Agenda

- Introductions
  - who are we and why are we here?

- Challenges
  - Difficulties in studying food distribution dynamics

- Opportunities
  - Use of simulation and modeling in food traceability

- Examples
  - Food distribution models and their application
Introduction to IFT

- For more than 75 years, the Institute of Food Technologists (IFT) has unlocked the potential of the food science community by creating a dynamic global forum where members from more than 100 countries can share, learn and grow.
- More than 18,000 members worldwide
- Members come from industry (80%), academia (15%), and government (5%)
- 18% of IFT members are international in more than 100 countries

Introduction to GFTC

- IFT’s Global Food Traceability Center serves the food and agricultural sectors on science-based unbiased pragmatic advice on traceability
Introduction to Traceability: Role in Food Safety and Defense

- Causality
- Visibility
- Prevention
- Preparedness
- Recovery
- Response
- Trust
- Agility

Food Safety and Defense

Challenges: Butterfly Effect

Butterfly on a flower
Challenges: Globalized Supply chains

- **Tomatoes**: While the U.S. produces the most tomatoes, Mexico accounts for 71% of tomato imports, and Canada accounts for 27%.
- **Cheese**: 14% of the raw buffalo milk used for mozzarella is made in Italy, while 86% of buffalo milk is produced in Asia.
- **Anchovies**: 56% of our anchovies are produced in Peru, while pizza anchovies come from Argentina, Croatia, Spain, and Italy.
- **Mushrooms**: China produces 47% of our mushrooms across the globe, followed by the U.S. which produces only 11%.
- **Spices**: 11.5% of India’s spices are exported to the United Arab Emirates, the U.S., the EU, and Malaysia.
- **Peppers**: 95% of unprocessed peppers are exported to the U.S., China, and Hong Kong.

Challenges: Data

[Graph showing data trends over time]
Challenges: Garbage In = Garbage Out

Opportunities: Real Data

Real Data is already collected all the time!
- Academic research
- Teaching and learning
- Business intelligence
- Risk mitigation
- Supply chain efficiencies
- Outbreak investigations
- Recalls
- …
Challenges: Complexity

Application of Modeling and Simulations (M&S)
- Predictive microbiology
- Processing conditions
- Packaging operations
- Sensory characteristics
- Shelf-life studies
- Supply chain dynamics

Opportunities: Modeling and Simulation

Advantages of Modeling and Simulations (M&S)
- Cost effective
- Fast turnaround
- Near real-time feedback
- Measure secondary and tertiary effects
- Impact of decision-making
Challenges: Privacy
Challenges: Reality

Researcher

Data?

Sorry, law prohibits

Joint Proposal?

Data?

Sorry, boss prohibits

Government

Industry

Academia

Examples of Food Distribution Models

- **Supply Chain Dynamics**
  
  A VIRTUAL model of the supply chain using distribution dynamics and business intelligence extracted from the input data

- **Continuous Evolution**
  
  A VIRTUAL model of the supply chain as more data (and therefore more insights) becomes available
Examples of Food Distribution Models

- Comparative Analysis

Scenario 1

Scenario 2
Conclusion

- Simulation and Modeling Food Traceability
  - What it is NOT about…
    - The Matrix
    - Inception
    - Iron Man
  - What it is about…
    - Seeing the unknown
    - Merging of real and virtual
    - Leveraging a powerful tool

Thank you

Tejas Bhatt
Director, Global Food Traceability Center
Institute of Food Technologists
tbhatt@ift.org

http://www.globalfoodtraceability.org
http://www.ift.org

This project is supported by the U.S. Department of Homeland Security S&T through a grant awarded by the Food Protection and Defense Institute.