Cameron University

Narayan Thapa

The Department of Mathematical Sciences at Cameron University has actively been involved in numerous activities during the 2018-2019 academic year. This report highlights and documents the accomplishments of our faculty and students.

Undergraduate Research

In 2018, a number of undergraduates actively were involved in several undergraduate research projects and showcased their research outcomes at the Joint Mathematics Meeting in Baltimore, Maryland. The student researchers, topics of their research, and their advisors are listed below.

Samundra Regmi, mathematics and computer science major, presented "Majorizing Sequences for Iterative Methods with Applications." Regmi was supervised by **Dr. Ioannis Argyros.**

Hella Quinnett, a mathematics major, presented "Solution of Beam Equation with Free Boundaries." Hella was supervised by **Dr. Narayan Thapa.**

Upama Neupane and Joseph Morgan, mathematics and computer science major, presented "Pricing European and American Options using Numerical Methods," Upama and Joseph were supervised by **Dr. Narayan Thapa.**

Michael Demmin, a mathematics major, presented "Parameter Identification in an Initial Boundary Value Problem through Finite Difference Method," This was his joint work with fellow mathematics major **Nadab JuarezFlores**. Demmin and JuarezFlores were supervised by **Dr. Gregory Herring and Dr. Narayan Thapa.**

Seminar for Undergraduate Mathematics (SUM)

Seminar for Undergraduate Mathematics is designed to provide a platform for students to share their research outcomes. Six student researchers presented their research outcomes at SUM in 2018, and three student researchers presented their research outcomes at 2018 TORUS at Midwestern State University in Wichita Falls, TX.

Faculty Research Activities

The year 2018 was very productive for our faculty members. Some of their accomplishments are listed below.

Dr. Ioannis Argyros coauthored in following books and book chapters:

Ioannis Argyros, A contemporary study of iterative methods, Convergence dynamics and applications, Academic Press, Elsevier, New York.

Dr. Argyros also contributed book chapters to the following books:

Chapters in Book: Convex Optimization: Theory, Methods and Applications, Nova Science Publishers, Chapter title:

- Extended Newton's method for solving optimal design problems.
- A study on the local convergence and the dynamics of a Steffensen-King-type iterative method.
- Ball convergence for eighth order variant of Hansen's Patrick family under weak conditions.

Dr. Argyros also published **thirty plus papers** in national and international refereed journals. Selected papers are listed below.

- On two high-order families of frozen Newton-type methods, Numer. Linear Algebra Appl.25, (2018).
- Ball convergence of a sixth order Newton-like method based on means under weak conditions, J. Math. Chemistry (2018).
- On the local convergence and the dynamics of Chebyshev-Halley methods with six and eight order of convergence, J. Comput. Appl.Math.298, (2016), 236-251.
- Unified convergence for multipoint super Halley –type methods with parameters in Banach Space, Indian J. Pure and Applied Mathematics (2018).
- Predetermining the number of periodic steps in multi-step Newton-like methods for solving equations and systems of equations, Appl. Math. Comput. 329, (2018), 420-431.
- Enlarging the ball convergence of secant-like methods for non-differentiable operators, J .Kor. Math. Soc. 55, 1,(2018),17-28.
- Local convergence for an eighth order method for solving equations and systems of equations, Nonlinear Engineering-Modeling, and Application (NLENG),(2018).
- Design and Analysis of a new class of derivative-free optimal order methods for nonlinear equations, International J. of Computational methods, 15, 3, (2018).
- Extended Newton-type iteration for nonlinear ill-posed equations in Banach Space, J. Appl. Math. and computing,(2018).
- A family of higher order derivative-free methods for nonlinear systems with local convergence analysis, Computational and Applied mathematics, 37, 5, (2018), 5807-5828.
- Convergence ball and complex geometry of an iteration function of higher order, Mathematics 7,(2018),doi10.3390/math70120028
- Higher –order modification of Steffensen's method for solving systems of nonlinear equations, Computational and Applied Mathematics, 37, 2, (2018), 1913-1940.

