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Math Department Newsletter, 2014

University of Dayton. Department of Mathematics

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CHAIRPERSON'S MESSAGE

I hope that all of you have had a blessed year. We had another active and productive year here in the Department of Mathematics. Our faculty continues to change. This is the last year for Dr. Virginia Keen, one of our mathematics education specialists. We want to thank her for her contributions to that program and wish her the very best in her life after UD. We searched for a new faculty member to take her place and are pleased to welcome Dr. Jonathan Brown next fall. Dr. Brown studies the representation theory and ideal structure of C^* -algebras constructed from dynamical systems and is also interested in algebras associated with graphs. Dr. Brown has been enjoying a post-doc at Kansas State over the last two years, where he has been doing research and working as a team supported by a USD grant to run professional development programs for elementary school teachers. He will be helping teach some of our courses for education majors.

We are also very pleased to announce that Marilyn Szorc (Doc's daughter) has generously begun a fund which will provide money to aid our faculty members in their research. This is the Dr. Kenneth Schraut Faculty Research Award in Mathematics. We liked the idea so much that we are getting a jump start on making these awards. The first recipient is Dr. Lynne Yengulalp, a young topologist, who will use the award to invite collaborators to campus.

UD continues to recognize the good work of our faculty members. Dr. Maher Qumsiyeh was granted tenure and promoted to Associate Professor, and Dr. Wiebke Diestelkamp was promoted to Professor. Congratulations to both of these statisticians.

Joe Mashburn

THANKS!

Thank you again for your generous support. We deeply appreciate your generosity. We purposefully use it to support the educational mission at UD. As you read through the undergraduate and graduate activities sections, you can read about the activities you have supported this past year. You have helped support Math Events, Integration Bee, the High School Mathematics Competition, and undergraduate and graduate student travel. Thank you.

The University Development Office reports that the following people made valuable donations to the Department of Mathematics during 2013:

Mr. and Mrs. Ronald Beisel (63)	Mr. and Mrs Stephen Bergeon (83)
Mr. and Mrs. David E. Brown (65)	Dr. and Mrs. Gregory Campbell (70)
Mr. and Dr. Joseph Chmiel (69)	Mr. and Mrs. Kennon Copeland (75)
Dr. and Mrs. Paul Eloë (84)	Mr. and Mrs. Donald Kavalunas (65)
Mr. and Mrs. David L. Kramer (68)	
Dr. Charles F. Mott (61) and Ms. Alicia Feernandez-Mott	
Colonel and Mrs. Michael Okita (80)	Dr. Jane Pendergast (74) and Dr. Mark Hale
Mr. Timothy Rice & Ms. Angela Jacobs (88)	
Dr. and Mrs. Thomas Santner (69, 69)	Mr. & Mrs. Curtis Schultz (91)
Mr. Robert Springer (77)	Mr. Kevin Thomas (76)
Dr. Susan Miller Thompson (81)	Dr. and Mrs. Daniel Voss (79)

The following corporations and foundations provided matching gifts:

AON Foundation	IBM Foundation
Fidelity Charitable Gift Fund	Towers Perrin Co.

Recently the **Kenneth C. Schraut, Ph.D., Memorial Scholarship** was established in honor of Dr. Schraut. We thank the following donors for their generosity and support.

Mr. and Mrs. Philip Aftoora (69)	Mr. Richard Allen (75)
Mr. Eugene Bolzan and Ms. Lois Scaife (69)	
Dr. William Cash (65)	Mr. and Mrs. Andrew Ehrenzeller (81, 83)
Dr. and Mrs. William Fitzpatrick (50)	Ms. Anne Flynn
Mr. and Mrs. Ronald Steinkirchner (76,76)	Dr. C. Eugene Steuerle (68)

The following corporation provided matching gifts:

Lockheed Martin Corporation

This past year, two students received scholarship support through the **Kenneth C. Schraut, Ph.D., Memorial Scholarship**. These students are:

Hannah Lieber

Brian Turk

We have a newly endowed **Schraut Research Award** through the generosity of Marilyn (76) (Schraut) and Frank Szorc in memory of Marilyn's father, Kenneth C. Schraut. The award is intended to support the research agenda of individual faculty members from the Department of Mathematics. **Lynne Yengulalp** is the recipient of the first award; Lynne will use these resources to bring collaborators to the University of Dayton.

MATH EVENTS AT UD

Through generous contributions to the Kenneth C. Schraut Memorial Lectureship fund and to the department's restricted funds, our alumni have enabled us to host the annual

Math Events which features the Kenneth C. Schraut Memorial Lecture. Since 2002, the Schraut Lecture has anchored *Math Events* annually.

