

MATH CONNECTIONS

A Newsletter from the UConn Department of Mathematics
Volume 8, Summer 2005

In This Issue (unsigned articles are by the editors)

| | |
|--|----------------|
| From the Department Head | Miki Neumann |
| Alumni Relations Committee | Alan Stein |
| The Graduate Program | Manny Lerman |
| Undergraduate Mathematics at UConn | Jeff Tollefson |
| Actuarial Science Update | Dick London |
| Introducing the New Provost | |
| Professional Master's Degree/Financial Mathematics | Jim Bridgeman |
| Center for Actuarial Studies and Risk Management | |
| Q-Center News | |
| Faculty News | |
| New on the Scene | |
| Alumni News | |
| Post-Doctoral Program | |
| International Workshop on Operator Theory | |
| Another Look | |
| Mathematics Club | |
| Mathematics Awards Day | |
| Department Web Site Redesigned | Alan Stein |
| Stu's Puzzle Corner | Stuart Sidney |
| Feedback | |

Math CONNECTIONS is on-line at www.math.uconn.edu

FROM THE DEPARTMENT HEAD
Miki Neumann

This was a very busy year in the life of our department in which we took some very important decisions for our future. We worked hard to recruit new faculty and graduate students. We taught some 11,000 students in our many undergraduate courses.

At the outset I want to thank our staff: Arcelia Bettencourt, our Undergraduate Secretary; Kevin Marinelli, our System Manager; Sharon McDermott, our Graduate Program Assistant; and Tammy Prentice, our Administrative Coordinator, for all their hard work and dedication. Without their efforts, the department could not have achieved so much this year.

In December 2004 we learned that we were to lose Karlheinz Gröchenig, a Full Professor and a very reputable mathematician, who has returned to his home country of Austria. An equally major loss was the retirement of Richard London, our Actuarial Science Director for the last seven years. He has done an outstanding job in advancing the program in our department and he was much loved by all the students whom he served. We wish much health and success to both Charly and Dick in the next phase of their lives.

The loss of these two excellent faculty was mitigated by the very successful recruiting year that we have had. We hired five new faculty members who will join us in Fall 2005. One is Professor Tara S. Holm, currently an NSF Postdoctoral Fellow in Berkeley (PhD MIT). Her areas of research are in geometry/topology. Next we hired Professor Joseph S. Miller, currently an NSF Postdoctoral Fellow at the University of Indiana in Bloomington (PhD Cornell University). His area of expertise is mathematical logic. The third hire is Professor Kyu-Hwan Lee, who is a Postdoctoral Fellow at the University of Toronto with a Ph.D. from the National University of Korea in Seoul. His specialty is number theory.

The remaining two hires were part of our new Mathematics Education Group. The decision to start such a group was made by the department earlier in the year. Its purpose is to further integrate our department into the goals and outreach of the University by assisting interested organizations within the State of Connecticut and the US as a whole in K-12 mathematics education. Two opportunities were presented to the department to hire faculty for the group, one through the Directorship of the Q-Center (see the article about the Q-Center later in this issue), the other through the Carnegie Teachers for a New Era (TNE) initiative. In each case, the person would belong to the department, but with 50% responsibilities outside the department. For the Director of the Q-Center we hired Professor Thomas Roby, an Associate Professor of Mathematics at the California State University/Hayward whose Ph.D. is from MIT. For the Carnegie TNE position we hired Professor Fabiana Cardetti, currently a postdoctoral fellow in our department (PhD Louisiana State).

Aside from the five new faculty mentioned above, there was one important addition to our department this year, in the person of the new Provost and Executive Vice President for Academic Affairs of the University of Connecticut -- Professor Peter J. Nicholls. More about the provost can be found in an article later in this newsletter. We also anticipate that nine of our postdoctoral fellows will continue with us in 2005-06.

Many members of our faculty have received grants and won awards since our last Newsletter. You may find the details under FACULTY NEWS in this issue.

I started this letter by saying what a busy year this has been. Perhaps one of the busiest areas in the department was its undergraduate program. Part of the push came as a result of the pilot project for overhauling our undergraduate program. In the academic year 2003-04, and at the request of the university, the entire department worked on a proposal called the Pilot Project. If successful, the university would boost our annual operations budget.

With the submission of the proposal, several committees were set up to execute the suggestions made in the proposal and this year some of these committees have been able to work towards their realization. One of the foremost accomplishments of one of the committees was the establishment of a summer program of Research Experience for Undergraduates (REU). Under the directorship of Professors Kinetsu Abe and Joseph McKenna, nine students are working on projects in “Computational Topology and Geometry of Surfaces” and in “Differential Equations, Mechanics, and Computation,” respectively. All their expenses will be paid by the program, which will last for six weeks. We hope that within one or two years, the program that we have launched will be funded by the National Science Foundation (NSF).

Two further committees set up to implement the pilot project have been working hard on improving and redesigning our calculus program on all levels. We have adopted a sequence of honors courses in mathematics that will cater to our most motivated students. Furthermore, for those interested, Professor Keith Conrad has run a very active Math Club which met weekly and where speakers from both inside and outside the university gave informative and entertaining talks.

Finally, we have constituted an Alumni Relations Committee, headed by Professor Alan Stein, because we are very eager to revive ties with our former students, and we are planning several events involving our alumni. You can find more about this in Professor’s Stein’s message in this newsletter and on the Department’s Web pages, at www.math.uconn.edu.

Our graduate program, under the directorship of Professor Manuel Lerman, continued to gather strength. For the next academic year, we had applicants for TA positions with high credentials that we have not seen here before. To be candid, the best two or three of these students decided for various reasons not to attend UConn; nevertheless, the ten domestic and two foreign graduate students whom we did successfully recruit equaled in quality our best intake in previous years. (See Manny’s article for information on the winners of this year’s awards for excellence in graduate teaching and service to the graduate student community.) By summer’s end we expect to have graduated at least three more students with a Ph.D. degree in Mathematics.

As we mentioned above, we were sad to part with Richard London, who has done an outstanding job as Director of the Actuarial Science Program for the last seven years. This year we have also welcomed the incoming Director, Louis Lombardi, who has already shown us how hard-working he is. Among his achievements for the year was securing \$50,000 in scholarship funds from Mass Mutual, an amount that was matched by \$25,000 in state funds. One of the highest priorities in our plans is to hire next year an additional full time faculty member in Actuarial

Science so as to further cement the program. A more detailed description of the activity of our Actuarial Science Program can be found in Dick's report in this newsletter.

Our budding Professional Master's degree program in Applied Financial Mathematics conferred its first degree in summer 2004 and the number of applicants to the program keeps rising. See Jim Bridgeman's article in this issue for more about the program.

At the UConn Center for Actuarial Studies and Risk Management, students were engaged in some exciting interdisciplinary projects in 2004-05, under the direction of Jay Vadiveloo, who holds the title of Deloitte & Touche, LLP, Professor. More details can be found in the Center's report below.

