

Publisher's Editorial

The Doug Faires Award for 2018

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Introduction

COMAP is proud to announce the winner of the third annual Doug Faires Award, **Anne Dougherty of the University of Colorado Boulder.**



The purpose of the award is to encourage and recognize efforts to start modeling teams at both the high school and college levels. We dedicate this award to Doug Faires, who provided us with the perfect example of the goals we wish to attain.

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About Doug Faires

During his tenure at Youngstown State, Doug was the recipient of numerous awards, including the Outstanding College University Teacher of Mathematics by the Ohio Section of the Mathematical Association of America and five Distinguished Faculty awards from Youngstown State University, which also awarded him an Honorary Doctor of Science in 2006.

For nearly two decades, he was a member of the council of Pi Mu Epsilon National Mathematics Honorary Society, including a term as president. In addition, he was awarded the MacDuffee Award by Pi Mu Epsilon for lifetime service in 2005. Doug was a Co-Director of Examinations for the American Mathematics Competitions for 8 years and has been a long-term judge for the COMAP Interdisciplinary Contest in Modeling (ICM)TM. He authored or co-authored more than 20 books, including 10 editions of the classic *Numerical Analysis* (Cengage Learning, 2015).

A tireless champion of undergraduate research in mathematics, Doug was a driving force behind the establishment in 2006 of the Center for Undergraduate Research in Mathematics at Youngstown State. Doug had served earlier as a Faculty Advisor for the Mathematical Contest in Modeling (MCM)TM. He gave talks to local high schools, inviting them to form modeling teams to compete in the HiMCMTM (COMAP's high school modeling contest). He recruited and mentored high school faculty advisors and invited the advisors and their teams to Youngstown State, where the teams met one another, and the experienced members of the college teams mentored the high school students. Long-term bonds were formed, and each year college and high school teams were encouraged to participate in the modeling contests. Later, Doug served as a Final Judge for the Mathematical Contest in Modeling, where he again was a true leader.

2018 Winner: Anne Dougherty

Her Background

Anne Dougherty earned her Ph.D. from the Dept. of Mathematics at the University of Wisconsin in Madison in 1994. Anne started as an instructor in the Dept. of Applied Mathematics at the University of Colorado Boulder (CU Boulder) in August 1994. She was promoted to Senior Instructor (in 1998) and currently serves as the department's Associate Chair. In this capacity, Anne is involved with many aspects of the department, including scheduling of courses, recruiting and advising of students, and helping to create a new degree in Statistics and Data Science.

Anne particularly enjoys working with undergraduate students, watching them grow and develop throughout their academic career. She was recently designated as a CU Teaching Professor and is the recipient of sev-

eral teaching awards including the 2014 Burton W. Jones Award for Distinguished College or University Teaching of Mathematics, awarded by the Rocky Mountain Section of the Mathematical Association of America. Anne also holds the J.R. Woodhull/Logicon Teaching Professor of Applied Mathematics endowed chair.

Anne has taught courses in calculus, differential equations, linear algebra, analysis, and probability and statistics. She genuinely enjoys teaching mathematics and tries to instill in each student the motivation and the desire to think for themselves. Anne has been working with MCM/ICM teams at CU Boulder since 1997. Together with faculty members Bengt Fornberg and Manuel Lladser and Engineering Honors Program Director Scot Douglass, Anne works to recruit and train contest participants. CU Boulder has had 15–20 teams in each of the past three years!

Anne and her colleagues believe that the key to success is to take talented, creative, and motivated students and give them challenging coursework and training. And the MCM/ICM is an excellent vehicle for students to demonstrate their mathematical, computational, and communication skills.

My Experiences with the MCM/ICM

I am honored to receive this year's Doug Faires Award. For more than 20 years, I have been a strong advocate for student participation in the MCM/ICM at the University of Colorado Boulder. Over the years, first Prof. Bengt Fornberg, and then Prof. Manuel Lladser, have joined the effort of recruiting and training our teams. Prof. Scot Douglass, the Director of the Engineering Honors Program, has also been instrumental in recruiting additional students, from a variety of majors, to participate. In the past few years, we have gone from a steady state of 3–5 teams per year to 15 teams or more. And, participation in the contest has been a great learning experience for everyone.

When I first arrived at the University of Colorado Boulder in 1994 as a new faculty member, the informal mission statement for the undergraduate applied math degree was to graduate students with well-developed "mathematical skills, computational skills, and communication skills." This goal resonated with my own feelings about a mathematical education. Most of our undergraduate students were planning to enter the working world after graduation. They would be best served by a strong, multi-faceted education that prepared them with the analytical tools needed for a variety of careers. The faculty in the Applied Mathematics Dept. also worked hard to provide research experiences for its undergraduate students. When I learned about the MCM/ICM, I thought that this would be a perfect venue for our students to showcase their mathematical, computational, and communication skills. The MCM/ICM is also an intense, compressed research project: Students select a problem, research its history,

create a mathematical and then a numerical model, analyze the sensitivity of their results, and then prepare a written report. All in just four days!

I recruited our first two teams in 1997. With no experience of my own, I read everything I could find on the contest to try to prepare them. That first year, we had just five students participate, and both teams achieved a Meritorious ranking. I was thrilled, and the students remarked on what an intense experience it was: Very rarely does one have the opportunity to focus intensely and deeply on one problem.

Over the years, most of our teams have found their participation in the MCM/ICM to be both challenging and rewarding. It has become easier to recruit teams as we now have a “tradition”; and some teams participate for two, three, and sometimes all four years of their undergraduate education.

We try to have four to six training sessions each year in advance of the MCM/ICM. The first session is usually devoted to talking about the contest, hearing from prior participants about their experiences, and going over the rules. Over the rest of the sessions, we talk about mundane details (where each team will work and eat), discuss contest tips (someone on each team should start writing as early as possible, preferably Friday morning), and go over ideas for modeling and using various software packages. At each session, I try to get the teams to discuss one former problem and think about how they might have approached it. It’s always great to hear how many ideas the team can generate in just 15 minutes.

I think that one of the reasons why the contest has thrived is its collaborative nature. Students really enjoy the ability to work with two other teammates, and the result is usually superior to what would have resulted from three students each working alone.

My hope for the contest is that more U.S. teams will participate. Some of our original student participants are now faculty members at other schools and have begun to recruit and train their own teams. I think this is wonderful. While I believe CU has many outstanding and talented students, and that we give them exceptional training, the same can be said for many other colleges and universities. The spirit of the MCM/ICM resonates with my own beliefs on what constitutes a strong undergraduate applied mathematics education, and I would love to see more participants from across the U.S. and the world.