The Michigan Section of the Mathematical Association of America and MichMATYC 86th Annual Meeting

Eastern Michigan University
Ypsilanti, Michigan
May 7-8, 2010

Full details about the meeting schedule, registration, meals, and accommodations are available on the meeting website be accessed through http://www.math.emich.edu/2010-Joint-Meetings/michMAA-MichMATYC-front-page or at http://www.michmaa.org/ or http://maamichigan.weebly.com/index.html

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Mathematical Association of America

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2010 Joint Annual Meeting Michigan Section MAA & MichMATYC

The **2010** Joint Annual Meeting of the Michigan Section of the Mathematical Association of America and MichMATYC, the Michigan Mathematical Association of Two-Year Colleges, will be held on Friday and Saturday, May 7 and 8, on the campus of Eastern Michigan University in Ypsilanti, Michigan.

Registration: Registration will begin at 8:00 a.m. on Friday and at 8:30 a.m. on Saturday. Registration, exhibits, talks, and complimentary refreshments will all occur in rooms on the **300-level** of the **Student Center** on EMU's campus. **Maps** of Student Center and the EMU campus are located on the last pages of this booklet.

Program Notes: The following pages contain an overview of this year's program. Student talks are indicated with an asterisk next to the speaker's name. Abstracts for all of the talks can be found in this booklet.

Meal Information: (Prior registration and payment required for meals.)

Friday and Saturday luncheons will take place in room 310 of the Student Center on the EMU campus. Friday's lunch (Italian fare buffet) includes meat or vegetable lasagna entree with tortellini alfredo, penne arrabbiata, roasted vegetable ratatouille, Caesar salad, garlic bread, dessert and selected beverages. Saturday's lunch (deli buffet) will include roast beef, turkey, ham, assorted breads and rolls, Swiss and cheddar cheese, veggies, potato chips, coleslaw, dessert and selected beverages.

Friday's banquet will take place at the Marriot-Eagle Crest, 1275 S. Huron Street, Ypsilanti. The menu for the banquet meal is: garden salad bar, pasta salad, wild rice pilaf, roasted redskins, steamed seasonal vegetables, steamed broccoli and peppers, horseradish crusted roast sirloin of beef with a beer braised onion brown sauce, potato encrusted white fish fillets with a horseradish cream sauce, roasted vegetable lasagna (vegetarian). There will be a cash bar beginning at 6:30 at the Marriot-Eagle Crest.

The AWM breakfast on Saturday morning will be held at Cafe Luwak, **42 East Cross Street, in Ypsilanti's Depot Town (7 minute drive or 30 minute walk from campus).**

Parking: Parking is available in lots adjacent to the Student Center on the EMU Campus. On Friday, you will need to ***bring your parking ticket to the registration desk for validation***. On Saturday, the parking lots will be open and no ticket will be issued; parking is free.

Lodging: Hotel information is located on the last page of this program and can be found on the web at: http://www.math.emich.edu/2010-Joint-Meetings/Local-Arrangements

MAA/MichMATYC Spring 2010 Meeting

May 7-8, 2010 Eastern Michigan University

Program

Friday May7					
8:00	**Registration ... *Coffee and Breakfast Treats***				
8:50-9:00	**Welcome** **Auditorium**				
9:00-9:50	**David Bressoud** *"Issues of the Transition to College Mathematics"* **Auditorium**				
	Room 320	**Room 310A**	**Room 352**	**Room 350**	**Room 330**
10:00-10:20	**Brian Yurk** **10:00-10:30** *"Modeling the evolution of insect development time in response to climate change"*		**Andrew Ross** **10:00-10:30** *"Applied Queueing Models, and Teaching Math Modeling with Individual Projects"*	**TI-Nspire – Hands on Introduction….** *Siena Heights Univ. Students will demonstrate 10-10:20*	**Pat Shure- UM** **10:00-10:30** *Taking Symbols Seriously: Teaching Form and Function in College Algebra"*
10:20-10:50	**Break** **Rooms 300 and 302**				
10:50-11:10	**Barbara Britton and Bette Warren - EMU** *"David Eugene Smith –Trailblazer with (Michigan State) Normal Connections"*	**K. "Bala" Balachandran – *K V C C*** *"Solar Irradiance"*	**Edmond Nadler - EMU** *"Singularities of Parametric Cubic Bézier Curves"*	**Jeff Kallenbach - SHU** *"Maple Computer Algebra System Through the Undergraduate Curriculum"*	***Amber Berkobien SVCU**
11:15-11:35	**Tanweer Shapla - EMU** *"On the Assessment of Traditional and Hybrid Models of Teaching of Elementary Statistics"*		**Chris Moseley - Calvin College** *"Geometry of Control-Affine Systems"*	**Ron Carlson – EMU** *"Engaging Students with Real Data"*	***Kevin Meligan, Anna Vantsevich, Todd Wilmore- *Lawrence Tech*.** *"The Sweetest One of All"*
11:40 – 12:00	**Feryal Alayont - GVSU** *"Using pre-class activities to prepare students for class"*		**Fatih Celiker- WSU** *"Locking-free Optimal Discontinuous Galerkin Methods For A Naghdi-type Arch Model"*	**Michael Corral - Schoolcraft College** *"Free/Open-Source Software in Mathematics"*	***Andrew Fork – SHU** *"How generic is 2^n? A computational approach"*
12:00 – 1:45	**Lunch** **Sheldon Gordon** *"The Mathematics the Partner Disciplines Want and our Students Need"* **Rooms 310 A&B**				

Friday Continued					
	Room 320	**Room 310A**	**Room 352**	**Room 350**	**Room 330**
2:00 – 2:20	**Olivier Heubo-Kwegna - SVSU** *"Kronecker Function Rings And Generalizations"*		**Michael A. Jones -** Mathematical Reviews *"A New Look at the New States Paradox: Apportionment in the Democratic Primary"*	**David Redman - Delta College** *"Elements of Good Math Videos"*	**Tanima Banerjee, Tanweer Shapla -** *Eastern Michigan University* *"Inferences using Bootstrapping Procedure"*
2:30 – 2:50	**Jack Rotman - Lansing Community College** *"New Life for Developmental Mathematics"*		**Brian J. McCartin - Kettering University** *"Oblique Linear Least Squares Approximation**	**Randall Pruim – Calvin** *"What should a modern mathematical statistics course look like?"*	***Kelly Ruder, Andrew Fork SHU** ***"Conquering the obstacle: The COMAP Competition"***
3:00 – 3:20	**Kyle Kolasinski - WMU** *"Modular Edge-Graceful Graphs"*	**Michael "Cap" Khoury - UM-AA** *"Counting Occurrences of Given Curvatures in Apollonian Circle Packings"*	**Ray Jensen - LSSU** *"How To Teach Set Algebra Using Truth Tables"*		***Joel Parrish** – SHU *"Multi-touch Methods"*
3:20– 3:50	**Friday Break Rooms 300 302**				
4:00- 5:00	**Special Presentation** **Tim Chartier** *"Mime-matics"* **Auditorium**				
5-5:45	**Reception** **300 (Exhibit Area)**				
5:15 – 5:45	**Business Meeting** Room 302		**...Student Social Pizza/ Activity…TBA** Math Clubs to help organize EMU & SHU & (maybe GVSU?)		
5:45 – 6:15	**Liaison Meeting** Room 302				
6:30- 7:15	**Social 'Hour'** Cash Bar Marriott Eagle Crest				
7:15 – 9:45	**Awards Dinner** **Tim Chartier** *"March Mathness"* **Eagle Crest Marriott**				

