Perspectives on New Collaborative Areas

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A Strategic Topic of Major Importance to NCAR’s future

• What is the scope of our future research, facilities and service domain?
  – The atmospheric and related sciences, or
  – The full spectrum of environmental sciences and a broadening element of earth-related sciences, or
  – The full spectrum of environmental sciences and relevant social sciences and decision-sciences
The Polarity of Opinions (both are true)

The problems in the atmospheric and related sciences are significant and engaging, more than worthy of a national center that continues to be highly focused

vs.

The problems we face are multi-faceted (understanding weather and climate is only one intersecting component) and the future will be even more deeply tied to gaining a full environmental understanding and connecting it to societal benefit
Add a dose of reality

- We are in a **budget constrained environment** and this may last for a significant period.
- There is **no federal funding agency that effectively enables the cross-over** of the physical sciences much less the physical and social sciences.
- Our **constituency is a clearly defined set of disciplines**.
- So, without multiple changes in external boundary conditions (budget, agency approach to multiple disciplines, constituency), **an internal decision to expand our domain can only occur by deletion** (and negative impacts on constituents) or a different approach.
A second dose of reality

• Our mission is predicated on an approach that is “beyond those that can properly be made available at individual universities”

• So, when does the expertise that we might add in social sciences and decision-making (and many other sciences) exceed this threshold?
The Challenge is Clear

• How do we reasonably reach for the future that everyone knows is going to happen?
  – Without investment in other disciplines from our ATM base
  – Without agencies that enable the cross-over of the relevant disciplines
  – Without the foundation of matching underlying constituents
  – Without exceeding the mission mandate of NCAR
New Collaborations that directly intersect our mission

• Where is our mission most obvious?
  – Large community models
  – Key facilities (computers, airplanes, radars, etc)

• What capabilities are most needed in our intersection with other disciplines?
  – Prediction – the discipline of forecasting – an ability to anticipate the future.
An Example

• Human Health
  – Clear tie to weather and climate
    • Distribution and timing of vectors, “over-wintering” (e.g. mosquitoes), incubation periods, availability of hosts, food availability for hosts, contact with human populations, etc.
    • Heat waves, air pollution, etc.
  – Medical response is “point of service” – reacts to incoming cases (almost no discipline of forecasting)
  – Therefore, real potential if we can design monitoring algorithms or predictive capability
Example: Response based on Occurrence

Pennsylvania West Nile Surveillance Program
County Status

Legend:
- Routine surveillance
- Enhanced surveillance
- Control surveillance
- Virus present
National Lyme disease risk map with four categories of risk

Areas of predicted Lyme disease transmission:
- High risk
- Moderate risk
- Low risk
- Minimal or no risk

Center for Disease Control and Prevention
Potential to Forecast – PA county correlation between Lyme Disease cases and warm days in fall from the prior year (also correlates with fall snow cover in the prior year)

\[ y = 19.998x - 429.36 \]

\[ R^2 = 0.6842 \]
Compelling Problem of major significance

• Is our ability to predict adverse human health outcomes at the stage of weather forecasting in the 50’s?
• Imagine the impact on society if we could anticipate adverse health outcomes and mitigate them
• Added benefit – more capable assessments of human health changes associated with climate change
The Role of NCAR

• **Option A**: Add human health specialists and expand our domain

• **Option B**: Work in the “weather and climate services” framework – focus on providing our data and model output to a key, identified user (the health community) in a utilizable format

• **Option C**: Deliberately define new partnerships (NIH, NCAR-NSF, Universities) to create an independent focus on (Center?) Health and the Environment
Option C: NIH, NCAR-NSF, University Partnership

• **Objective** – bring the discipline of forecasting to the health community

• **Mechanism** – create an intersection between NCAR/community climate and weather forecasting and prediction capabilities and the health community

• **Funding** - Seek NIH, perhaps EPA, funding

• **Expertise** - Health expertise (and center) not at NCAR – NCAR/community is key collaborator
Bottom Line

- Capture the “future” by using our mission to enable other disciplines through deliberate partnerships
- Our internal growth has a clearer litmus test based on the level of connection to our mission
- Health is just one example.

Does it address the realities while still enabling the future that we know we must address?