

# PNNL Overview

CONSORTIUM FOR VERIFICATION TECHNOLOGY

Daniel Stephens



# PNNL at a glance

- ▶ 4,300 scientists, engineers and non-technical staff
- ▶ 1,200 peer-reviewed papers
- ▶ 85 U.S. and foreign patents granted; 264 invention disclosures
- ▶ Over 90 R&D 100 and 78 FLC Awards
- ▶ \$936M operating budget
- ▶ Operated by Battelle since 1965
- ▶ Unique S&T capabilities
- ▶ Mission-driven collaborations with government, industry and academia







# New Physical Sciences Facility



- ▶ Materials science & technology
- ▶ Trace and radiation detection
- ▶ Shallow underground laboratory
- ▶ Critical capabilities:
  - Trace detection of radionuclides
  - Low background nuclear science
  - Irradiated materials S&T
  - Fundamental and interfacial radiochemistry
  - Systems Development and T&E





Pacific Northwest  
NATIONAL LABORATORY

Proudly Operated by Battelle Since 1965

# Core Capabilities applicable to CVT mission

- ▶ **Center for Global Security**
  - Science and technology policy, analysis
- ▶ **Radiation Detection and Nuclear Science**
  - Advanced detection systems and fundamental physics
- ▶ **Radiochemical Analysis**
  - Microscopy, Mass Spectrometry, chemical techniques
- ▶ **Applied Physics**
  - Laser spectroscopy, RF, acoustics
- ▶ **Detection Systems**
  - Systems Engineering, field deployable methods
- ▶ **Reactor Engineering**
  - Fuel fabrication and analysis, core design and simulation
- ▶ **Advanced Analytics**
  - Human machine interface, big data, analytics in motion, signature discovery
- ▶ **Applied Mathematics and Statistics**
  - Algorithm development, optimization, uncertainty quantification
- ▶ **High Performance Computing**
  - Large scale distributed scientific computing, hardware architectures

Hanford circa 1944

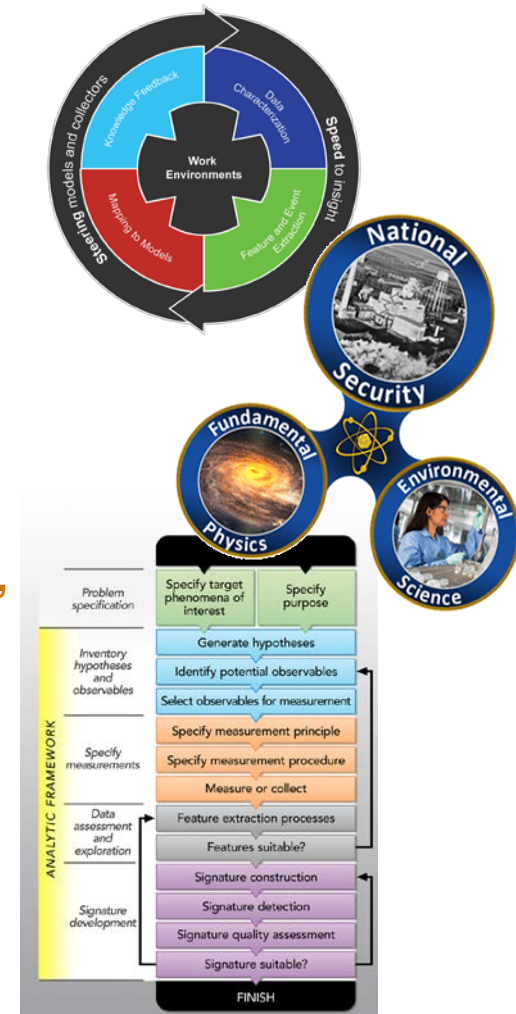


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# PNNL Internal Investments with CVT focus

- ▶ ***Disrupt Illicit Nuclear Trafficking – Lab Objective***
  - Developing tools and techniques necessary to define and detect signatures and transactions associated with the technologies, commodities, knowledge and trafficking of nuclear materials
- ▶ ***Signature Discovery Initiative***
  - Systematic processes to rapidly discover signatures in any domain
- ▶ ***Analysis in Motion Initiative***
  - Developing computational techniques for semi-automated, data-driven discovery that rebalance the efforts of people, machines, and sensors
- ▶ ***Ultra Sensitive Nuclear Measurements Initiative***
  - Building capabilities to discover, measure, and characterize rare physical events through increasingly sensitive nuclear measurement systems





# PNNL Student programs

## University Collaborations

PNNL partners with universities on research collaborations in many areas of national security R&D.

- ▶ **Purpose:** Provide work-based learning opportunities to students across the nation.
- ▶ **Emphasis:** Hire and retain qualified intern and post-graduate research candidates in positions that
  - Serve the educational focus of the student or graduate
  - Serve PNNL's ongoing research objectives.
- ▶ **Types of collaborations**
  - Short-term internships or multi-year Post-BS, post-MS, and postdoc positions
  - Conducting partial or all thesis research at PNNL
  - Joint appointments for faculty between PNNL and universities
  - Joint proposals and collaborations for future R&D projects

## Key programs

- ▶ **NNSA Graduate Fellowship Program**
  - Contact: Jana Fankhauser,  
[jana.fankhuaser@pnnl.gov](mailto:jana.fankhuaser@pnnl.gov), (206) 528-3264
- ▶ **National Security Internship Program**
  - Contact: Marisela Linares-Mendoza,  
[Marisela.Linares-Mendoza@pnnl.gov](mailto:Marisela.Linares-Mendoza@pnnl.gov), (509) 371-7645
- ▶ **Radiation Detection for Nuclear Security Summer School**
  - Contact: Robert Runkle,  
[robert.runkle@pnnl.gov](mailto:robert.runkle@pnnl.gov), (509) 375-1966
- ▶ **Next Generation Safeguards Internship Program**
  - Contact: Roberta Burbank,  
[roberta.burbank@pnnl.gov](mailto:roberta.burbank@pnnl.gov), (509) 372-4002

Students at PNNL 2014	Number
Undergrad	184
Graduates	80
Post Bachelors	40
Post Masters	74
Post Docs	217
Total	595



# Thank you

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CVT POC

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