

Summary of 2005 Research Activities

The activities of CMI researchers and research programs are sketched below. Researchers and programs are selected by the Scientific Advisory Board (see inside back cover).

Clay Research Fellows

Bo'az Klartag graduated from Tel Aviv University. His three-year appointment began in September 2005. He is based at the Institute for Advanced Study in Princeton, New Jersey.

David Speyer graduated from UC Berkeley and is working at the University of Michigan. He has a five-year appointment.

Klartag and Speyer joined current research fellows Manjul Bhargava (Princeton University), Daniel Biss (University of Chicago), Alexei Borodin (Caltech), Maria Chudnovsky (Princeton), Sergei Gukov (Caltech), Elon Lindenstrauss (Princeton), Ciprian Manolescu (Columbia University), Maryam Mirzakhani (Princeton University), Ben Green (MIT), András Vasy (Stanford) and Akshay Venkatesh (Princeton).

Book Fellows

Appointed in 2005 were Steven Finch (Boston University), who worked on a second volume of "Mathematical Constants," Grigory Mikhalkin (Toronto & Utah), who is writing a book on "Tropical Geometry and Amoebas," and John Morgan (Columbia University) and Gang Tian (Princeton & MIT), who are collaborating on a monograph on Ricci flow and Perelman's work.

Senior Scholars

Eric Zaslow (Northwestern University), November 1, 2004–July 14, 2005. Fields Institute thematic program on the Geometry of String Theory.

David Donoho (Stanford University), January 1–March 31, 2005. MSRI program on Mathematical, Computational and Statistical Aspects of Image Analysis.

Peter Winkler (Dartmouth College), January 1–



Barry Mazur's Clay Public Lecture "Are there unsolved problems about numbers?"

March 31, 2005. MSRI program on Probability, Algorithms and Statistical Physics.

Simon Levin (Princeton), June 26–July 16, 2005. PCMI program on Mathematical Biology.

Charles Peskin (Courant Institute, NYU), June 26–July 16, 2005. PCMI program on Mathematical Biology.

David Morrison (Duke), August 1–December 16, 2005. KITP program on Mathematical Structures in String Theory.

Robert Bartnik (Canberra), August 8–December 23, 2005. Newton Institute program on Global Problems in Mathematical Relativity.

Nigel Hitchin (Oxford), September 1–30, 2005. Kavli Institute program on String Theory.

Leo Kadanoff (Chicago), September 1–December 31, 2005. Fields Institute program on Renormalization and Universality in Mathematics and Mathematical Physics.

Research Scholars

Aderemi Kuku (ICTP, Trieste). August 15, 2004–March 31 2005 at MSRI and Ohio State.

Hiroshi Saito (Nagoya University). February 26–March 26, 2005 at Université Paris-Sud XI, Orsay.

Wandera Ogana (University of Nairobi). March 20–September 30, 2005 at Ohio State University.

Minoru Wakimoto (Kyushu University). April 1–May 31, 2005 at MIT.

Manfred Einsiedler (Ohio State University). July 1–December 31, 2005 at Princeton University.

Haruzo Hida (UCLA). September 1–30, 2005 at CRM, Montreal.

Peter Schneider (Münster). September 1–30, 2005 at CRM, Montreal.

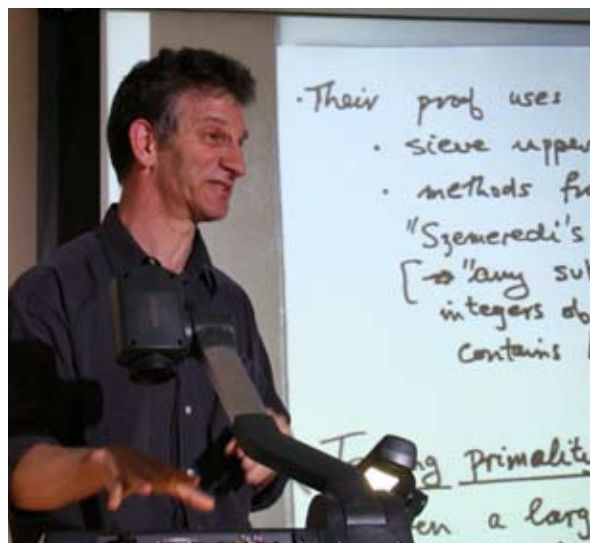
Wolfgang Ziller (U. Penn). September 1, 2005–June 30, 2006 at IMPA, Brazil.

Yaroslav Vorobets (Pidstryhach Institute of Applied Problems of Mechanics and Mathematics at NASU, Ukraine). September 1, 2005–August 31, 2006 at Texas A&M University.

