Daily News

International Congress of Mathematicians
Wednesday, August 19, 1998 – No. 1

Welcome to the ICM'98!

The team of the 'Daily News' welcomes all the participants of the ICM in Berlin! We will inform you in this newsletter about changes and cancellations in the scientific program as well as about additional ad-hoc talks. Also, some special events will be highlighted, both on and off the ICM. For further suggestions, feel free to contact us between 15:00 and 16:00 at the 'Daily News' desk in H 2036.

Enjoy your stay in Berlin!

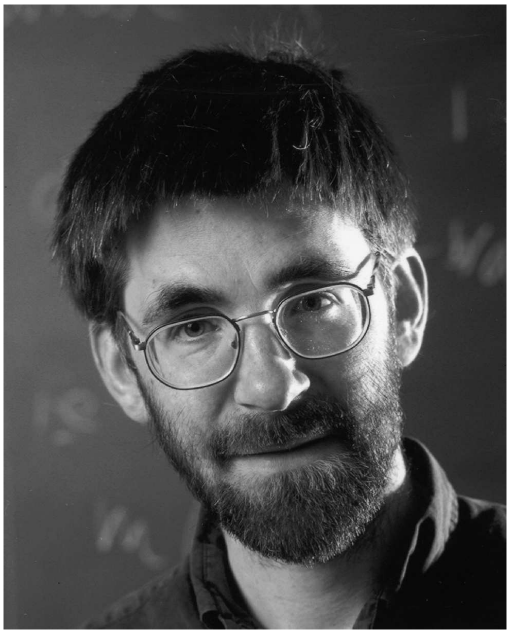
Drawing by Karl-Heinrich Hofmann, whose mathematical cartoons are presented in an exhibition at the mathematics library of Technical University Berlin, situated on the first floor of the Mathematics Building.

Congratulations to the prize winners!

Congratulations to the Fields medalists and the winner of the Nevanlinna prize! At yesterday's opening ceremony of the ICM 98 these prizes were awarded along with a Special Tribute to Andrew Wiles. Andrew Wiles will present his lecture entitled *20 years of number theory*, which is addressed to a broad audience, tonight at 19:30 in H 105 (Auditorium Maximum). Of course, also the space on the margin of the 'Daily News' is too narrow to carry his proof.

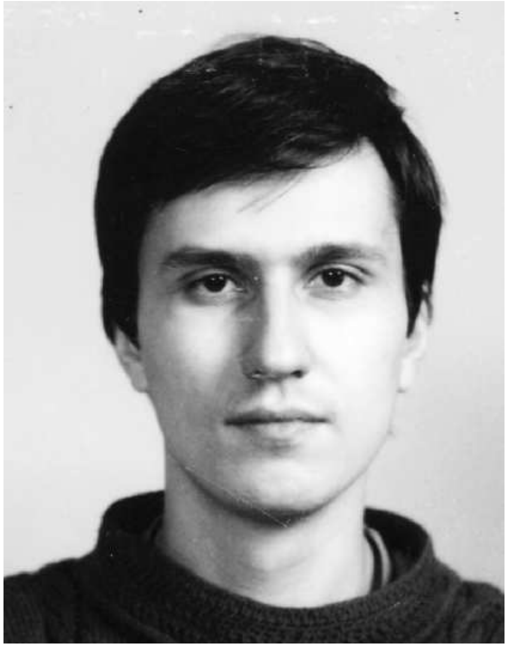
ANDREW J. WILES (Princeton University)

The new Fields medalists are:



RICHARD E. BORCHERDS (Cambridge University; Kac-Moody algebras, automorphic forms),

