

**THE UNIVERSITY OF TEXAS - PAN AMERICAN**

**DEPARTMENT OF MATHEMATICS**

**ANNUAL REPORT**

**DEPARTMENT OF EXCELLENCE  
FOR YEAR 2004**



**ANNUAL REPORT**

**SEPTEMBER 1, 2006 - AUGUST 31, 2007**



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# **The University of Texas - Pan American**

## **Department of Mathematics**

### **Annual Report**

**September 1, 2006 – August 31, 2007**

#### **Five- year Summary Statement**

Over the last five years, the Department of Mathematics has seen tremendous growth in its research and grant productivity. Of the 53 full-time faculty members in Fall 2007, 28 are very active and productive in terms of research, publications, presentations, and grant activities. Since 2002, department faculty members have published a total of 327 refereed research articles in national and international journals, and 8 graduate-level books and research monographs. In the same period, faculty members made 230 research presentations at national and international professional meetings and other universities. A total of 11 major research grants were obtained from agencies such as the US Department of Defense, NSF, and US Department of Energy in the amount of over 1.5 million dollars. Several other major teaching-related grants were also funded by NSF, US Department of Education, and other Texas State agencies in the amount of several million dollars. Five mathematics faculty members have directed a total of 30 Ph.D. dissertations and 100 master's theses at universities in the United States and abroad.

While there has been a remarkable increase in the scholarly productivity in terms of research and creative activity, research presentations, and grants and contracts, the major weakness in the department is the lack of a Ph.D. program to attract and retain the highest quality faculty and GTAs possible. With the growth of the department over the past five years, the Department of Mathematics is fully ready and can offer a Ph.D. program with an emphasis in applied and computational mathematics with little or no cost.

#### **I. Highlights and Noteworthy Accomplishments of the Department in 2006-07**

##### **IA. Department Activities**

In September 2007, the Department of Mathematics submitted to the UTPA Administration a *Request for Preliminary Authority and Addition to Table of Programs* for a new doctoral program in Applied and Computational Mathematics. This program was then submitted by the Administration to the Board of Regents for consideration.

The Department of Mathematics hosted the highly successful *5<sup>th</sup> International Conference on Differential Equations and Dynamical Systems*, held at UTPA on December 16-18, 2006. A total of 119 registered participants came to present their research results at this conference. Six plenary talks were delivered by internationally known mathematicians *Gui-Qiang Chen* (Northwestern University), *Wim van Saarloos* (Leiden University, Netherlands), *Lokenath Debnath* (The University of Texas-Pan American), *John Neuberger* (University of North Texas), *Shair Ahmad* (The University of Texas at San Antonio) and *Giles Auchmuty* (National Science Foundation). An additional fifteen special sessions and several regular sessions were also held, covering problems of current interest and important applications. Special thanks to Drs. Zhaosheng Feng and Lokenath Debnath (Chairs of the local organizing committee) and the many

mathematics faculty, staff and students who worked hard to make this a successful meeting. The Department of Mathematics wishes to express its thanks to Dr. Blandina Cardenas (President of UTPA), Dr. Paul Sale (Provost of UTPA), and Dr. Edwin LeMaster (Dean, College of Science and Engineering) who supported the meeting and gave \$3,000 towards conference costs. The Proceedings of the Conference, consisting of nearly sixty peer-reviewed papers, will be published in 2007 as supplementary volumes of the international journal, *Dynamics of Continuous, Discrete and Impulsive Systems (Series A)*, edited by Drs. Lokenath Debnath and Zhaosheng Feng.

The Department of Mathematics also hosted the 87<sup>th</sup> *Annual Meeting of the Texas Section of Mathematical Association of America* at UTPA on April 12-14, 2007. Held for the first time at UTPA, this annual meeting attracted a total of 247 participants from around the state and region. Special invited lectures were presented by *Stuart Anderson (Texas A&M Commerce University)*, *Efrain Armendariz (Chair of Mathematics at UT Austin)*, *Dambaru Bhatta (UT Pan American)*, *Lokenath Debnath (Chair of Mathematics at UT Pan American)*, *Tina Straley (Executive Director of Mathematical Association of America)* and *Jonathan H. Worstell (Shell Global Solutions)*. In addition to many presentations by faculty members, there were a large number of student presentations and an entertaining problem-solving carnival. Special thanks to Dr. Andras Balogh (Chair of the local organizing committee) and the many mathematics faculty, staff and students who worked hard to make this a successful meeting. The Department of Mathematics expresses its thanks to Dr. Blandina Cardenas (President of UTPA), Dr. Paul Sale (Provost of UTPA), and Dr. Miguel Nevarez (former President of UTPA) who supported the meeting and gave \$1,000 towards the conference costs.

The Quality Enhancement Plan (QEP) for improving student success in Developmental Mathematics and College Algebra began in 2006-07 with the identification and training of key personnel to support the project. Under the leadership of Dr. Olga Ramirez, Interim Director, enhanced instruction of sections of Math 1300 will begin in the fall of 2007. Drs. Andras Balogh, John Bernard, Monty Taylor, Cristina Villalobos, and Sophie Wang are also actively involved in this new program. The QEP is an outgrowth of a project submitted by Drs. John Bernard, Olga Ramirez and Cristina Villalobos, selected for implementation and awarded \$3,000 for its potential to improve developmental mathematics instruction.

The Statistics Consulting Center (see <http://www.math.utpa.edu/xhwang/scc.html>) was formed in our department to provide statistical advice on the design of experiments, data management, statistical modeling, and statistical analysis of experiments and studies. Founded by Dr. Xiaohui Wang, the Center aims to (1) provide statistical training to students in the effective collaboration with research investigators from a wide variety of disciplines, (2) connect our campus with city communities to help anyone from the region who needs to make practical use of statistics, whether they be students, faculty, or administrators at The University of Texas-Pan American, or researchers in Rio-Grande Valley, and (3) participate in research projects to provide high quality statistical advice to researchers and enhance collaboration between statisticians and researchers throughout the research project. During the spring semester in 2007, the consulting center provided free statistical consulting to UTPA researchers from the Department of Biology, Department of Occupational Therapy, Department of Chemistry, Department of Social Work, Department of Rehabilitation, and researchers from the Rio Grande Valley community.

For the 9<sup>th</sup> year in a row, The University of Texas – Pan American co-sponsored the *Annual Conference of the Rio Grande Valley Council of Teachers of Mathematics (RGVCTM)*. Held on November 16, 2006, this conference attracted over 900 K-12 school teachers from throughout the seven counties served by the Region One Education Service Center. Dr. Olga Ramirez continues to serve as the University Director on the RGVCTM Board and meets monthly with the Board to plan the annual conference. The Department of Mathematics plays a major role in hosting this conference by assisting Dr. Ramirez in making arrangements for the setting up of

events, and by providing access to classrooms, technology, equipment, and staff. Each year, department faculty members contribute presentations and help with the hosting of exhibits. The continued success of this meeting is due in large part to the helpful arrangements, advice and assistance provided by many faculty members, staff and students of the department, as well as to the strong and positive support from the UTPA Administration. The Department of Mathematics is proud to be a major participant in the RGVCTM Conference and salutes the RGVCTM and UTPA for its continued efforts to sponsor and support this teacher conference.

The Department of Mathematics once again sponsored an active Colloquium and Distinguished Lecture Series, with 28 presentations made by mathematicians and scientists from around the United States (see Section XII). Special thanks to the Colloquium and Distinguished Lecture Series Committee and its chair, Dr. Karen Yagdjian. Dr. Vladimir Varlamov successfully organized an Applied Mathematics Seminar series of 24 lectures (see Section XIII) during the year 2006-2007. These talks were well attended by faculty members and students from the Department of Mathematics, Physics and Engineering at UTPA.

Under the Managing Editorship of Dr. Lokenath Debnath, 72 issues of the *International Journal of Mathematics and Mathematical Sciences* (IJMMS) were published during the year 2006-2007. The success of this project is due to cooperative and collaborative efforts of the distinguished Editorial Board at national and international levels. This 30-year old international journal not only carries mathematics research, knowledge and information, but also contributes to the prestige of the Department of Mathematics and The University of Texas-Pan American.

In spite of their heavy office work load, the wonderful and hard working office staff and student helpers went beyond their job descriptions and supported the many different activities of the department. We appreciate their help and support.

## **IB. Program Growth, Improvement, and Development**

The Department of Mathematics continues to be one of the largest departments on campus in terms of student credit hours (SCH). At the request of the Administration, the department opened many additional sections of mathematics courses in 2006-2007 to meet the significant increase in demand during the year. Many of the new sections were taught by lecturers and overload instructors. The Faculty of the College of Science and Engineering and the Department of Mathematics have special concerns regarding issues of quality teaching, effective learning, advising, and quality education.

The ongoing College Algebra Project was led by Mr. Paul Pontius and Mr. Rene Torres. This continues to be a very successful program in terms of student retention and success in College Algebra. Special thanks to all faculty members actively involved in this project.

The Department of Mathematics actively participated in the development of the university's SACS – Quality Enhancement Plan. Drs. John Bernard, Lokenath Debnath, and Cristina Villalobos all served on the SACS – QEP Committee which identified improvement of success and retention in developmental mathematics at UTPA as a key to the success of our students. Across the nation, colleges and universities are experiencing an explosion in the number of students taking remedial mathematics, while at the same time are experiencing low success in these courses. The Department of Mathematics fully supports UTPA's investment of effort and resources to this challenge and hopes UTPA will become a national role model in the improvement of remedial mathematics instruction.

The course *Math 1348 - Contemporary Mathematics* was approved and will be offered for the first time in 2007-08. This course, designed to benefit liberal arts and humanities students, will strengthen the general education of UTPA students by providing a course which addresses THECB Exemplary Objectives in significant ways.

The Department of Mathematics opened a new tutoring laboratory in Spring 2007. Staffed by both graduate students and faculty members from the department, this provided an additional service to students in mathematics courses at all levels. Thanks to Mr. Nam Nguyen for managing the laboratory this past spring and summer as the Mathematics Laboratory Coordinator.

At the graduate level, the masters program has grown to become the second largest graduate program in the College of Science and Engineering in 2006-2007. The department continued to lay the foundation for a future doctoral program in mathematics by adding highly qualified teaching and research faculty members, adding new research thesis and research project options to the current program, as well as adding new programs in Applied Mathematics and Middle School Mathematics Teaching.

## IC. Student News

A total of 36 undergraduate mathematics students graduated during the 2006-2007 academic year. Graduating with a B.I.S. in Middle School Mathematics were Gladys Enriquez, Monica Garcia, Veronica Gonzalez, Maria Osornio, Criselda Ramos, and Radalberto Trevino. Graduating with a B.S. in Mathematics were Esequiel Alaniz, Hilda Alejandro, Karina Bazan, Nanette Cazares, Ricardo De La Cruz, Alberto DeLeon, Marc Del Rio, Rolando Flores, Jaime Gomez, Belen Gonzalez, Juan Gonzalez, Myra Mares, Christian Martinez, Erik Meiners, Anna Marie Mena, Emilio Mendez, Jaime Noriega, Roberto Nunez, Rolando Olivares, Saulo Orizaga, Jennifer Pedroza, Samuel Pedroza, Caren Perez, Daniel Sanchez, Sandra Serna, Veronika Villa, Troy Wipf, Jessica Zagouris, Virgen Zamarron, and Manuel Zarate.

A total of 7 graduate students graduated with M.S. degrees in mathematics: Saul Andaverdi, Arnab Bose, Reid Etheridge, Nadia Kasem, Antonio Layton, Todd Meisel, and Matea Vazquez Solis.

One graduate student, Arnab Bose, received a research award for his research project on *The Radon Transforms and Their Applications* from the UTPA HESTEC in September 2006. His project was supervised by Dr. Lokenath Debnath.

Three students received admission to Ph.D. programs in mathematics at major universities in the United States:

- Arnab Bose, University of South Carolina, Columbia
- Saulo Orizaga, University of Arizona
- Aditi Ghosh, University of Southern Illinois

## ID. Incoming Faculty

The Mathematics Search Committee, chaired by Dr. Andras Balogh, conducted a national search to fill **seven tenured/tenure-track professor/associate/assistant professor positions** effective September 1, 2007. Over 257 applications for tenure-track faculty positions were received and many interviewed on campus, leading to the hiring of the following faculty members:

**Dr. Barnabas Bede**, Assistant Professor, Ph.D. in Mathematics from Babes-Bolyai University, Romania in 2004. Prior to coming to UTPA, he taught in the Mathematics Department at The University of Texas-El Paso. He has published twenty-five research papers in refereed journals in research areas such as fuzzy differential equations, image processing and fuzzy numbers.

**Dr. Arunava Mukherjea**, Professor, Ph.D. in Probability and Applied Mathematics from Wayne State University in 1968. He has published over one-hundred original research papers in probability, functional analysis, applied mathematics and statistics. Ten of his research papers were published in the *Transactions and Proceedings of the American Mathematical Society*, *Annals of Probability and Mathematical Annalen*. He has published five graduate level textbooks and research monographs in functional analysis, probability and statistics. He directed sixteen Ph.D. dissertations in probability and statistics, applied mathematics, and functional analysis. He is the Editor-in-Chief of the *Journal of Theoretical Probability* published by Springer Verlag. He was also a Senior Fulbright Professor in India and has received several NSF and other research grants.

**Dr. Mau Nam Nguyen**, Assistant Professor, Ph.D. in Mathematics from Wayne State University in 2007. He published seven research papers in high quality refereed journals. His areas of expertise include applied mathematics and nonlinear functional analysis.

**Dr. Constantin Onica**, Assistant Professor, Ph.D. in Mathematics from Texas A&M University in 2005. He published five good quality research papers in refereed journals. His research expertise includes differential equations, applied mathematics and operator theory. He has prior teaching experience at both Indiana University and Texas A&M University.

**Dr. Ranadhir Roy**, Assistant Professor, Ph.D. in Mathematics from The University of Hertfordshire, London, U.K. in 1996, M.S. in Applied Computing Technology from Middlesex University, London, UK in 1993, and M.S. in Numerical Analysis from Brunel University, U.K. in 1975. He has published twenty-one research papers in refereed journals in applied mathematics, optimization and tomography, and has written two chapters in two published books. He received a major NIH research grant in the amount of over \$75,000 for 2007-2008.

**Dr. Jasang Yoon**, Assistant Professor, Ph.D. in Mathematics from the University of Iowa. He published eight high quality research papers in applied mathematics and functional analysis. Some of his research was published in the best mathematics journals, including *Transactions of the American Math Society*, *Proceedings of the London Mathematical Society* and *Journal of Functional Analysis*. He previously taught at Iowa State University.

The Department Search Committee, chaired by Dr. Zhijun Qiao, successfully completed a search to fill **several one-year lecturer positions**. The following faculty members were hired effective Fall 2007.

