

What is the Center for Smart Infrastructure?

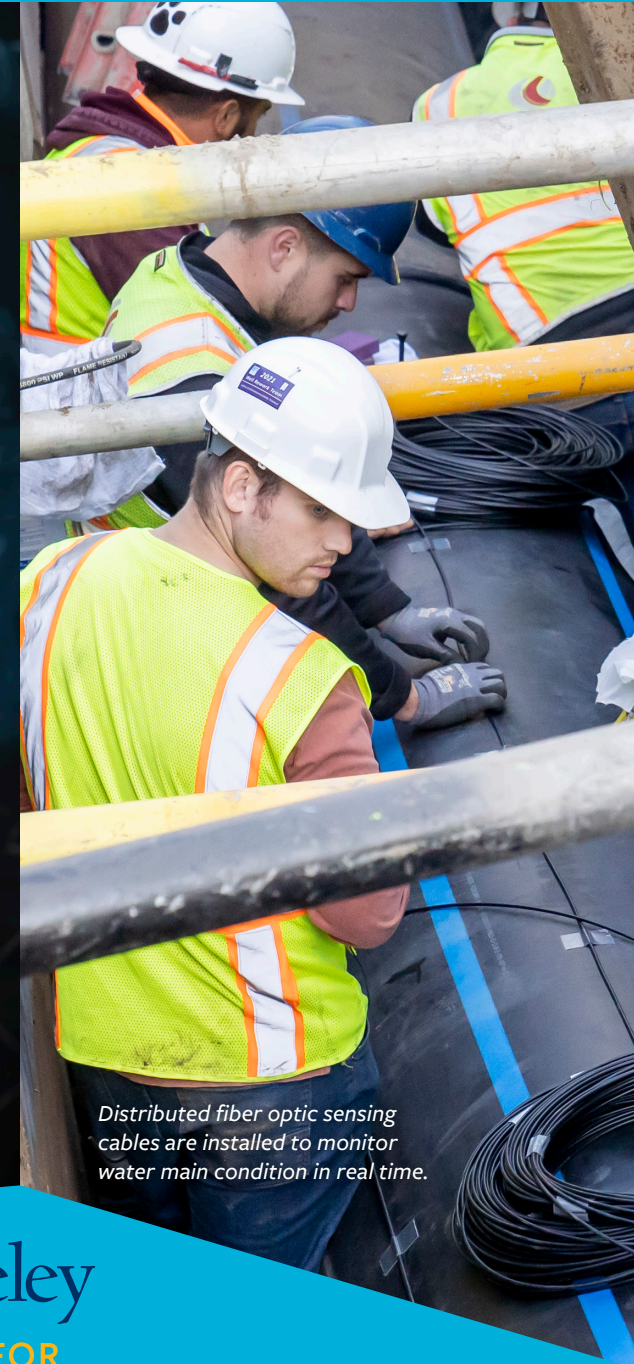


Civil and environmental engineering professor Kenichi Soga showcases advanced sensor technologies to monitor infrastructure.

The Center for Smart Infrastructure (CSI) is a partnership between infrastructure owners, academia, industry, and regulators to address the most pressing and challenging issues facing water and wastewater utilities.

CSI will address challenges with **aging infrastructure**, climate change, **water supply** and natural resources, **emergency and community preparedness** by using a holistic approach to provide **resilient** and **sustainable** networks through

- » State of the art testing equipment
- » Smart sensors and robotics
- » Big data and machine learning



Distributed fiber optic sensing cables are installed to monitor water main condition in real time.



Berkeley
CENTER FOR
Smart Infrastructure

CSI Progress to Date

Since CSI launched at the end of 2021, plans for a state of the art large-scale seismic pipeline testing facility have been completed at the Berkeley Richmond Field Station. Construction of various seismic pipeline testing facilities are in the process of being built including a new four-point bending apparatus for large diameter pipe. Equipment testing will continue through the end of the year, and the facility's first fault-rupture test is scheduled for November.

Initial equipment tests have been conducted to prepare for evaluations of bi-axial and bending loads on pipes under seismic forces. The installation of fiber optic sensing cables in an East Bay Municipal Utility District (EBMUD) water pipe crossing a fault zone near campus is now transmitting valuable data to researchers.

Pacific Earthquake Engineering Research (PEER) Center at UC Berkeley.

Industry stakeholders tour the CSI facility.



All photos: Adam Lau / Berkeley Engineering

On April 7, stakeholders convened at UC Berkeley for the inaugural Industry Collaboration Workshop. The workshop served as a forum to identify stakeholder research needs and potential opportunities for CSI to test and deploy technologies which address these priorities. Additional workshops are planned for 2022.

