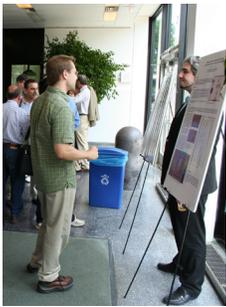


DEPARTMENT OF APPLIED MATHEMATICS NEWSLETTER

Solving complex problems with sophisticated mathematical methods

International, Regional Conferences Come to Campus to Share Research, Bring New Ideas

Photo courtesy of Oscar Ortega



Participants gather in the lobby to view and judge the CMMSE Conference poster competition.

The world came to IIT in June when the Department of Applied Mathematics hosted the Seventh International Conference on Computational and Mathematical Methods in Science and Engineering (CMMSE) and the Midwest Numerical Analysis Day.

Associate Professor **Greg Fasshauer** co-chaired the conferences, which hosted approximately 100 people June 20–23.

“The goal of CMMSE was to provide a venue for unifying or cross-cutting interdisciplinary gatherings, where specialists can have exposure to diverse fields and participate in special sessions different from their own field,” says Fasshauer.

Several distinguished guests gave invited plenary lectures, including **George Papanicolaou** of Stanford University, **H. T. Banks** of North Carolina State, **Mihai Anitescu** of Argonne National Laboratory, and **Erkki Brändas** of Uppsala Universitet, Sweden. Theirs were among the 77 presentations made during the three days. Associate Professor **Tomasz Bielecki** co-organized a session entitled “Financial Mathematics and Engineering,” and Professor and Chair **Fred Hickernell** co-organized a session entitled “Approximation in High Dimensions.” Associate Professor **Dietmar Rempfer** (joint appointment Applied Mathematics and MMAE departments), Hickernell, Bielecki, and Fasshauer also presented research in formal lectures.

The CMMSE also offered graduate and undergraduate students the opportunity to share their research through a poster competition and formal talks. **Mike McCourt** (AMAT '07) presented a poster, and **Xiaoyan Zeng** (M.S. 3rd year), **Ben Niu**

(M.S. 2nd year), **Jack Zhang** (Ph.D. '07), and **John Erickson** (Ph.D. '07) gave talks.

The MWNA, which met June 23 in conjunction with the CMMSE, brought numerical analysis and scientific computing researchers together to share ideas and research with colleagues from around the Midwest.

AMATH IPRO Helps Chicago Public Schools

IPRO 330: Dynamic and Contemporary Science Fair Projects for Chicago Public Schools is the department's first Interprofessional Project (IPRO) course. Conceived by students Mike McCourt (AMAT '07) and Tony Parrillo (AMAT 4th year) to boost CPS students' interest in math and science, the team created a website of science fair ideas designed to encourage deeper thinking about the scientific method. Last semester, IPRO 330 had a top website and the second best presentation as voted by IIT students. This semester, projects are planned to increase the site's reach. See more at <http://math.iit.edu/~ScienceFair>.



Letter from the Chair

Are you engaged with IIT's Department of Applied Mathematics? Our students, faculty, alumni, and friends are.

This newsletter provides a glimpse of our vibrant and diverse mathematical activity.

But are you engaged in helping our department to fulfill its mission of excellent research and teaching? We need your help. There are many ways that you can partner with us:

Would you share your experience as a mathematician with our undergraduate Math Club? Would you write an article for our next newsletter? Contact Michael Pelsmajer, Math Club advisor and newsletter editor, at pelsmajer@iit.edu.

Would you like to give a departmental colloquium talk? Contact Snejana Abarji, colloquium coordinator, at snejana@math.iit.edu.

Do you know a high school student interested in applied mathematics? Contact Greg Fasshauer, associate chair and director of Undergraduate Studies, at fasshauer@iit.edu.

Do you know someone who might be interested in our graduate programs? Contact Xiaofan Li, director of Graduate Studies, at lix@iit.edu.

Would you call admitted applied mathematics students and encourage them to come to IIT? Do you have comments or questions about our undergraduate and graduate programs and their curricula? Contact Greg Fasshauer or Xiaofan Li, as appropriate.

