



CITRIS and the Banatao Institute 2020 Seed Funding Program

Updated Deadline: **Thursday, September 10, 2020 at 5:00 PM (PDT)**

Program & Application Information: bit.ly/CITRISSeed2020 | Questions: seeds@citris-uc.org

[CITRIS and the Banatao Institute](#) create information technology solutions for society's most pressing challenges. Established in 2001, the Center for Information Technology Research in the Interest of Society (CITRIS) leverages the interdisciplinary research strengths of multiple UC campuses to advance the University of California's mission and the innovative spirit of California. The institute was created to shorten the pipeline between world-class laboratory research and the development of cutting-edge applications, platforms, companies, and even new industries.

We invite Principal Investigators at UC Berkeley, UC Davis, UC Davis Health, UC Merced, and UC Santa Cruz to apply for seed funding that furthers CITRIS and the Banatao Institute research initiatives, strengthens connections among UC campuses, and catalyzes early-stage research that can lead to external funding.

[Funded projects](#) have attracted more than \$60 million in follow-on support from federal, state, corporate, and private sources including the National Science Foundation, National Institutes of Health, Intel, Microsoft, Mellon Foundation, and the Bill & Melinda Gates Foundation.

ALERT: RFP deadline amended on 03.19.20 due to the [COVID-19 pandemic](#).

2020 RFP: Areas of Interest	Core Technology <ol style="list-style-type: none"> 1. Sustainable Infrastructures 2. People and Robots 3. Health Technology & Society <ol style="list-style-type: none"> 4. Policy Lab 5. The Future of Work 6. Women in Technology
Available per Project	\$40,000 to \$60,000
Eligibility	<p>All applicants must have Principal Investigator (or exceptional PI) status on their campus.</p> <p>At least two PIs required per proposal.</p> <p>Each PI comes from a different CITRIS campus: Berkeley Davis Davis Health Merced Santa Cruz</p>

Timeline

- **January 8, 2020: Online application portal opens for submissions.** Link to the portal will be posted on the [CITRIS Seed Funding webpage](#).
- **January 8, 2020:** Call for 2020 CITRIS and the Banatao Institute Seed Fund proposals will be announced online. [CITRIS News Digest](#) subscribers will receive the RFP information by email.
- **January–February 2020:** Each CITRIS campus may host an information session for potential applicants. Dates and details will be posted on the [Seed Funding webpage](#).
- **January–March 2020:** Matchmaking and multi-campus team formation occurs among Principal Investigators. Complete [Team Formation Support Form](#) for assistance with finding compatible co-PIs.
- **March 19, 2020: Deadline extended to fall 2020 due to COVID-19 pandemic.**
- **September 10, 2020 at 5:00pm PDT: Applications are due online.**
- **September 17, 2020:** Applicants who received a Seed Fund Award in 2019 must submit a preliminary report in order to be considered for a Seed Fund Award in 2020.
- **Late October 2020:** Awardees are notified.
- **November–December 2020:** Awardee funds transferred.
- **December 1, 2020:** Performance period begins for 2020 awarded projects.
- **December 31, 2021:** Performance period ends for 2020 awarded projects.
- **January 31, 2022:** Final reports for 2020 Seed Fund Award projects are due.

ALERT: RFP deadline amended on 03.19.20 due to the [COVID-19 pandemic](#).

Eligibility and Proposal Requirements

- To encourage multi-campus collaboration, each proposal must include at least two Principal Investigators from at least two different CITRIS campuses: UC Berkeley, UC Davis, UC Davis Health, UC Merced, UC Santa Cruz.
- Collaborations between PIs on the main UC Davis campus and the UC Davis Health campus in Sacramento fulfill the above requirement.
- Projects are expected to further one or more of the CITRIS and the Banatao Institute research thrusts described below.

Exclusions

- CITRIS Seed Funding may not be used for faculty salary or non-resident tuition.
- Principal Investigators may participate in a maximum of two proposals per application cycle and serve as Lead researcher on a maximum of one proposal per application cycle.
- Principal Investigators who previously received seed funding must submit an online status report for the prior project(s) before being considered for a new CITRIS Seed Fund Award.

