Below: Google site reliability engineer Alex Power (’06) works at his desk on Google’s Mountain View campus (and yes, we photoshopped his screen for the cover).

2 Chair’s letter; Celebrating Peters’ tenure as chair
4 Seven founding Advisory Board members gather
6 Math Circles (Philanthropy Insert)
7 Participation in Joint Mathematics Meetings
8 MSM survey results
9 Math and applied math news
10 Awards and honors
11 Alumni feature: What can you do with a math major?
12 By the numbers

We are hosting the 2008 Institute for Mathematics and Its Applications summer program for graduate students: Linear Algebra and Applications will be held June 30 through July 25. Check it out at: http://orion.math.iastate.edu/dept/IMA/
Dear Friends,

What a busy and productive academic year we have had! Last fall an external review team visited the Department to conduct a comprehensive review of our teaching and research missions. In preparation for the visit, the Department prepared a substantial self-study documenting most of our activities. After spending time meeting with department faculty members, the Dean’s staff and the Provost’s staff, the team offered the thoughts outlined below:

This study provides a valuable resource as we move forward. As a result of conversations we had within the Department, we are launching a new Center for Undergraduate Education. We hope to enhance the good job we are currently doing teaching lower division courses such as calculus and differential equations, and also to take a hard look at our upper division offerings. Over the past several years we have seen enrollment increase in our upper division offerings, with about half of the enrollment coming from non-math majors, such as computer science, electrical engineering, and economics. One of our goals is to increase the number of undergraduate majors, currently at 140. We are now advertising for a Director for the Center for Undergraduate Education, and we hope to attract someone who has research interests and will be an

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Strengths of the Department

The Department of Mathematics is a good academic unit and is working hard to serve the needs of the students of Iowa State University and the State of Iowa in general, while competing on a national and international basis in research and graduate education.

The Department’s record in teacher preparation concretely addresses the needs of the state of Iowa.

The Department enjoys very healthy and vibrant connections in interdisciplinary research with (a) mathematical biology and bioinformatics; and (b) materials and fluids.

The Department’s external funding profile is relatively diverse, with significant levels of funding from NIH and DOE to supplement the more traditional grants from the National Science Foundation.

Investing in the Future

Work with Iowa State University administrative officers to advance a comprehensive faculty development and recruiting plan that addresses key goals, such as:

- broadening and strengthening ties with engineering and science units;
- better positioning the department for intense competition at the national and international level for students, grants and infrastructure support;

- maintaining a healthy balance across fields and disciplines; and
- diversifying faculty profiles and recruiting from under-represented groups.

Take advantage of the University’s change to formula driven budgeting to support replenishing tenure-track lines.

When the optimal number of tenured faculty members is met, pursue a research group in mathematics education.

Work to normalize teaching and research duties and consider differentiated teaching loads (like 2-1) for faculty with significant grant support.

Increase support staff.

Nourishing the Department

Work with special expertise personnel housed in the Provost’s office to analytically assess and evaluate the teaching efforts and outcomes of the Department of Mathematics at the lower division level.

Examine the qualifying exam structure, with attention to analysis, requirements for the PhD degree, and the possibility of adding a graduate level course in mathematical biology to complement the new undergraduate major in Bioinformatics and Computational Biology.

Increase efforts to train TAs.

--External Review, Fall 2007

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One cannot help but notice the impressive progress the Department has made during the last years under Justin’s leadership. First and foremost, we have hired a group of young faculty that is simply outstanding. This is not an easy feat to accomplish since competition within the mathematics community for promising faculty is intense with most of our competitors in the AAU. The Department now counts five excellent women among its faculty, up from two when Peters took over. And we have expanded our scientific collaboration across campus as shown by the recent NRC data on faculty collaboration in other programs. About one third of the faculty now has ties with other programs, including the biological sciences, physics, chemistry, computer science, engineering and statistics.

These achievements, together with substantial progress in our undergraduate
inspiring teacher. We will keep you informed of our progress in this quest.

In early May, our newly formed Mathematics Advisory Board met for the first time. Each member has a close association with the Department and should collectively prove to be a rich resource that will assist the Department’s continued growth. Meet these seven pioneering members on pages 4-5.

