

March 2022



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## Welcome to issue 2 of Math Times

Dear Friends of the Department,

As we emerge from the shadow of COVID we are pleased to share with you the achievements of our students, faculty, and alumni/ae. I hope you enjoy reading about the Department and I especially want to thank Dr. Jimmy McLaughlin for putting this together.

For our alumni/ae and retired faculty members, please e-mail Ms. Sally Malarney ([smalarney@wcupa.edu](mailto:smalarney@wcupa.edu)), our Administrative Assistant, and let us know what you're up to. We'd like to highlight your accomplishments and whereabouts in future issues.

Issue #2 of Math Times was long delayed due to disruptions caused by the Coronavirus pandemic - hopefully issue #3 will be less delayed.



"A topologist is someone who cannot tell the difference between a doughnut and a coffee cup."



# Student News

## 32nd Annual Awards Ceremony November 4, 2018



The West Chester University Department of Mathematics 32nd Annual Awards Ceremony was held on November 4, 2016, at the [Penn Oaks Golf Club](#), 150 Penn Oaks Drive, West Chester. The program commenced with a social hour from 11:00 a.m. – 12:00 p.m, with the brunch and awards ceremony being from 12:00 p.m. to 2:00 p.m.

More information about the scholarships awarded may be found on the department's [scholarships](#) page.

The photographs on [this page](#) are of the students receiving their awards. A list of scholarships awarded may also be found on this page.

More pictures from the awards ceremony may be found in the [slideshow](#) uploaded to the department's youtube channel.

More pictures from the ceremony may be found on this [Shutterfly page](#).

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# 33rd Annual Awards Ceremony

November 17, 2019



The West Chester University Department of Mathematics 33rd Annual Awards Ceremony was held on November 17, 2019, at the [Penn Oaks Golf Club](#), 150 Penn Oaks Drive, West Chester. The program commenced with a social hour from 11:00 a.m. – 12:00 p.m, with the brunch and awards ceremony being from 12:00 p.m. to 2:00 p.m.

More information about the scholarships awarded may be found on the department's [scholarships](#) page.

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More pictures from the ceremony may be found on this [Shutterfly page](#).

## The 34th Annual Awards ceremony Fall 2020

This was not held in person due to the pandemic. However awards were still given - here is the list of [recipients](#) and the [program](#).

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# 35th Annual Awards Ceremony

November 14, 2021



More pictures, the complete program including a list of awardees, and information about the scholarship program, may all be found on [this page](#).

Click [here](#) to go to the Shutterfly page that has all of the pictures taken at the ceremony by Professor Lin Tan.



"Everyone knows what a curve is, until he's studied enough mathematics to become confused by the countless number of possible exceptions."

- Felix Klein

"Among mathematicians in general, three main categories may be distinguished; and perhaps the names logicians, formalists, and intuitionists may serve to characterize them."

- Felix Klein

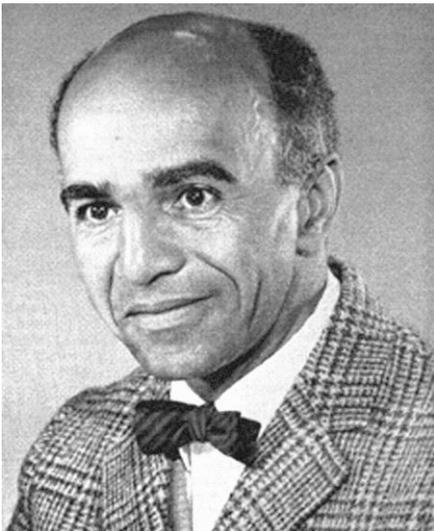
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# Mathematics Department Graduation, Spring 2019



Mathematics B.S.Ed graduates Mike DePrince, Katie Deegan, Alexandra Sonn, Paige Espenshade, Caroline Krusen, Gretchen Curry and Robert Clarke throwing their mortar boards in the air, at the Commencement Ceremony held on Saturday, May 11th, 2019.

Some more pictures may be found on this [page](#).



“Basically, I’m not interested in doing research and I never have been....I’m interested in understanding, which is quite a different thing. And often to understand something you have to work it out yourself because no one else has done it.”

- David H. Blackwell

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# Mathematics Department Graduation, Spring 2020



Congratulations to all our May 2020 graduates and especially to Angela Bussanich who was chosen as Commencement Speaker for the Undergraduate College of Science and Mathematics May 2020 Ceremony!

Ms. Bussanich is seen here with Commencement Mace Bearer Dr. Cliff Johnson and Professor Dr. Lisa Marano, both from the Mathematics Department. Angela will also participate in our May 2021 ceremony as she is graduating with her M.S. in Applied Statistics this year too.



"Arithmetic is being able to count up to twenty without taking off your shoes."

- Mickey Mouse

# 2019 Integration Bee

The Department of Mathematics 11th annual integration bee was held on April 10, 2019. For the second year running, there a separate category for BC Calculus students from local schools.

This event was organized by Dr. Mike Fisher, with the assistance of Dr. Andreas Aristotelous, Dr. Jeremy Brazas, Dr. Peter Glidden, Dr. Chuan Li, Dr. James Mc Laughlin, Dr. Scott Parsell, Dr. Rosemary Sullivan, and Dr. Peter Zimmer.

Thanks also goes to Dr. Lin Tan for all of the pictures he took of the event, and to the Math. Dept. secretary, Ms. Sally Malarney, for helping with all the pre-Bee ordering and logistics.

Pizza was provided by the Mathematics Department.

Thanks to Ms. Malarney for also posting the pictures taken by Dr. Tan to Shutterfly - here is the [Shutterfly page](#) with those pictures.



High school winners were: 1st Kevin Guo (Great Valley H.S.), 2nd Katelyn DePaula (GVHS), and 3rd Ethan Whitney.



WCU winners were: 1st Keith Hazen, 2nd Sean Hazen, and 3rd Michael Procell.

# Spring 2018 Pi Mu Epsilon Induction



**The Spring 2018 Pi Mu Epsilon induction ceremony was held on 5th April in the Mathematics Department.**

The complete list of Spring 2018 Pi Mu Epsilon Inductees: Ethan M. Braglio, Angela F. Bussanich, Robert J. Clark, Patrick G. Corrigan, Gretchen E. Curry, Brandon M. Edwards, Andrew Fleming, Abigail E. Foster, Albert J. Haynes, Josiah D. Keller, R. Hunter Langel, Stacy A. Porten-Willson, Kelly M. Schmooch, Jonathan I Thurston.

Here is a [link to a video collage](#) of the induction ceremony.

Here is the [program](#) from the ceremony.



“I don't have any particular recipe [for developing new proofs] ... It is like being lost in a jungle and trying to use all the knowledge that you can gather to come up with some new tricks, and with some luck, you might find a way out.”

