INFOMAT

Utgitt av
Norsk Matematisk Forening

September 2005

Fra foreningens aktiviteter bringer INFOMAT denne måneden for det første at fristen for å sende inn presøknad for å få arrangere Abelsymposiet 2007 er allerede 15. september, og for det andre at de første Abelstipendene er utdelt.

I dette nummer kommer også andre del av interviewet med årets Abelprisvinner Peter D. Lax.

Om du har stoff som du mener passer for INFOMAT, send et brev til

`infomat at math.ntnu.no`.

Hjemmeside: `http://www.matematikkforeningen.no/INFOMAT`

Nytt fra instituttene

Innholdet baserer seg på innsendt informasjon fra enkeltmedlemmer og fra instituttene.

Institutt for matematiske fag, Høgskolen i Agder

Avganger: 1. lektor Henrik Dahl og 1. amanuensis Bjørn Walther har sagt opp sine stillinger ved Høgskolen i Agder.

Institutt for matematiske fag (IMF), NTNU

Disputaser:

Bjarte Rom er tildelt doktorgraden (dr. scient.) etter sin disputas 28. juni. Hans avhandling har tittelen *Sampling and Interpolation in Spaces of Entire Functions and Applications*. Arbeidet har vært utført ved Institutt for matematiske fag, og hovedveileder har vært professor Yurii Lyubarskii.

Anita Valenta er tildelt doktorgraden (dr. scient.) etter å ha disputert 24. juni. Tittel på avhandlingen er *Finitely Presented Functors, Degeneration- and Hom-Order*. Arbeidet har vært utført ved Institutt for matematiske fag med professor Sverre O. Smalø som hovedveileder.

Midlertidige tilsettinger høst 2005:

- Førsteamanuensis Ole Jacob Broch
- Førsteamanuensis Kristian Gjøsteen
- Universitetslektor Torbjørn Helvik
- Førsteamanuensis Cathrine V. Jensen
- Universitetslektor Hans Kristian Karlsen
- Førsteamanuensis Tore August Kro
- Universitetslektor Janne Svensson
- Førsteamanuensis Trond Varslot
- Førsteamanuensis Jon Eivind Vatne

Gjesteforskere:

- Alphons van Daele, 04. til 25. september
- David Weissbart, 1. september 2005 til 31. august 2006

Forskningspermisjoner høst 2005:

- Professor Bo Lindqvis
- Professor Kari Hag
- Førsteamanuensis Idar Hansen
- Professor Helge Holden
- Professor Peter Lindqvist
- Professor Idun Reiten
- Professor Einar Rønqvist
- Professor Nikalai Ushakov

Permisjon uten lønn høst 2005:

- Professor Alexei Roudakov

Gjester:
Assistant professor Markus Schmidmeier, Florida Antlantic University, er gjesteprofessor hos Idun Reiten ved IMF i høstsemesteret 2005.

Eksperter i Team. Eksperter i Team ble introdusert ved innføringen av det femårige sivilingeniørstudier ved NTNU for noen år tilbake. Målet med emnet har vært å bevisstgjøre studentene om sine roller som medarbeidere i grupper som skal løse tverrfaglige problem. Emnet er nå også obligatorisk for masterstudenter i realfag og studenter ved Historisk-filosofisk fakultet. Fra og med 2006 er emnet også obligatorisk ved de samfunnsvitenskapelige studier. Over 1200 studenter var eksperter våren 2005.

Tiltaket er nylig evaluert, og resultatet er så vidt godt at NTNU anbefales å fortsette med opplegget. Nærmere omtale er gitt i Universitetsavisa, `http://www.universitetsavisa.no/`.

Tilsatte dekaner ved NTNU. NTNU har gått over fra å velge til å tilsette dekaner. Ved IMFs eget fakultet, Fakultet for informasjonsteknologi, matematikk og elektroteknikk, er professor Arne Sølvberg ansatt. Han var også dekanus i forrige valgperiode.

NTNU har nå innført enhetlig ledelse på alle nivåer, slik at dekanene nå har fått ansvaret også for den administrative virksomheten i tillegg til den faglige. Ved Fakultet for samfunnsvitenskap og teknologiledelse har dette ført til at en ikke lenger har egen fakultetsdirektør.

