NIH cancer Biomedical Informatics Grid (caBIG®) ICR Nanotechnology Working Group

For more information, visit http://goo.gl/niZN

Nathan Baker

National Security Directorate

Computational and Statistical Analytics Division

nathan.baker@pnl.gov

Pacific Northwest
NATIONAL LABORATORY

Proudly Operated by **Battelle** *Since 1965*

Who we are

▶ Government
  - National Institutes of Health
    • NCI, NHLBI, NIBIB, NCL
  - Center for Disease Control
  - Food and Drug Administration
  - Environmental Protection Agency

▶ Academia
  - Washington University
  - Oregon State
  - Stanford
  - MIT
  - Georgia Tech
  - UCLA
  - …

▶ Industry
  - Intel
  - Pennsylvania NanoSystems
  - …

▶ Standards organizations
  - ASTM E56
  - ISO TC229

▶ Alliances and organizations
  - International Alliance for NanoEHS Harmonization
  - Oregon Nanoscience and Microtechnologies Institute
  - National Nanotechnology Initiative
  - National Nanomanufacturing Network
 - NCI Nano Alliance

caBIG™
cancer Biomedical Informatics Grid ™

Pacific Northwest
NATIONAL LABORATORY

Proudly Operated by **Battelle** *Since 1965*

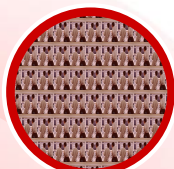# caBIG® Overview (http://cabig.nci.nih.gov/)

Clinical Research
- Track clinical trial registrations
- Facilitate automatic capture of clinical laboratory data
- Manage reports describing adverse events during clinical trials
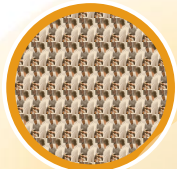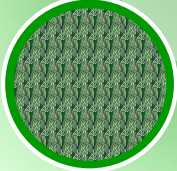
Imaging
- Use NBIA repository for medical images including CAT scans and MRIs
- Visualize images using DICOM-compliant tools
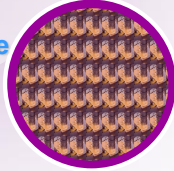- Annotated Images with distributed tools

Discovery Research
- Combine proteomics, gene expression, and other basic research data
- Submit and annotate microarray data
- Integrate microarray data from multiple manufacturers and permit analysis and visualization of data

Pathology
- Access library of well characterized and clinically annotated biospecimens
- Use tools to keep an inventory of a user's own samples
- Track storage, distribution, and quality assurance of specimens

