Analysis day in memory of
Mikael Passare

ICM 1962
and its impact on Swedish mathematics

October 19, 2022

Stockholms universitet

Organizers:
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ANALYSIS DAY IN MEMORY OF MIKAEL PASSARE

ICM 1962 AND ITS IMPACT ON SWEDISH MATHEMATICS

DEPT. OF MATHEMATICS, STOCKHOLM UNIVERSITY

October 19, 2022

Program

12:00-13:00 **Lunch** at restaurant *Kräftan*

Lecture hall 1, Building 1, Albano

https://stockholmuniversity.zoom.us/j/61069533676

13:15–14:00 Christer Oscar Kiselman:
The International Congress of Mathematicians 1962: Some memories

14:00–14:30 Jan Boman:
Fields medal to Lars Hörmander 1962

14:30–15:00 Tobias Ekholm:
Milnor's construction of exotic spheres

Coffee break

15:20–15:50 Petter Bränden:
Hodge theory in combinatorics, and beyond

15:55–16:25 Fredrik Viklund:
Lattice spin systems at criticality and beyond: on the work of Hugo Duminil-Copin

16:30-17:00: Matthew de Courcy Ireland:
Fourier interpolation following Cohn-Kumar-Miller-Radchenko-Viazovska

FIGURE 1. Opening ceremony of ICM in Stockholm, 1962. From left: Lars Gårding, Lars Hörmander, John Milnor, Hassler Whitney, Åke Pleijel, Harald Cramér, Otto Frostman. Standing: Rolf Nevanlinna.

It was the best ICM Congress that I have attended.

Shmuel Agmon (September 2022)

Abstracts

Fields medal to Lars Hörmander 1962

Jan Boman
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I will tell briefly about the works of **Lars Hörmander** that gave him the Fields medal and some memories connected with the event.

Hodge theory in combinatorics, and beyond

Petter Bränden
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I will talk about some of the work of **June Huh** that awarded him the Fields medal 2022. "For bringing the ideas of Hodge theory to combinatorics, the proof of the Dowling-Wilson conjecture for geometric lattices, the proof of the Heron-Rota-Welsh conjecture for matroids, the development of the theory of Lorentzian polynomials, and the proof of the strong Mason conjecture."

Fourier interpolation following Cohn-Kumar-Miller-Radchenko-Viazovska

Matthew de Courcy-Ireland
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Cohn, Kumar, Miller, Radchenko, and **Viazovska** proved an interpolation formula that recovers a radial function on Euclidean space from the values it takes on radii equal to the square roots of even integers, together with the values of its Fourier transform as well as the derivatives of both the original function and the transform. They used this to prove that the E8 and Leech lattices are the configurations of minimal energy for a wide class of interactions, which implies that these lattices give densest sphere packings in dimensions 8 and 24. The interpolation formula is proven using a two-variable kernel that must be analytically continued to a function of two complex variables with certain residues, and with automorphic properties of different weight in each variable under a discrete group. This is an expository talk that will sketch some of these ideas of Cohn-Kumar-Miller-Radchenko-**Viazovska**.

Milnor's construction of exotic spheres

Tobias Ekholm
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Milnor's 1956 discovery of exotic differential structures on the 7-sphere was in a sense the starting point of the subject differential topology which has been a central area of mathematics ever since. Initial developments were extremely fast, already in 1963, **Milnor** and Kervaire presented a classification of differential structures on spheres of dimensions > 4 (in particular, there are 28 different structures on the 7-sphere). The case of the 4-sphere remains open to this day. In the talk, we will give an elementary overview of **Milnor**'s original construction of exotic 7-spheres.

The International Congress of Mathematicians 1962: Some memories

Christer Oscar Kiselman
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One of the International Congresses of Mathematicians was held in Stockholm in 1962 August 15–22 with more then two thousand members. There were One-hour lectures; Half-hour lectures, and Short Communications. Also Fields Medals were awarded. In my talk I will present some memories from this great event, the first congress of this kind in which I participated.

Lattice spin systems at criticality and beyond: on the work of Hugo Duminil-Copin

Fredrik Viklund
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Hugo Duminil-Copin was awarded a Fields medal in 2022 for "solving long-standing problems in the probabilistic theory of phase transitions in statistical physics, especially in dimensions three and four." In this talk, I will discuss a small selection of his many achievements.