Saturday May 8					
7:00 – 8:30	**AWM Breakfast** *Cafe Luwak , 42 East Cross Street, in Ypsilanti's Depot Town*				
8:30	**Registration** – *Coffee and Breakfast Treats*				
9:00 – 9:50	**Plenary Address** **Maria Andersen** *"Math Technology to Engage, Delight, and Excite"* **Auditorium**				
	Room 320	**Room 310A**	**Room 352**	**Room 350**	**Room 330**
10:00 – 10:20	**Steve Blair** 10-10:30 *"Solving The Puzzle – Using Directed Graphs to Motivate Functions in High School and College Algebra Classrooms"*		**Paul Yu** 10-10:30 *"Cats, Dogs, and Mathematics: Semiotic and Prototype Theory in the Mathematics Classroom"*	**TI-Nspire – Hands on Introduction…. 10:00-10:20**	**John Camardese, Richard Geyer, Stephanie Shevenock – *Lawrence Tech-* *"COMAP"***
10:20 – 11:00	**Break** **Rooms 300 and 302**				
11:00 – 11:20	**Khairul Islam - U M** *"R-facilitated teaching: t tests and related basics"*		**Yangjin Kim - UM- D** *"Glioma invasion and microenvironment : a mathematical model"*	**David Redman - Delta College** *"Space Time … … The Final Frontier"*	**Paul Downen, Matt Lanting, Steven Sciacchitano– *Lawrence Tech-* *"COMAP"***
11:25– 11:45	**Khairul Islam - U M** *"On Standard Effect Measures of Assessing Risk for a Cohort Study"*		**Thomas Kelley - Henry Ford CC** *"Some Math from the Engineer's Point of View"*	**Randall Pruim – Calvin** *"Can Sage replace Maple and Mathematica?"*	
11:50 – 12:10	**Mahmoud Almanassra - UW-Marinette** *"Estimation of Survival and Cumulative-Hazard Functions of Restricted Quality Adjusted Lifetime"*		**Ryan Jones - WMU** *"Cents and Sensitivity"*	**Ron Carlson – EMU** *"Engaging Students with Real Data"*	
12:15 – 2:00	**Lunch** **Annalisa Crannell** *"Math and Art: The Good, the Bad, and the Pretty"* **Rooms 310 A&B**				
2:00- 5:00	Michigan NExT Symposium **Room 352**				

Invited Talks

David Bressoud (President, MAA - Macalester College)
Friday, May 7 Auditorium, opening plenary session.
"*Issues of the Transition to College Mathematics*"
Over the past two decades, the number of students studying calculus in high school has exploded. Last year it reached almost 600,000, 1/3 of the students who each year go directly from high school into a 2- or 4-year college. This phenomenon has created both problems and opportunities as these students enter college mathematics. I will talk about what we know about what is happening and what we need to learn. I will also explain the innovative responses we have put in place at Macalester College.

Sheldon Gordon, *Farmingdale State*
Friday, May 7 Room 310 Luncheon Address
"The Mathematics the Partner Disciplines Want and our Students Need"
The overwhelming bulk of our students, especially in courses below calculus, are there because of requirements from other disciplines or college-wide requirements. Leading educators from the partner disciplines, through the MAA"s Curriculum Foundations Project, almost unanimously recommend mathematics that has a very different flavor from what mathematics department tend to offer that is focused on the mathematics major. This talk will provide an overview of the mathematics that the partner disciplines actually use, and hence what their students really need, from our courses. If we are to support those other departments, maintain our enrollments, and provide courses that are beneficial to all of our students, we need to pay attention to what the other disciplines want.

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Tim Chartier, Davidson College
Friday, May 7 4:00 Auditorium
"*Mime-matics*"
In Mime-matics, Tim Chartier explores mathematical ideas through the art of mime. Whether creating an illusion of an invisible wall, wearing a mask covered with geometric shapes or pulling on an invisible rope, Dr. Chartier delves into mathematical concepts such as estimation, tiling, and infinity. Through Mime-matics, audiences encounter math through the entertaining style of a performing artist who have performed at local, national and international settings.

Tim Chartier, Davidson College
Friday, May 7 Eagle Crest (Marriot), Banquet Address
"March Mathness"
Abstract: Every year, people across the United States predict how the field of 65 teams will play in the Division I NCAA Men's Basketball Tournament by filling out a tournament bracket for the postseason play. This talk discusses two popular rating methods that are also used by the Bowl Championship Series, the organization that determines which college football teams are invited to which bowl games. The two methods are the Colley Method and the Massey Method, each of which computes a ranking by solving a system of linear equations. We also touch on how to adapt the methods to take late season momentum into account. We also see how the methods did in creating mathematically-produced brackets for 2010 March Madness.

Maria Andersen, President, MichMATYC, Muskegon CC
Saturday, May 8 Auditorium- Saturday Opening Plenary Session.
"Math Technology to Engage, Delight, and Excite"
We're in a recession and so is your department budget. Luckily for you, there are lots of great programs and web resources that you can use to teach math and most of these are free. Use the resources in this presentation to tackle the technology problems that haunt you and capture the attention of your math classes with interactive demonstrations and relevant web content.

Annalisa Crannell - Franklin & Marshall College
Saturday, May 8, Room 310 Luncheon Address
"Math and Art: The Good, the Bad, and the Pretty"
Dust off those old similar triangles, and get ready to put them to new use in looking at art! We're going to explore the mathematics behind perspective paintings---a mathematics that starts off with simple rules, and yet that leads into really lovely, really tricky mathematical puzzles. Why do artists use vanishing points? What's the difference between 1-point and 3-point perspective? Why do your vacation pictures not look as good as the mountains you photographed? We'll look at all of these questions, and more.

Local Invited Talks

Steve Blair - *Eastern Michigan University*
Saturday, May 8 Room 320 10:00-10:30
"Solving The Puzzle – Using Directed Graphs to Motivate Functions in High School and College Algebra Classrooms"

Greg Budzban, a mathematician working with The Algebra Project (founded by Bob Moses), has written a module called Road Coloring based on concepts from graph theory. I will discuss using this module with ninth grade algebra students at Ypsilanti High School as well as adapting it for use with college students in my Algebra for Elementary Teachers course at Eastern Michigan University.

Andrew Ross *Eastern Michigan University*
Friday, May 7 Room 352, 10:00-10:30
"Applied Queuing Models and Teaching Math Modeling with Individual Projects"

This talk will be split in two halves. First, I will discuss how basic queuing models can give us insight into situations like call centers and health care waiting times. Then, I will relate my experiences in requiring students in my math modeling classes to do projects based on their own interests. I will discuss how I guide students in selecting topics, how I help them in writing up their results and giving presentations, and the grading rubric I use.

David Redman- *Delta College*
Friday, May 7 Room 350, 2:00-2:20
"Elements of Good Math Videos"
You have many good presentations in your lectures, slides, handouts and activities. Now you want to present them as online videos for students to consume at their own pace.
How do you make the transition from a presentation to a video? We will show you some tools and rules, what to do and what not to do.

David Redman- *Delta College*
Saturday, May 8 Room 350, 11:00-11:20
"SpaceTime … The Final Frontier"
These are the voyages of the computer algebra system SpaceTime. Its continuing mission: to explore strange new surfaces, to seek out new matrices and new animations, to boldly go where no CAS has gone before - phone, PDA, iPod, computer! Let's see $30 app with lightning-fast color graphics versus $150 dot-matrix inspired calculator, analysis Spock?