THE 14th ANNUAL KENNETH C. SCHRAUT MEMORIAL LECTURE, 11/3/2013

Dr. Thomas Bohman (91), Alexander M. Knaster Professor and Department Head, Department of Mathematical Sciences, Carnegie Mellon University, delivered the 14th annual Kenneth C. Schraut Memorial Lecture to a diverse audience with high school students, undergraduate and graduate students and faculty members. **Adam Volk (16)**, Math Club Vice President, provided introductory remarks and introduced Dr. Bohman. Thank you Adam.

Tom earned a B.S. degree, majoring in mathematics, from UD in 1991. He then earned a Ph.D. in applied mathematics from Rutgers University, completed a postdoctoral appointment at the Mathematical Sciences Research Institute in Berkeley, and he was awarded a National Science Foundation postdoctoral fellowship at MIT.

Tom spoke to us on “Randomness and Pseudorandomness in Combinatorics.” He opened by introducing the probabilistic method as developed by Paul Erdos and showed how this method is used to prove existence of combinatorial objects. He then introduced the concept of pseudo randomness and showed how this concept has been used to advance combinatorial ideas. His talk was full of historical perspective with application to developments in Ramsey theory.

UNDERGRADUATE MATHEMATICS DAY November 3, 2013

The Schraut Memorial Lecture once again anchored Undergraduate Mathematics Day (UMD). This is now the sixth such undergraduate mathematics conference hosted at UD.

In addition to the Schraut Memorial Lecture, **Dr. Sara Miner More (96)** delivered an invited address entitled “Reasoning about Secrets.” Sara earned her undergraduate degree at UD in 1996, majoring in mathematics and computer science. She earned M.S. and Ph.D. degrees in cryptography from UC San Diego and is currently serving as Chair of the Department of Mathematics and Computer Science at McDaniel College in Westminster Maryland. Sara was introduced by **Patrick Zabriskie (14)**. Thank you, Patrick.

Sara spoke on the logic of secrets shared by more than two parties. She considered a case in which independence relations and functional dependence relations on secrets were defined. She described a logical system that is a complete axiomatic characterization of the properties that connect the independence and functional dependence relations.

AN INVITATION TO THE 26th BIENNIAL ALUMNI SEMINAR ON CAREERS IN MATHEMATICS, 10/25/2014

You are invited to participate in *Math Events 2014*, which will take place on Saturday, October 25, 2014. This year's program will consist of the 15th Annual Kenneth C. Schraut Lecture and the 26th Biennial Alumni Seminar on Careers in Mathematics. We are pleased to announce that **Dr. Rafe Donahue (87)** has graciously accepted the invitation to serve as the 15th Kenneth C. Schraut Memorial Lecturer; undoubtedly, he will also be asked to serve as a panelist on this year's Career Panel.

Paul Eloe, peloe1@udayton.edu, is organizing this year's career seminar. Currently, there is no further information; in general, the most current information can be found at <http://academic.udayton.edu/MathEvents/>.

FACULTY UPDATE

Full Time Faculty

Atif Abueida, 2000
Art Busch, 2006
Wiebke Diestelkamp, 1998
Shannon Driskell, 2003
Paul Eloe, 1980
Bob Gorton, 1969
William Harrison, 2009
Aparna Higgins, 1984

Peter Hovey, 2001
Muhammad Islam, 1985
Virginia Keen, 2007
Becky Krakowski, 2000
Catherine Kublik, 2013
Ruihua Liu, 2004
Joe Mashburn, 1981
Shirley Ober, 1977

Maher Qumsiyeh, 2008
Youssef Raffoul, 1999
Dan Ren, 2013
Paula Saintignon, 1983
Les Steinlage, 1969
Muhammad Usman, 2007
Lynne Yengulalp, 2009

Adjunct Faculty

Nicholaus Axmaker, 2014
Lisa Alexander, 2010
Bob Bennington, 2014
Matt Brenneman, 2012
Brett Bush, 2011
Karen Connair, 2010
Mark de Saint-Rat, 2011
Cheryl Edelman, 1999
Lauren Ferguson, 2014

Robert Finnegan, 1985
Bob Flavin, 2008
Steve Fuchs, 2005
Susan Holloway, 2011
Sandra Johnson, 2014
Fred Kingrey, 2014
Vickey Lackey, 2012
Jay Lane, 2014

John Loomis, 2007
Michael Mennett, 2014
Scott Mitter, 2001
Eileen Nolan, 2012
Donovon Ross, 2008
Larry Schmitt, 2011
Ed Wingham, 2011
Sam Wright, 2011

