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COMPLEX TIME:
Adaptation, Aging, Arrow of Time

Amy P. Chen
Program Manager

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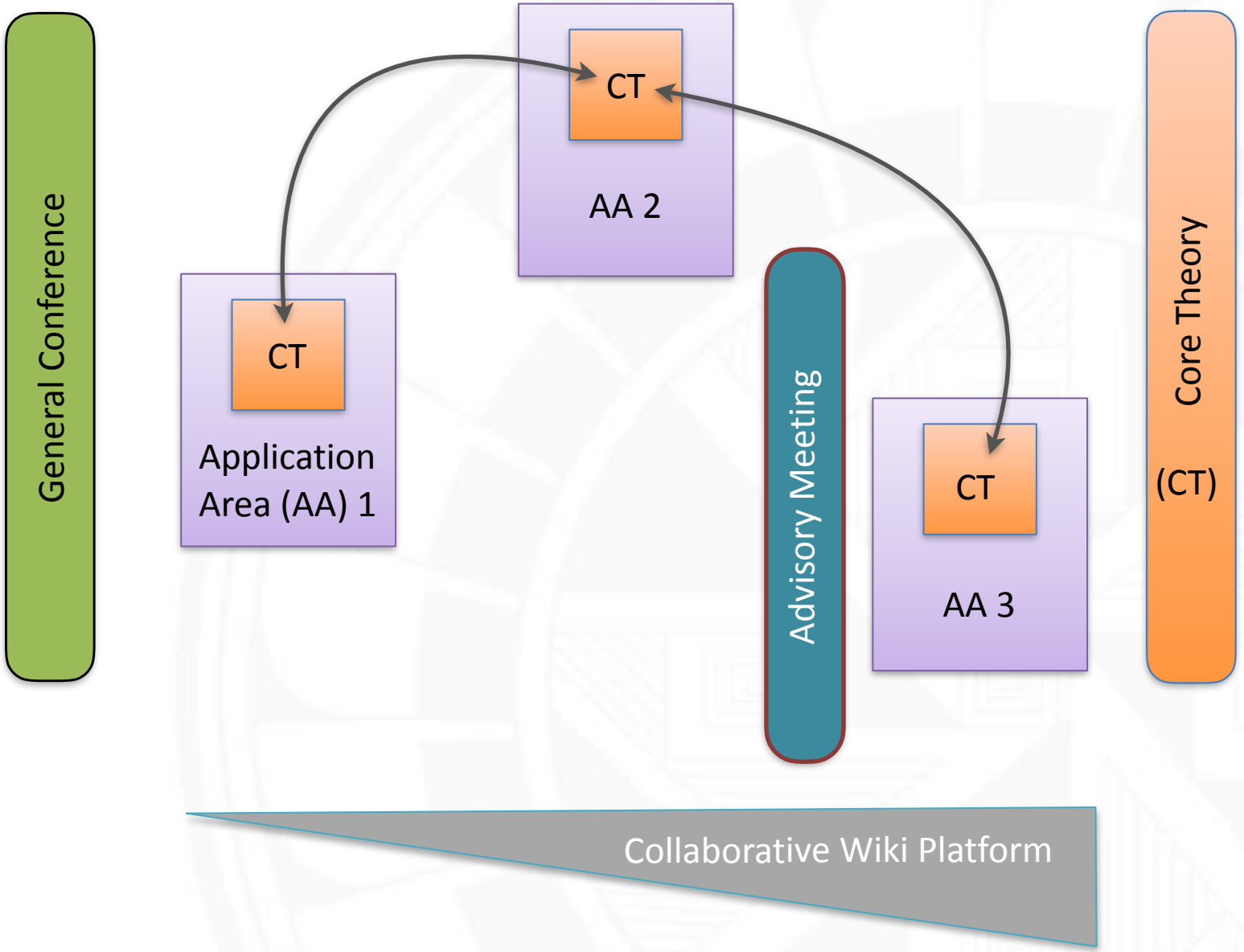
Program Structure



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General Conference

- Provide overview of related fields
- Identify problems for investigation

CT

Application Area (AA)

Form novel, strong collaborative networks capable of significantly advancing research on core topics:

- Based on phenomena related to AAA with strong supporting empirical data & evidences
- Development &/or application of complexity science framework, models, tools to transform understanding
- Suggestion for intervening & controlling the system to minimize/ circumvent loss of structure, order, function

Consolidation of data sets & tools

Core Theory (CT)