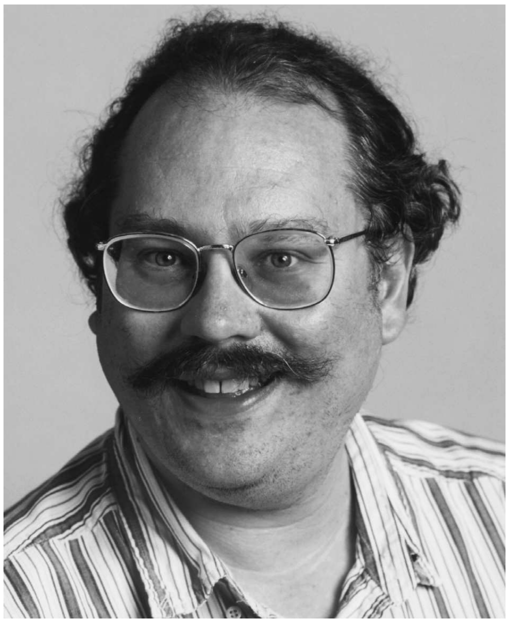
W. TIMOTHY GOWERS (Cambridge University; Banach space theory, combinatorics),



MAXIM KONTSEVICH (IHES Bures-sur-Yvette; mathematical physics, algebraic geometry and topology),

CURTIS T. MCMULLEN (Harvard University; complex dynamics, hyperbolic geometry).

The winner of the Nevanlinna prize is



PETER W. SHOR (AT&T Labs Florham Park, New Jersey; quantum computation, computational geometry).

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The prize winners will present talks on their work in the course of the congress. Here are the details:

RICHARD E. BORCHERDS, *What is moonshine?* Saturday, August 22, 17:15–18:00, H 2032
Abstract: I will try to explain what Conway and Norton's moonshine conjectures are, and give a non-technical explanation of some of the relations with Lie algebras, vertex algebras, and automorphic forms.

W. TIMOTHY GOWERS, *Fourier analysis and Szemerédi's theorem*. Thursday, August 20, 16:15–17:00, MA 005
Abstract: The famous theorem of Szemerédi, which solved an old problem of Erdős and Turán, states that for every natural number k and every $\delta > 0$ there exists N such that every subset of $\{1, 2, \ldots, N\}$ of size at least δN contains an arithmetic progression of length k. Not long after Szemerédi proved this result, Furstenberg discovered a different proof which uses ergodic theory and is simpler, although still by no means easy. Interest in the original problem remains, however, because neither proof gives any idea of how large N needs to be in terms of k and δ (although some sort of extremely weak bound can in principle be extracted from Szemerédi's argument).

The one case where the situation is somewhat different is the case $k = 3$. Here, there is a beautiful argument of Roth using exponential sums, or Fourier analysis, to use a different name for the same thing. Roth's argument gives a bound of $\exp\exp(c/\delta)$, which has subsequently been improved by Szemerédi and Heath-Brown to $\exp(\delta^{-c})$.

In this talk we shall describe a new proof of Szemerédi's theorem which can be regarded as a generalization of the approach of Roth. However, several new features have to be introduced, the most important of which is a deep theorem of Freiman, which describes sets of integers with small sumsets. (The sumset of a set A is the set $A + A = \{x + y : x, y \in A\}$.) We shall concentrate on the case $k = 4$, as this is simpler but gives a good idea of the argument in general. The bounds obtained by this method are of the form $\exp\exp(\delta^{-c(k)})$.

MAXIM KONTSEVICH, *Motivic Galois group and deformation quantizations*. Tuesday, August 25, 15:00–15:45, MA 001
Abstract: My recent formality theorem gives explicit formulae for the deformation quantization of Poisson manifolds. Numerical coefficients in these formulae are periods of algebraic varieties defined over $\mathbb{Q}$.

I will explain that this fact indicates that the motivic Galois group should act on the moduli space of non-commutative algebras. It implies the existence of new symmetries on the Hochschild cohomology of algebraic varieties and on centers of universal enveloping algebras.

CURTIS T. MCMULLEN, *Rigidity and inflexibility in conformal dynamics*. Saturday, August 22, 15:00–15:45, H 1012
Abstract: See the abstract book, p. 119.