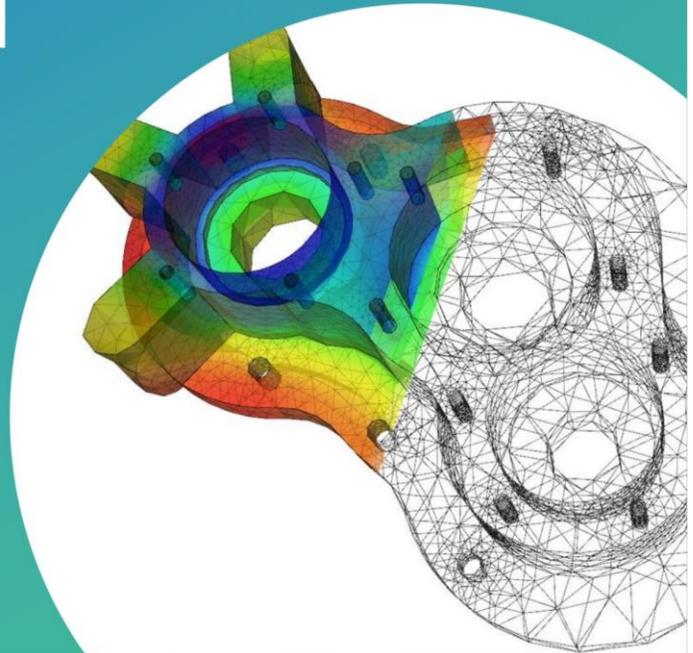
- Maryam Mirzakhani

# Research and Creative Activity Day Spring 2021

WCUPA  
RESEARCH AND CREATIVE  
ACTIVITY DAY  
APRIL 29, 2021

## SOLVING THE HEAT EQUATION WITH INTERFACES

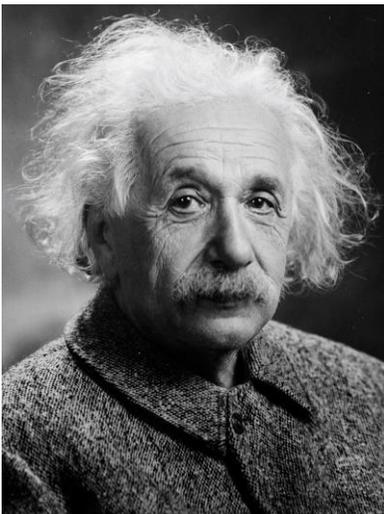
PRESENTER: MICHAEL BAUER  
WITH: REX LLEWELLYN,  
SHAUNA FRANK  
MENTORED BY: DR. CHUAN LI



Eric Boerman (graduate student, Applied and Computational Mathematics (A&C) Program, working with Professor [Chuan Li](#)) won 1st place for his oral [presentation](#) in the [Research and Creative Activity Day](#) held on Thursday 4/29/2021 (see the [Promotional Flyer](#)).

Mathematics graduate students [Mick Bauer](#) and [Henry Brown](#), also working with Professor Li, presented in this Research and Creative Activity Day also.

Congratulations to everyone for their excellent work.



"Since the mathematicians have invaded the theory of relativity, I do not understand it myself any more."

- Albert Einstein

-

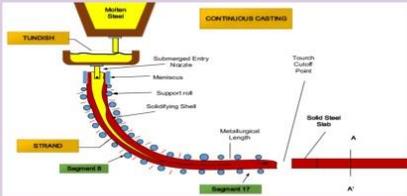
"Only two things are infinite, the universe and human stupidity, and I'm not sure about the former."

- Albert Einstein

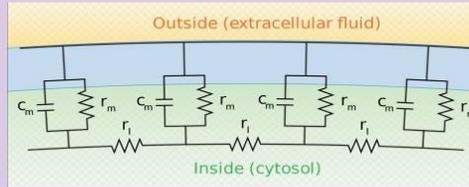
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# CSM Research Poster Session, Tuesday 4/27/2021

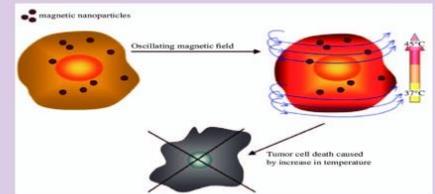
## Applications



**The Transient Heat Conduction Equation [1]**



**The Cable Equation [3]**

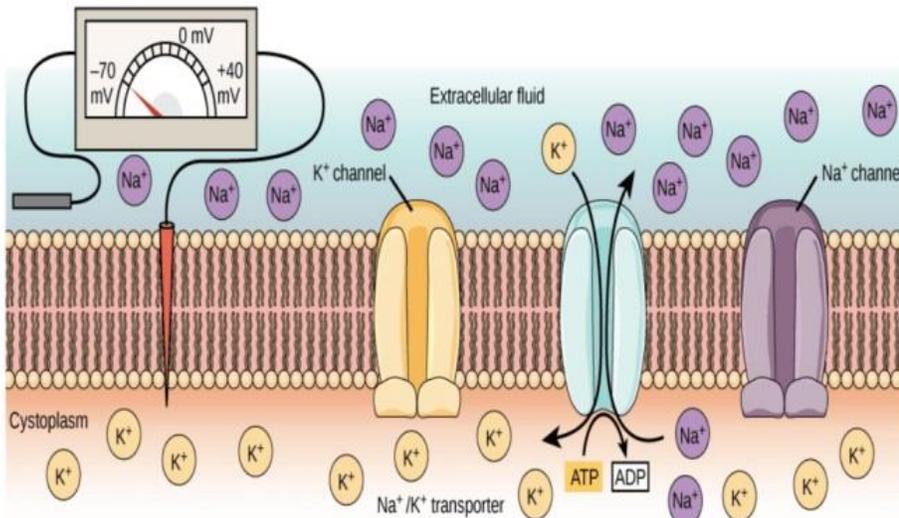


**Penn's Bioheat Equation [2]**

Some students of Professor [Chuan Li](#) presented posters at the CSM Research Poster Session, on Tuesday 4/27/2021. Rex Llewellyn (graduate student, Applied and Computational Mathematics (A&C) Program) presented a [poster](#) and Khanh Pham (graduate, A&C program) and Katherine Peltier (undergraduate, A&C BS), presented another [poster](#). Congratulations to all of them for their excellent work.

## Hodgkin-Huxley Model

(a) Resting potential



At the resting potential, all voltage-gated  $\text{Na}^+$  channels and most voltage-gated  $\text{K}^+$  channels are closed. The  $\text{Na}^+/\text{K}^+$  transporter pumps  $\text{K}^+$  ions into the cell and  $\text{Na}^+$  ions out.

