

Mathematics and Computer Science

Department Newsletter

Department News *by Sue LaForais*

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As this busy school year draws to a close, we would like to extend our thanks to all of you who have donated money to the Math and Computer Science Department through the NMU Foundation (formerly the NMU Development Fund). This year, because of the generosity of alumni and friends of this department, our students were able to travel to conferences, visit a national research center, and participate in contests at other

universities, tutors were employed, and we hosted our 7th Annual Programming Contest. Your continued support will make a difference as to whether

spoke at colloquia or presented their research projects at seminars and conferences at other universities. We're very proud of their ambition and accomplishments!

THANK YOU

Our students weren't the only ones who were busy during the year. As you will see from the following summary of activities, department faculty, as well as our students, enjoyed another productive school year.

these student activities and benefits will continue in the future.

This year, many of our students were also involved in research. They gave oral or poster presentations,

from the following summary of activities, department faculty, as well as our students, enjoyed another productive school year.

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Master of Science In Mathematics Education (MSME) *by Dr. Peggy House*

Northern Michigan University offers a Master of Science (MS) Degree in Mathematics Education through the Department of Mathematics and Computer Science. The program continues the professional development of licensed, experienced mathematics teachers by expanding their subject-area knowledge, enhancing their teaching skills and instructional strategies, increasing their awareness of contemporary issues and trends in mathematics education, and preparing them to assume leadership roles in their schools and in the

larger mathematics education community. The program serves secondary-school mathematics teachers (mathematics majors and minors with teaching certificates in mathematics) and elementary-school teachers with a mathematics major or minor and mathematics endorsement. The master's degree is not a certificate-granting degree. Applicants for the program must have an undergraduate mathematics major or minor, certification to teach mathematics, and at least one year of mathematics teaching experience at the level of their certification

prior to admission into the program. Applicants also should have a GPA of 2.7 or higher in previous mathematics courses and meet all NMU Graduate Program admission requirements.

The Master of Science in Mathematics Education (MSME) includes a major in mathematics education and supporting areas in both mathematics and educational foundations. The program requires 35-36 semester credits. The required and elective courses that constitute the program are scheduled during summers to

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The Mathematics and Computer Science Newsletter is published once a year for alumni and friends of the Mathematics and Computer Science Department.

Winter 2006

Sue LaForais
Organizer

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Computers and Labs *by Jeff Horn*

In the Fall of 2005, the department conducted a major upgrade of its computing facilities, thanks to an LTF expenditure of approximately \$60,000, plus some additional College of Arts and Sciences and departmental funds. We acknowledge the hard and expert work of Dr. Randy Appleton, Mr. David Powers, and Ms. Dawn Wilder.

1) PC Lab: 25 new PC workstations were purchased for the main computing lab in NSF 1207, replacing the 30 older 850 MHz PCs. These machines are currently used for CS 302, System Administration, which is popular enough to be taught every semester. Each new workstation has a 3.2 GHz HyperThreaded Intel P4 processor, 1 GB of RAM, CD-RW/DVD-ROM, and a 17 inch LCD monitor.

2) Departmental Servers: Two new PC servers (one as a backup for the other) replaced older machines, giving us higher speeds and greater disk storage space.

3) Beowulf Cluster Computer: Replaced older PCs with 9 new PC servers, each with a dual-processor Intel Xeon chip. The Beowulf cluster is our experimental parallel processing facility, in which dedicated server PCs running Linux are connected via a dedicated, high-speed network and coordinated via

Beowulf software. Student Brian Krent is working hard to implement the current plan, which is to turn this experimental cluster into an operational one, running large-scale, computationally intensive genetic algorithms. Eventually, this facility could become a general-purpose, auto-scheduled, interdisciplinary computing resource for the NMU scientific community.

4) Breve Cluster: This year we built a new experimental cluster. This student-led effort (Correy Kowall, Brian Krent, and Alex Anagnos) utilizes the computers replaced by the PC lab and Beowulf upgrades to run a dedicated network of processors for the purposes of simulating evolution using the breve open source, 3D simulation engine, currently popular in the artificial life research community and brought back to NMU by Mr. Kowall after he visited the 2005 Genetic and Evolutionary Computation Conference (GECCO) in Washington D.C. in June, 2005, to present his paper on evolving robots.

