INFOMAT

Oktober 2006

Kjære leser!

Nå som sommervarmen er borte og noen av oss(?) allerede har sett den første snøen er det på tide å tenke på forenings store vinter-arrangement, Ski og Matematikk 2007. Foreningen oppfordrer alle til å delta.

I dette nummeret har vi mange kunngjøringer. Oppfordringen går til alle her også, ta steget, send søknad og kast dere ut i det.

Vi fortsetter med vår presentasjon av årets Fields-medalje-vinnere, denne gangen er turen kommet til "Matematikkens Mozart", vidunderbarnet Terence Tao.

God lesning.

hilsen Arne B.

SKI OG MATEMATIKK 2007

Norsk Matematisk Forenings store vinterbegivenhet på Rondablikk høyfjellshotell.Vi kombinerer skiturer på høyfjellet med matematikkforedrag i peisestua.

Tid : 04.01.2007 -07.01.2007 med ankomst til lunsj 4/1 og avreise etter frokost 7/1.

Bekreftede foredragsholdere:

Mikael Passare, Stockholms Universitet.

Hans Brodersen, Universitetet i Oslo

Påmelding:

Dag Normann e-post dnormann@math.uio.no

INFOMAT kommer ut med 11 nummer i året og gis ut av Norsk Matematisk Forening. Deadline for neste utgave er alltid den 10. i neste måned. Stoff til INFOMAT sendes til

infomat at math.ntnu.no

Foreningen har hjemmeside `http://www.matematikkforeningen.no/INFOMAT`
Ansvarlig redaktør er Arne B. Sletsjøe, Universitetet i Oslo.

NYTT FRA INSTITUTTENE

Nye doktorgrader:
Hans Christian Karlsen forsvarer 19. oktober sin avhandling *The Peaks-Over-Threshold (POT) method and its use for estimating extreme values from measured data.*

Ledige undervisningsvikariater:
IMF lyser ut undervisningsvikariater for våren 2007, med mulighet for forlengelse høsten 2007. Søknadsfrist er 26. oktober 2006. Utlysingsteksten finnes på NTNUs webside for ledige stillinger, https://nettopp.ntnu.no/?kat=N_JOBB

Gjester:
Professor **Dieter Happel**, Chemnitz university, besøker instituttets algebragruppe 1. oktober til 20. desember.
P.Gonazales-Vera, La Laguna University, Tenerife, gjester professor emeritus Olav Njåstad.

Nye doktorgrader:
Erlend Fornæss Wold disputerte 6. oktober 2006 for Ph.D-graden. Hans avhandling har tittelen *Iterations of automorphisms and proper holomorphic embeddings of Riemann surfaces in* $\boldsymbol{C}^2$.

Jostein Roald Natvig disputerte 10. oktober 2006 for Ph.D-graden. Hans avhandling har tittelen *High-resolution methods for conservation laws in the geosciences.*

Nye sentermedlemmer:
Stipendiat **Solveig Bruvoll** er ansatt fra 27. september. Fagområdet hennes er geometrisk modellering.

Gjester:
I oktober vil Prof. Dr. **William G. Litvinov,** University of Augsburg, Tyskland og **Mats Ehrnstrom**, Lunds Universitetet, Sverige gjeste instituttet.

Matematisk kalender

2006
November:
3.-5. KoMiN, Trondheim
9.-10. Institut Mittag-Leffler 90 år, Stockholm
24.-25. Geometri i Norge, Trondheim
2007
Januar:
4.-7. Ski og Matematikk
Mars:
22. Offentliggjøring av årets Abelprisvinner, Oslo
Mai:
22. Abelpris-utdeling, Oslo
23. Abelforedragene, Oslo
Juni:
25.-1/7. Innovations in Mathematical Finance, Loen
August:
5.-10. Abelsymposiet, Oslo
2008
Juli:
14.-18. 5th European Mathematical Congress, Amsterdam
2009
Juni:
8.-11. Den Nordiske Matematikerkonferansen, Oslo

