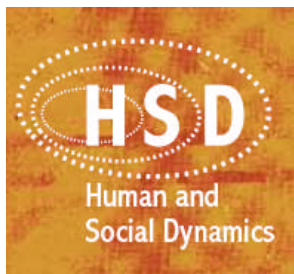




# Breakout Sessions 1: Emergent Themes

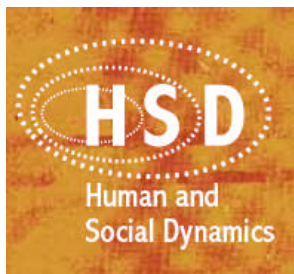
- Session 1 – Cognition, Language, and Modeling
- Session 2 – Decision Making, Risk Perception, and Coordination
- Session 3 – Disasters and Decision Making
- Session 4 – Environmental Dynamics
- Session 5 – Societal, Organizational, and Cultural Dynamics
- Session 6 – Social, Political, and Economic Dynamics





# Language, Cognition, Modeling

- 1. Build a unified, scalable view of coordination across all spatial and temporal scales.
  - Millisecond-by-millisecond coordination between muscles, response to looking at gestures, up to historical and evolutionary time, with unified methodological and conceptual tools
  - Fusion of multiple models from different disciplines.
  - Embodying models in the real world: from neural networks to robots.
- 2. More massive support for infrastructure, where, this might be datasets: recordings of human behavior, recordings of humans talking with one another, etc.





# Language, Cognition, Modeling

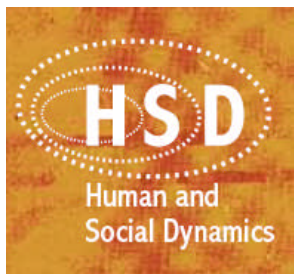
- 3. Support for education at all levels—high school to professors emeriti—to go beyond 19<sup>th</sup> century mathematical tools to emergent models, nonlinearity, etc.
  - Use REU to fund the creation of courses where undergrads can be trained on these methods while they are working with HSD-type data.





# Language, Cognition, Modeling

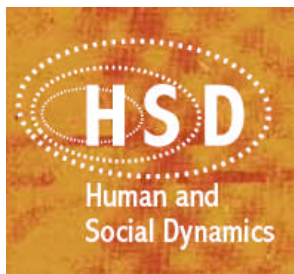
- 4. Integrate empirical data collection with theoretical modeling in an iterative fashion.
  - Infrastructure to allow the integration of these.
- 5. The distinction between the two purposes of modeling.
  - A. Understand how people do something, and use that to solve a problem in society, make predictions
  - B. Build a system that can do as much as possible.





# Decision Making, Risk Perception, and Coordination

- How are decisions made in complex, dynamic systems as they evolve
  - understanding causality and interactions across different levels of analysis
  - how decision makers generate causal explanations
  - role of added informational inputs to the system
- Transdisciplinary implications of the above





# Emerging Trends in Disaster Research

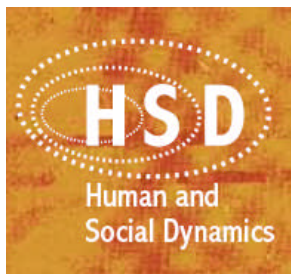
- Increased sophistication in mathematical models; agent-based modeling for decision making under uncertain conditions
- Increasing multidisciplinary in policy-relevant research
- Increasing focus on multiscale problems, policy learning and training





# Environmental Dynamics

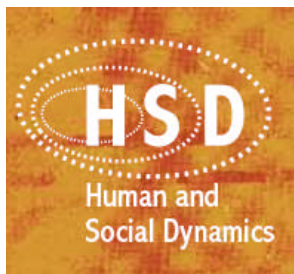
- The dynamic nature of human-environmental interactions mandates that we evolve new research methods that are appropriate for research on these complex systems and their interactions
  - e.g. identifying appropriate units of analysis; integration across scales; integrating different modeling approaches, integration of qualitative and quantitative approaches.
- The potential for systematic data collection for human systems to be integrated with natural system data in order to deal with research aiming for generalizability while recognizing variations across space, time, and organizational scales.





# Environmental Dynamics

- Challenges for conducting basic research in contexts for which policy makers and other stakeholders have very significant desire for immediately useful information.
- The heavy “up-front” costs for developing interdisciplinary collaborations and the potential utility for sharing scientifically based approaches for facilitating interdisciplinary research with researchers.

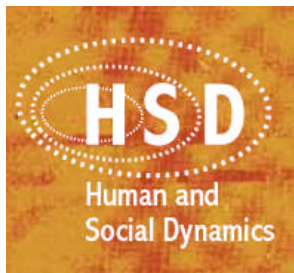






# Societal, Organizational, and Cultural Dynamics

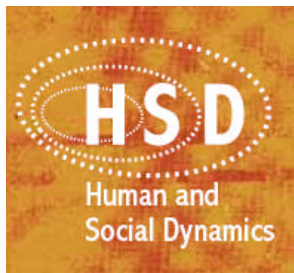
- Multi-level Theories of Social Process
  - Gene & Cultural Co-evolution
  - Environment – Culture – Individual level
  - Emergence
  - Cultural and Social Hierarchies of Knowledge Construction (Distributed Cognition)





# Societal, Organizational, and Cultural Dynamics

- Methodological Advances
  - Integrating mixed method and cross-level data
  - New methods for modeling temporal information
  - New computational approaches
    - Dealing with large data
    - Pattern detection
    - Agent based modeling
- Temporal and Spatial Dynamics
  - Importance of history
  - Importance of location
  - Understanding dynamic processes with different temporal trajectories
- Conflict and Cooperation

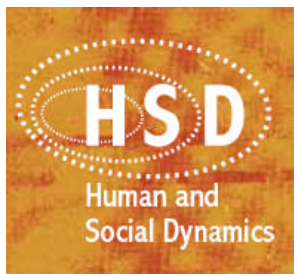




# Social, Political, and Economic Dynamics

## *Summary:*

- **Current Research Themes:** Issues of Scale; Issues of Database management and challenges in non-western locations; temporal data issues. Global social change. Multi-scale analysis.
- **Emergent Research Themes:** use/integration of agent-based models needs more exploration; multi-disciplinary challenges of examining change;
- **Identification of Needs:** need more database development; integration of methods; promotion of interdisciplinary interactions. Communication amongst disciplines. Sustainable research infrastructure. Need more advanced support of analysis that focuses on links. Understand the connection between modeling and observation.





# Social, Political, and Economic Dynamics

## *Main Points:*

- Grand Social-Economic themes
  - Global Social Change
  - Ecosystems
  - Networks
- Focused issues and concerns
  - Multidisciplinary approach to databases
  - Emphasis on methods, tools, models and conceptual framework integration
  - Communicating across disciplines
  - Interaction between academics, policy makers and various other interest/advocacy groups.

