

The New Jersey section would like to thank Carol Avelsgaard for her long service on the Nominating Committee, Amy Cohen for her long service as chair of the Teaching Award Committee, and Theresa Michnowicz for her long service as chair of the Selection Committee for Contributed Papers.

GSUMC Committees

Organizing Committee Karen Clark, The College of New Jersey; Srabasti Dutta (co-director), College of Saint Elizabeth; Olcay Ilcasu, Rowan University; Katarzyna Kowal, Ramapo College; Aihua Li (co-director), Montclair State University; Ken McMurdy, Ramapo College; Tatyana Stepanova, Raritan Valley Community College; David Trubatch, Montclair State University; Chengwen Wang, Essex County College

New Jersey Undergraduate Math Competition Committee Katarzyna Kowal (Co-Director), Ramapo College of New Jersey; Kenneth McMurdy (Co-Director), Ramapo College of New Jersey; Moira Chas, SUNY Stony Brook; Judit Kardos, The College of New Jersey; Tom Leong, University of Scranton; David Molnar, Felician College; Kenneth Monks, University of Scranton; Marek Slaby, Farleigh Dickinson University; G. Boyd Swartz, Monmouth University; Elizabeth Uptegrove, Felician College; Chia-Lin Wu, Richard Stockton College of NJ

Acknowledgments

The MAA New Jersey Section thanks the Mathematics Department of Essex County College for their kind hospitality in hosting the meeting. They also thank A K Peters, Ltd., CRC Press (Taylor & Francis Group), Random House Inc., and Springer for donating books for the silent auction and door prizes.

The Garden State Undergraduate Mathematics Conference is made possible by contributions from MAA-NJ and funding graciously provided by NSF grant DMS-0846477 through the MAA Regional Undergraduate Mathematics Conferences program. The GSUMC also thanks Springer-Verlag, Princeton University Press, and A K Peters for their donation of books for student prizes.

The Mathematical Association of America

New Jersey Section Meeting

in conjunction with the 8th annual

Garden State Undergraduate Mathematics Conference



**Essex County College
Newark, NJ**

Saturday, April 2, 2011

Abstracts and Biographies of Speakers

Mathematical Modeling of Chemical Kinetics in the Body

Leona Harris, The College of New Jersey

Pharmacokinetic modeling is an area of mathematical biology that lies at the intersection of mathematics, biology, and chemistry with applications in toxicology and pharmacology. Physiologically-based pharmacokinetic (PBPK) models provide a mathematical description of the disposition of a chemical in the body following some external exposure to the chemical via inhalation, dermal application, intravenous administration, or oral ingestion. These models are used to predict (organ) tissue and blood levels of a chemical over time and provide a framework for dose-response analyses needed to help assess the risk that a chemical has on human health.

My talk will discuss a PBPK model for the chemical perfluorooctane sulfonate (PFOS) in adult rats. PFOS has a variety of consumer and industrial applications, but has been shown to cause toxicity in adult and developing laboratory animals. The PBPK model predicts that there are fundamental biological changes that occur after long-term exposure to PFOS. Results from extending the model to characterize these biological changes will be presented. The talk will conclude with a discussion of ongoing modeling efforts to develop a PBPK model that extends the existing non-pregnant model to describe PFOS pharmacokinetics during pregnancy and lactation.

Leona A. Harris graduated magna cum laude with a B.S. in mathematics from Spelman College where she participated in the Scholars in Mathematics at Spelman (SIMS) Program. Harris earned a M.S. and Ph.D. in Applied Mathematics from North Carolina State University and did postdoctoral work at the National Health and Environmental Effects Research Laboratory of the U.S. Environmental Protection Agency (EPA). She has taught at Bennett College and since 2006 at The College of New Jersey. In 2005, Professor Harris presented the MAA-NAM David Blackwell Lecture at MathFest in Albuquerque, New Mexico. Harris's particular field of research is in mathematical biology and she has continued her collaboration with EPA scientists. Her current research involves the development and utilization of pharmacokinetic models, mathematical models that describe the fate of a toxic chemical in the body following external exposure to the chemical (e.g. inhalation, ingestion).

