2017 Joint Meetings

Of The

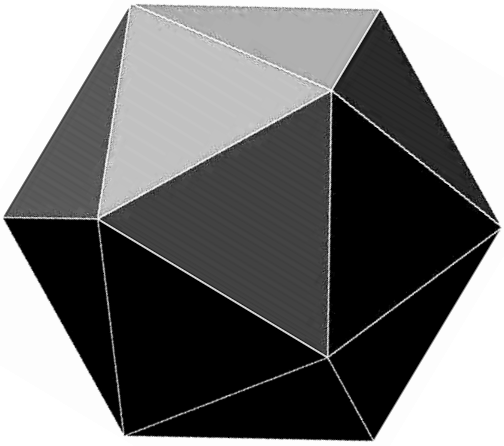
Florida Section

Of The

Mathematical Association of America

And The

Florida Two-Year College Mathematics Association



State College of Florida

February 17 - 18, 2017

Florida Section of the Mathematical Association of America

2016 – 2017

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Florida Two-Year College Mathematics Association

2016-2017

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President-elect	Sandra Seifert, Florida SouthWestern State College

PROGRAM

Friday, February 17, 2017

Committee Meetings and Workshops

FL – MAA

9:30 – 11:00 **Executive Committee Meeting** **9-102**

FTYCMA

9:30 – 10:30 **FTYCMA Officer's Meeting** **9-103**

10:30 – 12:00 **FTYCMA Annual Business Meeting** **9-103**

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12:00 – 1:30 **New Members Luncheon and Mingle** Student Center (#14)

Free lunch for first time attendees. This luncheon is our opening mingle to welcome new members and provide an opportunity to network with members from all over Florida. Pre-registration was required.

Registration

11:00 – **Registration & Publishers** Building 9 Hallways

Sign in and browse the displays from several publishing representatives.

Welcome

1:45 – 2:00 **Welcoming Remarks** Neel Performing Arts Center (11 East)

Joni Pirnot
Dr. Carol F. Probstfeld, President of State College of Florida
Altay Özgener, President, FTYCMA
John R. Waters, Jr. President, FL-MAA

Friday, February 17, 2017

2:00 – 2:50 Plenary Session Neel Performing Arts Center (11 East)

Tim Chartier – Vice President, Mathematical Association of America

March Mathness

3:00 – 3:45 Contributed Papers Session I

Full Session

Sarah Wyatt & Lynne O'Dell - Indian River State College 9-203

Proven Results: Improve Student Learning and Success Rates in Gateway Math

Stephen Davis - *Davidson College* 9-215

Writing and Reading the AP Calculus Exam

Naimul Chowdhury (Undergraduate) - New College of Florida 9-216

Stem Cell Modeling: Cell Fate Determination

Session A 3:00 – 3:20

Gregory McColm - University of South Florida 9-214

Utilitarian Roots of Geometry

Indu Rasika Churchill (Graduate Student) - University of South Florida 9-218

A new twist on Quandles

Valeria Gamboa (Undergraduate) – University of West Florida 9-219

Solving Linear Systems - PageRank and Markov Chains

Session B 3:25 – 3:45

Ted Andresen - Retired SPC and Honeywell Aerospace 9-214

Understanding curvature, geodesics and spaghettification

Sher B. Chhetri (Graduate Student) - Florida Atlantic University 9-218

Performance rating of the beta transmuted Pareto distribution: an analytical approach

Paul Webb (Undergraduate) – University of West Florida 9-219

Number Theory and R.S.A. Encryption

3:00 – 4:45 Workshops

Dr. Paul Nolting - State College of Florida 9-202
Dr. Fitzroy Farquharson - Valencia College - West Campus

Successfully Integrating Math Study Skills into Curriculum: Classroom, Emporium, Modular & Online

Mary Beth Williams - Eastern New Mexico University 9-210

Better, faster, cheaper – Leveraging OER & Adaptive Learning to improve outcomes

4:00 – 4:45 Contributed Papers Session II

Full Session

Li Zhou - Polk State College 9-214

Do dogs know Cauchy-Schwarz's inequality, or play with rulers and compasses?

Patrick Bibby - University of Miami 9-215

Teaching a Course in Sabermetrics, the Mathematics of Baseball

Josaphat Uvah - University of West Florida 9-218

On Design, Implementation and Assessment of Hands-on Activities for Undergraduate Mathematics Students

Session A 4:00 – 4:20

Jean S. Joseph (Graduate Student) - Florida Atlantic University 9-216

Cantor's Theorem

C. Altay Özgener - State College of Florida 9-219
Robert Shollar - University of West Florida

The "abc" conjecture, history, and progress

Session B 4:25 – 4:45

Hasala Senpathy Karunaratne Gallolu Kankanamalage - Florida Atlantic University 9-216

Lyapunov Characterizations of output stability for time delay systems

Carol Warner - Barry University 9-219

Flex Math

4:00 – 5:30 Student Events 9-203

Student Integration Contest (4:00-4:45)

Come test your integration abilities!

Student Problem Solving Contest (4:45-5:30)

Students test their problem solving skills.

4:45 – 5:30 Governor's Session

Pam Crawford – Jacksonville University 9-219

News and Notes from the MAA

4:45 – 5:30 Conference Break

Please visit the text book publishers in the Building 9 Hallways!

5:40 – 6:30 Plenary Session Neel Performing Arts Center (11 East)

Ken Ono – Emory University

Gems of Ramanujan and their Lasting Impact on Mathematics

6:45 – 8:30 Conference Banquet and Awards Ceremony Student Center (#14)

Playing at dinner will be SCF Presidential Jazz Quartet
featuring Fernando Cruz on tenor saxophone, Nico Sanchez on guitar, Isaac Mingus on bass, and Ethan Eckhard on drums

After the Banquet

Conference attendees will have the option of seeing *BY THE NUMBERS* on Friday at 8 PM or on Saturday at 11:45 AM. Tickets are complimentary but must be selected upon arrival at the conference registration table. The play runs approximately 90 minutes, which allows time to visit the art gallery after viewing the play.

The Fine Art Gallery at the State College of Florida will host a reception from 8-10 PM on Friday, February 17, for its newest exhibit, "Richard Anuszkiewicz: Inward Eye." The exhibit includes the words of the poet and painter William Blake and was chosen to emphasize the relationship of mathematics to the fine arts. Skillfully planned and executed, Anuszkiewicz's images allow him to focus on color and geometry; combined with Blake's words, the images produce associations that can transform meaning.

Saturday, February 18, 2017

8:45 – 9:30 Contributed Papers Session III

Full Session

Terje Hoim - H.L. Wilkes Honors College, FAU 9-203

Looking into a future – Is it possible to have a computer-based mathematics education?