Professors Emeriti

Stanley Back, 1998
Bill Friel, 1999
Tom Gantner, 2001
John Kauflin, 2006
Jerry Strange, 1999

Jack McCloskey, 2001
Harry Mushenheim, 2006
Jerry Neff, 1999
Richard Peterson, 1998

Ben Rice, 1998
Carroll Schleppe, 2001
Ralph Steinlage, 2001
Gerry Shaughnessy, 2012

FACULTY ACTIVITIES

Atif Abueida co-authored several papers this year including (with A. Blinco, S. Clark, M. Daven and R. Eggleton) “Reducible and purely heterogeneous decompositions of uniform complete multigraphs into spanning tress,” *Australasian Journal of Combinatorics*, 55 (2013), 145-152, (with **A. Busch** and **R. Sritharin**) Hamiltonian spider intersection graphs are cycle extendable,” *SIAM J. Discrete Math*, 27 (2013), 1913-1923, (with M. Daven) “Multidecompositions of several graph products,” *Graphs and Combinatorics*, 29 (2013), 3-15-326, and (with D. Pike) “Cycle extension in BIBD block-intersection graphs,” *Journal of Combinatorial Designs*, 27 (2013), 303-310.

Arthur Busch co-authored a paper (with M. Jacobsen, T. Morris, M. Plantholt and S. Tipnis) “Improved sufficient conditions for the existence of anti-directed Hamiltonian cycles in digraphs,” *Graphs Combin.* 29 (2013), 359-364 as well as the article listed above with **Atif Abueida**.

Wiebke Diestelkamp co-authored (with S.C. Gardstrom, J. Bartkoswki and J. Willenbrink) “The impact of group music therapy on negative affect of people with co-occurring substance use disorders and mental illnesses,” *Music Therapy Perspectives*, 31(2) (2013), 116-126 and (with S.C. Gardstrom) “Women with addictions report reduced anxiety after group music therapy: a quasi-experimental study,” *VOICES: A World Forum for Music Therapy*, 13(2) (2013), <https://normt.uib.no/index.php/voices/article/view/681/602>.

She delivered an invited plenary address at the spring meeting of the Ohio Section of the Mathematical Association of America in April 2013 entitled “The lady tasting tea: R.A. Fisher and the statistical revolution.” She continues her service to the Ohio Section of the MAA by chairing the Teaching Award Committee and she continues her service on campus activities on campus as the STEM Equity Advisor for the College. She keeps herself busy by translating Karl Weierstrass from German into English for the Ohio River Early Sources in Mathematical Exposition (ORESME) Reading Group. Wiebke earned promotion to the rank of Professor. Congratulations, Wiebke.

Shannon Driskell served as co-presenter on two refereed presentations at regional conferences. These are “Using dynamic shapes to explore properties of shapes,” at the Regional Conference & Exposition of the National Council of Teachers of Mathematics and “Reasoning with 2D shapes and their attributes,” at the 63rd Annual Ohio Council of Teachers of Mathematics Conference.

Paul Eloë co-authored several articles including (with **A. Altwaty (11)**) “A Leggett-Williams type theorem applied to a 2nd order problem with symmetry”, *Opuscula Mathematica*, 33 (2013), 603 - 613, (with M. Rehman) “Existence and uniqueness of solutions for impulsive fractional differential equations”, *Applied Mathematics and Computation*, 224 (2013), 422 - 431, (with R. Avery and J. Henderson) “An example employing convexity in functional fixed point arguments”, *Communications in Applied Nonlinear Analysis*, 20 (2013), 87 – 96.

Aparna Higgins was surprised one evening last summer by an email message telling her that she would be awarded one of MAA's Meritorious Service Awards at the 2014 Joint Mathematics Meetings in Baltimore. She was nominated by the Ohio Section of the MAA (which is allowed one nomination every five years) for her service to the Ohio Section and the national MAA, including Project NExT. You can find a citation, Aparna's response and a short biography in the awards booklet compiled for the ceremony on pages 53-54 at <http://www.maa.org/sites/default/files/pdf/awards/jmm14PB.pdf>. We print the citation below.

