Summer Math Institute
Presenter Biographies & Abstracts

Monday June 27, 2016
8:15 am in GOS-A300

Opening Remarks
Dr. William W. Destler

Dr. William W. Destler became president of Rochester Institute of Technology in 2007. He is the ninth president in the university's 186-year history. He was previously senior vice president for academic affairs and provost of the University of Maryland at College Park.

For the complete biography, please visit https://www.rit.edu/president/biography.html.

Monday June 27, 2016
8:30 am in GOS-A300

Teaching Mathematics and Statistics Beyond the Classroom
Chip Galusha, Paychex, Inc.

Bio: Chip Galusha is a Data Scientist at Paychex, Inc., providing data driven intelligence to improve strategic decision making via statistical modeling. Prior to Paychex, he's worked as a business intelligence engineer, public health analyst, business analysis, and carpenter; applying mathematics extensively in each position. He holds a Master of Science in Statistics from the University of Vermont, a Bachelor of Science in Management from Le Moyne College, and is a graduate of McQuaid Jesuit High School.

Abstract: As a data scientist at Paychex, mathematics and statistics are an integral part of the solutions I provide. Along the path to becoming a data scientist, I observed the universal applicability of mathematical concepts, once considered abstract, across a variety of professions. It was this revelation that led me to revise my indifferent perception of mathematics and statistics and pursue a career centered in the field. Engaging students in mathematics through application vs rote based tactics supports the development of intrinsic motivation and promotes mathematics as a tool rather than a requisite.

Monday June 27, 2016
9:45 am in GOS-A300

More Math = Better Marketing
The continued influx of math in marketing is pushing the field to make more informed decisions

John Loury, Michael Sutton, Laura Calloway, Anoosha Anvari,
Cause & Effect Strategy and Marketing

Bios:

John Loury - President
John has spent the last ten years honing his strategic marketing skills in a variety of agency account service and business development roles. With stops in Las Vegas, N.Y., Buffalo, N.Y., and Rochester, N.Y., he has accumulated experience that assists clients achieve their marketing goals both regionally and nationally. He has guided traditional and direct marketing strategy for brands such Sylvan Learning, American Airlines, Citizens Bank, Bank of the West, and Brown Mackie Colleges. He's known for challenging convention and offering a "whatever it takes" type of approach.

Michael Sutton – Vice President of Account Service & Business Development
With over seven years of marketing and business development experience, Mike has become professionally known for determination, problem solving, and having a knack for maximizing budgets to garner the greatest ROI. He has spent the past several years successfully building and managing nonprofit marketing campaigns for organizations such as Children's Hospital Boston, UCSF, Canadian Kidney Foundation, and University of Rochester.

Laura Calloway – Marketing Analyst
Laura has spent the last four years fine tuning her data processing, data analysis, and data visualization skill set. She has created data stories and strategy recommendations on a variety of topics, from audience engagement with public radio to festival attendance. Prior to joining CESM, she worked as a data analyst for National Public Radio Digital Services (NPR DS) and Beam Interactive. At CESM, Laura enjoys turning client data into interactive data visualizations, as well as managing CESM's social media presence.

Anoosha Anvari – Marketing Analyst
Anoosha has spent the past five years informing strategy decisions using research and market analysis in various capacities. Fond of both the data and client sides of things, she has seen projects through their entire life cycles, from gathering to evaluating to

presenting information. At CESM, she gets excited about addressing big-picture problems with detail-oriented solutions and the kind of storytelling that puts data to work for clients instead of against them.

Company Profile:

CAUSE + EFFECT Strategy and Marketing (CESM) is a results-driven strategic marketing and analytics firm that leverages proven and innovative marketing principles with data insight to create marketing strategies that accomplish client goals.

The CESM team is made up of out of the box and accomplished marketers who are obsessed with ROI and the use data to validate results. Each team member is an expert at interpreting the unique needs of a client within their vertical. CESM is committed to being an invaluable partner to clients and an extension of their internal teams and resources.

As a firm, CESM carefully orchestrates and optimizes cross-media marketing programs by effectively incorporating data analysis, audience selection, offer, creative direction, and campaign management to meet a client's business goals for acquisition, retention, and growth.

Abstract:

Introduction – John Loury

Personal anecdote about his relationship aka struggle with Math. Infographic about who uses data and math to leverage it in marketing today. Explanation of the single most important marketing math formula, ROI (return on investment).