Patrick Murphy - Valencia College, East Campus 9-215

Resources and Best Practices for Teaching Polyhedra

Session A 8:45-9:05

David Quesada, Aylin Alejo, Yanko Davila, & Ashley Perez – 9-214
St. Thomas University

From statistical analysis to epidemic modeling: Virus-induced asthma in South Florida

Matthew Cuffaro - University of South Florida 9-216

Algebraic Significance of the Symmetry on the Gamma Function for the Special Values of L-Functions

Jessica Kitchen (Undergraduate) - University of West Florida 9-218

Finding the Good in the Bad of Matrix Product

Sarena D. Robertson & Rebecca A. Harvey (Undergraduates) – 9-219
Embry-Riddle Aeronautical University

Wave Motion Induced By Turbulent Shear Flows Over Growing Stokes Waves

Session B 9:10-9:30

David Quesada, Manuel Garcia-Russo, & Natasha Astudillo – 9-214
St. Thomas University

From time series to brain networks: Analysis of brain network dynamics in case of epilepsy

Jeffery W. Lyons, Samantha A. Major & Kaitlyn B. Seabrook - 9-216
Nova Southeastern University

Continuous Dependence and Differentiating Solutions of a Second Order Boundary Value Problem With Average Value Conditions

Joseph Kennedy, Talia Barroco, Stacey Burchette, Shawn Harrell (Graduate Students), & Anthony Okafor - University of West Florida 9-218

Baseball Analytics: Determining an Optimal Play Schedule

Claire Bodemann (Undergraduate) - Eckerd College 9-219

Invariants of Knots and the Alexander Polynomial

8:45 – 10:30 Workshops

C. Altay Özgener - State College of Florida 9-202
Robert Shollar - University of West Florida

Intermediate LaTeX Workshop

Milé Krajcevski - University of South Florida 9-210

Visualizing mathematical notions through freehand drawing

9:45 – 10:30 Contributed Papers Session IV

Full Session

Nely Hristova -Valencia College 9-215

New Approach in Teaching Sets in MGF1106 College Mathematics Course

Warren Wm. McGovern - H.L. Wilkes Honors College, FAU 9-216

Minimal primes in commutative rings with identity

Session A 9:45-10:05

Roxanne Back & Lisa DeCastro – Florida Southern College 9-203

Forming a Learning Community for 1st Semester Math Majors

Joseph Kennedy (Graduate Student) - University of West Florida 9-218

A Superficial Examination of Mean First Passage of Time

Rachel J. Cunio - St. Leo University 9-219

Effects of the Stereotype Threat on Women's Mathematics Performance at a Liberal Arts Institution

Session B 10:10-10:30

Jerry Tuttle - Bergen Community College 9-203

Those who can, do; those who can't - use computer simulation

Bret Taylor – Lake Sumter State College 9-214

A Committeed Look at Pascal's Triangle

***Gerald Meyers* (Undergraduate) -** State College of Florida 9-218

The Nature of Mathematics and How it can Improve How We Teach (v0.1)

Katherine Rose McClure (Undergraduate) - *USF Sarasota Manatee* 9-219

Statistical Correlation of Factors Associated with Liver Cancer

10:45 – 11:30 Contributed Papers Session V

Full Session

Dan Ray - Carnegie Math Pathways 9-202

Radically Transforming Mathematics Learning Experiences for ALL Students: Equity Lessons from the Carnegie Math Pathways (Statway and Quantway)

Alex Ambrioso - Hillsborough Community College 9-210

Incontrovertible Calculations in Jules Verne's Novel From the Earth to the Moon

Panel of Playwrights Student Center 14-147/148
moderated by **Joni Pirnot,** State College of Florida

BY THE NUMBERS

Joy D'Andrea - USF-Sarasota-Manatee 9-215
Rebecca Wooten - New College of Florida

Developing Critical Thinking using Practical Computing

Kathryn Van Etten - New College of Florida 9-216

Optimizing Jammer Transmissions for Wireless Localization

Session A 10:45-11:05

Scott H. Demsky - Broward College, Central Campus 9-218

A Consistent Methodology for Applying Linear Transformations

Devan Warden (Undergraduate) - Embry-Riddle Aeronautical University 9-219

Prediction Equation and Correlation Coefficients Using Multiple Linear Regression with Real Data

Session B 11:10-11:30

Sharmistha Chakrabarti, Frederique Drullion & Jayathi Raghavan 9-218
Embry-Riddle Aeronautical University

Teaching Innovations in Honors Mathematics Course Sequence

Richard Otto Krogman - H.L. Wilkes Honors College, FAU 9-219

Fusible Rings

11:45 – 1:15 Movie time (#10-115)

The Man Who Knew Infinity

Closing Remarks

Altay Özgener, President, FTYCMA

11:45 – 1:15 Play time Howard Studio (#11 West)

BY THE NUMBERS

Closing Remarks

John R. Waters, Jr. President, FL-MAA

1:30 – 3:00 Luncheon and FL-MAA Business Meeting Student Center (#14)

ABSTRACTS

Contributed Papers Session I

Full Session

Sarah Wyatt & Lynne O'Dell - Indian River State College

Proven Results: Improve Student Learning and Success Rates in Gateway Math

Redesigning Intermediate Algebra has been IRSC's 5 year Quality Enhancement Plan. Now in its 4th year, the redesign project includes using computer emporiums, expanding delivery methods, and adding Quantitative Reasoning as a second gateway course. This action research project will be shared from year 1 to the current year 4, including the implementation, data driven changes, our failures and successes. Join us to learn how your college and especially your math students may benefit from utilizing all or part of our plan!

Stephen Davis - *Davidson College*

Writing and Reading the AP Calculus Exam

The AP Calculus Chief Reader discusses aspects of building and grading a high-stakes exam for a large student population. In particular, in the implementation year for an updated AP Calculus curriculum, we explore how a new curriculum framework and associated Mathematical Practices for AP Calculus impact both the development and scoring of the exam.

Naimul Chowdhury (Undergraduate) - New College of Florida

Stem Cell Modeling: Cell Fate Determination

A central open problem of modern stem cell research is the production of a quantitative model which can predict the behavior of stem cells *in vivo* and *in vitro*. In contemporary stem cell research, proposed models are focused on graphs called Pluripotency Gene Regulatory Networks, which are described by systems of ordinary differential equations. Solutions of those ODEs describe equilibrium states of the system, which can be interpreted as distinct cell fates. In this presentation I will introduce the modeling problem and a working example, and finish with a discussion of its significance in biology, medicine, and mathematics.

Session I-A

Gregory McColm - University of South Florida

Utilitarian Roots of Geometry

Humans have been designing buildings and other structures since the end of the last Ice Age, and during the design process, engineers and architects have used images to depict the desired structure. But unlike artists, engineers and architects need depictions that they can use to fabricate products from screws to military fortifications. (Surveyors and navigators need similar depictions.) While an artist creates a compelling representation of something real or imaginary, an architect or an engineer needs a design that can guide the fabrication of the desired product. That's a very different kind of picture. One of the original (economic) motives for geometry was

the demand of the architects' and engineers' toolkit. This will be a brief account of the design problems engineers and architects faced and the mathematics they used (and occasionally developed) to address these problems - with the occasional assistance of academic mathematicians.