Voltage-gated channels can open or close and allow a surge of Sodium and Potassium ions to pass through. Voltage and current in the system are caused by charged ions moving across the membrane.

“They shouldn't be allowed to teach math so early in the morning.”

— Kendare Blake, Anna Dressed in Blood

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# Third Annual Joint Actuarial Career Day Of Arcadia and West Chester



WCU hosted the [Math and Actuarial Science Career Fair](#) on Friday, September 20, 2019. This is the third time that this Career Day has been held, the first time being in 2017 at our partner institution, Arcadia University.

This event was organized jointly by Dr. [Lisa Marano](#), West Chester University [Mathematics Department](#), and Dr. [Irina Pogrebivsky](#) and Dr. [Ned Wolff](#) from the Department of [Computer Science and Mathematics](#) at Arcadia University.

At this event, over 20 WCU students were given over 30 interviews for internships and jobs in the Actuarial or other related fields.

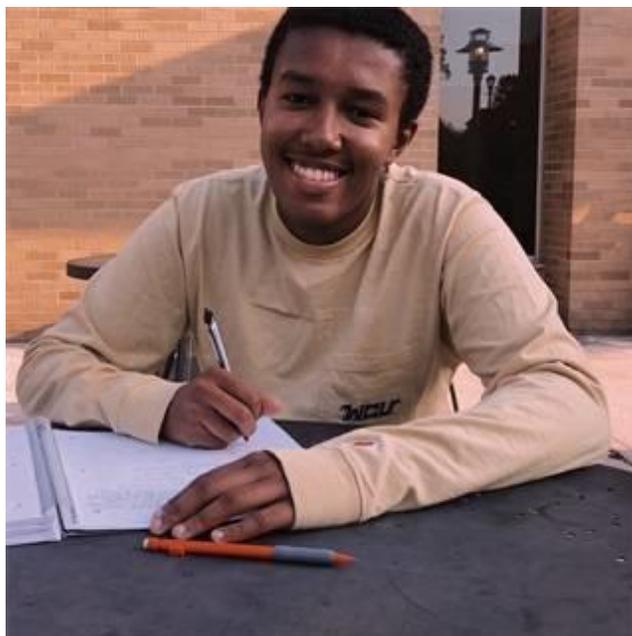
Participating as interviewers were alumni of the program, Kerry Frees of Penn Mutual, Courtney McIlvaine of TransAmerica, and Michael Colon and Mark Remner of Willis Towers Watson.

Other companies participating included LTCG, Licoln Financial, Voya, Venerable, Independence Blue Cross, Aon, and CBIZ.

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# President of the Student Government Association

Mathematics major [Elias Nebiyou](#) (double majoring in Actuarial Science and Statistics) has been elected President of the [Student Government Association](#) for the 2021-22 academic year.



Nebiyou Elias (he/him) is a third-year student from King of Prussia, PA who is double majoring in Actuarial Science and Statistics. He currently serves as the [SGA](#) senator for the College of Sciences and Mathematics.

Nebiyou hopes to establish relationships with the administration to ensure they are able to understand student concerns. He hopes to make West Chester University a place that ALL students feel heard and valued. Nebiyou has worked with New Student Programs, Off Campus and Commuter Services, Office of Wellness Promotion, and the Dowdy Multicultural Center. While working in Student Affairs, Nebiyou realized student input makes a huge difference, especially when trying to improve future events. He would love to work with the student body and ensure that underrepresented groups have a voice.

Nebiyou wants to bring the colleges together by, for example, having forums with the deans of the colleges to have open conversations with students on ways to improve their experience with the colleges. He would also like to see organizations collaborate more with one another as we all have different things to offer that will help contribute to the overall success of the university's students. For instance, when OCCA and German Club collaborated and held an event, that provided a platform for the two organizations to not only reach a broader audience, but also introduce them to each other. Nebiyou Elias is dedicated and actively works to make sure students can voice concerns, work to be more inclusive and looks forward to improving West Chester for future Golden Rams.



“You know, people think mathematics is complicated. Mathematics is the simple bit. It's the stuff we can understand. It's cats that are complicated. I mean, what is it in those little molecules and stuff that make one cat behave differently than another, or that make a cat? And how do you define a cat? I have no idea.”

- John H. Conway

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# The Tournier Ethics Research Award 2020

The [2020 Tournier Ethics Research Award](#) has been won by mathematics major Julia Edwards.



The competition for this award, which was organized by the [Philosophy Department](#) at West Chester University, was open to all WCU students. Each entrant had to write a paper on a topic of Applied Ethics (including Medical Ethics, Bioethics, Professional Ethics, Business Ethics, Environmental Ethics, Animal Ethics, etc.). Julia (a Mathematics major in the Pure Mathematics BS Accelerated track) won the \$300 scholarship first prize by writing an applied ethics paper entitled, “Ethics of Care and the Good Life.”

This award was also announced in an [end-of-semester video](#) from the Philosophy Department, and you can find out more about the award there.

A big congratulations to Julia, for her exemplary example of interdisciplinary scholarship.



*“Science is a differential equation. Religion is a boundary condition.”*

- Alan Turing

*“Mathematical reasoning may be regarded rather schematically as the exercise of a combination of two facilities, which we may call intuition and ingenuity.”*

- Alan Turing

# STEAM Night March 2020

On March 4, graduate students in Applied Statistics participated in STEAM night at Hillsdale Elementary School in West Chester. The WCU American Statistical Association Chapter was responsible for organizing the Statistics activities. The group created multiple statistical activities for the children to actively participate in.



Left to right: Joseph Kakyoma, Eric Terkperly, Professor Randall Rieger, Angela Bussanich, Monica Fries, Sola Odenyura, and in front, some of the elementary students.



Applied Statistics graduate student Angela Bussanich looks on while some of the students engaged in statistical activities.



## Featured Faculty and Staff



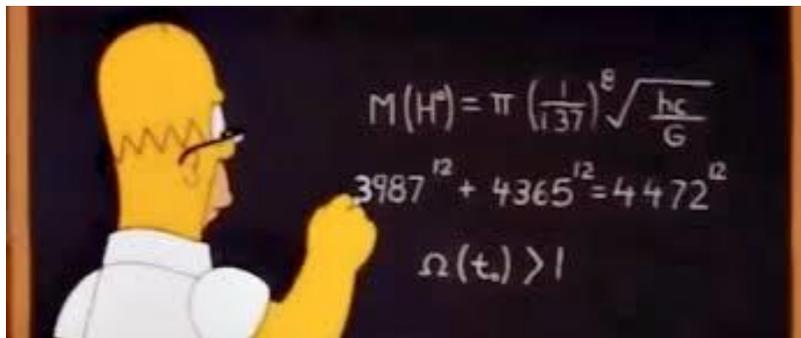
Dr. Cheng Peng

Dr. Cheng Peng joined the Mathematics Department faculty at West Chester University in the Fall of 2019. His teaching interests are primarily in applied statistics and data science. Before joining WCU, he was a Senior Data Scientist at WEX Inc., a Portland, Maine-based financial IT services and management company, and also was on the faculty of the University of Southern Maine for more than a decade.