Clinical Care

▶ Bench-to-beside biomedical research infrastructure

▶ Integrates basic research to clinical research to patient care

▶ Broad deployment
- Extensible framework
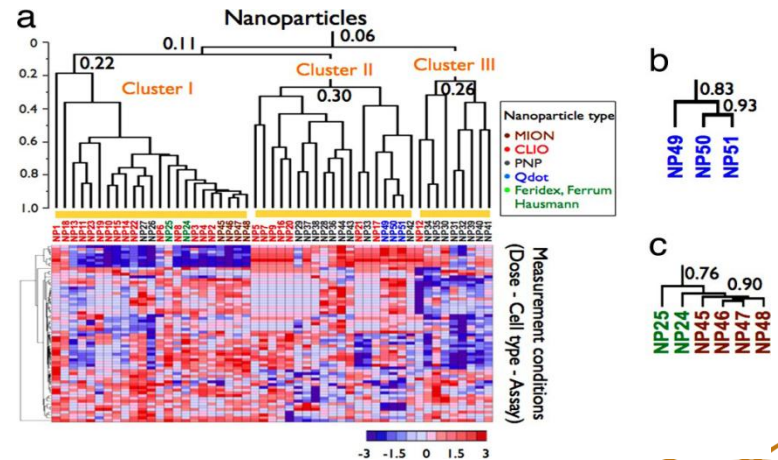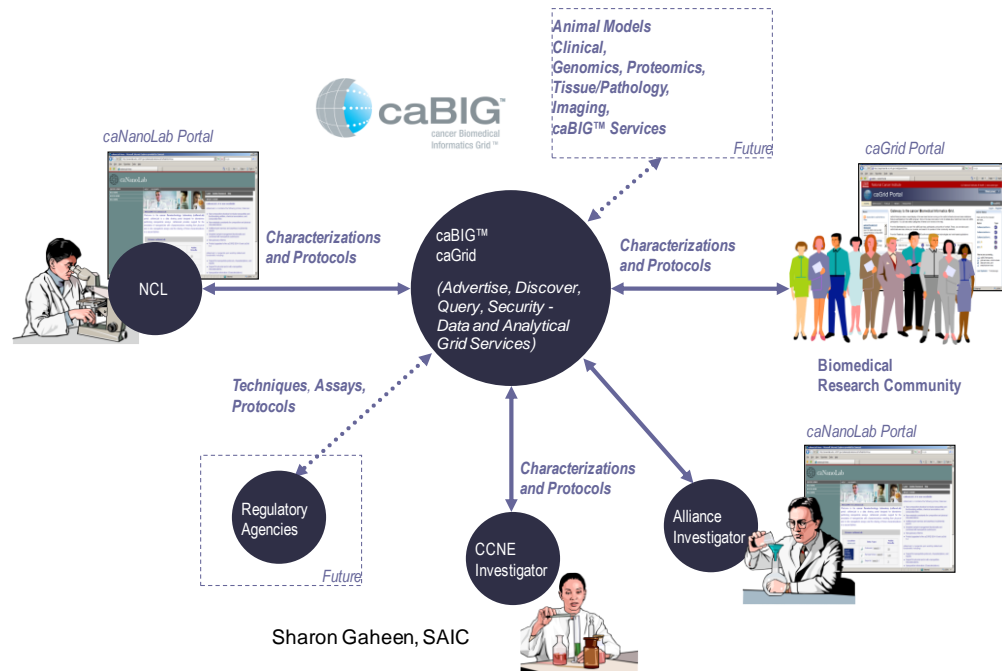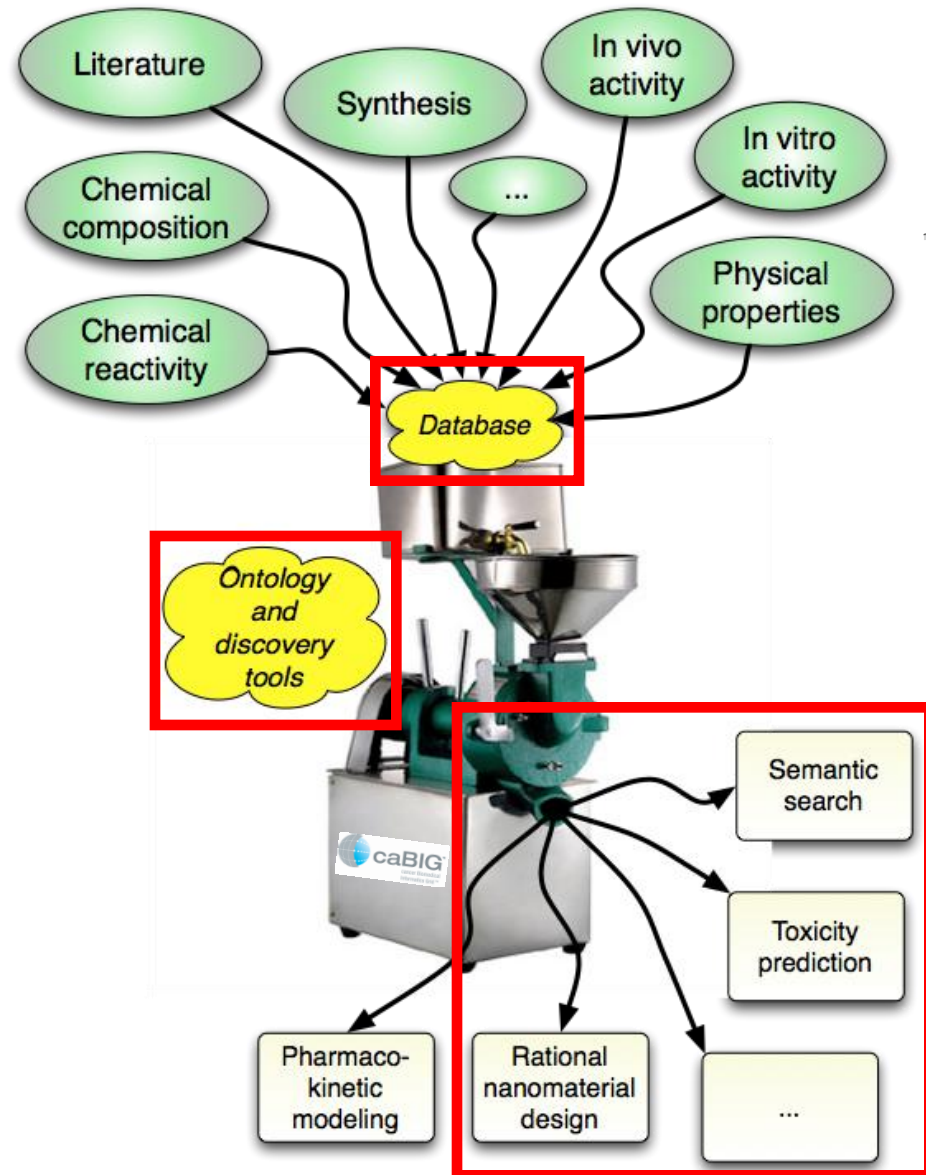- Significant use outside the cancer domain

