Las MATRICES

A NEWSLETTER OF THE DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE
VALDOSTA STATE UNIVERSITY

SPRING 2014

A WORD FROM OUR CHAIR

Greetings to friends and alumni of the Mathematics & Computer Science Department at Valdosta State University. 2013 was an exciting year for the Mathematics and Computer Science Department. We welcomed five new faculty members to our program as well as a new head secretary. During the 2013-2014 academic year, we are conducting searches for a tenure-track mathematician and a tenure-track computer scientist.

Our students accomplished great things in 2013. Ilya Rogers, a computer science major, won the best poster award at the VSU Undergraduate Research Symposium during the spring. Brittney Nelson, a December 2012 graduate of our mathematics program and member of the 2012-2013 VSU women's basketball team, was recognized for both her basketball success and academic success as the graduate student earned Capital One Academic All-Region honors in the spring. Michael Cauley, a May 2013 mathematics graduate, was accepted to the Ph.D. in Mathematics program at the University of Oklahoma for Fall 2013, where he was awarded a Teaching Assistant position.

In addition to our constant pursuit of academic excellence in our undergraduate mathematics and computing programs, the department also reaches out to grade k-12 students and encourages them to pursue studies in science and mathematics through a variety of on-campus programs. During 2013, we hosted over 500 area k-12 students at five different outreach events.

During 2013, our faculty conducted research and published articles in peer-reviewed state, national, and international journals and proceedings. In addition, the faculty continuously seek to improve the undergraduate learning experience for students at Valdosta State. During 2013, the department implemented a Math Placement Policy to ensure that students entering VSU are properly positioned for success. The department also focused on providing extra support to our computer science and computer information systems majors in the entry level CS class. So far, both of these initiatives are showing positive results for students.

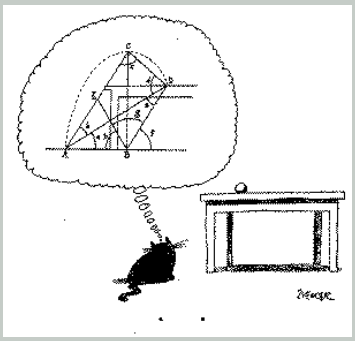
During the fall, we honored our department's outstanding alumnus, Capt. Stephen Pugh. Capt. Pugh received his B.S. in Computer Science and was commissioned in the U.S. Air Force as a Cyberspace Defense Officer in 2004. He is currently the Commander of Detachment 2 of the 315th Network Warfare Squadron. We congratulate Capt. Pugh for his many and varied professional accomplishments as well as his strong legacy of service to the communities in which he has lived.

Throughout 2013, the department developed strong partnerships to serve our students and region. For the first time, we offered guaranteed $1000 scholarships to the top five winners of our annual high school mathematics tournament. We are also partnering with Nexxtep Technologies to offer a $500 scholarship award each year to an outstanding junior/senior computer information systems majors.

We greatly appreciate the people who donate to our program. As an indicator of our faculties' commitment to our institution, in 2013 the faculty contributed 47% of the total amount donated to our department. As we strengthen our programs and our grade k-12 outreach, we also strengthen the value of our alumni's degrees, empower young minds, and enrich our community. We encourage you to consider partnering with us in 2014 as we strive to meet the needs of our region by donating to our Math/CS department fund. We would also enjoy hearing your ideas of how you can partner with us to meet the needs of our region. Further, we encourage our alumni to send in your alumni news to appear in our next newsletter. We would enjoy hearing from you at mathcs@valdosta.edu.

Warm regards,

Dr. Greg Harrell, Ph.D.
Professor and Department Head
Math and Computer Science



DR. GREGORY HARRELL
DEPARTMENT HEAD
DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE
VALDOSTA STATE UNIVERSITY
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VALDOSTA, GA 31698-0040

VSU COMPUTER SCIENCE WORKSHOP: A COMPLETE SUCCESS!