**Mr. Saul Andaverdi**, M.S. in Mathematics from UTPA in 2007.

**Mr. Abdallah Aounallah**, M.S. in Electrical Engineering, Southern Methodist University in 1980. He completed 18 hours of graduate mathematics at UTPA.

**Dr. Ramendra K. Bose**, Ph.D. in Applied Mathematics from the State University of New York in Stony Brook, 1973. He published two graduate level books and many research articles in refereed journals at national and international levels. He also directed two Ph.D. dissertations.

**Ms. Madhavi Devanaboina**, M.S. in Mathematics from Texas A&M University-Kingsville in 2004.

**Ms. Tatyana G. Korotkova-Egan**, M.S. in Applied Mathematics from Moscow State University in 1989, M.S. in Engineering from UTPA in 2004, MBA in Business Administration from UTPA in 2006. Her research expertise is in the area of modeling and simulation of dynamic nonlinear systems and controls.

**Mr. Rommel Garza**, M.S. in Electrical Engineering from UTPA in 2003, and has completed 31 hours of graduate level mathematics at UTPA.

**Dr. Zhongxiao Li**, M.S. in Mathematics from the University of Idaho in 2006, and has published one article in mathematics education in 2005.

**Dr. Salma J. Mahmood**, M.S. in Mathematics from Texas Southern University in 1989, M.S. in Physics from Dhaka University, Bangladesh, in 1979 and Ed.D. in Curriculum and Instruction from Texas Southern University in 2006.

**Mr. Nam Nguyen**, M.S. in Mathematical Science from UTPA in 2004.

**Dr. Rajendra Rai**, Ph.D. in Mathematics from Dalhousie University in Canada in 1980. He has published several research articles in refereed journals.

**Mr. Partha Ray**, M.S. in Mathematics from UTPA in 2006, and MBA in Business Administration from Bangalore University, India in 1982.

**Mr. Mohammad Uddin**, M.S. in Statistics from Stephen F. Austin State University, Texas, in 1994, and M.S. in Statistics from University of Rajshahi, Bangladesh in 1973.

**Ms. Eun-Mee Yoon Ann**, M.S. in Applied Mathematics from Iowa State University in 2006.

We welcome the new and returning faculty members and wish each a happy and productive year.

## **IE. Faculty Activities**

Congratulations to the following faculty members for their promotion to Associate Professor effective September 1, 2007:

- Dr. Paul Bracken
- Dr. Bao-Feng Feng *with tenure*
- Dr. Cristina Villalobos *with tenure*
- Dr. Karen Yagdjian

The following mathematics faculty members served on College or University Academic Committees during the 2006-2007 academic year:

Dr. Lokenath Debnath	Faculty Senate, Quality Enhancement Plan, University Scheduling Committee
Dr. Dambaru Bhatta	Faculty Senate
Dr. Paul Bracken	University Library Committee
Dr. Ben Ebaseh-Onofa	Program Review Council

Dr. Zhaosheng Feng	Honors Council
Dr. Roger Knobel	University Library Committee
Mr. Paul Pontius	COSE College Council
Dr. Monty Taylor	Honors Council
Dr. Vladimir Varlamov	Institutional Assessment Committee
Dr. Cristina Villalobos	Quality Enhancement Plan, COSE College Council
Dr. Xiaohui Wang	Commencement Committee, Student Health Advisory Committee
Dr. William Watkins	Faculty Senate
Dr. Karen Yagdjian	Program Review Council

The following mathematics faculty members were either newly appointed/elected or will continue their term of service on University Academic Committees during the 2007-08 year:

Dr. Andras Balogh	Graduate Council	6/1/07 - 5/31/10
Dr. Dambaru Bhatta	Faculty Research Council	6/1/06 - 5/31/09
Dr. Paul Bracken	Library Committee	7/1/05 - 5/31/08
Dr. Santanu Chakraborty	Honors Council	6/1/06 - 5/31/09
Dr. Lokenath Debnath	Faculty Senate	7/1/07 - 5/31/08
Dr. Bao-Feng Feng	Academic Computer Council	7/1/05 - 5/31/08
Dr. Zhaosheng Feng	Honors Council	7/1/05 - 5/31/08
Dr. Anahit Galstyan	Admissions Committee	6/1/06 - 5/31/09
Dr. Anahit Galstyan	Faculty Senate	6/1/07 - 5/31/10
Dr. William Heller	University Curriculum Committee	6/1/07 - 5/31/10
Dr. Roger Knobel	Library Committee	6/1/06 - 5/31/09
Dr. Zhijun Qiao	Graduate Council	7/1/05 - 5/31/08
Dr. Zhijun Qiao	Student Affairs Advisory Committee	7/1/06 - 7/1/09
Dr. Olga Ramirez	University Curriculum Committee	6/1/06 - 5/31/09
Dr. Xiaohui Wang	Commencement Committee	10/20/06 - 5/31/09
Dr. Xiaohui Wang	Student Health Advisory Committee	12/11/06 - 9/30/09
Dr. Will Watkins	Faculty Senate	6/1/06 - 5/31/09
Dr. Karen Yagdjian	Program Review Committee	7/1/05 - 5/31/08

Congratulations to the following Faculty appointed to the University Graduate Faculty effective September 1, 2007: Dr. John Bernard (Full Member), Dr. Lokenath Debnath (Full Member), Dr. Kenichi Maruno (Full Member), Dr. Elena Poletaeva (Full Member), Dr. Daniel Riahi (Full Member), Dr. Barnabas Bede (Full Member), Dr. Arunava Mukherjea (Full Member), Dr. Mau Nam Nguyen (Full Member), Dr. Constantin Onica (Full Member), Dr. Ranadhir Roy (Full Member), David Tsay (Associate Member), Cristina Villalobos (Full Member), Dr. Xiaohui Wang (Full Member) and Dr. Jasang Yoon (Full Member).

Dr. Miguel Paredes successfully directed the Texas Pre-Freshman Engineering Program (TexPREP) at The University of Texas-Pan American with 165 students accepted for the summer of 2007. The major goal of this program is to stimulate early interest in mathematics, science,

engineering and technology among middle and high school students who have potential for careers in the above fields.

Dr. Olga Ramirez was appointed by the Executive Committee of the Board of Directors of the National Council of Teachers of Mathematics (NCTM) to serve on the NCTM Achievement Gap Task Force.

Special thanks to Mr. Nam Nguyen for his outstanding job as Chair of the Department Social Committee. The many social events organized by the Social Committee were enjoyed by students, staff, and faculty. He is also serving as Coordinator of the Mathematics Laboratory.

With the help of the College Algebra, Business Algebra, Trigonometry, Pre-calculus, Calculus, and Statistics Committees, a report on the Spring 2006 assessment of mathematics in the core curriculum was completed. The report contained recommendations on how to improve student achievement of objectives for mathematics in the core. A fifth assessment was conducted in the spring of 2007 of students in the courses College Algebra, Elementary Statistics, Business Algebra, Pre Calculus, and Calculus I. The assessment was conducted with much help and cooperation from the instructors of these courses.

Special thanks to the following mathematics faculty members for their outstanding service and contributions to the department during the 2006-2007 year. Their services have been most valuable for the department's students, staff, and faculty in many ways.

Dr. Andras Balogh	Assistant Chair
Dr. John Bernard	Coordinator of Mathematics Education
Dr. Paul Bracken	Graduate Program Coordinator
Dr. Ben Ebaseh-Onofa	Statistics Coordinator
Dr. Baofeng Feng	Undergraduate Mathematics Advisor
Dr. William Heller	MAGC Building Supervisor
Dr. Monty Taylor	Scheduling Coordinator

## II. Research Publications and Research Presentations

### IIA. Books Published

#### Lokenath Debnath

*Linear Partial Differential Equations for Scientists and Engineers* (with Tyn Myint-U), (Fourth Edition), 761 pages, Birkhauser Verlag (Fall 2006).

*Integral Transforms and Their Applications* (with Dambaru D. Bhatta), (Second Edition), 700 pages, Chapman & Hall/CRC Press (October 2006).

#### Zhijun Qiao

*Advances in Applied and Computational Mathematics* (with F Liu, Z Nashed, G Nguerekata, D Pokrajac, X Shi, and X Xia), Nova Science Publication Inc. (2006).

### IIB. Research Articles Published/Accepted in National and International Refereed Journals

#### Andras Balogh

Output-Feedback Stabilization of an Unstable Wave Equation (with M. Krstic, B-Z. Guo and A. Smyshlyaev), *Automatica*, accepted (2007).

Control of a Tip-Force Destabilized Shear Beam by Non-located Observer-Based Boundary Feedback (with M. Krstic, B-Z. Guo and A. Smyshlyaev), *SIAM Journal on Control and Optimization*, accepted (2007).

#### Dambaru Bhatta

Few Fractional Order Derivatives and their Computations, *International Journal of Mathematical Education in Science and Technology*, **38** (2007) 449-460.

Computation of Added Mass and Damping Coefficients Due to a Heaving Cylinder, *Journal of Applied Mathematics and Computing*, **23** (2007) 127-140.

Dispersion Relation and Wave Loads on a Vertical Cylinder in Water Due to First Order Diffraction, *Journal of Mathematical Sciences and Mathematics Education*, **2** (2007) 7-21.

Two Layer Transient Water Waves Over a Viscoelastic Ocean Bed (with L. Debnath), *Journal of Applied Mathematics and Computing*, **22** (2006) 133-147.

Behavior of the Integrand Appearing in Axisymmetric Free Surface Water Elevation Function, *International Journal of Applied Mathematics and Engineering Sciences*, accepted (2006).

Fractional Ordinary Differential Equations with Real Constant Coefficients, *International Journal of Applied Mathematics & Engineering Sciences*, accepted (May 2007).

#### Paul Bracken

The Generalized Weierstrass System for Nonconstant Mean Curvature Surfaces and the Nonlinear Sigma Model, *Acta Applicandae Mathematicae*, **92** (2006) 63-76.

Classical Equations of Motion in Gravitational and Electromagnetic Fields from a Variational Principle, *Journal of Dynamical Systems and Geometric Theories*, **4:2** (2006) 173-181.

Diagonalization of a Hamiltonian Describing a Single Two-Level Atom Interacting with a Two Mode Amplifier, *International Journal of Modern Physics B*, **21:2** (2007) 211-220.

Hamiltonians for the Quantum Hall Effect on Spaces with Non-Constant Metrics, *International Journal of Theoretical Physics*, **46:1** (2007) 119-132.

### **Santanu Chakraborty**

A Random Walk Phenomenon Under an Interesting Stopping Rule, *International Journal of Mathematical Education in Science and Technology*, **38:3** (2007) 407-412.

Divisibility by 4 and 8 for Smaller Natural Numbers, *International Journal of Mathematical Education in Science and Technology*, **38:5** (2007) 699-701.

### **Lokenath Debnath**

New Oscillation Criteria for First Order Delay Differential Equations in a Critical State (with J.C. Jiang), *Applied Mathematics Letters*, **19** (2006) 1237-1243.

Some Properties of Mittag-Leffler Functions (with Indranil Sen Gupta), *Integral Transforms and Special Functions*, **18:5** (2007) 329-336.

On a New Simple Method for Evaluation of Certain Multiple Definite Integrals (with Indranil Sen Gupta), *International Journal of Mathematical Education in Science and Technology*, England, **37** (2006) 624-628.

Inequalities for Convex Sequences and their Applications (with Shanhe Wu), *Computers and Mathematics with Applications*, **54** (2007) 225-534.

Two-layer Transient Water Waves over a Viscoelastic Ocean Bed (with D. Bhatta), *Journal of Applied Mathematics and Computing*, **22** (2006) 133-147.

On Hilbert's Type Inequalities on the Weighted Orlicz Spaces (with K. Jichang), *Pacific Journal of Applied Mathematics*, (2007) 95-103.

Weighted Generalization of Rado's Inequality and Popoviciu's Inequality (with Shanhe Wu), *Applied Mathematics Letters*, accepted (2007).

Existence of Monotone Positive Solutions to a Third Order Two-Point Generalized Local Boundary Value Problem (with Z. Liu), *Computers and Mathematics with Applications*, accepted (2007).

A Brief Historical Introduction to Solitons and the Inverse Scattering Transform – A Vision of Scott Russell, *International Journal of Mathematical Education in Science and Technology*, accepted (December 5, 2006).

A New Generalization of Aczel's Inequality and its Applications to an Improvement of Bellman's Inequality, *Applied Mathematics Letters*, accepted (2007).

On Some New Nonlinear Delay and Weakly Singular Integral Inequalities (with Qing-Hua Ma), *Journal of Applied Mathematics and Computing*, accepted (July 2007).

### **Bao-Feng Feng**

An Efficient Pseudo-spectral Method for Some Nonlinear Wave Equations with Higher Linear Dispersive Terms, (with Youn-Sha Chan, Taketomo Mitsui ), accepted for publication in *Dynamics of Continuous, Discrete and Impulsive Systems*, **14**, 134-140 (2007).

Finite Part Integrals and Hypersingular Kernels, (with Youn-Sha Chan, A.C. Fannjiang, G.H. Paulino), accepted for publication in *Dynamics of Continuous, Discrete and Impulsive Systems*, in press.

Discrete Breathers in Two-dimensional Nonlinear Lattices, (with T. Kawahara), *Wave Motion*, in press, available online 25 April 2007.

Chaotic Breathers in Two-dimensional Morse Lattices with On-site Harmonic Potential, (with Youn-Sha Chan, Taketomo Mitsui), *Physica D* **225**, 184-196 (2007).

Nonlinear Intrinsic Localized Modes in a Reduced Fermi-Pasta-Ulam Chain with On-site Harmonic Potential, (with Youn -Sha Chan, A.C. Fannjiang, G.H. Paulino), *Math. Comput. Simul.* **74**, 292-301 (2007).

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### **Zhaosheng Feng**

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Computing Lower and Upper Bounds on Stress Intensity Factors in Bimaterials (with Z.C. Xuan and D.Y. Gao), *International Journal of Nonlinear Mechanics*, **42** (2007) 336-341.

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On Solitary Waves to the Compound Burgers-Korteweg-de Vries Equation (with C. David and R. Fernando), *Physica A*, **375** (2007) 44-50.

Lie Symmetry to the Burgers-Korteweg-de Vries Equation, *Science in China (Series A)*, **50** (2007) 412-422.

A Two-step Algorithm for Layout Optimization of Structures with Discrete Variables (with L.S. Shi, E.M. Feng and H.C. Sun), *Journal of Industrial and Management Optimization*, **3** (2007) 543-552.

A Nonconvex Dissipative System and its Applications, *Journal of Global Optimization*, **40** (2007) 121-150.

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Burgers-Korteweg-de Vries-Type equation with any-order nonlinearities, *Advance in Mathematics and Mechanics*, in press (2007) by Springer (62 pages).

