WOMEN IN MATHEMATICS DAY*

December 13, 2024

Institute of Mathematics Czech Academy of Sciences (IM CAS)
Address: Žitná 25, 110 00 Praha, Blue lecture room, rear building, ground floor

PROGRAM

A part of the exhibition "Women of Mathematics From Around The World. A gallery of portraits." will be presented for the visitors during the whole day of the event.

9:00 – 9:10	Opening
9:10 – 10:00	Sylvie Paycha, University of Potsdam *The short story of a growing touring exhibition*
10:00 – 10:15	Coffee break
BECOMING A MATHEMATICIAN – LIFE STORIES	
10:15 – 10:45	Karen Strung, Institute of Mathematics CAS *Mathematics and badly drawn cartoons*
10:45 – 11:15	Alena Pravdová, Institute of Mathematics CAS *Walking along my geodesic towards mathematics*
11:15 – 12:00	Diana Piguet, Institute of Computer Science CAS *Solving independence through courage and resilience: from scaring my parents to becoming a group leader*
12:00 – 13:00	Lunch break Refreshments will be available for participants
MATHEMATICAL LECTURES	
13:00 – 13:45	Sylvie Paycha, University of Potsdam *A transformation group in the locality framework and renormalisation*
13:45 – 14:00	Coffee break
14:00 – 14:45	Karen Strung, Institute of Mathematics CAS *From topological dynamics to classifiable C*-algebras*
14:45 – 15:30	Alena Pravdová, Institute of Mathematics CAS *Universal spacetimes: bridging the gap across gravity's landscape*

**The event is supported by the Czech Academy of Sciences special program "Podpora prezentace vědy a výzkumu AV ČR"*

WOMEN OF MATHEMATICS FROM AROUND THE WORLD

A gallery of portraits

https://womeninmath.net/catalogue/

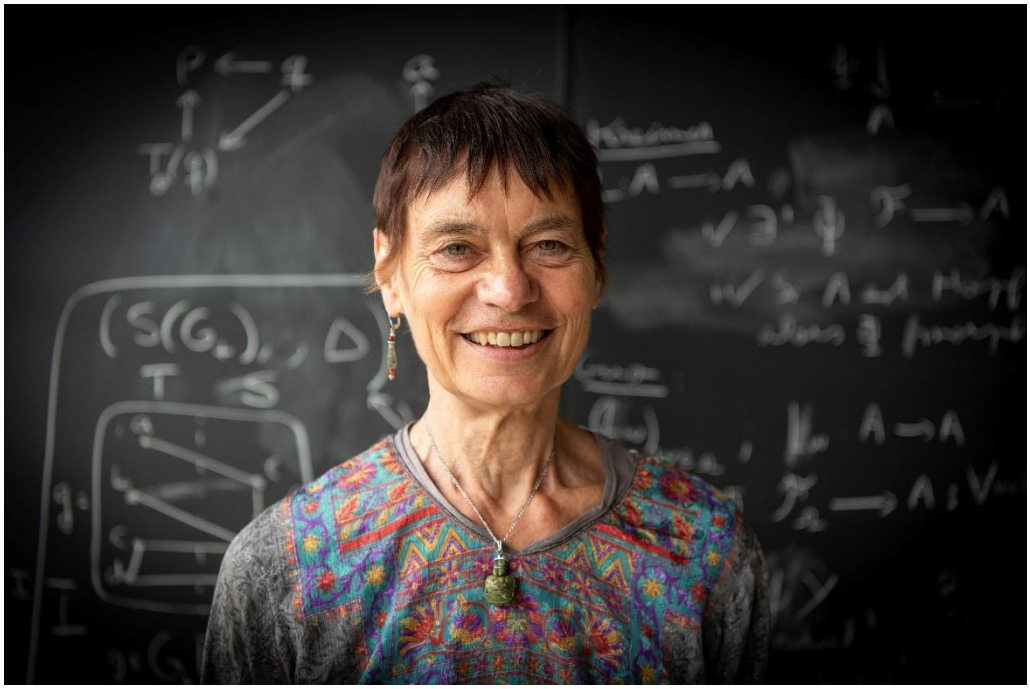
The exhibition comprises some 34 portraits of female mathematicians or theoretical physicists, made by the photographer Noel Matoff, who is also co-curator of the exhibition. Alongside the exhibition comes a catalogue designed by the graphic designer Gesine Krüger, which comprises many more photographs as well as interviews with 20 protagonists of the exhibition. They tell us about their life and scientific paths, sharing with us the difficulties they came across in their career and the many joys they have experienced with mathematics. None of them regrets their choice. To quote Dusanka Perisic, a Serbian mathematician portrayed in the exhibition, "je ne regrette rien!".