Part 1 Math in Direct Marketing – Michael Sutton

Ever get a piece of junk mail asking you to donate to a cause or attend a college? Some people throw them away and some actually respond. There are several formulas that are used to determine success or failure of these campaigns including response rate, cost per lead, cost per dollar raised, lifetime value, and more.

Part 2 Applications for Relational Algebra and Logic in Marketing – Laura Calloway

Marketing firms rely on customer database information to create relevant messaging that influence customer behavior. How is this information organized and leveraged to create successful strategy? Relational algebra and logic.

Part 3 Descriptive Math: The Road to Analytics – Anoosha Anvari

Understanding the shape of data is an important precursor to gleaning insight. Creating benchmarks for what is normal or abnormal is the next step before meaningful insight can be learned. Once that is accomplished priorities can be established and decision making can be recalibrated.

Monday June 27, 2016
11:00 am in GOS-A300

A Computational Exploration of Some Foundational Statistical Concepts

Dr. Ernest Foque, RIT

Bio: Ernest was born and raised in Cameroon (Central Africa), and has been around mathematical sciences from his very early childhood. He studied Mathematics and Computer Science in Cameroon, and after his Bachelor of Science Degree in Mathematics and Computer Science and his Maitrise in Computer Science and Mathematics, he earned a Master of Science Degree in Neural Computation at Aston University in England and then a PhD in Statistics at Glasgow University in Scotland (UK). Ernest is the author of a graduate textbook published by Springer-Verlag and also author of multiple peer-reviewed articles published in international journals. Ernest has always greatly enjoyed the beauty and power that mathematics brings to problem solving and thrives on sharing his mathematical insights. Statistical Science in particular and specifically Statistical Machine Learning and Data Science are his passion, his profession and to some extent a substantial component of his vocation. The flexibility and power of probabilistic reasoning along with the richness and vast applicability of statistical models both fascinate and enthuse him immensely. His mission as a professor of statistical science is to generously, joyfully and rigorously share the full extent of his knowledge and expertise in this exciting field, with the ultimate goal of empowering all the students that God graciously sends his way. Ernest always likes to envision his students acquiring state-of-the-art knowledge in statistical science and ultimately developing into world class experts and pioneers.

Abstract: Road Map:

1- Get acquainted with R
2- What really is a probability?
3- Empirical versus Theoretical quantities in probability and statistics
4- Weak law of large numbers for proportions?
5- Weak law of large numbers for averages?
6- The ubiquitous Central Limit Theorem? What really is it?
7- What is a margin error?
8- What really is a confidence interval?
9- A look at some real life examples.

Tools needed: To make the most of this session, attendees should bring a laptop and make sure they have the latest version of the statistical software R installed on it.
R can be found at www.r-project.org and the installation is very user friendly.

Monday June 27, 2016
1:30 pm in GOS-A300

The Geometry of a Novel Optical Communications System

RIT Hyperloop Imaging Team: Zach Assenmacher, Jeff Maggio, Catherine Meininger, Ryan Hartzell

Bio: We are members of an RIT engineering and research team that has recently advanced to the next tier of the SpaceX Hyperloop design competition. Hyperloop is a (concept) fast transportation system consisting of pods traveling in an evacuated tube from Los Angeles to San Francisco. SpaceX is running a competition for university and independent engineering teams to produce a working prototype for this system, along with subsystems to supplement its functions. In January, SpaceX awarded us the Special Innovation Award for our proposed subsystems at Hyperloop Design Weekend. Recently, our team of college sophomores has been working with SpaceX directly to design a rail scanning robot for use at SpaceX's Hyperloop Competition Weekend and beyond, as well as implementing our proposed structural integrity monitoring system (ITIC) on the pod designed by RUMD Loop (Rutgers and the University of Maryland).

