

About the Lecture *continued*

Mathematics. Remarkably, this question cannot be solved on the basis of the basic principles (these are the ZFC axioms) on which the entire subject is based. This discovery of Cohen, 50 years ago this summer, is arguably one of the major discoveries in the history of modern Mathematics.

But does this mean that the question of the Continuum Hypothesis has no answer? Any “solution” must involve the adoption of new principles but which principles should one adopt? Alternatively, perhaps the correct assessment of Cohen’s discovery is that the entire enterprise of the mathematical study of Infinity is ultimately doomed because the entire subject is simply a human fiction without any true foundation. In this case, any “solution” to the Continuum Hypothesis is just an arbitrary (human) choice.

Over the last few years a scenario has emerged by which with the addition of a single new principle not only can the problem of the Continuum Hypothesis be resolved, but so can all of the other problems which Cohen’s method has been used to show are also unsolvable (and there have been many such problems). Moreover the extension of the basic (ZFC) principles by this new principle would be seen as an absolutely compelling option based on the fundamental intuitions on which the entire mathematical conception of Infinity is founded.

However, this scenario critically depends upon the outcome of a single conjecture. If this conjecture is false then the entire approach, which is the culmination of nearly 50 years of research, fails or at the very least has to be significantly revised. Thus the mathematical study of Infinity has arguably reached a tipping point. But which way will it tip?

MATHEMATICS

UASCIENCE

Members of the department create, communicate, and apply mathematics of the highest caliber through activities such as internationally recognized research and graduate education, award winning undergraduate programs, and extensive outreach to local schools.

The department’s faculty includes two Regents’ Professors, three University Distinguished Professors, and numerous recipients of national and international awards. Over the last five years, a large percentage of the faculty has been awarded grants and contracts from external funding agencies, with total awards averaging about \$5 million per year.

The department offers PhD, MS, and MA programs in Mathematics and Mathematics Education, and it provides major contributions to the Graduate Interdisciplinary Degree Programs in Applied Mathematics and Statistics. It also offers several unique post-doctoral opportunities for recent PhDs planning careers in research and education.

At the undergraduate level, the department provides more than 46,000 credit hours of instruction per year and offers its more than 500 majors unparalleled opportunities for research, tutoring experiences, and internships. The undergraduate, graduate, and GIDP programs have recently been recognized with two 5-year, \$3.5 million VIGRE training grants from the National Science Foundation, a distinction very few programs in the country can match.

The department has a long and excellent tradition of outreach to schools in Tucson, ranging from programs supporting high school teachers to a research center focusing on improving the mathematics education of low-income Latino students.

Through the breadth and quality of its programs, the Department of Mathematics makes major contributions to the mission of the University of Arizona and to the quality of life in Tucson and beyond.

Daniel Madden
Professor of Mathematics
Interim Department Head

DANIEL BARTLETT
MEMORIAL LECTURE 2013

HUGH WOODIN



OCTOBER 28, 2013
6:30 PM
MODERN LANGUAGES 350
THE UNIVERSITY OF ARIZONA
1423 E. UNIVERSITY BLVD.



ABOUT HUGH WOODIN



Born in Tucson, Arizona, Woodin earned his Ph.D. from the University of California, Berkeley in 1984 under Robert M. Solovay. His dissertation title was Discontinuous Homomorphisms of $C(\Omega)$ and Set Theory.

He served as chair of the Berkeley mathematics department for the 2002-2003 academic year. Woodin is a managing editor of the Journal of Mathematical Logic. He was elected a Fellow of the American Academy of Arts and Sciences in 2000.

ABOUT THE LECTURE “The Infinite Far Beyond”

The modern mathematical study of Infinity began with Cantor’s discovery in the late 1800s that there are different sizes of Infinity and this immediately led to Cantor’s formulation of the Continuum Hypothesis. This is the hypothesis that the cardinalities of the sets defined by the two most basic conceptions of Mathematics, that of the counting numbers and that of the real numbers, represent consecutive sizes of infinity.

By middle of the 20th century the problem of the Continuum Hypothesis was widely regarded as one of the prominent problems in all of

ABOUT DANIEL BARTLETT



Daniel Wezelman Bartlett was born November 8, 1980. He died of sudden cardiac arrest on August 8, 2006, just before commencing his fourth year of graduate school in mathematics at The University of Arizona. He was a wonderful and loving son to his parents, a close companion to his younger sister, and fierce friend for many.

Daniel was born with physical impairments, but that didn’t stop him from enjoying life. He played piano, trumpet, and shofar; he was a chess player; and he was an academic athlete, winning scholarships and contests for Academic Decathlon, economics, and the annual Shakespere monologue competition (he loved portraying Iago). He was a proud leader in his B’rith Youth Organization.

Daniel’s academic interests were not restricted to mathematics. As a junior in high school he was selected for the Telluride Association Summer Program at Cornell, an intense program in the humanities.

He graduated from University High School in Tucson both as a Presidential Scholar and a National Merit Scholarship winner.

Daniel Bartlett *continued*

Daniel loved mathematics and excelled at it all his life. He went to Harvard for his undergraduate work, concentration in mathematics, where his undergraduate advisor was Barry Mazur. While an undergraduate, he worked one summer at The University of Arizona Astronomy Department and another summer at the National Security Administration, where he co-authored a classified paper. He received his BA degree in 2003.

While studying for his PhD at The University of Arizona, Daniel had narrowed his research interest to the field of algebraic geometry, and at the time of his death he was beginning the work he hoped to use for his doctoral dissertation.

DANIEL BARTLETT MEMORIAL FUND

Generous contributions by Daniel’s family and friends have made it possible to establish this fund, whose purposes are to memorialize Daniel Bartlett, to foster awareness and appreciation of mathematics of the highest level in the Tucson community, and to support graduate education in Mathematics at The University of Arizona.

The inaugural Daniel Bartlett Memorial Lecture was given in 2008 by Barry Mazur, Gerhard Gade University Professor, Harvard University.

2012: Dr. Robert L. Devaney, Boston University
2013 President of the Mathematical Association of America and Director of the NSF’s Dynamical System and Technology Project.