2019 GFDL External Review Agenda
Oct. 29-31, 2019

Day 0: Monday Evening, Oct. 28
7:00 pm  Dinner for Review Panel* only (at hotel (Library))

Day 1: Tuesday, Oct. 29 (Taylor Auditorium, Frick Laboratory, Princeton University)
7:00-7:55am Closed Session: Breakfast (Review Panel with OAR leadership at hotel (Library))
8:00am Shuttle transport from Nassau Inn to Princeton (Review Panel with OAR leadership)

[7:50 am Homewood Suites Shuttle departs for Frick Laboratory]

Welcome & Introductory Talks
8:15-8:35am Remarks from OAR leadership
8:35-8:40am Logistics – Whit Anderson
8:40-9:20am Opening remarks and State of GFDL – V. Ramaswamy

THEME 1: Modeling the Earth System (Co-Chairs: Leo Donner, Kirsten Findell)
9:20-9:35am Theme 1 Overview - Mike Winton
9:35-9:55am FV3 at GFDL and beyond - Lucas Harris
9:55-10:15am MOM6, SIS2, and OM4 (ocean-ice components of CM4) – Alistair Adcroft
10:15-10:35am New generation atmospheric model AM4 and Cloud-Climate Initiative – Ming Zhao
10:35-10:55am Break
10:55-11:15am Land model component and land-climate interactions – Elena Shevliakova
11:15-11:35am Atmospheric chemistry-composition in GFDL models – Vaishali Naik
11:35am-12:05pm CM4 and ESM4 – John Dunne
12:05-12:40pm Discussion (Leaders: Mike Winton and Isaac Held)

12:40-1:40pm Lunch

* Members of the Review Panel, see Appendix A
THEME 2: Advancing the Understanding of the Earth System: Phenomena, Processes, Variability and Change (Co-Chairs: Larry Horowitz, Sonya Legg)

1:40-1:55pm Theme 2a Overview (Atmosphere & Land focus) - Yi Ming
1:55-2:10pm Radiative impacts of aerosols and greenhouse gases – David Paynter
2:10-2:25pm Chemistry climate interactions – Fabien Paulot
2:25-2:40pm Land-biosphere feedbacks on air quality – Meiyun Lin
2:40-2:55pm Land-coastal ocean interactions - Minjin Lee
2:55-3:10pm Stratospheric processes and impacts – Pu Lin
3:10-3:35pm Discussion (Leader: Larry Horowitz)

3:35pm-3:55pm Break

3:55-4:10pm Theme 2b Overview (Ocean & Cryosphere focus) - Rong Zhang
4:10-4:25pm Mixing for the ocean surface boundary layer and WAVEWATCH III model – Brandon Reichl
4:25-4:40pm Understanding future ENSO risks – Andrew Wittenberg
4:55-5:10pm Interactions between ocean and ice-sheets/icebergs – Olga Sergienko
5:10-5:30pm Discussion (Leader: Sonya Legg)

5:30pm Reception/ dinner begins

5:45-6:45pm: Closed Poster Session I (Theme 1 and 2, see Appendix B). Coordination by Tim Marchok and Catherine Raphael.

6:45-7:45pm Review Panel with Early-Mid Careers from Themes 1 & 2 (Closed Session, see Appendix C).

Shuttle to Nassau Inn at 8:00 pm
Shuttle to Homewood Suites at 6:45 and 8:00 pm
Day 2: Wednesday, Oct. 30 (Taylor Auditorium, Frick Laboratory, Princeton University)
7:00-8:00am **Closed Session: Breakfast** (Review Panel at hotel (Library), tentatively with GFDL Director and Deputy Director)
8:00am Transport from Nassau Inn to Princeton University (Shuttle for Review Panel)

[7:50 am Homewood Suites Shuttle departs for Frick Laboratory]

**THEME 3: Earth System Predictions and Projections** (Co-Chairs: Xiaosong Yang, Matt Harrison)

- **8:20-8:40am** Overview: seamless predictions and projections of the Earth’s climate system – Tom Delworth
- **8:40-8:55am** Unified global and regional weather prediction at medium and short-range timescales – Jan-Huey Chen
- **8:55-9:10am** Subseasonal to Seasonal (S2S) prediction - Baoqiang Xiang
- **9:10-9:25am** North American Multi-Model Ensemble (NMME) and associated predictions – Nat Johnson
- **9:25-9:40am** Hydroclimate variability, predictability, and extremes – Sarah Kapnick
- **9:40-9:55am** Tropical cyclone prediction and attribution – Hiroyuki Murakami
- **9:55-10:10am** Next generation initialization system for predictions – Feiyu Lu