Valdosta State University hosted its second Google-funded computer science workshop for area school-teachers June 17-20. The workshop, titled Valdosta Computes 2.0, is the only workshop in the state funded through Google as part of its Computer Science for High Schools (CS4HS) program. This workshop was coordinated and supervised by Dr. Krishnendu Roy. This year's workshop included 15 teachers from Berrien, Brooks, Lowndes, Tift, Irwin and Clinch counties whose subject areas ranged from math, technology and engineering to gifted classes and English. Thirteen schools were represented. Teachers learned basic concepts in computer science and were provided with several free online resources that they could use to educate students in the classroom. The workshop also included several hands-on activities. Google's CS4HS program provided $12,500 to VSU to fund Valdosta Computes 2.0. Through the CS4HS initiative, funds are provided by the Google Education Group to host two to three day workshops for middle school and high school teachers. Google currently offers CS4HS grants to colleges and universities across the world.

According to a Google blog about the program, the ultimate goals are to "'train the trainer,' develop a thriving community of high school CS teachers, and spread the word about the awe and beauty of computing." The grant was introduced in 2010 with hopes of impacting at least 36,000 students and ensuring they are exposed to the latest computing tools in technology.

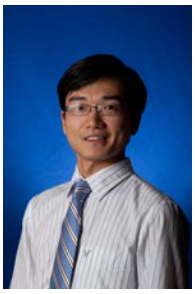
THANKS TO OUR DONORS

Mrs. Pat Bezona, Robert C. Beeland with CJB Industries Inc, Mr. Said Fares, Dr. Greg Harrell, Greg Morris with Hester & Morris DMD PC, Dr. Ashok Kumar, Mr. Wing Lee, Wade H. Coleman with the Leona S Hudson Charitable Foundation, Mr. Benjamin Li, Ms. Janice F. Lowe, Angie Crawford of State Farm Insurance, Dr. Sandy Trowell, Dr. Zhiguang Xu and Ms. Anna Lane.

UPCOMING EVENTS

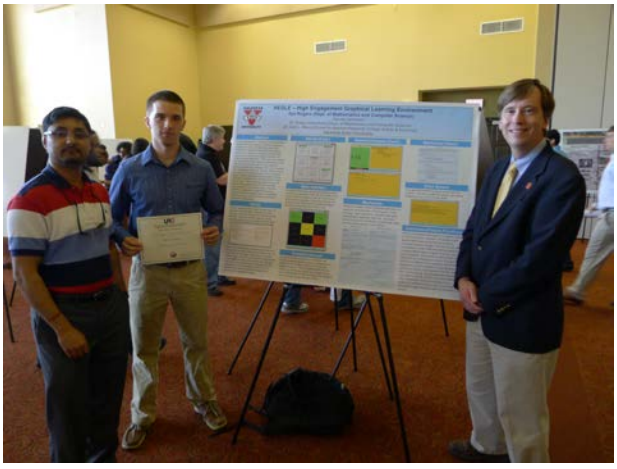
- The VSU Middle School Math Tournament: May 2014
- MAA Picnic: TBA
- Camp Invention: June 2014
- Computing Adventures Camp: July 2014
- Sonia Kovalesvsky days: April 2014

DEPARTMENTAL NEWS



- **Dr. Haiquan "Victor" Chen** recently published an article entitled: "*A Bayesian Inference-Based Framework for RFID Data Cleansing*" *in the journal* **IEEE Transactions on Knowledge and Data Engineering (TKDE)**. TKDE is one of the most reputational journals in computer science area and is ranked as "A", according to the Australia Research Council 2010 Excellence in Research for Australia (ERA) Journal and Proceeding list. Congratulations Victor! For more information, see http://www.computer.org/csdl/trans/tk/2013/10/ttk2013102177-abs.html