DEPARTMENT EXPANDS EFFORTS TO KEEP IN TOUCH WITH ALUMNI **Alan Stein**

Involved alumni are an important asset to any university and increased alumni activity has been a key ingredient in the expansion and modernization of the University of Connecticut.

The Mathematics Department recognizes that its alumni can be an asset not just to the University as a whole but to the Department and its students as well, so it has initiated an effort to increase the integration of former students into current activities, forming a new Alumni Relations Committee this past spring semester.

The charter members of the committee are Ron Blei, Jerry Leibowitz, Kevin Marinelli, Miki Neumann, Stu Sidney and Alan Stein (Chair). The committee has already set up a special area of the Department Web site, www.math.uconn.edu/alumni, with information for and about alumni. One section of the Web site contains current information about what Math alumni are doing now. Please let the department know what you're doing now so we can make your story available to your former classmates! Send your information to any of the committee members, or to the Department's Undergraduate Secretary, Arcelia Bettencourt (arcelia@math.uconn.edu). You can also just fill out a convenient online form on the Web site.

We'll be specially inviting alumni to participate in many of the Department's activities in the future along with planning programs exclusively for alumni. Let us know of any programs or events you'd be particularly interested in. The first invitation went out inviting alumni to the Awards Day festivities this past May; unfortunately, logistical and postal problems prevented the invitation from reaching many alumni in time.

The next program alumni are invited to is the Department's Fall Picnic, tentatively scheduled for Sunday, September 18, 2005. Details will be published on the Web site as they become available, but you can expect food, fun and friendly sports contests.

The Alumni Relations Committee anticipates sending out one letter to alumni each year in addition to this annual newsletter, with frequent communications throughout the year via E-mail. So please make sure the Department has your current E-mail address, and keep checking the alumni section of the Department's web site for current information.

THE GRADUATE PROGRAM, 2004-05
Manuel Lerman, Associate Head for Graduate Studies

The past year has been an exciting year for me, as we continued to witness the growth of our Ph.D. program and the successes of our students. As in every year, we began a week before fall classes with PhD prelims for continuing doctoral students and orientation for the incoming class. More students than ever took prelims, and the success rate was the highest it has ever been! We are beginning to see the fruits of the recruiting that has produced large classes of outstanding students for three consecutive years. The new students coming in for orientation were comparable in number and in their excellent qualifications to the large incoming class of the previous year, and many quickly became involved in the social fabric of graduate student life. They participated in the SIGMA Seminar, a weekly graduate student run seminar, and monthly movie nights combined with potluck dinners. Gorjan Alagic and Matt Jura were our two representatives to the University Graduate Student Council. Our more senior students also took an active role, and I would particularly like to note the contributions of Lance Miller, a first-year student who assumed the role of coordinating the SIGMA seminar, and Rachel Schwell, who coordinated the movie nights and potluck dinners, and all members of the TA Network.

One of the greatest pleasures inherent in coordinating the graduate program is to interact with large numbers of students, both on a professional and personal basis, and observe their maturation both as mathematicians and as responsible citizens. The Graduate Program Committee works closely with representatives elected by the graduate students, meeting with them on a regular basis, and trying to implement some of their suggestions for enhancing the program. There were no major innovations or suggestions made this year, and I would like to interpret this as a sign of a smoothly running program. Thanks go to Marc Corluy and Bob Wooster who served ably and conscientiously as the graduate student representatives for the past year.

We continued, for the second year, to set aside two days during which we invited some of our recruits to visit the department. These visits were funded partially through a grant from the UConn Graduate School, and partially by the Dean's office. The grants enabled us to bring in a group of recruited students to learn about our program first-hand. These students were also invited to attend some graduate courses and undergraduate courses being taught by TAs, speak to faculty members about their interests, and socialize with faculty and graduate students. Eight students accepted our offer to visit at that time, and four will be joining us in the fall. Other recruits visited at other times, many deciding to join our Graduate Program. We look forward to having another excellent entering cohort next year, a group of mathematically bright and very personable people.

We recognized contributions of three students who have distinguished themselves over the course of their graduate careers. Robert Wooster received the Louis J. DeLuca Award recognizing an outstanding TA, and Marc Corluy and Rachel Schwell shared the Constance Strange Graduate Community Service Award.

I would like to recognize these graduate students who received PhD degrees in 2004 or are expected to receive degrees this year: Minerva Catral, Alexander Lavrentiev, Ermek Nurkhaidarov, Krista O'Neill and Regina Speicher,

Many of the students who choose UConn for their graduate work do so because of the excellent support and training we offer to our teaching assistants, both while preparing to teach for the first time, and while they are teaching. It is our intention to reexamine these supports next year, and to try to enhance them. We hope to continue to be a model program in this area.

GRADUATE DEGREES GRANTED

Although a number of our students were close to finishing their doctoral work, no one in the Department satisfied all of the technical requirements in time to be awarded the PhD at the December 2004 or May 2005 commencement exercises. However, there were several Master's Degree Recipients in 2004-05.

Mathematics:

| | |
|-----------------------------|------------------------|
| Joseph Andrasko | Rachel Schwell |
| Brigid Boyle | Phillip Cameron Sisson |
| Christopher Hamelin | Emily Slater |
| Ellen Lavorato | Thomas Michael Smith |
| Craig Miller | Jaimie Stone |
| Abhijnan Rej | Lisa Termine |
| Kristin Lee (Savage) Cekala | Robert Wooster |
| | Jian Zou |

Applied Financial Mathematics: Hector Honvoh (August 2004)

Mathematics/Actuarial Science (with employer if known):

| | |
|-------------------------------|-------------------------------|
| Hassan Ayoub | Xianhui Lin (Travelers) |
| Ping Chen | Chunhua Meng (Mercer) |
| Jianbo Deng (Hartford P & C) | Lin Meng (Sun Financial) |
| Fengchen Du (Guardian Life) | Wei Pan (Swiss Re) |
| Chenlong Gong (Sun Financial) | Sudath Ranasinghe * |
| Nikolai Kovtunenکو (Deloitte) | Suppakit Sattayarath |
| Tommy Junyoung Kwak | Yufeng Shen |
| Lingyun Li (LIMRA) | Yilin Sun |
| Louis Chia-Wei Li (Travelers) | Yeqing Yin |
| Yi Liao | Shan Zhu (Pension Associates) |

* Sudath is in the UConn PhD program

UNDERGRADUATE PROGRAM NEWS
Jeffrey L. Tollefson, Undergraduate Studies co-director

The Mathematics department is participating in a pilot project funded by the Provost and dedicated to the overall improvement of undergraduate education in mathematics. Below are some of our activities of this project that relate directly to mathematics majors.

Students will soon be able to use an online process to sign up as math majors. All features of this process will be automated: Advisor selection, advisor signature (electronic), submission of application, assignment of computer account, and more.

