TEXAS A&M UNIVERSITY CORPUS CHRISTI

42nd Texas Differential Equations Conference

(42nd TX-PDE)

March 30 - 31, 2019

University Center and Michael and Karen O'Connor Building

Texas A&M University - Corpus Christi

Department of Mathematics & Statistics

Organiser: **Dr. D. Palaniappan (devanayagam.palaniappan@tamucc.edu)**

Co-organisers: Dr. M. Muddamallappa (m.muddamallappa@tamucc.edu)

Mr. Douglas Johnson (douglas.johnson@tamucc.edu)

$$\mathbf{H} = \frac{1}{n}\mathbf{J} + \mathbf{H}_c = \frac{1}{n}\mathbf{J} + \mathbf{X}_C(\mathbf{X}_C'\mathbf{X}_C)^{-1}\mathbf{X}_C'$$

$$g(x) = \frac{1}{\sqrt{2\pi}} e^{-x^2/2}, \quad -\infty < z < \infty$$

$$\rho c_P \frac{\partial T}{\partial t} - \nabla(k\nabla T) = \dot{q}_v$$

$$\frac{\partial u}{\partial t} - \alpha\nabla^2 u = 0$$

$$\left[\int_{-\infty}^{\infty} e^{-x^2} dx \int_{-\infty}^{\infty} e^{-y^2} dy\right]^{1/2} = \left[\int_0^{2\pi}\int_0^{\infty} e^{-r^2} r\, dr\, d\theta\right]^{1/2} = \left[\pi \int_0^{\infty} e^{-u} du\right]^{1/2} = \sqrt{\pi}$$

$$\nabla \cdot \nabla\psi = \frac{\partial^2\psi}{\partial x^2} + \frac{\partial^2\psi}{\partial y^2} + \frac{\partial^2\psi}{\partial z^2}$$

$$= \frac{1}{r^2 \sin\theta}\left[\sin\theta \frac{\partial}{\partial r}\left(r^2 \frac{\partial\psi}{\partial r}\right) + \frac{\partial}{\partial\theta}\left(\sin\theta \frac{\partial\psi}{\partial\theta}\right) + \frac{1}{\sin\theta}\frac{\partial^2\psi}{\partial\varphi^2}\right]$$

$$\bar{A}\,{}^{p_1 \cdots p_m}_{q_1 \cdots q_n} = \frac{\partial \bar{x}^{p_1}}{\partial x^{i_1}} \cdots \frac{\partial \bar{x}^{p_m}}{\partial x^{i_m}} \frac{\partial x^{j_1}}{\partial \bar{x}^{q_1}} \cdots \frac{\partial x^{j_n}}{\partial \bar{x}^{q_n}} \bar{A}\,{}^{i_1 \cdots i_m}_{j_1 \cdots j_n}$$

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots, \quad -\infty < x < \infty$$

$$\bar{\varepsilon}_{pqr} = J^{-1} \frac{\partial x^i}{\partial \bar{x}^p} \frac{\partial x^j}{\partial \bar{x}^q} \frac{\partial x^k}{\partial \bar{x}^r} \varepsilon_{ijk}$$

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L}\right)$$

42nd Texas-Differential Equations Conference
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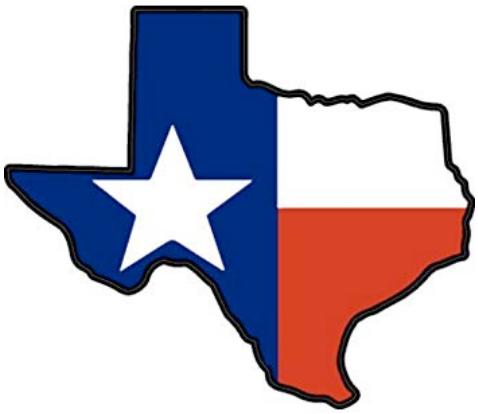

University Center (UC) and Michael & Karen O'Connor (OCNR) Building

March 30, Saturday, UC-Ballrooms

8:00 am – 8:45 am	Breakfast and Conference Registration UC – Lone Star-C
8:45 am – 9:00 am	Welcome (UC-Anchor Ballroom-A) **Dr. D. Palaniappan**, Conference organiser Opening Remarks: **Dr. Frank Pezold**, Dean College of Science & Engineering **Dr. Blair Sterba-Boatwright**, Chair Department of Mathematics & Statistics

March 30, Saturday,
Parallel Session-IA, UC Ballroom-A
Chair: Dr. Changfeng Gui, University of Texas-San Antonio

9:00 am – 9:20 am **Zhaosheng Feng**

The University of Texas- Rio Grande Valley

Implicit solutions to the KDV-Burgers-Kuramoto equation

9:25 am – 9:45 am **Qi Han**

Texas A&M University-San Antonio

Compact embedding results of general Sobolev spaces on R^N

9:50 am – 10:10 am **Giles Auchmuty**

University of Houston

Interior decay of solutions of harmonic boundary value problems

10:15 am – 10:40 am **Coffee Break (UC- Lone Star-C)**

10:40 am – 11:00 am **Changfeng Gui**

The University of Texas – San Antonio

Axially symmetric solutions of Allen-Cahn equation with finite morse index

11:05 am – 11:25 am **Qinfeng Li**

The University of Texas – San Antonio

Some energy estimates for stable solutions to nonlocal Allen Cahn equations

11:30 am – 11:50 am **Yeyao Hu**

The University of Texas – San Antonio

Uniqueness and symmetry of solutions to a mean field equation on tori

March 30, Saturday,

Parallel Session-IB, UC Ballroom-B

Chair: Dr. Zhijun Qiao, UT-Rio Grande Valley

9:00 am – 9:20 am **Du Pham**

The University of Texas – San Antonio

Stochastic solutions of Shigesda-Kuwasaki-Teramoto

9:25 am – 9:45 am **Phuc Nguyen**

Louisiana State University

Pointwise gradient estimates for a class of singular quasilinear equation with measure data

