



C3.ai Digital Transformation Institute Announces AI for Energy and Climate Security Grantees

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C3.ai DTI Awards \$4.4M to 21 Projects to Advance Breakthrough Artificial Intelligence Research for the Energy Sector

URBANA, Ill. & BERKELEY, Calif.--(BUSINESS WIRE)-- C3.ai Digital Transformation Institute ([C3.ai DTI](#)) today announced the second round of C3.ai DTI awards, focused on using artificial intelligence (AI) techniques and digital transformation to advance energy efficiency and lead the way to a lower-carbon, higher-efficiency economy that will ensure energy and climate security.

C3.ai DTI issued this call for proposals in February 2021, and received 52 submissions. A rigorous peer review process led to 21 awards for research proposals to improve resilience, sustainability, and efficiency through such measures as carbon sequestration, carbon markets, hydrocarbon production, distributed renewables, and cybersecurity, among other topics.

The Institute awarded a total of \$4.4 million in cash from this call for proposals, the second call the Institute has released since the organization's launch in March 2020. In addition to cash awards, research teams gain access to up to \$2 million in Azure Cloud computing resources, up to 800,000 supercomputing node hours on the Blue Waters petascale supercomputer at the National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign, up to 25 million computing hours on supercomputers at Lawrence Berkeley National Laboratory's National Energy Research Scientific Computing Center (NERSC), and free, unlimited access to the C3 AI® Suite hosted on the Microsoft Azure Cloud.

"The world's energy infrastructure will need to undergo radical changes to address the impact of global energy generation," said Thomas M. Siebel, chairman and CEO of C3 AI. "In the face of this crisis, the Institute is proud to bring together the best and brightest minds and provide direction and leadership to support objective analysis and AI-based, data-driven science for climate security."

"Pursuing a sustainable future via advances in science and engineering is absolutely critical," said Eric Horvitz, Chief Scientific Officer at Microsoft. "We're deeply enthusiastic to join with the C3.ai Digital Transformation Institute to support frontier research on energy and climate at leading universities."

The 21 projects were each awarded \$100,000 to \$250,000, for an initial period of one year, in one of nine categories, as listed below by project title, principal investigator, and affiliation.

- **Sustainability** - Applying AI, machine learning, and advanced analytics to support sustainability initiatives for energy consumption and greenhouse gas emissions:
 - Learning in Routing Games for Sustainable Electromobility (Henrik Sandberg, KTH Royal Institute of Technology)
 - AI-Driven Materials Discovery Framework for Energy-Efficient and Sustainable Electrochemical Separations (Xiao Su, University of Illinois Urbana-Champaign)
- **AI for Carbon Sequestration** -Applying AI/ML techniques to increase the scale and reduce costs of carbon sequestration:
 - Optimization of Agricultural Management for Soil Carbon Sequestration Using Deep Reinforcement Learning and Large-Scale Simulations (Naira Hovakimyan, University of Illinois at Urbana-Champaign)
 - Affordable Gigaton-Scale Carbon Sequestration: Navigating Autonomous Seaweed Growth Platforms by Leveraging Complex Ocean Currents and Machine Learning (Claire Tomlin, University of California, Berkeley)
- **AI for Advanced Energy and Carbon Markets** - Enabling dynamic, automated, and real-time pricing of energy-generation sources:
 - Quantifying Carbon Credit Over the U.S. Midwestern Cropland Using AI-Based Data-Model Fusion (Kaiyu Guan, University of Illinois at Urbana-Champaign)
 - The Role of Interconnectivity and Strategic Behavior in Electric Power System Reliability (Ali Hortacsu, University of Chicago)
- **Cybersecurity of Power and Energy Infrastructure** - Leveraging AI/ML techniques to improve the cybersecurity of critical power and energy assets, along with smart connected factories and homes:
 - Private Cyber-Secure Data-Driven Control of Distributed Energy Resources (Subhonmesh Bose, University of Illinois at Urbana-Champaign)
 - Cyberattacks and Anomalies for Power Systems: Defense Mechanism and Grid Fortification via Machine Learning Techniques (Javad Lavaei, University of California, Berkeley)
 - A Joint ML+Physics-Driven Approach for Cyber-Attack Resilience in Grid Energy Management (Amritanshu Pandey, Carnegie Mellon University)
- **Smart Grid Analytics** - Applying AI and other analytic approaches to improve the efficiency and effectiveness of grid transmission and distribution operations:
 - Scalable Data-Driven Voltage Control of Ultra-Large-Scale Power Networks (Alejandro Dominguez-Garcia, University of Illinois at Urbana-Champaign)
 - Offline Reinforcement Learning for Energy-Efficient Power Grids (Sergey Levine, University of California, Berkeley)