In his role at WEX Inc., Dr. Peng developed novel statistical models and machine learning algorithms such as POC (point of compromise identification) and fraud index models and implemented them on a platform for real-time fraud detection. He also helped build models for credit risk and customer experience management.

During his tenure at the University of Southern Maine, Dr. Peng taught both mathematics and statistics courses for undergraduate and graduate students as well as developed numerous undergraduate and graduate courses in applied and computational statistics and data science.

Dr. Peng received his Ph.D. in Mathematics from the University of Toledo in Toledo, Ohio. His research interests are in semiparametric regression modeling, statistical process control and reliability modeling, machine learning, and collaborative research in related fields. He has published his research in these areas in mainstream statistics and relevant journals over the years. Currently, Dr. Peng is focusing on developing statistical methods to extract information from sequence data and use it to develop scalable machine learning algorithms.



There is a fairly simple explanation why Homer Simpson's equation

$$3987^{12} + 4365^{12} = 4472^{12}$$

has to be false, and is thus not a counterexample to Fermat's Last Theorem. Can you see it?

(Hint: Think modulo 4.)



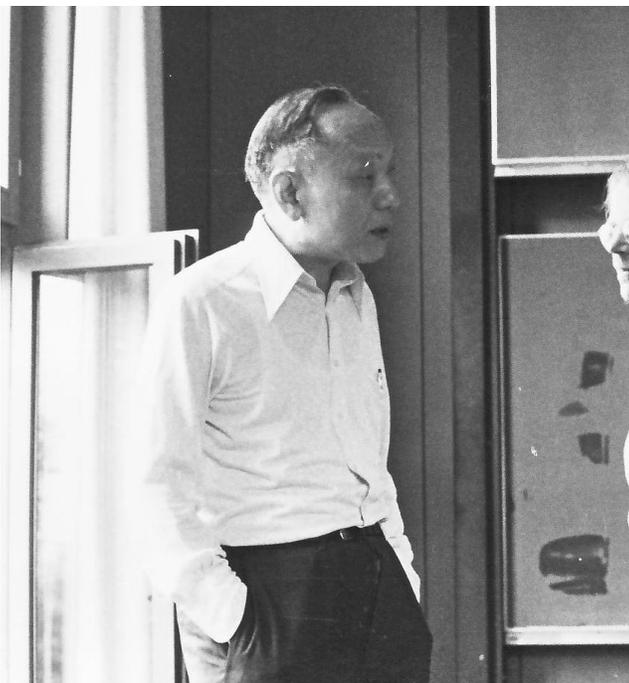
Dr. Barbara Ann Swartz joined the faculty of the West Chester University Mathematics Department in Fall 2020. Prior to joining WCU, she was an associate professor at McDaniel College in Westminster, MD where she was awarded the Faculty Scholarly Publications Award and Distinguished Scholar Award. Additionally, Dr. Swartz was a former president of the Association of Maryland Mathematics Teacher Educators, university supervisor and high school math teacher. In May 2021, she co-authored her first book, *Classroom-Ready Rich Math Tasks, Grades 2-3: Engaging Students in Doing Math*.

Dr. Swartz received her Ph.D. in 2013 from the University of Virginia. Her work focuses on investigating effective ways to develop current and future teachers' knowledge, skills, and dispositions to implement equity-based teaching practices, including the eight teaching practices recommended by the National Council of Teachers of Mathematics. She has a passion for designing learning opportunities to support all learners in making sense of the mathematics and creating positive learning experiences for every student in math class.

She teaches a range of courses from general undergraduate education requirements to mathematics content and pedagogy courses to prepare effective teachers of mathematics (at both the undergraduate and graduate levels). She presents both regionally and nationally on the work she has done in creating innovating learning experiences in mathematics education.

Outside of mathematics, she likes spending time with her family, reading, doing yoga and anything outdoors. Together they ride bikes, read Harry Potter, explore different parks and playgrounds and visit local wineries and breweries. This winter she plans to teach her sons how to snowboard so they can hit the slopes together as a family.

Dr. Barbara Swartz



“Physics and geometry are one family. Together and holding hands they roam to the limits of outer space... Surprisingly, Math has earned its rightful place for man and in the sky; Fondling flowers with a smile — just wish nothing is said!”

- Shiing-Shen Chern

“I usually like to say that vector fields is like a man, and differential forms is like a woman. Society must have two sexes. If you only have one, it's not enough.”

- Shiing-Shen Chern on the two competing methods of geometry: the tensor calculus and the newer differential forms.



Dr. Jiatian (Justin) Xu

Dr. Jiatian (Justin) Xu joined the faculty of the Mathematics Department in Fall 2021.

Before that (2018 to 2020), he was the Assistant Director of the Janet & Mark L Goldenson Center for Actuarial Research at the University of Connecticut.

Dr. Xu is an Associate of Society of Actuaries (ASA). He has three years of industry experience as an actuary and six years of academic experience with actuarial teaching and research. He received his PhD from the University of Connecticut in 2018 under the advisement of Dr. Jay Vadiveloo. The topic of this thesis was in quantile optimization in stochastic financial planning model. His research focuses on quantitative finance, predictive modeling, and application of AI in actuarial science.

In his spare time, he likes running, swimming, and writing poems. Especially, he is good at doing Chen Style Tai Chi. Below is an action shot.



“Nothing comforted Sabine like long division. That was how she had passed time waiting for Phan and then Parsifal to come back from their tests. She figured the square root of the date while other people knit and read. Sabine blamed much of the world's unhappiness on the advent of calculators.”

— Ann Patchett, *The Magician's Assistant*

# Contact Information for the Mathematics Department



**Address:**  
Room 101  
25 University Avenue  
West Chester, PA 19383

**Phone:** 610-436-2440  
**Fax:** 610-738-0578  
**Email:** [Department Chair](#)

Follow the links for each of the following:

[Department Webpage](#)

[Location of the Math. Dept. on Google Maps/directions](#)

[Visitor Parking in B lot \(Reynolds Alley\) or University Ave \(metered\)](#)

[Colloquium Schedule \(all talks open to the public\)](#)

Note: “UNA” = “25 University Ave.”, the location of the Math. Dept.