Notiser

Abelstipend

NMF delte i sommer ut Abelstipend til to hovedfagsstudenter til støtte for utenlandsopphold. De to er

- Siri Øyen Larsen som er tatt opp ved programmet "Anvendt matematikk, mekanikk og numerisk fysikk" innenfor studieretningen "Computational Science" ved Matematisk Institutt på Universitetet i Oslo.
- Alexander Lundervoll som er tatt opp på masterprogrammet i topologi ved Universitetet i Bergen.

Interview med Stubhaug. I juninummeret av European Mathematical Society Newsletter finner man et lengre interview med Arild Stubhaug. Her kan man glede seg over noen tidlige blikk inn i Stubhaugs arbeid med en Mittag-Leffler biografi. Interviewet som også trykkes i Oktobernummeret at the Notices of the American Mathematical Society (medlemmer kan gå til `http://www.ams.org/notices/200509/comm-persson.pdf`) er ført i pennen av Ulf Persson, (Chalmers).

Interview with

Peter D. Lax

Martin Raussen, Aalborg University, Denmark

Christian Skau, NTNU, Trondheim

Sammen med EMS Newsletter trykker INFOMAT intervjuet av Peter D. Lax som Martin Raussen og Christian Skau gjorde i Oslo 23. mai 2005.

Her kommer andre del. Den første halvdelen finner du i augustutgaven.

Scribbles that changed the course of human affairs

The mathematician Stanisław Ulam was involved with the Manhattan Project and is considered to be one of the fathers of the hydrogen bomb. He wrote in his autobiography "Adventures of a Mathematician": "It is still an unending source of surprise for me to see how a few scribbles on a blackboard, or on a sheet of paper, could change the course of human affairs". Do you share this feeling? And what are your feelings to what happened to Hiroshima and Nagasaki, to the victims of the explosions of the atomic bombs that brought an end to World War II?

Well, let me answer the last question first. I was in the army, and all of us in the

army expected to be sent to the Pacific to participate in the invasion of Japan. You remember the tremendous slaughter that the invasion of Normandy brought about. That would have been nothing compared to the invasion of the Japanese mainland. You remember the tremendous slaughter on Okinawa and Iwo Jima. The Japanese would have resisted to the last man. The atomic bomb put an end to all this and made an invasion unnecessary. I don't believe reversionary historians who say: "Oh, Japan was already beaten, they would have surrendered anyway". I don't see any evidence for that. There is another point which I raised once with someone who had been involved with the atomic bomb project. Would the world have had the horror of nuclear war if it had not seen what one bomb could do? The world was inoculated against using nuclear weapon by its use. I am not saying that alone justifies it, and it certainly was not the justification for its use. But I think that is a historical fact. Now about scribbles changing history: Sure, the special theory of relativity, or quantum mechanics, it would be unimaginable today without scribbles. Incidentally, Ulam was a very interesting mathematician. He was an idea man. Most mathematicians like to push their ideas through. He preferred throwing out ideas. His good friend Rota even suggested that he did not have the technical ability or patience to work them out. But if so, then it's an instance of Ulam turning a disability to tremendous advantage. I learned a lot from him.

It is amazing for us to learn that an 18 year old immigrant was allowed to participate in a top-secret and decisive weapon development during WWII.

The war created an emergency. Many of the leaders of the Manhattan Project were foreigners, so being a foreigner was no bar.

Collaboration. Work Style

Your main workplace has been the Courant Institute of Mathematical Sciences in New York, which is part of New York University. You served as its director for an eight year period in the 70's. Can you describe what made this institute, which was created by the German refugee Richard Courant in the 1930's, a very special place from the early days on, with a particular spirit and atmosphere? And is the Courant Institute today still a special place that differs from others?

To answer your first question, certainly the personality of Courant was decisive.

Courant. Foto fra MacTutor.

Courant saw mathematics very broadly, he was suspicious of specialisation. He wanted it drawn as broadly as possible, and that's how it came about that applied topics and pure mathematics were pursued side by side, often by the same people. This made the Courant Institute unique at the time of its founding, as well as in the 40's, 50's and 60's. Since then there are other centres where applied mathematics is respected and pursued. I am happy to say that this original spirit is still present at the Courant Institute. We still have large areas of applied interest, meteorology and climatology under Andy Majda, solid state and material science under Robert Kohn and others, and fluid dynamics. But we also have differential geometry as well as some pure aspects of partial differential equations, even some algebra. I am very pleased how the Courant Institute is presently run. It's now the third generation that's running it, and the spirit that Courant instilled in it - kind of a family feeling - still prevails. I am happy to note that many Norwegian mathematicians received their training at the Courant Institute, and later rose to become leaders in their field.