PETER W. SHOR, *Quantum computing*. Wednesday, August 19, 9:30–10:30, H 105 (Auditorium Maximum) $\longrightarrow$ **TODAY!!!**
Abstract: See the abstract book, p. 19.

Scientific Program – Changes

1. Logic

no changes

2. Algebra

no changes

3. Number Theory and Arithmetic Algebraic Geometry

15:00 – Cancelled: Mariano Garcia, *New type* $(i, 1)$ *amicable pairs with greatest common factor a power of 2 or a prime times a power of* 2, 15:00, MA 311

4. Algebraic Geometry

15:00 – New (moved): MA 304, Uwe Nagel, *Characterization of projective subschemes by locally free resolutions* (from: Aug 25, 17:30, MA 042)
15:30 – New (moved): MA 304, Sheldon H. Katz, *Geometric Engineering of Quantum Field Theories* (from: Aug 24, 14:00, MA 042)
14:00 – Moved: Rudi Weikard, *Algebro-geometric Differential Operators* ⇒ Aug 25, 16:15, MA 144

5. Differential Geometry and Global Analysis

no changes

6. Topology

17:30 – Cancelled: Hugh R. Morton, *The Burau matrix and Fiedler's invariant for closed braids*, 17:30, H 112

7. Lie Groups and Lie Algebras

no changes

8. Analysis

no changes

9. Ordinary Differential Equations and Dynamical Systems

17:45 – Cancelled: Nikolas Efstathiou Sofronidis, *The Topological Entropy is continuous on a second category set in* $\mathrm{Diff}^r(M)$, *whenever* M *is a compact manifold and* r *is a non-negative integer*, 17:45, H 110

10. Partial Differential Equations

15:30 – New (moved): H 110, Vladimir Kozlov, *Singularities of solutions of nonlinear elliptic equations* (from: Aug 26, 14:00, H 110)

11. Mathematical Physics

14:00 – Cancelled: Gian Michele Graf, *Stability of matter in classical and quantized fields*, 14:00, H 1028
17:15 – New (moved): MA 301, Joyati Debnath, *Associated Transforms Through a Mathematical Software System* (from: Aug 25, 15:15, H 1029)

12. Probability and Statistics

no changes

13. Combinatorics

no changes

14. Mathematical Aspects of Computer Science

no changes

15. Numerical Analysis and Scientific Computing

no changes

16. Applications

no changes

17. Control Theory and Optimization

no changes

18. Teaching and Popularization of Mathematics

no changes

19. History of Mathematics

no changes

20. Special Activities

no changes

Ad-hoc Talks

1. Logic

no ad-hoc talk

2. Algebra

no ad-hoc talk

3. Number Theory and Arithmetic Algebraic Geometry

no ad-hoc talk

4. Algebraic Geometry

15:00 Uwe Nagel (University-GH Paderborn FB Mathematik/Informatik, Germany), *Characterization of projective subschemes by locally free resolutions*, MA 304
15:15 Yurii Brezhnev (Kaliningrad State University, Russia), *Gröbner bases and elliptic solutions*, MA 304
15:30 Sheldon H. Katz (Oklahoma State University, USA), *Geometric Engineering of Quantum Field Theories*, MA 304

5. Differential Geometry and Global Analysis

no ad-hoc talk

6. Topology

no ad-hoc talk

7. Lie Groups and Lie Algebras

no ad-hoc talk

8. Analysis

15:00 Jirí Rakosník (Mathematical Institute AS CR, Czech Republic), *On higher order Hardy inequality*, MA 301
15:15 Palanichamy Veeramani (Indian Inst. of Technology Madras, India), *Best Proximity Pair Theorems for Multifunctions with Open Fibres*, MA 301
15:30 Alexander Sostak (Univ. of Latvia, Latvia), *On a class of special Namioka spaces*, MA 301

