

# Welcome to



**Bridging the Gap Between the Geosciences and Mathematics,  
Statistics, and Computer Science**

This program is partially supported by NSF

## Bridging the Gap Between the Geosciences and Mathematics, Statistics, and Computer Science

### Monday, 1 October 2012

- 8:45 am      **Breakfast**
- 9:05 am      **Conference Opening**
- 9:15          "Playing Against Nature: Developing Strategies for Cost-Effective Natural Hazard Mitigation"  
**Seth Stein**
- 9:45          "Advances in Novel Numerical Methodologies for the Geosciences: An Avenue for Developing Collaboration Environments Towards Scientific Discovery"  
**Natasha Flyer**
- 10:15        "Climate Sensitivity, Reduced and Stochastic Models, and Global Climate Model Optimization"  
**Michael Ghil**
- 10:45        **Coffee Break**
- 11:15        "Can Problems in the Geosciences Inspire Fundamental Research in the Mathematical Sciences?"  
**Grady Wright**
- 11:45        "High-Performance Computing in the Geosciences"  
**Dave Yuen**
- 12:15        "Getting Modern Algorithms into the Hands of Working Scientists on Modern Hardware"  
**Matthew Knepley**

12:45–1:45 pm **Lunch at PCTS**

## Bridging the Gap Between the Geosciences and Mathematics, Statistics, and Computer Science

### Monday, 1 October 2012

- 1:45 pm      **Session Opening**
- 1:50          "Maximum-likelihood Methods for Multivariate Multidimensional Processes in Geophysics"  
**Frederik Simons**
- 2:10          "Fault Interaction and Earthquakes in Mid-Continents: A System Approach"  
**Mian Liu**
- 2:30          "TerraFERMA: Advanced Computational Software for Managing and Exploring Coupled Multi-Physics Problems"  
**Marc Spiegelman**
- 2:50          "Self-similar Network Approach to Modeling Complex Geophysical Systems"  
**Ilya Zaliapin**
- 3:10        **Coffee Break**
- 3:40          "Data Assimilation in Geosciences"  
**Adrian Sandu**
- 4:00          "Downscaling, Data Fusion and Data Assimilation: A Variational Framework Based on Regularized Inverse Estimation in the Derivative Space"  
**Efi Foufoula-Georgiou**
- 4:20          "On the Challenges of Statistical Analysis in the Study of Climate Change"  
**Jingfeng Wang**
- 4:40          Plenary Discussion
- 6:00          Session Closing
- 7:00          Hors d'Oeuvres at Mediterra, Cash bar for Alcohol
- 7:30          Dinner at Mediterra  
29 Hulfish Street, Princeton  
(609) 252-9680

## Bridging the Gap Between the Geosciences and Mathematics, Statistics, and Computer Science

### Tuesday, 2 October 2012

- 8:45 am**      **Breakfast**
- 9:15 am**      **Session Opening**
- 9:20            “Nonlinear Methods for Geophysical Imaging”  
**Alison Malcolm**
- 9:40            “A Boundary Perturbation Method for Interface Reconstruction via Constrained Quadratic Optimization”  
**David Nicholls**
- 10:00          “Physical Causes and Modeling Challenges of Anomalous Diffusion of Sediment Tracers”  
**Douglas Jerolmack**
- 10:20          “Coastal Ocean Modeling with Applications to Hurricane Storm Surge and Oil Spills”  
**Clint Dawson**
- 10:40**          **Coffee Break**
- 11:00          “Computational Issues Relating to Inversion of Practical Data”  
**Rosie Renaut**
- 11:20          “Weight Selection when Combining Models with Measurements”  
**Jodi Mead**
- 11:40          “Inverse Problems for Scanning Magnetic Microscopy”  
**Doug Hardin**
- 12:00          “The Inverse Problem of Cryo-Electron Microscopy”  
**Amit Singer**
- 12:20-1:45 pm**   **Lunch at PCTS**

## Bridging the Gap Between the Geosciences and Mathematics, Statistics, and Computer Science

### Tuesday, 2 October 2012

- 1:45 pm**      **Session Opening**
- 1:50            “Expander Graphs: A Key to Robust Geophysical Imaging?”  
**Laurent Demanet**
- 2:10            “Stochastic Earthquake Source Model for California”  
**Dave Jackson**
- 2:30            “Pervasive Multiscale Modeling, Solvers, and Analysis”  
**Jed Brown**
- 2:50            “Advantages and Challenges of Increasing Complexity in Geodynamic Modeling”  
**Margarete Jadamec**
- 3:30**          **Coffee Break**
- 4:00            Plenary Discussion
- 5:00            Session Closing