Mathematics Colloquium

Katie Ziegler-Graham, a biostatistician at St. Olaf College, will be speaking on Tuesday, April 15, at 4:00 p.m. in CMC 206.

Using Statistics to Count: Modeling Incidence and Forecasting the Worldwide Prevalence of Alzheimer’s Disease

Alzheimer’s disease (AD) is a chronic disease that affects the elderly throughout the world. It is not well understood how many people have AD and as populations become older, the number of persons living with AD will increase. It is important for planning purposes to be able to accurately predict how many people will be living with AD in the future. An important component of forecasting disease prevalence is the age-specific risk of developing the disease. I will present work and focus on modeling strategies that were employed as part of a meta-analysis on AD incidence rates. We used these incidence rates in conjunction with UN worldwide population projections to forecast AD prevalence. A stochastic, multi-state model was used which not only allowed us to obtain prevalence estimates, but to evaluate the potential impact of interventions that delay disease onset or progression.

MUDAC Report

The Carleton Analytics Team (AKA the CAT's Meow) was a force to be reckoned with at the 3rd annual Midwest Undergraduate Data Analytics Competition (MUDAC), which took place on April 5-6 at Winona State University. MUDAC is a 24-hour data analytics competition in which teams of 3 or 4 across the Midwest gather to work to analyze data, write up a report, and prepare an oral presentation in 24 hours. Teams are scored both on the merits of their analysis and their ability to communicate their analyses and conclusions effectively. Rachel Ewing, Harrison Reeder, and Sophia Davis were on one team and Kaitlyn Cook, Huaiyu Wang, Hilary Marshall, and Graham Tierney were on the other team. Both Carleton teams did very well, and Kaitlyn, Huaiyu, Hilary, and Graham's team made the top five!

Putnam Results Are In

Congratulations to Isaac Garfinkle, Dylan Peifer, and Jacob Spear, all of whom placed among the top 450 contestants in last December’s Putnam competition. This year 4113 students from 557 colleges and universities took the exam. Nationally, the median was 1 (out of a possible 120) and the high score was 99. Kudos to all who took the exam!

Math Department Jobs Next Year

Need a job for next year? Apply to work in the Math Department! The department is looking for: course graders, Mathematica or statistics lab assistants, and Math Skills Center tutors. Applications can be found at https://apps.carleton.edu/curricular/math/resources/student_worker_application/ and are due on April 14.
**IXL Learning**

IXL Learning is an educational technology company that focuses on creating high quality, dynamic practice software for K-12 students. There will be a recruiting event on campus on Friday, April 11, at 12:00 p.m. in Leighton 304. At the talk, a recent Carleton grad will talk about the company and its job openings and demonstrate some of the company’s software. There will also be a swanky raffle prize (a Kindle Fire) and free pizza from Basil’s.

**PROBLEM OF THE WEEK**

Suppose \( f \) and \( g \) are non-constant differentiable functions on \( \mathbb{R} \) satisfying

\[
\begin{align*}
    f(x+y) &= f(x)f(y) - g(x)g(y) \\
    g(x+y) &= f(x)g(y) - g(x)f(y)
\end{align*}
\]

for all \( x \) and \( y \). Suppose also that \( f'(0) = 0 \). Prove that \( f(x)^2 + g(x)^2 = 1 \) for all \( x \).

**Acknowledgments**

John Snyder in Oconomowoc submitted a Mathematica analysis of last week's problem, but no formal solutions have been received. Keep at it: prizes await you!