As we come to the end of the academic year, my term as Chair of the Department is likewise ending. I have served as Chair since July, 2001, a period which has seen enormous changes in both the Department and the University. It has been a challenging time, as state budgets were affected by the recession of 2002, which had a lingering impact on ISU’s budget and consequently the Department’s budget up until last year. The Department lost eight faculty during this period; however, we also hired nine outstanding faculty.

July 1 will bring a new fiscal year and a new Chair of the Department, Wolfgang Kliemann. Wolfgang is the first Chair in my tenure at Iowa State who enters the job with prior administrative experience. He served both in the office of the College of Liberal Arts and Sciences, and most recently as Associate Vice Provost for Research at ISU, a job which he held until three years ago. Until Wolfgang returns from Chile in September, I will continue as interim Chair. The job is a demanding one, and I am ready to return to a position of regular faculty, with duties of teaching and research.

Justin R. Peters, Chair

Peters’ tenure as chair

and graduate programs, the REU program and a multitude of international collaborations have resulted in greater national and international visibility of the Department and our research and education activities. As the incoming chair, I am honored to express our sincere gratitude to Justin for his work and his leadership that has made many of the advances possible over the last years. Several new initiatives are just at the beginning and I hope that we will be able to continue and expand them as the Department builds on the solid basis that has been constructed. Thank you, Justin!

Highlights during Peters’ tenure as chair:

Ten faculty members joined the Department. Four are women, tripling the number of female tenure track faculty.

The faculty publication rate increased from 1.7 refereed publications per year during 1992-1998 to 2.0 during 1999-2006. The 2007 self-study noted, “the number of faculty receiving external funding, both through interdisciplinary activities and from individual investigator grants is higher now than at any time in the past.” This continued improvement occurred during a period in which ISU sustained repeated budget cuts and resources were scarce.

The quantity and quality of candidates seeking graduate admission improved. The 1999 External Review recommended a size of the graduate programs of about 60-70 (excluding students in the Masters of School Mathematics program), which has been achieved under the leadership of Dr. Paul Sacks (up from 33 in 1998). A significantly larger proportion of students are in the doctoral programs.

As Co-Principal Investigator for the Department’s NSF-sponsored Research Experiences for Undergraduates (REU) program, Peters together with Dr. Leslie Hogben helped bring 36 outstanding undergraduates from all over the country to work with faculty over the summers 2004-2006. This grant -- that has significantly enhanced the Department’s visibility (through participation in the Promoting Undergraduate Research Conference) and helped in the recruiting of graduate students -- has been renewed.

The undergraduate program has made important advances over the last few years. Peters’ and Dr. Elgin Johnston’s innovative use of undergraduate teaching assistants provided excellent leadership opportunities for outstanding advanced undergraduates, and the teaching assistants were well received by their students. To help mathematics majors develop a sense of community, last year a lounge for undergraduate mathematics majors was created, providing a convenient place in Carver Hall to study and to socialize.

For several years now the Department has increasingly paid attention to improving K-12 mathematics education, through the Masters of School Mathematics program and participation in the Iowa Initiative for College Mathematics and Statistics Education (I2CMASE). This
Six founding members gathered and a seventh joined the conversation via teleconference at our first Math Advisory Board meeting held on Friday, May 9 on the campus of Iowa State University. Here they offer thoughts about the future of the Department.

**What do you see as the Department’s most immediate challenge, and what would your first recommendation for addressing this be?**

Better rapport between faculty members and undergraduate majors. Ways to accomplish this: Require undergraduates to participate in a math student seminar where they observe the first 2 years and present a talk their JR/SR years. Require your top 5 upper division majors to do a research project with a faculty member to encourage graduate work in mathematics. Offer an operations research and/or applied statistics minor to prepare students for work in the business world. Require a working knowledge of some computer language. Offer a course in the history of mathematics. Offer a problem solving class to help prepare majors for math contests (MM).

I was pleased to see better rapport between faculty members and undergraduate majors. I think this is key to attracting more students to the major and to the graduate program. I would also like to see continued outreach to Iowa high schools as an avenue for increasing visibility of the department as the logical next step for high school students interested in pursuing a degree in mathematics (JC).

I would love to see the department work with K-12 to help fill the pipeline of new students in mathematics (AE).

I’d like to see continued outreach to Iowa high schools as an avenue for increasing visibility of the department as the logical next step for high school students interested in pursuing a degree in mathematics (AE).