GSUMC Co-Directors

Srabasti Dutta, College of St. Elizabeth;
Aihua Li, Montclair State University

Project NJ-NExT Co-Directors

Kaaren Finberg, Ocean County College;
John Saccoman, Seton Hall University

• MAA-NJ Committees

Organizing Committee Carol Avelsgaard, Middlesex County College; Zhixiong Chen, New Jersey City University; Karen Clark, The College of New Jersey; Larry D'Antonio, Ramapo College; Srabasti Dutta, College of St. Elizabeth; Bonnie Gold, Monmouth University; Thomas Hagedorn, The College of New Jersey; Olcay Illicasu, Rowan University; Mark S. Korlie, Montclair State University; Aihua Li, Montclair State University; David Marshall, Monmouth University; Theresa C. Michnowicz, New Jersey City University; Sarita Nemani, Georgian Court University; Beimnet Teclezghi, New Jersey City University; Chengwen Wang, Essex County College; Dirck Uptegrove; Elizabeth Uptegrove, Felician College; Paul von Dohlen, William Paterson University

Hosting Committee Chengwen Wang, Nadezhda Lvov, Eman Aboelnaga, Brooke Orosz, Carlos Castillo, and Lei Shi. The committee is grateful to Prof. Carlos Dela Torre, Chair of Mathematics and Physics Division, for his support and directive during the preparation. They also would like to thank Dean White and her assistant Ms. Nakesha, and Ms. Nadiyah Samad from ECC Auxiliary Services for their help.

Awards Committee Siham Alfred, Raritan Valley Community College; Larry D'Antonio, Ramapo College; Mark Korlie, Montclair State University; Theresa C. Michnowicz (chair), New Jersey City University

Nominating Committee Mark Korlie, Montclair State University; Theresa C. Michnowicz (chair), New Jersey City University; Hieu D. Nguyen, Rowan University

Teaching Award Committee Bruce Bukiet, NJIT; Janet H. Caldwell, Rowan University; Bonnie Gold (chair), Monmouth University; Robert Wilson, Rutgers University; Kenneth Wolff, Montclair State University

Selection Committee for Contributed Papers Carol Avelsgaard (chair), Middlesex County College; Lawrence D'Antonio, Ramapo College; Yi Ding, New Jersey City University; Olcay Illicasu, Rowan University; Theresa C. Michnowicz (ex-officio), New Jersey City University; Chengwen Wang, Essex County College

However, of most disturbing is the steadily decreasing number of MAA members.

Ivars Peterson, Director of MAA Publications and Communications, reported that beginning in January 2011, electronic editions of current issues of the *Mathematical Monthly*, *Mathematics Magazine*, *College Mathematics Journal*, and *Math Horizons* will be available to libraries via JSTOR. He suggested that we should let our libraries and departments to be aware of MAA books. There is a page or pages in MAA FOCUS devoted to MAA books, MAA books catalog is on the web at <http://www.maa.org/pubs/books.html>. Some of these books can be used as textbooks in some of our courses.

The Board approved a discounted MAA membership for secondary school teachers. It is intended for high school calculus instructors, and it comes with *Math Horizons* as automatic benefit.

MAA-NJ Section Officers

Chair	Bonnie Gold, Monmouth University
Chair-Elect	Carol Avelsgaard, Middlesex County College
Vice Chair for	
Speakers	Thomas Hagedorn, The College of New Jersey
Innovations	Theresa C. Michnowicz, New Jersey City Univ.
Two-Year Colleges	Chengwen Wang, Essex County College
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Door Prize Coordinator	Olcay Ilicasu, Rowan University; Sarita Nemani, Georgian Court University

Spherical Cats and Ham Sandwiches *Jonathan Rogness, University of Minnesota* *(Joint MAA-GSUMC Speaker)*

This presentation will explore topology, an area of mathematics where circles are squares and a doughnut is the same as a coffee cup. After explaining some basic concepts, examples of how topology applies in everyday life will be presented. Along the way I will discuss one-sided surfaces, subway maps, and a theorem that has amazing consequences ranging from meteorology to ham sandwiches. I will also explain what topology can tell us about the shape of our universe, and the audience will experience 3D fly-throughs of various models of the universe.

Jonathan Rogness is an assistant professor of mathematics at the University of Minnesota. He earned his doctorate in topology at the University of Minnesota under Donald Kahn. Rogness has become well-known for his mathematical visualizations for use in and outside of the classroom. He was recently named the new director of the university's Mathematics Center for Educational Programs (MathCEP), which runs one of the nation's premier accelerated mathematics programs for middle- and high-school students.

