Workshop Program†

The 2nd International Workshop on Nonlinear and Modern Mathematical Physics

9 March - 11 March, 2013
University of South Florida, Tampa, Florida, United States of America

Workshop Sponsors:

The National Science Foundation, USA
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The Organizing Committee:

Members from University of South Florida:

Dr. Wen-Xiu Ma (Chairman), Email: mawx@cas.usf.edu
Dr. Sherwin Kouchekian, Email: skouchekian@usf.edu
Dr. Razvan Teodorescu, Email: razvan@usf.edu

Members from University of Central Florida:

Dr. S. Roy Choudhury (Co-Chairman), Email: roy.choudhury141@gmail.com
Dr. David J. Kaup, Email: kaup@mail.ucf.edu
Dr. Constance Schober, Email: Constance.Schober@ucf.edu

†The speakers are flagged with an asterisk (*) in this workshop program.
Acknowledgements

The organizing committee would like to take this opportunity to thank all colleagues and students who contributed to this workshop.

We are particularly grateful to our administrative specialist Beverly DeVine-Hoffmeyer, who assisted with all travel logistics and reimbursements through USF Travel Module, and to our receptionist Mary Ann Wengyn for coordinating with the area hotels and pulling together information on shuttles and local restaurants. We also thank our college research administrator Sandy Justice for her constructive advice and supervisory guidance to address every aspect of the workshop. Special thanks to CAS Webmaster Michael Abrahams for beautifully crafted web designs, CAS Marketing Director Michele Dye for marketing and communication support, and Staff Accountant Randall Barnett in CAS Dean’s Office for administering online registration payment transactions.

We also thank our research visitors, Dr. Shaowei Liu, Ms. Qiulan Zhao, Dr. Rui Wang and Mr. Xinyue Li, and graduate students, Emmanuel Appiah, Xiang Gu, Morgan McAnally and Solomon Manukure, of Department of Mathematics and Statistics for offering selfless and dedicated service to the workshop.

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The organizing committee:

Members from USF:
Dr. Wen-Xiu Ma (Chairman)
Dr. Sherwin Kouchekian
Dr. Razvan Teodorescu

Members from UCF:
Dr. S. Roy Choudhury (Co-Chairman)
Dr. David J. Kaup
Dr. Constance Schober
Saturday March 9, 2013

Saturday March 9, 2013, 7:30am-8:30am
Auditorium Room - CMC 141
7:30am  Registration
8:00am  Opening ceremony

Saturday March 9, 2013, 8:30am-10:30am
Auditorium Room - CMC 141

Chair: David J. Kaup
8:30am  Tutorial:  *Isochronous systems are not rare*
Francesco Calogero*, University of Rome “La Sapienza”, Italy
9:30am  *Geometric curve flows and integrable systems*
Stephen Anco*, Brock University, Canada
10:00am  *Discrete Schlesinger transformations and difference Painlevé equations*
Anton Dzhamaev*, University of Northern Colorado/Columbia University, USA
Hidetaka Sakai, University of Tokyo, Japan
Tomoyuki Takenawa, Tokyo University of Marine Science and Technology, Japan
10:30am  Coffee Break

Saturday March 9, 2013, 10:45am-12:15pm
Auditorium Room - CMC 141

Chair: Shijun Liao
10:45am  *Lax operators of the exceptional Lie algebras*
Paolo Casati*, Università di Milano-Bicocca, Italy
11:15am  *On the combinatorics of Wronskian-integrable equations*
Shabnam Beheshti*, Rutgers University, USA
Amanda Redlich, Massachusetts Institute of Technology, USA
11:45am  *Soliton solutions of coupled systems by improved-expansion method*
Syed Mohyud-Din*, HITEC University, Pakistan
Muhammad Shakeel, COMSATS Institute of Information Technology, Pakistan
12:15pm  Lunch Break

Saturday March 9, 2013, 2:00pm-4:00pm
Auditorium Room - CMC 141

Chair: Roy Choudhury
2:00pm  **Tutorial:** *Introduction to the Painlevé property, test, and analysis*
Robert Conte*, ENS Cachan et CEA-DAM, France
Micheline Musette, Dienst TENA, Vrije Universiteit Brussel, Belgium

3:00pm  **Geometry and symmetry of the non-commutative Hirota system**
Adam Doliwa*, University of Warmia and Mazury, Poland

3:30pm  *On the inverse scattering transform for the defocusing nonlinear Schrödinger equation with non-vanishing boundary conditions*
Barbara Prinari*, University of Colorado at Colorado Springs, USA
Federica Vitale, Università del Salento, Italy
Francesco Demontis, Cornelis van der Mee, Università di Cagliari, Italy

4:00pm  Coffee Break

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**Saturday March 9, 2013, 4:15pm-7:15pm**
Auditorium Room - CMC 141

