



The 12th Annual

Mathematics on the Northern Plains

Undergraduate Conference 2011

Saturday, April 16, 2011

Funded by:

**MAA Regional Undergraduate Mathematics Conferences program (NSF grant
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Augustana College**



Program Schedule

8:00 - 9:00	Registration – Gilbert Science Center (GSC) – Main Floor Lobby Breakfast - Pendulum Lounge		
9:00 - 10:00	Keynote Address – GSC 100 Dr. Joan Lubben Dakota Wesleyan University “Structured Population Dynamics and Calculus: An introduction to Integral Population Modeling”		
10:00 - 10:30	Coffee Break - Pendulum Lounge		
10:30 - 12:00	Student Talks		
	Room 201 Chair: Curt Olson	Room 207 Chair: Sean Satjer-Wagstaff	Room 241 Chair: Dan Van Peurse
10:30 - 10:55	Erin Walter Mount Marty College “Hit me! The Probabilities and Strategies Associated with the Game of Blackjack”	Dan Ingebretson NDSU “Irreducible Decompositions of Monomial Idea in Real-Exponent Polynomial Rings”	Jared Soundy Augustana College “Exploring the genetics of race”
11:00 - 11:25	Doug Dailey USD “Dynamics of a Cubic Map”	Quentin Knoell & Rosemarie Decker Dakota Wesleyan “A Data Analysis of Treatment Programs at Mental Health Facilities”	Jared Soundy Augustana College “Exploring the genetics of race”
11:25 - 11:55	Madeline Schrier USD “The Recognition Problem for One-Deimensional and Planar Dynamical Sytstems”	Eachenzie Edgington Morningside College “Are educational programs on HIV/AIDS in Kenya effective?”	Stephanie Norton Morningside College “Squeezed Chip Puzzle”
12:00 - 1:00 p.m.	Lunch Break and Mathematic Quiz Bowl - Pendulum Lounge		
1:00 - 2:00	Student Talks		
	Room 201 Chair: Eric Canning	Room 207 Chair: Daniel Kemp	Room 241 Chair: Rocky VonEye
1:00 - 1:25	Trent Anderson Augustana College “Modeling the Spread of Disease on the Augustana Campus”	John Merkwan Augustana College “Exploring sums that add up to anything!”	Gregory Tanner SDSU “Off-Diagonal Rado Numbers”
1:30 - 1:55	Trent Anderson Augustana College “Modeling the Spread of Disease on the Augustana Campus”		Brad Penning Morningside College “Optimal Pebbling of Hypercubes”
2:00 - 3:00	Closing Session and Panel Discussion: Opportunities in Mathematics–GSC 100		
3:00 - 3:30	Closing Remarks		

Dr. Joan Lubben



“Structured Population Dynamics and Calculus: An introduction to Integral Population Modeling”

Joan Lubben is an Assistant Professor of Mathematics at Dakota Wesleyan University. She completed her PhD in 2009 at the University of Nebraska-Lincoln and has a BA in geology from Rice University in Texas. At UN-L, she was a recipient of the 2009 campus-wide award for Outstanding Teaching by a Graduate Student. Her doctoral thesis, written under the supervision of Drs. Richard Rebarber and Brigitte Tenhumberg, was entitled “Modeling and Analysis of Biological Population.” Dr. Lubben's ongoing research interests include developing population models that can be used to guide management of populations of both plants and animals, help control invasive species, and improve the viability of endangered or threatened species.

Website - <http://myweb.dwu.edu/jolubben>

Abstract:

A single species is often modeled as a structured population. In a matrix projection model, individuals in the population are partitioned into a finite number of stage classes. For example, an insect population can be partitioned into egg, larva, pupa, and adult stages. For some populations the stages are better described by a continuous variable, such as the stem diameter of a plant. For such populations an integral projection model can be used to describe the population dynamics, and might be easier to use or more accurate than a matrix model. I will discuss the similarities and differences between matrix projection models and integral projection models. I'll illustrate integral projection modeling by a Platte thistle population showing how the model is determined by basic life history functions.