### **Anahit Galstyan**

About the Existence of the Global Solution for One-dimensional Semilinear Gellerstedt-type Equation, *International Journal Dynamics of Continuous, Discrete and Impulsive Systems*, accepted (2007).

Fundamental Solutions for the Wave Equation in de Sitter Model of Universe, *University Potsdam, Potsdam, Germany*, ISSN 1437-739X, 2007, pp.1-36 (with K. Yagdjian).

### **Roger Knobel**

Traveling Waves to a Burgers-Korteweg-de Vries-type Equation with Higher Order Nonlinearities, (with Zhaosheng Feng), *Journal of Mathematical Analysis and Applications*, **328** (2007) 1435-1450.

### **Kenichi Maruno**

Construction of Integrals of Higher-order Mappings (with G.R.W. Quispel), *Journal of the Physical Society of Japan*, **75** (2006) 123001-123005.

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### **Elena Poletaeva**

On Matrix Realizations of the Contact Superconformal Algebra  $\widehat{\mathfrak{K}}(4)$  and the Exceptional  $N=6$  Superconformal Algebra, *Dynamics of Continuous, Discrete and Impulsive Systems-Series A* (Special Issue). Accepted for publication in 2007; arXiv:0707.3097.

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### **Zhijun Qiao**

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- Cusp and Smooth Solitons of the Camassa-Holm Equation under an Inhomogeneous Boundary Condition, (with Guoping Zhang and Fengshan Liu), *Pacific Journal of Applied Mathematics*, **1** (2007), 113 – 130.
- Cuspons and Smooth Solitons of the Degasperis-Procesi Equation under Inhomogeneous Boundary Condition, (with Guoping Zhang), *Mathematical Physics, Analysis and Geometry*, **10** (2007), DOI 10.1007/s11040-007-9027-2.
- A New Integrable Equation with Cuspons and W/M-shape-peaks Solitons, *Journal of Mathematical Physics*, **47** (2006), 112701-09.
- A Note on Nonlinear Integrable Hamiltonian Systems, (with Zhi-Jiang Qiao), *Advances in App. and Comp. Mathematics*, (2006), 179-191.
- A Finite-dimensional Integrable System Associated with a Polynomial Eigenvalue Problem, (with T Xu and W Mou), *International Journal of Mathematics and Mathematical Sciences*, Article ID 13479, (2006), doi:10.1155/IJMMS/2006/13479.
- R-matrix Structures and a New Integrable Peakon Equation, *Advances in App. and Comp. Mathematics*, accepted, (2007).
- A New Integrable Equation with No Smooth Solitons, (with Liping Liu), *Chaos, Solitons and Fractals*, accepted, (2007).
- Cusp Solitons of the Degasperis-Procesi Equation, (with Guoping Zhang), *Chaos, Solitons and Fractals*, accepted, (2006).
- Traveling Wave Solutions of the Generalized BBM Equation, (with Xianlin Yang and Tang), *Pacific Journal of Applied Mathematics*, accepted, (2007).
- On Peaked and Smooth Solitons for the Camassa-Holm Equation, (with G Zhang), *Europhys. Lett.*, **73** (2006), 657 – 663.

### **Daniel N. Riahi**

- Effect of Depth Dependent Thermal Expansivity on High Rayleigh Number Thermal Convection, (with A. T. Hsui), *Int. Journal of Math. Sciences*, **4** (2006) 43-53.
- Effect of Permeability on Steady Flow in a Dendrite Layer, *Journal of Porous Media*, **9:2** (2006) 135-153.
- Mathematical Modeling of Flow Control Using Magnetic Fluid and Field, (with P. Bhattacharjee), in special volume: *Functional Equations, Integral Equations & Differential Equations with Applications (Euler volume)*, *Int. Journal of Applied Math. & Statistics*, **10** (2007) 81-97.
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- Inertial Effects on Rotating Flow in a Porous Layer, *Journal of Porous Media*, **10** (2007) 343-356.
- Steady and Oscillatory Flow in a Mushy Layer, *Current Topics in Crystal Growth Research*, in press (2007).
- Inertial & Coriolis Effects on Oscillatory Flow in a Horizontal Dendrite Layer, *Transport in Porous Media*, in press (2007).

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A Hybrid Level Set and Volume of Fluid Method for the Simulation of Thermal Magnetic Fluids, (with P. Bhattacharjee), *International Journal of Numerical Methods in Engineering*, in press (2007).

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On Mixed Oscillatory and Steady Modes of Nonlinear Convection in Mushy Layers, *Transport in Porous Media*, in press (2007).

### **Ranadhir Roy**

Fluorescence-enhanced Three-dimensional Lifetime Imaging: a Phantom Study, (with Sevick-Muraca and Godavarty), *Physics in Medicine and Biology*, **52** (June 2007) 4155-4170.

### **Jeng-Jong Tsay**

Pre-service Elementary Teachers' Understanding of Logical Inference, *FOCUS on Learning Problems in Mathematics*, accepted (2007).

### **Vladimir Varlamov**

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Convolutions of Rayleigh Functions and their Applications to Semi-Linear Equations in Circular Domains, *Journal of Mathematical Analysis and Applications*, **327** (2007) 1461--1478.

Fractional Derivatives for Products of Airy Functions and for Products of Airy Transforms, Proceedings of the 5<sup>th</sup> International Conference on Differential Equations and Dynamical Systems, *Dynamics of Continuous, Discrete and Impulsive Systems (Series A)*, **14** (2007), 159-163.

Global Solvability for the Cahn-Hilliard Equation in a Disc, *Pacific Journal of Applied Mathematics*, accepted.

Semi-integer Derivatives of the Airy Functions and Related Properties of the Korteweg-de Vries-type Equations, *Zeitschrift fur angewandte Mathematik und Physik*, accepted (2007), published on line, 19 pages.

Fractional Derivatives of Products of Airy Functions, *Journal of Mathematical Analysis and Applications*, accepted (2007), published on line, 19 pages.

Two-dimensional Boussinesq Equation in a Disc and Anisotropic Sobolev Spaces, *Comptes Rendus des Academie des Sciences de Paris, Ser. Mechanique*, accepted (2007) 20 pages.

Global Solutions and Smoothing Effects for Semi-linear Equations in Circular Domains, *Nonlinear Analysis TMA*, accepted (2007) 19 pages.

### **Xiaohui Wang**

Bayesian Curve Classification Using Wavelets, *Journal of American Statistics Association*, (2007), in press. (with B. Mallick and S. Ray)

Bayesian Multivariate Curve Regression Methods, *Dynamics of Continuous, Discrete and Impulsive Systems-Series A (Special Issue)*, 2007, Vol. 14, 227-231.

An Estimation of Attraction Domain of Equilibrium Points in Fuzzy Neural Networks, *Dynamics of Continuous, Discrete and Impulsive Systems-Series A (Special Issue)*, (2007), Vol. 14, 59-62. (with T. Huang)

Burgers-Korteweg-de Vries Equation and Its Approximation, (with Z. Feng, L. Debnath, and D.Y. Gao), *International Journal of Computer Mathematics*, to appear in Vol 84, (2007).

### **Karen Yagdjian**

The Self-similar Solutions of the One-dimensional Semilinear Tricomi-type Equations, *Journal of Differential Equations*, **236:1** (2007), 82-115.

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Fundamental Solutions for the Wave Equation in de Sitter Model of Universe, (with A. Galstyan), *University Potsdam, Potsdam, Germany, ISSN 1437-739X*, 2007, pp.1-36

Global Existence for Model Semilinear Hyperbolic Equation with Variable Speed of Propagation, *Dynamics of Continuous, Discrete and Impulsive Systems*. **Vol. 14** (2007), 174-179.

## **IIC. Research Articles Submitted to Refereed Journals for Publication**

### **Paul Bracken**

Periodic Solutions of the Duffing Equation (with M. Bhatti and M. Lara), *International Journal of Contemporary Math Sciences* (2007).

### **Santanu Chakraborty**

Cyclicity and Weak Convergence for Convolution of Measures on Non-negative Matrices, *Sankhya, Series A* (2007).

The Maximum Size of a Regular Polygon in Extended Buffon's Needle Experiment, *International Journal of Mathematical Education in Science and Technology* (2007).

Non-explosion of a Class of Semilinear Equations via Branching Particle Representations (with Jose Alfredo Lopez Mimbela), *Advances in Probability* (2007).

Some Applications of Dirac's Delta Function in Statistics for more than One Random Variable, *Application and Applied Mathematics* (2007).

### **Lokenath Debnath**

Positive Solutions of Singular Boundary Value Problems for Sturm-Liouville Differential Systems Involving Parameters (with Yan Sun), *Journal of Nonlinear Analysis*, submitted in April 2007.

Burgers-Korteweg-de Vries Type Equation with Higher-order Nonlinearities (with Zhaosheng Feng and Indranil Sen Gupta), *International Journal of Nonlinear Mechanics*, submitted in October 2006.

On a New Nonlinear Transformation and Its Applications to Special Functions (with Indranil Sen Gupta), *Advan. Stud. Contemp. Math*, submitted in June 2007.

### **Bao-Feng Feng**

On the Analysis of a Finite Crack Paralleling a Bimaterial Interface (with Y. S. Chan), *The Quarterly Journal of Applied Mathematics and Mechanics* (2006).

### **Zhaosheng Feng**

Uniformly Translating Solutions of the Complex Ginzburg-Landau Equation, *Proceedings of the Royal Society of London (Section A) Mathematics* (under revision).

An Approximate Technique to a Nonconvex Dissipative System, *Advances in Applied Mathematics (MIT)*, (November 2006).

### **Anahit Galstyan**

Global Existence for the One-dimensional Second-order Semilinear Hyperbolic Equations, 22 pages, submitted to the *Journal Mathematical Analysis and Applications*.

Fundamental Solutions for the Wave Equation Generated by de Sitter Model of Universe, 30 pages, submitted to the *Journal of Differential Equations*, (co-author K. Yagdjian).

### **Kenichi Maruno**

Integrable Discretizations of a Two-dimensional Hamiltonian System with a Quartic Potential (with Bao-feng Feng), *Physics Letters A* (2007).

A Possible Mechanism of Generation of Extreme Waves in Shallow Water (with H. Tsuji and M. Oikawa), *Physica D* (2007).

### **Zhijun Qiao**

R-matrix Structure for a Lattice System, *Advances in App. and Comp. Mathematics*, submitted (2007).

R-matrix Structure for the CH Constrained System, *Advances in App. and Comp. Mathematics*, submitted (2007).

New Solitons of the Harry-Dym Equation, *Nonlinear Math. Phys.*, submitted (2007).

**Daniel N. Riahi**

On Mathematical Modeling of Rotating Flow in Liquid and Mushy Regions during Alloy Solidification (with B. S. Okhuysen), *International Journal of Dynamics of Fluids* (2007).

On Oscillatory Modes of Nonlinear Compositional Convection in Mushy Layers, *Nonlinear Analysis: Real World Applications* (2007).

On Mathematical Modeling, Nonlinear Properties and Stability of Secondary Flow in a Dendrite Layer, *Applications & Applied Math.: An International Journal* (2007).

On Spatial Instability of Electrically Driven Jets, *Acta Mechanica* (2007).

Perturbation and Stability Analyses of Nonlinear Buoyant Flow in Mushy Layers (with B. S. Okhuysen), *Fluid Dynamics Research* (2007).

On Buoyant Convection in Binary Solidification (with B.S. Okhuysen), *Journal of Fluid Mechanics* (2006).

Numerical Simulation of Surface Tension Driven Convection in Thermal Magnetic Fluids (with P. Bhattacharjee), *Journal of Crystal Growth* (2006).

On Weakly Nonlinear Convection in Mushy Layers during Solidification of Alloys (with B. S. Okhuysen), *Journal of Fluid Mechanics* (2006).

**Vladimir Varlamov**

Riesz Potentials for Products of Airy Transforms, *Journal of the London Mathematical Society* (2007).

Functional Derivatives for Products in the Class of Airy Transforms, *Mathematics and Computers in Simulation*, (2007).

**Cristina Villalobos**

UWB Matching Limitations for Higher-Order Spherical Modes (with H.D. Foltz and J.S. McLean), *IEEE Transactions on Antennas and Propagation*, (April 2007).

**Xiaohui Wang**

A Reaction-Diffusion Equation and Its Applications in the Study of Population Growth, *Mathematical Biosciences and Engineering*, (2007).

A Preliminary Assessment of an In-House PCR for Chlamydia Trachomatis in Response to the Inaccessibility of Commercial Tests in Trinidad, *Revista Panamericana de Salud Pública/Pan American Journal of Public Health*, (2007), under invited revision.

**Karen Yagdjian**

On the Cauchy Problem for Wave Equations with Time-dependent Coefficients (with T. Kinoshita), *International Journal of Applied Mathematics & Statistics* (IJAMAS) (2007) 20 pages.

Fundamental Solutions for the Wave Equation Generated by de Sitter Model of Universe (with A. Galstyan), *Journal of Differential Equations*, (2007) 30 pages.

### IID. Research Presentations at National and International Meetings and Conferences

#### Andras Balogh

Numerical Study of a Boundary Controlled Aircraft Wing Model, *The 5th International Conference On Differential Equations and Dynamical Systems*, Special Session on Flow Structures, Flow-Structure Interactions and Flow Control, UTPA, Edinburg, Texas, December 16-18, 2006.

Lyapunov-Based Feedback Boundary Control of a 3D Channel Flow, *The 5th International Conference On Differential Equations and Dynamical Systems*, Special Session on Flow Structures, Flow-Structure Interactions and Flow Control, UTPA, Edinburg, Texas, December 16-18, 2006.

#### Dambaru Bhatta

Asymptotic Behavior of the Integrand for Free Surface Elevation in Axisymmetric Water Wave Problem, *Joint Meetings of American Mathematical Society (AMS) and Mathematical Association of America (MAA)*, New Orleans, LA, January 5<sup>th</sup>, 2007.

First and Second Order Wave Loads on a Cylindrical Structure due to Diffraction, *The 5<sup>th</sup> International Conference on Differential Equations and Dynamical Systems*, University of Texas-Pan American, Edinburg, TX, December 16-18, 2006

#### Paul Bracken

Some Methods for Generating Explicit Solutions to the Generalized KdV Equation and an Associated Hierarchy, the *5<sup>th</sup> International Conference on Differential Equations and Dynamical Systems*, UTPA, Texas, December 16-18, 2006.

Some Methods for Generating Explicit Solutions to the Generalized KdV Equation and an Associated Hierarchy, *Joint Meetings of American Mathematical Society (AMS) and Mathematical Association of America (MAA)*, New Orleans, LA, January 5-8, 2007.

#### Santanu Chakraborty

Discussion on Invariant Measure for Generalized Gauss Transformations, *The 5<sup>th</sup> International Conference on Differential Equations and Dynamical Systems*, UTPA, Texas, December 16-18, 2006.