**What is the single most powerful attribute that you bring to the Math Advisory Board?**

My most powerful attribute is also my greatest handicap. I was a successful member of the faculty and know the department well (JC).

My years in the applied mathematics field in industry provided a perspective on mathematics that I hope can be of some use to the department and its students (AE).

My main attributes for the advisory board are my knowledge of both the research community and also the mathematics education community due to my many years working at the AMS and interfacing...

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**Without regard to limitations, what things would you most like to see the Department achieve in the next three years?**

I’d like to see successful implementation of the proposed Center for undergraduate instruction and the Janson Professorship, with an accompanying emphasis on undergraduate instruction with the goal of attracting more undergraduate majors, not just majors who are not going on to teach, but those who will see the value of mathematics in preparing for other professions (BJ).

I would like to see the department build a world class undergraduate program to which it would aggressively recruit outstanding students. This would involve establishing a strong student-faculty relation and sense of belonging in the students (JC).

I would love to see the department work with K-12 to help fill the pipeline of new students in mathematics (AE).

I’d like to see continued outreach to Iowa high schools as an avenue for increasing visibility of the department as the logical next step for high school students interested in pursuing a degree in mathematics (AE).

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**My main attributes for the advisory board are my knowledge of both the research community and also the mathematics education community due to my many years working at the AMS and interfacing...**
see the Department achieve in the next three years?

I’m excited about the formation and staffing of the Center for Undergraduate Mathematics. Excellence in undergrad math education is something that will attract quality students (EN).

More external funding for research in mathematics is what I’d like to see (JB).

Existing initiatives to stimulate undergraduates like Problem of the Week are great. Regular seminars on uses of mathematics with content taken from the AMS web site would be a great addition. With enough hype and a little ingenuity, these seminars might bring in students who haven’t previously thought of mathematics as a major. The more the department can build a network of students interested in math, the more likely that the number of majors will increase.

To be successful, professors who actively participate should not be penalized for the time it takes them away from their research (BJ).

The department should strive to achieve the double and combined majors (BHB).

and what would your first recommendation for addressing this be?

that the department has recently undergone an external review. The immediate challenge should be to implement the suggestions after review and prioritization by faculty members (EN).

Clearly the department has many top notch researchers and we learned of excellent programs for graduate students. I see increased vitality in undergraduate instruction as the main departmental challenge (BJ).

I like the push to working collaboratively with other disciplines. There are opportunities in many fields, and growing the cross-disciplinary work in biology, engineering, and finance all look fruitful (AE).

Recruiting and keeping outstanding faculty (JC).

While much effort supports other disciplines, need to ensure the Department is a thorough leader across campus (JB).

Bolster the education of incoming students; work directly with the school of education (BHB).

Board, and how can we optimize this resource? (What do you need from us?)

with the MAA and NCTM at Janson Publications. I also bring knowledge of business strategy and many years of entrepreneurial experience (BJ).

I have a positive attitude.

I could suggest seminar resources, interesting topics in the history of mathematics, how to run a successful problem solving course. I could talk about my graduate thesis on a general summability method for improper Lebesgue-Stieltjes integrals!!! (MM)

I hope that my experience in the business world will be of value to the department (EN).

Experience in industry and with multidisciplinary programs in the university (JB).

I bring a great interest and concern for the education of the next generation (BHB).
When Elgin Johnston was recruited by Ames Middle School teacher Jean Krusi to help coach her Math Counts team ten years ago, he enjoyed it so much he continued attending the weekly meetings. “I believe,” he acknowledges, “it is important for the Department to be visible in the schools.”

One of the students on that original team was Qi Gan, now a student majoring in mathematics at ISU. When Gan moved up to high school, he missed the competition and the challenges provided by Math Counts. “There was pretty much no activity in the math section,” Gan recalls. He and a friend started asking teachers about starting something, but none had time. So Gan went back to Johnston, who agreed to meet with students at the high school, and Math Circles began.

For ninety minutes every Friday afternoon during the school year, students gather to challenge themselves with interesting topics in math. Depending on the semester, anywhere from 7 to 15 high school students participate, listening to Johnston present information on combinatorics, geometry, number theory, graph theory or probability before digging into problems on their own or in groups.

