# Strategic Implementation Plan (SIP) for a Community-based Unified Modeling System

## *Land Surface Models + Hydrology WG*

*Presented by*

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*Presented at NOAA Community Modeling Workshop*

*April 18-19, 2017; College Park, MD*

# Land WG *Membership*

- *Christa Peters-Lidard (NASA/GSFC) ***
- Tanya Smirnova (ESRL/GSD)
- Fei Chen (NCAR/RAL)
- Elena Shevliakova (OAR/GFDL)
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- Chris Milly (OAR/GFDL)
- *Mike Ek (NWS/NCEP) ***
- Randy Koster (NASA/GSFC)
- Dave Gochis (NCAR/RAL)
- Dave Lawrence (NCAR/CGD)
- Brian Cosgrove (NWS/OWP)
- Xubin Zeng (Univ. Arizona)
- Brent Lofgren (NOAA/GLERL)

- *Co-Chair **

# Land WG
## *Initial Findings*

Consensus points among the Land WG members. Important to represent:

- Seasonal interactions among dynamic vegetation, hydrology, and weather.
- Human influences on surface energy and water budgets, i.e. urban regions, crops, irrigation, water reservoirs/diversions/extraction, fire.
- Energy and water partition across various time and space scales.
- Surface heterogeneity (vegetation, soils, etc) and scale-dependencies.
- Lateral movement of water, hydrology (groundwater/streamflow), estuary modeling, freshwater inflow to oceans.
- BGCs, water quality, and interaction with atmosphere (PBL, chemistry) and other earth system components.
- Lakes (explicit as well as sub-grid and not represented).
- Assimilation of land surface states (soil moisture, snow, vegetation, streamflow).

# Land WG
# *Key issues to resolve*

- Challenging development and R2O environment:
  - Need land-sensitive integrated metrics (2m T,q; 10m u,v; QPF).
  - Biases in upstream physics (radiation, precipitation).
  - Coupling strategies (numerical efficiencies, consistency, data input).
  - Disjointed land approach across systems (CFS, GFS, NAM, HRRR, NWM).
- Communication across NOAA offices and partners.
- Computational resources (access, sufficient, coordinated).
- Coupled model testing requirements as part of a model hierarchy with an “individual component to fully-coupled model” testing paradigm with appropriate benchmark tests at each step.
- Necessary data sets to test/validate each process/component/sub-component in our land model, and other components in a earth-system model more generally.
- System design ensuring support of widely varying end user needs.