Workshop on Advancing X-cutting Ideas for Computational Climate Science (AXICCS)

September 12-14, 2016
Hilton Rockville, 1750 Rockville Pike, Rockville, MD 20852

Agenda

Monday, September 12, 2016

<table>
<thead>
<tr>
<th>Start Time</th>
<th>End Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>9:00AM</td>
<td>9:30AM</td>
<td>Welcome</td>
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<tr>
<td>9:30AM</td>
<td>10:30AM</td>
<td>Plenary: Bill Collins, Lawrence Berkeley National Laboratory <em>Climate Simulation at Impactful Scales: Charge for a New Physics Paradigm</em></td>
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<td>10:30AM</td>
<td>11:00AM</td>
<td>Coffee Break</td>
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<tr>
<td>11:00AM</td>
<td>12:30PM</td>
<td>Breakout #1</td>
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Breakout Topic 1A: Climate Science Problems in Coupling
*Moderators: Peter Caldwell and Forrest Hoffman*
Speakers: 40 minutes total
Discussion: 50 minutes
L. Li, Y. Shi, C. Duffy. *Building Computational Bridges Across the Water, Ecosystem, and Soil Biogeochemistry Disciplines*
R. Mills and F. Hoffman. *Machine-learning guided, multi-resolution approaches to high-fidelity representation of global hydrology in ESMs*
H. Waisman, J. Bassis, S. Price, R. Tuminaro and I. Tezaur. *A physics based iceberg calving model coupled with a global ice-sheet flow model for accurate assessment of sea level rise*
M. Hoffman, L. Bertagna, M. Gunzburger, M. Perego and Stephen Price. *Realistic Subglacial Hydrology For Improved Ice Sheet-Climate Coupling and Sea Level Prediction*

Breakout Topic 1B: Climate Model Complexity and Scaling
*Moderators: Ruby Leung and Paul Ullrich*
Speakers: 45 minutes total
Discussion: 45 minutes
M. Allen, M. Branstetter, O. Omitaomu. *Embedded Urban Framework for ACME Regions of Refined Resolution*
P. Bochev, K. Evans, M. Gunzburger and K. Peterson. *Optimization-Based Heterogeneous Numerical Methods: an Abstraction for Mathematically Rigorous Coupling of Earth System Models*
W. Maslowski, A. Roberts, E. Hunke, F. Giraldo and M. Kopera. *Sea Ice Modeling Across Scales at Exascale and Beyond*

Breakout Topic 1C:
*Moderators: Charles Jackson and Michael Prather*
Speakers: 40 minutes total
Discussion: 50 minutes
A. Salinger, E. Phipps and J. Fyke. *Embedded Ensembles*

S. Mahajan, K. Evans and M. Norman. *Expanding the Utility of High-Resolution Global Climate Models via Short Ensembles*

S. Price, M. Perego and G. Stadler. *Optimization and Uncertainty Quantification of Ice Sheet Models*

S. Wang, N. Urban, M. Maltrud and Alexandra Jonko. *Automation of parameterization and structure selection of ocean biogeochemical models*

12:30PM 2:00PM Lunch

2:00PM 2:30PM Outbriefs from Breakout #1 (all)

2:30PM 3:30PM Plenary: Christopher S. Bretherton, University of Washington

*Frontiers in Multiscale and Global Simulation of Boundary Layer Clouds and Their Interactions with Climate*

3:30PM 4:00PM Coffee Break

4:00PM 5:30PM Breakout #2: Math and Computer Science Advances

Breakout Topic 2A: Coupling, PDEs, and linear algebra

*Moderators: Ray Tuminaro and Dan Martin*

Speakers: 45 minutes total

Discussion: 45 minutes

M. Perego, S. Price and A. Salinger. *Next generation implicit solvers and analysis algorithms for ice sheet modeling*

J. Brown. *Higher Standards on the Control of Numerical Accuracy*

M. Norman. *New Temporal and Spatial Algorithms for Atmospheric Climate Models*

Breakout Topic 2B: Optimization and Statistics

*Moderators: Stefan Wild and George Ostrouchov*

Speakers: 40 minutes total

Discussion: 50 minutes

O. Ghattas and G. Stadler. *From Data through Inference to Optimization under Uncertainty: Towards End-to-End Climate Model-Based Decision-Making*

J. Ray, L. Swiler, G. Pau, G. Bisht, F. Hoffman, M. Huang, Z. Hou and X. Chen. *Improving predictive capability of land surface models through robust statistical calibration techniques*

N. Urban. *Climate Model Uncertainty Quantification*

Breakout Topic 2C: Computational Performance and Data Management

*Moderators: Sam Williams and Kerstin Kleese Van Damm*

Speakers: 40 minutes total

Discussion: 50 minutes

P. Ullrich, G. Jost, B. Lelbach and H. Johansen. *Exascale-Ready Programming Models for Climate*

D. Wang, O. Hernandez, G. Lopez and F. Winkler. *Compiler-based software analysis toolkit for climate model development*

5:30PM 7:00PM Poster Session
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**Agenda**

**Tuesday, September 13, 2016**

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<tr>
<td>9:00AM</td>
<td>9:30AM</td>
<td>Outbriefs from Breakout #2 (all)</td>
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<tr>
<td>9:30AM</td>
<td>10:30AM</td>
<td>Plenary: <strong>Petros Koumoutsakos</strong>, ETH Zurich, Switzerland <strong>The Art of Computational Science: Closing Gaps, Forming Alloys</strong></td>
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<td>10:30AM</td>
<td>11:00AM</td>
<td>Coffee Break</td>
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<td>11:00AM</td>
<td>12:30PM</td>
<td>Breakout #3: Climate Response to Math and CS Ideas</td>
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<td><strong>Breakout Topic 3A:</strong> Same as 1A</td>
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<td><strong>Breakout Topic 3B:</strong> Same as 1B</td>
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<td><strong>Breakout Topic 3C:</strong> Same as 1C</td>
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<tr>
<td>12:30PM</td>
<td>2:00PM</td>
<td>Lunch</td>
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<td>2:00PM</td>
<td>2:30PM</td>
<td>Outbriefs from Breakout #3 (all)</td>
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<tr>
<td>2:30PM</td>
<td>3:30PM</td>
<td>Plenary: <strong>George Mozdzynski</strong>, European Centre for Medium-Range Weather Forecasts, UK <strong>Addressing Future Scalability and Power Challenges at the European Centre for Medium-Range Weather Forecasts (ECMWF)</strong></td>
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<td>3:30PM</td>
<td>4:00PM</td>
<td>Coffee Break</td>
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<tr>
<td>4:00PM</td>
<td>4:30PM</td>
<td>Wrap-up</td>
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Wednesday, September 14, 2016

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<tr>
<td>8:30AM</td>
<td>1:00PM</td>
<td>PC Only Report Writing</td>
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