Pat Shure - *University of Michigan-Ann Arbor*
Friday, May 7 Room 330, 10:00-10:30
"Taking Symbols Seriously: Teaching Form and Function in College Algebra"
Since many students taking College Algebra courses have seen the topics before, they often find it easier to ignore the underlying structure and focus instead on acquiring a surface knowledge of manipulations. Unfortunately, the fluency they seek often eludes them precisely because they fail to recognize the underlying algebraic form and the purpose of different forms.
To use algebra effectively, students need 'symbolic literacy,' the ability to analyze the form of an expression, employ algebraic foresight, and choose the appropriate manipulation. This presentation will be centered on a set of problems that provide a framework for by helping students achieve both conceptual understanding and procedural fluency.

Paul Yu - *Grand Valley State University*
Saturday, May 8 Room 352, 10:00-10:30
"Cats, Dogs, and Mathematics: Semiotic and Prototype Theory in the Mathematics Classroom"
Semiotics as a discipline is the analysis or study of signs and sign systems. According to linguist Ferdinand de Saussure, a sign is a two part entity consisting of a signifier (symbol) and its signified (meaning). As such, the terms "cat," "dog," and "exponential function" are meaningless without the necessary experiences to give the terms meaning to a person. Prototype theory is a field of cognitive science that looks at the manner by which humans categorize certain phenomenon. For instance, a retriever may be more dog-like than Great Dane, or certain examples of rectangles may be more rectangular-like than others. In this talk, I will describe the basic tenets of Semiotic and Prototype theory and share how I have used these theories in my research of collegiate students' understanding of mathematics as I reflect on two classroom research projects. One project was conducted in a 200 level mathematics course for pre-service elementary education majors, and the other was conducted in a 400 mathematics course in non-Euclidean geometry. I will then share some possible implications of these learning theories for instruction in mathematics.

Brian Yurk -Hope College
Friday, May 7 Room 320, 10:00 – 10:30
"Modeling the evolution of insect development time in response to climate change"

Since developmental timing in insects is temperature-dependent, it is likely that climate change will result in dramatic changes in insect populations. In these populations, there are strong selective pressures for maintaining appropriate developmental timing. To survive to maturity, insects must avoid coincidence of sensitive life stages with extreme weather while maintaining overlap with resource availability. The degree to which development is synchronized in a population can also have important fitness consequences, determining the probability of finding mates, the likelihood of avoiding predators, and the ability to overwhelm prey. As climate changes, populations that are well-adapted to local climate conditions will be forced to migrate, evolve, or go extinct.

In this talk, I will present a mathematical model of the evolution of temperature-dependent development time in response to selection on emergence time and density in insect populations. Steady distributions for the model under stable temperatures are determined using asymptotic methods. In numerical simulations, the existence of these distributions determines population dynamics under warming temperatures as well. The model is applied to predict population dynamics and evolution of development time in mountain pine beetle (MPB) populations under warming temperatures. Recent MPB range expansion and increased outbreak frequency have been linked to warming temperatures. The MPB is an important insect from both an ecological and an economic perspective, because its outbreaks often result in massive timber loss.

Contributed Talks:

Feryal Alayont - *Grand Valley State University*
"Using pre-class activities to prepare students for class"
While it is common in social disciplines to assign students reading before class, you may have found that students do not get much out of reading mathematics before class unless you spend a significant effort to ensure that they do their reading correctly. For this reason, I started using pre-class activities in place of, or in addition to, reading to help students prepare for class. These activities are inspired by the "Preview activities" from Mathematical Reasoning: Writing and Proof by Ted A. Sundstrom. They serve many purposes. They can help students remember a prerequisite mathematical concept, can contain the time consuming part of an in-class activity, can introduce the lecture material in a simpler context, etc. This talk will focus on how I use these activities in various classes with specific examples.

Mahmoud Almanassra - *University of Wisconsin-Marinette*
"Estimation of Survival and Cumulative-Hazard Functions of Restricted Quality Adjusted Lifetime"
Studying the quality adjusted lifetime has received much attention in the recent days because of its ability to take in to consideration both the quantity and the quality of the patient's life. In this paper, we will propose class of consistent, monotonic, and efficient estimators for the survival function of the quality adjusted lifetime. Also, we will propose another class of estimators for the cumulative hazard function of the restricted quality-adjusted lifetime.

K. "Bala" Balachandran - *Kalamazoo Valley Community College*

"Solar Irradiance"

Solar radiation received at ground level anywhere on Earth depends on the time of day, the latitude, and of course the absorption and scattering by the column of air above the ground. It seems to be a good idea to introduce students to the vast amount of solar radiation we receive daily to the total energy usage of the World and particularly the U.S. Data gathered and published by the Department of Energy is presented together with a simplified integration procedure to compute the irradiance in Springfield, IL using spherical polar coordinates. This would be a good exercise in Calculus and Engineering Physics classes and serves to introduce students to the abundance of Solar Energy on Earth. In addition to a description of the mathematical problem, the talk would be complemented by a demonstration of solar cooking (weather permitting – omelettes and pancakes are the most convenient).

Tanima Banerjee, Tanweer Shapla - *Eastern Michigan University*

"Inferences using Bootstrapping Procedure"

Bootstrapping, also known as resampling, is a computationally extensive method for estimating standard error of an estimate whose sampling distribution is not known explicitly. Bootstrapping has become very popular in recent years following Efron (1979) and has its increased dimension in multiple discipline for enabling standard error of estimates, constructing confidence intervals and testing hypothesis which otherwise become very difficult. This talk provides a naïve approach to the introduction of the bootstrap with a particular attention to the construction of confidence interval estimates using percentile and bootstrap-t methods.

Barbara Britton and Bette Warren - *Eastern Michigan University*

"David Eugene Smith – Trailblazer with (Michigan State) Normal Connections"

David Eugene Smith, fifth president of the MAA, was a well-known mathematician in the early 20th Century. He was a pioneer in the fields of history of mathematics and preparation of teachers, and worked to establish mathematics education as a separate field of study. Prior to becoming the chair of mathematics at Columbia Teachers' College, Dr. Smith served as the first head of the department of mathematics at Michigan State Normal School in Ypsilanti – the early incarnation of what would eventually become Eastern Michigan University. This talk will describe Dr. Smith's 1891-1898 tenure at MSNS in the context of teacher training in that era, and will discuss his 1900 book *The Teaching of Elementary Mathematics* (a pioneering handbook for teachers) and two of his many published textbooks in comparison to modern practices in mathematics education.

Fatih Celiker- *Wayne State University*

"Locking-free Optimal Discontinuous Galerkin Methods For A Naghdi-type Arch Model"

We introduce and analyze discontinuous Galerkin methods for a Naghdi type arch model. We prove that, when the numerical traces are properly chosen, the methods display optimal convergence uniformly with respect to the thickness of the arch. These methods are thus free from membrane and shear locking. We also prove that, when polynomials of degree k are used, {\em all} the numerical traces superconverge with a rate of order h^{2k+1}. We exploit this superconvergence to post-process the DG solution in an

element-by-element fashion to obtain a new approximation which converges much faster than the original one. Numerical experiments verifying the above-mentioned theoretical results are displayed

Ron Carlson – *Eastern Michigan University*
"Engaging Students with Real Data"
Challenge your students with real data and technology. This session will generate data that can be modeled with a step function. The data is collected with a TI-Nspire and a CBR2. The calculator and CBR2 will collect and display the data in graphical or table form. Four or five volunteers will be needed to stand and move to create the data. The students analyze the data, discover a function that models the data and explore the effects of several of the variables. This example also provides an opportunity to explore multiple representations (data, function and the experiment) of the concepts.