- **Dr. José A. Vélez-Marulanda** recently published an article entitled: *"On the Infinitude of Prime Elements"* in the journal **Revista Colombiana de Matematicas.** Dr. Velez-Marulanda also gave a presentation entitled: *"Deformations and Derived Equivalence over Frobenius Algebras"* at the **2nd Conference on Geometric Methods in Representation Theory**, which was held at the University of Missouri in Columbia, MO, in November 2013.
- **Dr. Denise Reid** and Dr. Vélez-Marulanda published an article entitled: *"Leslie Matrices and Women Population in the United States"* in the **Georgia Journal of Science**. This is a joint-work with the former undergraduate students **Brittney Nelson** and **Antonija Tangar**.
- The **Valdosta State University Chapter of the Mathematical Association of America (MAA)** is now led by President **Daniel Drummond**, Vice-President **Avisha Patel**, Secretary **Erica Garcia**, and Treasurer **Lizzie Lohmar**. According to Daniel: *"After we graduate, we are all planning on attending graduate school to pursue a higher education in mathematics. As an organization we are planning on offering tutoring toward College Algebra students at VSU as well as volunteering at the local Boys and Girls Club. We are planning on having outside groups, such as an actuary group from Tallahassee, come and talk about the opportunities that mathematics can lead to. The MAA is also looking into research opportunities with professors and looking forward to participating in a student/faculty colloquium that would discuss math, problem solving, and other math related topics. In the upcoming spring semester, the MAA looks forward to hosting a department picnic."*
- We welcome to our new faculty: Ms. Poulomi Ghatak, Ms. Anna Lane, Dr. Jason Loew, Ms. Brenda Morgan and Dr. Benjamin Wescoatt.
- Our web site was updated! We are very grateful with **Dr. Krishnendu Roy** and **Dr. Dave Gibson** for doing a wonderful job.



OUR EXPERIENCE IN ...

THE NATIONAL ALLIANCE FOR DOCTORAL STUDIES IN THE MATHEMATICAL SCIENCES 7TH FIELD OF DREAMS CONFERENCE

BY AVISHA PATEL & AUBRIANNA LUNDY*

Among many students who applied for Math Alliance Program, it was surprising news for us to get accepted and to know we got a chance to attend the Field of Dreams Conference in Phoenix, Arizona on November 1, 2013 to November 3, 2013.

It is a program that wants to guarantee that students who have the passion and the ability to pursue a doctoral degree in mathematical science will be given the support and opportunity to succeed. While attending the conference we met graduate students, postdoctoral fellows, and faculty from a variety of fields and institutions. Talking to several people we acquired a better understanding of what our options after graduate school could be. We also discovered the variety of jobs available to us depending on our area of concentration for masters in mathematics. We also heard Alliance PhD graduates talk about their experiences and struggle that they faced being in graduate school and while getting their Ph.D. They also gave us tips on what to expect and what we should do to better prepare ourselves. Being a senior, we learned how to determine what graduate program/school would best fit us. The speakers gave advice on how to identify which professors to choose to write a letter of recommendation; they also gave us tips on how to better prepare ourselves and staying on top of the game when it comes to the letters of recommendation and what the pros and cons are about letters of recommendation and statement of purpose.

"You are the future mathematicians"
-Dr. William Y. Vélez

We attended the career summer program fair that they provided us. We spoke with many colleges graduate department representatives at the college fair. We asked them what their requirements are and what kind of program their college offers for masters in mathematics. There were several colleges that had REU summer program in which if you're accepted you will have the opportunity to spend time with a professor and learn more about the research opportunities. Later on during the day we attended the conference of Careers in Industry and Government. We heard several speakers talk about their experience with their math career job in the industry and government field. From that conference we found out that not only do you have limited option in the math field, but you also have an option of working as a Bio-Statistician, which is in high demanding. In addition we learned some history and application about Bayesian Statistics Overall this trip was worth going. We would advise first generation graduate students to definitely take this opportunity and go when it's offered next year. Thanks Dr. José A. Vélez-Marulanda for nominating us.