Gan has remained involved throughout his undergraduate study. “I do it so I can continue to be exposed to these kinds of problems that keep me sharp,” he explained. “And also, because I want to help out others with great potential who might need a little push.”

One Saturday each month finds the group traveling to competitions hosted by the Great Plains Math League (http://mathleague.org/). Here, students face Power Questions (multi-part, proof-oriented questions that test higher-level mathematical reasoning skill), Team Tests (10 questions, 20 minutes, 6 team members); Sprint Rounds (individual test, 30 multiple choice, 60 minutes); Target Rounds (individual, 8 questions); or Relays (teams of 3; question has 3 parts; each member completes one part). Ames will host an event in December, 2009. Last year 180 students registered for the Ames event. “Students don’t participate for the prizes,” smiles Johnston, “They do it because it’s interesting, innovative and different from what they see in the classroom.”

While Math Circles at Ames High emerged out of Johnston’s committed efforts, they are a growing phenomenon, with dozens of groups meeting across the country. There is now a national movement to organize structurally, reports Johnston, who attended an organizational meeting in San Diego recently. He will travel to Madison this summer to participate in a workshop for teachers on running Math Circles.

Because the Ames group is the only one in Iowa, Johnston has had students from other districts participate. “It is fun to see all these kids get together and talk about problems after the competition or test,” he said.

Post Doc Jason Grout assists Johnston in this program.

Below, Grout and Johnston discuss student effort at deriving trilinear coordinates of the orthocenter.
Introducing the benefactors of our newest faculty position and undergraduate scholarship: The Janson Professorship in Mathematics The Fred Wright Mathematics Endowed Scholarship

Barbara Janson travels extensively, visiting international educators, schools, and mathematics classrooms here and abroad whenever possible. So it was no surprise to find her packing for a trip to Australia when we called to talk about her recent gift to the Iowa State University Department of Mathematics.

The 1965 alumnus, recently appointed a Governor of Iowa State, established the Janson Professorship in Mathematics this past year, in support of a research mathematician with a commitment to undergraduate education.

“This is very much a function of my having been a graduate of ISU, and of having worked in the

“He has been a mathematician all his life,” Mary Lou Wright said of her husband, Fred Wright. “As soon as he got out of the Marine Corps he went right back to Denison University to teach.”

After teaching at his alma mater for a semester, Fred Wright enrolled at Northwestern to pursue his masters, and eventually, his PhD. He remembers the financial assistance he received—in the form of the GI Bill. “It was very helpful,” he recalled, “because I had practically no money.”

Upon graduating, Wright joined the faculty at Iowa State University in 1953 as an assistant professor in
The mathematics community at the American Mathematical Society and in the mathematics education community at Janson Publications,” explained Janson. “Endowing this position is a way to give back to both sectors of the mathematics community. My business focused on mathematics education, so supporting undergraduate education came to the fore as a way to invest in that same community to have a continuing impact.”

Tapped by Mortar Board in her junior year, Janson remembers that Iowa State offered many opportunities for scholarship, leadership and service. In particular, being one of a dozen students selected to participate in an overseas project captured her imagination.

“We had to do research for a year before we went,” she recalls. “And, they encouraged us to go outside our field to study.”

Janson credits that early experience with exposing her to other cultures. “It really opened my eyes to how differently people think in other countries,” she said. “We were exposed to the culture in a way that doesn’t happen when you are just visiting as a tourist.”

“Upon returning from that trip,” Janson said, “so many more opportunities arose at Iowa State and elsewhere because I looked at life through a different lens.”

Janson finds giving back very rewarding. “Continuing to be active and seeing the results of all those years of work, being financially active in the community where I spent my career….these are ways to give back to Iowa State and say thanks for all that institution gave me,” she said.

There are many levels at which donors may give and have an impact, Janson points out. She believes anyone who has the resources should consider giving. “Individuals may contribute to a scholarship fund or other established fund,” she explained. “Establishing this endowment is one of the most rewarding things I have ever done. Contributing to something specific is very rewarding. It gets you involved on a personal level that simply writing a check to the University does not.”

Barbara Janson is grateful to Iowa State University and the Department of Mathematics for starting her on a path that led to a rewarding career and numerous friendships at home and abroad. “Travel and the lifelong learning that it entails have enriched my life tremendously,” she said with a smile, “But it all began at Iowa State.”