The Seven Deadly Sins of Data Mining and How to Avoid Them *Richard De Veaux, Williams College*

Every day, individuals and organizations find themselves inundated with data. Strategic decision making can often be helped with insights from data mining. Through data mining, the analyst can build predictive and descriptive models to uncover trends and patterns in vast amounts of data.

But much can go wrong in the data mining process, even for trained professionals. I will present case studies from a range of industries to illustrate the potential dangers and mistakes that can frustrate problem-solving and discovery — and that can unnecessarily waste resources. I'll show how to take advantage of data mining insights without committing the “Seven Deadly Sins.”

Richard De Veaux majored in mathematics and civil engineering as an undergraduate at Princeton University and earned a M.A. in Dance Education and a Ph.D. in Statistics at Stanford. Once a professional dancer, he is now an

applied statistician interested in data mining methodology and its application to problems in science and industry. Methods used in his analysis include artificial neural networks, and such techniques as decision trees, MARS, and boosting algorithms such as MART. Additional interests include model selection and other problems for large data sets. Professor De Veaux is also a distinguished speaker and expositor on statistics. He is a co-author of *Intro Stats*, *Stats: Data and Models*, *Stats: Modeling the World* and *Business Statistics*; has organized the MAA Short Course on Data Mining and New Trends in Teaching Statistics at the 2009 Joint Mathematics Meetings and given a short course on data mining at the Food and Drug Administration. During 2006–2007, he was the William R. Kenan Visiting Professor for Distinguished Teaching at Princeton University.

Professor De Veaux has won both the Wilcoxon and Shewell awards from the American Society for Quality. He is a fellow of the American Statistical Association. De Veaux is also well known in industry, where over 20 years he has consulted for such companies as Hewlett-Packard, Alcoa, DuPont, Pillsbury, General Electric, and American Express. Because of some conversations he had with Mickey Hart while Hart was doing research for his book, *Planet Drum*, De Veaux has been called the “Official Statistician for the Grateful Dead.”

Abstracts of MAA-NJ Contributed Paper Sessions

Session 1: Statistics: Practice and Pedagogy

Room 203, Health Center

Organizer and Presider: **Dexter C. Whittinghill**, Rowan University

1:50-2:05

Dexter C. Whittinghill, Rowan University
whittinghill@rowan.edu

The Gummy Bear Launcher Meets the Gaussian Process: An Introduction to the Gaussian Process Model

In computer experiments the behavior of a physical process is investigated by writing computer code for a mathematical model, and then evaluating that model at a sample of inputs. The model can be large and complicated, such as a climate model, so each evaluation can be extremely time consuming and expensive, and a closed-form function describing the physical relationship (like a polynomial in the inputs) does not exist. The analysis of the computer experiment involves finding a manageable functional form that adequately describes the response surface (for prediction, optimization, etc.).

(by Dawn Lott of Delaware State University), the PME-Frame Lecture (by Margaret Wright of the Courant Institute of Mathematical Sciences), the NAM Blackwell Lecture (by Farrah Jackson Chandler of Elizabeth City State University), and the MAA Lecture for Students (by Roger Nelsen of Lewis & Clark College).

John Kenelly, the Treasurer of the MAA, reported that overall the “MAA’s financial health is sound and that we are doing well and able to continue our great strides in our good programs.” Further, according to him, the MAA has gained in investment returns all the money it lost during the recent financial crisis (2007-2010).

Rick Cleary, the Associate Treasurer, reported in the Budget Committee Report that for the past few years the MAA has been running operating deficits, and the deficit seemed to have taken a turn for the worse in late 2010. This has led the Executive Committee to consider many options for cost saving throughout the MAA in 2011. He suggested that encouraging colleagues and participants at MAA sections meetings to join the MAA would help to increase revenue. Contributing through the MAA voluntary contributions would also be helpful.

Francis Su, First Vice-President of the MAA, is chairing a committee to select the next Director of the MAA Tensor Women and Mathematics Program. This program awards grants for projects designed to encourage college and university women or high school and middle school girls to study mathematics.

