FACULTY PROFILE — GARY CORNELL, A TRUE MAN OF THE BOOK

Gary Cornell joined the UConn Mathematics Department in 1980, two years after receiving his Ph.D. from Brown University. In the years since, Gary has served the nation as a Program Director in Mathematics at the National Science Foundation while on leave from his teaching duties, and he continues to work for the NSF on a part-time basis. He has also spent leaves at the Thomas J. Watson Research Laboratories of IBM in Yorktown Heights, New York, and at the prestigious Mathematical Sciences Research Institute in Berkeley, California, and has held fellowships in France and Japan.

Anyone who sees Gary's office or visits his barn or garage in Storrs realizes at once that he is an enthusiastic collector of books. His passion for the printed word is also seen in his activities as translator, reviewer, editor and author. Gary edited the book review column in the periodical 'The Mathematical Intelligencer' from 1982 to 1986 and has continued as a consulting editor for Springer-Verlag ever since.

Gary's research interests are in algebraic number theory. This area of mathematics began with the study of solutions of polynomial equations with integer coefficients, moved on to try to understand prime factorizations in mathematical systems which have much in common with the integers, and gradually evolved into a complex web of interrelated abstractions. From 1979 to 1991, Gary published more than a dozen articles which deal with the class group (a detailed measure of the deviation from uniqueness of factorization). Together with Walter Kauffman-Buhler, Gary translated Scharlau and Opolka's book 'From Fermat to Minkowski: Lectures on the Theory of Numbers and Its Historical Development' (Springer Undergraduate Texts in Mathematics Series, 1985) from the German. Under Gary's leadership, our Department hosted a major conference in the summer of 1984, and 'Arithmetic Geometry: Papers from the conference held at the University of Connecticut, Storrs, Conn.' was published by Springer in 1986. A decade later, as the word spread in the community that abstract methods of algebraic number theory were converging on a proof of Fermat's conjecture, Gary and co-editor Joe Silverman (Brown) brought the leading thinkers together at their International Conference on Number Theory and Arithmetic Geometry (B.U., August 1995) ('Modular Forms and Fermat's Last Theorem,' Springer, 1997).

But if you were to mention Gary's name to a computer professional, you would probably get the response, "Isn't he the guy who wrote the Core Java books" [or the J++ books, or the Visual Basic books, or ....] Indeed, Gary's long interest in computer languages and his gift for writing have led to technical books on BASIC (beginning in 1984 with 'The BASIC Adam', written jointly with UConn's Bill Abikoff), Delphi, Visual BASIC for Windows, and programming in Java (for the Web) as well as guides such as his 'Brief Lotus for Windows 4.0' and 'Teach Yourself Word for Windows.' Gary has written or co-authored some thirty books on computing (closer to 40 if revisions are included). Under UConn auspices, he has given courses for programmers and analysts, and during his current extended leave from the Department he has been in demand to hold intensive in-service workshops on the latest refinements in programming languages. Although Gary is preparing to retire because of medical problems, he continues an active life of lecturing, writing and revising.

MATHEMATICS POSTDOCTORAL PROGRAM, 2001-02

In its third year, the post-doctoral program continued to mature.

The senior members of the cohort, Sudeb Mitra (complex analysis: quasiconformal mappings, Riemann surfaces and Teichmüller spaces) and Kevin Wald (mathematical logic and computability theory) had productive third years, while second year fellows Gueo Grantcharov (differential geometry) and Nic Ormes (minimal homeomorphisms and applications to matrix theory) had active research and teaching agendas. Seminars included a series of four differential geometry presentations by Gueo on "Moment Maps and Reductions of Geometric Structures " and Sudeb's geometric analysis talks in November on "Kobayashi Metric and Holomorphic Motions" and "Teichmüller Contraction."

Yonghoi Koo decided to resign after spending Spring 2001 in the Department, and Cat McCune took Spring 2002 off for personal reasons.