Aparna concludes her five-year term as Director of Project NExT in August 2014 and has decided not to seek re-appointment. As she mentioned in her acceptance speech at the award ceremony, the overwhelming feeling she has is that of gratitude to have been involved with two of MAA's most important programs (Project NExT and MAA Student Chapters). Aparna has worked with Project NExT since 1995. She has presented a 4-hour course on directing undergraduate research in the Project NExT Workshops at Mathfest every year since then. In 1998, she became a Co-Director on the leadership team of Project NExT, and then Director of Project NExT in 2009. The Project NExT Fellows (now numbering 1480) form an identifiable group of educators interested in holding conversations about, and experimenting with, issues in educating undergraduate students (including K-12 preservice teachers) and graduate students in mathematics. Aparna believes that Project NExT has created a community that facilitates dialogue about the teaching and learning of undergraduate mathematics. The mathematics community now provides ever-increasing numbers of forums for such dialogues to take place and for experiments to be performed. Aparna is grateful for the opportunity to get to know many of the Project NExT Fellows, to follow their careers, and see what new professional directions and programs they have forged. In addition to presenting the four-hour Project NExT course "Undergraduate Research – how to make it work" to the Project NExT Fellows in August 2013, Aparna presented "Directing undergraduate research," an MAA minicourse at the Baltimore JMM in January 2014. Aparna was a speaker in West Chester University's Department of Mathematics Spring 2014 Colloquium. She spoke on "Demonic Graphs and Undergraduate Research." Aparna also enjoyed interacting with the eager high school students who competed in UD's High School Mathematics Competition – she spoke to them about pebbling and troop deployment.

Muhammad Islam co-authored (with **Bader Masry (13)** and **Emad Mikael (13)**) "Bounded, L^1 , and asymptotically stable solutions of a perturbed nonlinear equation," *Dynamics of Continuous, Discrete and Impulse Systems*, 20 (2013), 83-93. This past year, he delivered several invited lectures, "Asymptotic stability of solutions of a nonlinear integral equation" at the New Trends in Differential and Difference Equations, in Chattanooga, "Fractional differential equations of Caputo type and asymptotically stable solutions", at the 1092nd meeting of the American Mathematical Society, in Louisville, "Asymptotically stable solutions of a nonlinear integral equation", at the 1094th meeting of the American Mathematical Society, in St. Louis, and "Asymptotic

stability of functional equations by fixed point theorems”, at the 2013 International Conference on Advances in Electrical Engineering in Dhaka, Bangladesh.

Catherine Kublik co-authored (with N.M. Tanushev and R. Tsai) “An implicit interface boundary integral method for Poisson’s equation on arbitrary domains,” *J. of Comput. Phys.*, 247 (2013), 279-311. She gave a talk at the Ohio Section of the MAA meeting in October 2013 on “A novel boundary integral method for implicit interfaces,” and she spoke to Math Club in November on “Buffon’s needle problem.” Catherine and her husband Richard are pleased to announce the birth of their son, Simon Matthew Kublik on January 13, 2014.

Ruihua Liu co-authored (with I. Florescu, M. Mariani and G. Sewell) “Numerical schemes for option pricing in regime-switching jump diffusion models,” *Int. J Theor. Appl. Finance*, 16 (2013), and (with **Jialin Zhao (11)**) “A lattice method for option pricing with two underlying assets in regime-switching model,” *Journal of Computation and Applied Mathematics*, 250 (2013), 96 - 106. He gave an invited lecture on “Optimal stopping of switching diffusions with state dependent switching rates” at a sectional meeting of the American Mathematical Society in Philadelphia and he gave an invited lecture on “Apply stochastic optimal control to investment and consumption problems with regime-switching” at the 2013 SIAM Conference on Control and Its Applications in San Diego. He served as a member of the Program Committee SIAM Conference on Control and Its Applications during 2013.

Maher Qumsiyeh published “Using the bootstrap for estimating the sample size in statistical experiments,” *Journal of Modern Applied Statistical methods*, 12 (2013), 45-53 and he co-authored (with W.Y. Mergia, D. Eustace and D. Chimba) “Exploring factors contributing to injury severity at freeway merging and diverging locations in Ohio,” *Accident Analysis and Prevention*, 55 (2013), 202-210.

Youssef Raffoul authored “Exponential stability and instability in finite delay nonlinear Volterra integro-differential equations,” *Dynamics of Continuous, Discrete and Impulsive Systems Series A*, 20 (2013), “Existence and uniqueness of asymptotically constant or periodic solutions in delayed population models,” *Journal of Difference Equations & Applications*, 2 (2013), and “Scale-limited activating sets and multi-periodicity for threshold-linear networks on time scales,” *IEEE Trans. Cybern* (May 3), (2013). He also co-authored (with **S. Althubiti (13)** and **H. Ali Makhzoum (13)**) “Periodic solution and stability in nonlinear neutral system with infinite delay,” *Applied Mathematical Sciences*, 7 (2013), 6749-6764, (with **A. Sayed (13)**) “Classification of positive solutions of nonlinear systems of Volterra integral equations,” *International Journal of Research and Reviews in Applied Sciences*, 17 (2013), and (with M. Unal) “Qualitative analysis of solutions of nonlinear delay dynamic equation,” *International Journal of Differential Equations*, 10 (2013). He also delivered the following invited addresses: “Functional differential equations on periodic time scales with applications to population models,” in Lincoln, Nebraska, “Equations with applications to Bernoulli type differential equations,” in Knoxville, Tennessee, “Boundedness in functional difference equations,” in Chattanooga, Tennessee, and

