**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.

**Welcome Back Helen!**

After being away on sabbatical for 1 year and 2 terms, Helen Wong is back! While on sabbatical, she had a baby and spent much of her time with family in North Carolina. She also spent time on her research in topology and knot theory. This term, she is teaching Calculus III and Topology.

**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/](https://apps.carleton.edu/curricular/math/resources/student_worker_application/) and are due on April 14.

**Fun Math Books**

Last term the Gazette started featuring math books that are available for students to read for fun. All books are kept in the Reading Nook in the back corner of the Math Skills Center. This month, take a look at two books on combinatorial math. For those of you taking Combinatorics this term, these books are great for supplementary reading!

*Proofs That Really Count: The Art of Combinatorial Proof* by Arthur T. Benjamin and Jennifer J. Quinn demonstrates that many number patterns, even very complex ones, can be understood by simply counting arguments. It explores more than 200 identities throughout the text and examples, frequently emphasizing numbers not often thought of as numbers that count: Fibonacci Numbers, Lucas Numbers, Continued Fractions, and Harmonic Numbers.
generatingfunctionology by Herbert S. Wilf is an introduction to the use of generating functions and series in combinatorial math. The book provides enumerative applications of generating functions, such as applications to the cycle index of the symmetric group, permutations and square roots, counting polyominoes, and exact covering sequences.

Meet one of our SDA's: Hilary Marshall

Q: Introduce yourself and tell us about your experiences with math.

A: My name is Hilary. I'm originally from Glencoe, IL, but recently moved to Portland, OR. My interests in math are in statistical consulting, applied regression analysis, and building models. Outside of math, I love ice hockey and country music.

Q: What do you do as a Student Departmental Advisor (SDA)?

A: As the SDA, I inform students about math classes and the structure of the math major. Since I'm a Math/Stats major, students can come talk to me about stats-related classes and summer opportunities. I also try to organize events that people request.

Martin Bobb is the other SDA who we interviewed earlier this year.

Problem of the Week

A permutation of length $n$ is an ordering of the integers $1, 2, ..., n$. Every permutation can be obtained from the standard ordering \{1, 2, ..., $n$\} by a sequence of transpositions, which are interchanges of two numbers. It can be shown that, for a given permutation, either all the sequences of transpositions giving that sequence have even length or they all have odd length. A permutation is called even or odd accordingly. Let $E_n$ be the number of even permutations of length $n$ and $O_n$ be the number of odd permutations of length $n$. Compute $E_{2014} - O_{2014}$.

Acknowledgments

Welcome back! John Snyder in Oconomowoc submitted a solution and a Mathematica analysis for the last problem of winter term. However, no complete student solution has been received. Keep them coming!