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Computing Research for Sustainability

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Elements of a Computer Science Research Agenda for Sustainability

Efforts required

- Measurement and instrumentation;
- Information-intensive systems;
- Modeling, simulation, and optimization;
- Human-centered systems.



MEASUREMENT AND INSTRUMENTATION



Key factors:

Embedded computing

Digital electronics has expanded in function to include quite general processing, storage and communication capabilities.

Information-rich operation

Automotive instruments helps to subcontrol the operational processes

Cross-system integration

Measurements designed for one system are increasingly being exploited to improve the quality or performance of others.

INFORMATION-INTENSIVE SYSTEMS

Complex systems challenges:

- Big Data
- Heterogeneity of Data
- Coping with the Need for Data Proxies
- Coping with Biased, Noisy Data
- Coping with Multisource Data Streams



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ANALYSIS, MODELING, SIMULATION, AND OPTIMIZATION



Models for technology improvement:

- ❖ Developing and Using Multiscale Models
- ❖ Combining Statistical and Mechanistic Models
- ❖ Decision Making Under Uncertainty

HUMAN-CENTERED SYSTEMS



Main topics:

- Supporting Deliberation, Civic Engagement, Education, and Community Action
- Design for Sustainability
- Human Understanding of Sensing, Modeling, and Simulation
- Tools to Help Organizations and Individuals Engage in More Sustainable Behaviors
- Mitigation, Adaptation, and Disaster Response
- Using Information from Resource-Usage Sensing

Thank you for attention!