“Stability in highly nonlinear difference equations,” in San Diego. Youssef also served as the Main Advisor to **Ernest Yankson (05)** who earned a Ph.D. in August, 2013 the University of Cape Coast, Ghana. Youssef also served as the Guest Editor for a Special Issue in Nonlinear Functional Difference equations with Applications in the journal, *Discrete Dynamics in Nature and Society*.

Muhammad Usman co-authored (with A.A. Khan and R. Ellahi) “The effects of variable viscosity on the peristaltic flow of nonNewtonian fluid through a porous medium in an inclined channel with slip boundary conditions”, *Journal of Porous Media*, 16 (1) (2013), 59-67; he also co-authored (with M. Imram) “A generalization of Poincare-Cartan integral invariants of a nonlinear nonholonomic dynamical system”, *Dynamics of Continuous, Discrete Impulsive Systems Series A: Mathematical Analysis*, 21 (2014), 111-134. He also gave several invited lectures including “Applications of numerical analysis in STEM disciplines” as an invited Lecturer at an NSF funded Seminar Series in Applied Mathematics at Tennessee State University and “Application of computational mathematics in STEM disciplines” as the Keynote Speaker at the PASSHE-MA conference at Lock Haven University in Pennsylvania. In addition, he gave invited lectures at the Sixth International Symposium on Biomathematics and Ecology: Education and Research – 2013 at Marymount University in Virginia and at the AMMCS – 2013 International Conference in Waterloo, Ontario. Usman served as Guest Editor of a Special Issue in *Abstract and Applied Analysis on Analytical and Numerical Approaches for Complicated Nonlinear Equations*.

Lynne Yengulalp co-authored (with W. Fleissner) “When $C_p(X)$ is domain representable,” *Fundamenta Mathematicae*, 223 (2013), 65-81 and (with V. Tkachuk and W. Fleissner) “Every scattered space is subcompact,” *Topology and Its Applications*, 160 (2013), 1305-1312.

AWARD CITATION

Aparna Higgins received a Certificate for Meritorious Service from the Mathematical Association of America (MAA) at the 2014 Joint Mathematics Meetings held in Baltimore. Certificates for Meritorious Service are presented, on the recommendations of the Sections of the Mathematical Association of America, for service at the national level or for service to a Section of the MAA. Each year, honorees from several Sections are recognized.

Citation

Aparna Higgins, Ohio Section of the MAA

Aparna Higgins is probably best known within the MAA for her work with Project NExT. She was a codirector of the program 1998-2009 and is currently the director. As such, she has influenced numerous early career mathematicians. Even before assuming a leadership role in Project NExT, Aparna served as a consultant and workshop presenter for early cohorts of Project NExT Fellows. Aparna has also served on numerous MAA committees, among them committees that select award winners, speakers for national meetings, and nominees for national offices. She has served on the Advisory Boards for

Math Horizons and *Focus*, and as the chair of the Committee on Student Chapters. In the Ohio Section, Aparna has served as Section President, chair of a number of committees, and has helped with local arrangements at several Section meetings; she has given Ohio Project NExT Workshops. Aparna was recognized with the MAA's Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching of Mathematics in 2005. She was a presenter of an MAA minicourse on undergraduate research at JMM 1997 and then has been every year since 1999, many of these with Joe Gallian. Aparna has given many invited talks at various Section meetings, undergraduate conferences, and undergraduate summer research programs.

ACTIVITIES OF UNDERGRADUATE STUDENTS

The **Math Club and Pi Mu Epsilon Chapter** of the University of Dayton (<http://academic.udayton.edu/mathclub/>) was very active this year. The officers were **Carly Gross** (Math Club President), **David Fan** (PME President), **Adam Volk** (Vice-President), **Luke Bugada** (Secretary) and **Alexander Kinkade** (Treasurer). **Maher Qumsiyeh** served as the faculty advisor for Math Club and **Lynne Yengulalp** served as faculty advisor for Pi Mi Epsilon. Math Club keeps an informative web page this year at <http://academic.udayton.edu/mathclub/>

Elections for officers for 2014-15 resulted in **Adam Volk** being elected President of the Math Club, **Claire Sonneborn** elected as PME President, **Matt Devilbiss** elected as Vice-President, **Luke Bugada** elected as Secretary, and **Kelsey Mason** as Treasurer.