9. Ordinary Differential Equations and Dynamical Systems

16:15 Hasna Riahi (Ecole Nationale d'Ingenieurs de Tunis, Tunisia), *Periodic Orbits of N-Body Type Problems via Morse Theory*, MA 301
16:30 Dinh Cong Nguyen (Hanoi Institute of Math, Vietnam), *Structural stability of linear random dynamical systems*, MA 301

16:45 Govindan Rangarajan (Department of Mathematics, India), *t. b. a.*, MA 301

10. Partial Differential Equations

17:15 Roman M. Cherniha (Institute of Mathematics, Ukrainian Nat. Acad. Science, Ukraine), *Lie and Non-Lie Symmetries of Nonlinear Diffusion Equations with Convection Term*, MA 304
17:30 Abduhamid Dzhuraev (Tajik Academy of Siences, Tadschikistan), *On non-classical problems for quasi-linear parabolic equations*, MA 304
17:45 Ivan G. Kazantsev (ELIS-RUG Gent University, Russia), *On the system of Beltrami type and its applications*, MA 304

11. Mathematical Physics

17:15 Joyati Debnath (Winona State University Math & Stat. Department, USA), *Associated Transforms Through a Mathematical Software System*, MA 301
17:30 Volker Michel (AG Geomathematik KSM26 Universität Kaiserslautern, Germany), *A New Way of Reconstructing the Density of the Earth From Measurements of the Gravitational Potential*, MA 301
17:45 Igor Yu. Popov (Department of Higher Mathematics Leningrad Institute of, Russia), *Operator extension theory model for a system of coupled Aharonov-Bohm rings: Localization effects*, MA 301

12. Probability and Statistics

no ad-hoc talk

13. Combinatorics

no ad-hoc talk

14. Mathematical Aspects of Computer Science

no ad-hoc talk

15. Numerical Analysis and Scientific Computing

no ad-hoc talk

16. Applications

14:00 Minping Quian (Peking University Dept. of Probability & Statistics, China, Peoples Republic of), *Hidden Markov Model, Context free Grammar and their Applications*, MA 301
14:15 Andrej Yu. Dubinsky (Keldysh Institute of Applied Mathematics, Russia), *Mathematical Modelling of electron and proton Transport in Chloroplasts*, MA 301
14:30 Gabriela G. Marinoschi (Romanian Academy Dept. of Mathematics, Romania), *Study of the transient and asymptotic diffusive transport in a stratified medium*, MA 301

17. Control Theory and Optimization

14:00 Alexander A. Yushkevich (UNC-Charlotte Dept. of Mathematics, USA), *Blackwell optimality in Markov decision processes with a Borel state space*, MA 304
14:15 Isaak Yakovlevich Kats (Ural State Academy of Railway Transport, Russia), *Optimal stabilization of linear controllable systems with random structure*, MA 304
14:30 Antonio Jorge Brandao Lopes-Pinto (Dept. of Mathematics/University of Lisboa, Portugal), *t. b. a.*, MA 304

18. Teaching and Popularization of Mathematics

no ad-hoc talk

19. History of Mathematics

16:15 Oscar Joao Abdounur (Institute of Mathematics from the University of Sao Paulo, Brazil), *A triple crisis of irrationality, in music, in mathematics and astronomy*, MA 304

Miscellaneous Announcements

Discussion rooms: Between 9:00 and 18:00 you can freely use the following lecture rooms in the Mathematics Building for discussions:
MA 645, 649, 741, 742, 744, 749, 750, 751, 848, 850.

Television: Tonight the channel B1 ('3. Programm SFB') runs a documentary on the ICM. Time: 22:15–22:45, rerun: tomorrow 15:15–15:45. (In German.)

Exhibition: The exhibition 'Terror and Exile' opens today at 12:15 in the TU Lichthof. In addition to the catalogue for the exhibition, the book *Mathematiker auf der Flucht vor Hitler* (Vieweg-Verlag) by Reinhard Siegmund-Schultze on the same topic has appeared.