Igor Tamm won the Nobel Prize in physics in 1958. During the Russian revolution, he was a physics professor at the University of Odessa in the Ukraine. Food was in short supply, so he made a trip to a nearby village in search of food. While he was in the village, a bunch of anti-communist bandits surrounded the town.

The leader was suspicious of Tamm, who was dressed in city clothes. He demanded to know what Tamm did for a living. He explained that he was a university professor looking for food. “What subject?,” the bandit leader asked. Tamm replied “I teach mathematics.”

“Mathematics?” said the leader. “OK. Then give me an estimate of the error one makes by cutting off a Maclaurin series expansion at the  $n$ th term. Do this and you will go free. Fail, and I will shoot you.”

Tamm was not just a little astonished. At gunpoint, he managed to work out the answer. He showed it to the bandit leader, who perused it and then declared “Correct! Go home.” Tamm never discovered the name of the bandit.



# Faculty News



Dr. Kim Johnson

Professor [Kim Johnson](#) was co-chair of the [43rd Annual Meeting](#) of the [North American Chapter of the International Group for the Psychology of Mathematics Education](#) (PME-NA 43).

West Chester University is an official sponsor of the conference, which was held in Philadelphia, Pennsylvania on October 14-17, 2021.

This was the first time the conference was held in Northeastern United States since 1989.

Here is the conference [flyer](#).

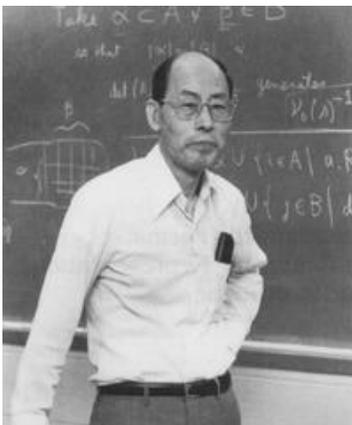
Professor Johnson was also one of the editors of the [conference proceedings](#).



Dr. Emily Miller

Professor [Emily K. Miller](#) of the Mathematics Department is co-PI on a recently awarded [NSF grant](#) of nearly \$1 million to provide scholarships for low-income, STEM-intending students.

The National Science Foundation (NSF) award to West Chester University's Scholarships in STEM (science, technology, engineering, and mathematics) Program, also known as WCU S-STEM, will provide greater access to high-achieving STEM students in the region who have financial need and come from groups typically underrepresented in such fields.



“The maxim "A university professor is the next easiest profession after a beggar" really rings true.”

- Goro Shimura

“He was not a very careful person as a mathematician. He made a lot of mistakes. But he made mistakes in a good direction. I tried to imitate him. But I've realized that it's very difficult to make good mistakes.”

- Goro Shimura

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Dr. Lisa Marano

[Dr. Lisa Marano](#) of the Mathematics Department (along with Drs. [Rodney Mader](#) and [Shannon Mrkich](#), English, and Dr. [Josh Auld](#), Biology) was named one of WCU's First [Mission Makers](#) (follow the link for more details and video of Dr. Chris Fiorentino making the announcement) for the work they have done in developing and implementing the First Year Experience program at WCU.

From the [Undergraduate Catalog](#):

“The First Year Experience (FYE 100\_) provides students with a basic platform from which they can plan their growth and development while at WCU. First Year Experience courses are offered in a variety of areas, but they share common content across all sections, including:

- An overview of the liberal arts tradition in higher education and an explanation of the structure of WCU's General Education curriculum
- An introduction of the e-portfolio and its use across the undergraduate degree
- Research about brain development, psychology of learning, and metacognitive, affective, and social dynamics; information intended to help students understand the learning process and the factors important to a successful college experience
- An opportunity for experiential learning
- Information pertaining to university policies and campus life

The First Year Experience is a four-credit requirement and applies to incoming first-year students, as well as transfer students with fewer than 24 college-level credits.”

Update: Professor [Marano](#) was recently appointed as the College of the Sciences and Mathematics Associate Dean beginning August 2021.



“While asleep, I had an unusual experience. There was a red screen formed by flowing blood, as it were. I was observing it. Suddenly a hand began to write on the screen. I became all attention. That hand wrote a number of elliptic integrals. They stuck to my mind. As soon as I woke up, I committed them to writing.”

- Srinivasa Ramanujan

“Plenty of mathematicians, Hardy knew, could follow a step-by-step discursus unflinchingly—yet counted for nothing beside Ramanujan. Years later, he would contrive an informal scale of natural mathematical ability on which he assigned himself a 25 and Littlewood a 30. To David Hilbert, the most eminent mathematician of the day, he assigned an 80. To Ramanujan he gave 100.”

— Robert Kanigel, *The Man Who Knew Infinity: A Life of the Genius Ramanujan*

# Pre-Service Mathematics Teacher Day Conference Hosted by West Chester University Mathematics Department Sponsored by PCTM and PAMTE



Dr. Brian Bowen



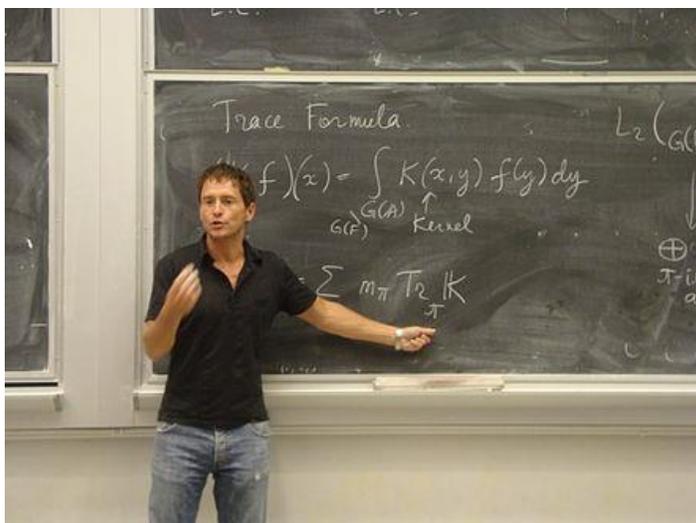
Dr. Kim Johnson



Dr. Emily K. Miller

On October 19th, 2019, West Chester University hosted a [Preservice Teacher day of Mathematics](#). This event was co-organized by [Dr. Brian Bowen](#), [Dr. Kim Johnson](#) and [Dr. Emily K. Miller](#), with sponsorship from [PCTM](#) and [PAMTE](#).

This years Pre-Service Teacher Day – East was held at West Chester University. There were over 80 students in attendance. Dr. Kathleen McAneny gave the key-note address on Standards for Mathematical Practices in Action. We had 9 breakout sessions that included topics such as DESMOS Polygraph, Think Like an Egyptian, Purposeful Discourse, Teaching for Engagement, Using Mistakes to identify misconceptions, and many more. We had a panel on first year and student teaching, where tips and tricks were shared for those preparing for the next step in their journey. A productive day was enjoyed by all who attended.



