

## Plenary Speaker

**Dr. Chun Liu**

Pennsylvania State University



### An Energetic Variational Approach for Ionic Fluids and Ion Channels

The interactions of ions flowing through biological systems have been a central topic in biology for more than 100 years. Flows of ions produce signaling in the nervous system, initiation of contraction in muscle, coordinating the pumping of the heart and regulating the flow of water through kidney and intestine. Ion concentrations inside cells are controlled by ion channel proteins through the lipid membranes. In this talk, a continuum model is derived from the energetic variational approach, which include the coupling between the electrostatic forces, the hydrodynamics, diffusion and crowding (due to the finite size effects). The model provides some basic understanding of some important properties of proteins, such as the ion selectivity and sensor mechanism. Transport of charged particles and ions in biological environments is by nature a multiscale and multiphysics problem. I will also discuss the roles of other important ingredients such as those of general diffusion and also the connection between kinetic description and continuum approaches.

## Call for Presentations

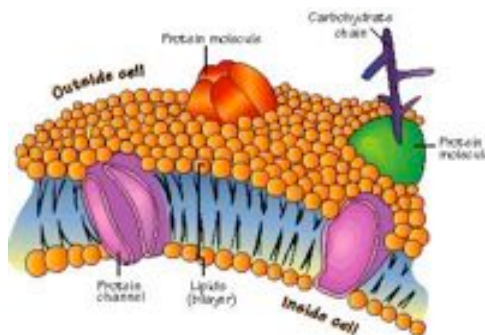
All students (both undergraduate and graduate) are invited to submit abstracts on any research topic in Applied Mathematics. Abstracts should include:

- Title of work to be presented,
- Author's name,
- The university the author is currently attending,
- Names of any advisors or other collaborators,
- An extended description of the research to be presented (of length no greater than 500 words).

**Talks:** Presentation slots are available for 25 minutes (20 minute talk followed by 5 minutes for questions and set-up of the next speaker).

Please send abstracts in LaTeX or plain text to [FRAMSC.abstracts@gmail.com](mailto:FRAMSC.abstracts@gmail.com)

The abstract submission deadline is **Friday, February 26, 2016.**



### 12<sup>th</sup> Front Range Applied Mathematics (FRAM) Student Conference

**University of Colorado Denver**

**SATURDAY  
MARCH 5<sup>TH</sup>, 2016**

#### SPONSORS:

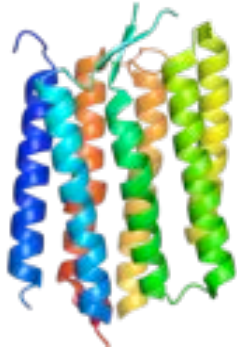
**SIAM STUDENT CHAPTERS AT**  
University of Colorado, Boulder  
University of Colorado, Colorado Springs  
University of Colorado, Denver  
Colorado School of Mines  
Colorado State University  
Colorado College  
University of Wyoming

<http://goo.gl/emgYFD>



## About the conference

The Front Range SIAM Student Chapters are sponsoring the 10th Annual Applied Mathematics Regional Student (aka FRAM) Conference. This event allows students from all universities along the Front Range to learn about new developments in Applied Mathematics and promotes interest in the field. Additionally, this event is open to both undergraduate and graduate students.



## SIAM Student Chapters

Several universities in Colorado host active SIAM Student chapters, with the mission to promote applied mathematics and computational science and to encourage young mathematicians to pursue these fields. Student chapters provide opportunities to share ideas, learn about careers in applied and computational mathematics and develop networks with faculty and fellow students.

## Schedule of Events

The conference is scheduled for Saturday, March 5<sup>th</sup>, 2016, between 8am and 4pm. Exact schedule will be posted on the conference website. Events will include a plenary address, parallel sessions for student presentations (including a special MCM/ICM session) and a poster session.

**Location:** The conference will take place in the North Classroom building, on the Auraria Campus Downtown. For more details and directions, please visit the conference website.

## Contact Information

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## Registration Information

We are requesting a \$10 donation per person to help defray the cost of the breakfast and lunch that will be provided at the conference. To register before the day of the conference, please send the name of the conference attendee and their university affiliation along with a check made out to "CU Denver SIAM Student Chapter" to:

Dr. Henricus Bouwmeester  
Department of Mathematics and  
Statistical Sciences  
University of Colorado Denver  
1201 Larimer Street, 4th Floor  
Denver, CO 80204

If your university has multiple attendees please feel free to submit one check with the registration donation along with a list of the attendees. We strongly encourage registering before the conference date. Registration will also be available from 8:30am to 9:00am the day of the conference.