Parametric Inference on Zero Inflated Poisson Distributions and its Variants, the *3<sup>rd</sup> Eric Lehmann Symposium*, Rice University, Houston, May 16-19, 2007.

#### Lokenath Debnath

Linear and Nonlinear Rossby Waves in an Ocean, *The International Congress of Mathematics (ICM 2006)* in Madrid, Spain, August 22-30, 2006.

Four Major Discoveries in Applied Mathematics in the Second Half of the 20<sup>th</sup> Century, the *Annual Meeting of the Indian Mathematical Society* at Jabalpur, December 27-30, 2006. Invited lecture.

Fractional Calculus and its Applications, a 2 hour research workshop on April 12, 2007 at the *Texas Section of the MAA meeting*, April 12-14, 2007.

Linear and Nonlinear Rossby Waves in an Ocean, the 5<sup>th</sup> *International Conference on Differential Equations and Nonlinear Dynamical Systems*, UTPA, December 16, 2006.  
Plenary lecture

### **Bao-feng Feng**

Non-smooth Solitary Wave Solutions of the Cammassa-Holm Equation and the Degasperis-Procesi Equation, the 7<sup>th</sup> *National Conference of Solitons and Integrable Systems*, Xuzhou, China, August 10, 2007.

Interaction of Discrete Breathers in Fermi-Pasta-Ulam Chain, *SIAM Conference on Dynamical Systems and its Applications*, Snowbird Utah, May 30, 2007.

Interaction of Discrete Breathers in Fermi-Pasta-Ulam Chain, the 5<sup>th</sup> *IMACS Conference on Nonlinear Evolution Equation and Wave Phenomena: Computation and Theory*, Athens, GA, April 16-19, 2007.

A Numerical Method to the Cammassa-Holm and Degasperis-Procesi Equations, *Joint Mathematics Meetings*, New Orleans, Louisiana, January 7, 2007.

A Symmetric Three-level Pseudo-spectral Method for some Nonlinear Wave Equations, 5<sup>th</sup> *International Conference on Differential Equations and Dynamical Systems*, Edinburg, TX, December 17, 2007.

Integrable Discretization of Several Integrable Two-dimensional Hamiltonian Systems, 2<sup>nd</sup> *SIAM Nonlinear Waves and Coherent Structures Conference*, Seattle, Washington, September 9-12, 2006.

### **Zhaosheng Feng**

Fisher Equation and Applications in Population Dynamics, *The Third Shanghai International Symposium on Nonlinear Sciences and Applications (Shanghai NSA'07)*, Fudan University, Shanghai, China, June 6-10, 2007.

Approximate Study to the Fisher Equation and Applications in Population Dynamics, *The Second International Conference on Recent Advances in Applied Dynamical Systems*, Zhejiang Normal University, Jinhua, Zhejiang, China, June 4-8, 2007.

Traveling Waves to a Reaction-diffusion Equation, the *Fifth International Conference on Nonlinear Analysis and Convex Analysis (NACA2007)*, National Tsing-Hua University, Hsingchu, Taiwan, May 31-June 4, 2007.

Fisher Equation and Applications in Population Dynamics, *Applications of Analysis to Mathematical Biology*, Duke University, Durham, North Carolina, May 21-23, 2007.

Lie Symmetry Method and Duality Theory for a Reaction-diffusion Equation, *The Second International Conference on Complementarity, Duality, and Global Optimization in Science and Engineering*, University of Florida, Gainesville, February 28-March 2, 2007.

Approximate Study of Burgers-KdV Equation, 5<sup>th</sup> *International Conference on Differential Equations and Dynamical Systems*, UTPA, Edinburg, Texas, December 16-18, 2006.

### **Anahit Galstyan**

Necessary Condition for the Existence of the Similarity Solutions for the Semilinear Gellerstedt-type Equation, *Fifth International Conference on Differential Equations and Dynamical Systems*, UTPA, Edinburg, Texas, December 16-18, 2006.

On the Oscillations of the Solution Curve for a Class of Semilinear Equations, *The 3rd Symposium on Analysis & PDEs*, Purdue University, West Lafayette, IN, May 27-30, 2007.

### **Kenichi Maruno**

Integrals of Higher-order Mappings and Discrete Bilinear Equations, *SIAM Conference on Nonlinear Waves and Coherent Structures*, University of Washington, Seattle, Washington, September 9-12, 2006.

On the Hirota-Miwa Bilinear Difference Equations, *The 5th International Conference on Differential Equations and Dynamical Systems*, The University of Texas-Pan American, Edinburg, Texas, December 16-18, 2006.

Some Properties of Higher-order Mappings and their Ultra-discrete Analogues, *Joint Mathematics Meeting of AMS and MAA*, New Orleans, Louisiana, January 5-8, 2007.

On the Rational Solutions of Continuous and Discrete DKP-type Equation, *The Fifth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, University of Georgia, Athens, Georgia, April 16-19, 2007.

Two-dimensional Vector Yajima-Oikawa System, *ISLAND3: Algebraic Aspects of Integrable Systems*, Islay, Scotland, United Kingdom, July, 2-7, 2007.

Two-dimensional Vector Yajima-Oikawa System, *Dynamics Days in Europe 2007*, Loughborough University, Loughborough, United Kingdom, July, 9-13, 2007.

### **Elena Poletaeva**

On Infinite-dimensional Lie Algebras and Superalgebras of Vector Fields, *The Fifth International Conference on Differential Equations and Dynamical Systems*, UTPA, December 16-18, 2006, 05-08.

Lie Algebras and Superalgebras of Vector Fields, *Program for Women and Mathematics: Algebraic Geometry and Group Actions*, Institute for Advanced Study and Princeton University, May 21, 2007.

### **Zhijun Qiao**

Finite-dimensional Integrable Dynamical Systems, *International Workshop: Applied Mathematics*, DoD program in Aug 2007, Delaware State University, Dover, Delaware. Invited talk.

CH Peakon System and  $r$ -Matrix Structure, *Fifth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, April 2007, Athens, GA. Invited talk.

[A New Integrable Equation and its Solution](#), *The Joint Annual Meetings of the American Mathematical Society and MAA*, January 2007, New Orleans, LA. Invited talk.

Peaked Solitons Equations, *The 5<sup>th</sup> International Conference on Differential Equations and Dynamical Systems*,” December 16-18, 2006, Edinburg, TX. Invited talk.

Toda Lattice and Integrable Symplectic Mapping, *The International Conference of the Society of Industrial and Applied Mathematics: SIAM – NW06*, Sept 2006, University of Washington, Seattle, WA. Invited talk.

### **Daniel N. Riahi**

The Cellular Structure of Convective Flow in Horizontal Mushy Layers, *Fifth International Conference on Differential Equations and Dynamical Systems*, UTPA, Edinburg, Texas, December 16-18, 2006. Invited lecture.

### **Vladimir Varlamov**

Fractional Derivatives of Airy Functions and of Products of Airy Functions, *American Mathematical Society Sectional Meeting*, Fayetteville, Arkansas, November 3-4, 2006.

Properties of Korteweg-de Vries Equations Related to Fractional Derivatives of Airy Functions, *Fifth International Conference on Differential Equations and Dynamical Systems*, UT-Pan American, Edinburg, Texas, December 16-18, 2006.

Products of Airy Functions and Applications to Nonlinear Wave Equations, *International Conference “Nonlinear Evolution Equations and Wave Phenomena”*, Athens, Georgia, April 16-19, 2007.

Fractional Derivatives for Products of Airy Transforms, *American Mathematical Society Sectional Meeting #1027*, Tucson, Arizona, April 21-22, 2007.

Fractional Derivatives of Airy Transforms, *Russian Academy of Sciences Computational Center*, Moscow, Russia, June 14, 2007.

Fractional Derivatives of Airy Transforms and Applications to Wave Equations, *International Conference “New Trends in Complex and Harmonic Analysis”*, Bergen, Norway, May 7-12, 2007.

### **Cristina Villalobos**

Formulating Fano’s Method as an Optimization Problem to Obtain Broadband Tuning Limits on UWB Antennas, (work with H.D. Foltz and J.S. McLean), *the 8<sup>th</sup> US-Mexico Workshop on Optimization and Its Applications*, Huatulco, Mexico, January 8-12, 2007. Invited talk.

Formulating Fano’s Method as an Optimization Problem to Obtain Broadband Tuning Limits on UWB Antennas, (work with H.D. Foltz, and J.S. McLean), *Blackwell-Tapia Conference*, Institute for Mathematics and Its Applications, University of Minnesota, November 3-5, 2006. Invited talk.

Modeling Faculty Teaching Workload as a Linear Program, (poster presentation with K. Basu and T. Sircar), *Blackwell-Tapia Conference*, Institute for Mathematics and Its Applications, University of Minnesota, November 3-5, 2006.

### **Xiaohui Wang**

Bayesian Unified Hierarchical Model for Classification of Curve Data, *The Third Shanghai International Symposium on Nonlinear Sciences and Applications (Shanghai NSA'07)*, Fudan University, Shanghai, China, June 6-10, 2007.

Wavelets Application in Statistical Analysis of Dynamical Data, *The Second International Conference on Recent Advance in Applied Dynamical Systems*, Zhejiang Normal University, Jinhua, Zhejiang, China, June 4~8, 2007. Invited Talk.

Classification Models for Non-linear Functional Data, *The Fifth International Conference on Nonlinear Analysis and Convex Analysis*, Hsingchu, Taiwan, May 31 - June 4, 2007.

Statistical Methods for Biological Data, *Applications of Analysis to Mathematical Biology*, Department of Mathematics, Duke University, Durham, NC, May 21-23, 2007.

Classifications of Proteomic Mass Spectra and Other Curve Data, *The Third Erich L. Lehmann Symposium*, Statistics Department, Rice University, Houston, TX, May 16 - 19, 2007.

Bayesian Method for Curve Classification Using Wavelets, *The International Biometric Society/Eastern North American Region (ENAR), 2007 Spring Meeting*, "Statistical science solving problems that matter", Hyatt Regency Atlanta, Atlanta, Georgia, March 11-14, 2007. Invited Talk.

Curve Regression Using Wavelet and Spline, *the 5<sup>th</sup> International Conference on Differential Equations and Dynamic Systems*, The University of Texas-Pan American, December 16-18, 2006.

### **Karen Yagdjian**

Nonlinear Wave Equations with Time-dependent Speed of Propagation, *The Fifth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, the University of Georgia Center for Continuing Education, Athens, Georgia, April 16-19, 2007.

Global Existence for Model Semilinear Hyperbolic Equation with Variable Speed of Propagation, *The Fifth International Conference on Differential Equations and Dynamical Systems*, UTPA, December 16-18, 2006.

## **III. Presentations at Local, Regional and State Levels**

### **Andras Balogh**

Control of the Undamped Shear Beam Model Arising in Atomic Force Microscopy, *Colloquium Talk, Department of Mathematics*, Colorado State University, November 6, 2006.

Output-Feedback Stabilization of an Unstable Wave Equation, *The 30th Annual Texas Partial Differential Equations Seminar*, The University of Texas at San Antonio, March 24-25, 2007.

Stationary Solutions for a Boundary Controlled Burgers' Equation, *Applied Mathematics Seminar*, UTPA, November 29, 2006.

### **John Bernard**

The “A-B-C’s” of the “Middle-Term-Splitting” Method for Factoring Quadratic Form Algebraic Expressions over the Integers, *Colloquium Talk*, Department of Mathematics, UTPA, October 10, 2006, (with C. Villalobos and O. Ramirez).

Fractions—Can Computer Software Help To Teach Operations More Effectively?, *41<sup>st</sup> Annual Conference of the Rio Grande Council of Teachers of Mathematics*, UTPA, Edinburg, TX; September 18, 2006, (with O. Ramirez).

The Middle-Term-Splitting Method for Factoring Quadratic Algebraic Equations: A Relational Learning Heuristic Search Approach, *41<sup>st</sup> Annual Conference of the Rio Grande Council of Teachers of Mathematics*, UTPA, Edinburg, TX; September 18, 2006, (with O. Ramirez and C. Villalobos).

The BIS Middle School Mathematics Program at the University of Texas – Pan American, *15<sup>th</sup> Meeting of the South Texas Mathematics Consortium*, UT-Brownsville, Brownsville, TX; February 10, 2007, (with Olga M. Ramirez and Monty Taylor).

Mathematics Professional Development for Faculty: Why? How?, member of panel discussion at the *87<sup>th</sup> Texas Section Meeting of the Mathematical Association of America*, UTPA, Edinburg, TX; April 14, 2007.

### **Dambaru Bhatta**

Fractional Calculus: Theory and Applications, a workshop organized and delivered for the *87<sup>th</sup> Texas Section Meeting of the Mathematical Association of America*, held in Edinburg, TX during April 12-14, 2007. It was attended by 37 faculty and students from various universities/colleges throughout Texas.

Wave Loads on a Cylinder in Water Due to Diffraction, *Seminar Talk*, Department of Mathematics, UTPA, December 6, 2006.

### **Santanu Chakraborty**

Global Solutions for a Semilinear Equation Arising from an Interesting Branching Markov Process, *Indian Statistical Institute*, January 4, 2007. Seminar talk.

### **Lokenath Debnath**

UTPA Department of Mathematics and Education at Border Institutions of the State of Texas, *Texas Section of the MAA Meeting* on April 13, 2007. Invited lecture.

Fractional Calculus and its Applications, *Heritage Institute of Technology*, Calcutta, December 21, 2006. Invited lecture.

Linear and Nonlinear Rossby Waves in an Ocean, *Indian Statistical Institute, Calcutta*, January 9, 2007. Invited lecture.

Delivered an invited lecture at the Department of Applied Mathematics of the University of Calcutta, December 13, 2006.

Delivered invited lecture at Jadarpur University, Calcutta, December 28, 2006.

### **Baofeng Feng**

Interactions of Solitary Waves in Dispersive Systems, *Nonlinear Science Center*, Northwestern University, Xian, China, August 17, 2007.

Interactions of Localized Coherent Structures in Nonintegrable Dispersive Systems, *Nonlinear Studies and Computation (NSC) Seminar*, Research Institute of Electronics Sciences (RIES), Hokkaido University, Sapporo, Japan, July 26, 2007.

Non-smooth Solitary Wave Solutions of the Degasperis-Procesi (DP) Equation and Their Numerical Aspect, *Department of Mechanical Science and Bioengineering*, Graduate School of Engineering Science, Osaka, Japan, July 10, 2007.

Recent Developments on Quasi-continuum Approximation of Intrinsic Localized Modes, *2<sup>nd</sup> Workshop on Intrinsic Localized Modes (ILMs)*, Osaka University, Osaka, Japan, June 30, 2007.

