



NSF Campus Cyberinfrastructure PI and Cybersecurity Innovation for Cyberinfrastructure PI Workshop

September 23 – 25, 2019 | Minneapolis, MN

NSF Program: CC*

Program Area: OAC

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Project Title: End-to-End Performance and Security Driven
Federated Data-Intensive Workflow Management



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Quad Chart for: *End-to-End Performance and Security Driven Federated Data-Intensive Workflow Management*

Challenge Project Seeks to Address:

- End-to-end multi-domain security design for scientific applications
- Using NIST standard definitions and novel formalizations of security specifications in application workflow lifecycle stages
- Novel resource/data brokering approaches with multiple resource provider configurations/policies

Solution(s) or Deliverables:

- Publication: “Security-aware Resource Brokering for Bioinformatics Workflows across Federated Multi-cloud Infrastructures”, ACM ICDCN’20.
- Publication: “Increasing Protected Data Accessibility for Age-Related Cataract Research Using a Semi-Automated Honest Broker”, JMO’19.
- Development of a security middleware coupled within a unified resource broker framework for Science Gateway applications/users

Multiple Resources/Data Sources

*Heterogeneous Datasets; Multi-domain;
Sensitive Data; Multiple Access
Regulations; Target Storage Regulations*



Honest Broker

**Automate the Data Sharing
Negotiation Process**

**Ensure Data Security and
Access Compliance**

**Facilitate Users
Requirements Compliance**

**Protect All Parties and Audit
the Process**



Science Gateway Users

*Data Management Policies, Concerns about
Data Privacy, Data Custodians/Consumers*

Scientific Impact or Broader Impact:

Project outcomes will advance the knowledge for a CI engineer on:

- How to intelligently allocate resources among private and public cloud locations by streamlining end-to-end security posture across domains in dynamic compute/network services?
- How to effectively use advanced CI technologies and build user-friendly web interfaces within large facilities to reduce turnaround times in a secured and policy-compliant manner?

Metadata tag:

- *<<http://www.ontimeurb.net>>*
- *<Collaborations between cyberinfrastructure, science gateway workflows, usability>*
- *<Ready for transition to practice!>*
- *<Looking for more science gateway collaborators!>*