KoMiN - KONFERANSEN FOR MATEMATIKKSTUDENTER I NORGE, 3.-5. november 2006

http://www.komin.math.ntnu.no/2006/
Her er programmet presentert og man har mulighet til å registrere seg. I tillegg til seks foredrag vil det være to bedriftspresentasjoner, workshop om konferansens framtid og avsatt tid til å diskutere egen og andres forskning. Foredragsholderne er:
Mathias Barra, UiO, *Uendelighet, Cantor og matematiske misforståelser.*
Christin Borge, UiO, *Endelig gruppeteori, gamle problemer og nye perspektiver*
Bjørn Dundas, UiB, *Sfære-spekteret.*
Vedad Hadziavdic, UiT, *Matematikk, statistikk og medisinsk diagnostikk — hvordan simulere en lege?*
Hugo Hammer, NTNU, *Seismisk inversjon, bayesiansk statistikk og simulering.*
Karina B. Hjelmervik, UiO, *Når vann påvirkes av måne, sol og vind.*

ARRANGEMENTER

INSTITUT MITTAG-LEFFLER CELEBRATING 90 YEARS SYMPOSIUM, 9.-10. november 2006

at Beijersalen, Kungl. Vetenskapskademien Lilla Frescativägen 4, Stockholm.
Programme:
Thursday, November 9
13.30 - 13.45 Opening of the symposium
Gunnar Öquist, Permanent Secretary, The Royal Swedish Academy of Sciences
Anders Björner, Director, Institut Mittag-Leffler
13.45 - 15.00 **Arild Stubhaug**, Oslo: *Under övertygelsens tecken: Gösta Mittag-Leffler och hans institut*
Coffee break
15.30 - 16.20 **Lennart Carleson**, Stockholm: *The dream of an institute*
16.30 - 17.00 **Paul Malliavin**, Paris *The renaissance of the Institut Mittag-Leffler*
Friday, November 10
10.00 - 10.30 **Nicolas Varopoulos**, Paris *Memories and retrospectives (personal and mathematical) from Institut Mittag-Leffler and Sweden*
Coffee break
11.00 - 11.30 **Jean Pierre Bourguignon**, Paris *A praise of diversity, or How to make the case of mathematics in the definition of patterns for the support of science*
11.40 - 12.10 **Olli Martio**, Helsinki *Gösta Mittag-Leffler in Finland*
12.15 - 12.30 **Lars Gårding**, Lund *Från flydda tider ...*
Lunch
14.00 - 14.30 **Sigurdur Helgason**, MIT *Lie group analysis at Institut Mittag-Leffler*
14.40 - 15.00 **Jan-Erik Björk** *Reminiscences of a postdoc from the early years*

TOPOLOGI I NORGE, 24.-25. november 2006

Årets norske topologi-møte blir i Trondheim, 24.-25. november. Mer informasjon senere.

SKI OG MATEMATIKK 2007, 4.–7. januar 2007

Det årvisse arangementet *Ski og Matematikk* vil gå av stabelen på Rondablikk Høyfjellshotell 4/1 – 7/1 2007.
Priser:

Pr.person/enkeltrom	KR. 2.350:-
Pr.person/dobbeltrom .(deltager)	KR. 2.050:-
Pris for samboer/ektefelle	KR. 1.560:-
Pr.barn under 15 år / x-seng	KR. 250:-

Påmelding til Dag Normann via e-post dnormann@math.uio.no
Hjemmeside: http://www.math.uio.no/~dnormann/skiogmatematikk2007.html.

Utsikt mot Rondane

ABELSTIPEND FOR 2007

Styret for Niels Henrik Abels minnefond har gitt Norsk matematisk forening i oppgave å forestå utdeling av årlige Abelstipend til studenter som er opptatt i masterprogram i matematiske fag ved norske læresteder. Abelstipendene har som formål å stimulere lovende studenter til videre studier og forskning i matematiske fag.

Mer informasjon og retningslinjer er tilgjengelig på http://www.matematikkforeningen.no abelstipend/ for informasjon og retningslinjer for søknader.

Søknadsfristen er ***10. november 2006***. Send søknaden til Norsk Matematisk forening, Institutt for matematiske fag, NTNU, 7491 Trondheim, og/eller gjerne elektronisk til Inger.Seehuus@math.ntnu.no. Merk eventuell konvolutt med ”Abelstipend”.