A Reduced Model for Collisions of Intrinsic Localized Modes in Fermi-Pasta-Ulam Lattice, *special Lecture of the 21<sup>st</sup> Century Program*, Center of Excellence for Research and Education on Complex Functional Mechanical Systems, Kyoto University, Kyoto, Japan, June 15, 2007.

An Operator Splitting Scheme for the Peakon and Shock-peakon Solutions of Degasperis-Procesi Equation, *30th Annual Texas PDE Conference*, San Antonio, March 24, 2007.

Wave Phenomenon in Nonlinear Lattices, *15th Annual South Texas Mathematics Consortium*, Brownville, TX, February 10, 2007.

### **Zhaosheng Feng**

Approximate Expressions to the KdV-Burgers Equation, *Beijing University of Aeronautics and Astronautics*, Beijing, China, June 29, 2007.

Traveling Wave Phenomena in a Reaction-diffusion System, *Beijing Jiaotong University*, Beijing, China, June 28, 2007.

Traveling Wave Solutions to a Reaction-diffusion System, *China University of Mining and Technology*, China, June 19, 2007.

Everywhere Regularity for P-harmonic Type Systems under the Subcritical Growth, *Tinajin University of Technology and Education*, June 22, 2006.

Asymptotic Behavior to the KdV-Burgers Equation, the *30th Texas Conference on Partial Differential Equations*, The University of Texas at San Antonio, San Antonio, TX, March 24-25, 2007.

### **Anahit Galstyan**

Global Existence for the One-dimensional Semilinear Gellerstedt Type Equation, the *30th Annual Texas Conference on Partial Differential Equations*, University of Texas at San Antonio, San Antonio, TX, March 24-25, 2007.

Global Existence for the One-dimensional Semilinear Gellerstedt Type Equation, *Applied Mathematics Seminar*, Department of Mathematics, UTPA, April 18, 2007.

### **Roger Knobel**

Visualization of Concepts in Complex Analysis with Geometer's Sketchpad, (with Monty Taylor), *the 15<sup>th</sup> Annual Conference of the South Texas Mathematics Consortium*, The University of Texas at Brownsville, Brownsville, Texas, February 10, 2007.

### **Kenichi Maruno**

Coupled KP Equation and Weyl Group Actions, *the 30<sup>th</sup> Annual Texas Conference on Partial Differential Equations*, University of Texas at San Antonio, San Antonio, TX, March 24-25, 2007.

### **Elena Poletaeva**

Superconformal Algebras, *Algebra/Number Theory Seminar*, Department of Mathematics, the Pennsylvania State University, March 8, 2007.

Superconformal Algebras and Semi-infinite Cohomology, *Mathematical Physics Seminar*, Center for Geometry and Mathematical Physics, the Pennsylvania State University, March 9, 2007.

### **Zhijun Qiao**

*The Degasperis-Procesi Hierarchy - Part I*, Ningbo University, Ningbo, PR China, June 30, 2007. Invited talk.

*Integrable Peakon Equation*, Zhengzhou University, Zhengzhou, PR China, June 24, 2007. Invited talk.

Integrable Peaked Soliton Equations, Liaoning University, Shenyang, PR China, June 19, 2007. Invited talk.

Integrable CH Peakon Equation, Shanghai University, Shanghai, PR China, June 14, 2007. Invited talk.

Integrable Peaked CH Equation, Fudan University, Shanghai, PR China, June 12, 2007. Invited talk.

Integrable Peaked Soliton Equations and Related Topics, Ningbo University, Ningbo, PR China, June 5, 2007. Invited talk.

Integrable Peakon Equations and Related Topics, Chinese Academy of Science, Beijing, PR China, June 1, 2007. Invited talk.

The Degasperis-Procesi Hierarchy and Its Solution, Chinese Academy of Science, Beijing, China, May 31, 2007. Invited talk.

Integrable Peaked and Cusped Equations and Related Topics, Tsinghua University, Beijing, China, May 29, 2007. Invited talk.

The Degasperis-Procesi Hierarchy and Its Solutions, *30<sup>th</sup> Annual Texas Conference on Partial Differential Equations*, University of Texas at San Antonio, March 2007.

The Degasperis-Procesi Hierarchy, at the *Applied Math Seminar*, Department of Mathematics, UTPA, April 2007.

Integrable Symplectic Map and Toda Lattice, at the *Applied Math Seminar*, Department of Mathematics, UTPA, October, 2006.

### **Daniel N. Riahi**

Math Modeling and Nonlinear Properties of Flow in a Mushy Layer, *Applied Mathematics Seminar*, Department of Mathematics, UTPA, February 7, 2007.

Buoyant Flow Around Growing Protein Crystal, (with C. Obare & D. Bhatta), *87<sup>th</sup> Meeting of the Texas Section of the MAA*, UTPA, April 12-14, 2007.

Math Modeling of Electrospinning, (with A. Ghosh, C. J. Carrasquero & K. Sarkar), *87<sup>th</sup> Meeting of the Texas Section of the MAA*, UTPA, April 12-14, 2007.

### **Ranadhir Roy**

Automatic Differentiation in Optical Tomography, *Applied Mathematics Seminar*, Department of Mathematics, UTPA, March 21, 2007.

Fluorescence-Enhanced Optical Tomography (Molecular Imaging), *Applied Mathematics Seminar*, Department of Mathematics, UTPA, November 8, 2006.

### **Vladimir Varlamov**

Fractional Derivatives of Airy Functions and of Products of Airy Functions, *Applied Mathematics Seminar*, Department of Mathematics, UTPA, September 27, 2006.

Riesz Potentials and Products of Airy Transforms, *Applied Mathematics Seminar*, Department of Mathematics, UTPA, April 4, 2007.

Korteweg-de Vries and Ostrovsky Equations. Similarity and Differences, *Theory and Applications of Fluid Mechanics Workshop*, Cincinnati, Ohio, December 9-10, 2006.

Fractional Derivatives of Airy Functions and Applications to Differential Equations, *Applied Mathematics Seminar*, University of Houston-Downtown, Houston, Texas, March 7, 2007.

Fractional Properties of Korteweg-de Vries-type Equations, *Texas Conference on Partial Differential Equations*, San Antonio, Texas, March 24-25, 2007.

### **Cristina Villalobos**

The ‘A-B-C’s’ of the ‘Middle-Term-Splitting’ Method for Factoring Algebraic Expressions: A Relational Learning Heuristic Search Approach, (co-developed with J.E.T. Bernard and O. Ramirez), *Annual Meeting of the Rio Grande Council of Teachers of Mathematics*, The University of Texas-Pan American, October 2007.

Modeling Faculty Teaching Workload as a Linear Program, (poster presentation with K. Basu and T. Sircar), *HESTEC*, The University of Texas-Pan American, September 2006.

### **Xiaohui Wang**

Classification of Curve Data Using Bayesian Wavelet Methods, *Department of Biostatistics - Division of Quantitative Sciences*, The University of Texas M.D. Anderson Cancer Center, Houston, Texas, April 25, 2007. Invited Talk.

### **Karen Yagdjian**

Parametric Resonance in the Nonlinear Wave Equations, *Applied Mathematics Seminar*, Department of Mathematics, The University of Texas-Pan American, April 25, 2007.

Nonlinear Hyperbolic Equations with Time-dependent Speed of Propagation, *the 30th Annual Texas Partial Differential Equations Seminar*, University of Texas at San Antonio, March 24-25, 2007.

Fundamental Solutions of PDE with Multiple Characteristics and the Gauss Hypergeometric Function, *Applied Mathematics Seminar*, Department of Mathematics, The University of Texas-Pan American, October 25, 2006.

## **III: Other Professional Activities**

### **Andras Balogh**

Served as Associate Editor of the *International Journal of Robust and Nonlinear Control*.  
Conference Editorial Board Member, *IEEE Control Systems Society*, 2004-present.

Chair of Arrangements Committee of the *2007 Annual Meeting of the Texas Section - Mathematical Association of America*, UTPA, Edinburg, Texas, April 12-14, 2007.

Organized the special session Flow Structures, Flow-Structure Interactions and Flow Control, at *The 5th International Conference on Differential Equations and Dynamical Systems*, December 2006.

Control of Strings and Flexible Beams by Backstepping Boundary Control (with M. Krstic, A. Siranosian, and B-Z Guo), *Conference Proceedings of the 2007 American Control Conference*, in special session *Backstepping Designs for Boundary Control of PDEs*, New York, NY, July 11-13, 2007.

Observer Based Boundary Control of an Unstable Wave Equation, (with M. Krstic, B.-Z. Guo, and A. Smyshlyaev), *Conference Proceedings of the 2007 American Control Conference*, in special session *Control of Distributed Process Systems*, New York, NY, July 11-13, 2007.

Backstepping Boundary Controllers for Tip-Force Induced Flexible Beam Instabilities Arising in AFM, (with M. Krstic and A. Smyshlyaev), *Conference Proceedings of the 45th IEEE Conference on Decision and Control*, San Diego, CA, Dec. 13-15, 2006.

### **John Bernard**

Drs. John Bernard, Olga Ramirez, and Cristina Villalobos were actively involved in the development and implementation of the QEP intervention for improving student success in MATH 1300, 1334, and 1340 courses. Dr. Bernard will be conducting a series of professional development workshops for the Fall 2007 Modularized MATH 1300 instructors.

### **Dambaru Bhatta**

Served as a member of the editorial board for the journal *International Journal of Applied Mathematics and Engineering Sciences*, since 2006.

Reviewed research articles for the following journals during 2006-07: *Applications and Applied Mathematics: An international Journal (AAM)*, *International Journal of Applied*

*Mathematics and Computing, International Journal of Applied Mathematics and Engineering Sciences.*

Attended the workshop *Wavelets and Applications: A Multi-disciplinary Undergraduate Course with Emphasis on Scientific Computing* at the Joint Meetings of American Mathematical Society (AMS) and Mathematical Association of America (MAA), New Orleans, LA, January 5-8, 2007.

### **Paul Bracken**

Refereed two papers, one for *Letters in Mathematical Physics* and one for *Journal of Computational and Applied Mathematics*.

Reviewed papers for *Mathematical Reviews of the American Mathematical Society*.

Refereed several problems for *American Mathematics Monthly*, and edited some solutions for Problems Section.

### **Santanu Chakraborty**

Attended the *Pipelines Issues Workshop* for statistics faculty members serving Minority Serving Colleges and Universities, North Carolina State University on September 30, 2006.

Attended the workshop *Fostering Diversity in Biostatistics* for students and faculty interested in Biostatistics as a part of ENAR (Eastern North American Region) 2007 conference, *Hyatt Regency*, Atlanta, March 11, 2007.

Attended the *Introductory Workshop on Dynamical Systems with Emphasis on Extended Systems* for young researchers in dynamical systems, organized by Mathematical Sciences Research Institute, Berkeley, California, January 22-26, 2007.

Served as a member in the Masters Thesis Committee of Ms. Chaitanya Jasti, Department of Electrical Engineering at UTPA, and also guided her in various statistical aspects.

### **Lokenath Debnath**

Served as Managing Editor of the *International Journal of Mathematics and Mathematical Sciences* (IJMMS). Forty Eight (48) issues (5000 pages) were published during September 2006 – August 2007.

Served as Associate Editor and on the Editorial Board of many refereed journals including the *Journal of Mathematical Analysis and Applications*, *International Journal of Engineering Science*, *Journal of Applied Mathematics and Stochastic Analysis*, *Quarterly of Pure Mathematics*, *Integral Transforms and Special Functions*, *International Journal of Applied Mathematics*, *International Journal of Pure and Applied Inequalities*, and *Fractional Calculus and Applied Analysis*, *International Journal of Mathematical Education in Science and Technology*.

Served as reviewer of book manuscripts for Springer Verlag, Boston.

Reviewed 20 research articles and 3 books for *American Mathematical Society's Mathematical Reviews*, *Zentralblatt für Mathematik*, and *Society for Industrial and Applied Mathematics (SIAM)*.

Served on a Visiting Lecturer Program of the *Society of Industrial and Applied Mathematics (SIAM)* 2001-present.

Served as a visiting speaker of the *Mathematical Association of America (MAA)* 2001-present.

Refereed 50 research papers for national and international journals including *Proceeding of the Royal Society, London, Applied Mathematics Letters, Journal of Fluid Mechanics, Journal of Engineering Science, Journal of Mathematical Analysis and Applications, Quarterly of Pure Mathematics, Kuwait Journal of Science and Engineering, Mathematical and Computer Modeling, Korean Journal of Applied Mathematics, Indian Journal of Pure and Applied Mathematics, and Rocky Mountain Journal of Mathematics, International Journal of Applied Mathematics and International Journal of Mathematical Education in Science and Technology, Journal of Sound and Vibration, Journal of Mathematical Biology, England, and MAA Mathematics Monthly.*

Reviewed contributed full papers for the Proceedings of *5th International Conference on Differential Equations and Dynamical Systems.*

### **Baofeng Feng**

Co-organizer, special session “Integrable Discrete and Ultra-discrete Systems and Their Applications,” with Drs. Takahashi and Matuskidaira at *Second SIAM Conference on Nonlinear Waves and Coherent Structures*, Seattle, Washington, September 9-12 2006.

Co-organizer, special sessions “Integrable Systems and Their Applications” and “Numerical Study in Differential Equations”, *5th International Conference on Differential Equations and Dynamical Systems*, Edinburg, TX, December 16-18, 2006.

Co-organizer, special session “Continuous and Discrete Integrable System and their Applications,” with Drs. Zhijun Qiao and Wen-xiu Ma at the *Annual Joint Meeting of the American Mathematical Society*, New Orleans, January, 2007.

Co-organizer, special session “Advances in Theoretical and Numerical Methods of Discrete Systems” at the *5<sup>th</sup> IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory*, Athens, April, 2007.

### **Zhaosheng Feng**

Reviewed eighteen papers for fifteen international journals: *Mathematical Reviews, Computational and Applied Mathematics, Discrete and Continuous Dynamical Systems-A, Discrete and Continuous Dynamical Systems-B, Journal of Mathematical Analysis and Applications, Computers and Mathematics with Applications, Acta Mathematica Scientia, Acta Mathematica Applicatae Sinica, Chaos, Solitons and Fractals, Nonlinear Dynamics and Systems Theory, Journal of Global Optimization, Physica D, Journal of Industrial and Management Optimization, International Journal of Computer Mathematics, Qualitative Theory of Differential Equations and Applications.*

Invited Adjunct Professor to China University of Mining and Technology, Xuzhou, China, four-year term from June 2007-June 2011.

Organizing Committee Co-Chair and Scientific Committee Member, *5th International Conference on Differential Equations and Dynamical Systems*, University of Texas-Pan American, Edinburg, TX, USA, December 16-18, 2006.