Michael Corral - *Schoolcraft College*
"Free/Open-Source Software in Mathematics"
Free/Open-Source Software (F/OSS) has taken the world by storm. Mathematical software such as R, Gnuplot, Octave, Sage, Maxima, and other F/OSS are making inroads against closed-source, commercial software such as SPSS, Mathematica, Maple, and Matlab. This presentation discusses how R was used in an elementary statistics course at Schoolcraft College, in addition to using Gnuplot and Octave in trigonometry and calculus courses. When to use any software - F/OSS or otherwise - in teaching mathematics will also be discussed.

Olivier Heubo-Kwegna - *Saginaw Valley State University*
"Kronecker Function Rings And Generalizations"
In order to generalize the notion of a Kronecker function ring, Krull introduced the notion of e.a.b. (*endlich arithmetisch brauchbar*) star operations in 1936. Two generalizations of the concept of Kronecker function rings were proposed in 2001: one by F. Halter-Koch, and the other one by M. Fontana and K.A. Loper. Halter-Koch's construction starts from an axiomatization of two properties of the classical Kronecker function ring, whilst the Fontana – Loper approach uses semistar operations. A notion of a projective star operation is introduced and related to the classical star operations. We show that the projective Kronecker function ring built from the projective star operation is an example of Halter-Koch's generalization of Kronecker function ring.

Thomas Kelley - *Henry Ford Community College*
"Some Math from the Engineer's Point of View"
As part of my sabbatical in the fall term of 2009 I attended two engineering courses at Oklahoma State University as a guest of the departments of Chemical and Electrical Engineering. One course was titled "Introduction to Engineering Mathematics" and used engineering labs to illustrate and preview various topics in mathematics. The course itself was taught by a team of teachers and made extensive use of web based materials. I'll first talk about the course's overall structure and then I will give a short description of the labs and how they were used to present mathematical topics such as algebra, trigonometry, linear algebra, sinusoids, derivatives, and integrals.

Khairul Islam - *University of Michigan*

"R-facilitated teaching: t tests and related basics"

t-test is an important topic from an elementary to the higher level of mathematical sciences and statistics classes. It has widely been used in almost every branches of educational and scientific research. However, several assumptions need to be satisfied for any inference using t-test to be valid for an effective decision making. Therefore, it is imperative that we address these issues while teaching and students should be aware of the necessity of verifying such issues while learning through practice. This talk is intended to address different versions of t tests and related basics which should be followed while making an inference using t tests. A particular attention is paid on using a freely accessible statistical software R in achieving all these goals.

"On Standard Effect Measures of Assessing Risk for a Cohort Study"

Assessing risk of a factor is an important topic in biostatistics and epidemiology. Several standard effect measures such as relative risk, odds ratio, risk difference and various versions of attributable risks are widely used measures for assessing the risk of an exposure to the development of the disease or an outcome of interest. Because attributable risk takes into account the actual prevalence of exposure in the population, they are preferable to others while comparing epidemiological importance of several factors varying both in their relative risks and prevalences. Recently proposed impact numbers are an addition to the list to some extent. While attributable risk measures the proportion of disease that could be eliminated by completely eliminating the exposure from the population of interest, impact numbers reflect the number among whom one outcome is attributable to the exposure of the risk factor specific to a population. This talk is intended to address an overview of various measures in use for a cohort study and compare the interpretational aspects using real life examples. In particular, an attention is paid in the computational aspects of interval estimates of impact numbers in relation to the other measures of risk factor.

Ray Jensen - *Lake Superior State University*

"How To Teach Set Algebra Using Truth Tables"

In this presentation, a method is shown which integrates the truth table with proving theorems in set algebra. This technique has the advantage of allowing the student or researcher to use a more systematic approach to proof. Further, the technique can be used to inegate hypotheses and locate exactly where problems arise. The technique was used in an introductory class on theoretical mathematics in the Fall of 2009 at Lake Superior State University, and was well-received by the students in the class.

Michael A. Jones - *Mathematical Reviews*

"A New Look at the New States Paradox: Apportionment in the Democratic Primary"

In the Democratic Presidential Primary, the Democratic Party uses Hamilton's method to apportion delegates to candidates based on the portion of the population each candidate receives after all votes for candidates receiving less than 15% of the popular vote are eliminated. The 15% cutoff results in a paradox: A candidate with more than 15% of the popular vote could receive more delegates after the votes are eliminated than if no cutoff were used! This is an example, in reverse, of the New States

Paradox: when the addition of a new state results in an old state receiving an additional representative in the US House of Representatives despite the populations of the other states and the number of representatives in the House remain the same. Geometry will be used to explain the paradox and why such a cutoff paradox would not occur if the Democratic Party used a divisor method to apportion delegates. The Democratic Delegate Selection Rules, Hamilton's method, and divisor methods will be reviewed.

Ryan Jones - *Western Michigan University*
"Cents and Sensitivity"
The squares of an $m \times n$ checkerboard are alternately colored black and red. It is possible to place coins (pennies) on some of the squares of the checkerboard (at most one coin per square) such that for every square of one of the colors the number of coins on neighboring squares is odd, while for every square of the other color the number of coins on neighboring squares is even. A placement of coins that accomplishes this is called a solution of the checkerboard. Some checkerboards are color-sensitive in the "sense" that specifying whether the number of coins on neighboring squares is even or odd depends on which squares of the checkerboard are which color. We discuss the problem of determining which checkerboards are color-sensitive.

Jeff Kallenbach - *Siena Heights University*
"Maple Computer Algebra System Through the Undergraduate Curriculum"
The Maple© Computer Algebra System, provided by Maplesoft, Inc. of Waterloo, Ontario, is a rich, mature package for symbolic and numerical mathematics. It provides the power, affordability, and usability to enrich the undergraduate curriculum from Calculus I up through senior-level courses. It can be used at a variety of levels of complexity depending on the difficulty of the material and maturity of the student. This presentation covers a survey of how the faculty at Siena Heights University make use of Maple in explorations, analysis, and supplementary activities from freshman year through graduation.

Michael "Cap" Khoury - *University of Michigan-Ann Arbor*
"Counting Occurrences of Given Curvatures in Apollonian Circle Packings"
To construct an Apollonian Circle Packing (ACP), we begin with four pairwise-tangent circle and successively inscribe circles in each of the lunes formed, resulting in an aesthetically-pleasing configuration of countably many circles. Remarkably, if the starting four circles all have integral curvatures, then so will all the circles in the packing. These packings have attracted significant attention in recent years; number theorists are particularly interested in understanding which curvatures appear. There are numerous open questions along these lines. (One typically works in the standard integers, but all the ideas make sense more generally---in particular, we can take packings of circles with curvatures in the ring of integers of some number field.) Here we will take as our starting point two basic questions. 1) Given an integer, how many times does a circle with that curvature appear in an integral ACP? 2) Given a pair of integers, how many times do tangent circles with those curvatures appear in an integral ACP? We will answer these questions over $\mathbb{Z}$ and make some comparisons to the situation for packings in other number rings.

Yangjin Kim - *University of Michigan - Dearborn*

"Glioma invasion and microenvironment : a mathematical model"

Tumor proliferation and migration depends on its microenvironment. We analyze the migration patterns of glioma cells (brain cancer cells) from the main tumor, and show that the various patterns observed in experiments can be obtained by a model's simulations, by choosing appropriate values for some of the parameters (chemotaxis, haptotaxis, and adhesion) of the PDE model. A multiscale model may be presented for better understanding of the interaction between a tumor and its environment at the cellular level.