Does your organization offer internships or employment for applied mathematics

B.S., M.S., or Ph.D. holders? Would you like to become a mentor for an applied mathematics student? Contact Emily Breckenridge in the Career Management Center at ebrecken@iit.edu, or me.

Do you know someone who might donate funds for the Menger Lecture Series, Summer Student Scholarships? Contact me.

In the past year, many of you have supported us in various ways. Thank you. My hope is that even more of our alumni and friends will become engaged with us in some way to make us an even better department.

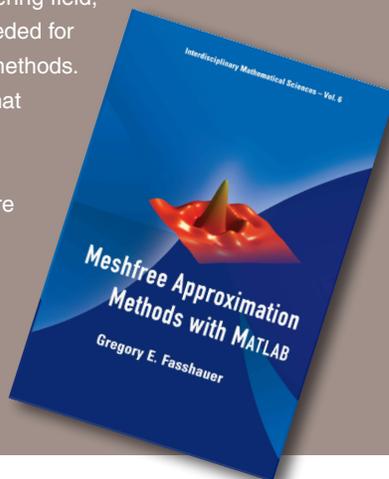
Fred J. Hickernell
Department Chair

Fasshauer Publishes New Book

Meshfree Approximation Methods with MATLAB (World Scientific, 2007)
by Associate Professor and Associate Department Chair Greg Fasshauer

Meshfree approximation methods are a relatively new area of research, and there are only a few books covering it at present. Whereas other works focus almost entirely on theoretical aspects or applications in the engineering field, this book provides the salient theoretical results needed for a basic understanding of meshfree approximation methods.

The emphasis here is on a hands-on approach that includes MATLAB routines for all basic operations. Meshfree approximation methods, such as radial basis function and moving least squares method, are discussed from a scattered data approximation and partial differential equations point of view. A good balance is supplied between the necessary theory and implementation in terms of many MATLAB programs, with examples and applications to illustrate key points.



STUDENT FOCUS

Kevin Ventullo, Third-Year Undergraduate



This past summer, instead of working at a movie rental store or the local college, as I have for past summers, I had the opportunity to be involved

with an REU (Research Experience for Undergraduates) at the University of West Georgia in Carrollton, Ga. I had never even heard of REUs until about five months earlier at a Math Club meeting, when other students from the applied mathematics department came and described what they had done the previous summer.

After being shown the National Science Foundation website listing the different research opportunities, I ended up applying to about 20 different programs around the country. It seems to be sheer luck that I was enrolled in a number theory course at the time, as many of the programs were interested in students with a number theory background.

The REU itself was an amazing experience. The other students were

all as interested in math as I was, so any time an idea struck, it wasn't a terribly difficult process to explain the idea to them and have them bounce their own ideas back to me. Also, since the problems being worked on represented a wide range of mathematical areas, I was introduced to topics I had not otherwise experienced.

While I was probably brought in because of the number theory class I'd taken, I ended up learning enough graph theory from the professors and other students that I was able to contribute to those problems by the end of the summer.

Being a part of the REU would not have been a possibility if it weren't for the applied mathematics department bringing it to my attention, and for professors Hemanshu Kaul and Michael Pelsmajer writing me letters of recommendation (as well as teaching me a thing or two). Overall, it was a great experience, and I recommend it to any student who is interested in mathematics.

Math Club Excels

Coached by Assistant Professor **Michael Pelsmajer**, the Math Club sent 12 students to Western Illinois University in Macomb for the 86th annual meeting of the Illinois Section of the Mathematics Association of America (ISMAA). Earning second-place honors for the second year in a row was the team of **Chris Mitillos** (AMAT 3rd year), **Laura Rodriguez-Mosquera** (ECE 2nd year), and **Jeffrey Stanford** (CS and AMAT 4th year). **Jongmin Lim** (EE 3rd year), **Young Cho** (AMAT 3rd year), and **Jong-Yon Kim** (BUS 3rd year) earned third place, while the team of **Sangwook Lee** (AMAT 2nd year), **Mitch Isoda** (AMATH 2nd year), and **Ricky Leavell** (EE 2nd year) earned sixth place. **Jon Beagley** (AMAT 4th year) did double-duty during the conference, giving a lecture, "A Conjecture for Completing Latin Hypercubes," and competing as a member of the eighth-place team along with **Keith Campbell** (EE 4th year) and **Tony Parrillo** (AMAT 4th year). Assistant Professor **Hemanshu Kaul** also presented some of his research on graph theory, in a talk entitled, "Breaking Symmetries in Graphs."