“Mathematical knowledge is unlike any other knowledge. While our perception of the physical world can always be distorted, our perception of mathematical truths can’t be. They are objective, persistent, necessary truths. A mathematical formula or theorem means the same thing to anyone anywhere – no matter what gender, religion, or skin color; it will mean the same thing to anyone a thousand years from now. And what’s also amazing is that we own all of them. No one can patent a mathematical formula, it’s ours to share. There is nothing in this world that is so deep and exquisite and yet so readily available to all. That such a reservoir of knowledge really exists is nearly unbelievable. It’s too precious to be given away to the “initiated few.” It belongs to all of us.”

— Edward Frenkel, *Love and Math: The Heart of Hidden Reality*

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Dr. James Mc Laughlin

[Dr. James Mc Laughlin](#) was selected to receive the 2021 Trustees Achievement Award.

“The [Trustees Achievement Award](#) recognizes distinguished scholarly and creative work by a current West Chester University faculty member: specific, original contributions to a discipline (as in a research study, monograph, scholarly paper, literary work, musical composition, or work of art), or a significant collective body of work. Emphasis is on the national and international contribution of the scholarly work.”

Dr. Mc Laughlin joined the Mathematics Department in Fall 2005. Before that he held a visiting position at Trinity College, Hartford Ct., from 2002 to 2005.

He received his PhD in 2002 from the University of Illinois at Champaign-Urbana. His thesis adviser was [Dr. Douglas Bowman](#) (who incidentally is younger than Dr. Mc Laughlin), and the topic of his thesis was in the area of continued fractions.

Dr. Mc Laughlin’s current research interests still include continued fractions, but also included basic hypergeometric series (q-series) and related areas such as integer partitions. He is the author of a mathematics book, [Topics and Methods in q-Series](#).

His favourite classes to teach are “Introduction to Cryptography” and “Computer Algebra”. Both of these courses make use of a computer algebra system such as Mathematica, and assist students to go a little deeper into various areas of mathematics than they might otherwise be able to do.

During lockdown he continued to indulge his hobby of collecting vinyl records – maybe worse than ever since he was at home so much with extra time to listen to music.

“I never am really satisfied that I understand anything; because, understand it well as I may, my comprehension can only be an infinitesimal fraction of all I want to understand about the many connections and relations which occur to me, how the matter in question was first thought of or arrived at, etc., etc.”

- Ada Lovelace

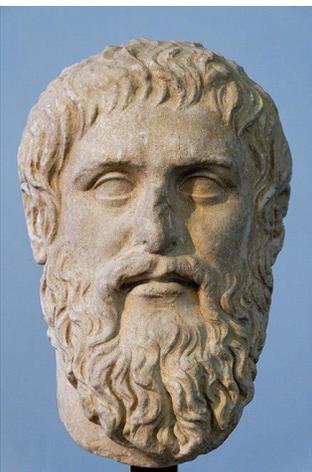
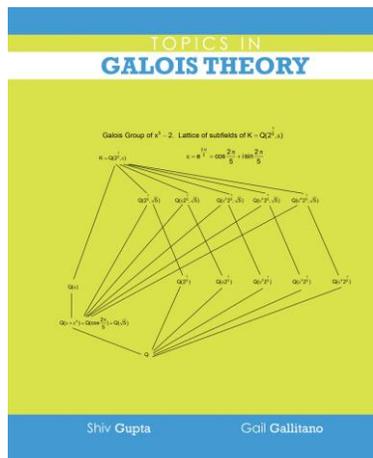
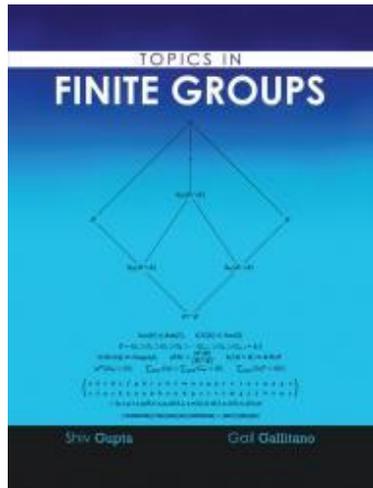
“I may remark that the curious transformations many formulae can undergo, the unsuspected and to a beginner apparently impossible identity of forms exceedingly dissimilar at first sight, is I think one of the chief difficulties in the early part of mathematical studies. I am often reminded of certain sprites and fairies one reads of, who are at one’s elbows in one shape now, and the next minute in a form most dissimilar.”

- Ada Lovelace

“Forget this world and all its troubles and if possible its multitudinous Charlatans-- everything in short but the Enchantress of Numbers.

- Ada Lovelace





[Dr. Gail Gallitano](#) and [Dr. Shiv Gupta](#) have published two books, [Topics in Finite Groups](#) and [Topics in Galois Theory](#). The publisher of both books is [Kendall Hunt Publishing](#).

From the publisher's web page for [Topics in Finite Groups](#):

**"Topics in Finite Groups** introduces the basic concepts of Group Theory and is rich in illustrative examples which will help the readers to understand and appreciate this beautiful area of mathematics. The topics discussed include Permutation Groups and Sylow Theorems, Representation and Characters, Solvable Groups, Frobenius Groups. Over one hundred problems of varying degrees of difficulty along with their partial or complete solutions are included."

Here is the table of contents of [Topics in Galois Theory](#):

**Chapter 1. Preliminaries**

**Chapter 2. Field Embedding and Extensions**

**Chapter 3. Solution in Radicals**

**Chapter 4. Field Automorphisms and Galois Groups**

**Chapter 5. Examples of Galois Groups and Galois Correspondence**

**Chapter 6. Resultant and Discriminant**

**Chapter 7. More Galois Groups**

**Chapter 8. Transcendence of e and n**

**Chapter 9. A Radical Expression for cos 2π/11**

**Chapter 10. A Natural Basis of Q(x) over Q(x<sup>p</sup>)**

**Chapter 11. Some Interesting Irreducible Polynomials over Z**

Appendix 1. Linear Independence of  $\sqrt{p_1}, \sqrt{p_2}, \dots, \sqrt{p_n}$  over Q

Appendix 2. Ruler and Compass Construction

Appendix 3. Tate's Proof of a Theorem of Dedekind

Appendix 4. About Solvable Quintics

"I have hardly ever known a mathematician who was capable of reasoning."

- Plato.

The authors of [Topics in Finite Groups](#) and [Topics in Galois Theory](#), [Dr. Gail Gallitano](#) and [Dr. Shiv Gupta](#) .