5) Northern Evolutionary Robotics Laboratory: The NERL received funds for new robot batteries and chargers, along with more reliable infrared and sonar sensors, in support of CS 370, Intelligent Mobile Robots, individual student projects, and research.

6) Ken Culp (adjunct faculty) used one of the spare new PC workstations to create a Microsoft Server with Windows Server 2003, Microsoft SQL Server 2005, and ASP.Net 2.0. The server will be used to host student projects and potentially other departmental web pages.

7) Repaired (by upgrading) the motherboards, memory, and processors of the two Virtual NMU computers (one is the vNMU-online hosting server and the other is the graphics design workstation for vNMU development). Technical work performed by students Brian Krent and Alex Anagnos.

8) Purchased 50 USB flash memory drives for use in the annual NMU invitational programming contest. These "thumb drives" replace CDs (which replaced floppy disks) as the medium for teams to submit programs for judging, keeping our programming contest at the forefront of technology.

9) Purchased a copy of the Torque Shader Engine, an advanced 3D game engine, for development of the next version of Virtual NMU.



The Math Lab *by Bob Myers*

The Mathematics Lab is a room on the third floor of the West Science Building, where mathematics students study. There is a "tutor" (an upper division mathematics student) who can give explanations and answer mathematical questions during Math Lab hours.

Textbooks and reference materials are available for student use in the Lab and may be checked out for use at home. Instructors may also put test keys, sample tests, solution manuals and supplementary course materials there for student use.

The Math lab has been in operation

since the mid eighties. For a number of years it was located in the basement of the West Science Building. After the West Science renovation, it was moved to its current location in West Science 3810. Hours of operation have varied over the years; currently, the Lab is open Monday through Thursday from 9 to 4 and Friday from 9 to 3.

Each semester, between six and ten students, usually mathematics majors or minors, are recruited to work as tutors in the Math Lab. Generally, these students have finished at least half of the mathematics courses required for their degrees. Some are elementary education

majors, some are mathematics or computer science majors, and some major in one of the sciences and minor in mathematics. The majority, however, are secondary education majors, so working in the Math Lab provides them with valuable teaching experience.

Many former Math Lab tutors are currently teaching mathematics in local schools, some have gone on to get advanced degrees in mathematics or mathematics education, and one former tutor is currently an adjunct professor in NMU's Mathematics Department.

Outstanding Graduating Senior

Outstanding Graduating Senior **Joseph Henry**

Joseph Henry moved to the small town of Wilson, Michigan, with his family when he was six years old. He attended Carney- Nadeau School, a small rural K-12 school, where he graduated first in his class.

After graduating from high school, Joe attended Northern Michigan University earning a bachelor's degree in English/Creative Writing and a Master's in English/ Literature. He had planned to earn a doctorate in literature until he re-evaluated his original intent and entered the job market as an adjunct faculty for NMU's English department. In 1999 he was hired by the Glenn T. Seaborg Center as an editorial assistant to Dr. Peggy House, who was then director of the

Seaborg Center and MCTM publications editor. Later, he also became responsible for the Seaborg Center's Web server/site and taught himself several programming languages.

While working at Northern, Joe took a computer science class and rediscovered the joys and agonies of programming which



Joe with daughters - Hailea (4 yrs. old) and Briana (2 yrs. old)

he learned at the age of 13 when he bought his first computer with money from a summer job and taught himself how to write programs in BASIC.

In 2003, his position in the Seaborg Center was eliminated as part of the university's efforts to balance its budget. However the computer bug had bitten him and in the Fall of 2003 he entered NMU's computer science program. Two years later, in December, 2005, Joe graduated Suma Cum Laude with a degree in Computer Science.

After graduating, Joe, along with his wife Karen and their two daughters, moved to Longmont, Colorado, where he now works as a PHP/MySQL developer for Celebrity Access, a company which runs a database of information on musicians, comedians, lecturers, agents, managers, record companies, talent buyers and venues.

Master of Science *continued from page 1*

make them available to teachers; some courses are also offered during the academic year utilizing a combination of appropriate distance technologies and weekend classes. Course enrollment is not limited to students pursuing the master's degree; mathematics teachers of any grade level find the courses to be valuable for their professional development.

