What I have learned...

- **Diversity is good!**
  - Clear correlation between pollinator abundance/diversity and crop yield
  - Different pollinator species/functional groups can synergize and buffer against losses
  - Pollinator diversity is correlated to landscape diversity
  - Landscape diversity may buffer effects of pesticides (drift, nutrition)
What I have learned...

• **We need an Integrated Pest Pollinator Management (IPPM) approach**
  - Get info to growers who would benefit
  - Find policy approaches to encourage adoption
  - Avoid tragedy of the commons (need all growers to cooperate)

• **Involve the ecologists!**
  - Ecologists deal with messy, variable data
  - Apply approaches to large data sets associated with disease, environmental contaminants, etc
  - Example: Bee Informed Partnership
What I have learned...

• My PhD research is finally useful!
  – Our approach to risk analysis for pharmaceutical chemistry and pollinator conservation are exact opposites
    • If a drug candidate fails a Tier 1 test (toxic to cell culture), it is not further tested in humans, even though humans have livers to detox and the drug may not be so harmful. If a pesticides fails (toxic to individual bees), it is automatically evaluated on colonies.
  – Clear disconnect between lab assays and regulation
  – Attempt to bridge via field experiments, but this is costly/wasteful and variability will likely obscure impacts
  – Need to achieve consensus on tested substances, exposure rates/doses, accepted lab assays and accepted field assays
What I have learned...

- 1000 active ingredients × 20 formulations × 100 mixtures × 2 life stages × 4000 species =
  - Job security (kidding)
  - Highlights the need to develop biologically rational generalizations to reduce complexity
What I have learned...

• Better apply our basic knowledge to pollinator health and conservation
  – Know a great deal about genomics, physiology, neurobiology, behavior, cognition
  – Can we harness this to understand (at mechanistic level) impact of four ‘p’s – pathogens, parasites, pesticides, poor nutrition
  – Can we develop better assays?
Goals for 2016...

• Keep conversations going

• Develop new collaborations

• Get all A’s on Dave Mendes’ report card!
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