Paul Zorn presented and summarized the final report of the Strategic Planning Working Group on Periodicals and Communications with a list of recommendations to the Board. Some of the recommendations were accepted and the rest were tabled for discussions at future meetings. Doug Ensley, MAA Second Vice-President, presented and discussed an interim report of the Strategic Planning Working Group on SIGMAAs. Rick Cleary spoke about the Strategic Planning Working Group on Book Publications and said that an interim written report will be available for the Board meeting at MathFest 2011.

Tina Straley, MAA Executive Director, reported that electronic memberships continue to be popular and it now accounts for approximately 20% of memberships. She said that library journals subscriptions continue on a downward trend as universities cut budgets. Further, participation of students in the American Mathematics Competitions (AMC) program has been declining.

Governor's Report

The MAA Board of Governors had its winter meeting at the Joint Mathematics Meetings on January 5, 2011 in New Orleans, LA. As in past Board meetings, in addition to its usual business, the Board heard reports from the Washington Office, national MAA officers, strategic planning working groups, and editors of MAA publications. Further, the Board voted on prizes and awards, committees, and conducted elections. Some of the Board's decisions and reports presented at this meeting are highlighted in this report.

David Bressoud's term as President of the MAA ended after the Board meeting on January 5, 2011. Paul Zorn of St. Olaf College succeeded David Bressoud and he will serve as President of the MAA for two years.

David Bressoud reported that the search is underway for a new Executive Director of the MAA to replace Tina Straley when she retires in December 2011. She will be completing 12 years as Executive Director of the MAA. Members of the search committee to find her successor are Ron Graham (Chair), David Bressoud, Paul Zorn, Barbara Faires, John Kenelly, Bob Megginson, and Jenny Quinn. In addition, John Kenelly will be completing 10 years (two terms) as Treasurer of the MAA at the end of 2011. Members of a search committee to find his successor are Donna Beers, Annalisa Crannell, Jerry Porter, Alan Tucker, and Ann Watkins (Chair).

In his update to the Board about work on the MAA's NSF-DRL REESE grant, *Characteristics of Successful Programs in College Calculus*, David Bressoud reported that about 300 Colleges and Universities agreed to participate. The initial fall surveys were answered by over 12,000 students and 700 instructors. Data collected will be analyzed and results reported. In 2012, the second phase of the survey dealing with case study analysis of successful calculus programs at different types of institutions will begin.

The Associate Secretary of the MAA, Gerard Venema, reported that there has been a strong upward trend in overall attendance at MathFest over the past decade. Attendance was up at the 2010 MathFest held in Pittsburgh, PA; however, attendance at the 2010 Joint Mathematics Meetings in San Francisco, CA was down slightly. The 2011 MathFest will be held in Lexington, Kentucky, August 4-6. The invited addresses include the three Hedrick Lectures (by Manjul Bhargava of Princeton University), MAA Invited Addresses (by Ed Burger of William College, Annalisa Crannell of Franklin & Marshall College, and Lauren Ancel Meyers of the University of Texas at Austin), AMS-MAA Invited Address (by Laura DeMarco of the University of Illinois at Chicago), the Leitzel Lecture (by Philip Kutsko of the University of Iowa), the AWM-MAA Falconer Lecture

George Cobb's gummy bear launcher and student-generated data will be used to compare the more traditional regression model with the Gaussian process interpolation model.

2:10-2:25

David E. Payne, Monmouth University,
payne@monmouth.edu

Handy approximation formulae are suggested for teaching alongside standard t tests, power analysis, interval estimation, and Killeen's probability-of-replication statistic (p_{rep}). Besides helping applied statistics students see the "forest, not just the trees," simple approximations can also facilitate critical thinking about scientific reports, even – or especially – when statistical tables and software are not readily at hand.

Session 2: Complex Systems

Room 203, Health Center

Organizer and Presider: **Srabasti Dutta**, College of Saint Elizabeth

2:30-2:45

Amit Priyadarshi, Rutgers University
amitpriy@math.rutgers.edu

Hausdorff Dimension of Fractal Sets

In this talk I will discuss theorems which give the Hausdorff dimension of invariant sets given by iterated function systems or more generally, "graph directed systems", on a complete, perfect metric space. The maps are assumed to be contraction maps which are "infinitesimal similitudes". We use the theory of positive linear operators and generalizations of the Krein-Rutman theorem to characterize the Hausdorff dimension as the unique value of $\alpha > 0$ for which $r(T_\alpha) = 1$, where T_α , $\alpha > 0$, is a naturally associated family of positive linear operators and $r(T)$ denotes the spectral radius of T . I will show how these results can be used to get an estimate for the Hausdorff dimension of "complex continued fractions".

