



# NSF Campus Cyberinfrastructure PI and Cybersecurity Innovation for Cyberinfrastructure PI Workshop

September 23 – 25, 2019 | Minneapolis, MN

**NSF Program: CC**

**Program Area: Integration**

**Award Number: 1826997**

**PI: Anirban Mandal**

**co-PIs:** Ewa Deelman, Michael Zink, Ivan Roderio

**Project Title:** Delivering a Dynamic Network-centric Platform for  
Data-driven Science (DyNamo)



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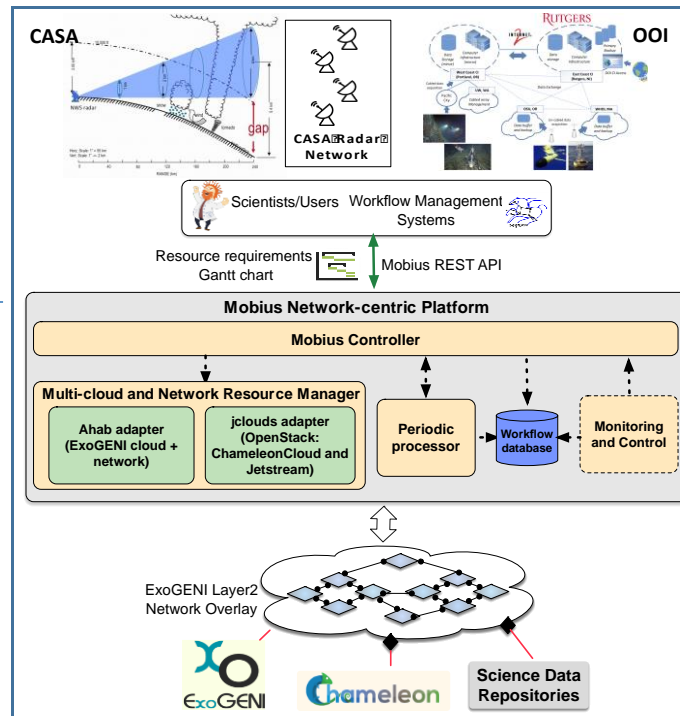
Quad Chart for: ***CC\* Integration: Delivering a Dynamic Network-centric Platform for Data-driven Science (DyNamo)***

## Challenges:

- A major challenge for data-driven science applications is the integration of data into the scientist's workflow.
- Domain science applications and workflows have seldom taken advantage of advanced technologies like SDN and dynamic, networked cloud infrastructures.

## Deliverables:

- Develop novel algorithms, policies, and mechanisms in a network-centric platform to offer optimized data-flows across different kinds of national CI – ExoGENI, Chameleon, OSG, XSEDE.
- Novel network-aware workflow scheduling approaches in Pegasus.
- Deploy solutions for use in observational science communities - Collaborative and Adaptive Sensing of Atmosphere (CASA) and Ocean Observatory Initiative (OOI).



## Broader Impact:

- Advances in the CASA and OOI workflows enabled by DyNamo will improve weather forecasting and ocean sciences.
- DyNamo will enable other domain sciences that rely on data captured from scientific instruments (LIGO, LHC, etc.).
- DyNamo's workflow management improvements will be available to broad range of domains that rely on Pegasus.

## Metadata tag:

- <https://sites.google.com/view/dynamo-nsf/>
- <Network-aware data and workflow management for observational science workflows>
- <Leverage national distributed CI>

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**NSF Program: CICI**

**Program Area: SSC**

**Award Number: 1839900**

**PI: Anirban Mandal**

**co-PIs:** Ewa Deelman, Von Welch

**Project Title:** Integrity Introspection for Scientific Workflows (IRIS)



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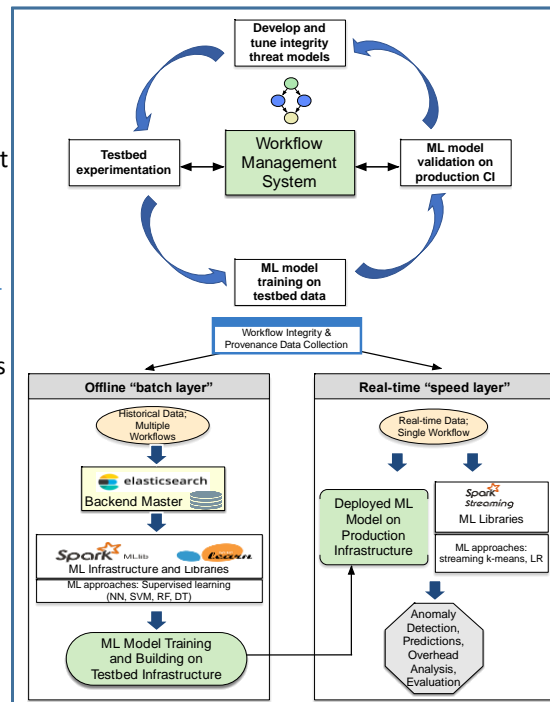
## Quad Chart for: *CICI SSC: Integrity Introspection for Scientific Workflows (IRIS)*

### Challenges:

- Scientific workflow processing sometimes suffers from data integrity errors when executed on distributed cyberinfrastructure (CI).
- Lack of tools that can collect and analyze integrity-relevant data and hence, errors go undetected and corrupt data becomes part of the scientific record.

### Deliverables:

- Develop an integrity introspection framework that collects integrity data and utilizes ML algorithms to automatically detect, analyze and pinpoint source of integrity errors.
- Train ML algorithms on controlled testbeds and validate on national CI by integrating framework with Pegasus.
- Engage with science application partners in gravitational-wave physics, earthquake science, and bioinformatics to deploy the analysis framework.



### Broader Impact:

- The IRIS integrity introspection framework will be available to a broad range of domains that rely on Pegasus.
- IRIS will contribute to the discussions on reproducibility since integrity is essential to supporting reproducibility.
- Integrity-relevant data collected in IRIS and ML algorithms developed can be used by students and researchers.

### Metadata tag:

- <<https://sites.google.com/view/iris-nsf/>>
- <Application of ML for integrity analysis>
- <Looking for different sources of integrity data: infrastructure and application>
- <Builds on CICI SWIP project, by adding detection and analysis of integrity errors>

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