Remarkably, Math Club organized and hosted the **18th annual High School Mathematics Contest**, a tradition initiated by **Andrew Hetzel** (98) when he served as Math Club President. This year, the officers of Math Club submitted a proposal to host the contest to the SGA and won a grant of \$1120 to host the contest. Nicely done. **Aparna Higgins** spoke to the contestants over lunch on "Pebbling and Troop Deployment."

The annual **William Lowell Putnam Competition** was held on the first Saturday of December. Eight students, **Brennan Artzt**, **Luke Bugada**, **Matthew DeVilbiss**, **James Fagan**, **Micah Lustig**, **Katie Stephen**, **Ben Thompson**, and **Adam Volk** participated. We congratulate Matthew and James, who scored 9 and 8, respectively.

The formal induction ceremony for Pi Mu Epsilon, the national mathematics honorary society, was conducted on Wednesday March 26th. The ceremony was quite nice this year. It included a banquet dinner and a presentation by Paul Eloie who spoke on "Generalizations of concavity." This year's inductees are:

Ibraheem Alawadhi
Kelli Marquardt
Katie Stephen

Matthew DeVilbiss
Kelsey Mason
Andrew Stine

James Fagan
Emma Romstadt
Sarah Walker

Research Experiences for Undergraduates (REU) programs are summer programs sponsored by the National Science Foundation are designed with the intention to introduce undergraduate students to research and attract potential mathematicians into the mathematics community. Students apply and compete for opportunities to participate. This summer, three of our students will participate in REUs. **Megan Brown** will attend the REU program at Sam Houston State University, **Claire Sonneborn** will attend the REU program at Auburn University and **Adam Volk** will attend the REU program at Grand Valley State University.

Last summer, **Matt DeVilbiss** participated in the REU program at Auburn University. He has presented his results at a CUR conference in Washington D.C. and he presented his results in Capetown, South Africa in a SAMSA conference. That trip was supported by an NSF grant through the Auburn University REU program.

THE STANDER SYMPOSIUM

The **Stander Symposium** is a very special event at UD. We can't really even characterize the dates this year. Activities related to the Symposium were spread across several days. The Integration Bee and the posters sessions were held on Wednesday April 9. Student presenters this year included:

- **Alhusain Saad** (advisor, **Muhammad Usman**), Valuation of options using Sinc collocation methods
- **Lawrence Kondowe** (advisor, **Muhammad Usman**), Truncation error for a finite difference scheme for the Black-Scholes model
- **Matthew D. DeVilbiss**, (advisor, **Lynne Yengulalp**), Weak domains and the weakly way below topology

Integration Bee continues to be a popular event during the Stander Symposium. **Arthur Busch** and **Maher Qumsiyeh** organized this year's Bee. First place went to the Calculating consisting of **Luke Bugada**, **Jimmy Vogel** and **Adam Volk**. Second place went to InteGreat (sic) consisting of **Michael Catania**, **David Devlin** and **Cole Francetic**. There was a huge turnout this year with more than 150 participants.

THE HONORS STUDENTS SYMPOSIUM

In recent years, the University Honors Program has been hosting the Honors Students Symposium. This year it was held on Friday afternoon, March 22, 2013. In the Stander Symposium, the vast majority of the students present their work in the form of a poster. In the Honors Students Symposium, students present their work in the form of fifteen minute talks. This year five math majors participated.

Daniel Esposito, Exploring data-driven electricity feedback on energy conservation behavior in the University of Dayton student neighborhood

AWARDS

The co-recipients of the 2014 Senior Award for Academic Excellence in Mathematics are **Daniel Esposito** and **Patrick Zabriskie**. Daniel was a double major, mathematics and physics. He is also the recipient of the 2014 Sigma Pi Sigma Award of Merit to a senior in recognition of outstanding academic achievement and involvement in physics.

The recipient of the 2014 Award of Excellence in Support of Mathematics is **Carly Gross**. Carly graduated with a major in electrical engineering and she also is the recipient of the 2014 Mary C. Millette Endowment Award for the outstanding senior electrical engineering student.

The co-recipients of the 2014 Sophomore Award for Excellence in Mathematics are **Matt DeVilbiss**, **Megan Brown** and **Adam Volk**.

PLANS OF RECENT GRADUATES

Michelle Connor is a double major in mathematics and music; she plans to continue her study in music.

Danny Esposito will pursue a dual master's degree in environmental science and public policy through the School of Public and Environmental Affairs.

