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Research Highlights from CVT Collaborations with PNNL

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Consortium for Verification Technology Workshop

PNNL at a glance

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- 4,400 scientists, engineers and non-technical staff
- 1,200 peer-reviewed papers annually
- 85 U.S. and foreign patents granted; 264 invention disclosures annually
- Over 90 R&D 100 and 78 FLC Awards
- $1.02B operating budget

- Operated by Battelle since 1965
- Unique S&T capabilities
- Mission-driven collaborations with government, industry and academia

our nonproliferation project areas

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Signature Discovery

We develop and demonstrate new scientific approaches that include the implementation of algorithms, methods, and tools in a reusable analytic framework.

Material Production Detection

We develop technologies that improve detection, location, and characterization of radiological & nuclear material for treaty enforcement.

Nuclear Forensics

We provide state-of-the-art analytical services that support the U.S. Government's nuclear forensics mission.

Radiation Detectors

We develop robust, automated collection and measurement systems for applications directly supporting nuclear nonproliferation.

examples of internships

How can students get hands-on experience in some of PNNL's cool research areas?

Let me show you a few ways…

you could help us…

design better detectors

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for example

PNNL & the **University of Michigan** are developing an ultra sensitive radioxenon detector.

- this will improve the detection of nuclear testing activities
- we are looking for activation of stable xenon isotopes
- we keep this detector in our underground laboratory on the PNNL campus

*CVT associate **Ciara Sivels**, PhD student, suited up with us to help create this detector*

you could help us…

protect nuclear information

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for example

PNNL and **MIT** are collaborating on a new information-theoretic approach for evaluating new verification technologies. We call it the **Privacy Funnel.**

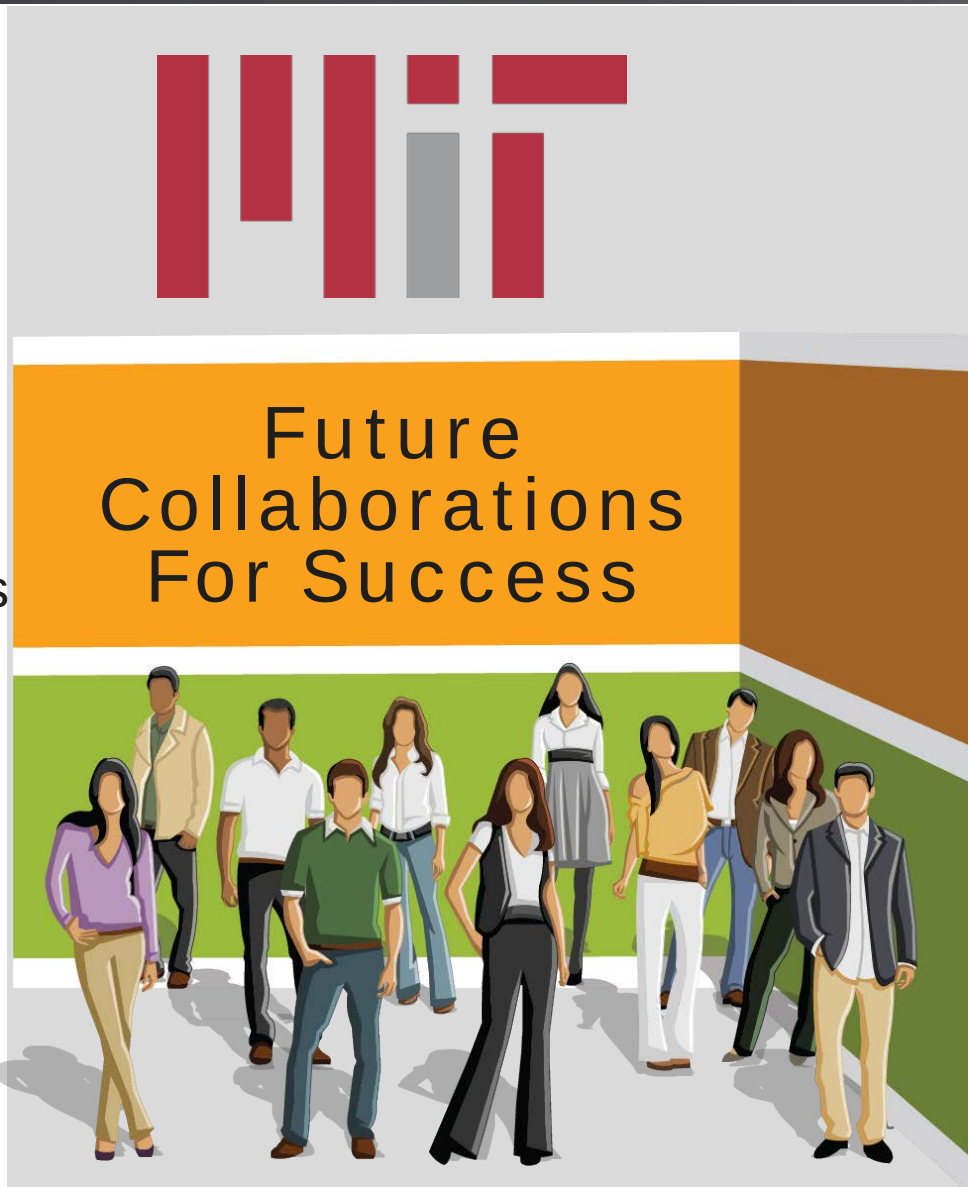
What does it do?

