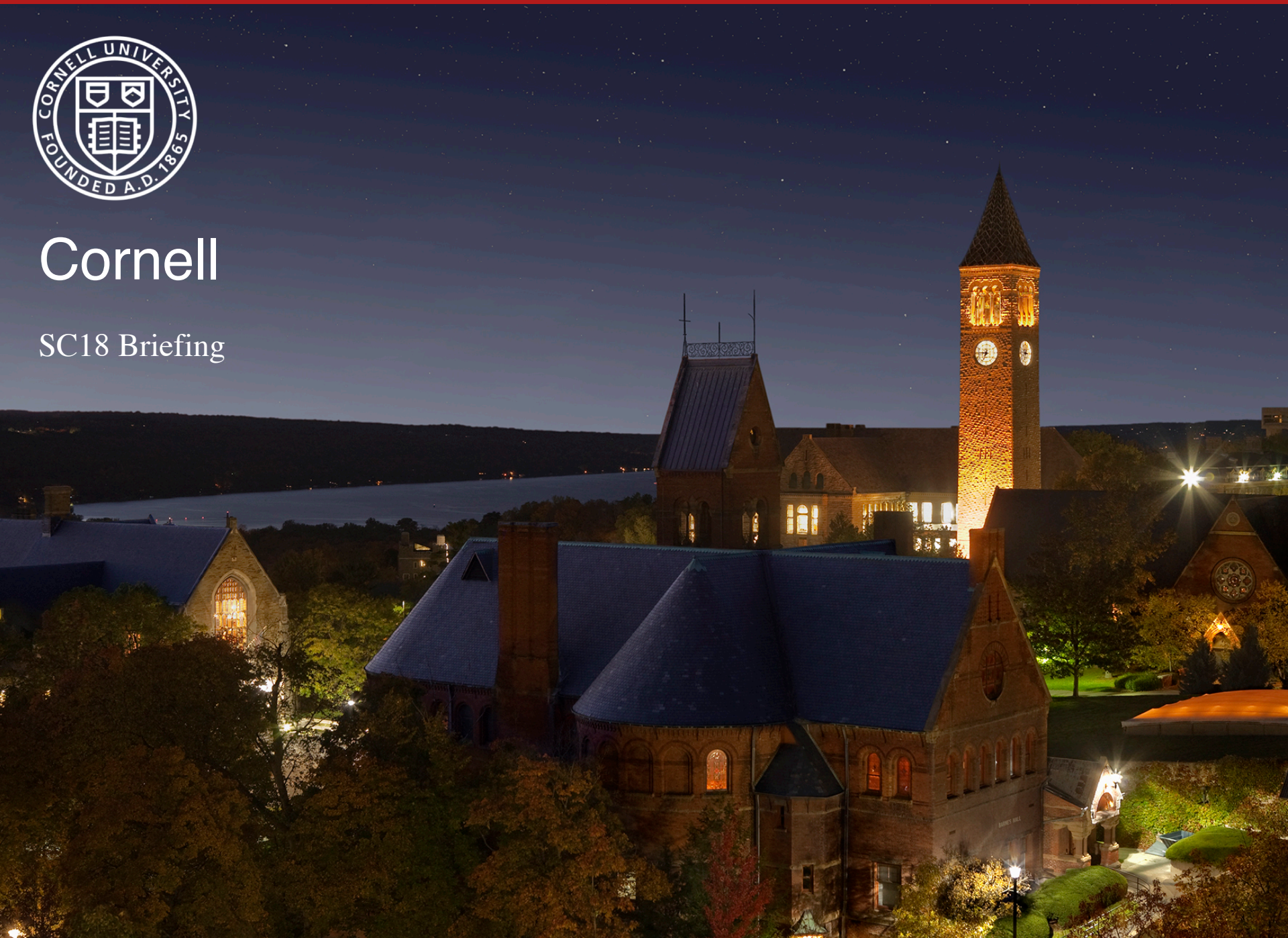


Cornell

SC18 Briefing

Center for Advanced Computing (CAC)

- Mission
  - Deliver advanced computing, training, and consulting services to accelerate discovery and broaden impact
  - Support Cornell faculty with >$100M in research funding from NSF, NIH, USDA, DOE, NASA …
  - Enhance the national cyberinfrastructure ecosystem

CAC

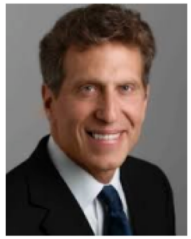
- Most recent NSF awards
  - Multi-Messenger Astrophysics Cyberinfrastructure Planning Lead
  - Institute for Research and Innovation in Software for High-Energy Physics (IRIS-HEP) Software Development Team
  - TACC Frontera Training Partner
  - Aristotle Cloud Federation