Evaluation Criteria

1. **Feasibility:** Can the stated goals be achieved within 12-18 months?
2. **Creates solution to a societal challenge and demonstrates impact:** Is the societal problem and its scale clearly identified? What potential impact will this seed-funded work have on the challenge, field, and/or society?
3. **Potential for follow-on funding:** How will investigators build upon the CITRIS Seed Fund Award outcomes? Has this topic been identified by federal agencies or other funders for future investment? Projects demonstrating a clear path from seed investigation to expanded funding will be rated more favorably. Awardees will be asked to report on resulting proposals.
4. **Alignment with the CITRIS [mission](#) and [research initiatives](#):** Does the proposal advance information technology solutions in one or more of the current CITRIS interest areas described below? Under the charter of the [Banatao Institute](#), applications that benefit developing regions in the U.S. and abroad are also welcome, but not required.
5. **Use of CITRIS and the Banatao Institute research assets** including the [Marvell NanoLab](#), [CITRIS Invention Lab](#), or other CITRIS-affiliated testbeds is encouraged, but not required.
6. **Inclusion of pre-tenured faculty** is highly encouraged, but not required.

Submission Instructions and Requirements

The online application portal can be accessed via the [CITRIS Seed Funding webpage](#). You can submit and manage your applications online when the portal opens on **January 8, 2020**.

You will be guided to create an application management account or log in to your existing account. We recommend that the Lead PI initiates the online account and application for each proposal team, using a campus email address. Any co-PI(s) listed will receive an automated email link to log on and view or edit the joint proposal. Please have the following information ready to complete your online application:

- Name, campus, home department, and CV link for each PI
- Project Title
- Project Summary/Abstract (*250 words max*)
- Project narrative (*1500 words max*): What societal problem does your proposal aim to address? What methodologies or processes will you employ?
- Impact statement (*500 words max*): What results do you hope to achieve? What potential impact will the research results have on the field? On society?
- Budget narrative with allocation of funds between campuses (*500 words max*).
- Downstream project applications (*500 words max*): What opportunities do you anticipate for building on the results of this seed award, if awarded? Describe larger grant proposal opportunities or partnerships here.
- Up to five references (*weblinks*). These may refer to the challenge being addressed or to existing work you intend to build upon.
- Optional: upload a one-page graphic file to illustrate the project.
- List of prior CITRIS Seed Awards (if any): PI names, year, project title.

CITRIS Seed Funding: 2020 Areas of Interest

Core Technology

1. [Sustainable Infrastructures](#)
2. [People and Robots](#)
3. [Health](#)

Technology & Society

4. [Policy Lab](#)
5. [The Future of Work](#)
6. [Women in Technology](#)

ALERT: RFP deadline amended on 03.19.20 due to the [COVID-19 pandemic](#).

1. CITRIS Sustainable Infrastructures | sustainable-infrastructures.citris-uc.org

How can we apply emerging technology to support tomorrow's infrastructure?

Research in energy, water, transportation, and the built environment aims to ensure a sustainable future. This research thrust examines Smart Cities, decarbonized mobility, resilience, energy storage, and grid connectivity, along with climate change mitigation. The California Institute for Energy and the Environment ([CIEE](#)) operates within this thrust.

CITRIS's research in sustainable infrastructures supports the development of information technologies related to improving the efficiency of our energy, water, and transportation systems and the intersections among them. The energy that lights and powers our buildings, the water we drink or wash with, and the transportation systems that move us and our goods are at the heart of vital societal infrastructures. These systems affect not only our personal wellbeing and productivity but also that of our planet. The evolution of wireless sensors and smartphones have created opportunities to understand—in real-time—the behavior of critical infrastructures and ultimately manage such infrastructures more efficiently and effectively, including actions toward mitigating greenhouse gas emissions.

Proposals solicited under CITRIS Sustainable Infrastructures include (but are not limited to):

- A. **Integrated sensors** to monitor and communicate vast amounts of real-time information.
- B. **Data management** to gather, process, and direct information. Proposals involving applications of [BTrDB](#) and [XBOS](#) are encouraged.
- C. **Advanced controls** to act on infrastructure information, thereby increasing the productivity and sustainability of involved systems.
- D. **Energy generation, storage, and distribution** to develop and prove new information technologies and systems for energy-efficient generation, storage, and distribution of energy — including through advanced electrochemical and other storage systems, integration of electric vehicles as grid storage (i.e., “vehicle-grid integration”), and to improve energy end-use and distribution system efficiency.
- E. **Intelligent water infrastructures** that create a water monitoring system enabling any country, state, region, or city to:
 - a. Manage and operate its water system more efficiently, sustainably, and equitably.
 - b. Better meet the challenges created by climate change, population growth, and changing demographics. IT tools to meet these challenges could include innovative decision models, simulation models, and use of data analysis and visualization.