Abstract: The Hyperloop has the potential to become the next major mode of transportation. Due to the harsh environment in which it operates, the Hyperloop will require additional support systems and structures compared to traditional maglev trains. Our team recognized this need, and has been working on solving the problems of maintenance and communication within the Hyperloop's unique working environment by utilizing imaging-based methods. To date, our team has designed a total of three systems: a structural integrity monitoring system (ITIC), an optical communications system (ITOC), and a Mechanized Autonomous Rail Scanner (MARS) specifically designed for SpaceX to use at their scale Hyperloop test track. The ITOC system will be the focus of our talk, as it had a highly theoretical component on which we built our argument for the system's usefulness. To ensure ITOC's viability, our team considered many designs before settling on our final choice, created models and met with professors to isolate variables and work through difficult problems, wrote code and built a test rig to prove our concept, and finally put together a briefing of cost versus benefit with respect to alternative technologies. In choosing to put an emphasis on the theory involved in solving the problems at hand, our team solidified the defense of each solution. We definitely benefitted from being able to apply mathematical processes or theory to our work while recognizing the real-world implications of that math.

Monday June 27, 2016
2:45 pm in GOS-A300

On the Five Pillars of Statistical Science: Methodology, Theory, Computation, Applications and Data

Statistics Panel, Dr. Ernest Foque, RIT

Abstract:

1. What is the place of statistics in an era dominated by data and how do the five pillars help make the most of that place?
2. How soon do we expose our youth to statistics? Middle school? High School?
3. What are the components of a good statistics curriculum?
4. How well does good mathematical foundation prepare one for statistical science, or does it?
5. What is the best way to introduce statistics to (a) mathematicians (b) non mathematicians?
6. How strong is the impact of computational simulations and computational demonstrations on deepening the understanding of foundational statistical concepts?
7. Can one really do statistics without data?
8. Can one really do statistics without mathematics? If no, how much math is needed for a solid statistical foundation?
9. Can one really do statistics without computing? If no, how much computing (programming and systems) is needed for a solid statistical foundation?
10. Are menu driven software environments a hindrance to deep understanding of statistical concepts?
11. What statistical software is most ideal in teaching statistics?
12. What are the three most vital changes you suggest to help make statistics more appealing to youngsters?

Tuesday June 28, 2016
8:30 am in GOS-A300

Who says mathematicians can't do biology, too?

Christina Battista, University of North Carolina at Chapel Hill

Bio: Christina grew up in the small town of Alden, NY, about 20 miles outside of Buffalo, where she went to Alden High School and participated in the Project Lead the Way program through RIT. Christina then attended and graduated from RIT with her BS/MS in Applied and Computational Mathematics in 2011. She was then accepted into and enrolled in the Applied Mathematics PhD program at North Carolina State University in Raleigh, NC. Christina successfully defended her dissertation on modeling blood flow in viscoelastic arteries in August 2015 and officially graduated in December 2015. Since September 2015, she has held postdoctoral positions in multiple related companies (The Hamner Institutes for Health Sciences and DILIsym Services, Inc.) and is currently a postdoctoral fellow at the University of North Carolina at Chapel Hill, Eshelman School of Pharmacy where she is externally funded and supported by DILIsym Services, Inc. and the US Food & Drug Administration as an ORISE Fellow in Mechanistic Drug Safety. Her current work researches the mechanisms behind drug-induced liver injury and involves collaboration with numerous modelers and toxicologists in the pharmaceutical industry.

Abstract: Drug-induced liver injury (DILI) is one of the primary reasons for the termination of drug candidates during preclinical or clinical development. By improving the hepatotoxic preclinical screening for new drugs, drug development may become a more efficient, stream-lined process with more focus at enhancing patient care. Computational models can assist in evaluating the hepatotoxic liability of novel therapeutic compounds. DILIsym®, a mechanistic, mathematical model, can be applied to predict toxicity based on in vitro and/or in vivo data, and the model can provide further insight into the mechanisms responsible for DILI. In this talk, we will walk through modeling an exemplar compound and look into how high school (and even middle school) mathematics are useful for predicting toxicity.

Tuesday June 28, 2016
9:45 am in GOS-A300

High School Mathematics for Software Engineering

Carlos Bribiescas, DigitasLBi

Bio: Carlos Bribiescas was born on August 23, 1988. He has always loved mathematics and has loved computer programming since high school. In the past he has worked as a consultant in fraud detection and prevention as well a software engineer in consolidating rail travel. He is currently living in Boston working for DigitasLBi. The product he is developing, IDIOM, allows advertisers to better understand custom groups of individuals. Using predictive analytics, they are able to select a particular group of people and estimate the likelihood they will google certain terms, visit particular websites, or watch certain TV shows.