CALL FOR PROPOSALS FOR 2009 - 2010

The board of the Mittag-Leffler Institute invites program proposals for the the academic year Sept 1, 2009 - June 15, 2010.
The Institute runs programs in specialized areas of mathematics to which leading scientists are invited. Post-docs and advanced graduate students are invited to participate in a concurrent junior visiting program. The programs can run for the whole year, or be of semester length (Sept 1 - Dec 20 and Jan 15 - June 15, respectively). Around 10-15 senior visitors are in residence at any given time. The minimum length of stay is one month, and it is expected that two or three leading mathematicians will stay for at least a semester each. The selection criteria for proposals are scientific strength and timeliness, and the degree to which the program would benefit mathematical research in Scandinavia (including Finland and Iceland).
Each scientific program is led by a steering committee of 2-4 persons, which will work closely with the director and which will suggest invitees to the board. It is expected that at least one member of the committee be present at all times during the period of the program.
Proposals should contain:
– a description of the intended area of specialization
- the names of the proposed committee
- a list of suggested invitees, most of whom should have indicated an interest in the program
- a willingness to participate
- a description of the Scandinavian connection
The deadline for applications is ***January 15, 2007***.
For further information, consult the Institute home page: *www.mittag-leffler.se*, or contact the director, Professor Anders Björner.

CALL FOR BIDS: 6TH EUROPEAN MATHEMATICAL CONGRESS, 2012

Applications are invited to hold the 6th European Mathematical Congress in the year 2012. Applications should reach the Executive Committee in electronic form before ***March 15, 2007***, to the address riitta. ulmanen@helsinki.fi of the EMS Secretariat.
The decision process is subject to the following guidelines:
The EC appoints a site committee in case there are more than one bid. The site committee makes its inspections during the year 2007; the costs are borne by the bidders. The site committee inspects the auditoriums and the accommodation, plans for the scientific programme, the financial plans and the strength of the mathematical community making the bid. It also takes into consideration the costs for the participants to reach the site and the costs for the stay during the congress. Special attention will be paid to the availability of inexpensive student dormitories.
Decision: In the year 2007 or 2008 the Executive Committee makes a recommendation for the site to the Council and the Council decides in the year 2008. For guidelines concerning organisation and finances, please consult *www.emis.de/* .

CALL FOR PROPOSALS FOR MINISYMPOSIA DURING 5ECM, AMSTERDAM, july 2008

At the Fifth European Conference of Mathematics (5ECM), to be organized in Amsterdam, July 14-18, 2008, minisymposia on various topics ranging over all of mathematics will be held. Minisymposia typically consist of one 45 minute lecture and three half hour lectures. We call for organizers to submit propositions.

A proposal should be approximately one page and contain:

* The names of the organizers (or organization, such as research networks)
* A short description of the topic and its importance for contemporary mathematics
* Names of proposed speakers

Proposals should reach the Scientific Committee before ***November 1, 2006.***

First announcement - the workshop:

INNOVATIONS IN MATHEMATICAL FINANCE

will be held at Hotel Alexandra in Loen, Norway, in the period 25 June – 1 July, 2007 . The workshop is sponsored by the ESF program Advanced Mathematical Methods in Finance (AMaMeF) and the Center of Mathematics for Applications (CMA), University of Oslo, Norway.

Scientific Summary:

The intention of the workshop is to focus on new and untraditional mathematical ideas and methods within the mathematical finance research. Subjects that may be discussed include (but are not limited to)

- non-semimartingale models (including fractional Brownian motion)
- nonstandard stochastic analysis and hyper-finance
- new models for risk measures and related topics
- information and its relation to performance in stochastic control and related topics
- asymmetric information and equilibrium
- insider trading models
- partial information models
- Malliavin calculus in mathematical finance
- anticipative calculus in financial modeling
- white noise analysis in mathematical finance

Innovative topics within mathematical finance have already appeared in recent events and conferences, some of which organized within the AMaMeF program. This workshop aims at giving a broader platform for the presentation and discussion of these and other new issues and approaches.

Main speakers (confirmed):

Nicole El Karoui (Ecole Polytechnique, Palaiseau, France) and **Philip Protter** (Cornell University, USA)

In addition a number of other distinguished researchers will be invited. We also encourage the active participation of young researchers and PhD students. Expected number of participants: 50.