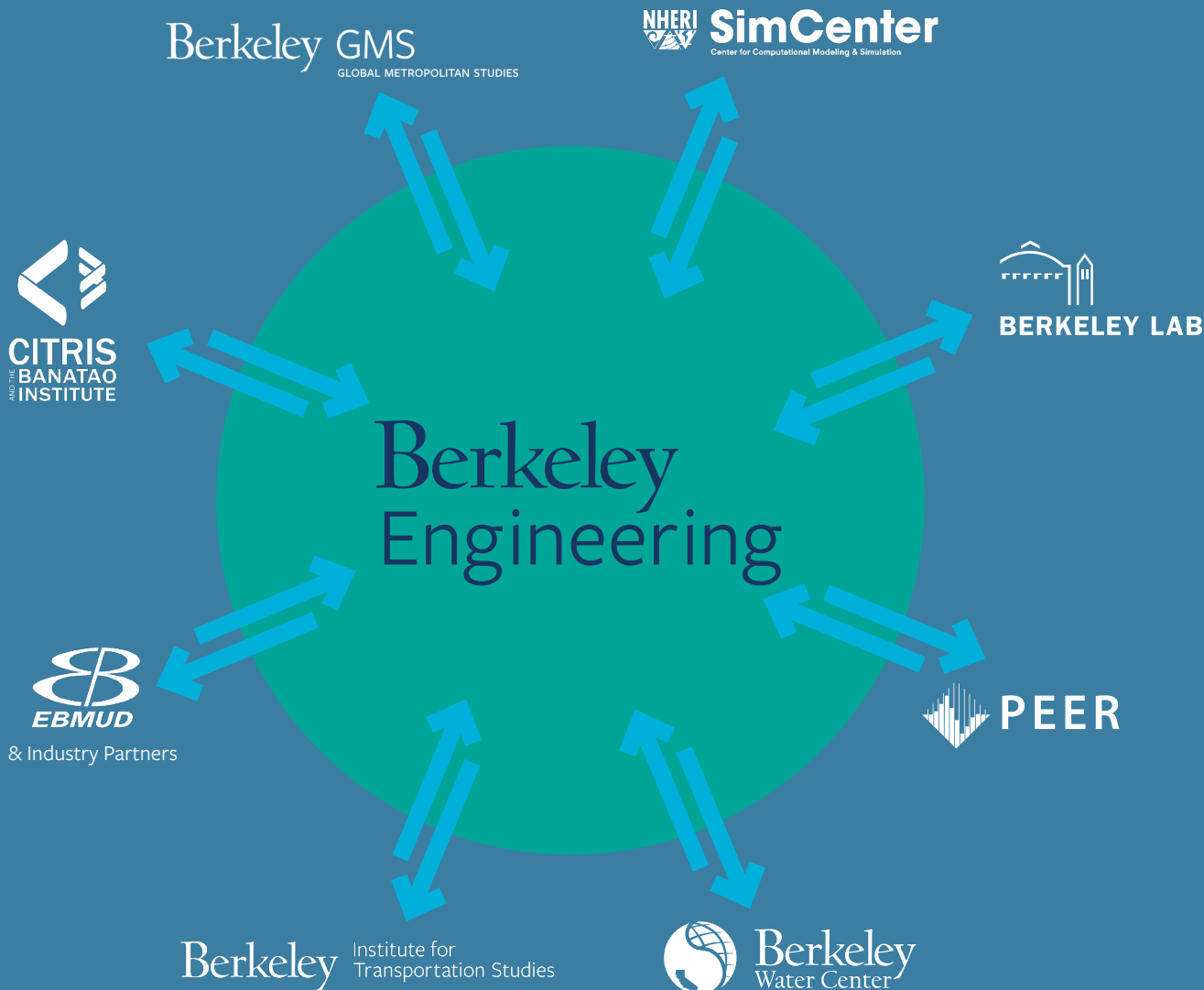
Participating Stakeholders

- » Isle [Facilitator]
- » UC Berkeley [Co-host]
- » East Bay Municipal Utility District [Co-host]
- » LA Department of Water and Power
- » Metropolitan Water District of Southern California
- » San Francisco Public Utilities Commission
- » Xylem
- » WaterStart
- » Water Research Foundation
- » SLC Advisors

Theme	Potential CSI Research Areas
Aging infrastructure	<ul style="list-style-type: none">» Apply data science advancements to refine models for predicting asset condition, improving operational efficiency, and improving preventive and predictive maintenance to extend asset life» Develop advanced sensors, tools (e.g., drones), and analytics to monitor asset condition over time» Validate new data collection opportunities
Water supply and natural resources	<ul style="list-style-type: none">» Evaluate comprehensive decentralization impacts» Develop tools to optimize water supply resilience while minimizing cost to customers» Apply social science research to develop more inclusive, equitable, and cost-effective supply strategies
Climate change	<ul style="list-style-type: none">» Recalibrate climate change and supply impact models with the latest climate data» Develop standards for resiliency measures and carbon accounting» Evaluate the impact of climate change on wildfire risk and develop tools to better prepare and mitigate these changes
Emergency and community preparedness	<ul style="list-style-type: none">» Evaluate system interdependencies to mitigate cascading failures and assist with recovery plans» Develop next-generation decision support models to monitor and respond to dam conditions» Identify communication methods and social factors to encourage community preparedness and resilience

Making Connections

Led by the **College of Engineering**, CSI is an interdisciplinary **hub of infrastructure research and innovation** with other UC Berkeley Programs and Centers. CSI is uniquely positioned to **align utility needs with researchers and industry** to test, develop, and deploy the latest technologies. These **real-world solutions** will advance the development of sustainable, equitable, and resilient systems and communities through applied research and **validation in operational environments**.



Phase 1

CSI is being developed through a phased implementation. EBMUD is funding the first phase which will be completed in 2022. The initial research focus is seismic testing after completion of the state-of-the-art large-scale pipeline testing facility.

Phase 2 and Beyond

Starting in 2023, CSI plans to expand pipeline testing capabilities and formalize a research roadmap in collaboration with infrastructure and industry partners. The research will leverage Berkeley's multidisciplinary capabilities to focus on problems which require collective effort between researchers and industry.

CSI Involvement

EBMUD and Berkeley are inviting partners to support CSI as a resource to promote sustainable, resilient infrastructure in the water industry. Invest in the future by becoming a CSI partner today.

Contact CSI Project Manager Nicole Kaiser nicole@slc-advisors.com or visit smartinfrastructure.berkeley.edu for more information.



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