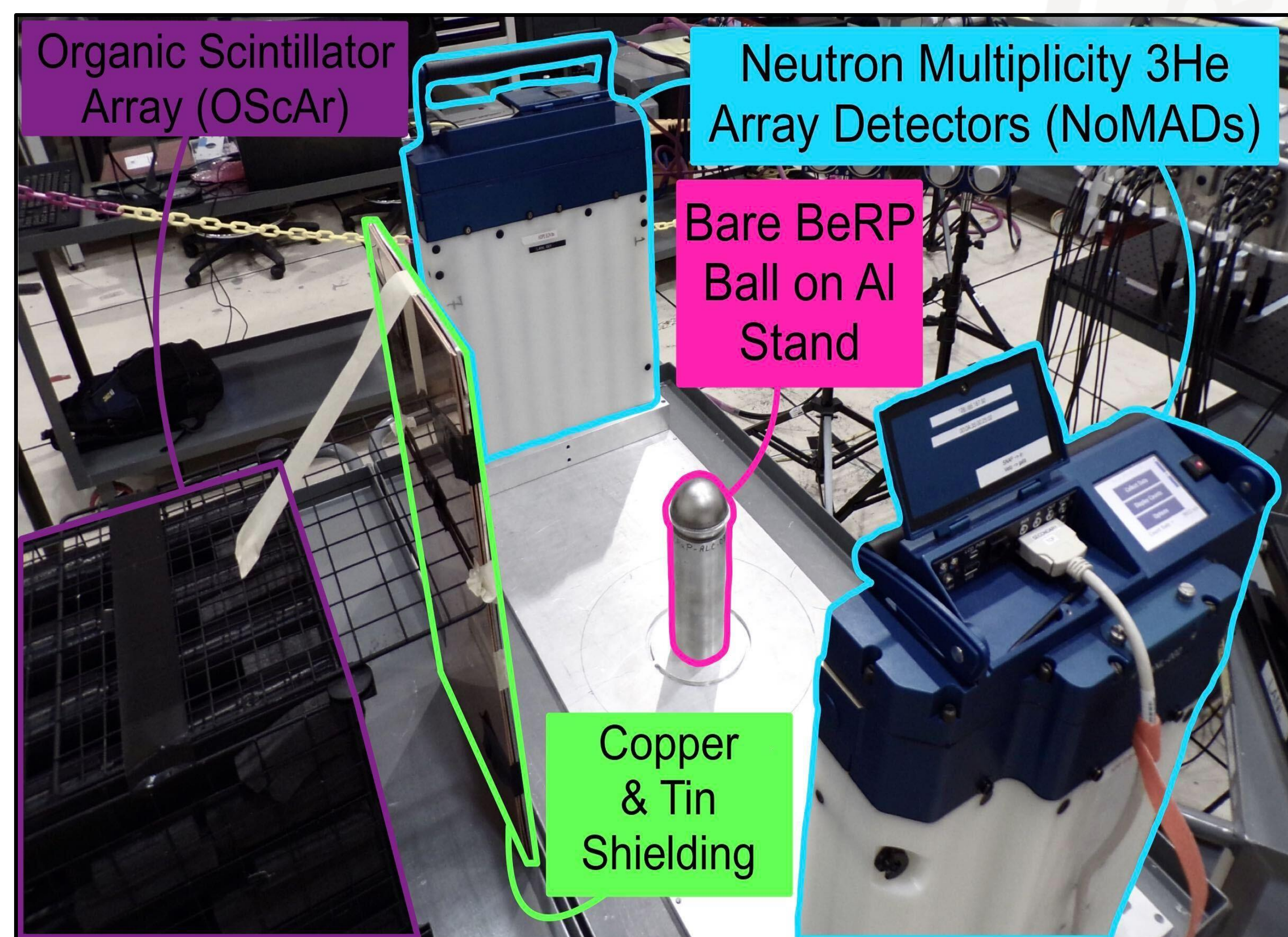


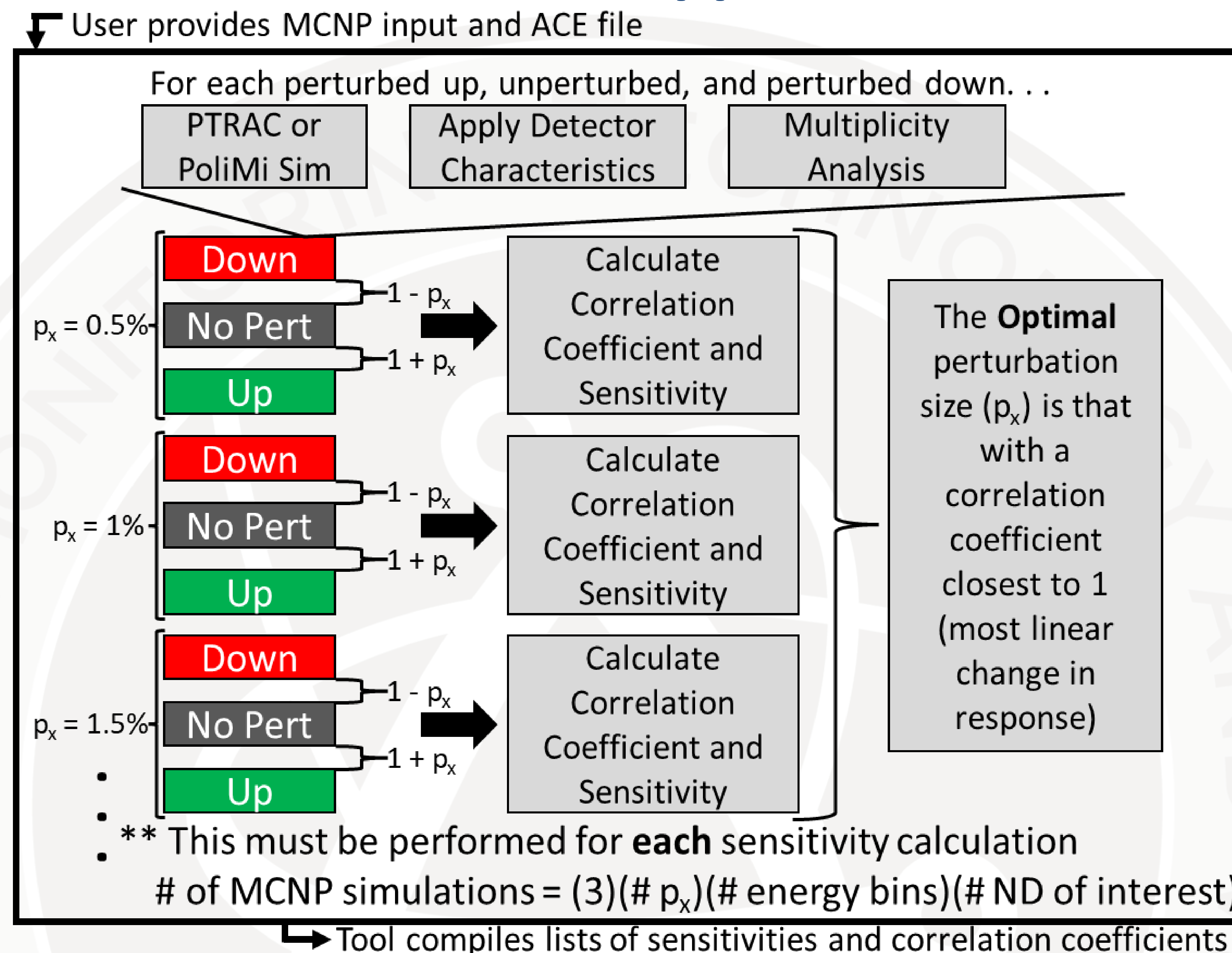
Introduction and Motivation

- This tool will streamline the design and analysis of subcritical benchmark experiments to improve nuclear data (ND)
- ND sensitivities are used to optimize experiments to reduce ND uncertainties
- Sensitivity calculations based on a central-difference approximation are used for responses not supported by more direct methods such as MCNP
 - Computationally expensive
 - Requires ND pre-processing and post-processing of results



- NoMADs are 15 ³He tubes (0.97x15 in. active cylinder) surrounded by polyethylene
- OScAr is a 3 by 4 array of trans-stilbene organic scintillators that are 2 in. long with a 1 in. radius