Dr. Gail Gallitano

**Gail Gallitano** received her Bachelor's degree in Mathematics from Monmouth University, West Long Branch, NJ, her Master's degree in Mathematics from Fairleigh Dickenson University, Teaneck NJ, her Master's degree in Mathematics Education from Columbia University, NYC, NY, her Master's degree in Educational Administration from Columbia University, NYC, NY, a Master's degree equivalent in Computer Science from Clarkson University, Potsdam, NY and her Ed.D. in Mathematics Education from Columbia University, NYC, NY. She has taught mathematics at all levels for over 45 years. She has also worked in administrative positions mostly developing curriculum in mathematics and computing. She founded The *West Chester University Teachers Teaching with Technology In-service/Pre-service Professional Development Program* and directed it for over fifteen years. Her main area of interest is professional development and teaching with technology.



**Shiv Gupta** received both his Bachelor's degree and Master's degree in Mathematics from Delhi University, India. He received his PhD in Mathematics from Case Western Reserve University, Cleveland, Ohio. He has taught mathematics at various institutions in both the United States and abroad for over 50 years. In his spare-time he likes to read, do mathematics and travel extensively. He has attended many national and international mathematics conferences. He also enjoys giving colloquium talks to his colleagues and students at West Chester University.



“Good, he did not have enough imagination to become a mathematician.

[Upon hearing that one of his students had dropped out to study poetry]”

- David Hilbert

“Sometimes it happens that a man's circle of horizon becomes smaller and smaller, and as the radius approaches zero it concentrates on one point. And then that becomes his point of view.”

- David Hilbert

“Mathematics knows no races or geographical boundaries; for mathematics, the cultural world is one country.”

- David Hilbert



## Other News

### Epadel's Fall 2018 Meeting Was Held November 3, 2018 At West Chester University



Some of the more than 200 attendees at the meeting.

Full details of the meeting may be found on the EPaDel [page](#) for the meeting.

The program for the meeting may be found [here](#).

Here is a [slideshow on youtube](#) of the pictures taken by Professor Lin Tan.

You may also download those pictures/order prints from the [Shutterfly page](#) that also has Dr. Tan's pictures from the meeting.

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# Recent Colloquium Talks

West Chester University  
Spring 2022 Mathematics Colloquium

presents

**TAI-DANAE BRADLEY**

Sandbox@Alphabet

$$d \left( \begin{array}{c} \text{Green} \quad \text{Blue} \quad \text{Orange} \\ \diagdown \quad \diagup \quad \diagdown \\ \text{Pink} \end{array} \right) = \begin{array}{c} \text{Green} \quad \text{Blue} \quad \text{Orange} \\ \diagdown \quad \diagup \quad \diagdown \\ \text{Pink} \\ d \end{array} + \begin{array}{c} \text{Green} \quad \text{Blue} \quad \text{Orange} \\ \diagdown \quad \diagup \quad \diagdown \\ \text{Pink} \\ d \end{array} + \begin{array}{c} \text{Green} \quad \text{Blue} \quad \text{Orange} \\ \diagdown \quad \diagup \quad \diagdown \\ \text{Pink} \\ d \end{array} + \begin{array}{c} \text{Green} \quad \text{Blue} \quad \text{Orange} \\ \diagdown \quad \diagup \quad \diagdown \\ \text{Pink} \\ d \end{array}$$

**“Entropy + Algebra + Topology = ?”**

Friday, February 25, 2022 from 3:15 to 4:05PM  
Anderson 211

(attend via Zoom: [https://wcupa.zoom.us/meeting/register/tJIfuqgrzkqH9CvGcvDJpouDmdISovx\\_ihc](https://wcupa.zoom.us/meeting/register/tJIfuqgrzkqH9CvGcvDJpouDmdISovx_ihc) )

In this talk, I'll describe a small connection between information theory, abstract algebra, and topology. It is based on a recently discovered correspondence between Shannon entropy and functions on topological simplices that satisfy an equation akin to the Leibniz rule. The correspondence relies heavily on a particular operad, which is an abstract tool with origins in algebraic topology. Explicitly, the theorem gives a new way to think about Shannon entropy from a pure mathematical perspective: it can be thought of as a derivation of the operad of probabilities. My goal in this talk is to explain what these words mean and why one might find this new result interesting.

*Tai-Danae Bradley is a research mathematician at Sandbox@Alphabet and a visiting research professor of mathematics at The Master's University. She earned a PhD in mathematics from the CUNY Graduate Center and is the creator of Math3ma, a blog that seeks to distill higher mathematics in accessible ways. She is also a former co-host of the PBS YouTube channel "Infinite Series" and coauthor of the book Topology: A Categorical Approach. Her research interests include category theory, quantum physics, and machine intelligence.*

**For further information e-mail [mfisher@wcupa.edu](mailto:mfisher@wcupa.edu)**

**See also the [Colloquium page](#) for upcoming talks.**

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West Chester University  
Spring 2022 Mathematics Colloquium

presents

**MELANIE MITCHELL**

The Santa Fe Institute



**“Why AI is Harder Than We Think”**

Wednesday, February 9, 2022 from 4:00 to 4:50PM

<https://wcupa.zoom.us/meeting/register/tJcucOmrrDwjE920WyrUY7TV95OyWYnAxQPr>

Since its beginning in the 1950s, the field of artificial intelligence has cycled several times between periods of optimistic predictions and massive investment (“AI Spring”) and periods of disappointment, loss of confidence, and reduced funding (“AI Winter”). Even with today’s seemingly fast pace of AI breakthroughs, the development of long-promised technologies such as self-driving cars, housekeeping robots, and conversational companions has turned out to be much harder than many people expected. One reason for these repeating cycles is our limited understanding of the nature and complexity of intelligence itself. In this talk I will discuss some fallacies in common assumptions made by AI researchers, which can lead to overconfident predictions about the field. I will also speculate on what is needed for the grand challenge of making AI systems more robust, general, and adaptable—in short, more intelligent.

