

Cameron University

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The Department of Mathematical Sciences at Cameron University has actively been involved in numerous activities during the 2019-2020 academic year. This report highlights and documents the accomplishments of our faculty and students.

Undergraduate Research

In 2019, a number of undergraduates actively were involved in several undergraduate research projects and showcased their research outcomes at the 2020 Joint Mathematics Meeting in Denver CO. The student researchers, topics of their research, and their advisors are listed below.

Yauheniya Shviadok a mathematics major, presented “Developments in the semi-local convergence of Newton’s method.” Yauheniya was supervised by **Dr. Ioannis Argyros**.

Malcolm Gehlbach a mathematics major from Lawton presented “Reaction-Advection-Dispersion Model.” Malcolm was supervised by **Dr. Janak Joshi**.

Joseph Morgan, a mathematics and computer science major from Lawton, presented “Parameter Identification in a Parabolic Partial Differential Equation from the Overspecified Data.” Joseph was supervised by **Dr. Narayan Thapa**.

Goodness Agboola, a computer science major from Nigeria, presented “Polynomial multiplication using Karatsuba and Toom-Cook algorithms and their applications.” Goodness was supervised by **Dr. Parshuram Budhathoki**.

Seminar for Undergraduate Mathematics (SUM)

Seminar for Undergraduate Mathematics is designed to provide a platform for students to share their research outcomes. Four student researchers presented their research outcomes at SUM in 2019, and scheduled to present their research outcomes at 2020 TORUS at Cameron University Lawton, Oklahoma.

Faculty Research Activities

The year 2019 was very productive for our faculty members. Some of their accomplishments are listed below.

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

1. Undergraduate Research at Cameron University on Iterative Procedures in Banach and Other Spaces, Nova Science Publisher, New York, USA, (2019) ISBN: 978-1-53616-058-1.
2. Mathematical Modeling for the Solution of Equations and Systems of Equations with Applications, Vol. III, Nova Science Publisher, New York, USA, (2019) ISBN: 978-1-53615-942-4.

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

3. On the convergence of Secant-like methods, (2019), pages 141-184, in Current trends in Mathematical Analysis and Its Disciplinary Applications, Editors H.Dutta, L. D. R, Kocinac and H.M. Srivastava, Birkhauser, Springer, ISBN: 978-3-030-15241-3.
4. Ten Chapters in the book entitled “Understanding Banach Spaces”, Editor: Daniel Gonzalez, Nova Science Publishers Inc. Hauppauge, NewYork, (2019).

Dr. Argyros also published following papers in national and international refereed journals.

- 1) High Convergence Order Iterative Procedure for Solving Equations Originating from Real Life Problems, Mathematics, 7, (2019), 855; DOI: 10.3390/math7090855.
- 2) Efficient Optimal families of higher-order iterative methods with local convergence, Applicable Analysis and Discrete Mathematics, (2019), <https://pefmath.etf.rs>.
- 3) Extending the choice of starting points for Newton’s method, Mathematical Methods in the Applied Sciences, Wiley, (2019), 1-9.
- 4) Majorizing Sequences for Single-Step Iterative Processes and Restricted Convergence, PanAmerican Math. J., 29, 3, (2019), 93-102.
- 5) Ball comparison for three optimal eight order methods under weak conditions, Stud. Univ. Babeş Bolyai Math., 64, 3, (2019), 421-431.
- 6) Ball Convergence for a derivative free method with memory for solving nonlinear equations, Communications on Applied nonlinear analysis, 28, 1, (2019), 86-100.
- 7) Extending the Kantorovich’s theorem on Newton’s method for solving strongly regular generalized equation, Springer Link, Optimization Letters, 12, 1, (2019), 213-226.
- 8) Ball Convergence Theorems Extending the Chen-Yamamoto Results for Nonlinear Equations, PanAmerican Mathematical Journal, 29, 4, (2019), 97-104.
- 9) On the local convergence and complex geometry of eight order iteration function, Annales Universitatis Scientiarum, Computatorica, 49, (2019).
- 10) Extending the applicability of an efficient fifth order method under weak conditions in Banach space, MathLAB Journal, 2, 1, (2019), 63-78, <http://pubkh.com/indexphp/mathlab>.
- 11) A new technique for studying the convergence of Newton’s solver with real life applications, J. Math. Chem, (2019).
- 12) Majorizing Sequences for Single Step Iterative Processes and Restricted Convergence, PanAmerican Math. J., 25, 3, (2019), 93 - 102.
- 13) Extending the applicability of a Theorem by Häussler for The Gauss-Newton Solver, Transactions on Mathematical Programming and Applications, 7, 2, (2019), 57-62.
- 14) Extending the applicability of high-order iterative schemes under Kantorovich hypotheses and restricted convergence region, Rendiconti del Circolo Matematico di Palermo Series 2, (2019), DOI: 10.1007/si2215-019-00460-x.
- 15) Semilocal Convergence of a Newton-Secant Solver for Equations with a Decomposition of Operator, Journal of Computational Analysis and Applications (JoCAAA), (2019).
- 16) Convergence Analysis for Single Step-type methods for Non-Smooth Operators, Journal of Computational Analysis and Applications (JoCAAA), (2019).
- 17) Efficient optimal families of higher-order iterative methods with local convergence, Applicable Analysis and Discrete Mathematics, (2019).
- 18) Extending the Applicability of a Two-Step Chord-Type Method for Non-Differentiable Operators, Mathematics, 7, 804, (2019), DOI: 10.3390/math7090804.
- 19) Expanding the Applicability of Newton’s Method and of a Robust Modified Newton’s Method, Applicationes Mathematicae, (2019), 1-12, DOI: 10.4064/am2280-4-1016.

- 20) Local convergence and attraction basins of higher order, Jarratt-like Iterations, Mathematics, 7, (2019), 1203, DOI: 10.3390/math7121203.
- 21) Local Convergence of Inexact Newton-like Method under weak Lipschitz conditions, Acta Mathematica, Scientia, 40B(1), (2019), 1 – 12.
- 22) Extending a local convergence analysis of Newton's method for solving generalized equations, Applicable analysis and discrete mathematics, (2019), <http://pefmath.eft.rs>.
- 23) Ball Convergence for a three step one parameter efficient method in Banach space under generalized conditions, Mathematics, MDPI, (2019).
- 24) Two point method for solving equations and systems of equations, Applicationes Mathematicae (Poland), (2019).
- 25) Improved convergence ball and error analysis of Müller's method, Bol. Soc. Panam. Mat. (2019) SPM-ISSN-00378712
- 26) Weaker conditions for inexact multipoint Newton-like methods, Journal of Mathematical Chemistry, CMMSE, (2019).
- 27) Design and analysis of a faster King-Werner-type derivative free method (2019), Bol. Soc. Panam. Mat. SPM – ISSN – 2175-1188, SPM: www.spm.uem.br/bspm.
- 28) Local Convergence and attraction basin of higher order Jarratt like iteration, Mathematics, MDPI, (2019).

Dr. Narayan Thapa published the following book and a paper:

N. Thapa, Introduction to Capstone in Applied Analysis: A Fundamental Guide for Students and Instructors, Nova Science Publication, Hauppauge, NY USA 2020, ISBN: 978-1-53617-458-8.

N. Thapa, Numerical Solution of Sine-Gordon Equations with Spectral Methods, Appl. Math. Sci. Vol 14, 2020, no. 1, 21-29.

Ms. Barbara Jinks joined the department as an Instructor of Mathematics in 2020. Ms. Jinks received master's degree in mathematics in 1987 from Tarleton State University.