Indu Rasika Churchill (Graduate Student) - University of South Florida

A new twist on Quandles

Quandles are non-associative algebraic structures whose axioms are motivated by Reidemeister moves in Knot Theory. The concept of a quandle can be used to help solve the fundamental knot theory problem of determining if two different knot diagrams represent the same knot. In this talk, we will give the precise definitions to make the talk self contained. We present some of the recent research that generalizes quandles by introducing the notion of f-quandles wherein we attach a map f to the usual equation identities. We will give some examples of f-quandles.

Valeria Gamboa (Undergraduate) – University of West Florida

Solving Linear Systems - PageRank and Markov Chains

The algorithm developed by Google and used to rank websites for a given search result is known as PageRank. In this presentation, we will examine how PageRank works mathematically by replicating the behavior using linear numerical methods. We will develop a numerical linear solver for solving the linear system A~x = ~b by using the LU factorization based on Gaussian elimination with partial pivoting. In the linear system, matrix A is a huge sparse matrix that shows the Markov chains of the interconnected hyperlinks. We will use sparse matrices to improve efficiency, require less memory, and handle a large amount of results when the number of hyperlinks grow as the number of pages become larger.

Session I-B

Ted Andresen - Retired SPC and Honeywell Aerospace

Understanding curvature, geodesics and spaghettification

2015 marked the 100th anniversary of Albert Einstein's general theory of relativity. This centennial may prompt some to examine concepts, such as curvature and geodesics. Flat surfaces allow us to understand a simplified concept of curvature. Through the use of physical models these concepts can easily be extended to more complicated surfaces such as spheres, toroids, and saddles. Each attendee will be provided with a torus and a geodesic tool, so they can examine how geodesics behave on surfaces of different curvatures. Finally, we will explore the behavior of a rectangular region in free space and spaghettification near a large gravitational mass.

Sher B. Chhetri (Graduate Student) - Florida Atlantic University

Performance rating of the beta transmuted Pareto distribution: an analytical approach

In this work, we propose a new generalizer which is obtained by the composition of the genesis of beta distribution and transmutation map. We will execute this generalizer to the Pareto distribution to develop a new distribution with five parameter so-called beta transmuted Pareto distribution (BTP). Several mathematical properties including moments, mean deviation, probability weighted moments, residual life, distribution of order statistics and the reliability analysis are discussed. The method of maximum likelihood is proposed to estimate the parameters of the distribution. We illustrate the usefulness of the proposed distribution by presenting its application to model real-

life data. We show its flexibility over other sub models submodels and it has been shown that BTP is superior to its submodels.

Paul Webb (Undergraduate) – University of West Florida

Number Theory and R.S.A. Encryption

For thousands of years, encryption required symmetrical keys that locked and unlocked the message. This typically required a meeting between parties to establish the method and a key, and if the method was ever leaked or discovered otherwise a new manner of encoding becomes necessary. This led to a constant struggle between code makers and code breakers. That is, until the middle of the 1970s, three MIT Professors; Rivest, Adleman, and Shamir invented a one-way function that use a distinct key to decrypt that is mathematically difficult to derive from the known encryption key. Additionally, it no longer became necessary to conceal the manner in which you encrypt a message. This brought the subject of security to the public forum and forced systems to have provable security. This new form of Asymmetrical Encryption is the largest change to secret communication methods in thousands of years and relies on computational complexity in order to provide security for billions of people.

Workshops – Friday

Dr. Paul Nolting - State College of Florida **& Dr. Fitzroy Farquharson -** Valencia College - West Campus

Successfully Integrating Math Study Skills into Curriculum: Classroom, Emporium, Modular & Online

State movements have colleges redesigning courses. Students take accelerated developmental courses or are recommended to take higher-level credit courses for which they may not be prepared. The response to this crisis have been several National Math Summits joint sponsored by NADE, AMATYC and MAA. Summit experts agreed that the shifting emphasis on higher-level math courses will force students to improve their affective characteristics representing 25% to 41% of their grade or have higher failure rates. To mitigate this damage, colleges *must* find ways to integrate math study skills into developmental classrooms and credit courses. The workshop objective is to demonstrate to faculty the integration of math study skills (note-taking, online home work, reading), motivation, anxiety-reduction techniques, test-taking skills, test analysis skills, and persistence into the curriculum and math labs. Research has demonstrated that by integrating these math study skills and motivation directly into courses has improved math learning and grades.

Mary Beth Williams - Eastern New Mexico University

Better, faster, cheaper – Leveraging OER & Adaptive Learning to improve outcomes

In a single classroom, an educator can have any number of students who need extra support, those who may need challenging content, and others who simply need more time to complete assignments. Hear from early adopters how adaptive instruction combined with curated Open Educational Resources (OER) helps students gain mastery of every concept through real-time individualized instruction, just-in-time scaffolding and cross-course discipline interventions in Math.

In this interactive session, instructors will discuss how they implemented, their goals, successes and challenges.

The audience will: 1) Understand how adaptive instruction provides each student with a personalized learning path & helps struggling students master pre-requisite concepts across disciplines. 2) Learn how to use data to inform instruction 3) Gain insights to how curated OER lowers costs of course materials 4) Receive tangible tips on how to integrate adaptive technology & to engage students.

Contributed Papers Session II

Full Session

Li Zhou - Polk State College

Do dogs know Cauchy-Schwarz's inequality, or play with rulers and compasses?

More than a decade ago, CMJ featured the story of Elvis, the Welsh Corgi, who seemed to instinctively follow the path of least time to get from a point on the shore to a ball in the water, when he ran faster than he swam. Since such minimization problem is a typical exercise in calculus, the title of the CMJ article is Do dogs know calculus?. Since then, several different perspectives have been offered for the dog. In this talk, we present new elementary algebraic and geometric solutions to this minimization problem and its variations.

Patrick Bibby - University of Miami

Teaching a Course in Sabermetrics, the Mathematics of Baseball

An introductory course in sabermetrics was taught at the University of Miami during the fall of 2016. Much of the time was devoted to the metrics themselves, but there was sufficient time to discuss such topics as rules, baseball vernacular, scoring, important events in the history of baseball, career achievements, single-season achievements, famous quotations, and player nicknames. Offensive metrics included BA, SLG, OBP, OPS, POP, SLOB, TPQ, ISO, PwrF, PwrA, and SB%. Defensive metrics included ERA, WHIP, K/BB, SO9, and FLD%. Other metrics included park factors, park-adjusted metrics, relative metrics, and the Pythagorean record. At the end of the term, students participated in a correlation project to determine which metrics were most associated with team wins. Several documents from the course, including a summary of the correlation project, will be shared with those who attend.

Josaphat Uvah - University of West Florida

On Design, Implementation and Assessment of Hands-on Activities for Undergraduate Mathematics Students

We discuss elements of a good design for program-wide research activities for undergraduate students. While the benefits of such activities abound and are well-known, there are inherent issues in every phase of the endeavor, issues that must be overcome in order to establish a worthy research program for all students. Based on our twenty-year experience at the University of West Florida, we discuss some of those issues and strategies for tackling them successfully. In particular, we highlight an assessment platform for research activities for undergraduate students.

