Crowd Disasters

**Issue:**
Fatalities from crowd disasters are on the rise.

**Problem with Traditional Approach:**
Assumes people must be made to behave. Focus is on “crowd control”, which can end up causing friction. For example, when there is a protest toward police brutality, and the police show up in riot gear.

**How Complexity Science Can Help:**
Research shows most crowd related fatalities result from ‘crowd turbulence'. Computer modeling allows us to investigate the level of crowd turbulence under various conditions. As a result, we can identify and address sources, such as optimizing venue layout to reduce congestion. We can also involve stakeholders by allowing them to utilize their communication devices to report information (passively or actively), and receive important updates.

Crime

**Issue:**
Crime is committed despite harsh penalties.

**Problem with Traditional Approach:**
Assumes criminal activity can be deterred if the penalty is harsh enough.

**How Complexity Science Can Help:**
Consider the individual in the context of their system. Generate a model which accounts for factors such as socioeconomic background, education, barriers (such as prejudice), and behavior of ‘neighbors'. Attempt to address problematic aspects of the system in order to improve lives, resulting in fewer incentives to engage in criminal activity.

Terrorism

**Issue:**
Data suggests some ‘War on Terror’ strategies result in increased radicalization.

**Problem with Traditional Approach:**
Often fails to properly account for the many different factors leading to radicalization, which often vary significantly from region to region.

**How Complexity Science Can Help:**
Join forces with social sciences, and leverage available conflict data to more accurately model and understand the dynamics of individual systems.
**War**

**ISSUE:**
Accurately predicting wars has historically remained elusive.

**PROBLEM WITH TRADITIONAL APPROACH:**
Signs of tension can be subtle. Compiling and interpreting available data was time consuming. By the time a report was ready, it was often outdated.

**HOW COMPLEXITY SCIENCE CAN HELP:**
Using data mining and content analysis to identify ‘tension keywords’ in the news, researchers were able to predict wars several months in advance with 85% accuracy. This could allow for increased intervention with the goal of defusing the situation.

**Disease**

**ISSUE:**
Accurately predicting the spread of disease is essential to allocating response resources.

**PROBLEM WITH TRADITIONAL APPROACH:**
Because of the high number of factors contributing to the spread of disease, and the intense complexity of taking them all into consideration, it has historically been very difficult to predict.

**HOW COMPLEXITY SCIENCE CAN HELP:**
Using highly sophisticated modeling tools such as GLEAM (Global epidemic and mobility) many factors can now be taken into consideration with high accuracy. In addition, mapping out the most likely path the spread will take given a specific origin, combined with the early detection opportunities offered by available technology allows resources to be quickly allocated and deployed to achieve optimal coverage.

**Discussion**

Do you think any of these problems can be significantly understood without interdisciplinary collaboration?

Which of their findings did you find most interesting, and why?

Can you identify a question within your research interests that you feel would benefit from interdisciplinary collaboration?