



Cyber-Enabling Research, Education and Economic Development

September 23, 2009

5:00 pm **Registration Opens**

6:00–8:00 pm **Research Poster Session and Reception** (Sheridan Room)

Research Posters will be on display until 1:30pm, Sept. 24 in Sheridan Room

September 24, 2009

7:00-8:15 am **Continental Breakfast** (Pactola Room in Convention Center II)

8:30 am **Welcome** (Sylvan I & II)

Jim Rice (Director of SD EPSCoR)
Randy Lewis (Director of WY EPSCoR)
Dave Link (SD REACH Committee Chair)

8:40 am **SD BOR UPDATE** (Gary Johnson, SD BOR)

8:55 am **What we hope to accomplish today (CONCUR)**

- *Provide updates on status of the NSF-funded cyberinfrastructure project*
- *Foster a better understanding of the cyberinfrastructure linkages and interdependencies among schools, colleges, the private sector, economic development and the state*
- *Identify opportunities to strengthen the region's cyberinfrastructure*

9:00 am **Current Status of South Dakota's Cyberinfrastructure – Connectivity and Infrastructure**

- *Status of SD Northern Tier segment/REED (Claude Garelik, SD BOR/RIS)*
- *Status of WY Northern Tier segment/Supercomputer Facility (Bill Gern, UWy)*
- *Connectivity (Vernon Brown, SDN Communications)*

Questions, Answers and Discussion

10:15 am **Break** (Pactola Room)

10:30 am **Current Status of SD's Cyberinfrastructure – Education, Research & Workforce Development**

- *Computational Science/Engineering Research & Education Programs (Kurt Cogswell, SDSU)*
- *Educational programs (Mark Wilson, SD DoEd)*
- *Private Sector (Joe Krizan, Omnitech)*

Questions, Answers and Discussion

11:45 am **Lunch** (Legion I and II)

TRACK ONE

1:00 pm **Breakout Session #1** **SD Cyberinfrastructure Strategic Planning**

The goal of these breakout sessions is to answer the following questions:

- *Where do we want to be in 5 years? 10 years? (Goals)*
- *What steps do we need to take to achieve this?*
- *How could partnerships between and among the sectors support these efforts?*

- A. Infrastructure Development/Connectivity - Status, Goals and Needs** (Mike Adelaine, SDSU, Moderator) *(Harney Peak Room)*
- B. Computational Science & Engineering Research & Education Program Development - Status, Goals and Needs** (CONCUR, Moderator) *(Bear Butte Room)*
- C. Work Force Development - Status, Goals and Needs** (CONCUR, Moderator) *(Badlands Room)*

2:30 PM **Break** (Pactola Room)

- ### 2:45 pm **Report Back and Discussion** (CONCUR) (Sylvan I & II)
- *Report back key themes and findings from each breakout session*
 - *Provide opportunity for meeting participants to comment on and add to breakout session summaries; note cross-cutting themes*
 - *Develop punch list of next steps based on deliberations*

- ### 3:30 pm **Next Steps** (CONCUR) (Sylvan I & II)
- *Brief synthesis of meeting key outcomes*
 - *Discuss meeting summary needs and distribution*
 - *Identify specific assignments and key next steps*

4:00 pm **Meeting adjourns**

Post-meeting follow-up

- *Please provide feedback via the e-survey that will be available at www.sdepscor.org*

TRACK TWO

1:00 pm **Breakout Session #2** (Needles Room) **WY Research Infrastructure Track 1 Proposal Planning**

The goal of this breakout session is to develop research collaborations that will lead to a comprehensive and predictive understanding of how ecosystems will respond to climate change, and how those ecological changes will in turn moderate or exacerbate climate change. This challenge is particularly important in regions of topographically complex terrain, where interactions among atmospheric, ecological, and hydrological systems can change rapidly in short intervals of space and time. This proposal is designed to address the challenge by taking advantage of Wyoming's unique location at the headwaters of three major river systems in North America. The research focuses on climate processes affecting precipitation and snowpack storage in the mountains feeding these rivers. Processes that control orographic snowfall and water availability and their interaction with changing terrestrial ecosystems are poorly understood and not well represented in global climate models. While scientists agree that mean temperatures will increase, current models diverge about the impact of changes in precipitation and runoff. Targeted measurements and regional-scale climate models are thus needed. Factors such as timing and quantity of precipitation, snowmelt, runoff, water loss to sublimation, evaporation, transpiration, and seepage, and diversion of water for agricultural and other uses all affect water availability for Wyoming, downstream states, and the nation as a whole.