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General Conference

The Origin and Implication of Time in Adaptive Systems

June 18-20, 2018

Organizers: Jessica Flack, Sean Carroll, David Krakauer, Jim Hartle

- Fundamentals of time in physical system
  - Arrow of time and cosmology
  - Directional memory & causality <-> time asymmetry
- Origins & construction of timescales in adaptive systems
  - Nested & hierarchical timescale
  - Limits to adaptation & longevity
- Exploitation & control of time scales
  - Role of physical time scale in complex systems
  - Exploitation of periodic information
  - Catalysis in aging phenomena
- Role of information processing & perception
  - time detection principle <-> discounting

Participants: Christopher Jarzynski, Jessica Canton, Jennifer Dunne, Doug Erwin, Jenann Ismael, Malcom MacIver, Dan Schrag, David Wallace, Lin Chao, Coleen Murphy, Eric Smith, Geoffrey West

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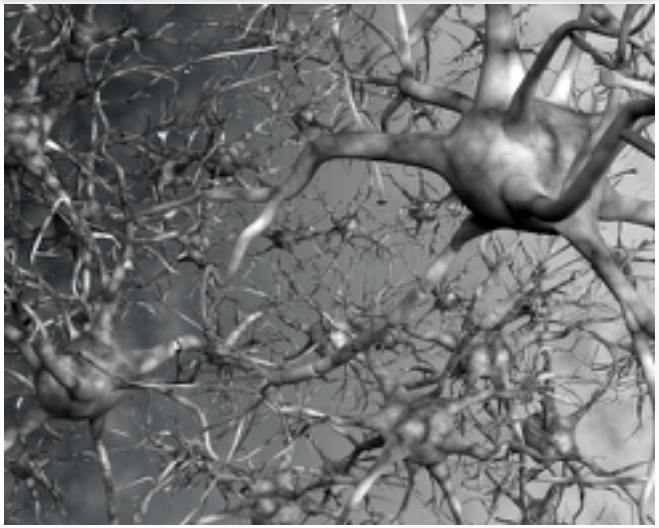
Planned

Application Area (AA)

Aging Brain



Infectious Diseases

Population & Environment

Human Aging

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In progress..

Application Area (AA)

Sleep

Civilization Decline

Ecological Irreversibility

Sociality & Aging

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History, Big History, & Metahistory

David C. Krakauer, John Gaddis, and Kenneth Pomeranz, eds.

Is there a "science of history"? Must historians be scientists? What is "history" anyway? Celebrated scientists and historians debate these complex questions in this thoughtful collection of essays.

SEMINAR SERIES, VOLUME I

2017

The Emergence of Premodern States: New Perspectives on the Development of Complex Societies

Jeremy A. Sabloff and Paula L.W. Sabloff, eds.

Archaeology is experiencing a data deluge. With it, fresh approaches—including agent-based modeling, network analysis, and cultural genotype theory—can probe long-debated questions on the formation of early states.

SEMINAR SERIES, VOLUME II

2018

Worlds Hidden in Plain Sight: The Evolving Idea of Complexity

David C. Krakauer, ed.

From power outages to predicting the future, this volume juxtaposes current SFI research with thirty years of bulletins from the world headquarters in complexity science.

COMPASS SERIES, VOLUME I

2018

The Interplay of Thermodynamics and Computation in Natural and Artificial Systems

David H. Wolpert, Chris Kempes, Joshua A. Grochow, and Peter F. Stadler, eds.

The time is ripe for a new synthesis between nonequilibrium physics, computer science, and biochemistry.

SEMINAR SERIES, VOLUME III

2018

Emerging Syntheses in Science: Proceedings of the Founding Workshops of the Santa Fe Institute

David Pines, ed.

Originally published in 1988, *Emerging Syntheses in Science* was the groundbreaking first publication from the then-nascent Santa Fe Institute. This special anniversary edition features never-before-published transcripts of the founding workshops, this volume lays the foundation for thirty years of complexity science and outlines challenges for thirty more.

with a new foreword by Stephen Wolfram

ARCHIVE SERIES, VOLUME I

2018

Law as Data: Text, Computation, and the Future of Legal Analysis

Michael A. Livermore and Dan Rockmore, eds.

In recent years, the digitization of legal texts and developments in the field of statistics, computer science, and data analytics have opened entirely new methodological approaches to the study of law.

SEMINAR SERIES, VOLUME IV

2018

Patterns Across the Disciplines

Simon DeDeo and Dan Rockmore, eds.

Patterns—quantifiable, textual, conceptual— pervade the sciences and the humanities alike. Ideas collide as fifteen scholars come together in a fruitful debate over the function and meaning of these elusive yet ubiquitous forces.

COMPASS SERIES, VOLUME II

2019

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Collaborative MediaWiki Platform

Santa Fe Institute Collaboration Platform

- Continued collaboration beyond time spent in meeting
- Linkage & continuity of Application Areas
- References, data, code sharing

In your in-box, sender=Wikiworks

https://**centre.santafe.edu**/complextime