Courses scheduled for **Summer 2006** are the following:

- MSED 511 Effective Teaching of Mathematics (2 credits)
- MSED 514 Historical Topics in the Mathematics Classroom (2 credits)
- MA 502 Spatial Visualization, Shape, and Measurement (3 credits)

Summer 2006 classes will meet Monday through Thursday for four weeks, between June 19 and July 14, on the NMU campus. Summer registration is ongoing.

Classes for the **Fall 2006** are the following:

MAED 534 Reasoning about Data and Chance K-12
2 credits

Fall 2006 classes will meet on the following Saturdays:
September 9 and 30, October 21 and November 11, 2006.

Descriptions of the courses can be found on the Department's Web site at <http://math.nmu.edu/masters/masters.htm>.

Application materials and other information about NMU graduate programs can be found on the Graduate Admissions page at <http://www.nmu.edu/gradstudies/admission.htm>. Or, for additional information about the graduate program and courses, contact the Department at 906-227-2020.

The Continuous Adding Song

(That's all integration is) by John Kiltinen

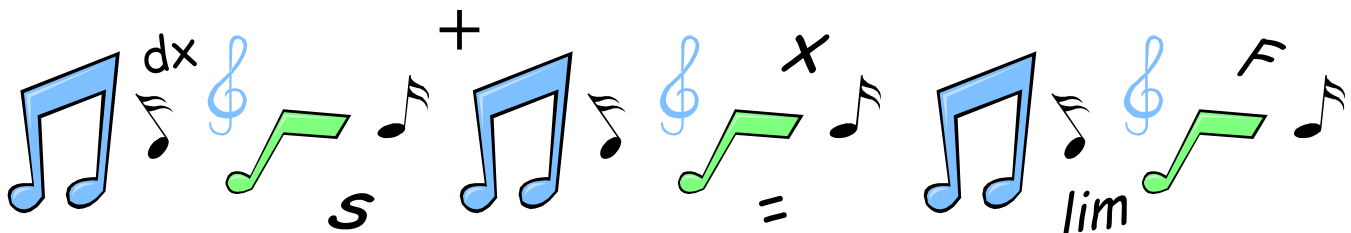
- Not just by twos, threes, fours or fives,
We can add continu'sly.
Not just by twos, threes, fours or fives,
We can add continu'sly.
Everybody's gladdin' bout a new way of addin'
Don't it truly blow your mind.
Not just by twos, threes, fours or fives,
We can add continu'sly.
 - Stretch that S, S is for sum,
It becomes an integral sign.
Stretch that S, S is for sum,
It becomes an integral sign.
Everybody's gladdin' bout a new way of addin',
That's all integration is.
Stretch that S, S is for sum,
It becomes an integral sign.
 - Bridge the gap, from old to new,
Finite to continuous.
Go the limit, sneak up on it,
That's the role of Riemann sums.
Everybody's gladdin' bout a new way of addin',
With a limit sneak up on it.
Bridge the gap, from old to new,
That's the role of Riemann sums.
 - If this seems just too hard to grasp,
Ponder your odometer.
It adds up the miles that you drive,
Doing so continuously.
Everybody's gladdin' bout a new way of addin',
Meters do it all the time.
If this seems just too hard to grasp,
Then ponder your odometer.
 - F of x, then times a dx,
They're the things that we add up.
The dx is so very thin,
And x flows from left to right.
Everybody's gladdin' bout a new way of addin',
Areas of little thin strips.
F of x, then times a dx,
They're the things that we add up.
 - Now we have a new way to add,
Aren't we rather proud of us.
No more two, three, four at a time,
We just let the summands flow.
Everybody's gladdin' bout a new way of addin',
They flow in and we add them up.
No more two, three, four at a time,
We just let the summands flow.
- (Reprise and finale. Repeat if you want.)
No more two, three, four at a time,
Baby let those summands flow on.



The Continuous Adding Song (That's all integration is) Sung to the tune of a 1960s pop song, "Walk right in, sit right down".

Words by John Kiltinen, December 3, 2004, revised October, 2005.

Published in the January, 2006, issue of the American Mathematical Monthly, page 46.



Department News *continued from page 1*

During the 2005-2006 school year our faculty traveled all over the country, as well as Scotland, Germany, Austria, Canada and Indonesia. Thirteen faculty gave 37 talks and presentations and 10 faculty had 26 papers and books published or accepted for publication. Faculty put on contests and tournaments, sat on committees, edited books and articles, hosted colloquia and seminars, wrote a grading program, gave a keynote address, received awards, and traveled with students.