Abstract: In this presentation we will talk about the role mathematics plays in software engineering. The tools necessary for software engineering are not only restricted to the mechanics learned in high school, but also the ability to solve word problems and do proofs. We will show that a surprising amount enterprise level software can be written using only high school mathematics. Even in the analytics space, where one would suspect it necessary to resort to advanced mathematics.

Tuesday June 28, 2016
11:00 am in GOS-A300

Zebrafish, heart development, and white coats: A mathematician putting on his best biology hat

Nick Battista, University of North Carolina at Chapel Hill

Bio: Nick is originally from Alden, NY, a small farming community outside of Buffalo, NY. He went to Alden High School, where he participated in Project Lead the Way, an RIT designed introduction to engineering sequence, and for some reason did not take physics. Nick then went to RIT to study applied mathematics and physics, graduating with a BS in Physics and a BS/MS in Applied and Computational Mathematics in 2010. After a brief stay at Stony Brook University, Nick enrolled in the Mathematics PhD program at the University of North Carolina at Chapel Hill. There his research has focused on fluid-structure interaction problems, namely the underlying blood dynamics during heart development, vertical axis wind turbine design and placement configuration, and aquatic locomotion and maneuverability, as well as comparative biomechanics, numerical analysis, and quantitative biology/math education research. Outside of the math realm, he is also a member of an integrative vascular biology group at UNC, the Physical Biology of Organisms group of NC, is a 2016 AAAS Emerging Leader in Science and Society, and owns a small strongman gym.

Abstract: Math can be applied to virtually any situation, whether it's in the pursuit of knowledge or for fun and recreation. The caveat, of course, is that this process may require the development of new mathematical tools and machinery, which only then may naturally lead to new insights about the world. In this talk, I will touch upon the questions that made me want to pursue a math and science career, as well as, discuss my current research, which focuses on blood flow in various stages of heart development. Proper vertebrate cardiogenesis requires a delicate balance between genetic and environmental (epigenetic) signals, and mechanical forces. Hemodynamic processes, such as vortex formation, are important in the generation of shear at the endothelial surface layer and strains at the epithelial layer, which aid in proper morphology and functionality. These effects are believed to be important immediately upon the initiation of the first heartbeat, when the heart’s morphology resembles a linear tube. Hematocrit first appears in the blood stream a few hours after the first heartbeat, while complex ventricular wall morphologies (trabeculae) form a few days later. Effects of hematocrit and trabeculation in this blood flow regime are not well understood. Computational fluid dynamics is used to quantify the effects of fluid scaling, idealized trabeculae morphology, and hematocrit on intracardial flows of embryonic zebrafish hearts.

Tuesday June 28, 2016
1:30 pm in GOS-A300

Insights into Mathematical Preparation from an Industrial Perspective

Dr. Nate Barlow, RIT & Dr. Steve Weinstein, RIT

Bio: Nate Barlow is an Assistant Professor in Mathematics at RIT. He was a National Science Foundation Postdoctoral Research Fellow working within the Chemical Engineering Department at SUNY Buffalo after graduating from Clarkson University with a PhD in Mechanical Engineering. As a graduate student, Nate was also full-time faculty in Clarkson's math department as well as an NSF GK12 fellow - bringing science and engineering into K-12 classrooms across NY from the Adirondacks to the Bronx. Nate graduated from a technical high school, with a certificate in Electronics - namely TV and VCR repair!

Steve received his PhD in Chemical Engineering from the University of Pennsylvania in 1988. He worked for Eastman Kodak Company for 18 years after receiving his PhD, and joined the faculty in the Department of Mechanical Engineering at Rochester Institute of Technology in early 2007. His areas of expertise are interfacial fluid mechanics, heat and mass transport phenomena, and applied mathematics. He is an internationally recognized expert on thin film flows, die manifold design, wave stability, and in finding novel applied mathematical solutions to complex problems. Steve founded the Department of Chemical Engineering at RIT in 2008, and has been department head since that time. He teaches undergraduate courses on material balances in reactive systems, chemical reaction engineering, separation processes, fluid mechanics, and applied math techniques for engineers. His graduate courses include applied mathematics and partial differential equations for engineers, convective phenomena, and interfacial phenomena.