You told us already about your collabora-

tion with Ralph Phillips. Generally speaking, looking through your publication list and the theorems and methods you and your collaborators have given name to, it is apparent that you have had a vast collaboration with a lot of mathematicians. Is this sharing of ideas a particularly successful, and maybe also joyful, way of advancing for you?

Sure, sure. Mathematics is a social phenomenon after all. Collaboration is a psychological and interesting phenomenon. A friend of mine, Vera John- Steiner, has written a book ("Creative Collaboration") about it. Two halves of a solution are supplied by two different people, and something quite wonderful comes out of it.

(Foto: Knut Falch/Scanpix)

Many mathematicians have a very particular work style when they work hard on certain problems. How would you characterise your own particular way of thinking, working, and writing? Is it rather playful or rather industrious? Or both?

Phillips thought I was lazy. He was a product of the Depression which imposed a certain strict discipline on people. He thought I did not work hard enough, but I think I did!

Sometimes mathematical insights seem to rely on a sudden unexpected inspiration. Do you have examples of this sort from your own career? And what is the background for such sudden inspiration in your opinion?

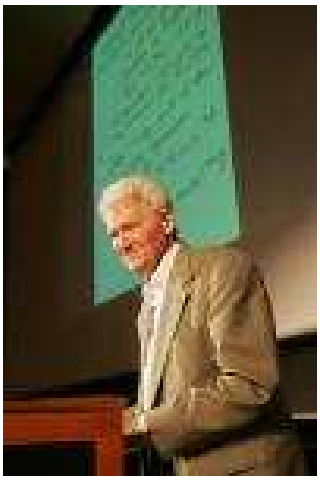
The question reminds me of a story about a German mathematician, Schottky, when he reached the age of 70 or 80. There was a celebration of the event, and in an interview like we are having, he was asked: "To what do you attribute your creativity and productivity". The question threw him into great confusion. Finally he said: "But gentlemen, if one thinks of mathematics for 50 years, one must think of something!" It was different with Hilbert. This is a story I heard from Courant. It was a similar occasion. At his 70th birthday he was asked what he attributed his great creativity and originality to. He had the answer immediately: "I attribute it to my very bad memory". He really had to reconstruct everything, and then it became something else, something better. So maybe that is all I should say. I am between these two extremes. Incidentally, I have a very good memory.

Teaching

You have also been engaged in the teaching of calculus. For instance, you have written a calculus textbook with your wife Anneli as one of the co- authors. In this connection you have expressed strong opinions about how calculus should be exposed to beginning students. Could you elaborate on this?

Our calculus book was enormously unsuccessful, in spite of containing many excellent ideas. Part of the reason was that certain materials were not presented in a fashion that students could absorb it. A calculus book has to be fine-tuned, and I didn't have the patience for it. Anneli would have had it, but I bullied her too much, I am afraid. Sometimes I dream of redoing it because the ideas that were in there, and that I have had since, are still valid. Of course, there has been a calculus reform movement and some good books have come out of it but I don't think they are the answer. First of all, the books are too thick, often more than 1000 pages. It's unfair to give such a book into the hands of an unsuspecting student who can barely

carry it. And the reaction to it would be: "Oh, my God, I have to learn all that is in it?" Well, all that is not in it! Secondly, if you compare it to the old standards, Thomas, say, it's not so different - the order of the topics and concepts, perhaps. In my calculus book, for instance, instead of continuity at a point, I advocated uniform continuity. This you can explain much easier than defining continuity at a point and then say the function is continuous at every point. You lose the students; there are too many quantifiers in that. But the mathematical communities are enormously conservative: "continuity has been defined pointwise, and so it should be!" Other things that I would emphasize: To be sure there are applications in these new books. But the applications should all stand out. In my book there were chapters devoted to the applications, that's how it should be, they should be featured prominently. I have many other ideas as well. I still dream of redoing my calculus book, and I am looking for a good collaborator. I recently met someone who expressed admiration for the original book, so perhaps it could be realized, if I have the energy. I have other things to do as well, like the second edition of my linear algebra book, and revising some old lecture notes on hyperbolic equations. But even if I could find a collaborator on a calculus book, would it be accepted? Not clear. In 1873, Dedekind posed the important question: "What are, and what should be, the real numbers?" Unfortunately, he gave the wrong answer as far as calculus students are concerned. The right answer is: infinidecimals. I don't know how such a joke will go down?



