

# Schedule of Events

---

## Friday, October 20, 2017

|              |  |  |
|--------------|--|--|
| 3:00-7:00 PM | Registration and Welcome   | Student Engagement Center—Ballroom Foyer |
| 6:00-8:00 PM | Making Math Fun in the Classroom<br>Dr. Padmanabhan Seshaiyer<br>George Mason University | Student Engagement Center—Room 2031      |
| 6:00-8:00 PM | Pizza and Games  | Student Engagement Center—Ballroom       |

## Saturday, October 21, 2017

|                |   |   |
|----------------|---|---|
| 8:00-9:00 AM   | Registration  | Student Engagement Center<br>Ballroom Foyer               |
| 9:00-10:55 AM  | Contributed Presentations   | Student Engagement Center<br>Rooms 2030, 2031, 2032, 2034 |
| 11:00-12:15 PM | Welcome and Keynote<br>Dr. Padmanabhan Seshaiyer<br>George Mason University | Student Engagement Center<br>Ballroom                     |
| 12:15-1:05 PM  | Lunch   | Student Engagement Center<br>Ballroom                     |
| 1:10-2:05 PM   | Contributed Presentations   | Student Engagement Center<br>Rooms 2030, 2031, 2032       |
| 2:10-3:05 PM   | Break Out Discussions<br>see page 6 for more information                    | Student Engagement Center<br>Rooms 2030, 2031, 2032       |
| 3:10-4:00 PM   | Invited Address<br>Dr. Paulette Willis<br>Kumon Math and Reading Center     | Student Engagement Center<br>Ballroom                     |
| 4:00-4:10 PM   | Closing Remarks   | Student Engagement Center<br>Ballroom                     |

\*All Texas NExT events will be held in SEC 2053

# Invited Talks

---

## ***Friday Night Workshop: Dr. Padmanabhan Seshaiyer, George Mason University***

**Title:** *Enhancing pedagogical practices to improve student engagement thorough inquiry-based problem solving approaches*

**Abstract:** In this session, we will share how inquiry based approaches can be employed to engage students in higher-level critical thinking strategies, open-ended exploration and multiple approaches in problem solving, including technology. Specifically, the participants will learn about best practices in teaching and learn to develop mathematically rich problem solving activities and tasks that can help students to develop their algebraic habits of mind. The participants will also have an opportunity to learn about effective performance based tasks with varying cognitive demand and 21st century skills designed to help educators support their students learning progression and their mathematical understanding.

## ***Keynote Speaker: Dr. Padmanabhan Seshaiyer, George Mason University***

**Title:** *Undergraduate research in mathematical modeling, analysis and simulation of biological, bio-inspired and engineering systems*

**Abstract:** In the last decade, there have been dramatic advances in mathematical modeling, analysis and simulation techniques to understand fundamental mechanisms underlying biological, bio-inspired and engineering systems. This work will present examples of undergraduate research projects that evolved from multidisciplinary applications modeled via coupled differential equations. Some of these examples include using mathematics to understand why aneurysms rupture; understand how zika spreads; studying social dynamics and; employing mathematics to stop poaching of elephants in Africa. Mathematical analysis and computation for some benchmark model applications will also be presented. Finally, we will also discuss how such projects can provide scholarship opportunities for students at all levels to employ transformative mathematical research in multidisciplinary areas.

## ***Invited Address: Dr. Paulette Willis, Owner and Director of the Kumon Math and Reading Center of Houston-Steeplechase***

**Title:** *How to choose a career*

**Abstract:** Most people believe that pursuing math leads to only two options for jobs: teacher or professor. That belief is completely false. There are many exciting career paths available to mathematically inclined individuals. Dr. Paulette N. Willis will share with you her nontraditional career path as a mathematician and discuss the ups and downs of her journey. Come listen to her story and the lessons she's learned. We are sure you will gain some insight on how to choose a career you will love.