Session II-A

Jean S. Joseph (Graduate Student) - Florida Atlantic University

Cantor's Theorem

In 1895, Georg Cantor gave an order characterization of the rational numbers $\mathbb{Q}$. With that characterization, it is easily seen that $\mathbb{Q} \times \mathbb{Q}$ with the lexicographic order and $\mathbb{Q} \cup \mathbb{Q}\sqrt{2}$ with the order on $\mathbb{R}$ are order isomorphic to $\mathbb{Q}$. We will discuss Cantor's theorem and a constructive version of that theorem.

C. Altay Özgener - State College of Florida **& Robert Shollar** - University of West Florida

The "abc" conjecture, history, and progress

The abc conjecture (aka Oesterlé–Masser conjecture) is a conjecture in number theory. It is stated in terms of three positive integers, a, b and c that are relatively prime and satisfy a + b = c. If d denotes the product of the distinct prime factors of abc, the conjecture essentially states that d is usually not much smaller than c. In other words: if a and b are composed from large powers of primes, then c is usually not divisible by large powers of primes. We will talk about the history, implications, and the recent "progress" on the conjecture.

Session II-B

Hasala Senpathy Karunaratne Gallolu Kankanamalage - Florida Atlantic University

Lyapunov Characterizations of output stability for time delay systems

In this work we present two Lyapunov Characterizations for output stability for systems with delays. Similar results for systems without delays have demonstrated wide applicability in stability analysis of nonlinear control systems. Output stability essentially appears in intrinsically different forms in control systems. In current work we concentrate on output Langrange stability condition for systems affected by delays. In current work we establish Lyapunov-Krasovskii characterizations with different decay estimates. These different characterizations provide flexibility in applications as well as theoretical computations.

Carol Warner - Barry University

Flex Math

Lessons learned from teaching a Flexible Math for Liberal Arts course broadcast to 3 locations simultaneously and online. The benefit of the flex course is the cost-savings to the university and the convenience for the students. But there are also some pitfalls.

Contributed Papers Session III

Full Session

Terje Hoim - H.L. Wilkes Honors College, FAU

Looking into a future – Is it possible to have a computer-based mathematics education?

Estonia was the first country to respond to Conrad Wolfram's vision to have computer-based mathematics (CBM) education. As a result, a completely new math curriculum for the probability and statistics course in middle schools and high schools was developed with learning taking place in a computer-based environment using real-life problem-solving situations. The objective was to make the learning of math more interesting for the students, improve the skills of mathematical thinking and implementation of mathematical methods in real life situations, and demonstrate how computers and other digital equipment make the learning and real-life use of mathematics more diverse and effective. Materials have been piloted with more than 40 teachers and 1800 students.
In this presentation we will take a look at the new CBS study materials (teacher's and student's view), introduce the philosophy and methodology of the statistics renewal project, analyze the feedback of teachers and students, and indicate possibilities for further improvement.

Patrick Murphy - Valencia College, East Campus

Resources and Best Practices for Teaching Polyhedra

Given the number and types of polygon faces, how many edges and vertices does a polyhedron have? What does it look like? Even some of our best students have trouble with the mathematical connections between 2-D polygons and 3-D polyhedra. Come see how the internet, tactile learning, specific vocabulary, and a table-solving format can be used to increase student learning regarding polyhedra.

Session III-A

David Quesada, Aylin Alejo, Yanko Davila, & Ashley Perez –St. Thomas University

From statistical analysis to epidemic modeling: Virus-induced asthma in South Florida

Health data collected by the Department of Health of Florida from January 2005 to December 2012 are analyzed in conjunction with weather information gathered from NWS and Weatherbug stations across South Florida. Data processing is performed using Mathematica 10.4 capabilities and rendered in variety of formats that are easy to be understood by medical practitioners. Such an analysis is aimed at finding potential correlations between weather conditions and the number of cases of asthma and other respiratory disorders at Emergency Departments in Miami Dade, Broward and Palm Beach counties. From a detailed biometeorological analysis it is concluded that associations with weather and environmental variables are weak enough to explain the observed seasonality. It motivated the authors to explore the potential relation between epidemics, seasonality, and the triggering of respiratory disorders. In this end, two epidemic models are analyzed: the classical SEIR model and a variation of it, that we have labelled as SEIAR model. The latest one seems to explain much better the seasonal effects, and the remainder components of the recorded health data. The geographic distribution of "hot spots per zip codes" is explained appealing to epidemics spread on networks. In conclusion, asthma is South Florida seems to results from the thermal stress associated with incoming cold fronts, which affects the upper respiratory system, making it vulnerable to infections, which in turn trigger inflammatory process conducive to asthma episodes.

Matthew Cuffaro - University of South Florida

Algebraic Significance of the Symmetry on the Gamma Function for the Special Values of L-Functions

The convexity of the gamma function induces an equivalence relation on the positive reals stating the unique existence of a pair of values (a, b) such that $\Gamma(a)=\Gamma(b)$ for some positive real h. For $2h$, we conjecture that these pairs are always members of some algebraic number field, and that this property of the gamma function allows us insight into the relationships between these fields. This property helps us build evidence towards the existence of relationships between modular L-functions $L(f, s)$, s within a particular algebraic number field, and ordinary zeta functions up to a scalar multiple.

Jessica Kitchen (Undergraduate) - University of West Florida

Finding the Good in the Bad of Matrix Product

Real symmetric matrices have many pleasant properties. For example, their eigenvalues are all real and symmetric matrices are orthogonally diagonalizable. However products of symmetric matrices in general are not symmetric. Since symmetric matrices have such a nice structure, we'll consider them to be instances of "good" matrices. In contrast a matrix that is far from being symmetric or lacks structure, would be considered a bad matrix. This report is based on the article "Bad Products of Good Matrices" by Paul Halmos, where a question is addressed: How

bad can the product of two symmetric matrices be? The surprising answer is that every square matrix is the product of two symmetric matrices. This presentation will provide a detailed explanation of how the result, from the major question in the article, is obtained.

Sarena D. Robertson & Rebecca A. Harvey (Undergraduates) – Embry-Riddle Aeronautical University

Wave Motion Induced By Turbulent Shear Flows Over Growing Stokes Waves

It is proposed that mechanisms identified for wave-induced motion contribute to a larger net growth of wind driven water waves when the waves are unsteady non-linear compared with growth rates for steady monochromatic waves. For unsteady surface waves the amplitude is proportional to $e^{kc_i t}$, where c_i is the complex portion of wave phase speed, the waves grow as energy is transferred to them by wind. This will display critical height to a point where thickness of the inner layer kl_i becomes comparable to critical height kz_c, where mean wind shear velocity equates to the real part of the wave speed c_r. Here we demonstrate that wave-induced motion, due to orbital velocity of the moving wave, contributes additional momentum transfer, F_ω, from wind to surface waves. This yields a larger shear flow over the waves around the critical layer where cat's-eye are formed at the inflection point in the wind shear.

