



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

September 24 – 26, 2018 | University of Maryland, College Park, MD

---

**NSF Program: CC**

**Program Area: Integration**

**Award Number: 1826997**

**PI: Anirban Mandal**

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

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



**Anirban Mandal**

Research Scientist  
RENCI, UNC – Chapel  
Hill  
[anirban@renci.org](mailto:anirban@renci.org)



**Ewa Deelman**

Research Director and  
Research Professor  
USC Information  
Sciences Institute  
[deelman@isi.edu](mailto:deelman@isi.edu)



**Michael Zink**

Associate Professor, ECE  
University of  
Massachusetts,  
Amherst  
[mzink@cas.umass.edu](mailto:mzink@cas.umass.edu)



**Ivan Rodero**

Associate Director  
Rutgers Discovery  
Informatics Institute  
[irodero@rutgers.edu](mailto:irodero@rutgers.edu)



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

September 24 – 26, 2018 | University of Maryland, College Park, MD

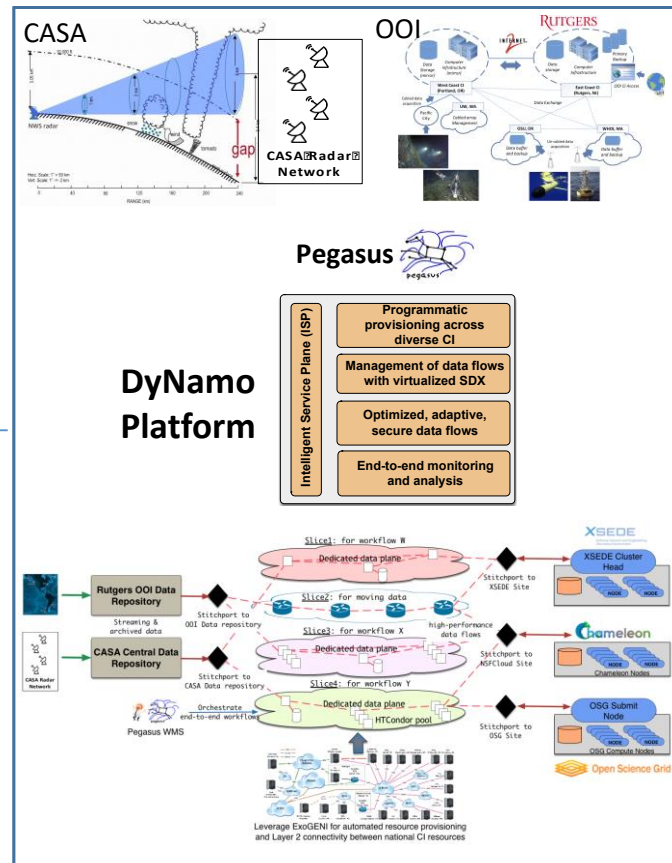
## Quad Chart for: *CC\* Integration: Delivering a Dynamic Network-centric Platform for Data-driven Science (DyNamo)*

### 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 CI>*
- *<Project starting up: looking for more use cases>*

PI/co-PIs: Anirban Mandal, Ewa Deelman, Michael Zink, Ivan Rodero  
 Contact: [anirban@renci.org](mailto:anirban@renci.org)



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

September 24 – 26, 2018 | University of Maryland, College Park, MD

---

**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)**



**Anirban Mandal**

Research Scientist  
RENCI, UNC – Chapel Hill  
[anirban@renci.org](mailto:anirban@renci.org)



**Ewa Deelman**

Research Director and  
Research Professor  
USC Information Sciences  
Institute  
[deelman@isi.edu](mailto:deelman@isi.edu)



**Von Welch**

Director of Indiana University (IU)  
Center for Applied Cybersecurity  
Research (CACR)  
Indiana University  
[vwelch@iu.edu](mailto:vwelch@iu.edu)



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

September 24 – 26, 2018 | University of Maryland, College Park, MD

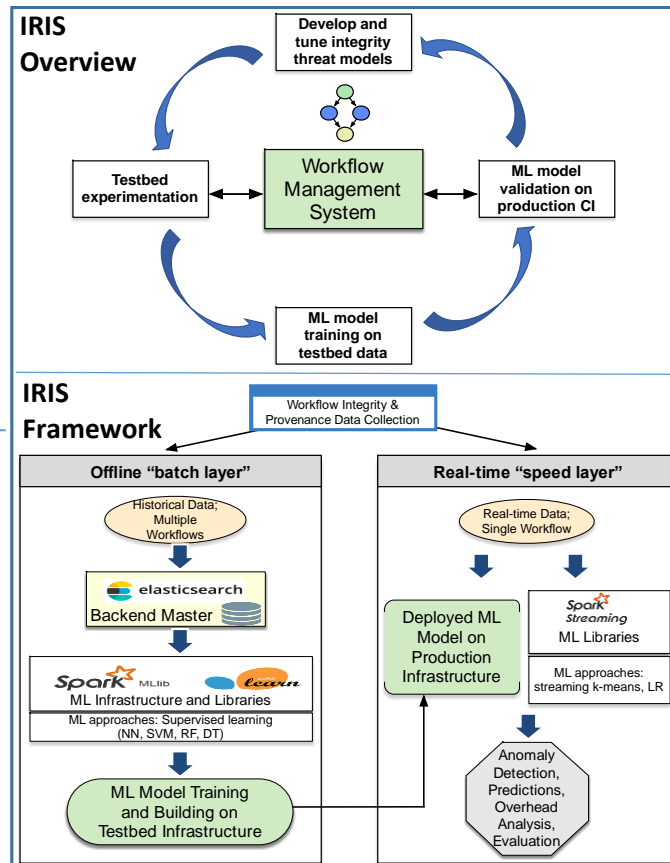
## Quad Chart for: *CICI SSC: Integrity Introspection for Scientific Workflows (IRIS)*

### Challenges:

- Scientific workflow processing sometimes suffers from data integrity errors when executed on national 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 relevant data and utilizes ML algorithms to automatically detect, analyze and pinpoint source of integrity anomalies.
- 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>`
- `<Project starting up: looking for different sources of integrity data>`
- `<Builds on CICI SWIP project, by adding detection and analysis of integrity errors>`

PI/co-PIs: Anirban Mandal, Ewa Deelman, Von Welch  
 Contact: [anirban@renci.org](mailto:anirban@renci.org)