*This is joint work with Avner Friedman (MBI), Sean Lawler, Michal O.Nowicki and E. Antonio Chiocca (Oncological Neurosurgery) at the Ohio State University.

Kyle Kolasinski - *Western Michigan University*

"Modular Edge-Graceful Graphs"

In an edge-graceful labeling of a graph G of order n and size m, distinct edges of G are assigned distinct labels of the set $\{1, 2, \ldots, m\}$ in such a way that for every two distinct vertices of G the sums of the labels of their incident edges are distinct in Z_n. A graph that admits an edge-graceful labeling is called edge-graceful. If $m > n$, then this edge labeling is not actually a bijective labeling. This suggests removing altogether the requirement that the edge labeling be bijective. We study such modular edge-graceful labelings and resulting modular edge-graceful graphs, primarily concentrating on which graphs are modular edge-graceful.

Brian J. McCartin - *Kettering University*

"Oblique Linear Least Squares Approximation"

The concept of oblique linear least squares approximation is introduced. This permits a unified treatment of the various modes of linear regression: coordinate regression, orthogonal regression, (λ)-regression and (λ, μ)-regression. This new concept is then given a geometric interpretation in terms of the concentration ellipse which is shown to provide a generalization of the Galton-Pearson-McCartin geometric characterizations of linear regression.

Chris Moseley - *Calvin College*

*"Geometry of Control-Affine Systems"*Satellite three-axis control, inertial navigation systems, and NMR quantum computers are examples of control-affine systems: control systems in which the system is subject to an uncontrolled ``drift'' vector field. This is a much broader category of interest than control-linear systems, a class whose geometry is well understood. Recent investigations have shown that geometric invariants for control-affine systems of constant type appear in dimensions as low as three; by contrast, control-linear systems have no such invariants in dimensions lower than five. In this talk I will explain recent results and some questions for future research. This is joint work with J. Clelland of Boulder and G. Wilkens of Hawaii.

Edmond Nadler - *Eastern Michigan University*

"Singularities of Parametric Cubic Bézier *Curves"*

Parametric cubic polynomial curves are useful in applications, being of relatively low dimension, and yet, flexible in their shape. To use these curves one must fully understand the cases of singularity, i.e., where the speed of the parametric curves is zero.

In this talk, these singularities are described in terms of the Bézier form, a representation of parametric polynomial curves employing the Bernstein polynomials as basis functions, in which the coefficients have geometric significance. These Bézier curves, which are used extensively in computer graphics and related fields, were first developed in the 1950s in the French automobile industry.

Randall Pruim – *Calvin College*

"Can Sage replace Maple and Mathematica?"

Sage (sagemath.org) is a free open-source mathematics software system licensed under the GPL. It combines the power of many existing open-source packages into a common Python-based interface. The designers of Sage claim that their mission is to create "a viable free open source alternative to Magma, Maple, Mathematica and Matlab". Have they succeeded? Are they on a trajectory to succeed? We'll present some examples of using Sage in undergraduate mathematics courses and *discuss its viability compared to the "big boys".*

"What should a modern mathematical statistics course look like?"

Over the past 10-15 years, there has been much discussion centered on a modern approach to introductory statistics. Many textbooks have been written that are data-centric and rely heavily on computers. But what should we do with our majors and other advanced students who want an introduction to probability and statistics? In particular, how should computation enter into this course? I'll present some examples from a statistics-centric approach to what used to be known as the probability and statistics sequence. This approach (a) uses the statistical package R throughout the course, (b) introduces hypothesis tests and p-values in the first week, and (c) covers important foundational topics in probability as they are motivated by statistics.

Jack Rotman - *Lansing Community College*

"New Life for Developmental Mathematics"

This session will present a brief summary of the AMATYC "New Life Project" for developmental mathematics – which will eventually lead to the old courses being replaced by mathematically-sound experiences that will directly help students succeed in college with a concurrent reduction in the number of courses that students must take.

Tanweer Shapla - *Eastern Michigan University*

"On the Assessment of Traditional and Hybrid Models of Teaching of Elementary Statistics"

In recent years, a significant number of studies have been conducted to compare students' performance in traditional (face-to-face) and hybrid (blend of online and face-to-face) models of elementary statistics class. In order to compare students' mastery, traditional and hybrid versions of statistics classes were offered where the course was taught by the same instructor, same topics were covered and similar tests were given. At the end of the semester, it was found that there was no significant difference in students' performance between the two teaching formats, which is supported by previous research results.

Undergraduate Student Talks:

Andrew Fork – *Siena Heights University*
"How generic is 2^n? A computational approach"

Powers of two are often used to measure computer memory. 2^n is the number of ways the bits in a binary integer of length n can be arranged. So is this by coincidence? I conjecture that no matter what number is specified as long as the number is a positive whole number, I can discover an exponent where 2 to that exponent will have a solution that begins with the same number specified. I will be using computer programming languages of "Visual Basic", "C++" and the mathematical programming language of "Maple" to examine the conjecture.

Kelly Ruder, Andrew Fork - *Siena Heights University*
*"Conquering the obstacle" COMAP Competition (*Consortium for Mathematics and Its Applications)

Mathematical Contest in Modeling (MCM), challenges teams of students to clarify, analyze, and propose solutions to open-ended problems. The contest attracts diverse students and faculty advisors from over 500 institutions around the world. To successfully complete the contest and receive an award takes dedication, motivation, ambition, and lastly creativity. In the 2009 "MCM", there were 1675 teams participating, 9 were designated outstanding winners, 294 Meritorious Winners, 298 Honorable Mentions, and finally 1074 Successful Participants. Our team from Siena Heights University was one of the 294 Meritorious Winners and throughout our presentation we will demonstrate the direction and approach our team took to create the solution to the problem ("Creating Effective Roundabouts") we chose to conquer.

Joel Parrish II – *Siena Heights University*
"Multi-touch Methods"

Multi-touch is a technology which allows for multiple user inputs, and more importantly multi-user interaction with a computer interface. Begun in the early 1970's, Multi-touch is currently the subject of much research. At Siena Heights University a small group of science, math, and computer students have undertaken some experiments in Multi-touch. We will present the current status of our work; including hits, misses, future research, and a presentation of a multi-touch system we currently have working

Kevin Meligan, Anna Vantsevich, Todd Wilmore - *Lawrence Tech*
"The Sweetest One of All"