* Avisha and Aubrianna are senior students in the B.A. in Mathematics program at VSU.

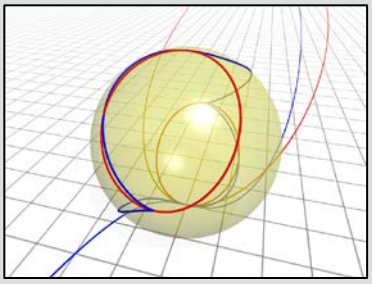
ATTENTION FACULTY, STAFF AND STUDENTS

Please send articles of experiences that you want to share with us to

mathcs@valdosta.edu

WHAT IS…

TOPOLOGY ?



Prof. Ault is currently putting together the material for a course in Topology (MATH 4540, Spring 2014), which is closer to his primary research interests. Topology is the study of properties of a space that remain invariant as the space undergoes stretching, bending, compressing, etc., but not tearing or gluing. Imagine a coffee mug that is made out of soft clay, and that mug is molded, little by little, into the shape of a donut. To a topologist, the two objects are the same! All that matters (topologically) is that both objects have a single "hole." If you're a Math major or minor, and you will have completed Set Theory (MATH 3040) by the end of this semester, consider signing up for Topology! (Note, actual donuts and coffee are not provided.)

MEET…

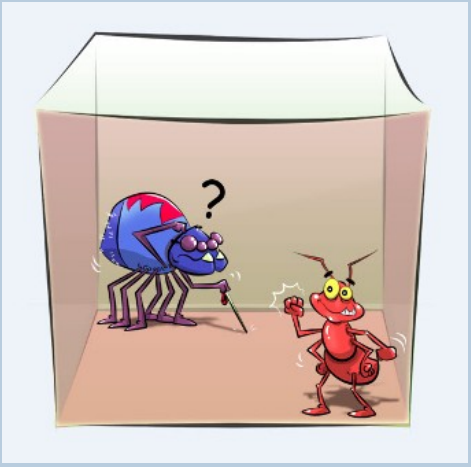
DR. SHAUN VAN AULT

Dr. Shaun V. Ault has been with the VSU Department of Mathematics and Computer Science since Fall 2012. Previously, Ault held a post-doctoral teaching and research position at Fordham University in the Bronx, NY.

Ault earned his Ph. D. in Mathematics at The Ohio State University (Go Bucks!!!), and has undergraduate degrees in Mathematics (B. A. 2002, Oberlin College) and Music Composition (B. Mus. 2002, Oberlin Conservatory of Music). His research interests are wide and varied, including Algebraic Topology, Computational Algebra, Combinatorics, and even Music. When asked what it is his favorite class to teach, the answer is, currently, MATH 2261 (Analytic Geometry & Calculus I). This class serves as a bridge from elementary mathematics (such as algebra and trigonometry) into "real" mathematics.

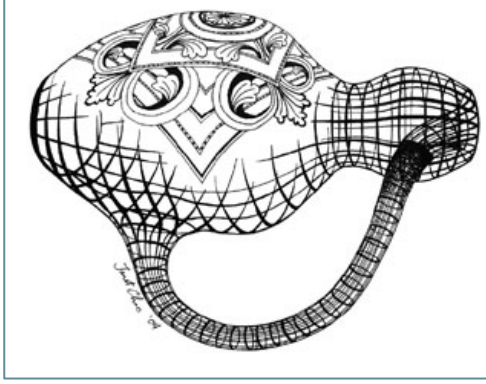
THE MATH PROBLEM CORNER

An ant and a blind spider are on opposite corners of a cube. The ant is stationary and the spider moves at random from one corner to another along the edges only. What is the expected number of turns before the spider reaches the ant? Optional: Also solve for a square, octahedron, icosahedron, and dodecahedron.



