

## First Call for Proposals

# Mitigation of COVID-19 and Future Pandemics

## Introduction

The C3.ai Digital Transformation Institute (C3.ai DTI) was recently established by C3.ai, Microsoft, the University of California, Berkeley (UC Berkeley), the University of Illinois at Urbana-Champaign (UIUC), Carnegie Mellon University, University of Chicago, MIT, and Princeton University. The goal of the Institute is to catalyze cooperative research activities to accelerate advances in research, combining machine learning (ML), artificial intelligence (AI), the internet of things (IoT), management science, ethics, and public policy to transform and enhance the quality of life in societal systems at large.

C3.ai DTI will develop the new and emerging field of Digital Transformation Science by leveraging the personnel and laboratory and research facilities at UC Berkeley, UIUC, and consortium institutions, to form dynamic teams of the best researchers in the world to interact with faculty and students to advance IoT and AI techniques for industrial, commercial, and public sector applications. This rich ecosystem will help address some of the most complex issues inherent in a massive societal Digital Transformation and to develop the underpinnings of a new Science of Digital Transformation.

## C3.ai DTI Leadership

The Institute is co-hosted at UC Berkeley and UIUC, with S. Shankar Sastry at UC Berkeley and R. Srikant at UIUC as co-Directors, and Costas Spanos at UC Berkeley and Tandy Warnow at UIUC as co-Chief Scientists. Faculty leads at the consortium partners are William Sanders at CMU, Michael Franklin at U. Chicago, Asuman Ozdaglar at MIT, and Vincent Poor at Princeton. One of the main functions of C3.ai DTI is to issue calls for proposals twice a year to provide research awards in the Science of Digital Transformation. More information about the institute can be found at <https://c3dti.ai>.

## Funding

The C3.ai DTI is being funded over the first five years with a \$57,250,000 cash pledge from C3.ai and \$310 million in Azure and C3.ai compute, storage, processing, and AI resources, totaling \$367,250,000 in initial cash and in-kind funding. In addition, significant scientific supercomputing resources are being made available by the National Center for Supercomputing Applications at UIUC and Lawrence Berkeley National Laboratory's National Energy Research Scientific Computing Center (NERSC).

## **First Call for Research Award Proposals**

In the context of the Worldwide COVID-19 Pandemic, the C3.ai DTI is soliciting Research Award proposals that catalyze cooperative research activities and advances in machine learning and other AI subdisciplines, analytics, statistical analysis, and advanced computing research aimed at (1) the current acute challenges with COVID-19 and (2) the methods for containing and addressing pandemics more generally for longer-term preparedness, including for future pathogens and SARS-like viruses. In response to the acute challenges the world is facing with the COVID-19 pandemic, we call for proposals on understanding and mitigating the spread of COVID-19, improving the ability of the public health and medical establishment to respond, and minimizing the impact of this disease on society. These projects could be stand-alone or could leverage existing funded efforts that are already addressing COVID-19 and other pandemics. However, the interests of C3.ai DTI are in the use of AI/ML, data analytics, cloud computing, and change management to mitigate the course and impact of the disease. The C3.ai DTI also has an interest at the intersection of technology and policy, related to digital transformation.

### **Topics for Research Awards may include but are not limited to the following topics:**

1. Applying machine learning/AI methods to mitigate the spread of the COVID-19 pandemic
2. Genome-specific COVID-19 medical protocols, including precision medicine of host responses
3. Biomedical informatics methods for drug design and repurposing
4. Design and sharing of clinical trials for collecting and analyzing data on medications, therapies, and interventions
5. Modeling, simulation, prediction of COVID-19 propagation and efficacy of interventions
6. Logistics and optimization analysis for design of public health strategies and interventions
7. Rigorous approaches to designing sampling and testing strategies
8. Data analytics for COVID-19 research harnessing private and sensitive data, including the role of edge computing/IoT for gathering data
9. Improving societal resilience in response to the spread of COVID-19 Pandemic
10. Broader efforts in biomedicine, infectious disease modeling, response logistics and optimization, public health efforts, tools, and methodologies around the containment of rising infectious diseases, and response to pandemics so as to be better prepared for future infectious diseases.

## **Eligibility**

Principal Investigators for these research award proposals must be researchers from the C3.ai DTI consortium member institutions, but Co-Investigators can be from other institutions. Preference will however be given to projects where the majority of the expenditures occur in the consortium partner universities. C3.ai DTI strongly encourages interdisciplinary and inter-institutional research projects across these institutions as well as leading research institutions around the world.

