



October 18, 2005

## **06pims003: Stability and instability of nonlinear waves**

### **Organizers:**

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Henderson, Diane, Penn State University, [dmh@math.psu.edu](mailto:dmh@math.psu.edu)

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Segur, Harvey, University of Colorado, [Harvey.Segur@colorado.edu](mailto:Harvey.Segur@colorado.edu)

### **Location:**

University of Washington

### **PIMS Sites:**

University of Washington

### **Objectives:**

Stability plays an essential role in many branches of science and engineering, including several aspects of fluid mechanics, high-speed transmission of information, and feasibility of MHD fusion devices. The objective of the workshop is to give an overview of current state-of-the-art methods for examining stability, as well as to present some widely applicable new techniques. The format will consist of four invited speakers giving a series of lectures at a level understandable to graduate students but useful for researchers from a variety of disciplines, such as mathematics, engineering, biology, etc.

### **Comments:**

As mentioned before, this workshop precedes the bi-annual SIAM conference on Pattern Formation and Nonlinear Waves, 9/9/06-9/12/06. Bernard Deconinck and Jose Nathan Kutz are the local organizers of that conference. We intend to use the presence of that conference, attended by roughly 250 people, as leverage to entice people to attend this workshop on stability. This also allows us to spend the obtained funding on junior people.

The five organizers listed are working together as a focused research group, and have submitted a grant proposal to the NSF requesting funding of their research effort. The budget submitted to NSF requests US\$4000, intended to reimburse the (not local) speakers at the workshop.

The material to be offered at the workshop consists of mathematics that is widely applicable, but is not found in the regular graduate student curriculum. As part of inviting the workshop speakers we will ask them to provide lecture notes for their mini-course. We intend for the collection of these lecture notes to be published, for instance as a volume in the lecture notes of the AMS. This volume should be the starting point for anyone interested in stability of nonlinear waves.

Support for attendees will be awarded based on an application stating (i) the reason for wanting to attend the workshop, and (ii) the potential impact of the workshop on the applicant's research. Graduate students and postdoctoral fellows from PIMS institutions will be especially encouraged to attend.

## **Audience:**

The intended audience for the workshop is graduate students and young researchers interested in stability methods, working in different disciplines on a variety of applications. Immediately following the workshop is the bi-annual SIAM meeting on Pattern Formation and Nonlinear Waves (for the webpage of the corresponding 2004 conference, see <http://www.siam.org/meetings/nw04/>), also at the University of Washington. We expect a large number of researchers to participate in both events. Because of this, we propose not to reimburse tenure-track or senior researchers to attend the workshop. Postdoctoral researchers will receive only US\$300 which should cover the incremental cost of attending the workshop if they are attending the SIAM conference. We propose that graduate students receive US\$500 for the cost of airfare and lodging. A detailed budget is given below.

The workshop will be advertised (using e-mail and web) so as to target the mathematical sciences and other disciplines equally. Graduate students and young researchers from PIMS institutions will be especially encouraged to attend.

## Participants:

Potential topics for mini-courses, with suggested lecturers: (3 names are given for each topic, only one will be invited)

- Introduction to stability of nonlinear waves: Mariana Haragus (Mathematics, France-Comte), Robert Pego (Mathematics, Carnegie Mellon), Keith Promislow (Mathematics, Michigan State)
- Evans functions: Todd Kapitula (Mathematics, U. of New Mexico), Bjorn Sandstede (Mathematics, Surrey), Arnd Scheel (Mathematics, Minnesota)
- Numerical methods: Bernard Deconinck (Applied Mathematics, U. of Washington), Jose Nathan Kutz (Applied Mathematics, U. of Washington), Jens Rademacher (Mathematics, Berlin)
- Nonlinear stability: Darryl Holm (Mathematics, Imperial College, London), Jerrold Marsden (Control and Dynamical Systems, Caltech), Harvey Segur (Applied Mathematics, U. of Colorado)

Four of these speakers have current (Bernard Deconinck and Jose Nathan Kutz) or previous (Jens Rademacher and Keith Promislow) PIMS affiliations.

## Amount Requested:

14740.00

## Expenditures:

The total requested budget requested from PIMS is US\$12500=CAN\$14740. This figure was obtained as described below.

We propose to reimburse graduate students US\$500. This is meant to cover airfare (at most US\$350 to Seattle from anywhere in the US or Canada) and shared accommodations (around US\$50/night). We wish to reimburse postdoctoral researchers US\$300, also to be used towards travel and lodging. Anticipating the participation of 40 students and 10 postdoctoral fellow, this amounts to US\$23000.

An additional US\$2000 will be needed for conference overhead. This is required to cover the cost of room rentals (approximately US\$70/hour), refreshments during breaks, etc.

Note that no monies are requested for the payment of the mini-course lecturers. These funds have been requested from the National Science foundation.

Not including those funds, the required budget amounts to US\$25000. We will request US\$12500 from the VIGRE grant shared between the Applied Mathematics,

Mathematics, and Statistics grants at the University of Washington. Our first overtures towards this have been favorably received. Thus the total amount requested from PIMS is US\$12500.

### **Income:**

- We have applied for a Focused Research Group grant to National Science Foundation. The proposed budget of this grant contains US\$4000 to reimburse the lecturers of the mini-courses.

- We will ask the VIGRE grant shared between the Applied Mathematics, Mathematics, and Statistics grants at the University of Washington for US\$12500. Our first overtures towards this have been favorably received.

### **Selected Dates:**

Wed, September 6, 2006

Fri, September 8, 2006