Organizer for special session "Nonlinear Reaction-diffusion Systems" at the 2<sup>nd</sup> *International Conference on Complementarity, Duality, and Global Optimization in Science and Engineering*, Gainesville, Florida, February 28 - March 2, 2007.

Conference Invited Speaker, *Fifth International Conference on Nonlinear Analysis and Convex Analysis (NACA2007)*, Hsinchu, Taiwan, May 31-June 4, 2007.

International Advisory Committee Member, *3rd Shanghai International Symposium on Nonlinear Sciences and Applications (Shanghai NSA'07)*, Fudan University, Shanghai, China, June 6-10, 2007.

### **Anahit Galstyan**

Served as Associate Editor of the International Journal of Applied Mathematics and Statistics and Scientific Journals International, U.S.A.

### **Kenichi Maruno**

Served as a reviewer of refereed journals including the Journal of Physics A: Theoretical and Mathematical, Physics Letters A, Journal of Optics A: Pure and Applied Optics, Journal of Mathematical Physics, Mathematical Reviews.

Organized a special session on Advances in Theoretical and Numerical Methods of Discrete Systems, at the *5th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena*, Athens, GA, April, 2007.

Organized a special session on Integrable Systems and Their Applications, at the *5th International Conference on Differential Equations and Dynamical Systems*, UTPA, Edinburg, TX, December 16-18, 2006.

### **Elena Poletaeva**

Awarded a visiting membership at the Institute for Advanced Study, Princeton, for term II of academic year 2006-2007, with a research grant \$29,700. She worked at IAS from January-August of 2007, and participated in the Algebraic Geometry Program.

Participated in Workshop "Lie Groups, Lie Algebras and their Representations" at the University of California, Berkeley, November 11-12, 2006, and "Workshops on Homological Mirror Symmetry and Applications, I and II", at the Institute for Advanced Study, January 22-26 and March 26-30, 2007.

Served as a referee for the Journal of Algebra, and prepared reports on 3 articles. She also prepared 2 reviews for the *Mathematical Reviews*.

The biography of E. Poletaeva was selected for publication in the upcoming 11-th Edition of Who's Who Among American Teachers & Educators.

### **Zhijun Qiao**

Served as Editor-in-Chief for the *Pacific Journal of Applied Mathematics* and Editor for the *International Journal of Nonlinear Operators Theory and Applications*.

Organizer of a special session on Continuous and Discrete Integrable Systems and Their Applications at the 2007 AMS-SIAM Annual Meeting with Dr. Ma (USF), Dr. Xu (SPSU), and Dr. B. Feng (UTPA) in Jan 2007, New Orleans, LA.

Organizer and session chair of the 2007 DoD – Applied Mathematics Summer Workshop with Fengshan Liu (DSU), Jiguang Sun (DSU), Xiquan Shi (DSU) et al at Delaware State University, August 2007.

Organizer of a special session on Advances in Theoretical and Numerical Methods of Discrete Systems at the Fifth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, April 2007, Athens, GA, USA.

Organizer of a special session at the 5<sup>th</sup> International Conference on Differential Equations and Dynamical Systems 2006, UTPA, Edinburg, TX.

Global Organizing Committee Member of the 5<sup>th</sup> and 6<sup>th</sup> International Conference on Differential Equations and Dynamical Systems 2006 and 2008, respectively.

Reviewed more than 30 papers for the following 18 international journals: *Nonlinearity*; *Journal of Mathematical Physics*; *Physica Scripta*; *Acta Applicandae Mathematicae*; *Chaos, Solitons and Fractals*; *Nonlinear Analysis Series B: Real World Problem*; *International Journal of Mathematics and Mathematical Sciences*; *Electronic Journal of Differential Equations*; *Physics Letters A*; *Symmetry, Integrability and Geometry: Methods and Applications*; *Advances in Applied and Computational Mathematics*; *Chinese Physics Letters*; *Computers and Mathematics with Applications*, *Communications in Nonlinear Science and Numerical Simulations*, *Science in China*, *Communications in Mathematical Analysis*, *International Journal of Nonlinear Operators Theory and Applications*, and *Pacific Journal of Applied Mathematics*, 2004 – present.

Awarded a Fudan University program professor by Fudan University, Shanghai, China, June 2007. Awarded an honorary professor by Xuzhou Normal University, Xuzhou, Jiangsu, since 2006. Awarded an adjunct professor by Xiangtan University, Xiangtan, China, since 2006.

Associate Member of the International Center of Theoretical Physics and the Third World Academic Science (ICTP/TWAS), Trieste, Italy, 2001 – 2008.

### **Daniel N. Riahi**

Served as Editor, Associate Editor and on Editorial Board of a number of refereed journals and book series including *Far East J. of Applied Math.*, *International Series in Advances in Fluid Mechanics*, *International Journal of Theoretical & Applied Mechanics*, *Global Journal of Pure & Applied Math.*, *Int. Journal of Applied Math Analysis & Applications*, *Global J. of Applied Math. & Math Sciences*, *Mathematics Applied in Science & Technology*, *Oriental Journal of Math Sciences*, *Far East Journal of Mathematical Sciences*, *Advances & Applications in Fluid Mechanics*, *Advances in Fluid Mechanics*, and *Mathematical Modeling & Applied Computing*.

Served as Member of International Scientific Advisory Board of Advances in Fluid Mechanics, Activity Group on Analysis and PDEs of Society of Industrial & Applied Math, International Forum in Porous Media, International Physics Forum of American Physics Society, Aerospace, Heat Transfer, Process Industries, Applied Mechanics and Fluid Engineering of American Society of Mechanical Engineers, South Central Region & Southwest Texas Section of Aeronautics & Astronautics

Collaborative Research Studies & Efforts with UTPA faculty members on Electrospinning Research & on Production of higher Quality Protein Crystal, with NASA Scientist on Space Technology & Exploration, with UIUC colleague on Propellant Management Devise Modeling & Computation.

Served as Member on Research Team for Establishing a Center for Undergraduate Research & Education in Nano-technology at UTPA.

Served as Member on Research Team for Establishing an Engineering Research Center on Bio-Medical, Mechanical & Electrical Nano-Technology jointly with a number of faculty members from UTPA, Vanderbilt University, Harvard University and ASU.

### **Cristina Villalobos**

Committee Member, *Richard Tapia Celebration of Diversity in Computing Conference* held October 2007.

Advisory Board Member, *Rice University Summer Institute in Statistics*, (2006-2008).

Member, *Mathematical Association of America Committee for the Participation of Women*, (2006-2009).

Faculty mentor to undergraduate and graduate students in the Arizona VIGRE Summer Program on Mathematical Modeling (July 20-28, 2007).

### **Vladimir Varlamov**

Served on the Organizing Committee of the *5<sup>th</sup> International Conference on Differential Equations and Dynamical Systems* held at UT Pan American, December 16-19, 2006.

Served as Editor for *Pacific Journal of Applied Mathematics*, 2006-2007.

Guest Editor for a supplementary issue of the International Journal, “*Dynamics of Continuous, Discrete and Impulsive Systems*”, Ser. A. 2007, Watam Press, Canada.

### **Xiaohui Wang**

Co-Organizer, special session “Statistical Analysis and Computations for Modern Dynamic Data”, *the 5<sup>th</sup> International Conference on Differential Equations and Dynamic Systems*, the University of Texas-Pan American, December 16-18, 2006.

Founder and Associate Director of Statistical Consulting Center in the Department of Mathematics, The University of Texas-Pan American, November 2006-present.

Coordinator of Student Support for QEP Mathematics Leadership Team. Detailed planning for the pilot 2007-08 academic year was carried out in the spring and summer of 2007.

### **Karen Yagdjian**

Served as Editor for *Pacific Journal of Applied Mathematics*, 2006-2007.

Served as Associate Editor and on the Editorial Board of *International Journal of Applied Mathematics & Statistics (IJAMAS)*, and *Scientific Journals International (SJI) USA*.

Co-organizer, special session “Evolution Partial Differential Equations” at the *5<sup>th</sup> International conference on Differential Equations and Dynamical Systems*, The University of Texas-Pan American, December 16-18, 2006.

### III. Grants and Contracts Funded and Grant Proposals Submitted

#### IIIA. Funded and Continuing Research and Research Related Grants

Faculty Member(s)	Agency and Title	Amount
Lokenath Debnath (PI)	UTPA Institutional Enhancement Grant, <b>Funded</b> (September 1, 2006)	\$12,000
Bao-feng Feng (PI) Dr. Y. Chang, (U. Houston Downtown)	US Department of Defense (DoD): <i>Mathematical Modeling of Micro &amp; Macro Behavior of Nonlinear Materials</i> , <b>Continued Funding</b> , (2005-2008)	\$240,000
Bao-feng Feng (Co-PI) Dr. Hantao Ji (PI), (Princeton University)	US Department of Energy (DoE): <i>Laboratory Study of MHD Effects on Stability and Turbulence in Free-surface Liquid Metal Flow</i> , <b>Continued Funding</b> , (2006-2009).	\$5,000
Zhaosheng Feng, (PI)	TUTE Research Grant 2006518: <i>Nonlinear Differential Equations, Dynamical Systems and Applications in Mathematical Biology</i> , <b>Continued Funding</b> , (2006-2009)	\$18,750
Zhaosheng Feng (Faculty Supervisor)	UTPA Undergraduate Research Initiative, <b>Funded</b> (Summer 2007).	\$6,000
Zhaosheng Feng (Co-PI) David Y. Gao (PI) (Virginia Tech)	NSF Grant CCF-0514768: <i>Primal-Dual Method and Algorithm for Large Scale Computations with Applications in Engineering Mechanics</i> , <b>Continued Funding</b> , (2005-2008)	\$180,000
Zhaosheng Feng (PI)	UTPA Faculty Research Council, <i>Mathematics Modeling in Animal Dispersal</i> , <b>Funded</b> (Summer 2007)	\$3,550
Kenichi Maruno (PI)	UTPA Faculty Research Council, <b>Funded</b> , (Fall 2006)	\$1,100
Zhijun Qiao (Faculty Supervisor)	UTPA Undergraduate Research Initiative, <i>Solitary Wave Propagations of Integrable Equations</i> , <b>Funded</b> (2006-2007).	\$1,940
Daniel Riahi (PI) Dambaru Bhatta (Co-PI)	Faculty Research Council (FRC), UTPA, “ <i>Computation of buoyant convection around growing protein crystal</i> ,” <b>Funded and Continuing</b> (Fall 2006)	\$3,000
Ranadhir Roy (PI)	National Institute of Health (NIH): <i>Fluorescence-enhanced Optical Tomography</i> , <b>Continued Funding</b> , (2007-2008)	\$75,622
Jenq-Jong Tsay (PI)	Charles A. Dana Center, Texas Higher Education Coordinating Board Teacher Quality Grant: <i>The South Texas Middle School Mathematics Project</i> , <b>Funded</b> (May 2007)	\$86,999

Jenq-Jong Tsay (Co-PI) Dr. Shandy Hauk (PI), (U. Northern Colorado)	US Department of Education FIPSE Program: <i>Video Cases for Novice College Mathematics Instructor Professional Development</i> . <b>Funded</b> .	\$10,516
Xiaohui Wang (PI)	UTPA Faculty Development Council, <i>Latent Variable Mixture Model for Categorical Data Analysis</i> , <b>Funded</b> (Fall 2006)	\$1,998
Xiaohui Wang (PI) John Bernard (Co-PI) Olga Ramirez(Co-PI) Cristina Villalobos(Co-PI) Jenq-Jong Tsay(Co-PI)	UTPA College of Science and Engineering, <i>How to Predict Graduation Based on Students' Entering Information and Performance Records</i> , <b>Funded</b> (Spring 2007)	\$2,000
Xiaohui Wang (Faculty Supervisor)	UTPA Undergraduate Research Initiative, <i>Regression Analysis on Graduation GPA with Respect to Mathematics GPA</i> , <b>Funded</b> (Summer 2007)	\$4,094
<b>Total Faculty: 13</b>	<b>Total Grants: 16</b>	<b>\$652,569</b>

### IIIB. Funded and Continuing Teaching, Teaching Related, and Other Grants

<b>Faculty Member(s)</b>	<b>Agency and Title</b>	<b>Amount</b>
Roger Knobel (PI)	Subward through the Institute for Advanced Study/Park City Mathematics Institute's Mathematics and Science Partnership grant from the National Science Foundation, \$500,000 for years 2003-2008. <b>Continued Funding</b> (September 2006-August 2007)	\$100,000
Miguel Paredes (PI)	NSF, Louis Stokes Alliance for Minority Participation (LSAMP). Additional funding for undergraduate research. (Ending October 31, 2006)	\$80,200
Miguel Paredes (PI)	NSF- LSAMP- UTEP. Annual Funding 2006-2007	\$17,500
Miguel Paredes (PI)	UTPA Institutional Enhancement Grant for LSAMP. Annual Funding 2006-2007.	\$35,900
Miguel Paredes (PI)	State of Texas, Texas Pre Freshman Engineering Program (Tex PREP), Annual Funding.	\$13,900
Miguel Paredes (PI)	Shell Oil Company, Support to Tex PREP, Annual Funding.	\$5,000
Miguel Paredes (PI)	Marathon Oil Corporation, Support to Tex PREP, Annual Funding.	\$15,000
<b>Total Faculty 2</b>	<b>Total Grants 7</b>	<b>\$267,500</b>

