

Date: 12/10/2018

JSPS US ALUMNI ASSOCIATION SEMINAR PROGRAM  
**REPORT**

Organizer (Awardee)

**Name:** Baofeng Feng

**Position & Affiliation:** Professor, University of Texas Rio Grande Valley

**1. TITLE OF SEMINAR**

Japan Society for the **Promotion** of Science (JSPS) US Alumni 2018 Seminar on  
Recent development in continuous and discrete integrable systems

**2. DATE(S)**

November 30 - December 1, 2018

**3. VENUE & CITY, STATE**

ITT International room 1.102 & EMAGC 2.412, Edinburg campus, UTRGV, Edinburg,  
Texas

**4. TARGETED RESEARCH AREAS**

(1) Integrable systems            (2) Mathematical physics            (3) Nonlinear waves

**5. NUMBERS OF PARTICIPANTS**

TOTAL: 58 persons including 4 US Alumni Association members

-US: 48 persons

-FROM OVERSEAS: 10 person(s) including 2 person(s) from Japan

## **Executive Summary:**

With the support from JSPS Washington office and supplemental support from School of Mathematical and Statistical Sciences and College of Sciences of University of Texas Rio Grande Valley, the JSPS Alumni Association Seminar on Recent Development in continuous and discrete integrable systems could be extended into a two-day event. We invited six outstanding researchers including two Japanese researchers: Dr. Yasuhiro Ohta from Kobe University, Dr. Kenichi Maruno from Waseda University. The goals of the seminar are twofold. One is to strengthen and advance the existing collaborative researches; the other one is to provide new collaborative opportunities among researchers in USA and Japan. During these two-day seminar, the researchers from USA and Japan interacted and exchange ideas for the recent development of integrable systems. Dr. Ohta, Dr. Maruno and I confirmed the joint project on rogue wave solutions in discrete systems and had intensive discussions on the Kadomtsev–Petviashvili (KP) equation of D type and its pfaffian solutions. Several invited speakers are also interested in coming for another similar meeting during winter break in one year. Five UTRGV faculty and one graduate student also made presentations for their most recent research. Four JSPS Fellows including three UTRGV graduate students and one faculty talked their research and culture experiences in Japan. Many graduate students and young researchers benefited a lot from this two-day seminar by learning cutting-edge research in nonlinear waves and integrable systems and knowing information of JSPS-supported research program and opportunities in Japan.

## **Topics Discussed with Outcomes & Future Challenges**

In addition to two Japanese professors, we were able to invite other four professors from the United States: Dr. Peter Miller from University of Michigan, Dr. Gino Biondini from State University of New York at Buffalo, Dr. Barbara Prinari from University of Colorado Colorado Springs and Dr. Vladimir Dragovic from University of Texas-Dallas. The topics discussed in their presentations include:

- Periodic phase solitons for discrete and ultradiscrete systems
- Self-Focusing dynamics with non-zero background: inverse scattering, modulational instability and solitons
- Some Interesting Solutions of the Painlevé-III Equation
- Algebro-geometric solutions to the Schlesinger and Painlevé VI equations
- Discrete solitons for the focusing Ablowitz-Ladik equation with non-zero boundary conditions via inverse scattering transform
- Soliton interactions of the KP and DKP equations and their network

Each of five UTRGV faculties and one graduate students also give a 30-minute presentation, whose topics include:

- Integral transform approach to solving hyperbolic equations in the curved space-times
- Soliton solutions of the modified Laplacian coflow of G<sub>2</sub>-structures on manifolds with symmetry
- Some properties of wronskian solutions of nonlinear differential equations

- The role of the asymmetric Ekman dissipation term on the energetics of the two-layer quasi-geostrophic model
- Restricted partitions: recent results and methods
- A quasi-polynomial decomposition of partitions into at most  $m$  parts and the coefficients of Gaussian polynomials

**Outcomes & Future Challenges:** By presentations and discussions during the seminar, we came to understand that the extreme wave phenomena, especially rogue waves, can be studied from inverse scattering transform and Hirota's bilinear method. The ideas and results from each method are exchanged between the invited speakers and UTRGV faculty. The future challenges will be the exact form for rogue wave solution in discrete systems such as fully discrete NLS equation and the modulational instability in fully discrete systems.