New post-docs as of Fall 2001 were Assaf Goldberger (PhD 2000, The Hebrew University, number theory and modular forms), Yasar Sozen (PhD 2000, University of Southern California, low dimensional geometry and topology, Teichmüller spaces of surfaces) and Alexander Stokolos (PhD 1998, Wroclaw University, real analysis: especially maximal functions and convergence of integral means). All three gave talks on their research: Stokolos , analysis seminar "On Weak Type Inequalities for Rare Maximal Functions" in October; Sozen, geometric analysis seminar on "Transverse Cocycles and Geodesic Hölder Currents" in November; and Goldberger, algebra seminars on "Modular Symbols and p-adic L-functions of Elliptic Curves" in November and December.

The Department conducted an extensive search in 2001-2002 and expects to progress toward its eventual target of ten post-docs in the near future.

FACULTY VISITORS

Thomas Hoover, University of Hawaii, analysis, spent Fall 2001 with us. On October 25, Tom gave a colloquium on "What are Toeplitz Operators and Why Don't They Commute?"

Terry Lyons, Wallis Professor at Oxford University, probability and analysis, worked with Rich Bass in September 2001.

Eggert Briem, University of Iceland, analysis, worked with Stu Sidney in October/November 2001. He gave an Analysis and Probability seminar on the topic of functions which operate (by composition) on the real parts of complex function algebras on locally compact spaces. Eggert, Stu, and Osamu Hatori are writing a book on an extended version of this subject.

Rafal Latala, University of Warsaw (Poland), probability theory, who will be a speaker at the International Congress of Mathematicians in China in summer 2002, visited UConn in Fall 2001, teaching probability and calculus courses. He also gave a seminar and on October 11 he gave a colloquium talk entitled "On Some Inequalities for Gaussian Measures."

Eustacio del Barrio, University of Valladolid (Spain), mathematical statistics, visited in Spring 2002, taught probability and calculus and also gave a seminar on April 12 on "Tests Of Fit Based On Wasserstein's Distance." Both Latala and del Barrio worked with Evarist Giné on projects of mutual interest.

Giné also hosted these short term visitors: David M. Mason, University of Delaware (October 2001); Joel Zinn, Texas A&M (December 2001); and Vladimir Koltchinskii, U. of New Mexico (January 2002).

Under the auspices of Wolodymyr Madych, Professor Yurii Lyubarskii of the Norwegian Technical University (Trondheim) visited us in April 2002. Yurii delivered eight lectures on "Entire Functions and Sampling Theory." [The general subject areas of the lectures were complex variables, functional analysis (Riesz bases, frames), and mathematical signal processing theory (reconstructing entire functions from discrete samples), areas to which Wally has made significant contributions.]

MISCELLANEOUS NEWS

In July 2001, Chancellor Petersen announced that four University faculty members had been chosen for the Chancellor's Research and Excellence Awards. We were especially pleased that two were mathematicians, Richard Bass and Patrick Joseph McKenna. On Thursday, November 15, the Department celebrated with a special dual colloquium at which Rich spoke for 30 minutes about one area of mathematical research to which he has made many contributions and Joe gave a half hour overview of the development of the problems with which he has tangled. The awards were formally presented at the graduate commencement on May 19, 2002.

Carol Roberts, who had served for several years as a departmental secretary, retired in Fall 2001. We will miss her smile and good advice.

Professors Jim Schmerl (mathematical logic and combinatorics) and Bill Wickless (algebra) took many of us by surprise by deciding to retire in June 2002. We anticipate that they will continue to work on their research and make good use of their departmental computer accounts, but we doubt that either will volunteer to assist in the mass grading of exams.

Domina Eberle Spencer, Professor of Mathematics, completed her 52nd year of service on the UConn faculty. She continues to have a full teaching load and to conduct a weekly seminar on the foundations of mathematical physics. Domina was one of the mathematicians profiled in the recent book *Women Becoming Mathematicians: Creating a Professional Identity in Post-World War II America* by Margaret A. M. Murray (MIT Press, 2000).

