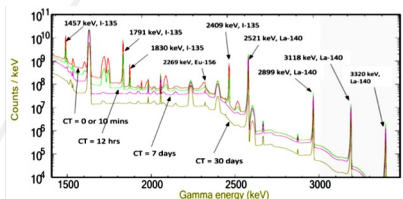
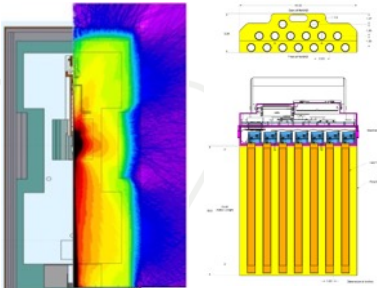
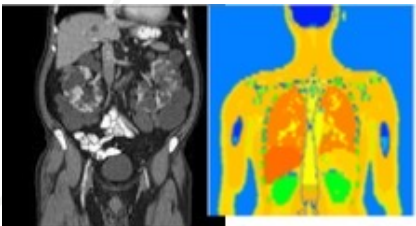


**Mission:** The **Radiological Engineering, Detection, and Dosimetry (RED<sup>2</sup>) Laboratory**, led by **Dr. Shaheen Dewji**, conducts innovative, interdisciplinary research focusing on harnessing **both computational capabilities** in Monte Carlo radiation transport modeling and **experimental measurements** for applications in **radiation detection**, **radiation protection and shielding**, **dosimetry**, **health physics**, and **nuclear materials accounting**.

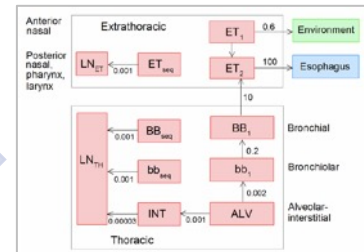


### Computational Dosimetry and Shielding

Development of dose coefficients and shielding design using Monte Carlo radiation transport codes

Age/sex-specific anthropomorphic computational phantoms

Radionuclide biokinetic models for emergency response and nuclear medicine

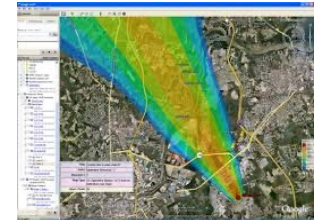


### Radiation Detection

Employment of validation and verification of gamma-ray spectroscopic detector responses

Contaminated environmental media for environmental assessment and decommissioning

Field triage of uptake during nuclear, radiological, and fission product release events



### Nuclear Nonproliferation and 3S (Safety, Security & Safeguards)

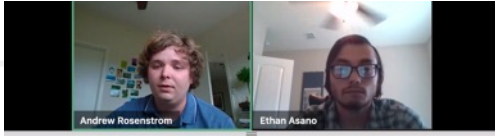
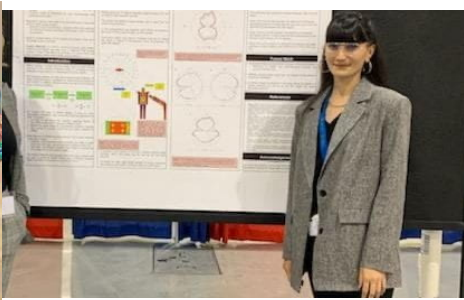
Nuclear materials control, accounting, and safeguards of SNM

Gamma-ray spectroscopic analysis for safeguards by design of advanced non-LWR reactors

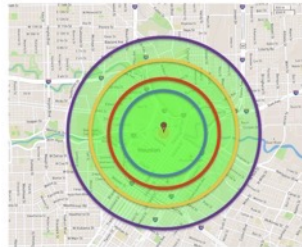
Neutron multiplicity counting for field search/detection and criticality safety







### Modeling Scenario: Estimation of Prompt Dose



- Detonation of little-boy bomb in Houston, Texas using the program NukeMap
- 1 rem dose at 2 km from hypocenter
- Threats:
  - IND detonated by nonstate actor
  - Low yield nuclear weapons
- How can decision makers and stakeholders prepare for an emergency response situation?

1000 rem 10 rem  
100 rem 1 rem

Contents lists available at ScienceDirect

**Nuclear Inst. and Methods in Physics Research, A**

journal homepage: [www.elsevier.com/locate/nima](http://www.elsevier.com/locate/nima)

Photon detector response function methodology using MCNP and shift hybrid radiation transport code for wide-area contamination assay applications

E. Asano<sup>a</sup>, D. Coleman<sup>b</sup>, G. Davidson<sup>c</sup>, S. Dewji<sup>a,\*</sup>

<sup>a</sup> Nuclear and Radiological Engineering and Medical Physics Programs, George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology



### Dose Coefficient Calculation for Use in Dosimetry Assessment of a Fission-Based Weapon

Andrew Rosenstrom,<sup>a</sup> Ethan Asano,<sup>a</sup> Keith Griffin,<sup>b</sup> Choonsik Lee,<sup>a</sup> David Hooper<sup>c</sup> and Shaheen Dewji<sup>a,1</sup>

<sup>a</sup> Department of Nuclear Engineering, Center for Nuclear Security Science and Policy Initiatives Texas A&M University, College Station, Texas 77843-3133; <sup>b</sup> National Cancer Institute, Rockville, Maryland 20850; and <sup>c</sup> Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830



## FUNDING AGENCIES AND COLLABORATORS



**Contact:**  
[shaheen.dewji@gatech.edu](mailto:shaheen.dewji@gatech.edu)  
<https://sites.gatech.edu/dewji/>  
 @DewjiRED2