Alumni News

Vladimir Andrijevik (AMAT '06) is a software engineer with Centro, an online marketing services company in Chicago.

Thomas Banach (MATH '65) passed away on February 2, 2007.

Milton Gordon (Ph.D. '68) was awarded the National Association of Student Personnel Administrators (NASPA) 2007 President's Award in April. The president of California State University, Fullerton since 1990, Gordon was honored for his work improving student life on campus.

Mike McCourt (AMAT '07) was awarded a National Science Foundation Graduate Research Fellowship. He is studying at Cornell University and working toward a Ph.D. in applied mathematics.

Inaugural Karl Menger Lecture Series a Success



On April 9, 2007, the Department of Applied Mathematics hosted the first annual Karl Menger Lecture and Awards with a half-day event that included receptions, several lectures, and more than 60 guests.

Karl Menger was a professor at IIT from 1946–1971 and was highly regarded the world over for his contributions to the fields of mathematics and education.

Professor **Karl Sigmund** of the University of Vienna gave the inaugural lecture, entitled “Menger, Games and Morals.”

The event also gave students, faculty, and friends a chance to meet former students and colleagues of Menger, including **Franz Alt**, a founder of the Association of Computing Machines.

Mike McCourt (AMAT '07) was awarded the Karl Menger award for outstanding student research.

An endowment has been established to perpetuate the lecture series, and efforts are underway to meet a \$20,000 challenge grant from Professor **Jerry Frank** and his wife, **Pat**. Meeting the goal and winning the challenge would bring the endowment to \$100,000. As of October 31, 2007, alumni, faculty, and friends have contributed a total of \$5,500 to meet the challenge grant. Those interested in contributing to the endowment may contact the Department of Applied Mathematics.

Professor Gene H. Golub of Stanford University will be this year's Menger Series Lecturer. On Monday, April 28, 2008, he will speak on “Data Analysis and the Singular Value Decomposition.”

If you are planning on attending the 2008 Menger Series and Awards, please RSVP with Patty Cronin at 312.567.3132 or cronin@iit.edu.

Last issue, we asked you to share with us some of your favorite memories of Professor Karl Menger, and we received several responses about this special member of IIT's history. What follows are excerpts from some of those memories.

For more information about the Karl Menger Lecture Series and the complete list of memories, please visit www.math.iit.edu/events/menger2007.html.

My first contact with Menger was as a student in a course he taught using his own book. I enjoyed the course and his book so much that I read the whole book, not just the material covered in the course, and made a list of errors. Most of the errors were minor, but the list was long.

Now I faced a dilemma: I wanted to let him know about these errors but was too shy to go to see him in his office... Few students in those days had the gumption to go to a professor's office without an invitation.

Nevertheless, I somehow mustered the courage to mention to Menger—with considerable trepidation—that I had found some mistakes in his book. To my amazement he was delighted and asked me to give him my list. From that day onward, although I was just an undergraduate, he treated me more like a colleague than a student.

—Anton Zettl (MATH '59)

Karl Menger was a demonstrative teacher; he was like a maestro conducting an opera of mathematics in the lecture hall. On the front walls of the lecture hall were eight very large, rectangular blackboards, which coupled with his rapid ability to fill them, necessitated the continuously tedious task of erasing the surface so that he could restart the process once more.

One day, Menger entered the lecture hall with several oversized erasers; they seemed to be about one by two feet in size.

He proclaimed that he had custom ordered these erasers so that he could restore the blackboards to their blank status with only a few swoops.