### IIIC. Research and Research Related Grant Proposals Submitted (Pending or Unfunded)

<b>Faculty Member(s)</b>	<b>Agency and Title</b>	<b>Amount</b>
Santanu Chakraborty (PI)	UTPA Faculty Development Council, (2007). <b>Unfunded</b>	\$2,000
Lokenath Debnath (PI) Andras Balogh (Co-PI)	NSF/CBMS Regional Conference in the Mathematical Sciences, <i>Riemann-Hilbert Problems: Theory and Applications</i> , (Spring 2007). <b>Pending</b>	\$76,020
Baofeng Feng (PI)	US Missile Defense Agency (MDA), <i>Theoretical and Numerical Study of High-energy Laser Beam Propagation in the Atmosphere</i> , (June 2007). <b>Pending</b>	\$181,256
Zhaosheng Feng (PI)	NSF, <i>Mathematical Modeling of Insect and Animal Dispersal with Growth Dynamics</i> , (August 2007) <b>Pending</b> .	\$150,600
Zhaosheng Feng (PI)	US Department of Defense, <i>Mathematical Modeling in the Atmospheric and Oceanic Boundary Layer Dynamics</i> , (December 2006). <b>Unfunded</b>	\$380,890
Miguel Paredes (PI)	NSF – LSAMP Phase IV, first year (2007-2008). <b>Pending</b> .	\$68,000
Zhijun Qiao (PI)	NSF – CAREER – RUI: <i>Non-classical Solitons' Internation of Integrable Equations</i> , (July 2007) <b>Pending</b>	\$467,059
Zhijun Qiao (PI) Andras Balogh (Co-PI) Guoping Zhang (Co-PI)	MDA HBCU/MI, <i>Micro-local Analysis and Image Reconstruction and Identification of Moving Target</i> , (Fall 2006). <b>Unfunded</b>	\$299,860
Daniel N. Riahi (Co-PI)	NSF for a new Engineering Research Center, <i>Integrated Systems for Automated Cellular Instrumentation and Control</i> , (2007-2010). (Joint proposal with a number of faculty from UTPA, ASU, Harvard Univ., Vanderbilt Univ.) (for 3 years for UTPA part). <b>Pending</b>	\$1,100,000
Daniel N. Riahi (Research Team Member)	MRI-NSF Proposal to establish a Center of Undergraduate Research and Education in Nano-Technology, (2006) (joint research team with a number of UTPA faculty). <b>Pending</b>	\$500,000
Daniel N. Riahi (Co-PI) Bao-Feng Feng Guopin Zhang One Faculty from FSU One Faculty from TTU	NSF-FRG, <i>Nonlinear Math Models of Hurricanes</i> , (2006-2009). <b>Unfunded</b>	\$1,068,679
Daniel N. Riahi (Co-PI) Zhijun Qiao	NSF-RUI, <i>Theoretical &amp; Experimental Investigations on Extreme Water Waves-Hurricanes</i> (2006-2009). <b>Unfunded</b>	\$410,592
Ranadhir Roy (PI)	<i>Bioluminescence Tomography-small Animal Molecular (biomedical) Imaging</i> (2006) <b>Unfunded</b>	\$2,095
Vladimir Varlamov (PI) Anahit Galstyan (Co-PI) Karen Yagdjian (Co-PI)	NSF, <i>Wave Generation by Moving Boundaries</i> , (August 2007). <b>Pending</b> .	\$443,731

Xiaohui Wang (PI) John Bernard (Co-PI) Olga Ramirez(Co-PI) Cristina Villalobos(Co-PI) Jenq-Jong Tsay(Co-PI)	UTPA Faculty Research Council, <i>Is Mathematics Performance Related to University Success?</i> (Spring 2007). <b>Unfunded</b>	\$4,000
Xiaohui Wang (PI of subcontract)	<i>Efficacy of simplified ADA dietary recommendations for a high-risk population in South Texas Institutional</i> , (July 2007). <b>Pending</b>	\$77,696
Xiaohui Wang (PI)	UTPA Faculty Research Council, <i>Dimension Reduction in Statistical Disease Study and Diagnosis</i> , (Fall 2006). <b>Unfunded</b>	\$3,938
Karen Yagdjian (PI) Anahit Galstyan (Co-PI)	NSF, <i>Studies on Wave Equations Arising in Cosmological Models with Expansion</i> , (August 2007), <b>Pending.</b>	\$228,272
<b>Total Faculty: 18</b>	<b>Total Grants: 19</b>	<b>\$5,464,688</b>

#### IV. Student Research Directed by Mathematics Faculty Members

Student	Faculty Involved	Project
Roberto Castillo	Andras Balogh	<i>Mathematical Models of the Spread of Infectious Diseases.</i> (Honors thesis)
Manuel Lara	Paul Bracken M. Bhatti	<i>Periodic Solutions of the Duffing Equation.</i>
Aditi Ghosh	Lokenath Debnath	<i>Wavelet Transforms and Their Applications</i> (M.S. thesis)
Indranil Sen Gupta	Lokenath Debnath	<i>Special Functions; Nonlinear Transformations.</i>
Ursual Zavala	Baofeng Feng	<i>Nonlinear Wave Phenomena in Discrete Lattice Systems.</i>
Charles Obare	Baofeng Feng	<i>Nonlinear Vibration of Beams under External Periodic Force.</i> (Masters Thesis)
Thomas Pulickal	Zhaosheng Feng	<i>Modeling in Animal Dispersal.</i> (URI project)
Noel Ivan Cavazos	Zhaosheng Feng	<i>Models in the Study of Population Growth.</i> (URI project)
Nabor Reyna, Jr.	Zhaosheng Feng	<i>Analysis in Insect and Animal Dispersal.</i> (URI project)
Eugenio DeHoyos	Zhijun Qiao	<i>Solitary Wave Propagations of Integrable Equations.</i> (URI project)

Saulo Orizaga	Zhijun Qiao	<i>Traveling Wave Solutions of Integrable Equations.</i> (LSAMP project)
Charles Obare	Daniel Riahi	<i>Nonlinear buoyant flow around growing protein crystal.</i>
Nelson Carrasquero	Daniel Riahi	<i>Computation and analysis of buoyant convection around growing protein crystal with and without presence of rotation.</i>
Aditi Ghosh	Daniel Riahi	<i>Mathematical modeling and analysis of electrospinning.</i>
Amery Yang	Xiaohui Wang	<i>Regression analysis of overall GPA with respect to mathematics GPA.</i>

### Student Papers and Presentations in AY 2006-07

Saulo Orizaga, (Zhijun Qiao), Traveling Wave Solutions of Integrable Equations, poster presentation at HESTEC 2006.

Manuel Lara, (M. Bhatti and Paul Bracken), Periodic Solutions of the Duffing Equation, paper to appear in the *International Journal of Math Analysis*.

Charles Obare, (Dambaru Bhatta and Daniel Riahi), Buoyant Flow around Growing Protein Crystal, presentation at the 87<sup>th</sup> Meeting of the Texas Section of MAA, UTPA, April 12, 2007.

Aditi Ghosh, (Daniel Riahi and K. Sarkar), Mathematical Modeling of Electrospinning, presentation at the 87<sup>th</sup> Meeting of the Texas Section of MAA, UTPA, April 12, 2007.

Indranil Sen Gupta, (Lokenath Debnath), Some Properties of Mittag-Leffler Functions, paper in *Transforms and Special Functions*, **18**:5 (2007) 329-336.

Indranil Sen Gupta, (Lokenath Debnath), On a New Simple Method for Evaluation of Certain Multiple Definite Integrals, paper in *International Journal of Mathematical Education in Science and Technology*, **37** (2006) 624-628.

Kanad Basu and Treen Sircar, (Cristina Villalobos), Modeling Faculty Teaching Workload as a Linear Program, poster presentation at the *Blackwell-Tapia Conference*, Institute for Mathematics and Its Applications, University of Minnesota, November 3-5, 2006.

**V. Statistical Information on Student Credit Hours Generated (SCH) and Number of Courses Taught**

**Table V-1. Total SCH Generated in Fall and Spring Semesters in Last Five Years**

<b>2006-07</b>	<b>2005-06</b>	<b>2004-05</b>	<b>2003-04</b>	<b>2002-03</b>
28,851 SCH	29,131 SCH	29,230 SCH	26,393 SCH	24,641 SCH
52 FTE Faculty 12 GTAs	47 FTE Faculty 8 GTAs	43 FTE Faculty 5 GTAs	39 FTE Faculty 5 GTAs	36 FTE Faculty 3 GTAs

**Table V-2. Number of Sections Taught by Level in the Last Two Years**

<b>LEVEL</b>	<b>FALL 2006</b>	<b>SPRING 2007</b>	<b>SUM I 2007</b>	<b>SUM II 2007</b>	<b>TOTAL</b>
<b>1000-2000</b>	153	129	37	34	353
<b>3000-4000</b>	16	17	6	2	41
<b>5000-6000</b>	5	6	1	0	12
<b>Total</b>	<b>174</b>	<b>152</b>	<b>44</b>	<b>36</b>	<b>406</b>

<b>LEVEL</b>	<b>FALL 2005</b>	<b>SPRING 2006</b>	<b>SUM I 2006</b>	<b>SUM II 2006</b>	<b>TOTAL</b>
<b>1000-2000</b>	160	142	40	39	381
<b>3000-4000</b>	16	19	3	3	41
<b>5000-6000</b>	6	6	3	1	16
<b>Total</b>	<b>182</b>	<b>167</b>	<b>46</b>	<b>43</b>	<b>438</b>

**Table V-3. Total Number (UG & Grad) SCH Taught in the Last Five Years**

	<b>FALL</b>	<b>SPRING</b>	<b>MINI</b>	<b>SUMMER</b>	<b>TOTAL</b>
<b>AY 2002-03</b>	13,205	11,703	-	6121	31,029
<b>AY 2003-04</b>	14,273	12,352	-	7908	34,533
<b>AY 2004-05</b>	15,588	14,022	123	8543	38,276
<b>AY 2005-06</b>	15,605	13,939	189	7429	37,162
<b>AY 2006-07</b>	16,063	13,614	258	7110	37,045

**Table V-4. Mathematics Degrees Granted During the Last 5 years**

	<b>AY 2002-03</b>	<b>AY 2003-04</b>	<b>AY 2004-05</b>	<b>AY 2005-06</b>	<b>AY 2006-07</b>
<b>BIS*</b>	-	-	5	0	6
<b>BS</b>	16	20	12	35	30
<b>MS</b>	3	1	1	15	7

\* Bachelors of Interdisciplinary Studies in Middle School Mathematics

**Table V-5. Distribution of Sections Taught by Full-time, Part-time and Overload Faculty, and GTAs in AY 2006-07**

		Tenured	Tenure Track	Lecturer	Part-time or Overload	GTA	TOTAL
<b>Fall 2006</b>	Number of Instructors	13	16	23	1	11	74
	Number of Sections Taught	73		85	4	11	173
	% Sections Taught	42%		49%	2%	7%	100%
<b>Spring 2007</b>	Number of Instructors	11	16	21	0	12	60
	Number of Sections Taught	64		78	0	8	150
	% Sections Taught	43%		52%	0%	5%	100%
<b>Sum I 2007</b>	Number of Instructors	7	4	9	0	4	24
	Number of Sections Taught	19		18	0	7	44
	% Sections Taught	43%		41%	0%	16%	
<b>Sum II 2007</b>	Number of Instructors	3	3	13	0	3	22
	Number of Sections Taught	11		20	0	6	37
	% Sections Taught	30%		54%	0%	16%	100%

## VI. Graduate Program Report 2006-2007

### VIA. Program Growth

The Graduate Mathematics Program generated 567 Student Credit Hours (SCH) during the 2006-2007 academic year; the following table shows the total graduate SCH generated by mathematics graduate courses in each of the last 10 academic years (including summers).

Year:	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07
SCH:	240	225	246	276	220	308	345	629	659	567

When compared to other graduate programs in the College of Science and Engineering, the Mathematics Graduate Program has improved to become the second largest program (by SCH) in the COSE. The following table compares the graduate SCH generated by the Department of Mathematics during AY2006-07 compared with other COSE programs.

Dept	CSCI	MATH	BIO	MECE	MANE	ELEE	CHEM	PHYS
SCH	1010	567	551	465	408	396	318	187

The department provided the equivalent of 12 Teaching Assistantships during the year.

## **VIB. Program Activities**

The stipend for Teaching and Research Assistants remained at \$10,000 per academic year for first year students and \$11,000 per year for second year students. According to the AMS publication *Assistantships and Graduate Fellowships in the Mathematical Sciences*, our assistantship stipend remains in the bottom 30% of stipends among graduate mathematics programs in Texas.

A proposal for a M.S. Interdisciplinary Studies – Middle School Mathematics was approved by the Departmental Graduate Committee and Tenure/Tenure-Track Faculty, and forwarded to the administration in the spring of 2007. This program addresses changes in mathematics education within Texas and the nation. When implemented, it will build on the growth of the B.S. Interdisciplinary Studies – Middle School Mathematics program.

Also approved by the Graduate Committee and Tenure/Tenure-Track Faculty was a pre-proposal for a new M.S. in Statistics. This program would be an interdisciplinary program with emphases on biostatistics, engineering, and business.

Finally, new thesis and Applied Mathematics options were added to the graduate program in 2006-07. These changes, along with new supporting courses, strengthen the masters program and build a foundation for a future doctoral program in Applied and Computational Mathematics.

## **VIC. Strategies for Graduate Student Recruitment**

To facilitate recruitment, several goals are in place for the next year to increase enrollment, including:

- Increase contacts with local high school teachers through Region One Education Service Center and regional school districts;
- Increase recruitment of students from the region and state, as well as international students;
- Develop cohorts of local high school teachers to pursue master degrees in mathematics;
- Continue to lobby to have the Teaching Assistant stipend increased to at least \$15,000 per year;
- Obtain approval to implement the M.S.I.S. - Middle School Mathematics program; and
- Obtain external funding to support tuition scholarships.

## VII. Goals and Plans for the 2007-2008 Year

- To maintain quality teaching, learning and advising at all levels, and to increase collaborative and cooperative efforts by developing more courses and programs in applied and engineering mathematics, mathematics education, biomathematics and biostatistics.
- To expand recruiting efforts to increase undergraduate and graduate enrollments in mathematics and mathematics education.
- To increase research and creative activities, publications, and grant activities of the department.
- To recruit at least three research oriented faculty members from the fall of 2008 in order to develop an interdisciplinary Ph.D. program in Applied and Computational Mathematics and to pursue a Ph.D. program in mathematics with emphasis on applied and computational mathematics.
- To develop plans for a master degree program in Statistics.
- To pursue a Ph.D. program in mathematics with emphasis on applied and computational mathematics.
- To implement a new MSIS program in Middle School Mathematics as an expansion of the current mathematics education programs.
- To increase efforts to improve student retention and success in mathematics courses at all levels, especially in Math 1300, Math 1334, and Math 1340.
- To request at least one junior level secretarial position and to upgrade the current Secretary I position to **Administrative Assistant** in order to handle the tremendous growth and heavy workload imposed on the office staff by the Departmental Chair, Assistant Chair, 51 FTE instructors, 15 GTAs and 6 coordinators.
- To seek adequate resources and funds in order to meet the critical and urgent needs of the department, and to improve faculty morale.
- To increase efforts to produce more mathematics teachers for schools at all levels.
- To continue publication of the *International Journal of Mathematics and Mathematical Sciences* in order to provide meaningful scholarly service to the national and international mathematical and scientific community.
- To inform and encourage all faculty members to actively participate in research and/or creative activities, grants and other professional activities and attend professional meetings with presentations.
- To represent the department effectively to the Administration.
- To support and promote the goals of the College of Science and Engineering and The University of Texas – Pan American.

## VIII. Critical Needs and Major Concerns of the Department

Over the past five years, there has been tremendous growth in the size and productivity of the department, accompanied by a significant increase in the volume of work at the department level. New programs have been added, such as the B.I.S. program in Middle School Mathematics, and existing programs have been expanded, such as the addition of the Applied Mathematics and Thesis Options in the graduate program. New programs have been proposed such as an MSIS in Middle School Mathematics and a Ph.D. in Applied and Computational Mathematics. To accommodate the past, current, and future growth of the department, an increase in resources and funds is absolutely essential. Critical needs of the department include the following.