- F. **Traffic management, mobility management (people and goods), and energy footprint of transportation** with a focus on information technology and tools to increase energy efficiency in transportation.
 - G. **Unmanned Aerial Vehicle (UAV) technology and infrastructure** involving the design and use of UAVs – including new applications in health, transport, and infrastructure inspection.
 - H. **Carbon neutrality:** Information technology that supports UCOP’s carbon neutrality goals. UC has pledged to become [carbon neutral by 2025](#), aiming to become the first major university to achieve this benchmark.
 - I. **Research problems at the nexus of energy, water, and transportation** infrastructures, and underlying methodologies which integrate human input to these systems in a meaningful way.
-

2. CITRIS People and Robots | robotics.citris-uc.org

How do we harness the power of AI and robotics to enrich human capability and experience?

The merging technologies of AI, robotics, sensing, and data science have the potential to touch all corners of society – creating a critical need for a people-centered approach to these powerful new tools. Counter to predictions of dystopian futures, CITRIS emphasizes AI’s potential to enrich human capability and experience.

The CITRIS People and Robots (CPAR) thrust includes 75 affiliated faculty and focuses on research applications that enhance humans rather than replacing them. Innovations in algorithms, sensors, devices, networks, optimization, and machine learning have potential to reduce drudgery and improve human experience in healthcare, agriculture, manufacturing, transportation, safety, and a broad range of other applications in the interests of society. Achieving this requires sensitivity to human factors, rigorous theory evaluated on benchmarks, user studies, and physical and simulated experiments. Multidisciplinary research is needed to investigate the basic and applied science for design of human-interactive systems and robust performance, addressing the inherent uncertainty in sensing, modeling, and actuation used for control, learning, and systems identification. This is particularly acute for non-convex, non-stationary, distributed, and heterogeneous systems operating with noisy sensors in the physical world that work with, around, and in support of humans. Recent developments in non-convex optimization, model predictive control, and Reinforcement Learning hold promise for addressing these problems at scale.

Proposals solicited under CITRIS People and Robots include (but are not limited to):

- A. **Human-Centric Automation:** New models, metrics, and algorithms for Human-Robot Interaction and methods that safely incorporate humans into the learning and control loop.
- B. **Bio-Inspired Robotics:** New algorithms/software and hardware inspired by biological systems.

- C. **Deep Learning:** Deep Learning has yielded surprising results in the Artificial Intelligence subfields of computer vision and speech recognition. Applying these ideas to Robotics will address challenges such as coping with uncertainty, time delay, stability, generalization, covariant shift, and sample complexity.
 - D. **Cloud Robotics:** Cloud Computing and Distributed Memory can provide access to large datasets and clusters of remote processors to filter, model, optimize, and share data across systems to improve performance over time. New research is needed to explore how new system architectures, network protocols, parallel processing, and Big Data can enhance robotics.
 - E. **Healthcare Robotics:** Advances in robotics can support a wide range of healthcare and rehabilitation applications – ranging from drones to deliver blood and medicine to prosthetic hands and exoskeletons to robot-assisted surgery.
 - F. **Internet of Things:** The number of Internet-connected devices now exceeds the global human population and is predicted to increase rapidly in the next decade. Many of these are passive sensors and new research is required to develop algorithms and system designs that can address security and network reliability at scale.
-

3. CITRIS Health | health.citris-uc.org

How can technology improve health care for aging populations?

The over-65 population is growing rapidly in the U.S., from 15 percent in 2015 to nearly 25 percent by 2060. CITRIS advances the well-being of older adults and family caregivers with enabling technology – including AI, sensors, robotics, and mobile tools. Working with UC Davis Health and other collaborators, CITRIS is developing technology-enabled solutions to achieve healthy aging in a digital world.

CITRIS Health focuses on developing transformative, scalable, and sustainable IT innovations to improve health and wellness. These technology-enabled solutions aim to improve the quality of care and health outcomes, while reducing healthcare costs. Current priorities address the primary drivers affecting health: including chronic disease, aging, and health behavior. Interdisciplinary projects should build upon the principal technology solutions of telehealth, sensors, mobile, cloud, informatics, robotics, and/or data analytics (AI/ML), with an emphasis on solutions that combine hardware and software.