The **Privacy Funnel**:

- is a quantitative measure of tradeoffs between protecting sensitive information & verification confidence
- is a guide for future system design

Exciting Future Collaborations

This project is leading to additional collaboration in machine learning, graphical models, and multi-sensor fusion



you could help us… track & predict nuclear movement in the atmosphere

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for example

PNNL's Paul Eslinger is collaborating with **University of Michigan's John Lee** on atmospheric transport work

- Source Term Estimation using Measured Atmospheric Samples
- Atmospheric Transport Modeling

PNNL hosted **CVT Fellow Mathew Krupcale** to work with us in atmospheric transport

you could help us…

develop prototype beta-gamma detectors

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for example

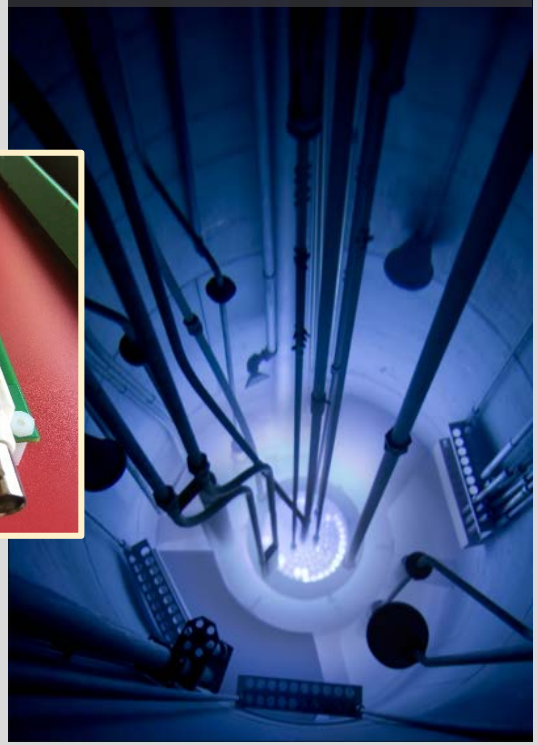
PNNL's Mitchell Myjak and **OSU's Abi Farsoni** are developing a prototype beta-gamma coincidence system for radioxenon detection

What makes it unique?