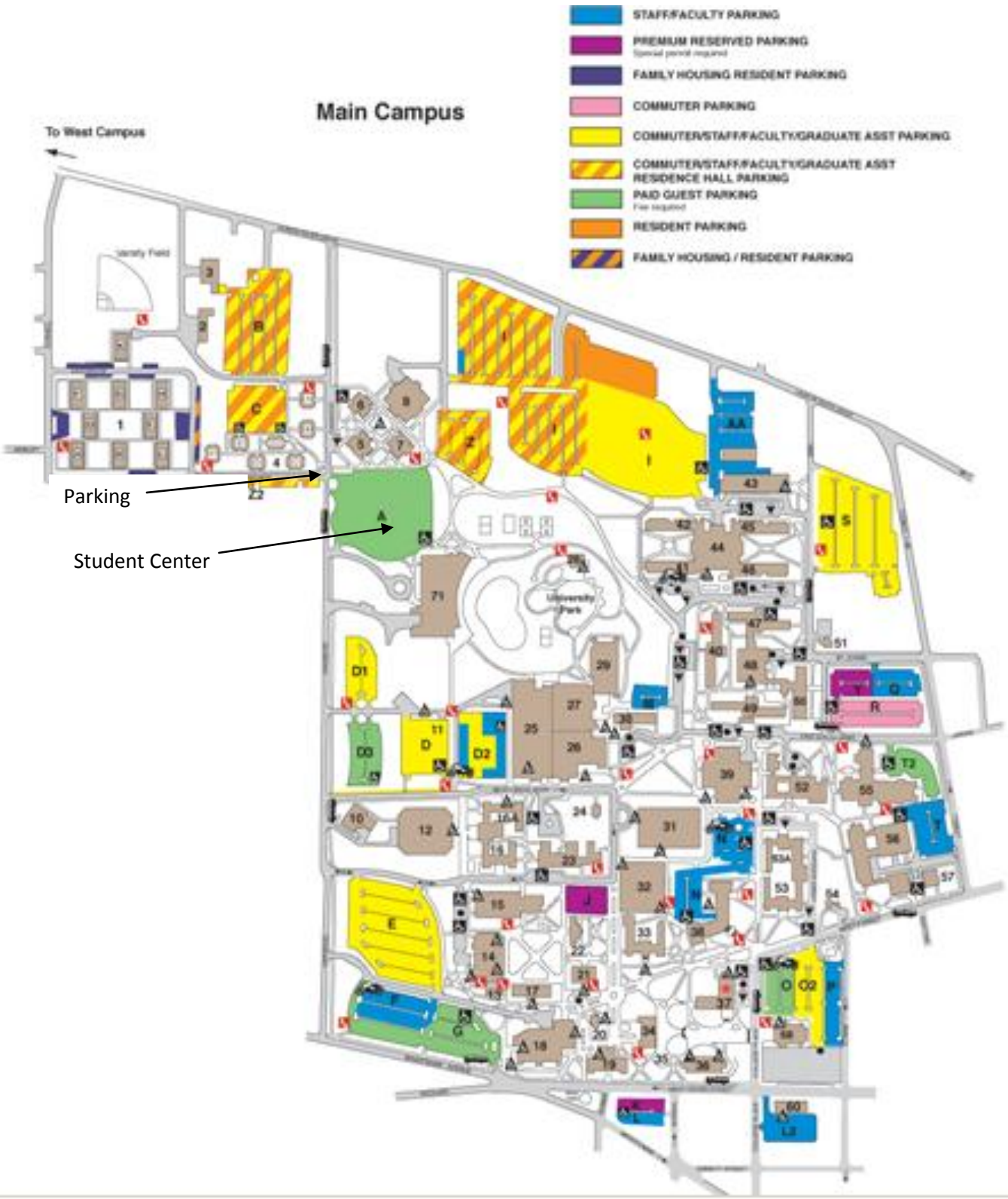
MCM 2010 Problem A: To justify the location of the true "sweet spot" of a baseball bat, which is actually a zone, a mathematical model was created to describe the normal modes of vibration of a bat, which was approximated to a freely-supported homogenous, elastic beam. This model was further used to explain how the material of the bat and its composition alters the performance of the bat.

John Camardese, Richard Geyer, Stephanie Shevenock – *Lawrence Tech-*
"The Killer Catcher"

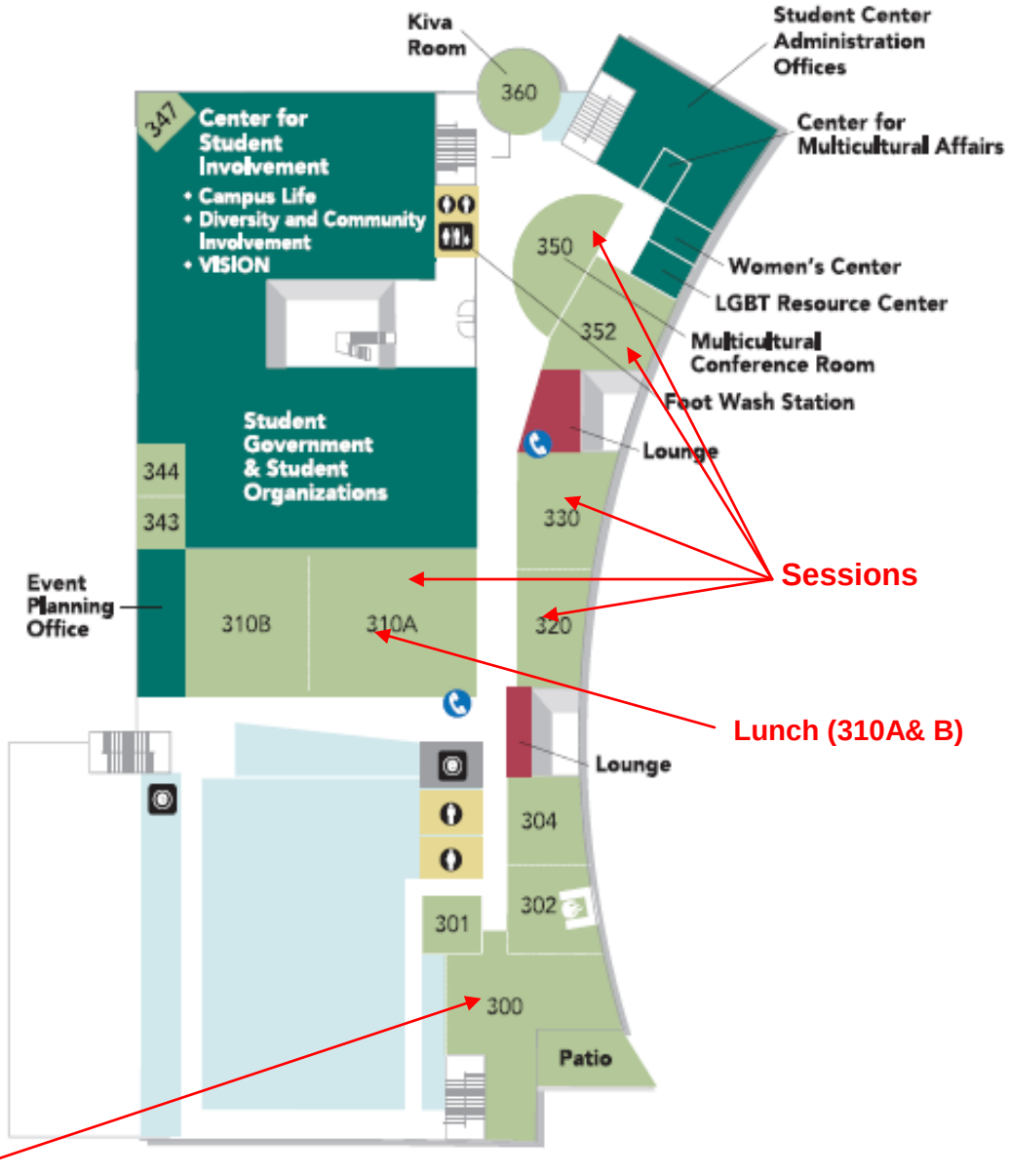
To approximate the location of a serial killer's next attack, we created a probability map that highlighted the areas with the highest risks. The probability map that we developed is a multiple scheme model that can show probabilities based on demographics alone, distance and time alone, or demographics and distance and time overlaid on each other. The model can be extended to accommodate as much relevant demographic data as is needed to accurately track a killer's patterns and tendencies. To test our model we chose two cases that occurred in California's Los Angeles area.