CITRIS Health is particularly interested in cutting-edge proposals that will 1) improve outcomes and services to persons with chronic disease at the patient, caregiver, provider, or system level; 2) advance behavioral, prevention, and wellness programs; 3) develop solutions using the home environment or remote technology; and 4) create innovative solutions using machine intelligence and data analytics.

ALERT: RFP deadline amended on 03.19.20 due to the [COVID-19 pandemic](#).

Proposals solicited under CITRIS Health include (but are not limited to):

- A. **Data analytics:** Integrating data analytics, particularly Artificial Intelligence (AI) or machine learning (ML), with clinical management and diagnostics. Linking sensor networks, patient-provided data, and Electronic Health Record data with patient-provided data for chronic disease modeling, population precision health, or diagnostic prediction. Developing new learning algorithms using data from wearables, medical devices, EHRs, genomics, and social determinants of health.
- B. **Care management solutions:** Improving models for chronic care management, including evaluation and validation of human factors in chronic care. Developing solutions for improved patient and provider engagement and communication. Creating digital health solutions that address accessibility and disability. Developing and implementing innovative and sustainable digital health solutions using telehealth programs.
- C. **New platforms and sensors:** Developing innovations in 3D visualization, population epidemiology visualization, virtual reality/augmented reality, wireless solutions, telehealth, mobile devices, and robotics. Developing innovative clinical and laboratory digital devices, passive and embedded sensors, and other devices using interoperable systems and improved user interfaces.
- D. **Integrated wireless, mobile, and app-based solutions:** Developing game-based learning, behavior-change programs, disease management solutions, or social networking solutions for health improvement.
- E. **Technology solutions for older adults and persons with disabilities:** Developing healthcare technology solutions for prevention, health promotion, and chronic disease management for older adults and persons with disabilities; innovative technology solutions for informal and formal caregivers; and innovative solutions for the health care workforce.

4. CITRIS Policy Lab | citripolicylab.org

How do we build – and harness – technology that protects privacy, security, and democracy?

The CITRIS Policy Lab supports interdisciplinary technology policy research and engagement to better ensure development and deployment of technology in the interest of society.

Reflecting its interdisciplinary approach, the CITRIS Policy Lab joins with partners from the public and private sectors to drive thoughtful policy research and engagement at local, state, national, and international levels. Activities address core questions regarding the role of formal and informal regulation in promoting innovation and amplifying its positive effects.

ALERT: RFP deadline amended on 03.19.20 due to the [COVID-19 pandemic](#).

The CITRIS Policy Lab invites proposals for research that addresses topical issues such as those listed below:

- A. **Computational Propaganda:** Algorithms, automation, and digital harassment campaigns are increasingly utilized to manipulate public opinion and attack vulnerable communities on social media. Proposals may seek to identify computational propaganda and digital harassment campaigns on social media and formulate counter-approaches to mitigate these tactics.
- B. **Inclusive AI:** While artificial intelligence holds great promise to address society's most pressing challenges, ill-considered deployments can perpetuate inequality and discrimination. We seek to support interdisciplinary research into the development and deployment of AI-enabled technologies that are fair, accountable, and trustworthy.
- C. **Digital Inclusion:** Access to the internet at sufficient upload/download speeds is not evenly distributed. Proposals may support innovative strategies for equitable deployment and adoption of broadband and ICTs in the United States and abroad.
- D. **Democratic Innovations:** Effective digital tools support more inclusive democratic discourse, enable new models for participatory resource allocation and budgeting, and provide elected leaders with timely updates on the changing needs and priorities of their constituents. Proposals may seek to design and pilot interactive digital tools that foster greater inclusion in democratic processes.
- E. **Disaster Risk Reduction:** New ICTs — such as crowdsourcing platforms, high-performance computing and visualizations — can lead to more informed strategies for disaster risk reduction. Proposals may seek to utilize new ICTs to inform such strategies and policies in California and abroad.
- F. **Digital ID Systems:** Strategies to develop digital ID systems are emerging from the public, private, and non-profit sectors worldwide. We seek to support research into the human rights implications of digital ID systems and formation of strategies to better ensure their ethical design and deployment.
- G. **Blockchain in Public Sector Applications:** Distributed ledger technology is gaining attention beyond its early applications in cryptocurrency. We invite proposals that investigate or develop blockchain technology for social good.