This summer Professors Kinetsu Abe and Joe McKenna are conducting a six week REU (research experience for undergraduates). This first year there are nine participants, four of whom are UCONN undergraduates. The program is presently financed by the pilot project with additional funding from the NSF. We will expand the REU program for next summer and seek outside funding to support future workshops.

Our mainstream calculus sequence, Math 115-116, has been redesigned for fall 2005. The new course will emphasize the fundamental concepts, logical reasoning, problem solving, collaborative work, and language skills (reading, writing and explaining mathematics). To achieve these goals we will introduce a new approach to teaching calculus and have selected a new textbook that shares our enthusiasm for this approach to teaching Calculus. More details can be found on the two course web pages: one for instructors and one for students.

Pending approval from the College and University Senate curriculum committees, we are implementing a comprehensive 4-year Honors Program in mathematics that will bring together the best freshmen each fall and provide them with a mathematical experience that is more structured and in-depth than anything currently available in the department. The foundation of this new honors program is a new 4-semester sequence: Advanced Calculus I, II, III, IV that will build a solid background in Calculus, Differential Equations and Linear Algebra, at a higher level than usually presented to freshman and sophomores. Upon completing the Advanced Calculus sequence students will be prepared for almost all of our more advanced offerings. To help attract students there will be a comprehensive honors web page this fall describing the new program.

This fall will also be the first semester for two new W courses for Mathematics majors: MATH 200-201W and MATH 202W. The first sequence is a writing supplement to the popular Undergraduate Math Seminar series sponsored by the Math Club. Students will select a topic each semester from one of the presentations, do some additional research and then write a paper on the selected topic. The second course is a writing supplement to the multivariable calculus course, MATH 210, in which the focus is on pedagogical issues related to MATH 210 (which students will take concurrently); we expect that many of the students in 202W will be Mathematics Education majors. These courses and the new MATH 291W, Technical Writing for Actuaries, are part of the University's new general education program of Writing in the Major. They join our current W courses, MATH 242W, History of Mathematics, and MATH 292W, Senior Thesis in Mathematics.

ACTUARIAL SCIENCE UPDATE

Richard L. (Dick) London, FSA
Director of Actuarial Science

A. The Past Academic Year

We have just completed the 2004-05 academic year at the time of this writing. The program continues to be healthy in terms of total student enrollments (both undergraduate and graduate), the undergraduate scholarship program (\$73,000 awarded to 27 students this year), summer internship opportunities (37 known placements, an all-time high), and full-time positions for our graduating students who have passed at least one of the SOA/CAS professional qualification exams.

Our core faculty group was expanded to six this year, with the additions of Louis J. Lombardi, FSA, and Dmitry Glotov, Ph.D. (as a new post-doctoral fellow). One consequence of having the extra person this past year was to allow us to offer the basic course in actuarial mathematics in separate sections for undergraduates (Math 287-288) and for graduate students (Math 387-388).

B. Future Faculty Changes

With my departure from the actuarial faculty group at this time, arrangements have been made to secure another adjunct for the upcoming 2005-06 academic year in order to be able to keep the separate offerings of Math 287-288 and Math 387-388. The new adjunct is Rachel C. Brown, FSA, formerly the Director of the Program in Actuarial Science at the University of Hartford. Professor Lombardi will be assuming my administrative duties here, as well as continuing to teach a full course load.

In anticipation of further retirements from the actuarial faculty group in the not-too-distant future, the Department has been authorized to advertise for another full-time hire in this specialty area.

C. Curriculum Changes

No significant curriculum changes were instituted in the 2004-05 academic year, although several are in the planning stages for the near future. (The details of this can be reported by Professor Lombardi in the following volume of this publication.)

In my article in last year's volume of *MATH CONN*ections, the new SOA/CAS requirements now known as VEE were described. During the past year we were successful in obtaining approval for all of the relevant UConn courses, thereby enabling our students to complete their VEE professional qualification requirements during their academic years.

D. Accreditation of Actuarial Programs

A proposal that SOA undertake a project of accreditation of academic Actuarial Science programs was reported in last year's article. At the October 2004 meeting of the SOA Board of Governors, the proposal was approved and a committee was established to recommend the specific criteria for accreditation at various levels. (What has been agreed to thus far is that programs will be accredited under several descriptions, rather than an all-or-nothing structure of accredited or not.) In light of this, there is no doubt that the UConn program will be accredited at some level, yet to be determined. But it is unlikely that it will be accredited at the highest levels, unless certain faculty and/or curriculum upgrades are made.

Beyond this concept of general accreditation, SOA is also exploring the possibility of authorizing the very best of the academic actuarial programs to designate certain of their students as qualifying for exemption from the professional actuarial exams as a consequence of excellence in their academic course work. This second step in the accreditation process is still several years away, and will likely be granted only to programs which meet very rigorous standards with respect to curriculum and (especially) faculty qualifications.

Certainly the several programs accredited by SOA for designating students for exam exemptions will come to be regarded as the elite programs within the discipline, and will have significant advantages over other programs with respect to recruitment of top students, financial support from the profession and industry, and the ability to attract top faculty. Will the University of Connecticut, the College of Liberal Arts and Sciences, and the Department of Mathematics be willing to do what will be necessary in order to have its program included among this elite group?

Time will tell.

[Editor's note: At its meeting on May 5, 2005, the faculty of the Department of Mathematics unanimously approved this statement of appreciation for Dick London's work over the past seven years.

- * He is a superb teacher and has often taught extra classes on a voluntary basis.
- * He is the author of three actuarial science texts.
- * He has served on the Board of Governors of the Society of Actuaries.
- * He has mentored and advised dozens of students every year, including graduate students and some with other official advisors; has worked diligently to find internships and permanent positions for actuarial students - about 35 found internships last summer!
- * He has increased donations from 'Corporate Partners' to \$80,000 per year.
- * He hosted job fairs and in-house interviews for actuarial majors each fall, with dozens of companies participating.
- * He supervised on-campus SOA and CAS exams twice a year, and provided voluntary review sessions for higher-level exams.
- * He hosted 20th and 25th anniversary dinners for the actuarial alumni, with SOA President Steve Kellison a speaker at the 25th.
- * Dick generated a genuine feeling of community for actuarial science majors, and his door was always open.]

PROVOST PETER NICHOLLS

Peter J. Nicholls joined the University as Provost and Executive Vice President for Academic Affairs, and the Mathematics Department as Professor, on March 1, 2005. He has extensive experience as a mathematician, an academic, and an academic administrator.

Nicholls grew up in Kent, England, and earned a Bachelor of Science degree in mathematics from Imperial College of the University of London and a Doctor of Philosophy degree in mathematics from Cambridge University. In 1971 he came to the United States as a Visiting Assistant Professor at Northern Illinois University. This evolved into a permanent position and later a full professorship, as well as a role as Associate Dean of the College of Liberal Arts and Sciences, and in 1984 Nicholls became a U.S. citizen. Dr. Nicholls left Northern Illinois to be Professor of Mathematics and Dean of the College of Arts and Sciences at Kansas State University, and then moved on to become Professor of Mathematics as well as Provost and Academic Vice President at Colorado State University. From CSU he has come to UConn.