Wright continued

Barbara Janson is grateful to Iowa State University and the Department of Mathematics for starting her on a path that led to a rewarding career and numerous friendships at home and abroad. “Travel and the lifelong learning that it entails have enriched my life tremendously,” she said with a smile, “But it all began at Iowa State.”

First Wright Mathematics Endowed Scholarship recipient, Justine Anders
I support mathematics education and research!

Name ________________________________________________________________

Address ____________________________________________________________________________________________

City ___________________________ State _______ Zip __________________

Country ______________________ Phone ________________________________

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Mail a check payable to ISU Foundation OR charge to: _____Discover _____MC _____Visa

Number: ________________________ Exp. date ______________________________

Signature: __________________________

Check number:____________________

Amount:_________________________

Campaign Code 07 MT8:03

You may designate the amount of your contribution to one or more of these established funds:

___ Dio Lewis Holl Chair in Applied Mathematics Fund (2700481) to recruit and retain the brightest and best faculty members.

___ Janson Professorship in Mathematics (2702279) to support a research mathematician with a commitment to undergraduate education.

___ Dr. Richard Sprague Memorial Fund (2701594) to furnish space and provide resource materials for upper level math majors.

___ Marian Daniels Scholarship Fund (0711566) for outstanding undergraduate math majors.

___ Robert & Marion (Betty) Lambert Award Fund (1900008) to support and reward teaching and research excellence by a graduate students.

___ Mathematics Graduate Student Scholarship Endowment (1900058) to support graduate study.

___ Dio Lewis Holl Award Fund (1909241) for an outstanding junior and an outstanding senior math major.

___ Herta & H.T. David Scholarship in Mathematics Fund (2700486) for an undergraduate math major with financial need and challenging family background.

___ Fred Wright Mathematics Endowed Scholarship Fund (2702071) for an undergraduate student that shows exemplary skills in extracurricular activities.

___ Mathematics Department Development Fund (2700704) to support the efforts of the Math Department.

___ Mathematics Department Scholarship Fund (1900057) to support math majors.

___ Mathematics Department Lectureship Fund (1922512) to finance lectures in mathematics at ISU by mathematicians who are not members of the ISU faculty and awards to graduate students.

Thank you for supporting the activities of the Mathematics Department at Iowa State University.
Thank you to all of our wonderful FY08 donors.

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Robert Antol
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Mary Baker
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Linnea Bennett
Elmer Billman
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Vernon Bothell
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Ronald Bowen
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As of May 28, 2008

To explore different ways to offer support, including cash gifts, non-cash gifts, matching gifts, planned gifts, and corporate and foundation gifts, visit www.foundation.iastate.edu/
Faculty, students participate in joint mathematics meetings

The Joint Mathematics Meetings of the American Mathematical Society (AMS) and Mathematical Association of America (MAA) convened in January, and our faculty members and graduate students were there. One chaired committees. Three helped organize special sessions. Six gave presentations.

In all, 13 faculty members and graduate students joined more than 5,500 other professionals in San Diego. According to the JMM website, researchers “presented over 1,900 papers from all specialties of mathematics, and mathematicians of all ages presented work, met colleagues, mentors and new friends, attended the annual Prize Ceremony, and saw a wide range of exhibitors. A graduate school fair was offered for the first time.

Elgin Johnston chaired the MAA Committee on American Mathematics Competitions and served on the MAA Strategic Planning Committee on Sections.

Three faculty members helped organize special sessions. Ling Long arranged a series of sessions on modular forms and modularity, and Irv Hentzel helped coordinate a session on representation theory and nonassociative algebras.

Maria Axenovich participated in combinatorics, graph theory and teaching proofs special sessions.