Dr. Roxin Zhang was recognized for his contribution to the "Automating Orientation" project. This project was selected as the recipient of the TLC Staff Award for 2006 and is viewed as a valuable contribution to the support of the TLC initiatives and the University's mission and vision. Roxin was responsible for writing and implementing programs which allow freshmen to take the math placement test on-line and obtain their placement results immediately.

Dr. Don Faust participated in the Study Aboard Program in Vienna, Austria, mentoring the 14 students in the program. While there he also taught the course "The Nature of Human Knowledge" which centered on the famous Vienna Circle which was formed in the early 20th century.

In September, the Math and Computer Science Department hosted the *MAA (Mathematical Association of America) Upper Peninsula Regional Fall Meeting*. Faculty and students from NMU, Michigan Technological University, and Lake Superior State University as well as members of the community attended. Five faculty and one student from NMU gave talks along with two guest speakers from St. John's University and Kalamazoo College. As part of a student activity and competition, students from NMU, MTU and LSSU participated in the

Map-Coloring-on-Donut Contest.

Six teams comprised of 14 NMU students and advised by Dr. Roxin Zhang, participated in the *Twelfth Annual Michigan Autumn Take Home Challenge*, a team-oriented mathematics competition for undergraduates sponsored by Alma College.

The Mathematics and Computer Science Department along with Dr. Andy Poe and the NMU student chapter of the ACM (Association of Computing Machinery) organized and hosted the *7th Annual Programming Contest* on Saturday, March 18, 2006.

Nineteen teams from five universities attended with 52 students competing in the contest.

NMU's *Network Gurus* (Ryan Fornwald, Will Kim, Scott Raiford) took second place overall.

Northern Michigan University was the second place school.

atics) *56th Annual Conference* in Grand Rapids accompanied by Dr. Don Zalewski and Dr. Peggy House.

During the 2005-2006 school year, two alumni, four students and four faculty participated in the department's colloquium and seminar series. We also hosted four outside speakers from

Michigan Tech, the University of North Texas, the University of Missouri-Columbia and the University of Wyoming.

New this year was our participation in the *Problem Solving Competition* which is sponsored by The American Society for Mathematics. Each month a math problem was posted in our Math Tutoring Lab. Students were invited to solve the problem and submit their solution by a given date. Each month's winner was awarded a certificate. The top problem solver had the chance to be invited to attend the U.S. National Collegiate Mathematics Championship in Knoxville, TN.

Computer purchases this school year include approximately \$60,000 in new computer equipment to replace the 30 aging (five year old) workstations in NSF 1207 used for teaching CS 302, System Administration, as well as nine new hyper-threaded CPU

workstations for a major upgrade to our Beowulf cluster computer, and two new servers to upgrade the department's main server and its backup machine. (See page 2 for the complete story)

Several faculty and adjunct faculty were the recipients of awards this year including the Influential Educator Award (Mr. John Croze), Service to Community Award and Distinguished Service Award (Dr. Peggy House), and the TLC (Teaching, Learning and Communications) Staff Award (Dr. Roxin Zhang).

Congratulations to everyone on a very productive year!

Dr. Randy Appleton and Dr. Qinghong Zhang, along with 13 Math and CS students, traveled to the *16th Annual Argonne Symposium for Undergraduates in Science, Engineering and Mathematics* in Argonne, Illinois, where three of our students presented talks.

Dr. Andy Poe and four Computer Science majors traveled to Sault Ste. Marie, Ontario, Canada, to compete in the *ADM North Central North America Regional Programming Contest*. This contest was hosted by Algoma College and sponsored by IBM.

Twelve Secondary Education Mathematics majors attended the MCTM (Michigan Council of Teachers of Mathe-

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I advise my students to listen carefully the moment they decide to take no more mathematics courses. They might be able to hear the sound of closing doors.

— James Caballero

Do you have comments or suggestions?

Visit our Web site at
<http://math.nmu.edu> and click on the
Alumni Welcome Center button.

We would be glad to hear from you!



E-mail us anytime at math_cs@nmu.edu or visit us at <http://math.nmu.edu>