▶ Poised for significant growth
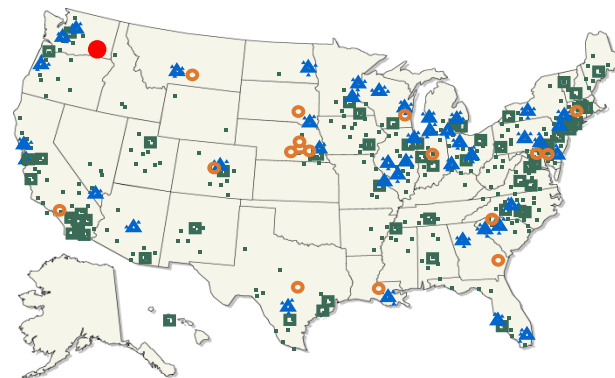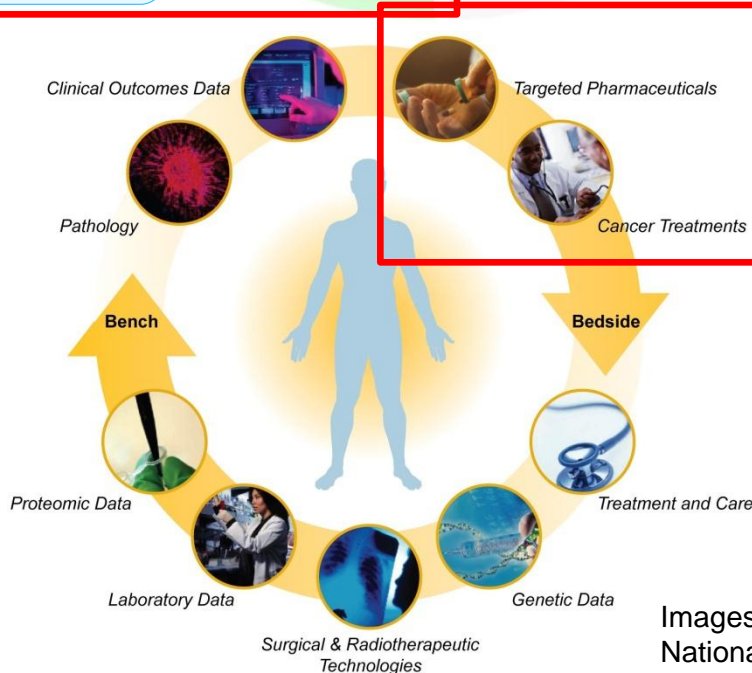
Images courtesy of Juli Klemm, National Cancer Institute

3

Proudly Operated by **Battelle** Since 1965

Working Group Scope

Literature, Synthesis, In vivo activity, In vitro activity, Chemical composition, Physical properties, Chemical reactivity, ... → Database

Ontology and discovery tools

Semantic search, Toxicity prediction, Pharmaco-kinetic modeling, Rational nanomaterial design, ...

Animal Models, Clinical, Genomics, Proteomics, Tissue/Pathology, Imaging, caBIG™ Services

caNanoLab Portal

caGrid Portal

Characterizations and Protocols

NCL

caBIG™ caGrid (Advertise, Discover, Query, Security - Data and Analytical Grid Services)

Characterizations and Protocols

Biomedical Research Community

caNanoLab Portal

Techniques, Assays, Protocols

Regulatory Agencies

Characterizations and Protocols

CCNE Investigator

Alliance Investigator

Future

Sharon Gaheen, SAIC

Shaw et al., 2008. *PNAS*, 105: 7387.

Proudly Operated by **Battelle** Since 1965

Pacific Northwest NATIONAL LABORATORY

Major current goals: facilitating data sharing

▶ Nano-TAB for nanotechnology data exchange
- Spreadsheet-based
- ISA-TAB format
- Community engagement
- Reusable tooling

▶ NanoParticle Ontology for describing nanotechnology concepts
- Ontology for reasoning and data sharing
- Harmonization with other vocabulary standards
- Long term applications in nanomaterial property prediction

For more information, visit http://goo.gl/niZN