The workshop will be held at the beautiful Hotel Alexandra, located at the village Loen, situated at the bottom of the scenic fjord of Nordfjord in the county of Sogn og Fjordane, at the west coast of Norway.

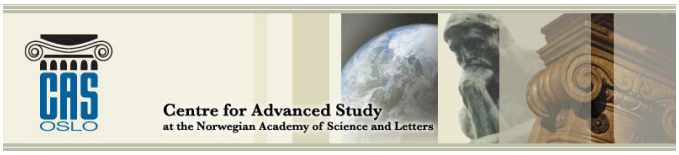
The special prices at the Hotell Alexandra for the workshop participants are: Single room per day: NOK 1195. Per person in a double room per day: NOK 1035. Lunch on arrival day: NOK 195. The room prices include full pension, i.e. breakfast, lunch and dinner at the hotell, and free access to the swimming pools etc.

For more information please contact one of the organizers:

Giulia DI NUNNO giulian ‘at’ math.uio.no

Bernt ØKSENDAL oksendal ‘at’ math.uio.no

KUNNGJØRINGER/NOTISER



SENTER FOR GRUNNFORSKNING 2009/2010

Det inviteres hvert år tre forskergrupper til å arbeide ett år ved Senteret, vanligvis én gruppe innen hvert av feltene: Humaniora/teologi, Samfunnsvitenskap/jus, Naturvitenskap/matematikk.
Hver gruppe skal ha internasjonal sammensetning og skal ledes av en eller to anerkjente norske forskere. Det bes nå om forslag på ledere for de gruppene som skal virke ved Senteret det akademiske år 2009/2010.
De utpekte lederne skal i forståelse med Senteret invitere de øvrige medlemmene i sin gruppe, normalt ca. 6 - 7 forskere. I hver gruppe bør det inngå både erfarne forskere og inntil 2 lovende post. docs/stipendiater. Gruppene vil bli fullfinansiert av Senteret i samarbeid med de seks norske universitetene og Norges Handelshøyskole. I inneværende år gis det et bidrag på 3 millioner kroner til hver gruppe. Vi håper å kunne øke dette, men det er avhengig av økte bevilgninger over Statsbudsjettet. Planleggingen bør ta utgangspunkt i nåværende forhold. Gruppene vil få arbeidsplass i Senterets lokaler i Akademiets hus på Drammensveien i Oslo. Det er ikke mulighet for eksperimentelt arbeid.
Ditt forslag trenger bare å inneholde:
1. Navnet på lederkandidat(er), arbeidssted og en kortversjon av CV (max 1 side)
2. En kort beskrivelse av forskergruppens tema, dets vitenskapelige betydning, og sentrale problemstillinger for prosjektet.

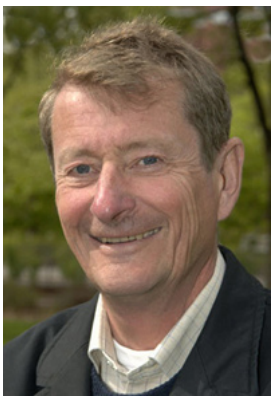
Beskrivelsen skal være beregnet på personer som har erfaring med forskning, men ikke er eksperter på feltet, og den bør ikke være over 20 linjer.
Frist: ***Mandag 20. november 2006***.
Styret ved Senteret vil i desember avgjøre hvilke forslag man skal gå videre med. De aktuelle lederkandidatene vil da bli anmodet om selv å formulere sine prosjekter. Forespørsler kan rettes til: Professor Aanund Hylland, styreleder, (22 85 42 71) eller Professor Willy Østreng, vitenskapelig leder, (22 12 25 11).