Nicholls's mathematical research has focused on the study of discrete groups, Riemann surfaces and topological dynamics. He has published numerous scholarly articles and received research support from the National Science Foundation. He is also the author or co-author of three books. *The Ergodic Theory of Discrete Groups* (London Mathematical Society Lecture Notes #143) is an advanced monograph published in 1989 by the Cambridge University Press. *Mathematical Thinking in a Quantitative World*, co-authored with Linda R. Sons, Jimmy Solomon, and Glenn Hopkins, is intended for a general audience; it was published in 1992 by the Kendall/Hunt Publishing Company. Likewise, Kendall/Hunt published the third edition of *Mathematical Thinking & Quantitative Reasoning*, co-authored with Dr. Sons and Joseph B. Stephen, in 2003.

Nicholls brings to UConn a terrific reputation as an administrator: one who seeks and respects input from others in many corners of the university community and does not rush to conclusions, so that when he makes a decision it is accepted even by those who may not agree with it fully. In his three years at CSU, he achieved many important academic goals, spanning the university from first-year undergraduate education through graduate school, and improving both diversity and the institution's research profile.

Nicholls believes that the mathematics department is central to both the pedagogical and the research mission of any university. Mathematics is a core component not only of the liberal education of students, but also of their training for any number of majors. As a research discipline, it is central to the scientific aspirations of the institution.

Nicholls enjoys teaching, particularly introducing freshmen to the joys of calculus. While the pressures of his administrative load will not permit him to teach during his first full year here, he hopes that by fall 2006 the provostial workload will have settled down and he will be in a position to return to the classroom a few hours a week.

Among the activities enjoyed by the Provost in his spare time are hiking and playing golf.

Mathematicians often associate with and beget other mathematicians, and this is certainly true in the Provost's case. Peter and his wife Trudy met when both were undergraduate mathematics students at London University. She moved into statistics, then acquired a master's degree in computer science. Their son David is an applied mathematician on the faculty of the University of Illinois at Chicago, their daughter Katharine has a bachelor's degree in mathematics and is an accountant, and their son Stephen received undergraduate degrees in two engineering majors, was a consultant dealing with Web programming for several companies over a five-year period, and is now studying for an MBA at the MIT Sloan School of Management. The branches of the Nicholls family tree have not fallen very far from the trunk!

PROFESSIONAL MASTER'S DEGREE/APPLIED FINANCIAL MATHEMATICS

Jim Bridgeman

The Professional Master's Degree program in Applied Financial Mathematics is a joint offering of the Mathematics, Statistics, and Finance departments at the University of Connecticut, administered through the Math department. We hope that it positions the department vis-à-vis the emerging financial mathematics profession similarly to the way the mathematics/actuarial science program relates to that profession.

The program conferred its first degree in 2004 to Hector Honvoh, who had transferred in with credits from actuarial science. The second full year in operation, 2004-2005, began with ten students: seven returning from the prior year, one new outside recruit, one transfer from actuarial science, and a new dual degree candidate from economics (the second such in the program). Eight of the ten remained active with the program through the spring semester, one dropped out to take up a career offer and one went inactive to devote full time to a career while maintaining registration. (The demand in the field seems to outstrip our timing to produce the degree!) We also had two new admissions for the spring, thus maintaining a level of ten active students for the spring semester. We expect two students from this group to be awarded degrees in August 2005 and possibly two or three to finish in December 2005. The courses around which the program is built also draw enrollment from graduate degree candidates in Economics, Finance, Engineering, and Statistics.

For fall 2005 we offered admission to 12 new students from an applicant pool of about 30, although with very little financial support available for new applicants to the program it is doubtful that more than five of the newly admitted students will actually enroll. In fall 2004, with the help of an advisory committee from local industry, we continued a successful series of one-credit seminars with a practical focus (to good reviews from both students and the industry presenters). The year saw welcome practical support for the program from Mathematics Department alumni including two seminar presentations by alumni and an internship placement with an alumna's firm. Five students in total are engaged in relevant internships in the summer of 2005. We regret that three who actively sought internships have been disappointed.

The program still faces difficulties in (1) a lack of financial support to attract new students and (2) the inability to guarantee or deliver outside internships to all of the students who need one. Nevertheless, the core demand for such a program has been demonstrated and it is becoming an established part of the mathematics landscape here.

CENTER FOR ACTUARIAL STUDIES AND RISK MANAGEMENT 2004 - 2005

The UConn Center for Actuarial Studies and Risk Management, under the direction of Jayraj Vadiveloo (Deloitte & Touche, LLP, Professor) was engaged in some exciting projects during the 2004/05 academic year.

An actuarial study of the Life Settlements industry was funded by Mass Mutual and several other major insurance companies. This project provided partial summer support to five graduate students (four from Mathematics/Actuarial Science and one from the School of Business) and three faculty members - Chuck Vinsonhaler (Mathematics), Joe Golec and Tom O'Brien (Finance). The project results are posted online at www.lifeselementeducation.com.

The study has already garnered considerable attention, including an interview of Jay Vadiveloo by the Wall Street Journal. Doctoral student Hui Shan has been hired by Deloitte & Touche, LLP as an intern to help with a follow-up study on how to address the issues raised by the Life Settlements study. He is developing an analytical model to determine how to quantify the longevity risk for an impaired annuitant, using data from the Hartford Life Insurance Company.

Two other Center projects involving doctoral students from the Department of Mathematics were begun this year. Sudath Ranasinghe is investigating Structured Settlements, sponsored by The Hartford, and Hongbiao Li is analyzing the marginal value of data sets, sponsored by Deloitte.

Q-CENTER NEWS

During the past academic year, the University opened the Center for Undergraduate Education on the Storrs campus. It is housed in a spectacularly renovated and expanded building that was the home of the School of Business for many years. The underlying concept is that of a place for "one-stop shopping" for students seeking services. One occupant of the CUE is the Center for Quantitative Studies. During the inaugural year, our former Department Head, Charles Vinsonhaler, served as Acting Director of the Q-Center.

The challenges faced by Chuck included establishing specific goals and activities for the Center, acquiring expertise in peer tutoring, hiring and training a program assistant and undergraduate and graduate tutors (for all quantitative studies, not just mathematics), building a Web site for the Center and publicizing it among the students, faculty and educational administrative staff. His annual report also mentions these accomplishments of the Q-Center: 'Began "Learning Modules" project in cooperation with the Institute for Teaching and Learning. These will be online quickie review packets for difficult subjects such as exponents and logarithms. Conducted online survey of students who received D, F or W in Calculus I in fall 2004. Took over Peer Tutoring in the residence halls, formerly run by the Office of Special Programs. Recruited TA's and undergraduate tutors for fall 2005, and began a search for new program assistant The Q-Center recorded roughly 600 student visits during spring semester, 2005. About half of these were for drop-in tutoring, and the other half were for review sessions offered during finals week.'