- **Distributed Energy Resource Management** - Applying AI to increase the penetration and use of distributed renewables:
 - Machine Learning for Power Electronics-Enabled Power Systems: A Unified ML Platform for Power Electronics, Power Systems, and Data Science (Minjie Chen, Princeton University)
 - Sharing Mobile Energy Storage: Platforms and Learning Algorithms (Kameshwar Poolla, University of California, Berkeley)
 - Data-Driven Control and Coordination of Smart Converters for Sustainable Power System Using Deep Reinforcement Learning (Qianwen Xu, KTH Royal Institute of Technology)
- **AI for Improved Natural Catastrophe Risk Assessment** -Applying AI to improve modeling of natural catastrophe risks from future weather-related events (e.g., tropical storms, wildfires, and floods):
 - AI for Natural Catastrophes: Tropical Cyclone Modeling and Enabling the Resilience Paradigm (Arindam Banerjee, University of Illinois at Urbana-Champaign)
 - Multi-Scale Analysis for Improved Risk Assessment of Wildfires Facilitated by Data and Computation (Marta Gonzalez, University of California, Berkeley)
- **Resilient Energy Systems** - Addressing how the use of AI/ML techniques and markets for energy and carbon introduce new vulnerabilities:
 - A Learning-Based Influence Model Approach to Cascading Failure Prediction (Eytan Modiano, Massachusetts Institute of Technology)
 - Reinforcement Learning for a Resilient Electric Power System (Alberto Sangiovanni-Vincentelli, University of California, Berkeley)
- **AI for Improved Climate Change Modeling** -Use of AI/ML to address climate change modeling and adaptation:
 - Machine Learning to Reduce Uncertainty in the Effects of Fires on Climate (Hamish Gordon, Carnegie Mellon University)
 - AI-Based Prediction of Urban Climate and Its Impact on Built Environments (Wei Liu, KTH Royal Institute of Technology)
 - Interpretable Machine Learning Models to Improve Forecasting of Extreme-Weather-Causing Tropical Monster Storms (Da Yang, Lawrence Berkeley National Laboratory)

“From wildfires to rising seas to monster storms crippling our energy systems, increasingly extreme weather clearly represents a severe threat to our economy, infrastructure, and national security,” said S. Shankar Sastry, C3.ai DTI Co-Director and Thomas M. Siebel Professor of Computer Science at the University of California, Berkeley. “Improving climate resilience will require profound changes powered by a new era of technology like those C3.ai DTI is supporting today.”

“A number of energy companies and utilities have used enterprise AI to transform their operations, but as we can see, there’s an even greater need for resilience to cyberattacks and large environmental disruptions,” said R. Srikant, C3.ai DTI Co-Director and Fredric G. and Elizabeth H. Nearing Endowed Professor of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign. “These projects are designed with those goals in mind.”

Award Criteria

C3.ai DTI selects research proposals that inspire cooperative research and advance machine learning and other AI subdisciplines. Projects are peer-reviewed on the basis of scientific merit, prior accomplishments of the principal investigator and co-principal investigators, the use of AI, machine learning, data analytics, and cloud computing in the research project, and the suitability for testing the methods at scale. Visit [C3DTI.ai](https://www.c3.ai/dti) to learn more about the Institute’s programs, award opportunities, and selected research proposals.

About C3.ai Digital Transformation Institute

Established in March 2020 by C3 AI, Microsoft, and leading universities, the C3.ai Digital Transformation Institute is a research consortium dedicated to accelerating the benefits of artificial intelligence for business, government, and society. The Institute engages the world’s leading scientists to conduct research and train practitioners in the new Science of Digital Transformation – operating at the intersection of artificial intelligence, machine learning, cloud computing, internet of things, big data analytics, organizational behavior, public policy, and ethics.

The ten C3.ai Digital Transformation Institute consortium member universities and laboratories are: University of California, Berkeley, University of Illinois at Urbana-Champaign, Carnegie Mellon University, KTH Royal Institute of Technology, Lawrence Berkeley National Laboratory, Massachusetts Institute of Technology, National Center for Supercomputing Applications at University of Illinois at Urbana-Champaign, Princeton University, Stanford University, and University of Chicago. Additional industry partners include AstraZeneca, Baker Hughes, and Shell.

To support the Institute, C3 AI is providing the Institute \$57,250,000 in cash contributions over the first five years of operation. C3 AI and Microsoft will contribute an additional \$310 million of in-kind support, including use of the C3 AI® Suite and Microsoft Azure computing, storage, and technical resources to support C3.ai DTI research.

About C3.ai, Inc.

C3.ai, Inc. (NYSE:AI) is the Enterprise AI application software company that accelerates digital transformation for organizations globally. C3 AI delivers a family of fully integrated products: C3 AI® Suite, an end-to-end platform for developing, deploying, and operating large-scale AI applications; C3 AI Applications, a portfolio of industry-specific SaaS AI applications; C3 AI CRM, a suite of industry-specific CRM applications designed for AI and machine learning; and C3 AI Ex Machina, a no-code AI solution to apply data science to everyday business problems. The core of the C3 AI offering is

an open, model-driven AI architecture that dramatically simplifies data science and application development. Learn more at: www.c3.ai.

**C3.ai DTI Contact**

Kap Stann

Communications Manager, C3.ai DTI @ Berkeley

(510) 295-9685

kstann@berkeley.edu

C3 AI Public Relations

Edelman

Lisa Kennedy

415-914-8336

pr@c3.ai

Investor Relations

ir@c3.ai

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