Session 3: General Session

Room 105, Health Center

Organizer: **Theresa C. Michnowicz**, New Jersey City University

Presider: Carol Avelsgaard, Middlesex County College

1:50-2:05

Suneal K. Chaudhary, Monmouth University,
schaudha@monmouth.edu

Hedging Fixed-Income Option Risk using Modified Least-Squares Monte Carlo.

In 2010 Wang and Caflisch introduced an elegant modification to the Least-Squares Monte Carlo (LSM) method which calculates sensitivities, or partial derivatives, of equity options to changes in underlying stock prices. In this talk we examine the performance of this method for fixed-income interest-rate options, including caplets and swaptions. We examine the use of low-discrepancy sequences, and Richardson extrapolation to correct for bias.

2:10-2:25

Zhixiong Chen, New Jersey City University,
zchen@njcu.edu

Discussion about Dispersion Relation and Patterns for One-species Diffusion Systems.

The mesoscopic models of particle diffusion in one particle systems were built to model the surface processes. Conditions under which the particles' behavior has patterns will be derived. Here we will present two special cases of dispersion relation and pattern formations for two common interacting potentials.

2:30-2:45

Jay Schiffman, Rowan University,
schiffman@rowan.edu

Utilizing Truth Tables to Furnish Some Neat Mathematical Properties

Students during their undergraduate careers in mathematics are exposed to operations that may or may not enjoy the commutative, associative, or distributive properties. What is not as well-known involves operations which may anti-commute, anti-associate, or anti-distribute with respect to themselves or to other operations. If one

Michnowicz, New Jersey City University, tmichnowicz@njcu.edu, by Thursday, September 1, 2011.

Book Sales at the Meeting

The discounted meeting price of MAA books also applies to books *not* currently on display. Further, when you order such books at the meeting no shipping costs will be charged.

Future MAA-NJ Meetings

- The Fall 2011 MAA-NJ Section meeting will be held at Montclair State University, Saturday, October 29. Invited speakers include Annalisa Crannell, Franklin and Marshall College, Diana Thomas, Montclair State University, and Keith Weber, Rutgers University.
- The Spring 2012 MAA-NJ Section/GSUMC meeting will be held at Raritan Valley Community College, Saturday, March 31.

MathFest 2011

The Mathematical Association of America will hold its annual MathFest in Lexington, KY, August 4-6, 2011. More information, including registration and a list of contributed paper sessions, can be found online at <http://www.maa.org>.

Other Future National MAA Meetings

- 2012 Joint Mathematics Meeting, Boston, MA, January 4-7, 2012
- 2012 MathFest, Madison, WI, August 2-4, 2012
- 2013 Joint Mathematics Meeting, San Diego, CA, January 9-12, 2013

2011 MAA PREP Workshops

The program costs as well as the costs of food and lodging during the workshop are covered by PREP. However, there is a registration fee for each workshop. Visit MAA Online at <http://www.maa.org/prep/> for information.

Dinner Honoring the Invited Speakers and Award Recipients

The Section will honor the invited speakers and award recipients at dinner following the meeting. Everyone is cordially invited.

JOIN THE MAA (http://www.maa.org/membership/join_main.html).

are posted online <http://www.maa.org/newjersey>. For additional information you may contact Zhixiong Chen (Secretary, MAA-NJ) at zchen@njcu.edu. Award nominations are due November 4, 2011.

NJ-NExT

A new series of NJ-NExT workshops is starting with this meeting. Please welcome them to the section.

The following is the NJ-NExT Itinerary:

Friday April 1, 4-9PM, The Academic Portfolio

Saturday, April 2: 1:50 - 3:05, "Interdisciplinary Mathematics Outreach,"

Nathan Kahl, Seton Hall University

4:25 - 6:00, "What I wish I knew before my first year of teaching," panel of National and NJ-NExT fellows: Jana Gevertz Fiorelli, The College of New Jersey; Jonathan Cutler, Montclair State University; David Nacin, William Paterson University; Srabasti Dutta, College of St. Elizabeth; Tatyana Stepanova, Raritan Valley Community College.