Aristotle Cloud Federation

NSF CC*DNI DIBBs project #1541215 (2015-2020)

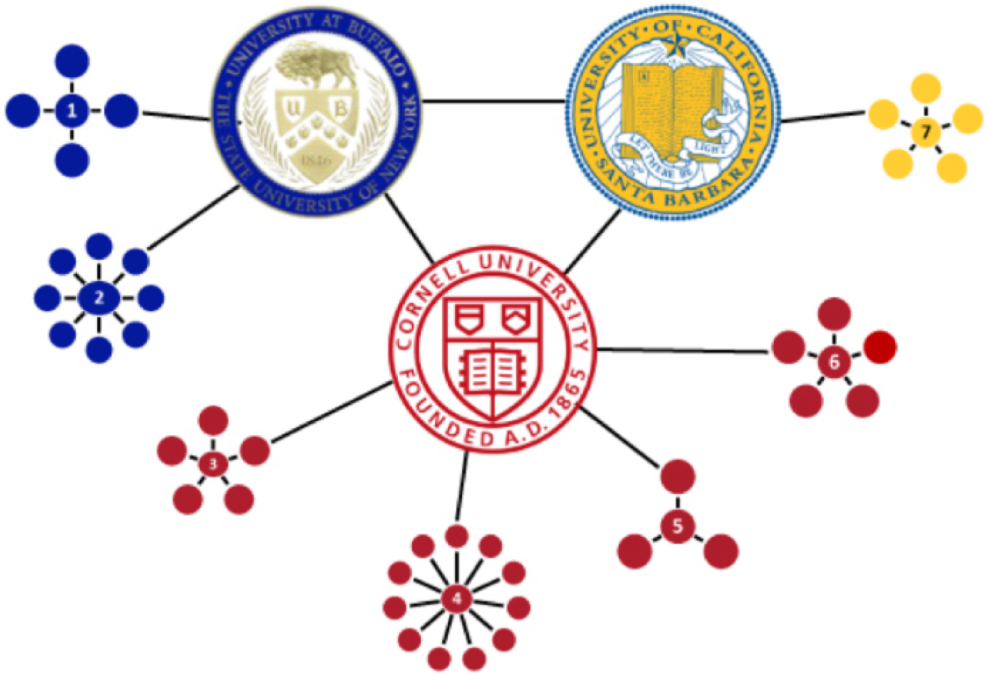
Aristotle leadership team

David Lifka, PhD
PI and Project Director
VP for Information Technologies & CIO
Director, Center for Advanced Computing
Cornell University



Tom Furlani, PhD
Co-PI
Director, Center for Computational Research
University at Buffalo

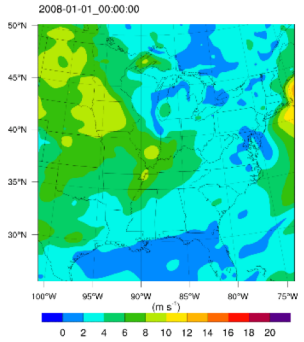
Rich Wolski, PhD
Co-PI
Professor, Computer Science
University of California, Santa Barbara



Aristotle Cloud Federation

- Federated cloud model goals
  - Reduce time to science
  - Share resources between institutions
  - Cross-institution allocations
  - Open XDMoD cloud accounting and metrics
  - Burst to public cloud during peak usage
  - Provide a complete portal interface

federatedcloud.org



Use case simulation

Testing the Model with Aristotle Use Cases

Onboarding Aristotle Use Cases	Use Case Goals
Developed webGlobe interface to visualize and analyze geo spatial data (Chandola)	Model changes in future climate simulations using machine learning algorithms
Developed data framework to compute intraday market efficiency on all U.S. stocks (Roesch)	Enable policymakers to more assess the impact of high-frequency trading on markets
Implemented Docker version of WRF physics model (Pryor)	Improve understanding of wind variability to reduce wind energy project costs and risks
Developed containerized solution with all pulsar processing software (Cordes)	Increase opportunities for astronomers and the public to make discoveries with new survey data
Containerized build scripts to run in MPI across multiple VMs using Docker (Reed)	Execute distributed software faster at cloud scale on Aristotle, XSEDE resources, and public clouds
Constructed multi-species metabolic networks and verified behavior (Douglas)	Exploit animal microbe symbioses to produce pest resistant crops
Developed IoT, edge computing, and cloud technologies for SmartFarms (McCurdy/Krintz)	Increase farm productivity and save resources (e.g., 66% less water used at model vineyard in CA)
Digital humanities (Dartmouth)	New use cases; goals TBA