NEW PRIME NUMBER RECORD

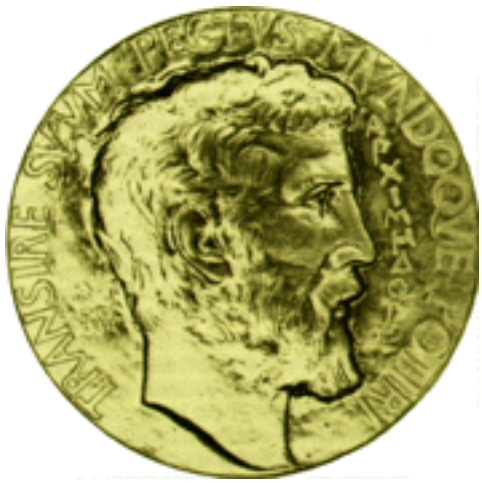
The Great Internet Mersenne Prime Search, a distributed computing project, has discovered the largest known prime number: $2^{32,582,657}$ -1, a number with 9,808,358 digits. It is the 44th known Mersenne prime number (one of the form 2^p-1). The number was discovered at Central Missouri State University by Curtis Cooper and Steve Boone, who also discovered the previous prime record holder. A US$100,000 award will go to the discoverer of a prime with 10 million digits.

Uniforum, 6.oktober:

REKTOR GEIR ELLINGSRUD VED UIO SKUFFET OVER STATSBUDSJETTET



–Statsbudsjettet er et skritt tilbake og en realnedgang for forskning og høyere utdanning. Det er alvorlig, spesielt sett i lys av forskningsmeldingen og Soria-Moria-erklæringen. Det er ikke en rød-grønn krone i budsjettet. Det er en risiko for at forskningen rammes, sa rektor Geir Ellingsrud ved Universitetet i Oslo til Uniforum på Stortinget i dag tidlig klokka ti da finansminister Kristin Halvorsen la fram statsbudsjettet.
Geir Ellingsrud sier at han helt fra starten av fryktet en slik utvikling da den nye regjeringen la barnehagene inn under Kunnskapsdepartementet. Han spør seg nå om regjeringen har resignert i forhold til det den har lovet om forskningsfinansiering.
Da finansministeren i finanstalen sin snakket om Kunnskapsløftet viet hun mesteparten av taletiden til skolesatsingen. Hun streifet bare kort innom forskning på høyt nivå.
–I talen hennes stod det to sider om Kunnskapsløftet og barnehager, men bare noen få linjer om høyere utdanning. Det sier noe om hvor regjeringen har fokus, beklager Geir Ellingsrud.



FIELDS-MEDALJE-VINNER TERENCE TAO

For his contributions to partial differential equations, combinatorics, harmonic analysis and additive number theory.

Terence Tao is a supreme problem-solver whose spectacular work has had an impact across several mathematical areas. He combines sheer technical power, an other-worldly ingenuity for hitting upon new ideas, and a startlingly natural point of view that leaves other mathematicians wondering, ”Why didn’t anyone see that before?” At 31 years of age, Tao has written over 80 research papers, with over 30 collaborators, and his interests range over a wide swath of mathematics, including harmonic analysis, nonlinear partial differential equations, and combinatorics. ”I work in a number of areas, but I don’t view them as being disconnected,” he said in an interview published in the Clay Mathematics Institute Annual Report. ”I tend to view mathematics as a unified subject and am particularly happy when I get the opportunity to work on a project that involves several fields at once.”

Because of the wide range of his accomplishments, it is difficult to give a brief summary of Tao’s oeuvre. A few highlights can give an inkling of the breadth and depth of the work of this extraordinary mathematician. The first highlight is Tao’s work with Ben Green, a dramatic new result about the fundamental building blocks of mathematics, the prime numbers. Green and Tao tackled a classical question that was probably first asked a couple of centuries ago: Does the set of prime numbers contain arithmetic progressions of any length? An ”arithmetic progression” is a sequence of whole numbers that differ by a fixed amount: 3, 5, 7 is an arithmetic progression of length 3, where the numbers differ by 2; 109, 219, 329, 439, 549 is a progression of length 5, where the numbers differ by 110. A big advance in understanding arithmetic progressions came in 1974, when the Hungarian mathematician Emre Szemeredi proved that any infinite set of numbers that has ”positive density” contains arithmetic progressions of any length. A set has positive density if, for a sufficiently large number n, there is always a fixed percentage of elements of {1, 2, 3, ... n} in the set. Szemeredi’s theorem can be seen from different points of view, and there are now at least three different proofs of it, including Szemeredi’s original proof and one by 1998 Fields Medalist Timothy Gowers. The primes do not have positive density, so Szemeredi’s theorem does not apply to them; in fact, the primes get sparser and sparser as the integers stretch out towards infinity. Remarkably, Green and Tao proved that, despite this sparseness, the primes do contain arithmetic progressions of any length. Any result that sheds new light on properties of prime numbers marks a significant advance. This work shows great originality and insight and provides a solution to a deep, fundamental, and difficult problem.