Chuck and his staff have left the Q-Center in good shape for the incoming Director, Professor Tom Roby, who will be joining our faculty in fall 2005.

FACULTY NEWS

Most of this information is available on the department website, but we also highlight it here.

Kinetsu Abe (MATH), Tom Peters (CSE and MATH) and Alexander Russell (CSE and MATH) were awarded a three-year grant by the National Science Foundation for the project "Computational Topology and Surface Approximation," as of September 2004.

In 2004, the American Mathematical Society published "In the tradition of Ahlfors and Bers, III: the Ahlfors-Bers Colloquium, October 18-21, 2001, University of Connecticut at Storrs", edited by Bill Abikoff and Andy Haas.

Sarah Glaz won an award in the 2005 General Education Course Development Grant Competition. The course that she proposed and has been developing is designed to prepare students with weak high school algebra backgrounds to succeed in University science courses.

Maria Gordina was awarded a prestigious Alexander von Humboldt Foundation Fellowship. These fellowships are intended to enable "highly qualified, early-stage researchers from abroad, who hold doctorates, to carry out research projects of their own choice in Germany." Masha's project, with professors M. Rochner of the University of Bielefeld and S. Albeverio of the University of Bonn, is entitled "Stochastic Analysis in Infinite Dimensions."

Changfeng Gui was awarded a three-year grant by the National Science Foundation for the project "Qualitative Studies of Some Partial Differential Equations and Systems." This is a continuation of his grant that expired in October 2004.

Jim Hurley (MATH emeritus) became one of the first two recipients of the University of Connecticut High School Cooperative Faculty Coordinator Award for Excellence in Curriculum and Adjunct Faculty Development; the other recipient was Jim's wife Cecile Hurley (CHEM).

Michael Neumann was recognized at the May 2005 Undergraduate Commencement for receiving the Chancellor's Excellence in Research award for 2004-2005.

Stuart Sidney won the University of Connecticut Alumni Association's 2005 Faculty Excellence Award in Teaching at the graduate level, and will be recognized at a ceremony in October.

Sasha Teplyaev has been awarded a three-year grant by the National Science Foundation for the project "Random, Stochastic, and Self-Similar Equations."

Erin Terwilleger Mullen and Ryan Mullen became the proud parents of Ava Sierra Mullen on July 20, 2004.

NEW ON THE SCENE

The Department was pleased to have two new members join the faculty in Fall 2004, Louis J. Lombardi (as Instructor-in-Residence) and Ralph M. Kaufmann (as Assistant Professor). In addition, Dr. Peter J. Nicholls became Provost and Executive Vice President for Academic Affairs of the University of Connecticut on March 1, 2005 and accepted the position of Professor of Mathematics at the same time. An article on Provost Nicholls appears elsewhere in this newsletter.

Louis Lombardi earned his Bachelor's degree from Central Connecticut State University and an MS in Mathematics from Tufts in 1978, after which he began a career as an actuary in the insurance industry. Louis spent five years at the Hartford, during which he achieved fellowship in the Society of Actuaries and membership in the American Academy of Actuaries. This was followed by seven years at Connecticut Mutual Life, where he rose to be a Second Vice President. During that tenure Louis published "Relationships between Statutory and Generally Accepted Accounting Principles (GAAP)" [Transactions of the SOA, 40: 1 (1988)], which was recognized as "Best Paper Published in 1988" by the Society of Actuaries. During 1990-2001 he worked at the consulting firm PriceWaterhouseCoopers and was Managing Partner, U.S. Life Actuarial Practice, specializing in particular in the valuation of reserves of insurance companies. Immediately before coming to UConn to be the Director of the Actuarial Program, he was a Senior Vice President at the Phoenix (2001-2004), with responsibility for all financial and risk management aspects of their life insurance and annuity operations. Louis belongs to these special interest sections of the SOA: Education and Research, Individual Life and Annuity Product Development, Investment, and Life Insurance Financial Reporting. In addition to teaching and working on personnel issues for the future of actuarial science at the University, Louis has devoted much energy in his first year here to working with corporate partners to endow scholarships for UConn students.

Ralph Kaufmann has earned numerous degrees from the University of Bonn (Germany). These include two Bachelor's - in Mathematics and in Physics, two Master's - in Mathematics and in Philosophy, a doctorate (Dr. rer. nat.) in 1997, and the post-doctoral Habilitation in 2004. His Ph.D. advisor was Yuri Manin, and the dissertation bore the title "The geometry of the moduli space of pointed curves, the tensor product in the theory of Frobenius manifolds, and the explicit Kunnet formula in quantum cohomology." Ralph tells us "My mathematical interests are Geometry and Topology, especially the study of moduli spaces of surfaces and maps of surfaces. In particular, I am interested in the algebraic structures induced by maps of surfaces such as string topology or quantum cohomology. ... I obtained my Ph.D in Bonn with while working at the Max-Planck-Institute for Mathematics (MPI). After spending one more year there as a post-doc, my wife Erika Birgit and I moved to Paris where I spent a year at the IHES with Maxim Kontsevich. After this we both moved to the University of Southern California and lived in LA for 3 years. After a year's visit to the MPI and a brief stint of one year at Oklahoma State, where our son Julian was born, we are now both at UConn - Birgit being in the Physics department here. After moving so much we both are very happy to be at UConn where both the academic and social environment suit us extremely well. We have never adapted to a place so quickly."

ALUMNI NEWS

Several UConn graduates have reached professional milestones recently. Among those we know about are the following actuaries. Gregory Czar (BA Mathematics/Actuarial Science 2001, magna cum laude) became a Fellow of the Society of Actuaries in 2005; he is a disability pricing actuary at CIGNA, Philadelphia. Daniel E. Flynn (BA ACTU 1994, cum laude) became an FSA in 2004; he is an associate with Hewitt Associates in Norwalk, CT. David S. Futterleib (BA ACTU 2000, summa cum laude, honors scholar) became a Fellow of the Casualty Actuarial Society in 2004; he is an actuarial analyst at the Travelers Group, Hartford. Steven Thomas James (BS ACTU 1995, magna cum laude) became an FSA in 2005; he is a consulting actuary at Watson Wyatt Worldwide, Stamford, CT. Frank (Yow-Ming) Kang (MS 1994, PhD 1999) became an ASA in 2004; he is with Russell Investment Group, Tacoma, WA. Hugh A. Lakshman (BA ACTU, December 2001, magna cum laude) became an Associate of the Society of Actuaries in 2004; he is employed by CIGNA, Bloomfield, CT. James Anton Landgrebe (BA ACTU 1998, summa cum laude, honors scholar) attained his FCAS in 2004; he is at St. Paul Travelers in Hartford. Nicholas Mocchiolo (BS MATH 1999, summa cum laude; MS ACTU, December 2000), assistant risk manager at Hartford Investment Management Company, became an FSA in 2004. Paul Navratil (BS ACTU, December 2000, summa cum laude, honors scholar; MS ACTU, May 2001), an assistant actuary at CIGNA, Hartford, became an FSA in 2004. Jeffrey M. Stock (BA ACTU, May 2000, magna cum laude), a senior actuarial consultant at Aetna, Hartford, became an FSA in 2004. And Matthew Wininger (BA ACTU 2001, cum laude), an actuarial consultant at Hartford Life, Simsbury, also attained his FSA in 2004. [Matt specializes in asset/liability management and variable annuity modeling, and is a recruiting strategist for Hartford Life's actuarial student program.] (In 2003, Aaron Cushing (BS MATH 1995) was designated FCAS, Peter Daggett (BA ACTU 1996) became an ASA, and Jeffrey A. Goodman (MS 1996) and Peter Richard Lopatka (BS ACTU 1993) became FSAs.)