Paul Downen, Matt Lanting, Steven Sciacchitano– *Lawrence Tech-*
"Modeling the Vibrations o9f a Baseball Bat"

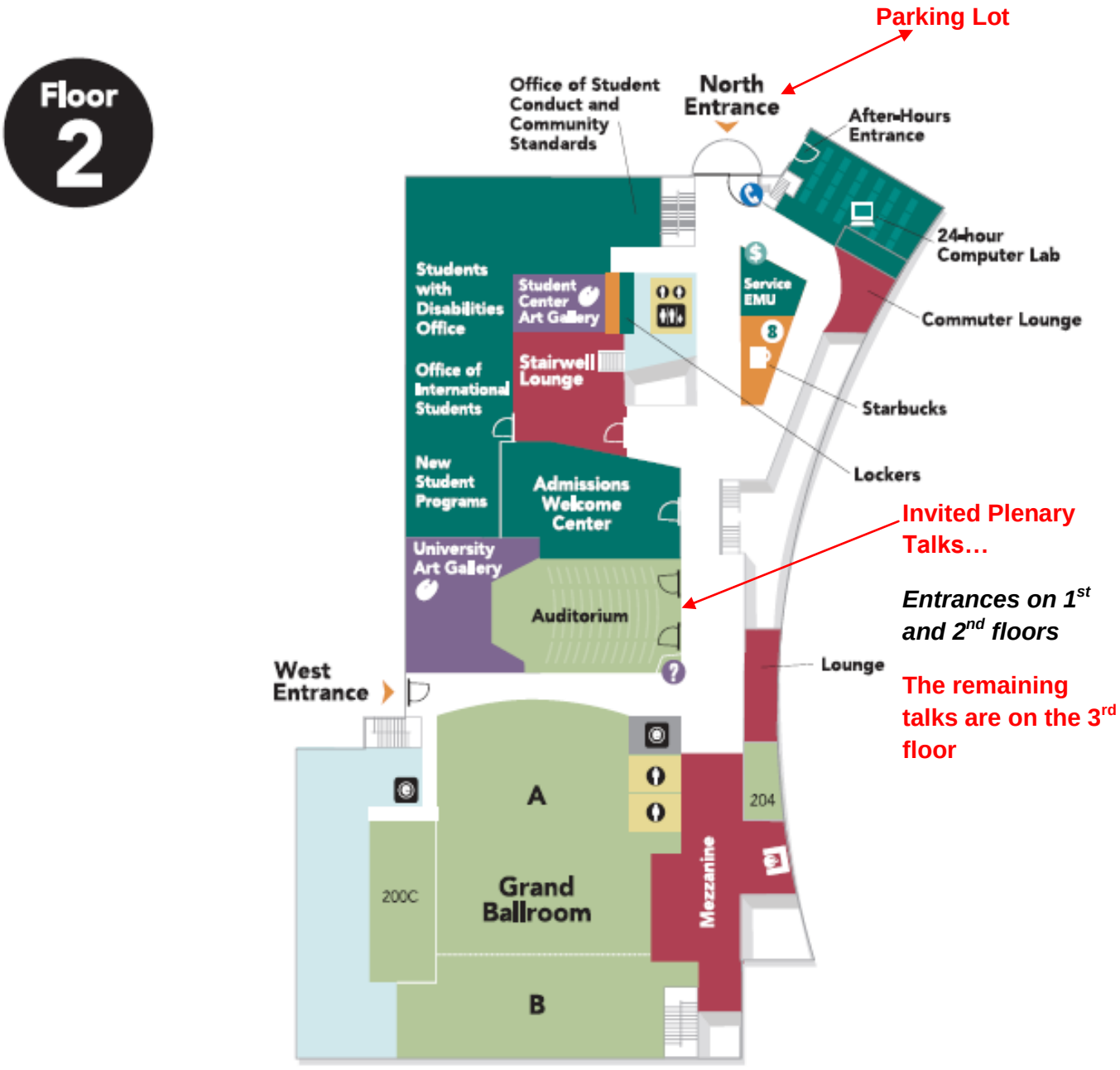
Baseball batters know from experience that there is a "sweet spot" on the fat part of the bat, not at the end, that delivers the most power to the ball on contact. We modeled the bending vibration in a baseball bat after collision as a function dependent on the position at which the ball strikes the bat to determine the amount of energy dissipated due to vibration in the collision. The location of the impact at which the bending vibrations and the energy loss due to those vibrations are minimized explained why the end of the bat is not the ideal place to hit the ball. We also analyzed the material and shape of the bat in order to quantify their ability to "enhance" the effect of hitting at the sweet spot and quantify the so-called "trampoline effect" that results specifically when a hollow aluminum bat is used.


Main Campus
To West Campus
STAFF/FACULTY PARKING
PREMIUM RESERVED PARKING
FAMILY HOUSING RESIDENT PARKING
COMMUTER PARKING
COMMUTER/STAFF/FACULTY/GRADUATE ASST PARKING
COMMUTER/STAFF/FACULTY/GRADUATE ASST RESIDENCE HALL PARKING
PAID GUEST PARKING
RESIDENT PARKING
FAMILY HOUSING / RESIDENT PARKING
Parking
Student Center