Noel Matoff is a **photographer** who was born in the USA, grew up in Frankfurt/Main, studied in Hamburg and now lives in Berlin and the Uckermark, near Berlin. One of her main themes is portraits, in different constellations and settings, always with great empathy, see www.matoff.de.
Noel also focuses on the work of midwives and photographed her first birth in 1995. Her sister Matina Matoff, herself a midwife, was assisting the mother with the birth. Another subject close to Noel's heart is men and women suffering from Alzheimer's disease. This has resulted in a very moving book featuring Noel's photographs of seven carers with their sick family members. It also shows photos of her own mother, who was diagnosed with Alzheimer's disease at a young age and suffered from it for twelve years.

Lecture by Sylvie Paycha: ***The short story of a growing touring exhibition***

The story begins in 2014, when journalist and filmmaker Agnes Handwerk whistled in my ear that I could set up an exhibition of portraits of female mathematicians to present at the European Mathematics Congress in Berlin 2016... this is how the exhibition was born and when its story began...I will tell you about its prehistory and still ongoing history.

**The event is supported by the Czech Academy of Sciences special program "Podpora prezentace vědy a výzkumu AV ČR"*



Sylvie Paycha is a professor at the mathematics department of the University of Potsdam in Germany since 2011 after holding a professorship at the University Clermont-Auvergne in France from 1995 to 2011. She received her PhD at the Ruhr University in Bochum in 1988. She brings together ideas coming from quantum field theory and tools borrowed from pseudo-differential analysis, geometry, and number theory to get a better understanding of infinities. These arise in many disguises such as Feynman integrals, multizeta functions, and the Todd genus, and require a renormalisation procedure in order to extract a finite quantity. Throughout her career, Sylvie Paycha has been actively involved in projects aimed at supporting women working in mathematics and theoretical physics.

Karen Strung is a researcher at the Institute of Mathematics of the Czech Academy of Sciences. She was born and raised in Toronto, Canada. After an indecisive few years at university, it suddenly dawned on her that she should become a mathematician. She obtained her MMath at the University of Nottingham and her PhD at the University of Münster, both under the supervision of Wilhelm Winter, and has held postdoctoral positions at the Fields Institute, the Institute of Mathematics of the Polish Academy of Sciences, and Radboud University. Mathematics has allowed her to travel the world, picking up collaborators, friends, and mathematical insights along the way. Her research interests include the classification and structure of C*-algebras and their connections to dynamical systems, as well as quantum groups.

**The event is supported by the Czech Academy of Sciences special program "Podpora prezentace vědy a výzkumu AV ČR"*

Alena Pravdová is a researcher at the Institute of Mathematics of the Czech Academy of Sciences. She got her PhD in mathematical physics in 1999 at Charles University. Her work focuses on mathematical relativity. In particular, she studies methods leading to the simplification of the non-linear field equations of gravity, which enables us to find exact solutions to these equations. Her work ranges from proving theorems to discussing the physical properties of the new solutions.