10:10-10:30am Break

- **10:30-10:45am** Arctic sea ice prediction and predictability– Mitch Bushuk
- **10:45-11:00am** Seasonal to multiannual marine ecosystem predictions – Charles Stock
- **11:00-11:15am** Southern Ocean decadal variability and predictability – Liping Zhang
- **11:15-11:30am** Sea level rise, ocean heat uptake, and climate change – John Krasting
- **11:30-11:45am** Future ocean warming and impacts on U.S. Northeast fisheries– Vincent Saba

11:45am-12:15pm Discussion (Leaders: Tom Delworth, Lucas Harris)

12:15-12:45pm Review Panel meets with **Early-Mid Careers from Theme 3** (see Appendix C).

12:45-1:45pm Lunch. Review Panel meets with **Recent Arrivals at GFDL** (see Appendix D).

1:45-2:45 pm **Closed Poster Session II** (Theme 3 and HPC-related subjects, see Appendix B). Coordination by Steve Garner and Catherine Raphael.
High Performance Computing: Techniques, Technologies and Strategies [Chair: Jeff Durachta]

2:50-3:10pm HPC needs for Earth System Modeling, predictions & projections – V. Balaji
3:10-3:25pm Unified modeling, infrastructure and exascale computing – Rusty Benson
3:25-3:45pm Discussion (Leader: Whit Anderson)

3:45-4:10pm: Break

Climate Assessments & Analysis - (Chair: V. Ramaswamy)
4:15-4:30pm IPCC Ocean and Cryosphere Report - Bob Hallberg
4:30-4:45pm IPCC Land Report - Elena Shevliakova
4:45-5:00pm Overview of CMIP6 at GFDL - Jasmin John
5:00-5:15pm Detection & attribution and Climate Change Assessments - Tom Knutson
5:15-5:30pm Statistical downscaling research and applications - Keith Dixon

5:30pm Open Poster Session – Themes 1, 2, 3, and High Performance Computing

5:35-6:35pm (Closed Session) Review Panel meets with Stakeholders (see Appendix E).
5:35-6:35pm (Closed Parallel Session) Meeting of OAR leadership and subset of GFDL scientists with NOAA Line Office Representatives (see Appendix F)

6:35 pm Shuttle from Frick Lab to Prospect House
6:45pm Reception and Dinner at Prospect House
   V. Ramaswamy and Whit Anderson, MC’s
   Remarks by Pablo Debenedetti, Dean of Research, Princeton University
   Brief presentations with animations:
   Xi Chen: "An Earth Story for Next-Gen Modeling"
   Paul Ginoux: "World Top Cup, the Final: Dust versus Black Carbon"
Shuttle from Prospect House to Nassau Inn at 9:00 pm
Shuttle from Prospect House to Homewood Suites at 9:00 pm
**Day 3: Thursday, Oct. 31** (GFDL, Forrestal Campus, Princeton)

7:00am **Closed Session: Breakfast** (Review Panel at hotel (Library))
7:50 am Transport to GFDL (Shuttle for Review Panel, carpool for others)

**Closed Sessions**

Smagorinsky Room

8:15-9:00am Model Development, Implementation and Data Management (see Appendix G).

Room 217

9:00-9:30am Meet with AOS Grad students (see Appendix H).

9:30-10:15am Review Panel with CIMES Leaders (Gabriel Vecchi/Stephan Fueglistaler/Sonya Legg)

10:15-10:35am Break

10:35-10:55am Review Panel with GFDL Administration (see Appendix I).

10:55 -11:40am Review Panel with GFDL Science Board (see Appendix J).

