

## ABOUT the Lecture

### Democracy in num3rs:

#### *A Tale of Two Elections*

In 2015 alone, more than half a billion votes were cast in one hundred national elections around the world. A large number of those elections were hotly contested, leading to mass violence and significant numbers of fatalities amidst claims of ballot rigging. The growing field of 'election forensics' seeks to develop quantitative tools that can be used to investigate the integrity of the electoral process, and particularly the plausibility of election results. These techniques can be effective for detecting the most obvious types of voting irregularities and fraudulent manipulations, particularly when statistical analyses are supplemented by other types of evidence, including reports from observer missions, election watch NGOs, and journalists. On the academic side, efforts are underway to improve the reliability of these techniques and bring sophisticated analytic methods to bear on the complex interplay between human and technological factors that can influence an election.

This talk is an introduction to the mathematics and statistics of election forensics. As a practical application it will focus on the analysis of Senegal's 2000 and 2007 presidential races, and its use in securing the 2012 election. However, other countries and elections will be discussed as well.

[math.arizona.edu/outreach/Bartlett\\_lecture](http://math.arizona.edu/outreach/Bartlett_lecture)



THE UNIVERSITY OF ARIZONA  
COLLEGE OF SCIENCE

Mathematics

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 70,000 credit hours of instruction per year and offers its more than 600 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.

Ken McLaughlin, Professor and Head  
The University of Arizona Department of Mathematics

# MATHEMATICS

## Democracy in num3rs:

### *A Tale of Two Elections*

**Momar Dieng**

2016

**DANIEL BARTLETT  
MEMORIAL LECTURE**

Monday, April 18, 2016

6:30pm – UA Campus

Gallagher Theater

Student Union Memorial Center

1303 E. University Blvd.



THE UNIVERSITY  
OF ARIZONA

## ABOUT Momar Dieng



Momar Dieng is the senior technical and policy advisor to Senegal's Minister of Education. He spearheads the ministry's reform agenda, which is designed to deliver better

educational outcomes for more than 3 million students across the country.

A mathematician by training, and a global expert on educational and economic issues in developing countries, he has served as visiting faculty and lecturer in the Department of Mathematics at the University of Arizona—and in the mid-career Master's of Public Administration program at the Harvard Kennedy School of Government.

Momar's primary interest is in using multidisciplinary approaches to identify and address development challenges in sub-Saharan Africa. This includes promoting good governance through the use of statistical and computational techniques to detect and prevent election fraud. It also involves designing and implementing human-centered, technology-driven projects to improve education and health outcomes, and reduce youth unemployment.

Momar earned his Ph.D. in Mathematics from the University of California at Davis, and studied development economics and public administration at the Harvard Kennedy School of Government.

## 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 Shakespeare 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 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.