Session III-B

David Quesada, Manuel Garcia-Russo, & Natasha Astudillo – St. Thomas University

From time series to brain networks: Analysis of brain network dynamics in case of epilepsy

Mapping brain areas responsible for pathological behaviors of the central nervous system is one of the areas of major interest in translational medicine nowadays. In this sense, the concept of brain networks ha emerged as one of the most fascinating applications of graph theory and complex networks. This communication is aimed at presenting the application of above ideas to address epilepsy. By using the capabilities provided by Mathematica 10.4 to deal with networks and time series analysis, data obtained from EEG measurements are analyzed and mapped into a network. Variability's within obtained network - measurement batches are computed and some predictions are advanced in terms of network features. Additionally, two types of mathematical models are solved, the FiztHugh - Nagumo and the Kuramoto model operating on a network. The former accounts for the behavior of a group of neurons within a particular cortical region of the brain, while the second is used to account for the synchronicity between different areas within the Temporal Lobes, where epileptic focal points use to be localized. Results from this research are translated into methodologies to be followed by surgeons when they do surgical procedures in patients who do not respond to antiepileptic medications.

Jeffery W. Lyons, Samantha A. Major & Kaitlyn B. Seabrook - Nova Southeastern University

Continuous Dependence and Differentiating Solutions of a Second Order Boundary Value Problem With Average Value Conditions

Using a few conditions, continuous dependence, and a result regarding smoothness of initial conditions, we show that derivatives of solutions to the second order boundary value problem $y'' = f(x, y, y')$, $a < x < b$, $y(x_1) = y_1$, $\frac{1}{d-c}\int_c^d y(x)dx = y_2$, $a < x_1 < c < d < b$, $y_1, y_2 \in \mathbb{R}$ with respect to each of the boundary data x_1, y_1, y_2, c, d solve the associated variational equation with interesting boundary conditions. Of note is the second boundary condition with an average value condition.

Joseph Kennedy, Talia Barroco, Stacey Burchette, Shawn Harrell (Graduate Students), & Anthony Okafor - University of West Florida

Baseball Analytics: Determining an Optimal Play Schedule

Historically in the professional sports, antiquated techniques have been employed to determine the schedules of play. A host of benefits stands to be gained in determining an optimal schedule including, but not limited to, minimal travel distance, reduced travel costs, as well as decreased physical and psychological stresses on players. Using binary linear programming and incorporating weighted directed graphs to model a season of play, we obtained, through the branch and bound method, a means of determining a minimum total travel distance. We represent the schedule as a set of sequences, each having terms indicating the location of the respective team and whether or not they play a game. We further explored the effect on the schedule by adjusting the bounds on the number of away games played, and the number of opponents a team competes against. Results obtained can be used to inform scheduling and managerial personnel. Additionally, the results can be implemented in time, personnel, financial assets, and other resource-saving measures to improve upon current practices.

Claire Bodemann (Undergraduate) - Eckerd College

Invariants of Knots and the Alexander Polynomial

This is an introductory talk which will explore the equivalence of knots. In particular, we will define the Alexander Polynomial and show how it can be used to distinguish two knots. We will also look at unknotting numbers and coloring schemes.

Workshops - Saturday

C. Altay Özgener - State College of Florida & **Robert Shollar** - University of West Florida

Intermediate LaTeX Workshop

This workshop will introduce some packages of the typesetting program LaTeX.

Milé Krajcevski - University of South Florida

Visualizing mathematical notions through freehand drawing

This workshop will enable its participants to represent mathematical objects in a visual way and illustrate mathematical statements using freehand drawing. We will present basic principles of freehand drawing, investigate connections between analytical and visual representations of the same object, and emphasize advantages of visualization in undergraduate mathematics.

Contributed Papers Session IV

Full Session

Nely Hristova -Valencia College

New Approach in Teaching Sets in MGF1106 College Mathematics Course

Understanding terminology and concepts is the foundation of learning in many disciplines. In Sets MGF1106 College Mathematics students struggle in grasping the terms and concepts that are abstract and difficult. Adding to this challenge is the complicated factor that students have to explore and apply this terminology in meaningful and rigorous manner in order to solve application problems.

Many students don't know and/or have difficulties solving problems where complement, union, and intersection of sets are present in the same problem. Introducing a new approach to teaching this material is the focus of this presentation. Data from my classes in fall of 2015 is taken under consideration when designing this new approach. Flip classroom is implemented into the new lesson plan, and its benefits and key elements will be presented along with a demonstration I have specifically created for solving complement and intersection, complement and union, and complement, intersection and union.

Warren Wm. McGovern - H.L. Wilkes Honors College, FAU

Minimal primes in commutative rings with identity

Let R denote a commutative ring with identity. We shall discuss the collection Min(R) of minimal prime ideals. The discussion will include a reason why such things exist, as well as two natural topologies on Min(R), the hull-kernel and inverse topology. The main thrust will be to show how some typical topological questions give rise to important classes of rings. Other structure spaces will be discussed: e.g. Max(R), Max_d(R), and Max_r(R).

Session IV-A

Roxanne Back & Lisa DeCastro – Florida Southern College

Forming a Learning Community for 1st Semester Math Majors

Learning communities are known to achieve many positive outcomes such as increased student retention, engagement and academic success. We developed a learning community for incoming math majors that was both rewarding and challenging. We will discuss our experience and share suggestions for planning and facilitating a Learning Community.

Joseph Kennedy (Graduate Student) - University of West Florida

A Superficial Examination of Mean First Passage of Time

The mean first passage of time problem examines the average time taken for a stochastic process to exit a certain region/state. We focus on the average time for a standard Brownian motion to leave regions in R and R^2. Brownian motion finds application in topics ranging from physics, financial mathematics, and biological chemistry amongst others. These different areas of study are often concerned with when the motion will enter a state of interest, in

financial mathematics this may be a buy or sell point used in channel trading, or an absorbing boundary in biological chemistry. The regions of concern in this paper are open balls centered at the origin for one and two dimensions. The balls are defined by traditional metrics including $d_1(x,y) = |x-y|$ for $x,y \in R$ along with $d_2(x,y) = (x^2 + y^2)^{1/2}$ and $d_\infty(x,y) = \max\{|x|,|y|\}$ for all $x,y \in R$. Using the Euler-Maruyama Scheme we simulate, and sample first exit times to form a bivariate data set of radii and mean exit times. We then build a linear regression model over the average exit times relative to the radii of the region, which may be used as a predictor. We found that the analytic results, found in literature, differed from the numerical results with very little error, and that the numerical results which were unable to be compared behave in a similar manor to the other numerical results. That is, all three numerical results behave in a quadratic behavior relative to the radius of the region.

Rachel J. Cunio - St. Leo University

Effects of the Stereotype Threat on Women's Mathematics Performance at a Liberal Arts Institution

The disparity in numbers of males and females in mathematics career fields may be due to gender-labeling decreasing females' mathematics performance and therefore interest in mathematics (Crisp, Bache, & Maitner, 2009). The phenomenon of competence-based stereotypes negatively affecting women's mathematics performance is known as a stereotype threat. This means when gender labels are salient, women tend to perform poorer than if gender labels are considered insignificant. However, Rivardo, Rhodes, and Klein (2008) found no evidence of this stereotype threat affecting mathematics achievement at a small liberal arts institution. This study sought to determine if the stereotype threat phenomenon would affect students of a small liberal arts institution in the southeastern United States. If so, an implication is that change in the mathematics education system is necessary so that gender-stereotypes are not made salient in classrooms. If not, what separates liberal arts institutions from other universities in terms of gender-related stereotypes?

