critical percolation crossings, suggested by the physicist John Cardy in 1992. Smirnov's theorem has led to a fairly complete theory for percolation on the triangular lattice, including conformal invariance of its scaling limit, as well as derivation of various dimensions and exponents via its relationship to the Schramm–Loewner evolution introduced by Oded Schramm. Smirnov applied these techniques to other problems, in 2006 establishing conformal invariance of the critical Ising model in two dimensions, a well-known problem related to ferromagnetism.

He has been recognized many times throughout his career. In 1997 he was awarded the Saint Petersburg Mathematical Society Young Mathematician Prize. In 2001 he received the Clay Research Award, the Göran Gustafsson Prize and the Salem Prize (joint with Oded Schramm) for his work in percolation theory. He also received the Rollo Davidson Prize for young probabilists in 2002.

In 2004, Smirnov was awarded the European Mathematical Society Prize for, amongst other results, "the proof of existence and conformal invariance of the scaling limit of crossing probabilities for critical percolation on the triangular lattice. This gives a formula for the limiting values of crossing probabilities, breakthrough in the field, which has allowed for the verification of many conjectures of physicists, concerning power laws and critical values of exponents". In 2010, at the International Congress of Mathematicians in Hyderabad, India, he received a Fields Medal for his work on the mathematical foundations of statistical physics, particularly finite lattice models. His citation read, "for the proof of conformal invariance of percolation and the planar Ising model in statistical physics".

From 1998-2005, Smirnov held a professorship at the Royal Institute of Technology in Stockholm. Since 2003, he is a professor at the University of Geneva, and also the Director of the Swiss National Centre of Competence in Research "Mathematics of Physics" (SwissMAP)

Since 2010, he has also been scientific director of the Chebyshev Laboratory and then the Department of Mathematics and Computer Science at at the St. Petersburg State University, and is taking active part in the organization of the ICM2022 in St. Petersburg, which will directly follow the 8ECM.

Martin Hairer

Imperial College, London

Hirzebruch Lecture

Professor Sir Martin Hairer KBE FRS is a professor of Pure Mathematics and Chair in Probability and Stochastic Analysis in the Department of Mathematics, Imperial College, London. His main area of research is the study of stochastic partial differential equations

(SPDEs); other research interests include nonequilibrium statistical mechanics, stochastic differential equations, stochastic processes with memory, and the general theory of Markov processes.

The work that led to his Fields medal concerns the mathematical understanding of nonlinear partial differential equations (PDEs), and in particular, his "breakthrough approach" to resolving the nonlinear KPZ equation proposed by physicists Kardar, Parisi and Zhang in 1986. This, and Prof. Hairer's subsequent work, develops a general theory of regularity structures that can be applied to a broad class of nonlinear stochastic PDEs, and goes a long way towards removing an obstacle in understanding nonlinear stochastic PDEs. Furthermore, the class of equations to which the theory applies contains several that are of central interest in mathematics and science and potentially opens the way to understanding the phenomenon of universality. His citation for the 2014 Fields medal award notes "his outstanding contributions to the theory of stochastic partial differential equations, and in particular … the creation of a theory of regularity structures for such equations."

Prof. Hairer's work in SPDEs has also been recognised with the award of the Institut de Mathématiques de Toulouse's Fermat Prize (2013) and the London Mathematical Society's Fröhlich prize (2014) "for his work on the interface between probability theory and partial differential equations; a body of work that is widely recognised as revolutionizing an entire field of research."

In addition to his mathematical research, Hairer's interest in music and computer programming led to the creation of Amadeus, an award-winning sound-editing program for Mac, and a popular tool among DJs, music producers and gaming companies.

In the course of his career, Prof. Hairer has received numerous other prizes and honours, including the Whitehead prize and the Philip Leverhulme Prize (2008). He was elected a Fellow of the Royal Society in 2014, and of the American Mathematical Society in 2015. In 2016, he was appointed Knight Commander of the Order of the British Empire (KBE).

Kathryn Hess

Ecole Polytechnique Fédérale de Lausanne (EPFL)

Kathryn Hess is an American-born mathematician, who is a professor of mathematics and life sciences at the Ecole Polytechnique Fédérale de Lausanne (EPFL). She received her PhD from MIT and held positions at the universities of Stockholm, Nice, and Toronto before moving to the EPFL.