9:50 am – 10:10 am **Youn-Sha Chan**

University of Houston-Downtown

Partial differential equations' point of view of various elasticity theories in fracture mechanics

10:15 am – 10:40 am **Coffee Break (UC- Lone Star-C)**

10:40 am – 11:00 am **Jianxin Zhou**

Texas A&M University

A new augmented singular transform and its partial Newton-Correction method for finding multi-solutions to nonvariational quasilinear elliptic PDEs

11:05 am – 11:25 am **Eleftherios Gkioulekas**

The University of Texas – Rio Grande Valley

The role of the asymmetric Ekman dissipation term on the energetics of the two-layer quasi-geostrophic model

11:30 am – 11:50 am **Neil Jerome Egarguin**

University of Houston

Active control of Helmholtz fields using an array of almost non-radiating sources

12:00 pm – 1:30 pm **Lunch Break (UC- Lone Star-C)**

March 30, Saturday,
Parallel Session-IIA, UC Ballroom-A
Chair: Dr. Jianxin Zhou, Texas A&M University

1:30 pm – 1:50 pm **Zhijun Qiao**

The University of Texas- Rio Grande Valley

Higher order Peakon models

1:55 pm – 2:15 pm **Eric Platt**

University of Houston

An application of EM field control

2:20 pm – 2:40 pm **Diane Denny**

Texas A&M University-Corpus Christi

Existence of a unique classical solution to a quasilinear elliptic equation

2:45 pm – 3:05 pm **Coffee Break** **(UC- Lone Star-C)**

3:05 pm – 3:25 pm **Kun Gou**

Texas A&M University – San Antonio

Pregnant cervix deformation under fiber remodeling and fluid accumulation

3:30 pm – 3:50 pm **Ray Treinen**

Texas State University

On the asymptotic behavior of solutions to Hele-Shaw problems with curvature

3:55 pm – 4:15 pm **Minh-Binh Tran**

Southern Methodist University

On the energy cascade of wave turbulence kinetic equations

4:20 pm – 4:40 pm **Saber Elaydi**

Trinity University

A mathematical model for Alzheimer's disease

March 30, Saturday,
Parallel Session-IIB, UC Ballroom-B
Chair: Dr. Giles Auchmuty, University of Houston

1:30 pm – 1:50 pm **Dambaru Bhatta**

The University of Texas – Rio Grande Valley

Free surface condition due to second order scattering by a pair of cylinders

1:55 pm – 2:15 pm **Baofeng Feng**

The University of Texas – Rio Grande Valley

Complex short pulse equation and its integrable discretization

2:20 pm – 2:40 pm **Max Melnikov**

Cumberland University

Specificity of the Green's function approach to problems arising in applied mechanics and financial engineering

2:45 pm – 3:05 pm **Coffee Break** **(UC- Lone Star-C)**

3:05 pm – 3:25 pm **Roger Knobel**

The University of Texas – Rio Grande Valley

On the reconstruction of unknown viscous damping from spectral data of a vibrating string

3:30 pm – 3:50 pm **Erwin Suazo**

The University of Texas – Rio Grande Valley

On persistence of superoscillations for Schrodinger equation with time-dependent quadratic Hamiltonians

3:55 pm – 4:15 pm **Taoufik Meklachi**

Penn State University - Harrisburg

Resonances of 3D high contrast linear and non-linear media with an asymptotic approximation

4:20 pm – 4:40 pm **George Livadiotis**

Southwest Research Institute

Sunspot evolution as a nonlinear dynamical system

6:00 pm – 8:00 pm **Dinner** **(UC- Lone Star-C)**

March 31, Sunday

Michael and Karen O'Connor (OCNR) Building

8:30 am – 9:00 am	**Breakfast and Conference Registration** **Conference Room 135**

March 31, Sunday,

Session-I, OCNR 115

Chair: Dr. Alexey Sadovski, Texas A&M University – CC

9:00 am – 9:20 am **Alexey Sadovski**
Texas A&M University – Corpus Christi
On spatial-temporal models of multi-species competition

9:25 am – 9:45 am **Saroj Pradhan**
Prairie View A&M University
Human respiratory control system model during exercise at altitude with two control loops and multiple transport delays

9:50 am – 10:10 am **Veena Rao**
Texas A&M University – Corpus Christi
A mathematical model to investigate effects of fishing zone configuration: Application to brown shrimp in Gulf of Mexico

10:20 am – 10:40 am **Coffee Break** **(OCNR 135)**

10:40 am – 11:00 am **Rajeev Kumar**

Texas A&M University – Corpus Christi

Incompressible Navier-Stokes equations solved using a least-squares/Galerkin split finite element method

11:05 am – 11:25 am **Farzana Hussain**

Houston-Tilloston University

Estimation of maximum water levels along east coast of India due to interaction of storm surge and tide- application to cyclone Phailin (2013)

11:30 am – 11:50 am **Gu Guangze**

The University of Texas – San Antonio

Existence of a positive solution to Kirchhoff equations with critical nonlinearities

11:30 am – 11:50 am **Nihal Siriwardana**

Prairie View A&M University

An efficient scheme for solving Navier-Stokes equation