Session IV-B

Jerry Tuttle - Bergen Community College

Those who can, do; those who can't - use computer simulation

Teachers are encouraged to use computer simulation in introductory statistics courses, but textbooks generally do not provide guidance on how to construct simulations. The speaker, who is a retired actuary and current community college instructor, will discuss creating some simulation examples and also how he used simulation in real-world actuarial use.

Bret Taylor – Lake Sumter State College

A Committeed Look at Pascal's Triangle

We will see how Pascal's Triangle can be constructed by counting how many committees consisting of N men and M women can be formed. It is a generalization of finding a number by adding the two numbers above it.

***Gerald Meyers* (Undergraduate) -** State College of Florida

The Nature of Mathematics and How it can Improve How We Teach (v0.1)

In the philosophy of mathematics, there is one question that is fundamental to how mathematics is perceived and done: Is mathematics is discovered or invented? This question can be boiled down into two different questions:

"Does math exist?" and "How is mathematics done?".These questions elucidate the distinction between the words discovered and invented, and, in some ways, their answers reflect upon the original question.
If mathematics exists in the same way as rocks, people, or anything we might deem physical, then one would expect to be able to discover mathematics in a similar manner to one discovering an island, new species, or planet. If mathematics does not exist in that manner, then mathematics can't be discovered, at least , not in any meaningful sense of the word, and has to be created. And if mathematics is more rigorous than artful, then it would make sense that it is more akin to a science than a painting. Conversely, if it is more artful, then it would be created, much like one carves a statue.

Katherine Rose McClure (Undergraduate) - *USF Sarasota Manatee*

Statistical Correlation of Factors Associated with Liver Cancer

Statistical modeling via the program R was utilized to determine the rate of correlation for a variety of factors with the incidence of liver cancer in Florida. All factors analyzed have previously been associated with liver cancer. Determination of which factors have the highest rate of correlation may be beneficial for future research. The factors evaluated were derived from the county health rankings website and include: adult obesity, binge drinking, low birthrate, adult smoking, physical inactivity, air pollution, low birth weight, and a lack of insurance. These were related to overall, female, male, Caucasian and African American liver cancer values using the Florida Cancer System's statistical data. In this talk, we will discuss a study that focuses on the incidence of liver cancer in Florida and factors associated with it from 2011 to 2014.

Contributed Papers Session V

Full Session

Dan Ray - Carnegie Math Pathways

Radically Transforming Mathematics Learning Experiences for ALL Students: Equity Lessons from the Carnegie Math Pathways (Statway and Quantway)

This talk will -
· Engage participants around "big ideas" for improving students' persistence and success in developmental mathematics
· Examine how Statway and Quantway address these ideas and result in greater success and a narrowing of the achievement gap
· Share suggestions of ways to address equity and achievement more intentionally within the various components of Math Pathways
· Highlight how the Pathways' organization as a networked improvement community critically supports collective learning and action and is working collaboratively to support more equitable learning and outcomes in developmental math.

This talk will begin with an overview of goals for transforming mathematics learning and addressing equity. It will explore one college's implementation of Statway as a case for achieving these goals. And it will encourage participants to consider approaches to addressing similar goals at their own institutions. The session will close with an opportunity for Q&A.

Alex Ambrioso - Hillsborough Community College

Incontrovertible Calculations in Jules Verne's Novel From the Earth to the Moon

In his novel *From the Earth to the Moon* Jules Verne's character Impey Barbicane, the president of the Baltimore Gun Club, claims that "by incontrovertible calculations…a projectile endowed with an initial velocity of 12,000 yards per second, and aimed at the moon, must necessarily reach it." We will show how he might have arrived at this calculation, discuss some of the novel's predictions and, in the spirit of the meeting, review some of its play-like scenes. The session should be interesting to Calculus teachers and science fiction enthusiasts.

Panel of Playwrights moderated by **Joni Pirnot,** State College of Florida

BY THE NUMBERS

THE MATH PLAYS is a series of short plays commissioned by the SCF theatre and math departments in honor of the 50th anniversary of the Florida Section of the MAA.
Come meet Lynne Halliday, James Hindman, Arlene Hutton, and Craig Pospisil, four award-winning professional theatre artists from New York City. We will learn how they explored the intersection between science and art by reading about math and talking to mathematicians, allowing their imaginations to take flight and create a cycle of dark, funny universes.

Joy D'Andrea - USF-Sarasota-Manatee & **Rebecca Wooten -** New College of Florida

Developing Critical Thinking using Practical Computing

Critical thinking is actively participating in a process designed to conceptualize, analyze, and evaluate information to interpret and draw conclusions. Computational skills require critical skills both inside and outside of academia – individuals need computer skills to succeed in the modern age of information and in the growing world of technologies. Practical computing begins with using software(s) for word-processing, graphic design, spreadsheets, programming, and statistical analysis. In this talk, we will briefly discuss some practical applications of computing; from writing a resume to doing academic research as it applies to education; both teaching and learning.

Kathryn Van Etten - New College of Florida

Optimizing Jammer Transmissions for Wireless Localization

Wireless sensor networks (WSNs) have the capacity to be useful tools in a wide range of situations, with applications in military communications, natural disaster prevention, or even climate control in buildings. The fundamental structure of a WSN – nodes that collect and communicate data, placed strategically around a certain area – lends itself especially to the problem of localization, the process of finding target locations based on known locations.

Current research addresses the questions of what kinds of data can be sent and received by sensor nodes to estimate location, and how to measure the amount of error in that estimation. In particular, this presentation examines the problem of localization in the presence of a jammer, which adds noise to disrupt sensor measurements. From the jammer-side point of view, we consider what variables we can control in the jammers, such as placement or power level, and how to optimize those variables for maximum effect.

Session V-A

Scott H. Demsky - Broward College, Central Campus

A Consistent Methodology for Applying Linear Transformations

Most College Algebra and Pre-Calculus textbooks accurately describe how to apply a single linear transformation (a horizontal or vertical translation, reflection, or stretch/shrink) to a function. However, few textbooks give a clear and consistent procedure for applying multiple linear transformations to a function. For example, how and in what order should linear transformations be applied to the graph of the function $y = \sqrt{x}$ to obtain the graph of the function $y = -2\sqrt{3x - 3} + 4$? This paper will provide and validate such a method in which the orientation of all transformations is consistent and in which all stretches, shrinks and reflections (horizontal or vertical) are applied before any translations (horizontal or vertical).