- It uses CdZnTe, an array of SiPMs, and a plastic scintillator
- We irradiated xenon gas samples in OSU's TRIGA reactor
- Further measurements of ^{135}Xe, ^{133}Xe, and ^{133m}Xe samples will be conducted for minimum detectable concentrations

Project will host **Eric Becker** from **OSU**

TRIGA reactor

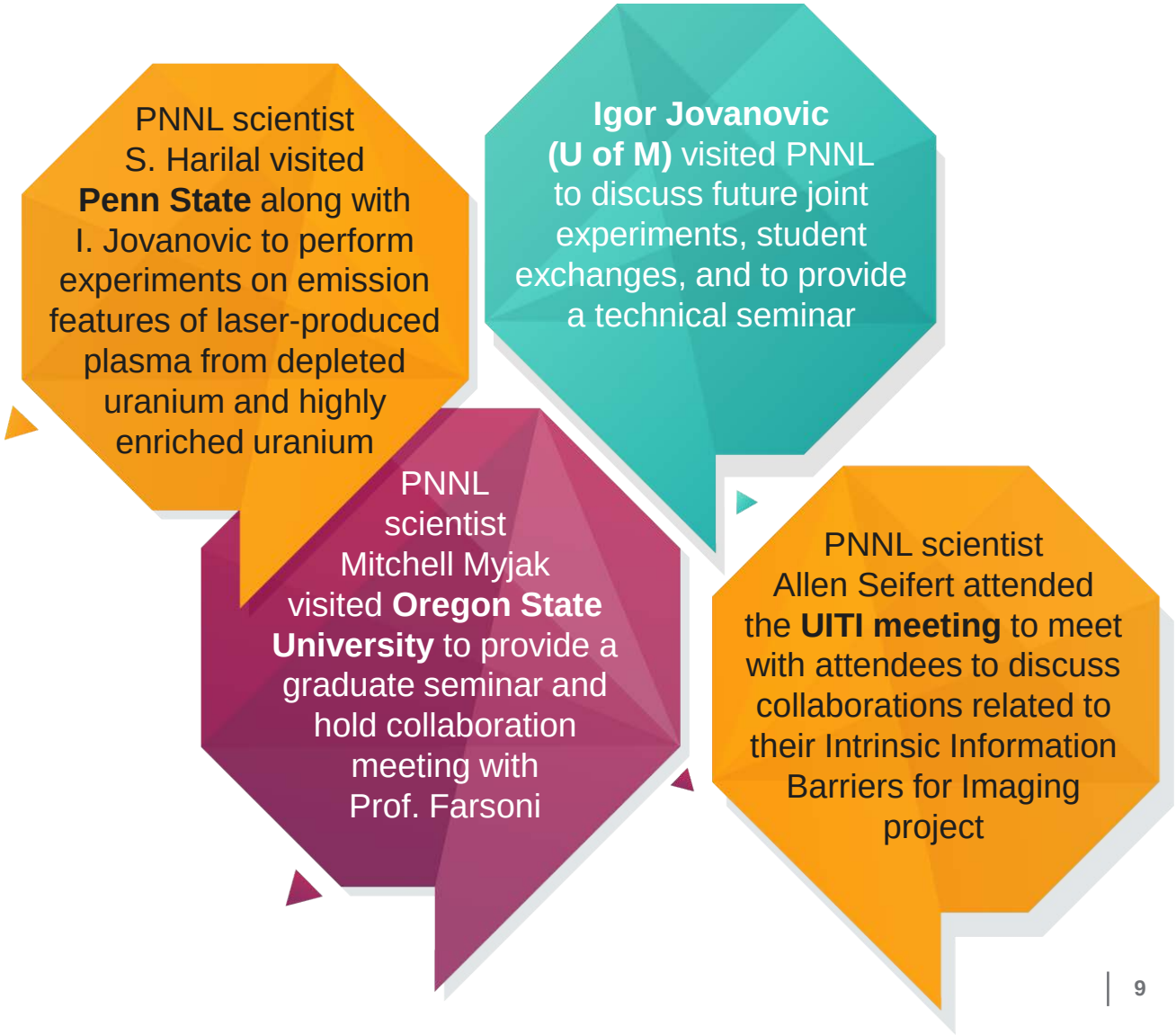


OSU Oregon State UNIVERSITY

What about collaboration?

At PNNL we love working with other institutions to collaborate, share, and discuss our work.

Our interns get to network with our collaborators, and they're encouraged to travel with us.



We're seeking 2017 interns

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These are just a few of the collaborations and opportunities PNNL has to offer.

Let **Ray Klann** know if you are interested in an opportunity at PNNL or if you'd like a complete list of our nonproliferation-focused projects.

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Thank you!

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