THE MATHEMATICS SCHOLAR PROGRAM

Each semester, starting in the Fall of 1996 and except for Fall 2000, the UConn Mathematics Department has offered one special course for some of our most talented undergraduate students under the auspices of the Mathematics Scholar Program. The intention of the program is to challenge and inspire these students with mathematics at a more sophisticated level than they would normally encounter in their curricular studies, and to provide a setting in which they benefit from a shared mathematical enterprise.

The program, which was the inspiration of Manny Lerman and Gene Spiegel, has been directed from its inception by them and Stu Sidney and more recently by Changfeng Gui as well.

Since Jim Schmerl taught the first Program course on combinatorics the variety of subjects has been impressive: numerical analysis, topology, probability, computability, number theory, mathematical modeling, chaos and dynamical systems, and a less categorizable course on great problems and the mathematics used to solve them. There have been a few repeats: Schmerl on combinatorics (Fall 1996 and Fall 2001), Miki Neumann on numerical analysis (Spring 1997 and Spring 2002), and Sidney on great problems (Spring 1998 and coming in Fall 2002). Of course, the same or similar subjects need not mean the same material. Furthermore, those Mathematics Scholar courses whose subjects are already offered by the department are at a minimum enriched versions of the standard offerings.

Enrollment in Mathematics Scholar courses is generally by invitation, and class sizes are small – so far they have ranged from two to seven. Students can expect lots of individual attention. Generally speaking, students and faculty have had good experiences in Mathematics Scholar courses.

The Mathematics Department recognizes those students who have taken a certain number of Mathematics Scholar courses by awarding them the designation "Mathematics Scholar" and presents them a certificate announcing this status. Unfortunately, because of their heavy programs and time conflicts, very few students actually take more than one or two of the courses. Most of the students who take the courses do so out of interest in the topics and because they enjoy the challenge, and the faculty members teaching them welcome the stimulation of going far beyond the routine.

MATH DAY 2002

Continuing a tradition of several years, the Department celebrated Mathematics Awareness Month in April and held its annual Awards Day on Tuesday, April 23.

As in previous years, Ioanna Mavrea papered the walls of MSB with posters bearing tantalizing puzzle problems, and all UConn undergraduates and non-mathematics graduate students were eligible to try their hands at solving the problems and compete for cash prizes offered by the Department. After a couple of weeks with no replies, Ioanna was pleased to see a large number of student submissions in time for Awards Day, and she identified the work of the following students for recognition on Math Day. Math Magic Problem: Kyle Misiaszek, Colin Li, Jonathan Lynn; Omelet Problem: Junfeng Liu, Kyle Misiaszek, Jeroen Thompson; Splitting the Heads: Brent Evans, Phil Gee, Rob Lozyniak, Jonathan Lynn, Jeroen Thompson.

For readers who enjoy challenging questions here's the Math Magic problem: Ioanna asks Rachel to select any five cards from a standard deck. Rachel does so and hands the cards to Ioanna's assistant Jonathan. Jonathan returns one of the five cards back to Rachel and arranges the rest of the cards on the table. Ioanna examines the four cards arranged on the table and then reveals the identity of the fifth hidden card. How do Ioanna and Jonathan do it? All of the problems from the 2001 and 2002 competitions can be viewed online at http://www.math.uconn.edu/ mathday.

As another Math Month activity, students Eric Dutko (CS&E) and Emily Slater (Math) exhibited a poster "The Topology of Substitution Tiling Spaces – Sphinx vs. Triomino," reporting on their project under Nic Ormes's supervision.

At the awards ceremony, undergraduate students were recognized for scholarly achievements and graduate students for teaching and service. The CIGNA Award for the Outstanding Actuarial Science Major was presented jointly to Michael Donovan and Hugh Lakshman. Winners in the Department's CALCULUS COMPETITION were Robert Folan (in the Beginner category), Huawei Li (Intermediate), and Steven Boyden, Ronald Pepino and Matthew Wilson (Overall). David Johnson won an award for Noteworthy Performance on the WILLIAM LOWELL PUTNAM MATHEMATICS COMPETITION (December 2001), and this year's MATHEMATICS SCHOLAR was Matthew David Costa. Six of our students, Cassie Becce (Educ/Math), Spencer Carini (Math/Stat), Mark Koudstaal (Physics/Math), Ankur Patel (Math), Deborah Spitzer (Actuarial Sci), and Christine Toth (Pre-Teaching/Math-Stat), were initiated into the Alpha of Connecticut chapter of PI MU EPSILON, the national mathematics honor society. The winner of the LOUIS J. DE LUCA MEMORIAL AWARD for Outstanding Teaching by graduate students was Christina Brewer, and the CONSTANCE STRANGE AWARD for community service by graduate students was shared by Jonathan Keiter and Jianhong Xu.