John T. Saccoman, Seton Hall University and Kaaren B. Finberg, Ocean County College, NJ-NExT co-directors.

Lunch Discussion Tables - Spring 2011 Meeting

Organized by Tom Hagedorn, The College of New Jersey and Theresa C.

Michnowicz, New Jersey City University

1. *The Use of Computer Algebra Systems in the Classroom: Benefits, Challenges, and Best Practices*, led by Leona Harris, The College of New Jersey.
2. *Running Mathematics Enrichment Programs for K-12 students*, led by Jonathan Rogness, University of Minnesota.
3. *How to Be Successful Teaching the Introductory Statistics course*, led by Richard De Veaux, Williams College.
4. *On-Line Courses*, Mark S. Korlie, Montclair State University.

Those who pre-registered have priority at these discussion tables.

Call for Contributed Paper Session Organizers and Lunch Table Discussion Leaders

MAA members interested in organizing a contributed paper session for the Spring 2012 meeting or leading a lunch table discussion at the Fall 2011 meeting are asked to please submit the proposed topics to Theresa

considers two propositional variables and attempts to form all possible truth functions, they arrive at sixteen possibilities including the obvious truth tables such as conjunction, conditional, and biconditional. Our focus here is to demonstrate that basic truth-table logic serves as fertile ground for obtaining some surprisingly fascinating outcomes.

2:50-3:05

Alla D. Kucher, Massachusetts College of Liberal Arts

A.D.Kucher@mcla.edu

Sponsoring Student Undergraduate Research. Samples of Students' Projects from: Differential Equations, Interest Theory and Mathematics of Social Choice.

In this talk, I will share my experiences in sponsoring students' undergraduate research projects in Mathematics. I will present four samples of students' projects from Differential Equations, Mathematics of Finance and Mathematics of Social Choice.

2:30 – 2:45 (This talk will be in Room 204, Health Center)

Mark Farag, Fairleigh Dickinson University

mfarag@fd.edu

Naïve Quotient Rules for Derivatives and Antiderivatives

Naïve mathematics rules, such as $\frac{d}{dx} \frac{f}{g} = \frac{f'g - fg'}{g^2}$, are seldom correct.

However, such mistakes can provide good fodder for individual and class projects at all levels. In this talk, I will characterize the pairs of differentiable functions f and g for which the above naïve rule holds. I will also characterize the continuous functions f and g for which $\frac{d}{dx} \frac{f}{g} = \frac{f'g - fg'}{g^2}$ is satisfied. In each case, only results from the standard single variable Calculus sequence are required.

Session 4: Online Courses

Room 204, Health Center

Organizer and Presider: **Mark Korlie**, Montclair State University

1:50 – 2:05

David Nacin, William Paterson University,

nacind@wpunj.edu

Peer Feedback and Other Forms of Assessment in On-line Courses: What Worked, What Didn't

In this presentation I will discuss the various methods of on-line assessment I experimented with in my first experiences with on-line teaching. These methods included checkpoints for long range assignments, discussion board topics, peer feedback and both timed and untimed quizzes in blackboard. I'll discuss my course design, grading criteria and what I feel worked best for maximizing student success.

2:10-2:25

Mark S. Korlie, Montclair State
korliem@montclair.edu

Teaching a Hybrid Contemporary Applied Math Course

This presentation is about a hybrid course that I taught in summer 2010 and will be teaching it again in summer 2011. The class met on the first day of classes on campus, and it met on two more other days on campus for the midterm exam and the final exam. The remaining times were devoted to online computer-based learning through reading of course modules posted on blackboard and doing regular assignments on WebAssign. Anecdotal evidence shows that the students were more engaged in learning the course contents, and they performed better, on average, than those who took the traditional face-to-face instruction of the same course with me in the past.

Session 5: Contributed Papers by Graduate Students

Room G05, Health Center

Organizer and Presider : **Sarita Nemani**, **Georgian Court** University

1:50-2:05

Matthew Vieira, Montclair State University
vieiram1@mail.montclair.edu

Increase of ferrofluid viscosity induced by applied magnetic fields

To experimentally measure the viscosity of magnetic fluids (ferrofluids), glass spheres were dropped into a sample of ferrofluid subject to various applied magnetic fields. The sphere's trajectories were observed using x-ray phase contrast imaging at the Advanced Photon Source of the Argonne National Laboratory. The average speed

Section meeting. He did an excellent job and the meeting was very successful. After the meeting, to the delight of the Section Executive Committee, he accepted the appointment to serve as the Section Public Information Officer. The following year, he took on the additional responsibility of Door Prize/Silent Auction Coordinator.