Several made presentations:

Development of Korean Mathematics in the late 19th and early 20th Centuries, Sung-Yell Song Song (with Sang-Gu Lee, Sungkyunkwan University and Jihwa Hoh, UNI)
Research Motivates Students, Leslie Hogben
On modular forms for some noncongruence subgroups, Chris A. Kurth and Ling Long
Farey Symbols and Finite Index Subgroups of PSL_2(Z), Chris Kurth
The minimum rank problem over finite fields, Jason Grout
Edge-colorings avoiding rainbow and monochromatic subgraphs, Maria Axenovich (with Perry Iverson, Louisiana State University)

Jiyeon Suh, Haseena Ahmed, Gargi Bhattacharyya, Jangwoon Lee and James Fiedler also attended.

initiative, conceived by Dr. Wolfgang Kliemann, is designed to improve the mathematics preparation of high school students through coordination between universities, community colleges and school districts and through offering additional training to the high school teachers. Among the issues that I2CMASE addressed under Justin’s leadership are placement exams, a transition guide for high school seniors planning to attend college, and the issue of teaching calculus which resulted in Team Calculus, convened by the Dean of LAS. This Team has made a list of suggestions that hopefully the campus will implement over the coming years.

The Department expanded its international cooperative agreements to South America, adding agreements for collaborations between faculty and graduate programs with universities in Chile, negotiated by Kliemann. Peters traveled several times to South America, including visits to Chile and Peru. A series of lectures Peters delivered in Peru resulted in Dr. Valdemar Medina Hoyos, Academic Vice Rector of the Universidad Nacional de San Agustín de Arequipa, to express support for signing a cooperative agreement for developing academic activities with Iowa State University.

A similar agreement is being discussed with the Universidad Mayor de San Andrés in La Paz, the main university in Bolivia.

The Department has been active in the Alliance for the Production of African American PhDs in the Mathematical Sciences, an NSF-supported partnership between the Iowa Regents universities and several historically black colleges and universities, since it began. Peters recruited faculty members Kliemann and Hogben to join the Alliance, thereby producing additional “ripple” effects as the Alliance continues to grow and develop new activities. Approximately ten Alliance students participated in our REU program, and most of these students have been mentored by Peters (and/or Kliemann). Of these, almost half went on to enroll in graduate programs.

Peters created the newly-formed Advisory Board of the Department of Mathematics, which met for the first time this May.

3,111: The number of living ISU Department of Mathematics alumni as of May 27, 2008.
**MSM survey**

Heather Thompson

Increased demands on secondary mathematics teachers and community college instructors, changing technology, and the need to assess the effectiveness of the program prompted the Fall 2007 distribution of a survey regarding the Master of School Mathematics (MSM) program. Sent to MSM alumni, current MSM teachers, and teachers formerly enrolled in the program, the results of the survey inform decisions in the making, some of which affect the operations of the program as early as Summer 2008.

**Statistics Instruction**

One component of the survey addressed the need to keep teachers well prepared to teach secondary mathematics. The State of Iowa recently adopted the Iowa Core Curriculum, which guides school districts to deliver instructional content that is challenging and meaningful to students. Iowa recognizes four main strands of mathematics content for learners in grades 9-12: algebra, geometry, statistics and probability, and quantitative literacy. High school mathematics teachers generally receive solid preparation in three of the four strands but do not receive enough instruction to adequately teach statistics and probability. In addition, an increased number of high school teachers are asked to teach Advanced Placement (AP) statistics or calculus or teach dual-credit (those that count for high school and community college credit) courses in statistics or calculus.

Of the twenty-seven teachers who responded to the survey, seven teachers (26%) teach statistics and probability including one alumnus who teaches an AP Statistics course and a current MSM teacher who teaches a dual-credit course. Those numbers will likely increase. Thus, this summer (2008), we launch a new six-credit statistics course: Statistical Methods for Mathematics Teachers. This course, designed and taught by Statistics assistant professor Amy Froelich, will emphasize statistical methods for research and content appropriate to teach statistics at the high school level. Effective pedagogy will be demonstrated through the use of classroom examples, activities, readings, and discussions.

**Course Transmission**

A second component emphasized the means by which courses in the MSM program are taught. Due to the difficulty of maintaining the fiber optics network and the cost of operation associated with the Iowa Communications Network (ICN), many ISU courses have migrated to online delivery with video-streaming.

Respondent concerns with the use of video-streaming highlighted feelings of isolation and glitches with the technology. Many indicated appreciation for the interaction with other teachers in the program. They conveyed fear regarding the potential lost interaction with other teachers regarding MSM coursework and matters related to the teaching profession. Other concerns included delayed responses by faculty, the need for quality equipment for the faculty and teachers in the program, and the time required to learn how to use the equipment.