Dr. Hong Li co-authored the following paper**:**

A Comparative Study of TELBS Robust Linear Regression, *American Review of Mathematics and Statistics*, 6:1, 1-16. DOI: 10.15640/arms.v6n1a1.

Dr. Narayan Thapa published the following paper:

N. Thapa, Existence of Optimal Parameters for Damped Sine-Gordon Equation with Variable Diffusion Coefficients and Neumann Boundary Conditions, Australian Journal of Mathematical Analysis and Applications, Vol 15, Issue 2, Articles 5, pp 1-9, 2018.

Ms. **Irene Corriette** codirected, the It's MathE, a middle school enrichment Program for students in the Lawton-Ft. Sill area. Similarly, Ms. Corriette co-directed the CU Engineering and Applied Mathematics Summer Academy for high school students in Oklahoma. This year, the academy focused on water purification with teams creating portable water purification units. Ms. Corriette also collaborated with the Department of Chemistry, Physics, and Engineering to host the 2nd annual CU Women in Leadership and STEM Conference which featured Charmaine McClarie, President and CEO of the McClaire Group. This conference also featured a panel of distinguished women in leadership. In April 2018, Ms. Corriette was awarded the Cameron University Faculty Award for Innovation and Excellence in Teaching. In 2018, Ms. Corriette presented "Pipeline Development through Middle School, High School, and Community Enrichment Opportunities" at the Oklahoma District Optimist International Club Meeting in Lawton OK and "2017 Cameron University Engineering and Applied Mathematics Summer Academy: Student Enrichment and Engagement by the Engineering Design Process" at the Oklahoma NSF EPSCoR 2018 Annual State Conference in Oklahoma City. Ms. Corriette also coauthored a work-in-progress paper titled "Pipeline Development through Middle School, High School, and Community Enrichment Opportunities" which was presented at the First Year Engineering Experience Conference in July 2018. Additionally, Ms. Corriette successfully received the following grants:

- **Home Savings Bank Endowed Lectureship in Organizational Leadership (Co-PI)** CU Empowering Women in Leadership and STEM Conference. 2018, $3,000, 1 yr.
- **Cameron University Lectures and Concerts (Co-PI)** CU Empowering Women in Leadership and STEM Conference. 2018, $9,000, 1 yr.
- **LaSill Optimist Club (Co-PI)** It's MathE, Middle School Enrichment Program, 2018, $1,400, 1 yr
- **LaSill Optimist Club (Co-PI)** CU Engineering and Applied Mathematics Summer Academy, 2018, $1,700, 1 yr
- **Walmart Community Grant (Co-PI)** It's MathE, Middle School Enrichment Program, 2018, $1,000, 1 yr.

Dr. Janak Joshi joined the department of mathematical sciences as Assistant Professor of Mathematics in 2018. Dr. Joshi came to Cameron from State University of New York (SUNY) at Oswego, where he served as a Visiting Assistant Professor of Mathematics. He received his Ph.D. in mathematics in 2018 from the University of North Texas at Denton. Dr. Joshi's research interest lies in Ordinary and Partial Differential Equations.

Ms. Elizabeth Reida joined the department as an Instructor of Mathematics in 2018. Ms. Reida received an M.S. degree in mathematics in 2018 from the University of Nebraska at Omaha.

Undergraduate Research Funding: In 2018, the department of mathematical sciences was awarded a variety of funds listed below.

1. Bill G. Taylor Endowed Lectureship in the Mathematical Sciences - $ 2,600.00
2. Gerald Paul Laursen and Kay Anne Davis Laursen Endowed Lectureship - $ 2,200.00
3. James Eddie Phillips Endowed Lectureship in the mathematical Sciences - $ 3,000.00
4. Undergraduate Research Funding - $5,902.00
5. Student Activity Fee Allocation (SAFAC) - $2,400.00

MathCom: Our student organization, MathCom, with faculty advisor **Dr. Gregory Herring** involved in the following activities:

During the Halloween week, MathCom participated in October Halloween carnival where a game booth was set up for children. Furthermore, MathCom launched a Math Jeopardy competition for algebra edition, derivative challenge, and magic with mathematics. In addition to this, MathCom volunteered in MathCounts, regional math competition and back to school party.