Micah Lustig has a position as an account executive with PLS Logistics.

Eric Roemmele will pursue a graduate program in mathematics at the University of Kentucky beginning in the fall term.

Kathryn Schaber will pursue a Ph.D. program in biology at Emory University.

Patrick Zabriskie will pursue a graduate program in applied mathematics at Michigan State University beginning in the fall term.

ACTIVITIES OF GRADUATE STUDENTS

We again had a large number of graduate students earn masters' degrees this past year. MFM refers to the financial mathematics master's degree and MAS refers to the M.S. in applied mathematics. Below, we list the graduates by name and give the title of the research project and supervising faculty member.

Ahmad Alhamad (December 2013) earned the MFM degree. He worked with **Maher Qumsiyeh** and wrote a math clinic project entitled "Multivariate time series models."

Asmaa Alharbi (December 2013) earned the MFM degree. She worked with **Maher Qumsiyeh** and wrote a math clinic project entitled "Exponential smoothing."

Rana Alharbi (August 2013) earned the MFM degree. She worked with **Wiebke Diestelkamp** and wrote a math clinic project entitled “Transfer function models for the Lydia Pinkham sales and advertising data.”

Shahah Almutairi (May 2014) earned the MAS degree. She worked with **Youssef Raffoul** and wrote a math clinic project entitled “Exponential stability in finite delay difference equations.”

Nora Alnami (December 2013) earned the MAS degree. She worked with **Muhammad Islam** and wrote a math clinic project entitled “Asymptotically stable solutions of a system of coupled nonlinear differential equations.”

Abdulmoshen Alruwaili (December 2013) earned the MAS degree. He worked with **Youssef Raffoul** and wrote a math clinic project entitled “Boundedness and decay of solution in delay difference equation with unbounded forcing terms.”

Salah Alсахafi (December 2013) earned the MAS degree. He worked with **Youssef Raffoul** and wrote a math clinic project entitled “Boundedness of solutions in Volterra systems of difference equations.”

Tamader Alsalami (August 2013) earned the MFM degree. She worked with **Wiebke Diestelkamp** and wrote a math clinic project entitled “Transfer function models for the Lydia Pinkham sales and advertising data.” Tamader is currently a Ph.D. candidate in finance at Texas Tech University.

Nujud Alsherhi (December 2013) earned the MAS degree. She worked with **Paul Eloe** and wrote a math clinic project entitled “Forced monotone methods.”

Min Chen (May 2014) earned the MFM degree. He worked with **Ruihua Liu** and wrote a math clinic project entitled “Implementation of a numerical scheme for pricing European options in regime-switching jump diffusion models.” Min will begin a Ph.D. program in computational finance at the University of Nevada, Las Vegas this fall.

Wenzhe Chen (August 2013) earned the MFM degree. She worked with **Jeffrey Zhang** (Department of Economics & Finance) and wrote a math clinic project entitled “State government public pension plans: how bad are they and how do they affect state financing cost?”

Hadiyah Esmail (December 2013) earned the MFM degree. She worked with **Maher Qumsiyeh** and wrote a math clinic project entitled “Exponential smoothing.”

Eric Gerwin (May 2014) earned the MAS degree. He worked with **Paul Eloe** and wrote a math clinic project entitled “An in-depth look at random number generation.” Upon graduation, Eric has an internship with State Auto in Columbus.

Shengqun Jiang (August 2013) earned the MFM degree. She worked with **Albert Wang** (Department of Economics and Finance) and wrote a math clinic project entitled “Analysis of systematic risk measures and the challenges of the measures.”

Jung Yu Liu (August 2013) earned the MFM degree. She worked with **Carl Chen** and wrote a math clinic project entitled “Relationship between risk and cross-sectional stock return in China market.”

Yulong Liu (December 2013) earned the MFM degree. He worked with **Paul Eloë** and wrote a math clinic project entitled “Pricing an American put option in a jump model.”

Haitham Ali Makhzoum (August 2013) earned the MAS degree. He worked with **Youssef Raffoul** and wrote a math clinic project entitled “Periodic solution and stability in nonlinear neutral system with infinite delay.”

Chao Song (August 2013) earned the MFM degree. He worked with **Carl Chen** and wrote a math clinic project entitled “A comparative analysis of effectiveness of KMV model and z-score model in predicting corporate default: empirical evidence from China.”

Jessica Steve (May 2014) earned the MAS degree. She worked with **Peter Hovey** and wrote a math clinic project entitled “A comparison of stepwise regression and regression trees for model selection.”