The editors have heard from the following alumni. Ronald DeGray (BA 1960, MA 1962; PhD Syracuse University, 1969) is an emeritus faculty member of the Department of Mathematical Sciences at Saint Joseph College in West Hartford. After graduating from UConn in 1994, Carrie Embleton began her career as a mathematics teacher with a position at Minuteman Technical High School in Massachusetts; currently, she teaches at the Lincoln-Sudbury Regional High School. Robert J. Studley also earned a BS in MATH in 1994. Bob returned to Storrs in 1998 and received an MA in 1999 from the School of Education in Sport Management. He has been teaching high school mathematics at St. Joseph High School in Trumbull, CT, since 1999. He teaches a wide variety of courses including geometry, algebra, pre-calculus and calculus and also serves as head coach of the baseball and boys' soccer teams. Mei Gao (PhD 1993, adviser Neumann) is at Pratt and Whitney. Carol (Helfgott) LeDoux (BA 1970; PhD in Computer Science from UCLA, 1985) writes "I have been working for The Aerospace Corporation in El Segundo, California since 1982. My title is Engineering Specialist. I support weather and navigational systems, and have been heavily involved in supporting the development of GPS receivers. I live in Redondo Beach with my 8-year old son, who loves math as much as I do." Talitha Washington (PhD 2001, adviser Choi), now on the faculty of the College of New Rochelle, will be moving to a new position at the University of Evansville (Indiana), in her hometown. (In fact, "My preschool is across the street!") Bill Hassell (BA 1970) retired after 35 years of teaching math at Windham H.S. and is an adjunct professor at ECSU in Willimantic.

MATHEMATICS POST-DOCTORAL PROGRAM 2004-05

In addition to our post-docs who finished their final years, four others decided to leave the program last summer. R. Moritz Kassmann returned to the University of Bonn (Germany). Zhenbu Zhang moved to Brandon, MS, and is one of nine "Summer Scholars Class of 2005" (and the only mathematician in the cohort) selected by the Center for University Scholars at Jackson State University (Mississippi). Edlira Shteto spent a year in Boston and will be an Assistant Professor at the Wentworth Institute of Technology, Boston, starting September 2005. Jennifer Ann Hill is still doing research in algebra, but we don't know where.

Staying for a third year were Fabiana Cardetti, Zhixong Chen, and Dahae You; Bjorn Kjos-Hanssen, Martynas Manstavicius, and Kasra Rafi (PhD 2001 SUNY Stony Brook, Hyperbolic three-manifolds) were in their second years; and we welcomed new post-docs Stephen Binns (PhD Penn State, Mathematical logic), Dmitry Glotov (PhD Purdue, Nonlinear PDEs), Jesse Ratzkin (PhD U of Washington, Geometric analysis), Nataliya Savytska (PhD UConn, 2002; adviser Koltracht; Numerical solution of nonlinear PDEs), Leonid Slavin (PhD Michigan State, Harmonic analysis), and Xudong Yao (PhD Texas A & M, Applied mathematics). Fabiana will be joining the Department this summer as an Assistant Professor of Mathematics and is expected to be a key participant in our Mathematics Education program. Zhixong will begin a faculty position at New Jersey City University (Jersey City), and Dahae is expected to return to South Korea.

IWOTA 2005

The Department of Mathematics of The University of Connecticut is host this summer to IWOTA 2005, the Sixteenth International Workshop on Operator Theory and Applications, due to the diligent efforts of Vadim Olshevsky of our Department. The local committee consists of Bill Abikoff, Ron Blei, Israel Koltracht, Miki Neumann, and Vadim. The conference dates in Storrs are Sunday, July 24 to Wednesday July 27. According to the conference Web pages, "The purpose of IWOTA 2005 is to bring together mathematicians and engineers interested in operator theory and its applications. Adhering to a tradition started at the last IWOTA meetings, the meeting will be focused on a few special themes, without losing sight of the general IWOTA mission. Our special interest areas are:

- operator theory and function theory,
- system theory and control theory,
- structured matrices and efficient computations.

Apart from these, we welcome proposals on special sessions, especially in traditional IWOTA areas. The list of plenary and semi-plenary speakers includes: Israel Gohberg, William Helton, Joseph Ball, A.Dijkstra, Nikolai Nikolski, Ilya Spitkovsky, Lev Sakhnovich, James Rovnyak," and several other distinguished researchers. "This IWOTA meeting will be the sixteenth in a series of highly successful IWOTA meetings. The previous IWOTA meetings were held in Santa Monica (1981), Rehovot (1983), Amsterdam (1985), Mesa AZ (1987), Rotterdam (1989), Sapporo (1991), Vienna (1993), Regensburg (1995), Bloomington (1995), Groningen (1998), Bordeaux (2000), Faro (2000), Blacksburg (2002), Cagliari (2003), and Newcastle (2004). The organizers of the present meeting intend to adhere to the high standards set by these previous meetings."

ANOTHER LOOK: OBI REJ

Abhijnan "Obi" Rej was the subject of an undergraduate profile in the 2003 edition of Math CONNections. Obi completed his undergraduate work that summer, earning several distinctions: He was a University Scholar, presenting a University Scholar thesis in Psychology; he was an Honors Scholar in Mathematics and wrote a Senior Honors thesis on the topic of Non-commutative Calculus; and he earned his bachelor's in Mathematics cum laude. (Perhaps the fact that he took only graduate courses in Psychology prevented him from satisfying the technical requirements for the BA in that department.) Obi continued with us as a graduate student in Mathematics and consulted at length with Physics professors Gerald Dunne (who has a joint appointment in Mathematics) and Juha Javanainen. In May 2005, he presented a thesis entitled " C^* -Algebra Approach to Quantum $SU(2)$ Groups," and a few days later received his Master's in Mathematics. During summer 2005 Obi is spending several weeks as a visitor at the Institute of Mathematical Sciences in Madras, India.