Devan Warden (Undergraduate) - Embry-Riddle Aeronautical University

Prediction Equation and Correlation Coefficients Using Multiple Linear Regression with Real Data

In my presentation, I will show the results of my analysis on the real data of two sections of a probability and statics class. I have used multiple linear regression to create a prediction equation to predict the final grade based on all the exams, homework, quizzes, and attendance. I will also show the correlation coefficients of the final grade with respect to the previously mentioned criteria.

Session V-B

Sharmistha Chakrabarti, Frederique Drullion & Jayathi Raghavan - Embry-Riddle Aeronautical University

Teaching Innovations in Honors Mathematics Course Sequence

The main purpose of this study was to improve retention, motivation and level of understanding in the mathematics honor sequence. To achieve these goals the authors implemented various teaching innovations over the past four semesters. These practices included: cross-collaboration among different levels of courses, digital team projects/homework, project-based learning, interdisciplinary modules, 3D-printing and guest lectures. The cross collaboration and the interdisciplinary modules motivate the students to retain information through their curriculum. The digital team project help the students with their oral communication skills and their digital literacy skills that are critical for the current era of information and technology. The project-based approach reinforces their leadership and teamwork skills. The 3D-printing helps the students visualize surfaces and work with the latest technology that will be part of their future work environment. The success of our study was assessed through student surveys, grade comparison and retention in the Honor sequence.

Richard Otto Krogman - H.L. Wilkes Honors College, FAU

Fusible Rings

Complemented rings, those of which have the property that any nonzero element has an annihilator for which their sum is regular, are a well-known class of rings. We introduce a weaker condition known as fusibility, where each nonzero may be represented as the sum of a zero divisor and a regular element. We investigate a construction formulated from a ring of functions that satisfies this weaker condition, but is not complemented.

Plenary Sessions

Tim Chartier – Vice President, Mathematical Association of America, Professor of Mathematics and Computer Science at Davidson College

Bio: Dr. Tim Chartier is Vice President of the MAA and a Professor of Mathematics and Computer Science at Davidson College, who specializes in sports analytics. He frequently works on data analytics projects with groups such as ESPN's Sport Science program, NASCAR teams, the NBA, and fantasy sports sites. He, along with a team of about two dozen student researchers, supplies analytics to Davidson College sports teams. Dr. Chartier is a recipient of the Alder Award and his research and scholarship were recognized with an Alfred P. Sloan Research Fellowship. He authored the book "When Life is Linear: From Computer Graphics to Bracketology," which won the Beckenbach Book Prize as a distinguished, innovative book. Dr. Chartier also authored "Math Bytes: Google Bombs, Chocolate-Covered Pi, and Other Cool Bits in Computing". Dr. Chartier serves on the Editorial Board for Math Horizons. He was the first chair of the Advisory Council for the National Museum of Mathematics. He has also worked with Google and Pixar on their K-12 educational initiatives. Dr. Chartier has served as a resource for a variety of media inquiries, including appearances with Bloomberg TV, NPR, the CBS Evening News, USA Today, and The New York Times.

March Mathness

Every year, people across the United States predict who will win in the Division I NCAA Men's Basketball Tournament, often called March Madness, by filling out a tournament bracket for the postseason play. This talk discusses two popular rating methods that were used by the Bowl Championship Series, the organization that determined which college football teams were invited to which bowl games. Each rating method 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. By the end, you'll be ready to create a mathematically-produced bracket for March Madness.

Ken Ono – Emory University

Bio: Ken Ono is the Asa Griggs Candler Professor of Mathematics at Emory University. He is considered to be an expert in the theory of integer partitions and modular forms. He has been invited to speak to audiences all over North America, Asia and Europe. His contributions include several monographs and over 150 research and popular articles in number theory, combinatorics and algebra. He received his Ph.D. from UCLA and has received many awards for his research in number theory, including a Guggenheim Fellowship, a Packard Fellowship and a Sloan Fellowship. He was awarded a Presidential Early Career Award for Science and Engineering (PECASE) by Bill Clinton in 2000 and he was named the National Science Foundation's Distinguished Teaching Scholar in 2005. In addition to being a thesis advisor and postdoctoral mentor, he has also mentored dozens of undergraduates and high school students. He serves as Editor-in-Chief for several journals and is an editor of *The Ramanujan Journal*.

Gems of Ramanujan and their Lasting Impact on Mathematics

Ramanujan's work has a truly transformative effect on modern mathematics, and continues to do so as we understand further lines from his letters and notebooks. In this lecture, some of the studies of Ramanujan that are most accessible to the general public will be presented and how Ramanujan's findings fundamentally changed modern mathematics, and also influenced the lecturer's work, will be discussed. The speaker is an Associate Producer of the film *The Man Who Knew Infinity* (starring Dev Patel and Jeremy Irons) about Ramanujan. He will share several clips from the film in the lecture

BY THE NUMBERS

Bios: Lynne Halliday is a writer and actor, recently appearing Off-Broadway in Accentuate the Positive and Baby, both at Theatre Row. She starred in Reinventing Mary Martin at the York Theatre, where she also appeared as Gretchen Cryer's daughter in I'm Still Getting My Act Together and Porterphiles. Her one-act play Ballad of 72nd Street appeared off-off-Broadway in The Barrow Group's 24-hour Play Fest and her work has been seen at Coogan's Play With Your Dinner. Most recently her short plays Reverend and Second Chance were presented as part of The Gorges Motel for the 2016 New York International Fringe Festival and will be published by Dramatists Play Service.

James Hindman is an actor and playwright. Plays: Pete 'n' Keely (Outer Critics nomination, two Drama Desk nominations), A Christmas Survival Guide (both published by Samuel French) The Audience (Transport Group, Drama Desk nomination), Being Audrey (Transport Group), The Gorges Motel (TBG Theatre), Littlest Light (The Vital Theatre), The Drama Department (Terrance McNally Award finalist, Second Stage Play Reading, Pub. Dramatic Publishing), Incubus (Pittsburgh Public Reading). Co-creator: The Bikinis! (numerous productions including Goodspeed Musicals and Long Wharf Theatre), Heaven Help Us (Denver Theatre Center, Carbonell Award Nomination). Upcoming: Multiple Family Dwelling (New Jersey Rep.), Popcorn Falls and Loveland Ski Lodge. As an performer: Ed Burn's "Public Morals" produced by Steven Spielberg, "The Family", "The Following", "Hostages", "House Of Cards", "The Blacklist", "Henry's Crime", "The Sopranos", "Law and Order, SVU, CI", "Person Of Interest", and upcoming Marvel Television's "Kick." Broadway: Mary Poppins, The Scarlet Pimpernel, 1776, City Of Angels, A Grand Night For Singing, Once Upon A Mattress.