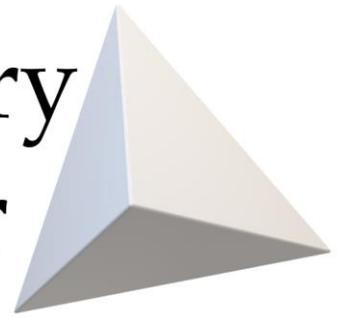
*Melanie Mitchell is the Davis Professor of Complexity at the Santa Fe Institute. Her current research focuses on conceptual abstraction, analogy-making, and visual recognition in artificial intelligence systems. Melanie is the author or editor of six books and numerous scholarly papers in the fields of artificial intelligence, cognitive science, and complex systems. Her book Complexity: A Guided Tour (Oxford University Press) won the 2010 Phi Beta Kappa Science Book Award and was named by Amazon.com as one of the ten best science books of 2009. Her latest book is Artificial Intelligence: A Guide for Thinking Humans (Farrar, Straus, and Giroux).*

**For further information e-mail [mfisher@wcupa.edu](mailto:mfisher@wcupa.edu)**

**See also the [Colloquium page](#) for upcoming talks.**

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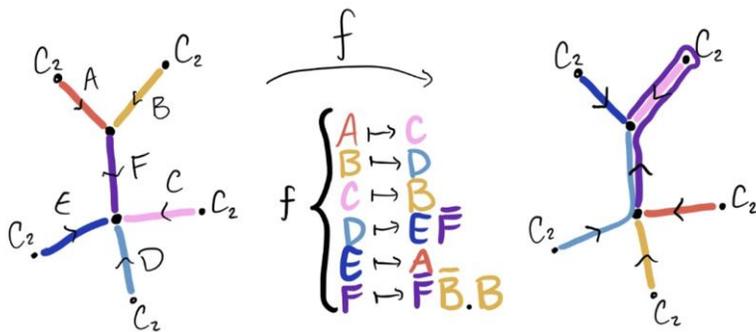
# Tetrahedral Geometry & Topology Seminar



Presents

**RYLEE LYMAN**

Rutgers University-Newark



**“Train track maps on graphs of groups and CTs for free products”**

Friday, March 4<sup>th</sup>, from 4:30 – 5:25 PM

West Chester University, Anderson Hall 211

(Attend via Zoom: <https://wcupa.zoom.us/meeting/register/tJ0pdOuoqzgiHtcKkXyjSCdGCrQa-vGFyxa2>)

A homotopy equivalence of a graph is a train track map when it sends vertices to vertices and the restriction of any iterate of the map to an edge yields an immersion. (Relative) train track maps were introduced by Bestvina and Handel in 1992; since then they have become one of the main tools in the study of outer automorphisms of free groups. More recently in 2011, Feighn and Handel introduced a stronger kind of relative train track map called a CT and proved their existence for all outer automorphisms of free groups after passing to a power. We extend the theory of relative train track maps to certain graphs of groups and the theory of CTs to free products (that is, graphs of groups with trivial edge groups).

*Rylee Lyman earned their PhD in Mathematics at Tufts University, studying with Kim Raune. Currently, Rylee is working with Lee Moser as a postdoc at Rutgers-Newark.*

For further information e-mail: [Jeremy Brazas](mailto:Jeremy.Brazas@rutgers.edu)

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West Chester University  
Spring 2022 Mathematics Colloquium

presents

**SHIV GUPTA**

West Chester University

**“Bernoulli Numbers”**

Friday, March 25, 2022 from 3:15 to 4:05PM  
UNA 161

While teaching “Computing Area as the Limit of Approximations”, in Calculus II we come across the sums like

$$\sum_{j=1}^n j = 1 + 2 + \cdots + n = \frac{n(n+1)}{2} = \frac{n^2}{2} + \frac{n}{2}$$

$$\sum_{j=1}^n j^2 = 1^2 + 2^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6} = \frac{n^3}{3} + \frac{n^2}{2} + \frac{n}{6}$$

$$\sum_{j=1}^n j^3 = 1^3 + 2^3 + \cdots + n^3 = \frac{n^2(n+1)^2}{4} = \frac{n^4}{4} + \frac{n^3}{2} + \frac{n^2}{4}$$

The problem of finding such formulas was considered by Jacob Bernoulli (1654-1705) which subsequently led to the introduction and study of what are now called *Bernoulli Numbers*. About his discovery of the formulas for these numbers, Jacob Bernoulli wrote:

*With the help of these formulas it took me less than half of a quarter of an hour to find that the 10th powers of the first 1000 numbers being added together will yield the sum*

**91,409,924,241,424,243,424,241,924,242,500**

We now know that Bernoulli Numbers were also independently discovered by Japanese Mathematician *Seki Takakazu* and his discovery was posthumously published in 1712 in his work *Katsuyo Sampo* where as Jacob Bernoulli's was published (also posthumously), in his *Ars Conjectandi* in 1713.

We shall discuss some properties of Bernoulli Numbers and talk about a conjecture and its resolution, using Kummer's Congruence, concerning the numerators of some Bernoulli Numbers.

**For further information e-mail [mfisher@wcupa.edu](mailto:mfisher@wcupa.edu)**

# Upcoming Graduate Classes

The [MA in Mathematics Program](#): [Course Schedule Fall 2021 - Summer 2023](#)

The [Master of Science in Applied and Computational Mathematics Program](#): [Course Schedule Fall 2019 – Spring 2023](#)

The [MS in Applied Statistics](#): [Summer 2022 and Fall 2022 Course Offerings](#)

If you wish to learn more about our graduate programs or the Department of Mathematics at West Chester University, please do not hesitate to contact us.

Peter L. Glidden, Ph.D., Columbia University  
Professor and Chair

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Gail Gallitano, Ed. D., Columbia University  
Professor and Coordinator of the MA Mathematics Program

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610-436-2893

Mathematics Department [Graduate Programs](#).



Weiner was in fact very absent minded.

The following story is told about him: When they moved from Cambridge to Newton his wife, knowing that he would be absolutely useless on the move, packed him off to MIT while she directed the move. Since she was certain that he would forget that they had moved and where they had moved to, she wrote down the new address on a piece of paper, and gave it to him.

Naturally, in the course of the day, an insight occurred to him. He reached in his pocket, found a piece of paper on which he furiously scribbled some notes, thought it over, decided there was a fallacy in his idea, and threw the piece of paper away.

At the end of the day he went home (to the old address in Cambridge, of course). When he got there he realized that they had moved, that he had no idea where they had moved to, and that the piece of paper with the address was long gone.

Fortunately inspiration struck. There was a young girl on the street and he conceived the idea of asking her where he had moved to, saying, "Excuse me, perhaps you know me. I'm Norbert Wiener and we've just moved. Would you know where we've moved to?" To which the young girl replied, "Yes daddy, mommy thought you would forget."

The capper to the story is that I asked his daughter (the girl in the story) about the truth of the story, many years later. She said that it wasn't quite true -- that he never forgot who his children were!

The rest of it, however, was pretty close to what actually happened...

Found on the "Annals of Improbable Research" Web site

<http://www.improb.com/>.

# Future Issues of Math Times

I would like to thank everyone who contributed to this this newsletter.

For future issues, all of the following would be great to get:

- News about any events similar to those that you see stories about in the current issue
- Articles from current undergraduate and graduate students
- Career news about our alumni
- News about our retired professors
- Anything else that seems like it would be suitable

[Dr. James Mc Laughlin,](#)

Mathematics Department,

West Chester University,

March 2022

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