Her research focuses on algebraic topology and its applications, primarily in the life sciences, but also in materials science. She has published extensively on topics in pure algebraic topology including homotopy theory, operad theory, and algebraic K-theory. On the applied side, she has elaborated methods based on topological data analysis for high-throughput

screening of nanoporous crystalline materials, classification and synthesis of neuron morphologies, and classification of neuronal network dynamics. She has also developed and applied innovative topological approaches to network theory, leading to a powerful, parameter-free mathematical framework relating the activity of a neural network to its underlying structure, both locally and globally.

In 2016 she was elected to the Swiss Academy of Engineering Sciences and was named a fellow of the American Mathematical Society and a distinguished speaker of the European

Mathematical Society in 2017. She is a member of the International Advisory Committee for ICM 2022.

She has contributed actively to the scientific life of the mathematical community, in particular by co-founding the network "Women in Topology '' in 2011 and co-organizing its first activities. She has also been deeply involved in outreach, such as the creation in 2008 of the Euler Course, a six-year, fast-paced math program for children with exceptional mathematical potential, based at EPFL.

She has been awarded several prizes for her teaching, including the top EPFL teaching award.

Bojan Mohar

University Simon Fraser and University of Ljubljana

Elsevier Lecture

Bojan Mohar is a Slovenian and Canadian mathematician whose areas of research include algebraic, structural and topological graph theory, and theory of computing. He received his PhD from the University of Ljubljana in 1986 under Tomaž Pisanski.

Mohar's research studies the interconnections between graphs, topology, geometry, and algebra, as well as graph minors, colorings and nowhere-zero flows. His work in graph theory is extended with developments of algorithmic and computational tools in these areas.

He co-authored *Graphs on Surfaces* (2001) with Carsten Thomassen, an influential book on topological graph theory, and proved a remarkable theorem that the question whether a given graph embeds in a given closed surface can be answered in linear time. His work in spectral graph theory builds a bridge between graph theory and some other branches of mathematics such as theoretical computer science and operator theory.

In 2010, Mohar received the Institute of Combinatorics and its Applications (ICA) Euler medal for contributions to combinatorial research. The citation reads: "Bojan Mohar's outstanding research and leadership over a period of thirty years place him as one of today's foremost discrete mathematicians worldwide. His deep and important contributions have dramatically improved our understanding of the structural properties of graphs." In 2018 he received the Royal Society of Canada John L. Synge award for outstanding research and a SIAM fellowship for his "contributions to graph theory and algorithms, in particular structural, topological, and algebraic graph theory." The Republic of Slovenia has also recognized Professor Mohar with two awards for scientific excellence: the Boris Kidrič prize (1990), and, for his work in Canada, Ambassador of Science of the Republic of Slovenia (2009).

Professor Mohar holds a Tier 1 Canada Research Chair in Graph Theory at Simon Fraser University, Canada, and is also a professor of Mathematics at the University of Ljubljana, Slovenia, and a member of the Institute of Mathematics, Physics, and Mechanics, Ljubljana.

Robin Wilson

Open University

Robin Wilson is an Emeritus Professor of Pure Mathematics at the Open University, Emeritus Professor of Geometry at Gresham College, London, and a former Fellow of Keble College, Oxford University. He is currently a Visiting Professor at the London School of Economics. A former President of the British Society for the History of Mathematics, he has written and edited over 40 books on a variety of subjects, including *Lewis Carroll in Numberland* and *Stamping Through Mathematics* on the history of mathematics, *Introduction to Graph Theory* and *Four Colours Suffice* on graph theory, and *How to Solve Sudoku*. He is a regular contributor to *The Mathematical Intelligencer*.

Long involved with the popularization of mathematics and its history, Prof. Wilson has been awarded the Mathematical Association of America's Lester Ford award for his 'outstanding expository writing', and the Stanton Medal for outreach activities in combinatorics by the Institute of Combinatorics and its Applications.

Along with the public lecture, Professor Wilson will curate a special mathematical-themed postage stamp exhibition at the 8ECM that will be on display for participants of the 8ECM, as well as the public.

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