11:40am-12:10pm Wrap-up with OAR DAA, GFDL Director, Deputy Director

12:10-2:15pm Review Panel internal deliberations (and writing) + Lunch Break

2:15-3:15pm Review Panel reflections and report to OAR DAA and GFDL Director and Deputy Director
Appendix A: Review Panel

- Dr. Anjuli S. Bamzai - National Science Foundation (Chair)
- Dr. L. Ruby Leung - Pacific Northwest National Laboratory
- Dr. Masaki Satoh - The University of Tokyo (Japan)
- Dr. Christopher Bretherton - University of Washington
- Dr. Tatiana Ilyina – Max Planck Institut für Meteorologie (Germany)
- Dr. Jean-François Lamarque - National Center for Atmospheric Research
- Dr. William Large - National Center for Atmospheric Research
- Dr. Shang-Ping Xie - Scripps Institution of Oceanography
- Dr. Varavut Limpasuvan (NSF; accompanying Dr. Bamzai)
## Appendix B: Poster Presenters

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<th>Poster Presenter</th>
<th>Theme</th>
<th>Poster Title</th>
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<td>1</td>
<td>Mingjing Tong</td>
<td>1</td>
<td>Improving Initialization of Cloud and Precipitation through All-Sky Radiance Assimilation in FV3GFS</td>
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<td>2</td>
<td>Linjiong Zhou</td>
<td>1</td>
<td>Toward Convective-scale Prediction in the GFDL Global Atmosphere Prediction System</td>
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<td>3</td>
<td>Xi Chen</td>
<td>1</td>
<td>Unlocking New Capabilities in Future Dynamical Core Development</td>
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<td>4</td>
<td>Stuart Freidenreich</td>
<td>1</td>
<td>An Investigation Into Sources of Solar Radiative Parameterization Biases in the Determination of Model Aerosol Instantaneous Radiative Effect (IRE)</td>
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<td>5</td>
<td>Nadir Jeevanjee</td>
<td>2</td>
<td>Why 3% K⁻¹? A Theory for Precipitation Change with Global Warming</td>
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<td>6</td>
<td>Wenhao Dong</td>
<td>2</td>
<td>Simulation and Projection of Indian Monsoonal Low-pressure Systems by GFDL CM4.0</td>
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<td>7</td>
<td>Xiao Liu</td>
<td>2</td>
<td>Simulating Water Residence Time in the Coastal Ocean: a Global Perspective</td>
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<td>8</td>
<td>Yujin Zeng</td>
<td>2</td>
<td>Impact of Asian Irrigation on Water Availability in the Sahel</td>
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<td>9</td>
<td>Jian He</td>
<td>2</td>
<td>Investigation of the Global Methane Budget over 1980–2017 using GFDL-AM4.1</td>
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<td>10</td>
<td>Hoi Ga (Veronica) Chan</td>
<td>2</td>
<td>Snowpack Parameterization Simulating Aerosols Deposition Induced Albedo Reduction</td>
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<td>11</td>
<td>Ray Menzel</td>
<td>2</td>
<td>GRTCODE: A New Line-by-Line Radiative Transfer Model for GPU and MIC Architectures</td>
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<td>12</td>
<td>Spencer Clark</td>
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<td>Monsoon Low Pressure System Like Variability in an Idealized Moist Model</td>
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<td>13</td>
<td>Julius Busecke</td>
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<td>The Equatorial Undercurrent and the Oxygen Minimum Zone in the Pacific</td>
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<td>14</td>
<td>Kun Gao</td>
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<td>Variable-resolution Strategy for Subseasonal Prediction</td>
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<td>15</td>
<td>Matt Harrison</td>
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<td>MOM6 Data Assimilation Interfaces</td>
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<td>16</td>
<td>Xiaosong Yang</td>
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<td>The Development of a Coupled Data Assimilation System Using Only Surface Pressure Observations</td>
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<td>17</td>
<td>Yitian Qian</td>
<td>3</td>
<td>Effect of Anthropogenic Forcing and Natural Variability on the Occurrence of the 2018 Heatwave in Northeast Asia</td>
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<tr>
<td>18</td>
<td>Gan Zhang</td>
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<td>Tropical Cyclone Motion in a Changing Climate</td>
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<td>19</td>
<td>Andrew Ross</td>
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<td>An Assessment of the Predictability of Dissolved Oxygen in Chesapeake Bay Using a Machine Learning Model</td>
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<td>20</td>
<td>John Lanzante</td>
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<td>Are Tropical Cyclones Really Slowing Down?</td>
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<td>21</td>
<td>Sarah Schlunegger</td>
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<td>“ToE-MIP”: Time of Emergence Model Intercomparison Project for Ocean Biogeochemistry</td>
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<td>22</td>
<td>Lori Sentman</td>
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<td>Earth System Implications of a Central American Seaway</td>
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<td>23</td>
<td>Liwei Jia</td>
<td>3</td>
<td>The Role of Atmospheric and Land Initial Conditions on Sub-seasonal to Seasonal Predictions; Improved Simulation of Stratospheric Warming and Its Impact on Surface Climate: The Influence of Model Vertical Resolution</td>
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<tr>
<td>24</td>
<td>Jessica Liptak</td>
<td>HPC</td>
<td>Building a Model Infrastructure for Today's Science and Tomorrow's Supercomputers</td>
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<td>25</td>
<td>Chris Blanton &amp; Aparna Radhakrishnan</td>
<td>HPC</td>
<td>Modeling System Division Workflow Initiatives for Strengthening Research</td>
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Appendix C: Early-Mid Career Scientists
(within approximately 10 years of Ph. D.)

