

Introduction to the UW-PNNL Northwest Institute for Advanced Computing (NIAC)

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NIAC Mission

- Bring together top researchers from UW and PNNL in areas related to:
 - Computing
 - Simulation
 - Computational and Data Science
- Advance the use of computing in discovery and a broad range of application areas
- Joint Proposals including as PIs from either side
- Joint R&D
- NIAC has a real component and is also a virtual collaborative

NIAC Location

- EE Space in Seig Hall
- Cubicles, offices, conference room/video conf.
- Close to capacity
- NIAC participation does not imply or require NIAC residency, or Seattle residency

NIAC Leadership

- Directors: Vikram Jandhyala (UW EE) and Thom Dunning (NCSA) joining as NIAC Director (PNNL), January 2014.
- Thanks also to FCSD ALD Doug Ray (interim director).
- Founding directorate at PNNL: FCSD
- Collaborations also growing with NSD, EED
- Founding depts. at UW: EE, CSE, Appl. Math
- Expect growing collaborations with other departments across campus
- UW Leadership: Mary Lidstrom, Mani Soma, Ed Lazowska, Nathan Kutz

NIAC Research Areas

- Advanced and Future Computing Systems
- Scalable Modeling, Simulation and Design
- Data-driven Science and Discovery

- Applications are going to be a key focus of the joint research

NIAC Scope

- Collaborative projects in computing, simulation, computational and data science, and applications
- Cross-cutting across PNNL and UW in these areas
- Synergize with existing PNNL-UW collaborations and future PNNL-UW collaborations in complementary areas
- Not intended to be a bottleneck!
- Sharing of experiences of joint projects, grants and contracts, IP, joint positions as a first cross-cutting collaborative entity across the two institutions

Some NIAC Participants

PNNL

David Callahan

Kenny Roche

Preston Briggs

Simon Kahan*

Guang Lin

Henry Huang**

Seunghwa Kang**

UW

Andrew Whitaker

Luis Ceze

Mark Oskin

Arun Sathanur

Randall Leveque

Daniel Kirschen

Miguel Ortega-Vasquez

- Left PNNL to commercialize GRAPPA (join KONYAC startup) and also BioCellion
- ** Proposed Dual Appointments

NIAC Opportunities & Synergies

- Computational Science Applications
 - Engineering, Applied Math, Physics, Materials, Energy, Computing, Chemistry, Biology, Environment, School of Medicine
- Big Data
 - Data Science, Cloud Computing, Statistics, Engineering, eScience, School of Medicine
- Urban Science and the Science of Cities
- Bring together computational scientists and data scientists!

NIAC Initial Collaborations

- Graph Analytics
 - Social Media
 - Parallel Languages
 - Systems Biology
 - Ecohazards Modeling
 - Smart Grid Simulation
 - Data Visualization
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- Researchers, Faculty, Students and Postdocs

Current NIAC Activities Proposal Development

- NIH Centers of Excellence for Big Data Computing in the Biomedical Sciences
 - Two Joint Proposals
- LDRD project (UW, PNNL NSD)
- DOD MURI BAA
- DOD MINERVA ONR BAA
- Google Exacycle projects

NIAC Activities → UW-PNNL Collaborations

- IEEE Intelligence and Security Informatics 2013
- Chesapeake Large-Scale Analytics Conference 2013
- Signature Discovery Seminar at PNNL
- Grid Optics Workshop at UW

NIAC Challenges / Opportunities

- Navigating Two Different Collaborative Cultures
- Scalable Funding Model
- Build a Self-Sustaining Entity that works with UW, PNNL, Govt, and Industry to help solve scientific and societal challenges through computing, simulation, and computational and data science

NIAC Measures of Success

- Demonstrated benefits to both UW and PNNL
 - New hires
 - New R&D and projects
- Demonstrated scientific domain leadership
 - NIAC initiatives gain national attention, focus on major problems, demonstrate world-class capabilities
- NIAC sustains itself
 - Wins major proposals, attracts external funding

NIAC Next Steps

- Distinguished Faculty Fellows
- Collaborative Access
- Administrative Staff
- Joint Students
- Seminar Series
- Industrial Participation
- Teaming and Brainstorming!

The Breakout Sessions

Session	Facilitators (Scribe)
1: HPC Applications at ExaScale	LeVeque, Oskin, (Callahan)
2. Graph Analytics and Network Data Analysis	Hallappanavar, Joslyn, (Sathanur)
3. Data-driven Discovery	Aragon, Howe, Kleese van Dam, (Greaves)
4. Urban Science Challenges	Roy, Dunning, Kintner-Meyer, (Kirschen)
5. Systems Biology and Medical Big Data	Sauro, (Shmulevich)
6. Cyber Security	Manz, (Poovendran)