Diana Piguet is a senior researcher at the Institute of Computer Science, Czech Academy of Sciences, where she serves as the Head of the Department of Theoretical Computer Science. Born to a Czech mother and a Swiss father, Diana grew up in Switzerland but decided to explore her roots by studying in Prague, her mother's homeland. It was during her master's studies at Charles University that she discovered her passion for Combinatorics.

A rigorous course in Extremal Graph Theory during her doctoral studies further shaped her research path. Her academic journey began with a postdoctoral fellowship at the Alfréd Rényi Institute of Mathematics, part of the Hungarian Academy of Sciences, where she had the opportunity to work with Abel Prize winner Endre Szemerédi. This was followed by postdoctoral positions at the Technical University of Munich, the University of Warwick, the University of Birmingham—where she held a Marie Skłodowska-Curie Fellowship. Beyond her professional achievements, she is the mother of three, an avid tango dancer, an enthusiast of Moravian folkloric music, and can speak five languages.

**The event is supported by the Czech Academy of Sciences special program "Podpora prezentace vědy a výzkumu AV ČR"*

ABSTRACTS FOR MATHEMATICAL LECTURES

- Sylvie Paycha, University of Potsdam

A transformation group in the locality framework and renormalization

In the locality framework, sets are enhanced to locality sets, namely to sets endowed with a symmetric binary relation — called a locality relation — which captures essential features of locality in quantum field theory. Accordingly, monoids generalise to locality monoids, the product being replaced by a partial product defined on the graph of the locality relation. Locality maps between locality sets should be compatible with the locality relations and locality morphisms of locality monoids are locality maps that preserve the unit and factorise on products of pairs in the graph of such locality relations.

This factorisation is a key property in the context of renormalisation, which served as a motivation for us to introduce the notion of locality in the first place. There, locality plays an essential role in evaluating meromorphic functions in several variables at their poles by means of generalised evaluators. In the locality framework, one can build a "minimal subtraction scheme" in several variables which consists in "projecting out the polar part" and then evaluating the remaining holomorphic function in several variables. We show that an appropriate locality group we call a Galois locality group, acts transitively on a space of generalised evaluators, which includes "minimal subtraction schemes".
This is based on joint work with Li Guo (Rutgers U., Newark) and Bin Zhang (Sichuan U., Chengdu).

- Karen Strung, Institute of Mathematics, Czech Academy of Sciences

From topological dynamics to classifiable C*-algebras

One of the most satisfying aspects of C*-algebra theory is the ability to encode other mathematical structures as C*-algebra, allowing one to study these objects using the robust C*-algebra toolkit. For this to be successful, it is important to understand the structure of C*-algebras themselves. An important example of this is constructing C*-algebras from minimal homeomorphisms of compact metric spaces. What kind of C*-algebras are obtained through this construction and how can we tell them apart? Using the machinery of the Elliott classification program for simple nuclear C*-algebras, we can show that many interesting C*-algebras arise in this way. In this talk I will introduce C*-algebras arising from topological dynamical systems and discuss some recent research, together with various coauthors, which looks at these C*-algebras through the lens of the classification program.

- Alena Pravdová, Institute of Mathematics, Czech Academy of Sciences

Universal spacetimes: bridging the gap across gravity's landscape

One aspect of mathematical relativity is the search for exact solutions to field equations of Einstein's general relativity, as well as its various generalizations. Due to the nonlinear character of this system of partial differential equations, finding exact solutions is highly non-trivial. Over the years, specific mathematical methods leading to the simplification of Einstein's equations have been developed. These include, e.g., Newman—Penrose formalism and algebraic classification of tensors. I will discuss my works with collaborators, where we have generalized these methods beyond four dimensions and general relativity. As an important application, I will discuss universal spacetimes. These are unique n-dimensional metrics that simultaneously solve field equations of virtually all generalizations to Einstein's gravity. Finally, I will discuss how universality inspired us to study new (non-universal) solutions to quadratic gravity describing new black holes.

**The event is supported by the Czech Academy of Sciences special program "Podpora prezentace vědy a výzkumu AV ČR"*