Footloose Tours

In case a tour you are interested in is booked out please continue registering in the conference office to show your interest in a repetition since we try to repeat this tour another day.

A visit to Humboldt University; booked out
Description: The places where Weierstraß and Einstein lectured (in English and German)

Walk around the Straussee (a lake near Berlin)
Description: With the S-Bahn to Strausberg (Märkisch-Oderland); guided tour through the town: medieval Wehrkirche (fortified church), town wall and water tower; Lunch; walk around the lake; if the weather is bad or too hot, we will take the ferry across the lake; facility to go swimming (depending on the weather); tea/coffee break; journey back with S-Bahn
Date: Wednesday, August 19
Meeting: 10.00 a.m. in front of the main building, Technical University
Duration: approx. 8 hours
Fees: costs for lunch and coffee; costs of the ferry (needed only when the weather is bad) DM 2.50 p.p. (public transport ticket required)

Picasso; booked out
Description: Visit of the Berggruen collection (Picasso and contemporary) and the architectural surrounding (Schloßstraße Charlottenburg).

Visit of "Hackesche Höfe"
Description: Visit of "Hackesche Höfe" and of the "Sophienviertel", a part of the city with the flair of both modern 19th and 20th century Berlin.
Date: Wednesday, August 19
Meeting: 3.00 p.m. in front of the main building, Technical University
Duration: 2 1/2 – 3 hours
Fees: no fees

KPM Werkstatt ("Royal Prussian porcelain manufacture"); booked out
Description: visit of the KPM workshop. No persons below the age of 16 admitted.

Strolling through the Botanical Garden
Description: With 20.000 different species of plants on 43 hectares one of the largest and most diverse botanical gardens
Date: Thursday, August 20
Meeting: 9.30 a.m. in front of the main building, Technical University
Duration: according to the interest of the participants
Fees: Entrance fee approx. DM 6.– (public transport ticket required)

Sight seeing by public transport: From Bahnhof Zoo to Alexanderplatz; booked out
Description: This tour by public transport (bus 100) and a short walk covers e.g. Castle Bellevue, Reichstag, Brandenburger Tor and the historic mile "Unter den Linden" with Humboldt University, Staatsoper, Kronprinzenpalais and Gendarmenmarkt.

Visite guidée de Berlin en Français.
Description: Nous visiterons les monuments principaux de Berlin (Porte de Brandebourg, Eglise commémorative, Berliner Dom Gendarmenmarkt, Alexanderplatz). For a longer description in French see: `http://www.math.fu-berlin.de/user/john/ICM.html`
Date: Thursday, August 20
Meeting: 1.30 p.m. in front of the main building, Technical University
Duration: approx. 2 hours
Fees: none (public transport ticket required)

Visita guidata di Berlino in Italiano
Description: Visiteremo i monumenti principali di Berlino (Porta di Brandenburgo, Chiesa commemorativa, Berliner Dom, Gendarmenmarkt, Alexanderplatz.
Date: Thursday, August 20
Meeting: 1.30 p.m. in front of the main building, Technical University
Duration: approx. 2 hours
Fees: none (public transport ticket required)

Riksha tour from Alexanderplatz to Brandenburg Gate
Description: Two persons per bicycle-taxi. The tour covers many historic buildings, e.g., Neue Wache, Zeughaus, Humboldt University, Staatsoper, Gendarmenmarkt with Konzerthaus and German and French Dom.
Date: Thursday, August 20
Meeting: 2.00 p.m. in front of the main building, Technical University
Duration: approx. 1/2 hour plus journey with public transport
Fees: Fare approx. DM 20.– per person (public transport ticket required)

Walk through the Grunewald
Description: Walk through a forest in the Western part of Berlin and around the Schlachtensee (a lake nearby)
Date: Thursday, August 20
Meeting: 2.00 p.m. in front of the main building, Technical University
Duration: approx. 2 1/2 hours
Fees: no fees (public transport ticket required)

Imprint

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Office Hour: 15:00 – 16:00
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