5. The Future of Work | wits.berkeley.edu

How can we develop and promote healthy societies in an era of intelligent tools?

Launched in the fall 2018, the Future of Work at CITRIS explores the intersections among technology, work, and the global economy. We examine how to create a future of high-quality work and economic equity amid pervasive and abundant computing power, storage, algorithms, bandwidth, and data.

ALERT: RFP deadline amended on 03.19.20 due to the [COVID-19 pandemic](#).

The Future of Work thrust comprises an interdisciplinary and international group of researchers from the fields of engineering and data science, economics, sociology, and political science. Through our global network of institutions and stakeholders, we facilitate cross-national dialogue and guide research, policy, and practice.

Proposals solicited under the Future of Work include (but are not limited to):

- A. **Rise of the platform economy:** Measuring, mapping, and analyzing the extent and impact on workers and communities of platform business models throughout the economy.
- B. **Intelligent tools deployment:** Understanding strategies companies use to deploy new tools, and how different approaches influence different outcomes in the quality of jobs and the organization of work, through case studies and other research approaches.
- C. **Technology assessment:** Assessing how the evolution of different tools – e.g., AI, sensor networks, online platforms, additive manufacturing – will change strategies for work, entrepreneurship, and investment.
- D. **Job creation and entrepreneurship:** Evaluating the role of startups in the future of work and emerging technology. How social media platforms contribute to job discovery, recruiting, and retention, in traditional industries as well as emerging markets.
- E. **Technical solutions for upskilling workers:** Creating workplace technology that complements worker capacities. Intuitive user interfaces that allow surgeons to use robots, or simple word processing programs that augment the abilities of professors, are two contemporary examples. We are interested in specific technical proposals for tools that can amplify workers' abilities, including information about how they fit into or reorganize work processes, and how they could benefit companies or institutions that adopt them.

6. Women in Technology | witi.berkeley.edu

How can CITRIS and UC foster a more inclusive workforce – from education to employment to leadership?

The Women in Technology Initiative at the University of California (WITI@UC) envisions a world in which women are proportionately represented and equitably compensated throughout the professional ranks in the tech industry and academia. To get there, we are preparing the next generation of technologists, supporting data-driven diversity research, and engaging corporate partners.

Launched in spring 2016 as a collaboration between CITRIS and the UC Berkeley College of Engineering, WITI@UC integrates research and action to address the technology industry's diversity challenge with the aim of increasing the persistence and success of women in technical fields. The initiative promotes the equitable participation of women in the tech industry as measured by career longevity, progression, pathways (both technical and leadership), and recognition.

ALERT: RFP deadline amended on 03.19.20 due to the [COVID-19 pandemic](#).

The initiative leverages best practices and interdisciplinary research to guide our strategy in five key objectives: (1) Advocating the adoption of diversity metrics in the tech industry, (2) Cultivating leadership skills and professional acumen among women in engineering and computer science, (3) Increasing the visibility of female role models and facilitating mentorship of students and recent graduates, (4) Enhancing awareness of implicit bias and promoting effective interventions, and (5) Paving new pathways to technology careers. WITI@UC brings together faculty, staff, and students from a range of disciplines and multiple campuses to work in partnership with executives, board members, investors, entrepreneurs, and career technologists in the technology sector.

Proposals solicited under Women in Technology include (but are not limited to):

- A. **Diversity Metrics:** Standardized metrics, methods, and frameworks to document diversity and enable organizations to measure the current state of diversity within their ranks, provide actionable insights, set benchmarks, and track the effectiveness of programs.
- B. **Women in Entrepreneurship:** Female startup founders can face hurdles to forming leadership teams and securing venture capital investment. Additionally, innovative ventures are increasingly technology-driven or technology-enabled. Proposals may seek to study and analyze gender differences in entrepreneurship and/or funding sources, or propose interventions to mitigate such differences.
- C. **Bridges to STEM:** Complex societal problems cannot be solved with engineering resources alone. Often interdisciplinary approaches are necessary, which can offer opportunities to diversify a research team. CITRIS welcomes proposals that create bridges between STEM and non-STEM disciplines to address issues that cannot be tackled with a purely technical solution.
- D. **Telling Her Story:** Women's accomplishments in science and technology, especially contributions to a larger team effort, have often been overlooked in prizes, awards, and attributions. We invite proposals that use creative expression to document and elucidate women's contributions to advances in science and technology that may not yet have received the attention they deserve.

– End –