Sindhura Sunkara (August 2013) earned the MFM degree. She worked with **Carl Chen** and **Paul Eloë** and wrote a math clinic project entitled “Equity analysis on the banking and financial sectors in India.” Sindhura is currently in Champaign Illinois.

Pei Xiao (August 2013) earned the MFM degree. He worked with **Ruihua Liu** and wrote a math clinic project entitled “Numerical solutions for option pricing in regime-switching jump diffusion with Kou’s model.”

Jizhe Zhang (August 2013) earned the MFM degree. He worked with **Carl Chen** and wrote a math clinic project entitled “Contrarian and momentum strategies in the Chinese stock market: 1993 - 2012.” Jizhe is currently in a Ph.D. program in finance at the University of Mississippi.

Pei Zhang (May 2014) earned the MFM degree. She worked with **Carl Chen** and wrote a math clinic project entitled “Idiosyncratic risk and the cross-section of expected stock return: a threshold regression approach.”

Yuchen Zhou (August 2013) earned the MFM degree. He worked with **Paul Eloë** and wrote a math clinic project entitled “Pricing multi-asset American options with regime-switching by exponential time differencing schemes.”

ALUMNI NEWS

Jane Pendergast (74) recently accepted a position in biostatistics at Duke University. Her new responsibilities begin on January 15.

Ed Mykytka (76) completed a five year appointment as Associate Dean of the Graduate School at UD and then accepted a second appointment to serve as Chair of the Department of Engineering Management & Systems. Ed has served on the faculty at UD since 1998.

John Sengewalt (86) attended the Sweet Sixteen games in Memphis Tennessee in March. He reported that Beale Street looked like a street in the Ghetto on a Thursday night.

Clarre (Johnston) Burkhardt (04) has been named full-time instructor in liberal arts and sciences at Ivy Tech Community College-Northeast in Fort Wayne.

Ernest Yankson (05) earned a Ph.D. in mathematics from the University of Cape Coast, Ghana. He wrote a dissertation entitled, Fixed Points and Some Qualitative Properties of Neutral Functional Differential Equations, Neutral Functional Difference Equations, and Dynamic Equations on Time Scales. Youssef Raffoul served as his major advisor.

Bridget Hilgeford (06) works as the Senior Managed Care Analyst with the corporate division of Premier Health in Dayton. Bridget was one of the early graduates of the master's in financial mathematics program.

Chris Cabanski (07) is finishing his second year as a Postdoctoral Research Associate at the Department of Medicine, Oncology Division / The Genome Institute, Washington University in St. Louis. He will start a new job this summer as a biostatistician at Genentech in South San Francisco.

Jennifer Diemunsch (09) continues her studies in a Ph.D. program in mathematics at the University of Colorado – Denver. Her research is reviewed in MathSCiNet Mathematical Reviews and includes (with M. Ferrara, A. Lo, C. Moffatt, F. Pfender and P. Wenger) “Rainbow matchings of size $\delta(G)$ in properly edge-colored graphs,” *Electron. J. Combin.* 19 (2012), 11pp and more recently, (with M. Ferrara, S. Graffeo and T. Morris) “on 2-factors with a bounded number of odd components,” *Discrete Math.* 323 (2014), 35-42.

Jialin Zhou (11) is a Ph.D. candidate in finance at the University of Illinois at Chicago. Her mathematics clinic research, advised by **Ruihua Liu** recently appeared with the citation, “A lattice method for option pricing with two underlying assets in regime-switching model,” *Journal of Computation and Applied Mathematics*, 250 (2013), 96 - 106.

Ariel Zheng (12) will begin a Ph.D. program in Finance on a graduate assistantship at the University of Wisconsin-Milwaukee.

Wanjun Li (12) was a visiting student from China and she keeps in touch with Aparna Higgins. Recently, she reported that she will join the University of Pennsylvania and study applied mathematics and computational science.

Tamader Alsalami (13) is a Ph.D. candidate in finance at Texas Tech University.

Chester Lian (13) has finished his first year as a Ph.D. candidate in mathematics at Duke University. He recently passed his written qualifying exams in analysis and linear algebra.

Dan Zhang (12) is enrolled in the economics program at Claremont Graduate University.

Junyao Zhang (12) has taken a position as Credit Analyst with China LianHe Credit Rating Co., Ltd. in Beijing.

Yuchen Zhou (13) is employed by Nanhua Futures, Co. Ltd. In Hangzhou City, Zhejiang Province, China.

ALUMNI E-MAIL ADDRESS BOOK

Updating our alumni e-mail address book is a never ending task. Vicki Withrow maintains the address book. If you have a new email address or if you know we have lost some of your friends from our list, please send updated information to

vwithrow1@udayton.edu

Thank you.