The titles/abstracts of all talks and bio of six invited speakers can be accessed at website:

<https://sites.google.com/view/utrgvjsps/home>



# JSPS AA SEMINAR

“RECENT DEVELOPMENT IN  
CONTINUOUS AND DISCRETE  
INTEGRABLE SYSTEMS”

NOVEMBER 30<sup>TH</sup> - DECEMBER 1<sup>ST</sup>



# JSPS Alumni Association (AA) Seminar on Recent development in continuous and discrete integrable systems

November 30 - December 1 2018  
The University of Texas Rio Grande Valley  
School of Mathematical and Statistical Sciences  
Edinburg, Texas, USA

## Invited Speakers

Gino Biondini, SUNY Buffalo, USA  
Vladimir Dragovic, University of Texas-Dallas, USA  
Kenichi Maruno, Waseda University, Japan  
Peter Miller, University of Michigan, USA  
Yasuhiro Ohta, Kobe University, Japan  
Barbara Prinari, UC Colorado Springs, USA

## SEMINAR PROGRAM

All presentations on November 30, Friday, will be given at International Trade & Technology (ITT) Building Conference Room 1.102 on the Edinburg Campus of UTRGV (**# 2 on the map**). All presentations on December 1, Saturday, will be given at Mathematics and General classrooms (EMAGC) C-STEM 2.412 on the Edinburg Campus of UTRGV (**# 40 on the map**). Breakfast, lunch and refreshment will be provided in both days.

## Local Arrangement Committee

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## Friday, November 30, 2018

<b>09:00-09:30</b>	Light breakfast, Registration	ITT Conference Room
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### Morning Session

<b>09:30-10:00</b>	Opening Remarks <b>Parwinder Grewal (Executive Vice President, UTRGV)</b> <b>Mohammed Farooqui (Dean, COS, UTRGV)</b> <b>Tim Huber (Director, SMSS, UTRGV)</b>	ITT Conference Room
<b>10:00-11:00</b>	<i>Periodic phase solitons for discrete and ultradiscrete equations</i> <b>Yasuhiro Ohta</b> , Kobe University, Japan	ITT Conference Room
<b>11:00-12:00</b>	<i>Self-focusing dynamics with non-zero background: inverse scattering, modulational instability and solitons</i> <b>Gino Biondini</b> , SUNY Buffalo, USA	ITT Conference Room
<b>12:00-13:00</b>	Lunch break	ITT Conference Room

### Afternoon Session

<b>13:00-13:30</b>	<b>JSPS Info Session</b> <i>Paid research opportunities in Japan</i> <b>Yusuke Nakashima</b> , JSPS Washington Office	ITT Conference Room
<b>13:30-14:30</b>	<i>Personal Experience of Stay in Japan as JSPS Fellow</i> <b>Acadia Larsen, Austin Marstaller,</b> <b>Nathalie Luna Rivera, Baofeng Feng</b>	ITT Conference Room
<b>14:30-15:00</b>	Coffee Break	ITT Conference Room
<b>15:00-18:00</b>	<i>Presentations from UTRGV Faculty and Student</i>	ITT Conference Room
<b>18:00-20:00</b>	Dinner	ITT Conference Room

## Saturday, December 1, 2018

<b>09:00-09:30</b>	Light breakfast	EMAGC 2.412
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### Morning Session

<b>9:30-10:30</b>	<i>Some Interesting Solutions of the Painlevé-III Equation</i> <b>Peter Miller</b> , University of Michigan	EMAGC 2.412
<b>10:30-11:30</b>	<i>Algebro-geometric solutions to the Schlesinger and Painlevé VI equations</i> <b>Vladimir Dragovic</b> , University of Texas-Dallas	EMAGC 2.412
<b>11:30-13:00</b>	Lunch break	EMAGC 2.412

### Afternoon Session

<b>13:00-14:00</b>	<i>Discrete solitons for the focusing Ablowitz-Ladik equation with non-zero boundary conditions via inverse scattering transform</i> <b>Barbara Prinari</b> , University of Colorado Colorado Springs	EMAGC 2.412
<b>14:00-15:00</b>	<i>Soliton interactions of the KP and DKP equations and their network diagrams</i> <b>Kenichi Maruno</b> , Waseda University, Japan	EMAGC 2.412
<b>15:00-16:00</b>	<i>Gram determinant solutions to local and nonlocal integrable discrete NLS equations via a pair reduction</i> <b>Junchao Chen</b> , Lishui University, China	EMAGC 2.412

## Schedule of Short Presentations

Friday, November 30, 2018

All short presentations are in ITT Conference Room

<b>15:00-15:30</b>	<i>Integral transform approach to solving hyperbolic equations in the curved space-times</i> <b>Karen Yagdjian</b>
<b>15:30-16:00</b>	<i>Soliton solutions of the modified Laplacian coflow of <math>G_2</math>-structures on manifolds with symmetry</i> <b>Sergey Grigorian</b>
<b>16:00-16:30</b>	<i>Some properties of wronskian solutions of nonlinear differential equations</i> <b>Vesselin Vatchev</b>
<b>16:30-17:00</b>	<i>The role of the asymmetric Ekman dissipation term on the energetics of the two-layer quasi-geostrophic model</i> <b>Eleftherios Gkioulekas</b>
<b>17:00-17:30</b>	<i>Restricted partitions: recent results and methods</i> <b>Brandt Kronholm</b>
<b>17:30-18:00</b>	<i>A quasipolynomial decomposition of partitions into at most <math>m</math> parts and the coefficients of Gaussian polynomials</i> <b>Arturo Martinez</b>