

MSCS Mess

Department of Mathematics, Statistics, and Computer Science
St. Olaf College, Northfield, MN 55057

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<http://wp.stolaf.edu/mscs/mscs-mess/>

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MSCS Colloquium

Title:	3D Vision and Graphics
Speaker:	CS Students
Date:	Monday, April 18
Time:	3:30- 4:30 pm
Location:	RNS 310

About the talks: These lightning talks present a taste of seven topics involved in 3D modeling from photographs, as follows:

Realistic Color: Our research specifically addresses color transformation in a camera-display system, in which both the camera and display distort the real life scene's color. Our method utilizes color mapping and barycentric interpolation to produce restored images within 5% average difference of real world colors.

Machine Learning: Semantic image segmentation is the process of classifying every single pixel in an image using a set of predefined classes. Using only 16 images, we trained a convolutional neural network to identify which pixels in photos of Regents Hall belonged to walls, ceilings, floors, and more.

Mobile Devices: Displaying 3D models on mobile devices is becoming increasingly possible thanks to advances in hardware acceleration and client-rendering methods. This paper explores these methods and recent advances in client-side rendering, and quantifies the extent to which this is a reasonable venture on modern hardware.

Lighting Effects: We present our approach of replacing specularly in an image. By detecting specularly based on the luminance of pixels in the

original image, we are able to find a diffuse sample to synthesize a texture and replace specular areas.

Indoor Location: While the mass availability of GPS has made pinpointing locations outdoors trivial, indoor location remains difficult, inaccurate, and expensive. We present a method to precisely locate a device indoors by matching images taken from its camera to a 3D model of a building.

3D Display: This paper studies the use of blur in simulating depth of field in a stereoscopic setting using OpenGL, in order to create a more interactive and navigable 3D model. We took user perception data from a participant study in which the subjects are asked to match real stereographic photographs with stereographic renderings of the same scene based on focal distance.

Camera Positioning: In computer vision, a least-squares minimization technique known as bundle adjustment is used to optimize the camera parameters necessary for 3D reconstruction of a scene. We implemented a fast and flexible bundle adjustment system for a stereo camera setup.

Authors: Maggie Connell, Abdel-Rahman Madkour, John Stone; Hao Du, Rodney Lalonde III, Ryan van Mechelen, Skylar Zhang; Austin Pejovich, Joseph Peterson, Elijah Verdoorn; Stephen Akers, Nadia El Mouldi, Thomas Weihe; Soren Bjornstad, Nathan Maveus, Tian-tian Pang; Jack Hamby, Conrad Parker, Mason Stilwell; Jacob Forster, Joe Jung, Andrew Turnblad.

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Math Across the Cannon

Each year, St. Olaf's MSCS Department teams up with the Mathematics Department at Carleton College for the Math Across the Cannon Speaker Series. This event brings a renowned mathematician to Northfield to deliver a lecture on each of our campuses. This year's speaker, Prof. Sara Billey of the University of Washington, will be in town on Thursday, April 28.

Her first lecture, *Trees, Tanglegrams, and Tangled Chains*, will be held at St. Olaf College at 3:30 p.m. in RNS 410. This talk will introduce math majors to fundamental ideas and applications in the field of algebraic combinatorics. The second lecture, *Computer Assisted Proofs: coming soon to a theorem near you!*, will be held at Carleton at 7:00 p.m. in Weitz Cinema. This talk should appeal to both math majors and non-majors alike.

Mark your calendars! More details about the talks will appear in next week's Mess.

Math Bio Symposium

Come see the Senior Math-Bio concentrators present their senior projects, followed by a talk from Dr. Marisa Eisenberg this Tuesday, April 19. The poster presentations will be outside RNS 150 from 4:15-5:00 p.m. The talk will be in RNS 150 starting at 7 p.m. Senior concentrators and their projects:

Kalyn Dorheim, Environmental Studies-natural science, Biology: "Mathematical Modeling of Plant and Microbial Nitrogen Dynamics" with John Schade.

Matt Kilens, Computer Science: "Using Depth First Search in Determining Sequences by Hybridization" with Olaf Hall-Holt.

Tomaz Mazoni, Biology: "Developing SIR Models for Dengue Fever".

Maureen Palmer, Chemistry: "Wetland as a Nutrient Sink in Kodaikanal, Tamil Nadu, India: an approach to a model".

Emily Voldal, Mathematics, Biology, and a statistics concentration: "Randomness of Head Direction Cells in Rats Under Anesthesia" with Miranda Tilton, Nick Bakke, Katie Ziegler-Graham, and Gary Muir.

Putnam Competition Results

Congratulations to all Putnam 2015 participants!

The Putnam Competition is the largest (and probably also the most challenging) annual mathematics problem-solving contest for undergraduate students in North America. This year's contest, given in December 2015, drew 4,275 participants from 554 institutions.

We are very excited to report that St. Olaf finished in 40th place this year, well within the top 10%! On the individual side, honorable mentions go out to Conrad Parker for finishing in the top 10%, and to David Crisler, Matthew Johnson, and Andrew Yarger for finishing in the top 25%. Congratulations to you all!

Phi Beta Kappa Members

Congratulations to the following students for having been elected to Phi Beta Kappa this year. PBK membership amounts in most cases to being in the top 10% of seniors for GPA. These students are also encouraged to accept this invitation and register with PBK:

Matthew A. Johnson, CS and Math
Joseph T Briesemeister, Math and Economics
Zequn Li, Math and Economics
Asa L. Giannini, Math
Lily K. Myers, Math
Jack O. Werner, Math
Emily C. Voldal, Math and Biology
Michael J. Shroeder, Math and Chemistry
Amanda G. Bauer, Math and Economics
Joseph E. Jung, Math and Physics
Adam C. Wood, Math and Physics
Benjamin B. Bruce, Math and Philosophy
Jordan T. Dull, Math and Physics

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