Arlene Hutton started her theatre career at Bayshore Elementary School and has had a long friendship with MJC/MCC/SCF as the daughter of professors Arlie and Mary Elizabeth Lincks. After attending Rollins College and the FSU/Asolo Conservatory, Hutton moved to New York. An alumna of New Dramatists and member of Ensemble Studio Theatre, Hutton is best known for her play Last Train to Nibroc, the first FringeNYC production to move Off-Broadway (Drama League Best Play nomination). It received major revivals last year at Rubicon Theatre in Ventura and Theatre Wit in Chicago. Hutton's works have been presented five times at Edinburgh Festival Fringe, Off- and off-off-Broadway, internationally and regionally, including productions at Florida Studio Theatre, Riverside, Starlite, Island Players and Theatre Conspiracy. A three-time winner of the Samuel French Short Play Festival and eight-time finalist for the Actors' Theatre of Louisville 10-Minute Play Contest, she is the recipient of an EST/Sloan Commission and a 2016 NYFA Fellowship. Her full-length plays are published by Dramatists Play Service. www.arlenehutton.com

Craig Pospisil is an award-winning playwright and filmmaker. He is the author of the plays Months on End, Life is Short, The Dunes, and Somewhere in Between. His plays have been seen at Purple Rose Theatre, Detroit Rep, Barrington Stage, Bay Street, City Theatre (Miami), New World Stages, around the US, and in two dozen countries on six continents, and translated into Cantonese, Dutch, French, Greek, Mandarin and Spanish. His short film January is currently on the festival circuit, and was an official selection at the Berkshire, Big Apple, Big Easy, Black Bear, Cayman Island and Sacramento international film festivals. He has written over 60 short plays, including It's Not You (theAtrainplays, Vol. 1), On the Edge (Best Ten-Minute Plays: 2005), There's No Here Here (Best Ten Minute Plays 2012), and Dissonance (Best American Short Plays 2010-2011). He lives in New York with his wife, Bloomberg TV anchor, Alix Steel, their daughter, Dillon (favorite word: "No"), and an imported French cat.

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NOTES OF INTEREST

SCF is a smoke-free zone

Wireless user ID and password **MAA2017**

SPECIAL THANKS TO

State College of Florida

Dr. Carol F. Probstfeld
Dr. Probstfeld generously provided some funding for the conference.

The Conference Committee:

Co-Chairs C. Altay Özgener and Joni Pirnot
The Mathematics Department of the State College of Florida

Vendors:

PEARSON

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WebAssign

We would like to thank Pearson for providing some funding for the reception on Friday night.

SCF Bradenton

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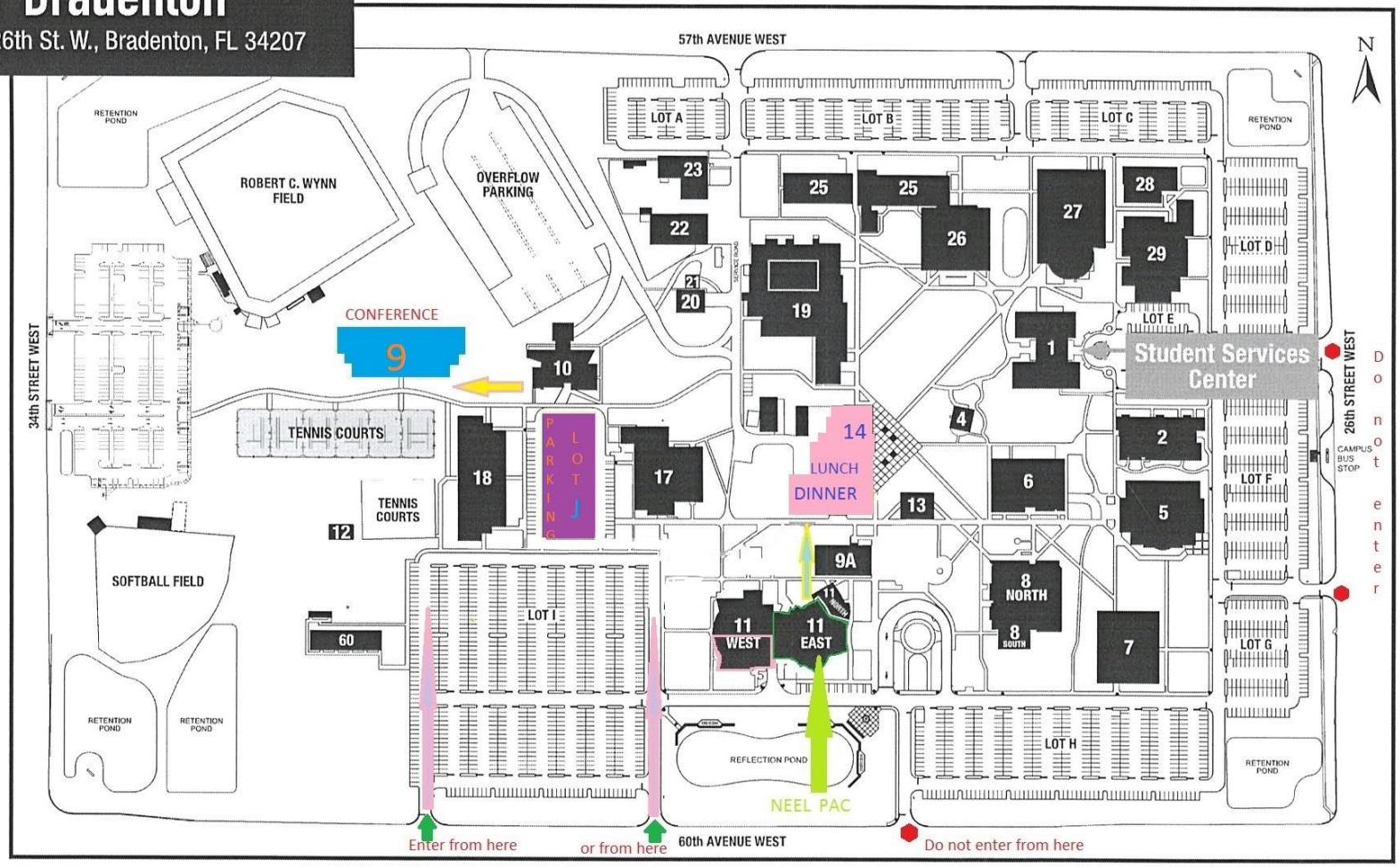

Directory

All SCF campuses are tobacco-free.

1 Student Services Center

- 2 Radiography Lab and Dental Hygiene Clinic
- 4 Student Services Annex
- 5 Academic Resource Center
- 6 Computer Center
- 7 Office Complex
- 8 NORTH: Library
  SOUTH: Family Heritage House
- 9 Classroom Building
- 9A Music Annex
- 10 Art & Design
- 11 EAST: The Neel Performing Arts Center
  WEST: Music and Theatre
  Howard Studio Theatre
  NORTH: Fine Art Gallery
- 12 Theatre/Athletics Warehouse
- 13 Performance Pavilion

14 Student Union

- 17 Gymnasium
- 18 Professional Development Center, Center for Corporate and Community Development, Traffic Safety Institute
- 19 SCFCS/Multi-use
- 20 Central Services
- 21 Motorcycle
- 22 Warehouse
- 23 Facilities Management
- 25 Science
- 26 Science Lab
- 27 Mathematics
- 28 Occupational Therapy Assistant and Physical Therapist Assistant
- 29 Nursing
- 60 Portable Classrooms (100-104)

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