Obi's immediate future is very exciting. Officially, he is a post-Master's Ph.D. student in Mathematics at Boston University, which has awarded him a prestigious Presidential Fellowship. Professor Dirk Kreimer selected Obi to be his student. Kreimer typically spends the fall semester at BU, where he is Professor of Mathematics and founder/director of the Center for Mathematical Physics, and the spring semester outside Paris at the Institut des Hautes Etudes Scientifiques (IHES), where he is also a professor. It is anticipated that Obi's life the next few years will also be a tale of two cities.

As Kreimer's appointments suggest, he is an academic of considerable distinction. He has been a Clay Mathematics Institute Fellow at Harvard and a Heisenberg Fellow of the German Government, and is a long-time collaborator of Professor Alain Connes.

The work Obi expects to do under Kreimer's direction involves finding algebraic structures (Hopf algebras) in a certain class of theories of elementary particles ("renormalizable quantum field theories"). This area is interesting for both physical and mathematical reasons. Mathematically, it has intriguing links with algebraic geometry and topology, knot theory, and number theory; this is perfect for Obi, who thrives on exploring the links connecting different areas. Obi says his interest in Kreimer's work was sparked by a reading course he took with Gerald Dunne during spring 2004.

UCONN MATHEMATICS CLUB 2004-05

The Math Club continued to be active, under the leadership of Keith Conrad, faculty adviser, and student officers. In Fall 2004 the president was Scott D'Alessandri, the vice-president Chris Collin, and the treasurer Cheng Yu. In Spring 2005 Anton Backer was president, Brian D'Astous vice-president, and Sindhudweep Sarkar treasurer. Usually the club listened to talks aimed at a level that did not require a background beyond calculus and a little linear algebra, but we see from the titles that they ranged broadly and provided introductions to an excellent mathematical education.

| | | |
|----------|-------------------------------|---|
| Sept. 15 | Keith Conrad (UConn) | Irrationality of π |
| Sept. 22 | Sasha Teplyaev (UConn) | Analysis on fractals |
| Sept. 29 | Steve Conrad (Math Leagues) | Convergence tests made easy |
| Oct. 6 | Reed Solomon (UConn) | Goedel's Theorem |
| Oct. 13 | Chuck Vinsonhaler (UConn) | The Game of SET |
| Oct. 20 | Michael Korman (UConn) | Cryptographically Secure Electronic Voting |
| Oct. 27 | Jim Carlson (Clay Math Inst.) | The Mathematics of Google |
| Nov. 3 | Farshid Hajir (UMass) | What is the ABC Conjecture? |
| Nov. 10 | Steve Miller (Brown) | Benford's Law and Digit Bias: Applications from the Fibonacci Numbers to the $3x+1$ problem to the IRS |
| Nov. 17 | Lance Miller (UConn) | Error-correcting codes |
| Dec. 1 | Joe McKenna (UConn) | The Calculus of Variations |
| Dec. 8 | Ron Blei (UConn) | Independence |
| Jan. 26 | Keith Conrad | The Principle of Maximum Entropy |
| Feb. 2 | Rachel Schwell (UConn) | Knot Theory — What They Didn't Teach You in Boy Scouts |
| Feb. 9 | Sonal Jain (Harvard) | Continued Fractions |
| Feb. 16 | Alex Russell (UConn) | Some Highlights of Combinatorial Game Theory |
| Feb. 23 | Gerald Dunne (UConn) | Asymptotic Freedom: The 2004 Nobel Prize in Physics. What Is It and Why Should Mathematicians Care? |
| Mar. 2 | Jim Bridgeman (UConn) | Financial Math: Little Assumptions/Big Money |
| Mar. 16 | Rob Benedetto (Amherst) | An Introduction to Complex Dynamics |
| Mar. 23 | Peter Garrity (Columbia) | Math for America/Newton Fellowships |
| Mar. 30 | Rob Pollack (BU) | Prime Factorization and Solving Equations |
| Apr. 6 | Sarah Glaz (UConn) | The Mysterious Hexaflexagon |
| Apr. 13 | Max Lieblich (Brown) | The Infinitude of Prime Numbers |
| Apr. 20 | Brian Conrad (Michigan) | Impossibility of Integrating $e^{\sqrt{x}}$ in Elementary Terms |
| Apr. 27 | Bill Wickless (UConn) | The Mathematics of Rubik's Cube |

The schedule of talks for Fall 2005 is located at <http://www.math.uconn.edu/mathclub>.
Alumni and other friends of the Department are always welcome to attend.

MATH DAY 2005

The Department's annual Awards Day Ceremony was held on Thursday April 21 in conjunction with national Mathematics Awareness Month. After cookies and punch and opening remarks by University Provost Peter Nicholls and Dr. Anne Hiskes, Associate Professor of Philosophy and Associate Dean of the College of Liberal Arts and Sciences, various students were recognized for their achievements.

Freshman Calculus Achievement Award, presented by Bill Wickless:

Lyndsey Farris

The University of Connecticut Calculus Competition winners, presented by Stu Sidney:

Gregory Magoon - First over-all (for the third year)
Andrew Polonsky - Second over-all
Sy-Han Chiou - Third over-all and First Intermediate
Joshua Miller - Fourth over-all, Second Intermediate and First Beginner
Cheng Yu - Fifth over-all
Michael Eiben - Third Intermediate and Second Beginner
Sean Kurth - Fourth Intermediate
Avani Shah - Third Beginner

The CIGNA Awardees in Actuarial Science, presented by Dick London:

Christie Dietrich, Michael Dodge and Robert Folan

Pi Mu Epsilon honor society initiates, presented by Jerry Leibowitz:

Patricia Apruzzese, Ki-Hing Chan, Kanghyun Choi, Brian D'Astous,
Kathleen Doonan, Adam Gamzon, Michael Nehring, Doug Snyder,
James Stankiewicz, Erin Xama

Presentations by Manny Lerman:

The Louis J. DeLuca Memorial Award for Outstanding Teaching Assistant

Robert Wooster

The Connie Strange Graduate Community Service Award

Marc Corluy and Rachel Schwell

Congratulations to all of the awardees!

The Ceremony was followed by a very enjoyable invited address by **Dr. Allison Pacelli** of Williams College, who spoke on "Democracy in Action: Your Vote Doesn't Matter, But You Can Still Get Your Way".

DEPARTMENT WEB SITE REDESIGNED

Alan Stein

The Mathematics Department's Web site was completely redesigned this year, integrating the site much more fully with the database maintained by the department. Marc Corluy, one of our graduate students, redesigned the web site and Kevin Marinelli, our computer guru, redesigned the MySQL database. Readers of Math CONNections are invited to take a look at www.math.uconn.edu.

The site is now crisper and much more visually appealing and is easier to maintain, with much of the content generated from the greatly expanded database.