Please see "Breakout Session #2 Background Information".

3:00 pm **Adjourn**

Breakout Session #1

Background Information

OVERALL MEETING OBJECTIVES

- Provide updates on status of the NSF-funded cyberinfrastructure project
- Foster a better understanding of the cyberinfrastructure linkages and interdependencies among schools, colleges, the private sector, economic development and the State
- Identify concrete opportunities to strengthen the region's cyberinfrastructure through greater collaboration and cooperation

DISCUSSION OUTLINE

I. Breakout Session Purpose and Approach

- Overview of Goals for Breakout Session
- Identify presenter(s) for reporting back on key findings

II. Guiding Questions (20 minutes each)

- Where do we want to be in 5 years? 10 years? (What are our goals?)
- What steps do we need to take to achieve these goals?
- How could partnerships between and among the sectors support these efforts?

III. Summarizing the Discussion (15 minutes)

- Reporting Back on Key Findings and Themes

Track Two
Breakout Session #2
Background Information

The central objective of the research is to determine how climate change affects mountain ecosystems and their connected ecohydrological processes. The research investigates how biological and physical change at the Earth's surface alters precipitation processes and snowpack dynamics. Specifically, the proposed research will establish the scientific infrastructure to address the following interdisciplinary questions:

1. How do land-atmosphere exchanges of energy and water vary between contrasting ecosystems in close proximity along an elevation gradient?
2. How are cloud formation and precipitation controlled by the land surface (including terrain, vegetation, and soil moisture)? How do seasonal to interannual ecosystem changes affect the energy, moisture and aerosol fluxes that feed clouds and precipitation?
3. How does ecosystem structure and function affect local to regional scale climate variability, particularly snow accumulation and snowmelt dynamics, in water-limited complex terrain?

This project will develop the infrastructure to pursue these questions through an interdisciplinary initiative, Earth System Interactions in Complex Terrain (ESICT), drawing together scientists from the atmospheric, ecological, hydrological, and computational sciences. ESICT focuses on the intersection among these disciplines, but also benefits the respective individual disciplines. The core objective will be pursued via three linked programs. These three programs will:

- Provide instrumentation networks and pioneering measurement techniques for integrating atmospheric, ecological, and hydrological studies of steep environmental gradients;
- Advance computational infrastructure, including human resources, capable of managing and distributing data streams and integrating data with coupled, predictive models;
- Contribute interdisciplinary education and outreach to diverse groups including middle and secondary school, undergraduate and graduate students, resource managers and the public.
- The overall objective of measuring and modeling the complex interactions among ecological, hydrological, and atmospheric processes will be pursued through three integrated and overlapping research-infrastructure initiatives, all of which feed into our educational and outreach programs:
- The **FoSTER (Forest-Steppe and Tundra Ecotones Research)** Observatory will provide an integrated ground-based sensor network, monitoring array, and experimental area spanning the critical transitions between steppe and forest, and forest and tundra.
- The **SOLPIN (Simulations and Observations of Land-Precipitation Interactions)** initiative will examine how the terrestrial biosphere interacts with cloud and precipitation processes. SOLPIN will utilize FoSTER and other land-atmosphere data networks, and will integrate these with information from novel airborne measurement techniques and related numerical experiments.
- The **RCI (Research Computing Initiative)** will directly integrate cyber infrastructure into research by supporting a centrally managed mid-size high-performance computing and data storage facility to provide the computational infrastructure required to manage the data streams from FoSTER and SOLPIN, developing and testing computational models that complement and assimilate the observational data for these projects, and providing a campus wide integrative strategy for computational science.