Each year, Math Awards Day is capped off with a lecture on an interesting topic accessible to undergraduates. The Pi Mu Epsilon Colloquium speaker in 2002 was Rick Cleary of Bentley College in Waltham, MA. Only a week after he participated in his 24th Boston Marathon, Rick spoke on "Models for the Qualification Process."

ALUMNI NEWS

Jacqueline (Madore) Corricelli (BA, 2000) was married in 2001. Jacqui is a systems engineer at Raytheon Corp. in Massachusetts. **William Duggan** (Statistics PhD, 1999) is at Pfizer in southeastern Connecticut. Noah Mason Leibowitz was born on March 14, 2002. His parents, UConn grads **Neal M.** (FCAS) and **Brenda Jean Leibowitz** (FSA) are actuaries at The Hartford. **Robert Lumia** (BS, 1991), who became an FSA in 2000, is a consulting actuary at Milliman USA in Windsor, Connecticut. Rob was kind enough to speak to some of our classes this year about issues of actuarial practice. **Jeffrey Oberlander** (BS, 1988) is a CPA in Louisiana. **David Pinchbeck** (Mathematics PhD, 1996) is on the faculty of Saint Joseph's College in Standish, Maine. And **Todd Whitney** (BA, 1984) is an actuary at Well Care HMO, Inc.

STU's PUZZLE CORNER

Polynomials and primes ...

Recently, an old friend at another institution told me about an interesting result obtained by one of his colleagues. It turns out that it is quite elementary and not too difficult, and I thought it could be the basis for a nice problem for the readers of MathCONNections. Part (a) is both a strengthening and a weakening of a famous theorem of Dirichlet from 1837 that *is* difficult: If a and b are natural numbers that are relatively prime (that is, have no common factor greater than 1), then the arithmetic progression

$$a, a+b, a+2b, a+3b, \ldots$$

contains infinitely many primes. We can think of this arithmetic progression as the set of values of the linear polynomial $\ell(x) = a - b + bx$ for natural number values of the variable. The result in our problem (below) will *strengthen* Dirichlet's theorem by permitting non-constant polynomials of *any* degree with integer coefficients. It will *weaken* Dirichlet's theorem by asserting existence of infinitely many primes that *divide* values of the polynomial, but are not necessarily themselves such values. I am told that the discoverers of the result have both an elementary proof and a topological one, but I have no idea what the topological one might be, so I will particularly welcome your finding and communicating one. Part (b) invites you to quantify the result of part (a), and is considerably more difficult. Part (c) is open-ended, requesting any sort of improvement you can devise to the result of part (b).

Please offer suggestions or solutions *via* e-mail to:

sidney@math.uconn.edu,

or *via* surface mail to:

Stuart Sidney
Department of Mathematics, Unit 3009
University of Connecticut
Storrs, CT 06269-3009

We plan to publish the first correct solution submitted in the next issue of this newsletter.
(Folks haven't been submitting solutions to past problems. Let's start a new tradition with this one!)

The problem. Let $F(x)$ be a nonconstant polynomial with integer coefficients.

(a) Show that the set of all prime numbers that divide $F(j)$ for at least one natural number j for which $F(j)$ is not zero is infinite.

(b) Show that there is a natural number C such that, if k is any natural number, at least $k+1$ primes are among the divisors of the nonzero numbers $F(j)$ for $j = 1, \ldots, (Ck)^{2k}$.

(c) In part (b), can you replace $(Ck)^{2k}$ by something of a smaller order of magnitude?