Abstract: Nowadays, there is a perception by students and some researchers that computers can solve any problem, and good sound analytical skills are unnecessary. This is a disturbing trend and not supported by my experience in 18 years of industry. In fact, I now spend much of my time teaching students and researchers to avoid blindly implementing mathematics on the computer with no pre-analysis. My approach is to examine the equations governing various physical phenomena, and examine the order of magnitude of terms in the equations. It is often the case that many terms in the governing equations are small enough that they can be neglected with little error (remember, even a numerical solution is approximate!). The result is often a simplified set of equations which is highly accurate and much easier to solve either by hand or on the computer. Sometimes, the resulting mathematics is simple enough that non-sophisticated users may easily

access the results in user-friendly formats such as spreadsheets. If there are no simplifications, then the equation set is implemented with full confidence that the equations are appropriate. So, my approach can be characterized as using appropriate mathematical techniques and simplifications to solve engineering problems of practical interest, and to obtain the simplest appropriate solutions. This talk will first focus on a variety of the problems I have encountered and solve while in industry in which applied mathematics played a central role. I will then lead an interactive discussion based on some of my observations of both deficiencies and strong points in math preparation, both at the high school and college level. These observations are based on my industrial experience, experience teaching applied mathematics to undergraduate/graduate students in Chemical/Mechanical Engineering here at RIT, as well as from my three children who were taught in the Monroe County Fairport Schools.

Tuesday June 28, 2016
2:45 pm in GOS-A300

Using Graphing to Develop a Visceral Understanding of Functions and Equations

Tim Goodwill, RIT

Bio: Tim Goodwill is a lecturer in the School of Mathematical Sciences, where he has taught Algebra, Calculus and Differential Equations for the past 14 years. Earlier, he earned a Master of Arts in mathematics from the University of Kentucky, and before that a Bachelor of Science in mathematics from Morehead State University. Additionally, he currently is the fencing teacher for the RIT Wellness program and in the past has taught beginning classes in subjects as diverse as piano, family history research, and Chinese Kung Fu. He is the father of 6 highly energetic kids who range from 2 to 12 years in age, and is married to a happy (though exhausted) wife.

Abstract: Students these days rely heavily on graphing software when they want to visualize a function, and understandably so. It is quick, convenient and highly accurate. Any graphing by hand tends to be heavily dependent on graphing points and connecting the dots. However, the ability to look at a formula and visualize its basic features is an important skill that helps develop a student's numerical intuition and confidence. This workshop will review basic graphing techniques that focus on understanding and interpretation rather than simple point-plotting. Without relying on formal notation or vocabulary these exercises introduce ideas of limits and extends students understanding of basic mathematics.

Wednesday June 29, 2016
8:30 am in GOS-A300

Joseph Oddo, General Motors

Bio: Graduated from Elba Central, NY in 2011 and RIT in 2016. Majored in Electrical Engineering with a minor in Economics. Had the opportunity to work with General Electric for two co-op rotations; one in Jacksonville, FL the other in Long Island, NY. I did my final two co-op rotations with General Motors in Rochester. I accepted a fulltime job with them in July of 2015 and worked part time there in my final year of school. I currently work at General Motors as a Controls Engineer.

Abstract: The mathematics taught early on in my career laid a firm foundation for the more advanced topics I have experienced. These topics include area, distance, mean, and standard deviation. These topics are directly applicable to the vision inspection programs I create at General Motors.

Wednesday June 29, 2016
9:45 am in GOS-A300

Learning Math - Who's Idea Was That?!
Jessica Sorrell, EMC

Bio: Jessica Sorrell graduated with a B.S. in Applied Mathematics from the Rochester Institute of Technology in 2015. Her interest in mathematics was sparked by a high school math teacher at the Duke Ellington School of the Arts when he explained what all the vividly-colored fractal images displayed in his classroom actually had to do with math. She works as a software engineer for EMC, where she uses mathematical techniques to analyze performance and security of data storage devices.

Abstract: Learning new mathematical methods can feel like gaining a superpower, especially when we're motivated by sincere curiosity. I'll talk about various learning environments in my life that I believe fostered curiosity and tricked me into thinking learning math was my idea along, from my high school calculus class to a 3-month "writer's retreat" for programmers. I'll also talk about how my co-workers and I use math, especially probability and statistics, to design and analyze data storage systems.