(Foto: Terje Bendiksby /Scanpix)

Heading large institutions

You were several times the head of large organisations: director of the Courant Institute in 1972-1980, president of the American Mathematical Society in 1977-1980, leader of what was called the Lax Panel on the National Science Board in 1980-1986. Can you tell us about some of the most important decisions that had to be taken in these periods?

The president of the Mathematical Society is a figurehead. His influence lies in appointing members of committees. Having a wide friendship and reasonable judgement are helpful. I was very much helped by the secretary of the Mathematical Society, Everett Pitcher. As for being the director of the Courant Institute, I started my directorship at the worst possible time for New York University. They had just closed down their School of Engineering, and that meant that mathematicians from the engineering school were transferred to the Courant Institute. This was the time when the Computer Science Department was founded at Courant by Jack Schwartz. There was a group of engineers that wanted to start activity in informatics, which is the engineers' word for the same thing. As a director I fought very hard to stop that. I think it would have been very bad for the university to have two computing departments - it certainly would have been very bad for our Computer Science Department. Other things: Well, I was instrumental in hiring Charlie Peskin at the recommendation of Alexander Chorin, I was very pleased with that. Likewise, hiring Sylvain Cappell at the recommendation of Bob Kohn. Both were enormous successes. What were my failures? Well, maybe when the Computer Science Department was founded I should have insisted on having a very high stan-

dard of hiring. We needed people to teach courses, but in hindsight I think we should have exercised more restraint in our hiring. We might have become the number one computer science department. Right now the quality has improved very much - we have a wonderful chairwoman, Margaret Wright. Being on the National Science Board was my most pleasant administrative experience. It's a policy-making body for the National Science Foundation (NSF), so I found out what making policy means. Most of the time it just means nodding 'yes', and a few times saying 'no'. But then there are sometimes windows of opportunity, and the Lax Panel was a response to such a thing. You see, I noticed through my own experience and those of my friends who are interested in large scale computing, in particular, Paul Garabedian, who complained that university computational scientists had no access to the supercomputers. At a certain point the government, which alone had enough money to purchase these supercomputers, stopped placing them at universities. Instead they went to national labs and industrial labs. Unless you happened to have a friend there with whom you collaborated, you had no access. That was very bad from the point of view of the advance of computational science, because the most talented people were at the universities. At that time accessing and computing at remote sites became possible thanks to ARPANET, which then became a model for the Internet. So the panel that I established made strong recommendation that the NSF establish computing centres, and that was followed up. My quote on our achievement was a paraphrase of Emerson: "Nothing can resist the force of an idea that is ten years overdue".

A lot of mathematical research in the US has been funded by contracts from DOD, DOE, the atomic energy commission, the NSA. Is this dependence of mutual benefit? Are there pitfalls?

I am afraid that our leaders are no longer aware of the subtle but close connection between scientific vigour and technological sophistication.

(Foto: Knut Falch/Scanpix)

Personal Interests

Would you tell us a bit about your interests and hobbies that are not directly related to mathematics?

I love poetry. Hungarian poetry is particularly beautiful, but English poetry is perhaps even more beautiful. I love to play tennis. Now my knees are a bit wobbly and I can't run anymore, but perhaps these can be replaced - I'm not there yet. My son and three grandsons are tennis enthusiasts so I can play doubles with them. I like to read. I have a knack for writing. Alas, these days I write obituaries - it's better to write them than being written about.

You have also written Japanese haikus?

You're right. I got this idea from a nice article by Marshall Stone - I forget exactly where it was - where he wrote that the mathematical language is enormously concentrated, it is like haikus. And I thought I would take it one step further and actually express a mathematical idea by a haiku.

Professor Lax, thank you very much for this interview on behalf of the Norwegian, the Danish, and the European Mathematical Societies!

I thank you.

Abelsymposiet
Abelprisen

Abelsymposiet 2007: søknadsfrist 15. september

Fristen for å sende inn en forsøknad for å få arrangere abelsymposiet 2007 er 15. september. På `http://abelsymposium.no/info.php` kan vi lese at

> [...] applicants should send an application draft to Norsk matematisk forening by email no later than 15 September in the year X. A pre-application should be brief and only contain information about the applicants, foreign co-organizers, scientific profile, and possibly names of key invitees.

Prosessen er videre at Norsk matematisk forening inviterer én av gruppene som har levert en forsøknad til å levere en komplett søknad innen 15. november. For mer nøyaktige retningslinjer, se `http://abelsymposium.no/guidelines.php`

nmf@math.ntnu.no