The MSM faculty considered incorporating an on-site component. The survey asked respondents to indicate the length of time they would come to ISU for face-to-face interaction and instruction. Of the twenty-seven respondents, three stated that they would not be willing to come for any length of time, one preferred only one day, while the remaining 23 indicated willingness to spend a minimum of two days. By and large, respondents seemed pleased at the opportunity to interact face-to-face with other teachers and faculty.

As change occurs with the ICN, we anticipate incorporating video-streaming with some face-to-face interaction. While technology concerns will need to be addressed, these changes open the opportunity for teachers outside Iowa to participate in the MSM program, expanding the influence of ISU.

**Assessment of the MSM Program**

A third component to the survey asked why respondents enrolled in the program, whether the program met professional and personal goals, and how the program
can be improved. Overall, most responded positively to participation in the MSM program, noting success in advancing in their positions and meeting their financial goals. Respondents welcomed the opportunity to build relationships with other teachers and improve their mathematical understanding.

Survey responses highlighted appreciation for the strength of the mathematics instruction of the program while communicating the desire for increased emphasis on mathematics education, specifically ways in which students learn mathematics and how teaching mathematics can be improved. Some expressed their desire for more instruction on teaching mathematics to struggling high school students. Others identified the intensity of the program during the summers leaving little time to refresh after one school year and to prepare for the next school year. Some recommended a stipend to help reduce the costs of the program.

Respondents submitted mixed reviews on the current requirement of writing a creative component. One individual wrote that the emphasis on mathematics in the creative component detracted from his/her focus on students. Others stated that they were overwhelmed by the creative component and questioned what topics to research and which faculty member(s) to consult. Some respondents appreciated the opportunity to accomplish this requirement.

In summary, the responses to the Master of School Mathematics survey validated concerns of the faculty and teachers and brought to light suggestions for improvement. The Department of Mathematics appreciates all responses and contributions for the advancement of the program.

Mathematics and Applied Mathematics Program News
Paul Sacks

Approximately 70 MS and PhD students from the United States and ten other countries are currently enrolled in the Mathematics and Applied Mathematics graduate programs.

During the period from June 2007 through May 2008, five students earned an MS degree and six students completed requirements for their PhD.

We anticipate up to 20 new graduate students will enter the Mathematics and Applied Mathematics programs in Fall, 2008.

At least 12 of our PhD students have had scientific publications submitted and/or accepted for publication within the last year.

In the last year graduate students have presented (or are scheduled to present) papers at scientific conferences in Ames, Iowa City, Minneapolis, Mesa (AZ) and San Diego as well as Cancun, Mexico; Marakesh, Morocco; and Shanghai, China.

In conjunction with the IMA, this summer we will co-host a program in linear algebra which is attracting about 50 graduate students from around the country, including our own students of course. Leslie Hogben, Yui Poon and Wolfgang Kliemann received a grants from the Institute for Mathematics and its Applications and National Science Foundation to host the program here.
Awards & Honors

Undergraduate Student Awards
Gertrude Herr Adamson Award - Qi Gan and Hannah Park
Marian Daniells Scholarship - Stefanie Anderson, Michael Felderman, Heidi Gibson, Nick Hinzman, Daehwan Kim, Kacy Messerschmidt, Annie Olson, Kaela Rasmussen, Lee Trask, Amelia Tuel.
Herta & H.T. David Scholarship - Nick Hinzman, Jaemyung Kim
Alan Heckenbach Award - Noel Pegg
Dio Lewis Holl Awards for Outstanding Senior - Michael Westphal; and Outstanding Junior - Brian Peck
Fred Wright Mathematics Endowed Scholarship - Justine Anders
Mathematics Scholarship - Chelsea Sackett
Outstanding Problem Solvers Fall 2007 - Qi Gan and David Newton
Outstanding Problem Solvers Spring 2008 - Qi Gan and Hannah Park

Graduate Student Awards
Aggie Ho Teaching Award - Aaron Allen
J. J. L. Hinrichsen Pure Mathematics Award - Chris Kurth
Robert J. Lambert Award for Excellence in Applied Math – Wen (Rick) Zhou
Alberta Wolfe Graduate Research Fellowship - Olga Pryporova
Teaching Excellence Awards - Ahmet Alturk, James Fiedler, Mike Hilgemann, Jangwoon (Leo) Lee

Faculty Awards
Vinograde Graduate Advising Award for 2008 - Paul Sacks

Other Honors
Iowa Collegiate Mathematics Competition winners - Nicholas Allendorf, Qi Gan, Hannah Park.
Phi Beta Kappa initiates - Seniors David Imberti, Hannah Park and Tao Zeng; Juniors Stefanie Anderson, Andrew Goers and Jessica Monk

Below: Aaron Allen, representing Mathematics graduate students, presents the Vinograde Graduate Advising Award to Paul Sacks.
What can you do with a math major?