While serving as Vice Chair for Speakers and Door Prize/Silent Auction Coordinator, Hieu founded the Garden State Undergraduate Mathematics Conference (GSUMC) and served as the Director of the first GSUMC held in March 2004 at Rutgers University, New Brunswick. He wrote the grant proposal to the National MAA that funded the first GSUMC. In addition to making sure that all members of the Organizing Committee did their job in preparing for the Conference and running activities at the Conference, Hieu designed and ordered t-shirts for the Conference. Further, he created and collected the evaluation forms, and took pictures during the Conference. The Conference was a huge success.

As Public Information Officer of the Section, Hieu created the first online registration for Section meetings in 2003. In Spring 2007, when another meeting was held at Rowan University, he was a member of the Host Committee.

Hieu has actively presented his research results in contributed papers session at MAA-NJ Spring meetings. The titles of his presentations at these meetings are *Soliton Radiation* (2002), *Traveling Wave Solutions to the Molecular Laser Equations* (2003), *Functional Inequality for Hypergeometric Zeta Functions* (2005), *A Half-Marriage in Error: When Zeta Integrates a Gaussian* (2006), and *Sums of Products of Hypergeometric Bernoulli Polynomials* (2010).

We appreciate and are very grateful to Hieu for his many years of effective and dedicated service to the New Jersey Section of the Mathematical Association of America.

Call for Nominations for the MAA-NJ Award for Distinguished College or University Teaching

The MAA-NJ Section Distinguished Teaching Award Selection Committee is seeking nominations for the 2012 award. Please consider nominating an inspiring, respected, or influential deserving colleague for this prestigious award. Information about the nomination process and eligibility requirements

(continued from page 9)

2:50-3:05

Stewart Hengeveld, Montclair State University,
hengevels1@mail.montclair.edu

Advanced Algebraic Methods in Solving Complex Systems and Enhancing GK-12 Education

When dealing with a complex system, we tend to find a way to simplify the problem in order to reduce the work. For example, when confronted with non-linear systems, we tend to linearize them. The focused question here is: How to deal with a “messy” polynomial system of equations? A system of interest arises from solving magic squares. In this talk I will illustrate how powerful algebraic algorithms and tools allow us to simplify the problem. These mathematical ideas were introduced to middle school classrooms, through the MSU GK-12 program. The students explored how to apply advanced algebraic techniques and algorithms to simplify and solve the problem of magic squares. This illustrates and emphasizes the need and usefulness of mathematics beyond the classroom. It is expected that through activities like this, students raise the level of their mathematical skills, critical thinking, logical reasoning, and appreciation of mathematics.

Announcements

The 2011 Distinguished Service Award

The recipient of the 2011 MAA-NJ Section Sr. Stephanie Award Distinguished Service is **Hieu D. Nguyen** of Rowan University.

Dr. Hieu D. Nguyen’s service to the New Jersey Section of the MAA has been outstanding. He has served as Chair (2007-2009), Vice Chair for Speakers (2003-2006), Director of the Garden State Undergraduate Mathematics Conference (2004), Public Information Officer (2001-2003), and Door Prize/Silent Auction Coordinator (2002-2007). He is currently serving as member of the Nominating Committee.

Hieu’s service to the MAA-NJ Section started in 2001 when he served as the contact person on the Host Committee at Rowan University for the Spring 2001

of a falling sphere is observed to decrease with an increase in the field strength, suggesting a saturable, magnetically induced increase in the ferrofluid viscosity.