Wednesday June 29, 2016
11:00 am in GOS-A300

From Insurance to Aerospace: A Mathematical Journey

Tyler Hayes, RIT

Bio: My name is Tyler Hayes and I am a current Applied and Computational Mathematics Master's student at the Rochester Institute of Technology. I received my Bachelor of Science degree in Applied Mathematics from RIT in May of 2014 with a concentration in Mechanical Engineering. As an undergraduate student, I had the opportunity to complete an internship as an Information Technology intern at Liberty Mutual Insurance the summer after my second year at RIT. After graduation, I accepted a full-time position as an Information Technology Analyst at Liberty Mutual Insurance, but soon found myself eager to explore other options in mathematics, which brought me back to RIT for the Master's program. The summer after my first year as a graduate student, I accepted an internship offer for the role of Image Science Intern at UTC Aerospace Systems.

Abstract: In this talk, I discuss experiences from internships that I have held at both Liberty Mutual Insurance and UTC Aerospace Systems. I provide an overview of my personal background and how my experiences aligned with the two internships, as well as an overview of the problems I worked on at each of the two companies. While Liberty Mutual Insurance provided more of a statistical-based internship, I had the opportunity to gain a deeper understanding of Predictive Analytics which utilizes current and previous company data to make predictions about future data trends. This problem utilized Bayesian statistics as well as linear (i.e.,$y=mx+b$) and non-linear curves to make estimates about the data. At UTC Aerospace Systems, I had the opportunity to work with a group of Image Scientists to estimate the quality metrics of images produced by the company's airborne image sensors. The main formulation of this problem was a non-linear data fitting problem where I was testing the fit of different functions to the data. This problem utilized non-linear fit functions as well as some statistical resampling methods to test our confidence in the fit model chosen.

Wednesday June 29, 2016
1:30 pm in GOS-A300

My math journey – schooled in India and US, and working in corporate R&D.

Dr. Marina Tharayil, PARC

Bio: Dr. Marina Tharayil is currently a research competency manager at the PARC, Webster, NY. She manages the Process Analytics group at Xerox Research. Her group of researchers work on services innovation in multiple domains. In addition, she is leading a project to optimize operations in Transaction Processing for BPO. She is the recipient of the 2009 Rochester Business Journal's 40 under 40 Award and a finalist for Rochester Engineering Society's 2012 Young Engineer of the Year Award. She was one of 3 Co-Chairs for the 2015 TWA International Conference.

Abstract: In this talk, I would like to share my personal experiences with math education and application. Having attended secondary school in India and US, graduated with a PhD in Engineering and worked for corporate R&D for the past 11 years, I have learned and used math in many forms. I will give a few examples of math applied to solve research questions in corporate research. Also, I have taught a college course in dynamics during my graduate studies. I can share observations from my education, and thoughts on what I think would be helpful to prepare students for future technical careers.

Wednesday June 29, 2016
2:45 pm in GOS-A300

Teachers' Panel

Samuel Simpson, RCSD

Thursday June 30, 2016
8:30 am in GOS-A300

From Moneyball to Moneypuck: Analytics in Hockey and Other Sports

Dr. Matt Hoffman, RIT

Bio: Matthew Hoffman was born and raised in Baltimore, MD and got a B.A. in Mathematics and Astrophysics from Williams College in 2004. He received a Ph.D. in Applied Mathematics and Scientific Computation from the University of Maryland, College Park in 2009 with a focus on data assimilation and forecasting chaotic dynamical systems. After his PhD, he spent two years as postdoctoral fellow in the Department of Earth and Planetary Sciences at Johns Hopkins University before starting as an Assistant Professor in the School of Mathematical Sciences at Rochester Institute of Technology in the winter of 2011.

His work is focused on integrating observational data and mathematical models through data assimilation. He has worked on reconstructing time series of flow in the Chesapeake Bay and the Martian atmosphere and has recently been working on applying these same techniques to models of cardiac electrophysiology. In addition, he works with the Air Force on airborne vehicle tracking. An avid sports fan, Dr. Hoffman organized an international conference on hockey analytics at RIT in 2015 and worked with the RIT men's hockey team during the 2015-2016 season. He is organizing the second iteration of the RIT Hockey Analytics conference on September 10th, 2016.

Abstract: While analytics movement was pioneered in baseball, the other profession sports have also seen an increased interest in analytics. There are several aspects of sports such as hockey and basketball that make them more challenging than baseball, in particular the increased importance of teamwork. I will discuss the use of hockey analytics in ice hockey and my experiences working with the RIT men's hockey team this past year.