The answer is 10.
If the spider started at a corner diagonally on the same face as the ant the answer would be 9, and if the spider started at an adjacent corner the answer would be 7.
Here are answers for other figures:
Square: 4, Octahedron: 6, Dodecahedron: 35, Icosahedon: 15

Solution
Let x=number of turns to reach ant from starting point.
Let y=number of turns to reach ant from diagonal corner on same face as ant.
Let z=number of turns to reach ant from an adjacent corner to ant.
After one turn the spider will be on a diagonal corner of a common face as the ant. So the mean number of turns from the x position is one more than the mean number from the y position:
E(x)=1+E(y).
Once at a y position there is a 2/3 chance it will then move to a z position, and a 1/3 chance back to an x position:
E(y)=(2/3)*(1+E(z))+(1/3)*(1+E(x)).
If the spider arrives at a z position there is a 1/3 chance it will move to the ant, and a 2/3 chance it will move back to a y position:
E(z)=(1/3)*1+(2/3)*(1+E(y)).
With these three equations and three unknowns it is not difficult to solve for E(x), E(y), and E(z).



2013 OUTSTANDING ALUMNI

Captain Steve Pugh was recognized with the annual outstanding alumni award from the Department of Mathematics and Computer Science on October 3, 2013. Capt. Pugh received his B.S. in Computer Science and was commissioned in the U.S. Air Force as a Cyberspace Defense Officer in 2004. He is currently the Commander of Detachment 2 of the 315th Network Warfare Squadron and also serves as National Security Agency Deputy Branch Chief at the Texas Cryptologic Center in San Antonio, Texas.

Steve has a long and varied list of professional accomplishments. While deployed in support of Operation Iraqi Freedom, Steve was responsible for air traffic control and landing systems at Balad Air Base as well as the operation of one of two satellite communication relay points for all of Iraq. Steve spent one year in South Korea supporting the defense of the Korean peninsula. He is a certified physical fitness trainer and a Certified Ethical Hacker.

Captain Pugh has written professional articles for cyberspace magazines, published the book ***Wicked Cool Ruby Scripts***, and served as a contributing author of the McGraw-Hill Homeland Security Handbook 2012.

In addition to his many professional accomplishments, Steve is also known for his service outside of his profession. He currently serves as an instructor and mentor at Financial Peace University, which teaches financial literacy to members of the community.

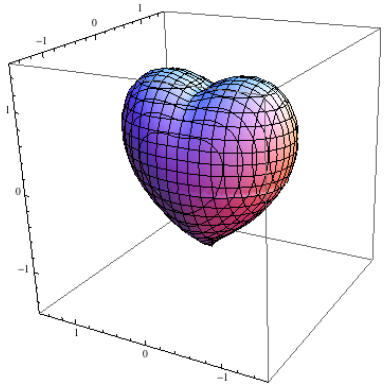
He plans and executes the annual Collegiate Cyber Defense Competition and serves as the lead mentor at Stacy High School for students to compete in the CyberPatriot National High School Cyber Defense Competition.

Steve has left a legacy of service at every location he has been assigned in the Air Force. While in Maryland, he served at the Arundel House of Hope. He has served as a volunteer builder for Habit for Humanity homes in three states spanning 12 years.

The Department of Mathematics & Computer Science is very proud to recognize Captain Steve Pugh as our 2013 Outstanding Alumni.

MATHEMATICA TIP…

A heart surface just right for Valentine's Day!



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ContourPlot3D[(2 x^2 + y^2 + z^2 - 1)^3 - x^2 z^3/10 - y^2 z^3 == 0, {x, -1.5,1.5}, {y, -1.5, 1.5}, {z, -1.5, 1.5}, Mesh -> Automatic, Axes -> True]
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Contribution by Dr. Jin Wang

ATTENTION ALUMNI!

PLEASE SEND YOUR PROFESSIONAL AND PERSONAL NEWS TO

mathcs@valdosta.edu

FOR INCLUSION IN THE ALUMNI SECTION OF THE NEXT NEWSLETER