

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

4:40-4:55pm Impacts of Southern Ocean circulation on climate and sea level:
Highlighting GFDL and Princeton/SOCCOM collaborations – Steve Griffies

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

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

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 Alberty
- 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

- Houssam Yassin [Advisor: Steve Griffies]: Dynamics of the deep overturning circulation. Mesoscale eddy parameterization.
- Tsung-Lin Hsieh [Advisor: Steve Garner]: Spatial distribution of tropical cyclones in idealized global models.
- 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