The web site contains general information along with areas devoted to academics (both graduate and undergraduate), research and resources. One special feature is a Mathematics Quote, by or about mathematicians, randomly generated from the database. And for anyone who has misplaced a recent copy of this newsletter, the last few issues are available online.

A new addition is a special area devoted to alumni, including updates on what your former classmates, undergraduate or graduate, are doing now. As this newsletter goes to press, we have posted information about Steve Cohen, Jacqueline (Madore) Corricelli, William Duggan, William Hesse, Niel Infante, Peter Johnson, Michael Jury, Cliff Lange, Tom Leibowitz, Robert T. Leo, Jr., Robert Lumia, Robert Makuch, Jeffrey Oberlander, David Pinchbeck, Haja-Nirina Razafinjatovo, Bob Studley, Dr. Fred Torcaso, James Walsh and Todd Whitney. There is a form you can fill out online to update your information, or you can contact the Department's Undergraduate Secretary, Arcelia Bettencourt (arcelia@math.uconn.edu).

The new site was made live at the beginning of the spring semester and the transition went amazingly smoothly. Naturally, there are always changes being made. If you have any suggestions for improving the site, please contact the Department Webmaster, Alan Stein, at webmaster@math.uconn.edu.

STU'S PUZZLE CORNER
Stuart Sidney

Dissection and recombination

A recurring theme in mathematics is the equivalence of point sets: When can one given point set be chopped up into finitely many pieces that can be reassembled to produce another given point set? The answer, of course, depends not only on the point sets but also on the geometrical setting: Euclidean plane, Euclidean 3-space, hyperbolic space, and so on. Our problems will all be situated in the Euclidean plane, but a bit of preliminary discussion will include Euclidean 3-space. The main result in the plane is the Wallace-Bolyai-Gerwien theorem (WBG). It is clear that if polygon A can be dissected into finitely many polygons that can be reassembled without overlap to produce polygon B (we say that the two polygons are equi-decomposable), then polygons A and B have the same area. WBG asserts the converse: If two plane polygons have the same area, then they are necessarily equi-decomposable. Wolfgang Bolyai posed this problem in the early nineteenth century and P. Gerwien solved it in 1833. It was later realized that William Wallace had proven it in 1807.

Whether an analogous result holds for polyhedra (more specifically, tetrahedra with the same base area and same altitude) in 3-space is the third of twenty-three famous problems presented by David Hilbert at the International Congress of Mathematicians in Paris in 1900. Shortly thereafter, M. Dehn constructed two such tetrahedra that were not equi-decomposable; most of Hilbert's problems have enjoyed a considerably longer life than did the third. ("The Honors Class: Hilbert's Problems and Their Solvers" by Benjamin Yandell is a wonderful recent book about the history of mathematics in the twentieth century.)

Very strange things happen if we do not insist that the pieces in a dissection be "regular" in some sense. The Banach-Tarski paradox asserts that a solid ball in 3-space can be dissected into finitely many disjoint pieces which can then be reassembled disjointly to produce two copies of the same ball! (Of course, these pieces are highly irregular; they are not measurable, and their existence requires transfinite methods.) S. Banach and A. Tarski proved in 1924 that six pieces suffice, and in 1947 R. M. Robinson improved their result by reducing the number six to five.

Back to polygons in the plane. WBG is an existence theorem. Its proof is not terribly hard, but still, there always remains the problem of practical implementation. Our problems ask you to find economical realizations of equi-decomposability. First, by a polygon we mean a simple closed polygonal curve together with the region it bounds; by a polygonal region we mean a finite union of non-overlapping polygons. WBG extends immediately to polygonal regions: two polygonal regions of the same area can be dissected into the same finite set of polygons. To eliminate wear and tear, let us agree that the notation $A \sim (n)B$ shall mean that the plane polygonal regions A and B are equi-decomposable, using a dissection into not more than n polygons.

Here are some problems for you to investigate.

- (a) Show that triangle \sim (2) parallelogram, that parallelogram \sim (2) rectangle, and that triangle \sim (3) rectangle. Here we mean that any triangle is equi-decomposable with some parallelogram, and so on.
- (b) Show that rectangle \sim (4) square, providing the rectangle's length is less than twice its width.
- (c) Show that if A is the union of disjoint squares of sides 3 and 4, and if B is a square of side 5, then $A \sim (4)B$.
- (d) Do the same if the square sides are 5, 12, 13; if they are 7, 24, 25.
- (e) What about square sides 8, 15, 17? Are four pieces enough?

You may be interested to know that equilateral triangles can be turned into squares, regular pentagons, and regular hexagons using 4, 6 and 5 pieces respectively, that squares can be turned into regular pentagons and regular hexagons using 6 and 5 pieces respectively, and that regular pentagons can be turned into regular hexagons using 7 pieces; fewer pieces may suffice in some of these cases. Play the equi-decomposability game with your favorite polygons!

Alumni, do keep in touch. Please offer suggestions or solutions via e-mail to: sidney@math.uconn.edu, or via surface mail to:

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LET US HEAR FROM YOU

The editors of Math CONNections welcome comments from our readers, especially alumni. Please send them to one of us by E-Mail or fill out this form and return it by mail or by FAX. (See the back page of this issue for the addresses.)

Name:

Years that you attended UConn:

E-Mail address:

Degree(s) and year(s) received:

Would you prefer to read the World Wide Web version of Math CONNections?

Your current affiliation:

Is your address correct on the label?

(If not, please include it with corrections.)

Your comments:

GIFTS

Contributions from current and former faculty and staff members and their families have endowed the prizes and awards mentioned in the Awards Day article: for outstanding performance by undergraduates on the Department's Calculus Competition and the Mathematical Association of America's Putnam Mathematics Competition, and the Louis J. De Luca and Constance Strange awards for outstanding teaching and service by our graduate students. We are also grateful for the continuing support of the actuarial science program in the form of scholarships underwritten by corporate friends of the University. Recently, we have begun a drive to establish two charitable funds at the University of Connecticut Foundation. One is the Mathematics Graduate Fund, a fund devoted to supporting, encouraging, and developing graduate education within the Department. It is anticipated that this fund will be used in many ways, such as full and partial fellowships; teaching and research awards; new student commitment awards; travel stipends; and conference registrations for our graduate students. The founders of the Mathematics Graduate Fund - Professors Lerman, Neumann, and Sidney - have already made significant monetary contributions and commitments, and they hope that they will be joined by other friends of the Department, including faculty, alumni, and other readers of Math CONNections. The second fund, the Dick London Fund, in honor of Richard London's seven years of service to actuarial education at UConn, has been established by Chuck Vinsonhaler and Louis Lombardi. Its goal is to provide scholarships for actuarial students at the University. Please contact Stu Sidney (sidney@math.uconn.edu) or Louis Lombardi (louisl@math.uconn.edu), respectively, for the details.

Math CONNectiions 2005

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