Chair: Stephen Anco

4:15pm  **Integrability in non-perturbative QFT**
Alexei Morozov*, Institute of Theoretical and Experimental Physics, Russia

4:45pm  **The concept of quasi-integrability**
Luiz Agostinho Ferreira*, University of Sao Paulo, Brazil
Wojtek J. Zakrzewski, University of Durham, England
Gabriel Luchini, University of Sao Paulo, Brazil

5:15pm  **Blowup solutions for systems of equations in two dimensional spaces**
Lei Zhang*, University of Florida, USA
Chang-shou Lin, National Chung Cheng University, Taiwan
Juncheng Wei, Chinese University of Hong Kong, Hong Kong

5:45pm  **The symmetry group of Lamé’s system**
João Paulo dos Santos*, Keti Tenenblat, University of Brasilia, Brazil

6:15pm  **Positive solutions for a classes of elliptic bi-variate systems with combined nonlinear effects**
Jaffar Ali Shahul Hameed*, Florida Gulf Coast University, USA
Ratnasingham Shivaji, Mississippi State University, USA

6:45pm  **Integrable generalization of the associated Camassa-Holm equation**
Lin Luo*, Shanghai Second Polytechnic University, P. R. China
Sunday March 10, 2013

Sunday March 10, 2013, 8:00am-10:00am
Auditorium Room - CMC 141

Chair: Constance Schober

8:00am Tutorial: The basics of the inverse scattering transform
David J. Kaup*, University of Central Florida, USA

9:00am Symmetry preserving discretization of differential equations and invariant
difference schemes
Pavel Winternitz*, Universite de Montreal, Canada

9:30am Explicit solutions to integrable equations
Tuncay Aktosun*, University of Texas at Arlington, USA

10:00am Coffee Break

Sunday March 10, 2013, 10:15am-12:15pm
Auditorium Room - CMC 141

Chair: Masood Khaliique

10:15am Discrete soliton equation hierarchy
Takao Koikawa*, Otsuma Women’s University, Japan

10:45am Nonlinear self-adjointness and conservation laws for a porous medium equation
Maria Luz Gandarias*, Maria S. Bruzon, University of Cadiz, Spain

11:15am Dissipative solitons in a generalized coupled cubic-quintic Ginzburg-Landau equation
Emmanuel Yomba*, Gholam-Ali Zakeri, California State University at Northridge, USA

11:45am Integrable couplings and matrix loop algebras
Wen-Xiu Ma*, University of South Florida, USA

12:15pm Lunch Break

Sunday March 10, 2013, 2:00pm-4:00pm
Auditorium Room - CMC 141

Chair: Sherwin Kouchekian

2:00pm Tutorial: Holomorphic PDE and potential theory
Dmitry Khavinson*, University of South Florida, USA

3:00pm Boundedness of nonlinear Volterra integro-differential equations
Tingxiu Wang*, Texas A & M University-Commerce, USA

3:30pm Shock creation and Painlevé property of colliding peakons in the
Degasperis-Procesi Equation
Lingjun Zhou*, Tongji University, P. R. China

Jacek Szmigielski, University of Saskatchewan, Canada

4:00pm Coffee Break
A macroscopic system with undamped periodic compressional oscillations

Francesco Calogero*, University of Rome “La Sapienza”, Italy
Francois Leyvraz, Universidad Nacional Autónoma de México, Mexico

Growth problems of Laplacian type and Hurwitz numbers

Anton Zabrodin*, Institute of Theoretical and Experimental Physics, Russia

Structure-preserving methods for damped Hamiltonian PDEs

Brian Moore*, Laura Norena, Constance Schober, University of Central Florida, USA

On peaked solitary waves of KdV, BBM and Boussinesq equations

Shijun Liao*, Shanghai Jiao Tong University, P. R. China

Integrability of differential equations: Double tangent extension method

Lanouar Lazrag*, ENS at LYON, France
Dmitry Khavinson, Razvan Teodorescu, University of South Florida, USA
Alexandre Eremenko, Purdue University, USA

A method for generating Lie algebras and some applications

Yufeng Zhang*, China University of Mining and Technology, P. R. China
Binlu Feng, Weifang University, P. R. China

Connections between HOMFLY polynomials and tau-functions

Andrey Morozov*, Institute of Theoretical and Experimental Physics and Moscow State University, Russia
Monday March 11, 2013

Monday March 11, 2013, 8:00am-10:00am
Auditorium Room - CMC 141
Chair: Paolo Casati
8:00am Tutorial: Constant Gaussian curvature and differential equations
Keti Tenenblat*, University of Brasilia, Brazil
9:00am Exact solutions of bidirectional wave equations
Masood Khalique*, North-West University, South Africa
9:30am On exact solutions in the continuous limits for soliton equations
Yi Zhang*, Zhejiang Normal University, P. R. China
10:00am Coffee Break