Thursday June 30, 2016
9:45 am in GOS-A300

Who will win the Pennant?
Understanding baseball with high school math

Dr. Bruce Bukiet, New Jersey Institute of Technology

Bio: Bruce earned his PhD in Mathematical Sciences from NYU performing research in the area of Detonation Theory. After working in the Applied and Theoretical Detonation group at Los Alamos National Laboratory in New Mexico, he moved to New Jersey Institute of Technology. Some say their research covers topics from A to Z, Bruce notes that just like his initials (BB) his research mostly spans topics from B to B: as he has made contributions to understanding baseball, biology, bombs and bugs. His current emphasis is on bringing written communication and reflection into college math courses.

Abstract: Baseball is very well suited for mathematical analysis. In this presentation, we discuss various ways math can be used to understand baseball and how baseball can be used to understand mathematical concepts. Then, just using math techniques learned in high school, along with logical thinking and organization skills, we develop the structure that allows us to answer some interesting questions about baseball, concluding with how to figure out which teams should make it to the post-season. Find out which teams should make it to the playoffs in 2016.

Thursday June 30, 2016
11:00 am in GOS-A300

Black Holes, Gravitational waves, and the birth of an entirely new kind of astronomy

Dr. Manuela Campanelli, RIT

Bio: Manuela Campanelli is a leading expert in computational General Relativity, the astrophysics of black holes and gravitational waves. Her groundbreaking work on numerical simulations of binary black hole space times enabled precise modelling of the signal measured in the first direct detection of gravitational waves by the Laser Interferometer Gravitational-Wave Observatory. Another of her papers was among those selected for a collection of landmark papers marking the centenary of General Relativity (http://journals.aps.org/general-relativity-centennial). Her current research focuses on computer simulations of accretion disks around merging supermassive black holes. Campanelli is a Fellow of the American Physical Society (APS), a former chair of the APS Topical Group in Gravitation and a winner of the RIT Trustee Scholarship.

Abstract: On September 14 and December 26, 2015, the advanced LIGO observatories detected gravitational waves coming from the coalescence of binary black holes, occurred nearly 1.5 billion years ago. Numerical relativity simulations of binary black holes played a crucial role in the calculations of the expected gravitational wave signal that was just observed. I will review briefly the history of numerical relativity simulation efforts to model these systems, with an emphasis on the role that it currently plays in the new field of gravitational wave astronomy. I will also present some exciting new results in the context of magnetohydrodynamical simulation indicating that massive binary black hole sources might be also detectable in the EM spectrum, in some not too distant future.

Thursday June 30, 2016
1:30 pm in GOS-A300

The Dynamics of Biology

Dr. Carl Lutzer, RIT

Bio: Carl Lutzer completed his Ph.D. in 2000 at the University of Kentucky. Since then he has been a faculty member at the Rochester Institute of Technology, where he has participated in several research efforts including the study of micro-electromechanical systems (MEMS), mobile ad-hoc networks (MANETS), and a method of using partial differential equations to determine the health of the human eye based on light-scattering data. RIT has also been a place where Dr. Lutzer has been able to continue developing his skill as a teacher; in 2006 he won the MAA's Carl B. Allendoerfer Award for Expository Excellence, and in 2013 Dr. Lutzer earned the university-wide Eisenhart Award for Excellence in Teaching.

Abstract: Participants will be guided through an investigation of population dynamics, and if time permits, a certain kind of heart condition. The mathematics involved will include piecewise-defined functions, quadratic equations, and the meaning of slope.

Thursday June 30, 2016
2:45 pm in GOS-A300

A Discussion Regarding the Advanced Placement Exam (AB/BC) for Mathematics

Dr. Matt Coppenbarger, RIT

Bio: Matt received a BS in Math and Physics at the University of Arizona before going to the University of Rochester to earn a Ph.D. in Mathematics studying quantum mechanics on graphs. He has taught at RIT since 2001. In addition to the lofty-sounding topics that you might expect a mathematician to study (differential equations, discrete mathematics, combinatorics), Matt shows a particular fondness for puzzles, games, and other things that an eight-year old might find of interest.

Abstract: Advanced Placement Calculus is used to indicate one of two distinct Advanced Placement courses and examinations offered by College Board in calculus: AP Calculus AB and AP Calculus BC. This talk will be a brief overview of the exam and a discussion of the merits of the exam with respect to students at RIT.