Theme 1 & 2
● Lucas Harris
● Fabien Paulot
● David Paynter
● Meiyun Lin
● Pu Lin
● Minjin Lee
● Brandon Reichl

Theme 3
● Jan-Huey Chen
● Nat Johnson
● Sarah Kapnick
● Hiroyuki Murakami
● Mitch Bushuk
● Liping Zang
● Feiyu Lu

Appendix D: Recent Arrivals
(within the last ~18 months)

● Yongqiang Sun
● Kai-Yuan Cheng
● Yongfei Zhang
● Graeme Macgilchrist
● Gaurav Govardhan
● Marion Albery
● Jake Huff
● Liz Drenkard
● Jessica Luo
● Eric Stofferahn
Appendix E: Stakeholders

- Steve Pacala (Princeton University)
- Steve Pawson (NASA Goddard Space Flight Center)
- Pat Hogan (Naval Research Laboratory Monterey)
- Veronika Eyring (German Aerospace Center (DLR, Germany))
- Laurent White (ExxonMobil)
- Joellen Russell (University of Arizona)
- Arlene Fiore (Columbia University)
- Ming Xue (University of Oklahoma)
- Dave DeWitt (National Weather Service/ Climate Prediction Center)
- Andrew Pittman (University of New South Wales, Australia)

Appendix F: Subset of GFDL scientists to meet with NOAA Line Office Representatives

- Alistair Adcroft
- John Krasting
- Rusty Benson
- Stephen Griffies
- Vaishali Naik
- Leo Donner
- Andrew Wittenberg
- David Paynter
- Keith Dixon
- Matther Harrison
- Paul Ginoux
- Yi Ming
- Lucas Harris
- Elena Shevliakova
- Larry Horowitz
- Robert Hallberg
- Mike Winton
- Sarah Kapnick
- Jeff Durachta
- Jasmin John
- Charlie Stock
- Ming Zhao
- Science Board (see Appendix J)
Appendix G: Model Development, Implementation and Data Management

- Matt Harrison (Lead)
- Huan Guo
- Sergey Malyshev
- Will Cooke
- Fanrong Zeng
- Matt Morin
- Seth Underwood
- Mary Jo Nath

Appendix H: Atmospheric and Oceanic Science Program, Princeton University, Graduate Students

- Jane Smyth [Advisor: Yi Ming]: Understanding the physical controls of monsoon seasonality and its response to climate change in a hierarchy of models.
- Elizabeth Yankovsky [Advisor: Sonya Legg]: Modeling transport and submesoscale mixing of dense flows in the Arctic Ocean.
- Priyam Raghuraman [Advisor: V. Ramaswamy]: Atmospheric radiation, and changes in Earth’s radiation budget due to natural and anthropogenic influences.
- Aaron Match [Advisor: Stephan Fueglistaler]: Buffer Zone of the Quasi-Biennial Oscillation Stratospheric dynamics.
- Michelle Frazer [Advisor: Yi Ming]: Extratropical clouds and humidity, including mixed-phase clouds. Project with Woodrow Wilson School on regional climatic effects of stratospheric aerosol albedo modification (solar geoengineering).
Appendix I: GFDL Administration

- Maria Setzer (Communication Lead)
- Steve Mayle (Administrative Officer)
- John Sheldon (Senior IT Manager)
- Tara McQueen (IT Security Manager)
- Whit Anderson (Deputy Director)
- V. Ramaswamy (Director)

Appendix J: GFDL Science Board

- V. Ramaswamy
- Whit Anderson
- John Dunne
- Tom Knutson
- Rong Zhang
- Tom Delworth
- V. Balaji