## **Budget**

Proposals can request research awards of \$100,000, \$250,000 or \$500,000 for a period of one (1) year. Awards will also include unlimited free access to the C3 AI Suite hosted on the Microsoft Azure Cloud including between 225,000 and 1.15 million CPU/GPU hours of compute capacity depending upon grant requirements. It is anticipated that up to \$5.8 million in cash grants will be awarded from the First Call for Proposals. The total amount of funding for the first call, including the cash awards and the in-kind computing support, will be approximately \$73 million. There is a potential for an extension of the award beyond the initial period of performance if needed with reasonable justification and approval. Collaborative research with multiple C3.ai DTI partner institutions is not required, but award proposals that include such collaboration are encouraged. A simple budget is required as per the template attached. Please note that the C3.ai DTI requests that no indirect cost or institutional overhead be charged to the Research Award.

## **Data Sources**

Several COVID-19-related data sets will be pre-loaded into the C3.ai/Azure platform and made available for research purposes to awardees. However, researchers are not restricted to use these data sets; they are encouraged to use any data sets that facilitate their research and to share their data sets with the broader research community when possible. An initial list of preloaded data sets is available at <http://c3dti.ai>.

## **Dissemination of Project Results**

It is preferred that C3.ai DTI Research Award recipients agree to disseminate the results of their research during the award period in publicly accessible repositories and more generally in the open literature for the public benefit. It is preferred that recipients work with the directorate to provide technical reports during and at the conclusion of the Research Award. Due to the rapidly changing COVID-19 environment, it is highly desirable for recipients to agree to provide additional information about their projects during the life of the award. The acknowledgement of the C3.ai DTI support in research products is also desirable.

## **Algorithms and Software Development**

Proposals that will leverage the C3 AI Suite, hosted on Microsoft Azure, will be favored. C3.ai DTI will make available cloud computing resources to enable the utilization of the C3 AI Suite on Microsoft Azure. Additionally, the National Center for Supercomputing Applications (NCSA) at UIUC and the Lawrence Berkeley National Laboratory have agreed to provide additional scientific (super-) computing resources for the C3.ai DTI Research Awards. Technical support for use of Microsoft Azure Cloud, and training and support in the use of the C3 AI Suite will be provided by C3.ai DTI Staff. It is preferred that research award recipients make their algorithms and software publicly available as open source for the public good.

## Review Criteria

Projects will be peer reviewed on the basis of their scientific merit, prior accomplishments by the PI and Co-PIs, the use of AI, machine learning, data analytics, and cloud computing in the research project, and suitability for testing the methods at scale. Projects addressing epidemiology should demonstrate prior research experience and publications in COVID-19 or in closely related epidemiological research. The use of the C3 AI Suite is encouraged for all funded projects, but prior experience with C3 AI Suite is not required. Winners will be provided detailed training support on the use of the C3 AI Suite.

## Instructions for Proposals

Proposals should be submitted via EasyChair: <https://easychair.org/conferences/?conf=c3aidticovid19>. Proposals must be submitted before May 1, 2020 and awards will be announced by early June. However, proposals submitted by April 15<sup>th</sup> will be reviewed for early potential award notification. Proposals should not exceed six (6) pages (not counting the cover page, budget, budget justification, list of personnel and institutions, bio-sketches, or bibliography). The text should have 11 point font and 1" margins. If you need additional information or clarifications, please do not hesitate to contact the faculty leadership of C3.ai DTI.

Submissions must include the following information:

### Project Title

**Project Abstract/Overview.** The goals, objectives, approach, and desired outcomes of the project.

**Research Project Components –** Please ensure that your proposal addresses each of these items.

1. Research impact and impact on societal global health
2. Project methodology
3. Expected research accomplishments
4. Criteria for success
5. Novelty of your approach and why it is likely to be successful
6. The research team's prior research accomplishments in this area.

### C3 AI Suite and Other Computing Resource Requirements

Estimate, if you can, the amount of cloud computing that you may need for evaluating your methods on data sets of scale. Explain as best as you can, how you may be able to use the C3 AI Suite. Also please explain if you need to use the scientific computing resources available from either the National Center for Supercomputing Applications at UIUC or the Lawrence Berkeley National Laboratory.

### List of personnel and Institutions

Provide the names and web pointers to the detailed CVs for the PI and up to 5 other co-PIs or senior investigators. Also, provide a short bio-sketch (around 100 words) of the PI with relevant experience.

## **Budget Request**

Each proposal must contain a budget, and a short budget justification less than a page in length. The following items budget may be included:

- Research personnel
  - Personnel estimates should include the amount of time for faculty, students, post docs, and staff. Benefit costs are allowable and should be included in the budget
- Administrative support
  - A modest amount of administrative support (salary and benefits) may also be included especially on large grants, but this is mainly a research award program.
- Travel, including travel to disseminate the results of the research and visit consortium partners.
- Materials and Supplies
- Other and Miscellaneous
  - If some special equipment is needed or special needs, please add them here and justify.

Awardees are encouraged to solicit additional outside funding to support their research.