

# U.S.-EU: Bridging NanoEHS Research Efforts: Ecotox CoR Breakout

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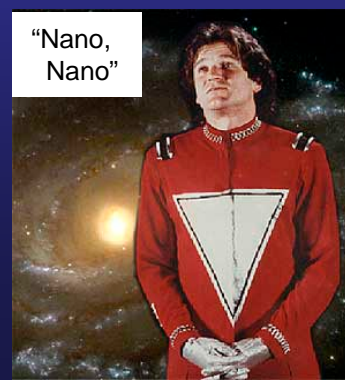
# Nanomaterials and Agriculture



- Prior to 2010, data on NM interactions with plants was limited. Many early studies looked only at NPs with no bulk material/ion comparison.
  - This is a key point. It is irrelevant whether a NP/NM is toxic. The key questions are is that NM/NP more toxic than the bulk/ion and if so, is it by a different mechanism?
- Are NM an emerging class of contaminants?
- There have been a number of recent studies assessing the effects of specific NPs on germination, root elongation, and other physiological/"omic" parameters
- These studies have tended to focus on acute toxicity; relatively short exposure to high concentrations. This is where we start in toxicology but as is frequently the case, chronic low dose exposure may be more important.
- Larger issue may be food chain contamination and an uncharacterized pathway of human exposure.



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# CAES Nanotoxicology Program

- The entire program is based on a simple question- From a regulatory standpoint, bulk/ion and NMs are considered equal. Is that true? Or are there important instances where NM “behave” differently? The follow up question; does it matter (hazard and risk assessment)?
- USDA NIFA Grant 1- “Addressing Critical and Emerging Food Safety Issues.” A 5-year \$1.5 million grant “Nanomaterial contamination of agricultural crops.”
  - Obj. 1: Determine the uptake, translocation, and toxicity of NM to crops.
  - Obj. 2: Determine the impact of environmental conditions on NM uptake, translocation, and toxicity to crops.
  - Obj. 3: Determine the potential trophic transfer of NMs.
  - Obj. 4: Quantify the facilitated uptake of pesticides through NM-chemical interactions.
- USDA NIFA Grant 2- Determine the impact of biochar on NM uptake and toxicity to crops and earthworm species.