# Schedule of Talks — Morning Session

|                    | <b>Room 2030</b><br><b>Algebra</b><br><b>Moderator: Jorgenson</b>   | <b>Room 2031</b><br><b>Numerical Analysis</b><br><b>Moderator: Yang</b>  | <b>Room 2032</b><br><b>Graph Theory</b><br><b>Moderator: Dunning</b>  | <b>Room 2034</b><br><b>Probably and Statistics</b><br><b>Moderator: Smith</b>  |
|--------------------|---|--|---|--|
| <b>9:00-9:15</b>   | <b>Andrew Soto</b><br>University of Texas at<br><i>Arlington</i><br><i>Matrix Factorizations for</i><br><i>Polynomials</i>  | <b>Aser Garcia, Eric Hall</b><br>Tarleton State University<br><i>Creating a Heliocentric</i><br><i>Lunar Forming Impact</i><br><i>Model</i>                | <b>Bianca Salinas</b><br>St. Edward's University<br><i>A Combinatorial Approach</i><br><i>to RNA-Inspired Folds</i>   | <b>Penny Phan</b><br>Southwestern University<br><i>Singapore: Model of a</i><br><i>Savings Fund</i>  |
| <b>9:20-9:35</b>   | <b>Yansy Perez</b><br>University of Texas at<br>Tyler<br><i>The Structure of the In-</i><br><i>verse Semigroups of Self-</i><br><i>Similar Graph Actions</i>                        | <b>Edwin Gonzalez, Stephen</b><br><b>Low</b><br>Tarleton State University<br><i>N-body Approach to the</i><br><i>Traveling Sales Man</i><br><i>Problem</i> | <b>Daniel Kim</b><br>Texas Academy of Mathe-<br>matics and Science @ UNT<br><i>The Devil in the Details:</i><br><i>Spectrum and Eigenvalue</i><br><i>Distribution of the Discrete</i><br><i>Preisach Memory Model</i> | <b>Madison Edwards</b><br>Southwestern University<br><i>Take Your Best Shot:</i><br><i>Optimizing Shot Selection</i><br><i>in Basketball</i> |
| <b>9:40-9:55</b>   | <b>Catherine Marin King</b><br><b>&amp; Asa Linson</b><br>University of Texas at<br>Tyler<br><i>Modular Arithmetic and</i><br><i>Cryptography</i>                                   | <b>Victoria Gore</b><br>Southwestern University<br>Modeling Trends in Austin<br>Traffic  | <b>Maria Mota</b><br>St. Edward's University<br><i>Solving 2-by-2 Scramble</i><br><i>Squares Puzzles with</i><br><i>Repetitions</i>   | <b>Samuel Vardy</b><br>Southwestern University<br><i>The Price of Health</i>   |
| <b>10:00-10:15</b> | <b>Robert Toedt</b><br>Sul Ross State University<br>A Study on Elliptic<br>Curves   | <b>Bryan Pennington</b><br>University of Texas at<br>Tyler<br><i>Pattern Avoidance on</i><br><i>Quasi-Stirling</i><br><i>Permutations</i>                  | <b>Derek Drumm</b><br>Lamar University<br>Setting Up Scheduling<br>Problems Through Linear<br>Optimization and Graph<br>Theory  | <b>Sabrina Hetzel</b><br>Tarleton State University<br>Computing absorption<br>probabilities in simple<br>finite random walks                 |
| <b>10:20-10:35</b> | <b>Richard N. Van Natta</b><br>The University of Texas at<br>Dallas<br><i>Ordering Spaces with a</i><br><i>"Tupling" Function using</i><br><i>Figurate Numbers</i>                  | <b>Arman Maesumi</b><br>The University of Texas at<br>San Antonio<br><i>Triangle Inscribed-Triangle</i><br><i>Picking</i>                                  | <b>Ivan Rocha</b><br>University of Houston-<br>Downtown<br><i>Mathematical Details on</i><br><i>the Singular Integral</i><br><i>Equation Method</i>   | <b>Kristen McCrary</b><br>Southwestern University<br><i>Math and Mancala</i>   |
| <b>10:40-10:55</b> | <b>Anca Andrei</b><br>University of Texas at<br>Austin<br><i>Some considerations on</i><br><i>the relationships between</i><br><i>an infinite group and its</i><br><i>subgroups</i> | <b>Bonnie Henderson</b><br>Southwestern University<br><i>The Mathemasticks of</i><br><i>Flower Sticks</i>  |   | <b>Amira Mahler</b><br>St. Edward's University<br><i>American Roulette: How</i><br><i>Long and Boldly Can You</i><br><i>Play?</i>            |

