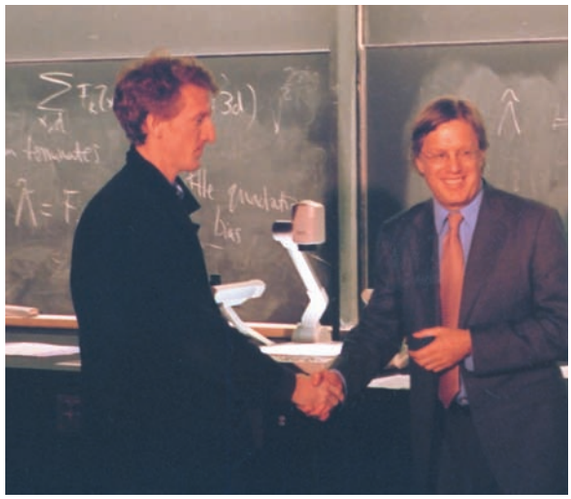
The 2004 Clay Research Awards

Ben Green



Jim Carlson congratulates Ben Green. © 2004 Mark Germann.

The aim of the Clay Research Awards is to recognize contemporary mathematical breakthroughs. This year the awardees were Ben Green (Trinity College, Cambridge), Gérard Laumon, and Bao Châu Ngô (both at the Université de Paris Sud, Orsay).

Ben Green was recognized for his joint work with Terry Tao on arithmetic progressions of prime numbers. These are equally spaced sequences of primes such as 31, 37, 43 or 13, 43, 73, 103. Results in the area go back to the work of Lagrange and Waring in the 1770s. A breakthrough came in 1939 when the Dutch mathematician Johannes van der Corput showed that there are an infinite number of three-term arithmetic progressions of primes. Green and Tao showed that for any n, there are infinitely many n-term progressions of primes. Their proof, which relies on results of Szemerédi (1975) and Goldston and Yildirim (2003), uses ideas from combinatorics, ergodic theory, and the theory of pseudorandom numbers. The Green-Tao result is a major advance in our understanding of primes.

Gérard Laumon

Bao-Châu Ngô

Gérard Laumon and Bao-Châu Ngô were recognized for their proof of the Fundamental Lemma for unitary groups. The lemma, which has been a major obstacle to progress in the Langlands program, is a conjectured identity relating orbital integrals of one group to another. In the case of Laumon and Ngô's these are the unitary groups $U(n)$ and $U(p)xU(q)$, where $p + q = n$. Combined with the Arthur-Selberg trace formula, the fundamental lemma enables one to prove relations between automorphic forms on different groups and is a key step toward proving links between Galois representations and certain automorphic forms. This is one of the aims of the Langlands program, which seeks a far-reaching unification of number theory and representation theory.

The result of Laumon and Ngô uses the equivariant cohomology approach introduced by Goresky, Kottwitz, and MacPherson, who proved the lemma in the split and equal valuation case. The proof for the unitary case, which is significant for applications, requires many new ideas, including Laumon's deformation strategy and Ngô's purity result (based on a geometric interpretation of the endoscopy theory of Langlands and Kottwitz in terms of the Hitchin fibration).

Ben Green was named a Clay Research Fellow for a term of two years. Laumon and Ngô were named Clay Research Scholars for a period of one year. Each received a bronze replica of the CMI icon by sculptor Helaman Ferguson. Former recipients of the Clay Research Award are Andrew Wiles, Laurent Lafforgue, Alain Connes, Stanislav Smirnov, Edward Witten, Oded Schramm, Manindra Agrawal, Richard Hamilton, and Terence Tao.