Monday March 11, 2013, 10:15am-12:15pm
Auditorium Room - CMC 141
Chair: Pavel Winternitz
10:15am On the nature of large and rogue waves
Mikhail Kovalyov*, Sungkyunkwan University, South Korea
10:45am Dynamical criteria for rogue waves in NLS models
Constance Schober*, University of Central Florida, USA
11:15am On nonlinear Schrödinger equations with magnetic fields
Shijun Zheng*, Georgia Southern University, USA
11:45am Conservation laws for a Kuramoto-Sivashinsky equation with dispersive effects
Maria S Bruzon*, Maria Luz Gandarias, University of Cadiz, Spain
12:15pm Lunch Break

Monday March 11, 2013, 2:00pm-4:00pm
Auditorium Room - CMC 141
Chair: Razvan Teodorescu
2:00pm Tutorial: Ameobas and Ronkin functions of algebraic curves with points
Igor Krichever*, Columbia University, USA
3:00pm Chaos: A bridge between micro-level inherent physical uncertainty and macroscopic randomness
Shijun Liao*, Shanghai Jiao Tong University, P. R. China
3:30pm Localization in linear and nonlinear complex media
Ziad Musslimani*, Florida State University, USA
4:00pm Coffee Break
Monday March 11, 2013, 4:15pm-7:15pm
Auditorium Room - CMC 141
Chair: **Tuncay Aktosun**

4:15pm  *Hirota bilinear equations with linear subspaces of hyperbolic and trigonometric function solutions*

**Xiang Gu**, University of South Florida, USA  
**Hongchan Zheng**, Northwestern Polytechnical University, P. R. China  
**Wen-Xiu Ma**, University of South Florida, USA

4:45pm  *Symbolic and computational tools to study bifurcations in steady state solutions for a class on nonlinear partial differential equations*

**Muhammad Usman**, University of Dayton, USA

5:15pm  *The effects of singular lines in nonlinear differential equations*

**Lijun Zhang**, Zhejiang Sci-Tech University, P. R. China  
**Li-Qun Chen**, Shanghai University, P. R. China  
**Jibin Li**, Kunming University of Science and Technology, P. R. China

5:45pm  *Empirical study on the relationship between China’s grain international trade and grain domestic and foreign prices based on the perspective of food security*

**Rui Wang**, Wuhan Polytechnic University, P. R. China

6:15pm  *A free boundary problem for Laplace’s equation*

**Erik Lundberg**, Purdue University, USA

6:35pm  *Iterative methods for a forward-backward equation*

**Venkataram Vanaja**, University of South Florida, USA

6:55pm  *Binary nonlinearization of a super NLS-mKdV equation*

**Qiulan Zhao**, **Yu-Xia Li**, **Xin-Yue Li**,  
Shandong University of Science and Technology, P. R. China  
**Ye-Peng Sun**, Shandong University of Finance and Economics, P. R. China
Speaker and author index

Aktosun T., 5
Anco S., 3
Beheshti S., 3
Bruzon M. S., 5, 7
Calogero F., 3, 6
Casati P., 3
Chen L. Q., 8
Conte R., 4
Demontis F., 4
Doliwa A., 4
dos Santos J. P., 4
Dzhamay A., 3
Eremenko A., 6
Feng B. L., 6
Ferreira L. A., 4
Gandarias M. L., 5, 7
Gu X., 8
Kaup D. J., 5
Khalique M., 7
Khavinson D., 5, 6
Koikawa T., 5
Kovalyov M., 7
Krichever I., 7
Lazrag L., 6
Leyvraz F., 6
Li J. B., 8
Li X. Y., 8
Li Y. X., 8
Liao S. J., 6, 7
Lin C. S., 4
Luchini G., 4
Lundberg E., 8
Luo L., 4
Ma W. X., 5, 8
Mohyud-Din S., 3
Moore B., 6
Morozov Al., 4
Morozov An., 6
Musette M., 4
Musslimani Z., 7
Norena L., 6
Prinari B., 4
Redlich A., 3
Sakai H., 3
Schober C., 6, 7
Shahul Hameed J. A., 4
Shakeel M., 3
Shivaji R., 4
Sun Y. P., 8
Szmigielski J., 5
Takenawa T., 3
Temenblat K., 4, 7
Teodorescu R., 6
Usman M., 8
van der Mee C., 4
Vanaja V., 8
Vitale F., 4
Wang R., 8
Wang T. X., 5
Wei J. C., 4
Winternitz P., 5
Yomba E., 5
Zabrodin A., 6
Zakri G.-A., 5
Zakrzewski W. J., 4
Zhang L., 4
Zhang L. J., 8
Zhang Y., 7
Zhang Y. F., 6
Zhao Q. L., 8
Zheng H. C., 8
Zheng S. J., 7
Zhou L. J., 5