Jacques Tilouine (Institut Galilée, Université Paris-Nord XIII). November 1–30, 2005 at CRM, Montreal.

Liftoff Fellows

CMI appointed seventeen Liftoff Fellows for the summer of 2005. Clay Liftoff Fellows are recent Ph.D. recipients who receive one month of summer salary and travel funds before their first academic position. See www.claymath.org/liftoff



Peter Sarnak's colloquium talk on prime numbers during the 2005 Clay Research Academy



Collaborators Tom Sanders and Ben Green at the Clay Mathematics Institute

Conferences Organized and Supported

Chern Memorial Conference at CIMAT, November 17–19, CIMAT, Guanajuato, Mexico.

Lie Groups, Representations, and Discrete Mathematics, November 14–18, IAS, Princeton.

Algebraic Statistics and Computational Biology, November 12–14, Clay Mathematics Institute.

Analytic and Stochastic Fluid Dynamics, October 10–14, MSRI, Berkeley.

Cluster-Polyfold Setup for Lagrangian Floer Homology, October 10–14, IAS, Princeton.

Euclid and his Heritage, October 6–8, St. Catherine's College, Oxford University.

Mathematical Structures in String Theory August 1–December 16, Kavli Institute for Theoretical Physics.

Summer Institute in Algebraic Geometry July 25–August 12, University of Washington, Seattle.

Geometric and Topological Methods for Quantum Field Theory, July 11–29, 2005, Villa de Leyva, Colombia.

Rigidity, Dynamics and Group Actions July 9 - 14, Banff International Research Station, Vancouver BC, Canada.

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Gauss-Dirichlet Conference, June 20–24, Georg-
August-Universität, Göttingen, Germany.

Representation Theory, Geometry and Automorphic
Forms, June 5–9, Tel Aviv University, Israel.

CMI Summer School on Ricci Flow, 3-Manifolds
and Geometry, June 20–July 15, MSRI, Berkeley.
See page 15 for more information.

CMI Workshop

Emergent Applications of the Goodwillie Calculus,
March 11–13.

Clay Research Academy

In April, CMI held its fourth high school workshop,
the Clay Mathematics Research Academy, which
brought together some of the world’s most
mathematically talented high-school students for
nine days of study and collaboration with leading
researchers. Richard Stanley (MIT) led a program
on generating functions and bijective proofs,
and Pavel Etingof (MIT) led a program on group
representations and their applications. The Academy
Colloquium Series attracted much interest (drawing
an average crowd of over 100). The speakers and
topics were as follows:

*Impossibility theorems on integration in elementary
terms*; Brian Conrad (Michigan).

The multiple facettes of the associahedron;
Jean-Louis Loday (Strasbourg, France).

E6, E7, E8; Nigel Hitchin (Oxford, UK).

*Bott Periodicity in Topological, Algebraic and
Hermitian K-Theory (Part I)*; Max Karoubi
(Paris 7, France).

*Bott Periodicity in Topological, Algebraic and
Hermitian K-Theory (Part II)*; Max Karoubi
(Paris 7, France).

Sizes and Scales in the Sub-atomic World;
Gerard 't Hooft (ITP, Utrecht).

Prime Numbers; Peter Sarnak (Princeton).

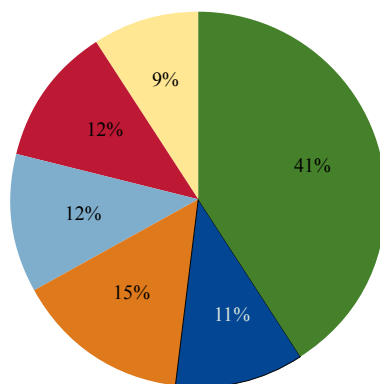
*Quivers in Algebra, Geometry, and Representation
Theory*; Victor Ginzburg (Chicago).

Notes and slides for the talks are available online at
[www.claymath.org/programs/outreach/academy/
colloquium2005.php](http://www.claymath.org/programs/outreach/academy/colloquium2005.php)

Program Allocation

Estimated number of persons supported by CMI in
selected scientific programs for calendar year 2005:

Research Fellows, Research Awardees, Senior Scholars, Research Scholars, Book Fellows and Public Lecturers	41
Summer School participants and faculty	120
Research Academy and Student Programs, participants and faculty	100
CMI Workshops, Liftoff program	50
Participants attending joint programs and the Independent University of Moscow	> 1000



Research Expenses for Fiscal Year 2005
(comparative allocations change annually based on scientific merit)