Thrust Area 6: Education and Outreach
Mission

The CVT will train the next generation of professionals in nuclear nonproliferation, safeguards, and arms control verification by introducing new topic-relevant courses, updating existing ones, organizing workshops and conferences, and engaging students in multi-institution research and development projects. These activities will enable the establishment of the following fellowships:
CVT Research Fellowships

1. CVT Undergraduate Fellowships
   – Involvement of students at early stages is critical to recruiting and retaining the best talent in support of the NNSA mission

2. CVT Graduate Fellowships
   – The experience of the graduate fellows will be enhanced by student internships at the national laboratories, where they will take part in research under the mentorship of laboratory scientists

3. CVT Postdoctoral Fellowships
   – Post-doctoral fellows will be integral part of the research activities and will act as mentors to the CVT students
CVT Research Fellowships

4. CVT Faculty Sabbatical Fellowships
   – The CVT will support a portion of faculty time for sabbaticals to be spent at the collaborating national laboratories. These sabbaticals will strengthen the existing relationships between universities and laboratories.

5. CVT National Laboratory Expert Fellowships
   – The CVT universities will invite national laboratory experts to spend time on campus and participate in activities such as: (i) serving on graduate student theses committees, (ii) teaching a short course on a topic of interest to verification technology and policy, and (iii) presenting invited seminars and lectures.
Career Development

1. CVT Fellows Career Development
   • All CVT-supported students and post-doctoral scholars will attend the University and Industry Technical Interchange (UITI) meeting and other field-specific research conferences
   • They will be mentored and advised on how to prepare and give poster and oral presentations describing their research activities
   • They will be encouraged and supervised in writing peer-reviewed research papers as lead authors

2. CVT Fellows Transition to National Laboratory
   • The CVT’s strong connection to the national laboratories will ensure a seamless transition for many of the graduating Fellows to a career in the national laboratory system
   • The national laboratories participating in our collaboration already have programs, such as Directors’ Post-Doctoral Fellowships, that will ensure that the best talent is retained and transitioned to the national laboratories
Enhanced Academic Courses

**Safeguards Laboratory Course**

- Students will take part in a week-long hands-on training course offered at the Safeguards Laboratory (SL) at ORNL
- This training includes integrated safeguards methods, procedures, and instrumentation, including experiments with small quantities of fissile material
- UM has been offering this course since 2009
Enhanced Academic Courses

*Subcritical Measurements of Category-I SNM at the Nevada National Security Site*

Students will measure objects such as:

1. BeRP ball: a 4.5 kg sphere of alpha-phase weapons-grade plutonium metal
2. Rocky Flats Shells: a collection of 80 nesting hemispherical shells of HEU with individual masses ranging from 176 grams to 8.4 kilograms
New Academic Course Development

**Tutorials on Seismic Detection**
- Columbia University and the University of Hawaii will develop a series of tutorials on seismic and infrasound detection, location, identification, and yield estimation for underground explosions.

**Coursera Open-Access Course on Nuclear Science**
- Princeton University will develop a *Coursera* open-access course on Science and Technology of Nuclear Power, with special emphasis on proliferation issues.

**Nuclear Security and Policy Courses**
- UM offers a cross-cutting course entitled “Nuclear Weapons,”
- MIT, PSU, and TAMU have jointly developed multiple Nuclear Security and Policy courses funded by Global Threat Reduction Initiative.
Certificates of Public Policy

- In order to broaden Fellows’ educational experiences, several CVT universities have existing certificates of public policy that incorporate public policy and technology.
- UM offers the Science Technology and Public Policy Graduate Certificate Program in which students explore the politics and policy related to science and technology.
- PSU offers bachelor’s, master’s, and doctoral degrees in public policy.
- UH offers graduate certificates in Public Policy and a program in Futures Studies.
- Princeton University’s Woodrow Wilson School of Public and International Affairs offers the Science Technology and Environmental Policy graduate fellowship.
- UW offers the Energy Analysis and Policy Graduate Certificate Program in which students combine studies in technology, policy, economics and environmental science.
- MIT has a Technology and Public Policy Program which studies technology policy and also a Security Studies Program that integrates technical and political analysis.
- UIUC offers an undergraduate certificate in Global Security through the Program in Arms Control, Disarmament, and International Security.
Outreach

• The consortium faculty and laboratory researchers represent a remarkable pool of interdisciplinary talent

• We will showcase this expertise through the following outreach activities

  1. Workshops, Summer Schools and Conferences
  2. Underrepresented Minority Summer Undergraduate Research Opportunities Program
  3. Institute of Nuclear Materials Management (INMM) Student Chapters
### Outreach

**Existing and proposed summer schools, workshops, and conferences of CVT institutions**

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<thead>
<tr>
<th>Institution</th>
<th>Annual Summer Schools</th>
<th>Annual Workshops/Conferences</th>
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<tr>
<td>University of Michigan</td>
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<td>CVT Annual Workshop</td>
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<td>MCNPX-PoliMi Training Workshop</td>
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<td>Symposium on Radiation Measurements and Applications (SORMA)</td>
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<tr>
<td>Massachusetts Institute of Technology</td>
<td>Nuclear Plant Safety, Nuclear Operational Risk Management</td>
<td>Multiple conferences across a broad spectrum from fundamental science to the Annual MIT Energy Conference</td>
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<tr>
<td>Princeton University</td>
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<td>International Panel on Fissile Materials.</td>
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<td>Topical workshops for the International Panel on Fissile Materials</td>
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<td>International workshops on political and technical verification challenges</td>
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<tr>
<td>Columbia University</td>
<td>Lamont-Doherty Earth Observatory Summer School</td>
<td>Science and Technology conference sponsored by the CTBTO</td>
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<tr>
<td>North Carolina State University</td>
<td>Young Investigators Summer Program in Nuclear Engineering.</td>
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<td>University of Hawaii</td>
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<td>Annual CTBTO Infrasound Technology Workshop</td>
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<td>Biennial CTBTO Science and Technology Conference</td>
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<tr>
<td>Pennsylvania State University</td>
<td>Toshiba-Westinghouse Fellows program</td>
<td>2014 American Nuclear Society Student Conference</td>
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<tr>
<td>Duke University</td>
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<td>Workshops on analysis of high-dimensional sensing data</td>
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<tr>
<td>University of Florida</td>
<td>PNNL Radiation Detection for Nuclear Security Summer School</td>
<td>Regular host for the annual FL-HPS and FL-AAPM joint meeting</td>
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<tr>
<td>Oregon State University</td>
<td>Advanced Radiation Detection and Radioanalytical Methods offered to distance students (ECampus program)</td>
<td>IAEA International Collaborative Standard Problem (ICSP) on Prediction of Hydro-Mechanical Behavior in Reactor Core with a Plate-type Fuel Assembly</td>
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<td>Nuclear Future: New Nuclear Power Plants from Design to Generation, International Workshop</td>
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<tr>
<td>Yale University</td>
<td>Summer School on Solid State Dosimetry</td>
<td>International Conference on Solid State Dosimetry</td>
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<tr>
<td>University of Illinois</td>
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<td>Summer Workshop in International Security</td>
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