What Can I Do with a Math Degree?

By Carla D. Martin

"What do people do with a math degree?" In today's business climate, we need to have answers beyond the usual "go to graduate school or teach." Some answers may be found at the MAA careers website at http://www.maa.org/careers and at a similar AMS website at http://www.ams.org/early-careers. Both contain profiles of mathematicians in bachelors-level positions. The books *101 Careers in Mathematics* by Andrew Sterrett and *She Does Math* by Marla Parker (both published by MAA) also feature profiles of mathematicians in industry.

As educators, we should be aware of non-academic careers in order to encourage more students who wouldn't otherwise pursue mathematics. I *was* this student — the one who almost didn't major in mathematics because of concerns about finding a job after college. To my surprise, there were several career choices available to me. During my stint between undergraduate and graduate school, I accepted a consulting job with IBM Global Business Services, where seemingly they couldn't hire enough people with math degrees. The quantitative reasoning skills that math majors possess are invaluable.

As a consultant, I took on many different projects all of which used my quantitative and logical reasoning skills. Here are just four examples — all of which involved undergraduate-level mathematics.

The Department of State needed to calculate the value of land owned and leased by the U.S. worldwide to prepare for their upcoming audit. Unfortunately, their data quality was poor due to outdated information and changing economies/currencies in many countries. We developed a model to estimate missing or invalid values and calculate the cost adjusted for inflation/deflation. Land values of developing countries with little to no data were estimated based on statistics for that country (mortality rate, GDP, literacy rate, etc.). The results and model were presented before Congress.

The National Highway Traffic and Safety Administration (NHTSA) noticed an increase in the number of single car accidents soon after antilock brakes (ABS) became stan-

The MAA's employment website, Math Classifieds.

dard on most cars. To understand this correlation, we performed a study on driver experiences with ABS and determined that the increase of single car accidents was attributed to driver error when the ABS engaged. The results were used by NHTSA to plan activities to increase the public's understanding of ABS.

A large fast food chain needed to forecast sales of their children's meals in order to determine individual store demand levels of the included toys. Individual stores need to keep toys available for the entire length of the promotion, while avoiding an oversupply at promotion conclusion. We developed an accurate predictor that determined the number of toys to be sent to each franchise based on toy popularity and region.

Data mining is ubiquitous. Supermarket shopper cards are one example where consumer purchasing histories are used for targeted coupon mailings. My particular project involved mining data from a large bank in order to target coupons in credit card statements. This was the most mathematical of the projects; we used nearest-neighbor models as well as neural network models.

After seeing these examples, it should be clear that math majors would be an asset on these projects. When the inevitable question comes up in class, it pays to be able to

explain how mathematics is used in a real setting. Giving examples is very important, since they help students understand how mathematics fits into their major. It is especially crucial in non-major classes. I have seen students change their major to math after learning how mathematics is used.

For some of our majors, encouraging exploration of employment options may not be appropriate. However, there are many math majors (perhaps the majority at many schools) who are not on a secondary education track and are not planning on attending graduate school, at least not immediately after graduation. These majors and potential majors benefit greatly from a good answer to the question of what to do with a math degree.

I will always have that distinct memory of sitting in my soon-to-be advisor's office as a sophomore in college. I loved mathematics and wanted to change my current chemistry major to mathematics. However, I did not want to change my major in return for losing career options. It was obvious to me I could get a job in chemistry, but it was not clear to me at all what I could do with a math degree. So it was me who asked this very question, "What can I do with a Math Degree?" Luckily, my advisor had a good answer. And here I am. 🜚

The MAA's career site.

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Mathematicians Elected to the National Academy

On April 28, the National Academy of Sciences announced the election of 72 new members and 15 foreign associates. The list included several mathematical scientists: Sun-Yung Alice Chang (Mathematics, Princeton University), Percy A. Deift (Mathematics, Courant Institute), John E. Hopcroft (Computer Science, Cornell University), Thomas J. R. Hughes (Engineering, University of Texas at Austin), John W. Morgan (Mathematics, Columbia University), Christos C. Papadimitriou (Computer Science, University of California, Berkeley), Adrian Raftery (Statistics, University of Washington), Gilbert Strang (Mathematics, MIT), Cumrum Vafa (Physics, Harvard University), John D. Weeks (Physical Science and Technology, University of Maryland), and Wing H. Wong (Statistics, Stanford University). Our congratulations to all, with special congratulations to Hughes and Strang, who are members of the MAA. 🜚

AAAS Elects Fellows

The American Association for the Advancement of Science (AAAS) announced in April the election of 212 new AAAS Fellows and 19 Foreign Honorary Members. The new Fellows of the AAAS in Class I Section 1 (Mathematics) are Spencer Bloch (University of Chicago), Robert Fefferman (University of Chicago), Dorian Goldfeld (Columbia University), Stanley Osher (UCLA), Terence Tao (UCLA), Gunther Uhlmann (University of Washington), and Ruth Williams (UCSD). Our congratulations to all. 🜚