Another highlight of Tao’s research is his work on the Kakeya Problem, which in its original form can be described in the following way. Suppose you have a needle lying flat on a plane. Imagine the different possible shapes swept out when you rotate the needle 180 degrees. One possible shape is a half- disk; with a bit more care, you can perform the rotation within a quarter-disk. The Kakeya problem asks, What is the minimum area of the shape swept out in rotating the needle 180 degrees? The surprising answer is that the area can be made as small as you like, so in some sense the minimum area is zero. The fractal dimension of the shape swept out provides a finer kind of information about the size of the shape than you obtain in measuring its area. A fundamental result about the Kakeya problem says that the fractal dimension of the shape swept out by the needle is always 2. Imagine now that the needle is not in a flat plane, but in n-dimensional space, where

n is bigger than 2. The n-dimensional Kakeya problem asks, What is the minimum volume of an n-dimensional shape in which the needle can be turned in any direction? Analogously with the 2-dimensional case, this volume can be made as small as you like. But a more crucial question is, What can be said about the fractal dimension of this n-dimensional shape? No one knows the answer to that question. The technique of the proof that, in the 2-dimensional plane the fractal dimension is always 2, does not work in higher dimensions. The n-dimensional Kakeya problem is interesting in its own right and also has fundamental connections to other problems in mathematics in, for example, Fourier analysis and nonlinear waves. Terence Tao has been a major force in recent years in investigating the Kakeya problem in n dimensions and in elucidating its connections to other problems in the field.

Another problem Tao has worked on is understanding wave maps. This topic arises naturally in the study of Einstein's theory of general relativity, according to which gravity is a nonlinear wave. No one knows how to solve completely the equations of general relativity that describe gravity; they are simply beyond current understanding. However, the equations become far simpler if one considers a special case, in which the equations have cylindrical symmetry. One aspect of this simpler case is called the "wave maps" problem, and Tao has developed a program that would allow one to understand its solution. While this work has not reached a definitive endpoint, Tao's ideas have removed a major psychological obstacle by demonstrating that the equations are not intractable, thereby causing a resurgence of interest in this problem.

A fourth highlight of Tao's work centers on the nonlinear Schrödinger equations. One use of these equations is to describe the behavior of light in a fiber optic cable. Tao's work has brought new insights into the behavior of one particular Schroedinger equation and has produced definitive existence results for solutions. He did this work in collaboration with four other mathematicians, James Colliander, Markus Keel, Gigliola Staffilani, and Hideo Takaoka. Together they have become known as the "I-team", where "I" denotes many different things, including "interaction". The word refers to the way that light can interact with itself in a medium such as a fiber optic cable; this self-interaction is reflected in the nonlinear term in the Schrödinger equation that the team studied. The word "interaction" also refers to interactions among the team members, and indeed collaboration is a hallmark of Tao's work. "Collaboration is very important for me, as it allows me to learn about other fields, and, conversely, to share what I have learnt about my own fields with others," he said in the Clay Institute interview. "It broadens my experience, not just in a technical mathematical sense, but also in being exposed to other philosophies of research and exposition."

These highlights of Tao's work do not tell the whole story. For example, many mathematicians were startled when Tao and co-author Allen Knutson produced beautiful work on a problem known as Horn's conjecture, which arises in an area that one would expect to be very far from Tao's expertise.

This is akin to a leading English-language novelist suddenly producing the definitive Russian novel. Tao's versatility, depth, and technical prowess ensure that he will remain a powerful force in mathematics in the decades to come.

BIOGRAPHICAL SKETCH

Terence Tao was born in Adelaide, Australia, in 1975. He received his PhD in mathematics in 1996 from Princeton University. He is a professor of mathematics at the University of California, Los Angeles. Among his distinctions are a Sloan Foundation Fellowship, a Packard Foundation Fellowship, and a Clay Mathematics Institute Prize Fellowship. He was awarded the Salem Prize (2000), the American Mathematical Society (AMS) Bocher Prize (2002), and the AMS Conant Prize (2005, jointly with Allen Knutson).