Technical Approach



MTV Impact

- National Laboratory connection through MTV resulted in a measurement campaign of kg quantities of special nuclear material at the National Criticality Experiments Research Center
- Networking at MTV events created connections with the MCNP development team

Expected Impact

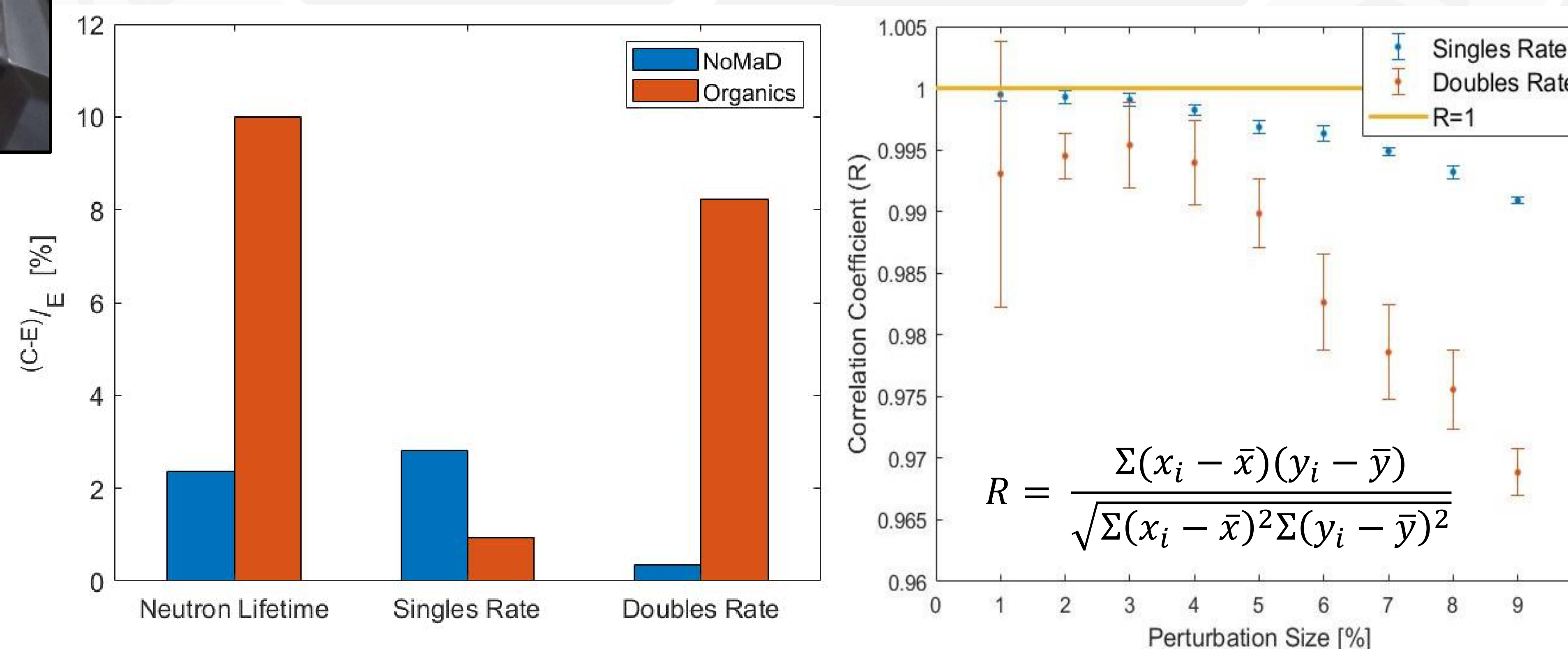
- This tool will be used to design integral benchmark experiments targeted at ND of interest

Mission Relevance

- Supports the design and analysis of integral benchmark experiments to improve nuclear data utilized in applications across the nuclear community

Results

- Current simulations match benchmarked and measured results within ~ 10%
- Doubles rates require larger perturbation sizes than singles rates



Conclusion

	NoMADs (³ He)	OScAr (Stilbene)
Singles Rate Sensitivity [%/%]	2.55 ± 0.116	3.75 ± 0.375
Doubles Rate Sensitivity [%/%]	7.91 ± 0.322	2.33 ± 0.233

Next Steps

- Decrease computational expense by implementing accelerated optimization method
- Compare results to a deterministic code, such as SENSIMG, for a simplified model