2:10-2:25

Emel Demirel, Montclair State University,
emel.demirel86@gmail.com

Study of Polynomial Solutions to Certain Diophantine Equations

In this paper, we investigate a particular Diophantine equation, $X^2 + Y^3 = 6912Z^2$, and a set of solutions to the equation, which are derived from some polynomials in $Z[x, y]$. We focus on three polynomials $X = f(x, y)$, $Y = g(x, y)$ and $Z = h(x, y)$ that satisfy the Diophantine equation and the greatest common divisors for the integer values of the polynomials. These polynomials are relatively prime in $Q[x, y]$. However, for a fixed integer pair x_0, y_0 , the integer values $f(x_0, y_0)$, $g(x_0, y_0)$ and $h(x_0, y_0)$ are not necessarily relatively prime in $Z[x, y]$. We investigate the greatest common divisors (GCDs) between these three polynomial values for specific integer pairs x_0 and y_0 . We focus on the cases where $y = 1$ and $y = 2$. For these cases, we give complete classifications on the distribution of the GCDs. We use the Gröbner Bases technique as an aid in investigating the GCDs for f, g, h in $Z[x, y]$. We then generalize the results from the cases $y = 1$ and $y = 2$ to obtain similar properties for the GCDs of f, g, h for all x and y in $Z[x, y]$. Then, we can generalize the greatest common divisors of the polynomials for all possible integer values of x and y .

2:30 – 2:45

Jonathan Weisbrod, Rowan University,
weisbrodj1@verizon.net

Numbers That Can Be Expressed As the Sum of Two Positive Squares in Exactly N Distinct Ways

The primary objectives of this project are to quickly and easily determine the number of distinct ways a particular positive integer can be expressed as the sum of two positive squares and to generate sequences of positive integers that can be expressed as the sum of two positive squares in exactly n distinct ways. In order to do this, we only need elementary factoring and algebraic techniques.

(Continued on page 12)

**Mathematical Association of America
New Jersey Section, Meeting Program Spring 2011**

8:30 – 9:30	Registration and Coffee Main Entrance MEGA Building
8:30 – 1:30	Book Exhibits Main Entrance MEGA Building
9:30 – 9:45	Welcome by Dr. Ladylease G White , Essex County College Room 2131: J. Harry Smith Hall
9:45 – 10:40	The Seven Deadly Sins of Data Mining and How to Avoid Them , Richard De Veaux, Williams College Presider: Siham Alfred, Raritan Valley Community College Room 2131: J. Harry Smith Hall
10:40– 11:10	Intermission , Coffee and Book Exhibits Gallery
11:10 – 11:25	Chair’s Report and Governor’s Report Room 2131: J. Harry Smith Hall
11:25 – 12:20	Mathematical Modeling of Chemical Kinetics in the Body , Leona Harris, The College of New Jersey Presider: Karen Clark, The College of New Jersey Room 2131: J. Harry Smith Hall
12:20 – 1:40	Lunch , 4th Floor Multipurpose Room
1:50 – 3:05	Contributed Paper Sessions <ul style="list-style-type: none"> • Statistics: Practice and Pedagogy Room 203, Health Center • Complex Systems Room 203, Health Center • General Session Room 105, Health Center • Online Courses Room 204, Health Center • Graduate Students Contributed Paper Room G05: Health Center NJ-NExT session: NJ-NExT fellows only CFT Conference Room (T233)
3:05 – 3:30	Intermission: Deadline for Silent Auction/Door Prizes Gallery

3:30 – 4:25	Spherical Cats and Ham Sandwiches , Jonathan Rogness, University of Minnesota (Joint MAA-GSUMC Speaker) Presider: Diana Thomas, Montclair State University Room 2131: J. Harry Smith Hall
4:25 – 4:45	Prizes and Awards , GSUMC Awards, door prizes, and silent auction winners (must be present to win) Room 2131: J. Harry Smith Hall
4:25 - 6:00	NJ-NExT session: NJ-NExT fellows only CFT Conference Room (T233)
5:00	Dinner honoring the Invited Speakers and Award Recipients

**Garden State Undergraduate Math Conference
Spring 2011 Program**

8:30 – 9:15	Registration and Breakfast Gallery
9:30 – 12:00	New Jersey Undergraduate Math Competition Siegler Hall
12:00 – 1:00	Complimentary Student Lunch Clara Dasher Student center
1:00 – 2:00	Student Poster Session CFT First Floor
2:15 – 3:15	Student Talks Rooms (CFT) T103, T104, T122, T203:
3:30 – 4:25	Spherical Cats and Ham Sandwiches , Jonathan Rogness, University of Minnesota Presider: Diana Thomas, Montclair State University Room 2131: J. Harry Smith Hall
4:25 – 4:45	Contest Results, Awards, and Prizes Room 2131: J. Harry Smith Hall