Streaming Data Analysis for Highly Correlated Events

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NATIONAL LABORATORY

a passion for discovery

U.S. DEPARTMENT OF **ENERGY** | Office of Science

Computational Science Initiative (CSI)

- Established December 2015

- Provides the umbrella for Computer Science, Applied Mathematics and Computational Science Research and Services at BNL

- **Vision - Translating Leading Computer Science and Applied Mathematics Research into Measurably Improved Scientific Discovery Processes**

- **Focus - Data Analysis, Numerical Modeling Support for Experiments, Reusable Knowledge Repositories**

- At present 70 staff and Students

- New Data Center in planning

- https://www.bnl.gov/compsci/

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Data Driven Discovery at NSLS-II Beamlines

- Scientific Goal
  - Enable reliable, real time, data-driven steering of experiments
- Achievement
  - New holistic approach to streaming data analysis and decision support
    - Integrating results from 7 projects, including ASCR-funded research
    - Applying results to Coherent Hard X-Ray (CHX) beamline at NSLS-II
    - Workflow provides streaming statistics, machine learning and visual analytics for decision support
- Impact
  - Enable data-driven steering of experiments to optimize their scientific outcomes
  - With 4.5 GB/s sustained data rates, CHX is a good test ground for higher rate instruments, such as HXN (1 – 5 TB/s in burst)
  - Solutions applicable to other beamlines and light sources, CFN, eRHIC, exascale simulations, Electric Power Grid, Observational Sensor Networks
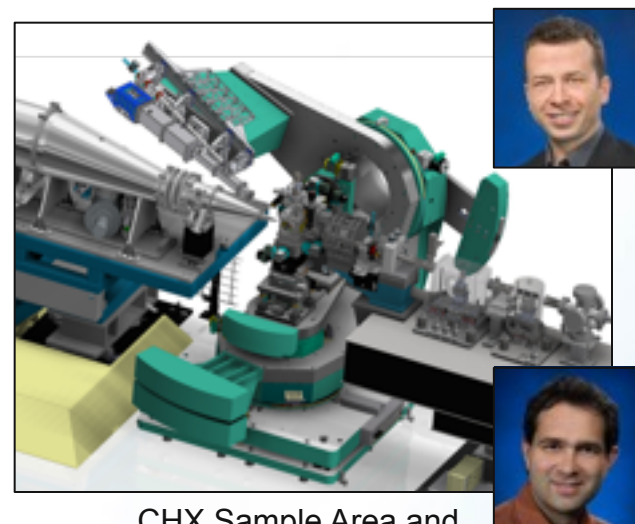
CHX Sample Area and Scientists

Workflow at CHX

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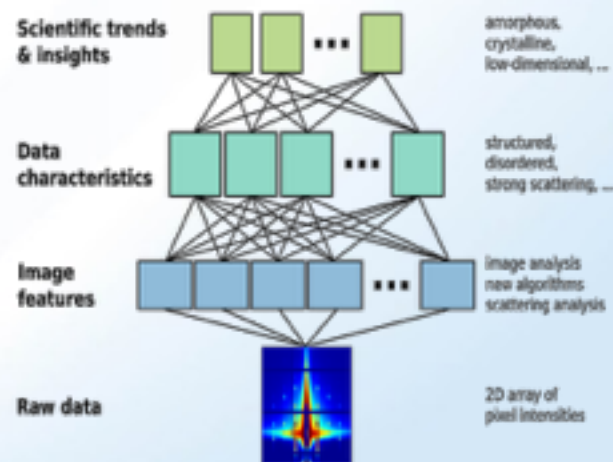
More Information - Collaboration Opportunities:

- Email: Kleese@bnl.gov or Lperagine@bnl.gov
- Web: http://www.bnl.gov/compsci/
- Jobs: http://jobs.bnl.gov/ - Keyword 'CSI'

- Collaboration Opportunities:
  - Visiting faculty and student summer projects
  - Year round student assistant opportunities
  - Semester break based internships for students – spring, summer and autumn
  - Joint Projects