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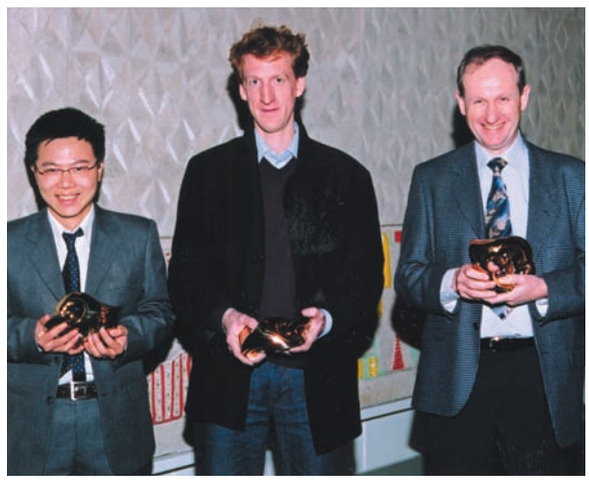


Bao Châo Ngô, Ben Green and Gérard Laumon holding their Clay Research Awards, bronze replicas of the CMI icon. © 2004 Mark Germann.

2004 Clay Research Awards - continued

Ben Green

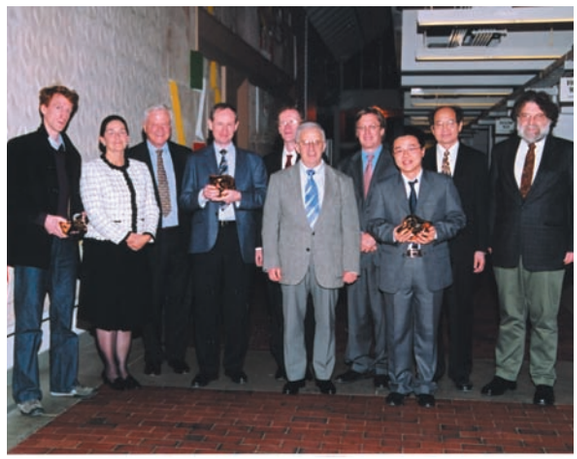
Ben Green was born in 1977 in Bristol, England, and educated at Trinity College, Cambridge, first as an undergraduate and later as a research student of Fields Medalist Tim Gowers. Since 2001 he has been a Fellow of Trinity College, and in that time he has made extended research visits to Princeton, the Rényi Institute in Budapest, the University of British Columbia, and the Pacific Institute of Mathematics (PIMS), where he was a postdoctoral fellow. In February 2005 Green was named a Clay Research Fellow. In January 2005, he took up a Chair in Pure Mathematics at the University of Bristol. He will begin his appointment as a Clay Research Fellow in July.

Gérard Laumon

Gérard Laumon, born in 1952, received his Thèse d'État from the Université de Paris-Sud, Orsay, in 1983 under the supervision of Luc Illusie, his Directeur de Recherche. In 1987 Laumon was awarded the Silver Medal of the CNRS. In 1992 he received the E. Dechelle Prize of the French Academy of Sciences.

Bao-Châu Ngô

Bao-Châu Ngô, born in 1972 in Hanoi, Vietnam, received his Ph.D. at the Université de Paris-Sud, Orsay, in 1997 under the direction of professor Gérard Laumon. He has held visiting positions at the Max Planck Institute in Bonn, the universities of Toronto, Sydney, and Chicago, and the Institut des Hautes Études Scientifiques (IHES). He has held a CNRS position at the Université de Paris 13 since 1998, and he assumed a professorship at the Université de Paris-Sud in the fall of 2004.



Recipients of the Clay Research Award with Mr. and Mrs. Clay and the Scientific Advisory Board on the occasion of the 2004 Annual Meeting at Harvard University. © 2004 Mark Germann.

CMI Announces Charitable Annuity Program

For retired mathematicians and others wishing to support its mission, CMI now offers charitable gift annuities. A donor of cash or marketable securities can receive an income stream measured by one or two lives, as well as a charitable donation. CMI currently uses annuity rates recommended by the American Council on Gift Annuities.

For more information, please contact Eric G. Woodbury, Esq., Chief Administrative Officer of CMI. Current single life annuity rates are illustrated in the table below.

AGE	ANNUITY RATE
60	5.7%
65	6.0
70	6.5
75	7.1
80	8.0
85	9.5