Google’s Alex Powers (’06) gives an electronic interview

Why math? I was always a good math student...found the advanced classes interesting. I also got a general sense from advisors that a math major was a good option for various paths after graduation, either a more applied or engineering graduate program, various jobs requiring advanced calculation skills, or math research. It seemed like a good approach.

Early recollections/indicators of math interest?

According to my parents, I learned math from watching hours of Sesame Street and daytime game shows when I was a very young child. By 2nd grade, I was definitely a stand-out math student. I did a summer enrichment program where there was a workbook of pre-algebra and algebra programs, and I completed the advanced one designed for 4th or 5th graders for the two-week class in a day or two.

You are a site reliability engineer at Google. What does that mean; what do you do?

Site Reliability Engineers are responsible for keeping Google running. The position is a bit of a hybrid between a Software Engineering position and a Systems Administration position. Parts of the job are focused on keeping systems running (and the associated pages); parts of the job are more aligned with developing software, working with the engineers to make it run better, and developing ways to better monitor and automate systems. The specific team I am on supports some of the infrastructure components of the web search system, such as the Googlebot that crawls pages on the internet.

How did you end up at Google?

I was initially contacted by a Google recruiter that found my resume online. It is definitely an interesting position at an exciting company. Getting to see the Google campus and the perks available when interviewing increased my excitement.

What future accomplishment is going to define who you are? Bring you the most satisfaction?

I really can’t imagine what future accomplishment is going to be “defining” for me. I don’t think I really have enough wisdom or experience yet to be able to guess in any reasonably informed manner. I would certainly hope that my “defining accomplishment” would bring me a degree of satisfaction.

Graduate school?

None in the short term future. I might consider this in a few years if I really want to focus on research in a specific area or want to transition to a drastic career change. However, right now I’m learning almost as much just by doing as I think I could be in graduate school.

What advice would you give someone considering a career in math?

It’s my sense that there aren’t that many careers that are specifically denoted “math”, they are either more specific, such as quantitative analysis or cryptography, or they are more general positions that don’t specifically cater to math majors, but involve lots of applied math.

Most interesting math fact you know and why that’s the one?

... this is a tricky one. I can think of lots of interesting math facts. A simple one that I particularly like is that the sum of the first n cubes is the square of the sum of the first n integers: $\sum_{k=1}^{n} k^3 = \left( \sum_{k=1}^{n} k \right)^2$

Math question that continues to puzzle you?

Once again, numerous answers come to mind. I’ve never quite been able to wrap my head around some of the intricacies of non-measurable sets. A more accessible problem I still find interesting is the 3n+1 conjecture; if you iterate the function f(x): {3x+1 if x is odd, x/2 if x is even} for any positive integer, it will eventually converge to the repeating series (4, 2, 1). This works for any number that it’s been tried for, but has never been proven.

Google has a “100 foot” rule (you should never be more than 100 ft from food) -- so there are break rooms throughout campus. There are also 18 cafes on the campus in Mountain View, serving local, organic and healthy food. A series of 80s arcades game are another feature of the Google workplace.
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By the numbers

Annual Budget

<table>
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<tr>
<th>Year</th>
<th>State funds</th>
<th>Development</th>
<th>Contracts &amp; Grants</th>
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Scholarships Awarded

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Degrees awarded

Summer 2007 through Spring 2008:
24 Undergraduate
13 Graduate

Faculty Members

- 2 Distinguished Professors
- 19 Professors
- 14 Associate Professors
- 8 Assistant Professors
- 15 Lecturers, Visiting Faculty & Post Docs

Enrollment

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<thead>
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<th>Graduate: Master of School Mathematics</th>
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