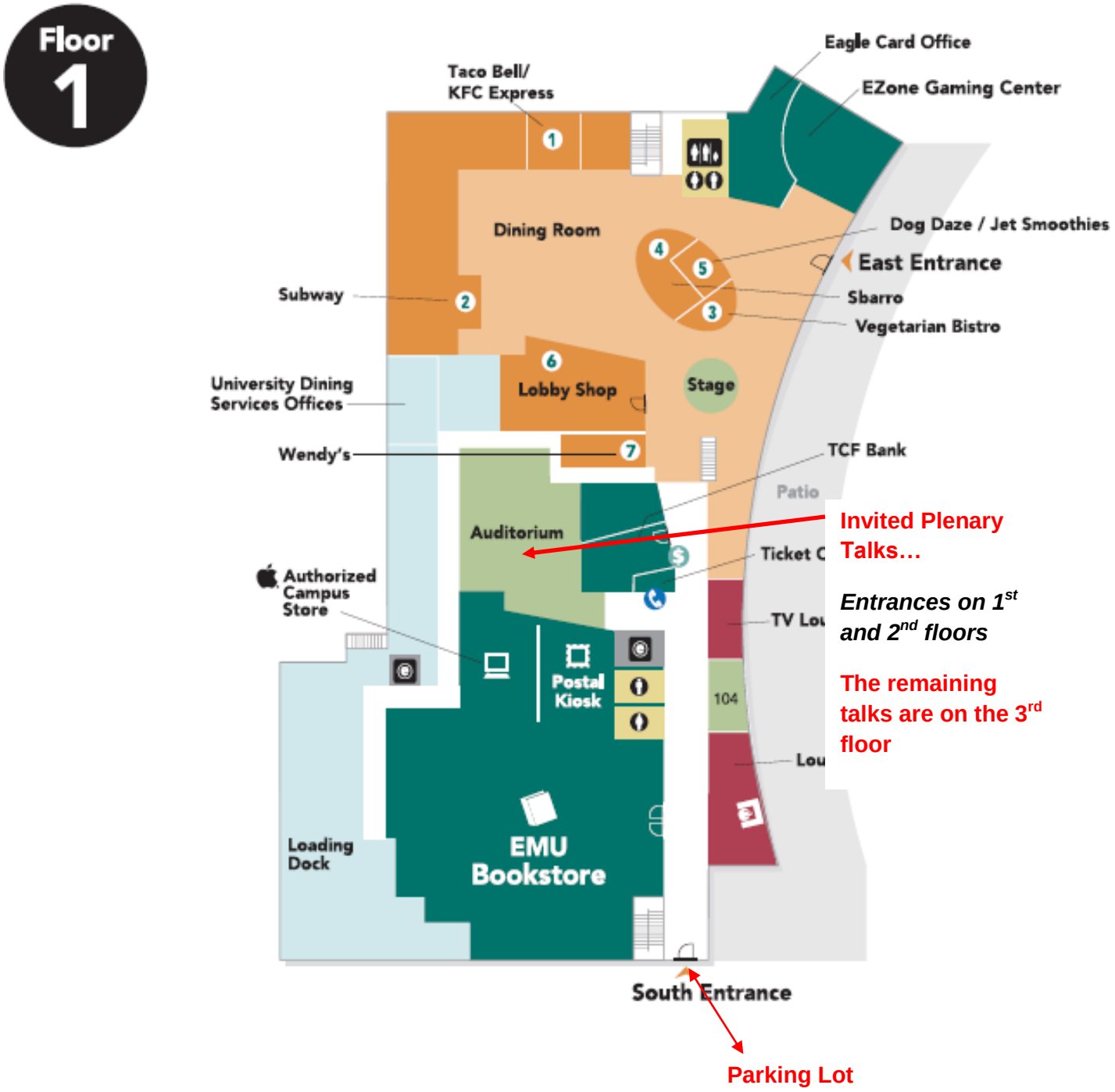
Floor 3


Kiva Room
360
Student Center Administration Offices
Center for Multicultural Affairs
347
Center for Student Involvement
• Campus Life
• Diversity and Community Involvement
• VISION
350
Women's Center
LGBT Resource Center
352
Multicultural Conference Room
Foot Wash Station
Lounge
Student Government & Student Organizations
344
343
330
Sessions
Event Planning Office
310B
310A
320
Lunch (310A& B)
Lounge
304
302
301
300
Patio
Exhibits/Refreshments

If you park in visitor's parking lot and enter from the NORTH, you will enter on the **second** floor.



If you happen to park in one of the other parking lots and enter from the South, you will enter on the **first** floor.



Welcome to Ypsilanti!

If you plan to stay in the Ypsilanti area for the night, we would recommend the following hotels. Additionally, you will find directions to campus and information about parking here.

Hotel Accommodations

Marriot-Eagle Crest, 1275 S. Huron Street, Ypsilanti
Holiday Inn Ann Arbor, 3600 Plymouth Rd, Ann Arbor
Comfort Inn & Suites, 2376 Carpenter Road, Ann Arbor
Harmony House, 615 E. Michigan Ave, Ypsilanti

Driving Directions to EMU Student Center · 900 Oakwood Street · Ypsilanti, MI, USA 48197

From the North

1. U.S. 23 to Washtenaw Avenue (Exit 37A)
2. Head east on Washtenaw to Oakwood St
3. Turn left on Oakwood St.
4. After 2nd stop sign
5. Proceed to the Student Center (on right).

From the South

1. U.S. 23 to Washtenaw Avenue (Exit 37A)
2. Head east on Washtenaw to Oakwood St.
3. Turn left on Oakwood St.
4. After 2nd stop sign.
5. Proceed to the Student Center (on right).

From the East

1. I-94 west to Huron Street (Exit 183)
2. Head north on Huron Street, which turns into Huron River Drive.
3. Turn left on Oakwood St. (stop light).
4. After 1 stop sign
5. Proceed to the Student Center (on left).

From the West

1. I-94 east to US 23
2. US 23 to Washtenaw Avenue (Exit 37A)
3. Head east on Washtenaw to Oakwood St.
4. Turn left on Oakwood St.
5. After 2nd stop sign
6. Proceed to the Student Center (on right).

Parking

Ample parking is available at the EMU Student Center.
Bring your parking ticket to the registration table and we can validate the ticket.

MAA/MichMATYC Spring 2010 Meeting

My Friday Schedule

Friday May7		
8:00	**Registration** ...***Coffee and Breakfast Treats…*** ***Room 302***	
8:50-9:00	**Welcome** ***Auditorium***	
9:00-9:50	**Plenary Address** **David Bressoud:** *"Issues of the Transition to College Mathematics"* ***Auditorium***	
10:00-10:20 10:00-10:30		
10:20-10:50	**Break**…Refreshments…Exhibits **Rooms 300 and 302**	
10:50-11:10		
11:15-11:35		
11:40 – 12:00		
12:00 – 1:45	**Lunch** **Sheldon Gordon:** *"The Mathematics the Partner Disciplines Want and our Students Need"* **Rooms 310 A&B**	
2:00 – 2:20		
2:30 – 2:50		
3:00 – 3:20		
3:20– 3:50	**Break**…Refreshments…Exhibits **Rooms 300 302**	
4:00-5:00	**<u>Special Presentation</u>** **Tim Chartier** *"Mime-matics"* ***Auditorium***	
5-5:45	**Reception**…Refreshments…Exhibits **Room 300**	
5:15 – 5:45	**Business Meeting** Room 302	**...Student Social Pizza/ Activity…TBA** Math Clubs to help organize EMU & SHU & (maybe GVSU?)
5:45 – 6:15	**Liaison Meeting** Room 302	
6:30-7:15	**Social 'Hour'**-Cash Bar- **Marriott Eagle Crest**	
7:15 – 9:45	**Awards Dinner: Tim Chartier -** *"March Mathness"* **Eagle Crest Marriot**	

My Saturday Schedule

Saturday May 8	
7:00 – 8:30	**AWM Breakfast** *Cafe Luwak , 42 East Cross Street, in Ypsilanti's Depot Town*
8:30	**Registration** – *Coffee and Breakfast Treats*
9:00 – 9:50	**Plenary Address** **Maria Andersen:** *"Math Technology to Engage, Delight, and Excite"* ***Auditorium***
10:00 – 10:20 10:00 - 10:30	
10:20 – 11:00	**Break**…Refreshments…Exhibits **Rooms 300 and 302**
11:00 – 11:20	
11:25– 11:45	
11:50 – 12:10	
12:15 – 2:00	**Lunch** **Annalisa Crannell:** *"Math and Art: The Good, the Bad, and the Pretty"* **Rooms 310 A&B**
2:00-5:00	Michigan NExT Symposium **Room 352**

Don't forget to visit in the Exhibit Area …Room 302

MAA MATHEMATICAL ASSOCIATION OF AMERICA

and see the excellent collection of items for sale from MAA.

Upcoming Events:

2010 Michigan Undergraduate Mathematics Conference, Grand Valley State University,
Saturday, October 9, 2010 (contact Paul Fishback for information)

2011 Michigan Section Meeting, Western Michigan University
April 29/30 or May 6/7, 2011(tentative dates) (contact Dennis Pence for information)

MichMATYC Conference 2010 – Muskegon Community College
October 16, 2010 **…visit:** **http://www.michmatyc.org/**

Notes:

Special thanks to the following exhibitors for their support and contributions to this year's conference:

Carnegie Learning

Al Gauche
1-888-851-7094 x-461
agauche@carnegielearning.com

Cengage Learning …

…thank you for sponsoring the Friday "Coffee Break"

Steve Korb, Jane Rodgers, Dawn Bauer
Steve.Korb@cengage.com
Jane.Rodgers@cengage.com
dawn.bauer@cengage.com

McGraw-Hill

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…thank you for sponsoring <u>Raffle Prizes:</u>

- ***TI Nspire™*** *Teacher bundle (software and handheld)* ***CAS***
- ***TI Nspire™*** *Teacher bundle (software and handheld)* ***Numeric***
- *Also… teachers who participate in the 'hands on' TI-Nspire™ sessions will be given a* ***free copy*** *of "Learn & Earn version of TI Nspire™ Teacher software.*

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