—Werner Frank (MATH '52)

Menger was always present at talks in the department. He often appeared to be very relaxed (actually asleep), but it was universal that he asked penetrating questions at the end of the talk. Every speaker I quizzed about this confirmed that his questions showed a complete grasp of the talk. This was certainly the case for talks that I gave. Menger's enthusiasm for both research and teaching was a prime source of life in the department. We all recognized that we were in the presence of a mathematical legend, but were equally impressed by how concerned he was about students on all levels.

—John W. Neuberger
(Math faculty, 1957–59)

Menger became a good friend and mentor to me during the last years of his life, when he was no longer teaching at IIT. It began when I invited him to speak at Benedictine University. Then he invited me to help him with the translations into English of some of his works. We spent many summer afternoons talking both about his long sentences and the substance of his thinking on a variety of matters, about not only mathematics but also ethics and economics. His stories of intimate experiences with the members of the Vienna Circle were fascinating. He never lost his accent when speaking English, a fact he bemoaned, often illustrating this bit of personal failure with the sentence: “My greatest worry is words like ‘work!’”

—Phyllis M. Kittel
(MATH M.S. '70, Ph.D. '75)

Faculty News

- Associate Professor Xiaofan Li won the 2006 College of Science and Letters Excellence in Teaching Award in November 2006.
- Associate Professor Snejana Abarji chaired and organized the international conference Turbulent Mixing and Beyond at the International Center for Theoretical Physics in Trieste, Italy, this past August.
- Sue Sitton, senior lecturer, won the 2007 Julia Beveridge Award in the faculty category.
- Assistant Professor Hemanshu Kaul was named a Project NExT Fellow for the 2007–08 school year. Project NExT (New Experiences in Teaching) is a professional development program for new or recent Ph.D.s in the mathematical sciences.
- Professor and Chair Fred Hickernell was recently elected as a fellow of the Institute of Mathematical Statistics.
- External research funding for Fiscal Year 2006: \$190,000.
- External research funding for Fiscal Year 2007: \$248,000.

New Faculty

The Department of Applied Mathematics is pleased to welcome two new faculty members to its roster, who bring with them a depth of experience in both the professional and academic world.



Name: Igor Cialenco
Title: Assistant Professor
Education: Ph.D. in applied mathematics, University of Southern California, Ph.D. in mathematics and physics, Moldova State University

Professional Experience: Research assistant, University of Southern California; teaching assistant, USC; lecturer, University of Moldova; Mathematical Olympic Council of Moldova

Research interests: Stochastic Processes, Stochastic Partial Differential Equations, Statistical Inference for Stochastic PDEs, Mathematical Finance, Fixed Income, Functional Analysis, Operator Theory, Spectral Analysis.

Name: Charles Tier
Title: Senior Lecturer
Education: Ph.D. in applied mathematics, Courant Institute at New York University
Professional Experience: Professor, University of Illinois–Chicago, member of SIAM, associate editor of *SIAM Journal on Applied Mathematics*

Research interests: Current research involves the construction of approximations to stochastic models arising in various applications. One area involves performance measures of queuing systems that arise in models of computer and communications systems. A second area involves the analysis of models in computational finance.

Professor Maurice (Jerry) Frank Retires



Professor Jerry Frank will retire this spring after 31 years on the faculty of the applied mathematics department. He joined the faculty at IIT four years after earning his Ph.D. in mathematics from IIT, and

has served in several posts throughout the department, including department chair, associate chair, and director of graduate studies. He is currently on sabbatical and lives in Evanston with his wife. *You may contact Professor Frank at frankm@iit.edu.*

Contact Us

Please send news of your professional or other achievements to:

Illinois Institute of Technology
Attention: Michael Pelsmajer
Department of Applied Mathematics
Engineering 1 Building, Room 208
10 W. 32nd Street
Chicago, IL 60616

Phone: 312.567.8980
FAX: 312.567.3135
newsletter@math.iit.edu
www.math.iit.edu

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newsletter@math.iit.edu

Fred Hickernell
Department Chair
Michael Pelsmajer
Editor
Gladys Collins
Administrative Associate
Joe Millham
Administrative Assistant

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Department of Applied Mathematics
Engineering 1 Building, Room 208
10 West 32nd Street
Chicago, IL 60616

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