## Schedule of Talks — Afternoon Session

|                  | <b>Room 2030</b><br><b>Education</b><br><b>Moderator: Archer</b>  | <b>Room 2031</b><br><b>Topology</b><br><b>Moderator: Hochberg</b>   | <b>Room 2032</b><br><b>Differential Equations</b><br><b>Moderator: Tek</b>   |
|------------------|---|---|--|
| <b>1:10-1:25</b> | <b>Jessie English</b><br>The University of Texas at Tyler<br><i>The Mathematics of SET</i>  | <b>Sarah Goldrup</b><br>St. Edward's University<br><i>A new lower bound on unstable neural codes</i>                                | <b>Niyousha Davachi</b><br>University of Texas at Arlington<br><i>Auxiliary Conditions To The Euler-Lagrange Equations For A New Class Of Non-Standard Lagrangians</i> |
| <b>1:30-1:45</b> | <b>Maria Ornelas, Petra Reyes-Perez, Zachery Viray</b><br>University of the Incarnate Word<br><i>Pedagogy and Paper Folding</i>           | <b>Jake Howell</b><br>Texas Christian University<br><i>Analyzing Personality Structure Over Time with Topological Data Analysis</i> | <b>Isaac Hopkins</b><br>Southwestern University<br><i>A Fluid Dynamical Approach to Modeling Traffic</i>   |
| <b>1:50-2:05</b> | <b>Jocelyn Alvarado</b><br>University of the Incarnate Word<br><i>A Study of Student Performance in Middle School Mathematics Courses</i> | <b>Emily Feller</b><br>University of Dallas<br><i>Ramsey Numbers from Tiling T-tetronimos</i>                                       | <b>Erik J. Harwell</b><br>Texas A&M University-Kingsville<br><i>Complex Matter Space (CMS) and Superluminal Particles</i>  |

## Schedule of Talks — Break Out Discussions

Students will have the opportunity to attend two of the three interactive discussions led by faculty members with significant experience in each topic.

|                  | <b>Room 2030</b>   | <b>Room 2031</b>  | <b>Room 2032</b>   |
|------------------|--|---|--|
| <b>2:10-2:40</b> | <b>Applying to Graduate School: Process, Necessary Documents, and Advice</b><br>Dr. Eileen Faulkenberry<br>Tarleton State University | <b>Summer Research Opportunities: REU's, Research Internships</b><br>David Milan, PhD<br>University of Texas at Tyler | <b>What Can You Do With a Math Degree? Jobs Outside of Academia</b><br>Kevin E Kalinowski, PhD, MPH, CPH<br>UIW School of Osteopathic Medicine |
| <b>2:45-3:15</b> | <b>Applying to Graduate School: Process, Necessary Documents, and Advice</b><br>Dr. Eileen Faulkenberry<br>Tarleton State University | <b>Summer Research Opportunities: REU's, Research Internships</b><br>David Milan, PhD<br>University of Texas at Tyler | <b>What Can You Do With a Math Degree? Jobs Outside of Academia</b><br>Kevin E Kalinowski, PhD, MPH, CPH<br>UIW School of Osteopathic Medicine |