- *The recruitment and retention of tenure-track and senior level faculty members of the highest caliber in both teaching and research.* Such faculty members are needed to expand and maintain high quality programs in applied and computational mathematics, mathematics education, and probability and statistics. Attracting and retaining top candidates will require nationally competitive salaries, the offering of advanced programs such as the proposed Ph.D. in Applied and Computational Mathematics, and the provision for additional release time for active and productive faculty members.
- *More release time for active and productive faculty members* is needed in order to further increase research productivity and grant activity within the department, attract and retain high quality faculty members in critical areas such as applied mathematics, mathematics education, and statistics, and support current and future graduate programs. Provisions are needed to reduce the teaching workload for highly productive faculty members to 8 hours or 7 hours per semester.
- *The department has a serious faculty office space problem in the MAGC building.* Six tenure-track assistant professors and **fourteen** lecturers joined the department in the fall of 2007. Many of the lecturers teach 5 sections with 160-190 students (15 hour teaching workload) and share office with other members of the department. Nine full-time faculty members have their offices in the Science Building and Southwick Hall.
- *An increase in the departmental budget.* Based on reports from departmental committees and requests from individual faculty members, the department is in critical need of funds to support research activities of department faculty members, instructional and office equipment, faculty recruitment funds, operating expenses, publication charges for refereed research articles, and travel funds. In spite of the Department Chair's conservative spending policy, the current department budget is not sufficient to meet the needs and demands in these areas.
- *Personal computers, printers and software for mathematics faculty members.* The Department of Mathematics has received several personal computers and printers for faculty members in the last two years; thanks to the Administration for providing computer support for these faculty members. There are, however, faculty members and graduate students with outdated computers and limited access to essential mathematical software. Coupled with the department's increase in the use of computers in teaching, research and service, there is an on-going critical need for funds to acquire updated computers, printers, and software.
- *An increase in the department's annual allocation for classroom instruction and maintenance.* The department's annual budget has not kept pace with the growth of the department in terms of faculty size and number of student credit hours generated. Previous sources of additional funds for classroom instruction, such as HEAF funds, are

no longer available. To fully utilize the instruction potential of the department, funds are needed to adequately provide teaching supplies, computers, and mathematical software.

- *Department Chair's release time.* A 75% release time for the Department Chair is absolutely crucial for handling the complex administrative duties and responsibilities, managing the *International Journal of Mathematics and Mathematical Sciences* and for his research and publications. (Teaching: 25%, Administration: 60%, and research, publication and grants: 15%).
- *An Administrative Assistant.* Managing such a large department with its complexity requires more organizational effort. It is absolutely critical to create a position of a full-time **Administrative Secretary** by upgrading the current Secretary I to an Administrative Assistant at a small cost.
- *A new junior level secretary position.* The Department of Mathematics remains the largest department in the COSE and one of the largest departments on campus. The department currently has 53 full-time mathematics instructors and **six coordinators**, including one Assistant Chair, Undergraduate Advisor, Graduate Program Coordinator, MGCB Building Manager, Scheduling Coordinator, Mathematics Education Coordinator, and Statistics Coordinator. In order to support such a large department with its current growth and numerous instructional and service programs, it is absolutely crucial for the department to have an **additional junior level secretarial position**.
- *An increase in the stipend for a Graduate Teaching Assistantship to at least \$15,000 per year.* The current stipend has remained stagnant for several years and is now well below state and national averages for assistantships in mathematics and mathematics education. A modest increase in the stipend is essential for the department's graduate program to attract and retain qualified students. This can be accomplished by converting a few lecturer positions into GTA positions. This would not only save money, but also increase the teaching productivity (SCH) by twice the amount. It would also help increase research and grant productivity.

## **IX. Mission Statement of the Department of Mathematics**

- To support the College of Science and Engineering mission statement by committing to excellence in instruction, student performance, grant, research, scholarly accomplishment and professional service.
- To provide students of mathematics with an environment of academic freedom that will ensure the exchange of ideas, the dissemination of knowledge, and the appreciation of mathematics.
- To inspire students with an appreciation of the impact of mathematics in a global economy, and with respect for the contributions made by previous generations.
- To provide students with analytical foundations empowering them to pursue chosen courses of study where they can apply mathematics meaningfully for the purpose of contributing to current and future societal needs.

## **X. Goals of the Department of Mathematics**

- To provide a variety of quality academic programs grounded in the liberal arts, that cultivate active learning, critical thinking, problem solving, and interdisciplinary perspectives.
- To recruit, retain, and develop highly qualified faculty and staff by providing an environment that promotes excellence in teaching, research, service, and student success.
- To facilitate and reward excellence in scholarship and research, for the enhancement of knowledge in mathematics, mathematics education and statistics that can be shared with the public through presentation, publication, or consultation.
- To encourage and support ongoing professional, university, and community service activities by faculty, staff, and students that enhance the quality of life of a multicultural diverse learning community.
- To provide effective student recruitment, development, retention, and placement programs designed to promote and serve a diverse student population.
- To develop and coordinate an ongoing planning, evaluation, and dissemination process designed to ensure academic excellence.
- To identify, increase availability of, and ensure appropriate utilization of resources that support academic programs, faculty, staff, and students.
- To provide academic leadership for the Department of Mathematics.
- To promote and establish increased empowerment of the Department Chair in distributing financial resources so as to facilitate the accomplishment of the goals of the department.

## XI. Mathematics Colloquium and Distinguished (\*\*\*) Lecture Series in 2006-2007

### \*\*\* Distinguished Lecturers

Speaker/Affiliation	Title of Lecture	Date
<b>Yang Kuang</b> ** Department of Mathematics and Statistics, Arizona State University	<i>Resource quality dynamics and its implications</i>	9/18/06
<b>C. Zălinescu</b> ** Faculty of Mathematics, University "Al. I. Cuza" Iasi, Romania	<i>Representative Functions and Convergence of Maximal Monotone Operators</i>	9/25/06
<b>Dr. Heinrich Foltz</b> Department of Electrical Engineering, UTPA	<i>Application of Spherical Harmonics and Complex Variables to Determine Bounds on Antenna Performance</i>	11/13/06
<b>Dr. Constantin Onica</b> Indiana University Bloomington	<i>Forced Two Layer Beta-Plane Quasi-Geostrophic Flow: Part I: Long-time Existence and Uniqueness of Weak Solutions, Part II: Time and Space Analyticity</i>	1/18/07
<b>Dr. Jianjun Tian</b> Mathematical Bioscience Institute, The Ohio State University	<i>Mathematical Study of Brain Tumor Therapies</i>	1/19/07
<b>Dr. Arunava Mukherjea</b> University of South Florida	<i>Comments on the Levy Continuity Theorem</i>	1/26/07
<b>Dr. Guoping Zhang</b> Department of Mathematics, UTPA	<i>Smoothing properties of Schrödinger equation with potential superquadratic at infinity</i>	1/29/07
<b>Dr. Jasang Yoon</b> Department of Mathematics, Iowa State University	<i>Reconstruction of the Burger measure when the core of a 2-variable weighted shift is of tensor form</i>	1/31/07
<b>Dr. Ranadhir Roy</b> Department of Mathematics, UTPA	<i>Fluorescence-enhanced optical tomography (molecular imaging)</i>	2/2/07
<b>Dr. Barnabas Bede</b> Department of Mathematics, The University of Texas at El Paso	<i>Fuzzy Differential Equations under Generalized Differentiability</i>	2/9/07
<b>Dr. Lin Wang</b> Department of Mathematics, The University of British Columbia	<i>Travel and Spread of Infectious Diseases</i>	2/15/07
<b>Dr. Lyudmila Sakhanenko</b> Department of Statistics and Probability, Michigan State University	<i>A New Approach to Estimation of Integral Curves and Statistical Problems in Diffusion Tensor Imaging</i>	2/20/07
<b>Dr. Jerome P. Keating</b> Department of Management Science and Statistics, University of Texas at San Antonio	<i>Pitman Closeness as a Criterion in Estimation Theory</i>	2/26/07
<b>Dr. Daniel Stevenson</b> Department of Mathematics, University of California at Riverside	<i>Higher Gauge Theory and the String 2-group</i>	2/27/07
<b>Dr. Kenji Kajiwara</b> Faculty of Mathematics, Kyushu University, Japan	<i>An introduction to the Painlevé systems</i>	3/9/07
<b>Dr. Nghiem V. Nguyen</b> Department of Mathematics, Purdue University	<i>Stability of Solitary Waves</i>	3/19/07

Speaker/Affiliation	Title of Lecture	Date
<b>Dr. Peter Olofsson</b> Department of Mathematics, Tulane University	<i>Multitype Branching Processes: What They Are and How to Make Them Useful</i>	3/20/07
<b>Dr. Mau Nam Nguyen</b> Department of Mathematics, Wayne State University	<i>Nonsmooth analysis of marginal functions and set-valued mappings with applications to optimization and Lipschitzian stability</i>	3/22/07
<b>Professor Earl H. Dowell **</b> William Holland Hall Professor, Former Dean of School of Engineering, Pratt School of Engineering, Duke University	<i>Reduced Order Models In Aeroelasticity, Unsteady Aerodynamic And Molecular Dynamics</i>	3/29/07
<b>Dr. Geraldo Soares de Souza</b> Department of Mathematics, Auburn University	<i>The Space Formed by Special Atoms, Origin, Motivations, Generalizations, Applications and Its importance in Harmonic Analysis</i>	4/19/07
<b>Dr. Chris Eilbeck **</b> School of Mathematical and Computer Sciences, Heriot-Watt University, UK	<i>PDEs and addition formulae associated with trigonal curves</i>	4/20/07
<b>Dr. Goong Chen **</b> Department of Mathematics, Texas A&M University	<i>Atoms, Molecules and the Schroedinger Equation</i>	4/27/07

\*\* Distinguished Lecturers

## XII. Applied Mathematics Seminar Series in 2006-2007

Speaker	Title of Lecture	Date
<b>Dr. Kenichi Maruno</b>	<i>The integrals of a class of higher-order integrable mapping.</i>	9/6/06
<b>Dr. C. Zalinescu</b> (University "Al. I. Cuza" Iasi, Romania)	<i>Continuity properties for the subdifferential and <math>\epsilon</math>-subdifferential of a convex function and its conjugate</i>	9/20/06
<b>Dr. Vladimir Varlamov</b>	<i>Fractional Derivatives of Airy Functions and of Products of Airy Functions</i>	9/27/06
<b>Dr. Zhijun Qiao</b>	<i>Integrable Symplectic Map and Toda Lattice</i>	10/04/06
<b>Dr. Guoping Zhang</b>	<i>Schrödinger equations with potentials superquadratic at infinity"</i>	10/11/06
<b>Dr. Karen Yagdjian</b>	<i>Fundamental Solutions of PDE with multiple characteristics and the Gauss Hypergeometric Function</i>	10/25/06
<b>Dr. Mircea D. Voisei</b>	<i>On the Rockafellar Conjecture</i>	11/01/06
<b>Dr. Ranadhir Roy</b>	<i>Fluorescence-enhanced optical tomography</i>	11/08/06
<b>Dr. Ingo Witt</b>	<i>The weak symbol topology and continuity of Pseudodifferential operators</i>	11/15/06
<b>Dr. Santanu Chakraborty</b>	<i>Global Solutions for a semilinear equation arising from an interesting branching Markov process</i>	11/22/06
<b>Dr. Andras Balogh</b>	<i>Stationary Solutions for a Boundary Controlled Burgers' Equation</i>	11/29/06
<b>Dr. Dambaru Bhatta</b>	<i>Wave Forces on a Vertical Cylinder in Water due to Diffraction</i>	12/06/06
<b>Dr. Daniel N. Riahi</b>	<i>On Mathematical modeling and nonlinear properties of flow in a mushy layer</i>	02/07/07

<b>Speaker</b>	<b>Title of Lecture</b>	<b>Date</b>
<b>Dr. Paul Bracken</b>	<i>The Generalized Weierstrass System in <math>R^3</math> and Application to the Study of Deformations of Surfaces by Means of Integrable Hierarchies</i>	2/14/07
<b>Dr. Zhaosheng Feng</b>	<i>Traveling Wave Phenomena in A Reaction-Diffusion Equation</i>	2/21/07
<b>Dr. Ramendra K. Bose</b>	<i>On a General Nonlinear Variation-like Inequality in Reflexive Banach Spaces</i>	2/28/07
<b>Dr. Bao-Feng Feng</b>	<i>An operator spitting scheme for the peakon and shock-peakon solutions of Degasperis-Procesi equation</i>	3/07/07
<b>Dr. Ranadhir Roy</b>	<i>Automatic differentiation in optical tomography</i>	3/21/07
<b>Dr. Ingo Witt</b>	<i>Green formulas for cone differential operators</i>	3/28/07
<b>Dr. Vladimir Varlamov</b>	<i>Riesz potentials and products of Airy Transforms</i>	4/4/07
<b>Dr. Guoping (David) Zhank &amp; Dr. Zhijun (George) Qiao</b>	<i>The Degasperis-Procesi Hierarchy and Its Solutions</i>	4/11/07
<b>Dr. Anahit Galstyan</b>	<i>Global existence for the on-dimensional semilinear Gellersedt type equation</i>	4/18/07
<b>Dr. Karen Yagdjian</b>	<i>Parametric resonance in the nonlinear wave equations</i>	4/25/07
<b>Dr. Kenichi Marumo</b>	<i>Two-dimensional vector Yajima-Oikawa system</i>	5/02/07

### XIII. Summary

	AY 2006-2007		AY 2005-2006	
	Total Number	Number of Math Faculty Involved	Total Number	Number of Math Faculty Involved
Faculty	52	52	48	48
Tenure	12	12	11	11
Tenure Track	17	17	14	14
Lectures /One Year Lectures	23	23	23	23
Books Published	3	2	4	2
Research Articles Published/ Accepted in National and International Refereed Journals	95	18	86	19
Research Articles Submitted to Refereed Journals for Publication	33	13	41	17
Research Presentations at National and International Meetings and Conferences	58	16	53	18
Presentations at Local, Regional and State Levels	62	18	51	17
Other Professional Activities	71	17	52	9
Funding and Continuing Research and Research Related Grants	16 grants \$652,569	11	15 grants \$827,150	7
Funded and Continuing Teaching, Teaching Related and Other Grants	7 grants \$267,500	2	8 grants \$1,585,173	3
Research and Research Related Grant Proposals Submitted (pending and unfunded)	17 grants \$5,464,688	18	25 grants \$6,049,226	25
Student Research Directed by Faculty Members	13 Students 15 Projects	9	7 Students 11 Projects	7
Student Papers and Presentations	7	6	-	-
Mathematics Colloquium	17	2	19	8
Applied Mathematics Seminars	24	17	24	11
Distinguished Lecture Series	5	-	3	-