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SDSC Awarded a Three-Year NSF Grant for Data Reproducibility Research

'Open Science Chain' to Use Distributed Ledger Technology

Researchers at the San Diego Supercomputer Center (SDSC), an Organized Research Unit of UC San Diego, have been awarded a three-year National Science Foundation (NSF) grant worth more than $818,000 to design and develop cyberinfrastructure that allows researchers to efficiently share information about their scientific data and securely verify its authenticity while preserving provenance and lineage information.

Subhashini Sivagnanam, principal investigator for the Open Chain Science project at SDSC. Image: John Chi Lou, SDSC

The award, which starts September 1, 2018 and comes from the NSF's Office of Advanced Cyberinfrastructure, which supports the Cybersecurity Innovation for Cyberinfrastructure (CICI) program, is focused on implementing what the SDSC researchers call an Open Science Chain – a web-based cyberinfrastructure platform that allows a wide community of researchers, regardless of domain, to efficiently share metadata and easily verify authenticity of their datasets in a secure manner.

"Data sharing is an essential element of scientific research and associated publications, and facilitating the future reuse of that data in a secure and independently verifiable manner is critical to the advancement of research," said Subhashini Sivagnanam, principal investigator for the grant and a principal scientific computing specialist with SDSC's Data-Enabled Scientific Computing division. "Researchers have the ability to extend and build upon prior research when they are able to efficiently access, validate, and verify the data referenced."

The overall goal of Open Science Chain is to increase the confidence of scientific results and enhance data sharing, which in turn would result in greater research productivity and reproducibility. It will be implemented as a consortium blockchain using open source

distributed ledger technologies. Metadata and verification information about the scientific dataset will be stored in a chain of connected, cryptographically signed 'blocks.' As the datasets change or evolve over time, this new information is appended to the chain.

"Open Science Chain will be designed and implemented using real-world scientific datasets from a diverse set of use cases ensuring broad applicability across scientific domains" said Viswanath Nandigam, co-principal investigator for the project and associate director for SDSC's Advanced Cyberinfrastructure Development Lab. "We envision it as resource that can be used by broad community of users who are in need of a platform that manages an immutable record of their data that can be independently verified."

Going forward, the researchers plan to demonstrate the extensibility and adaptability of the Open Science Chain platform to other science disciplines by working with stakeholders from various research labs and science gateways via the Science Gateways Community Institute (SGCI), the result of a five-year, $15 million NSF grant awarded in mid-2016.

The NSF award number for the Open Science Chain grant is 1840218.

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