

# Transdisciplinary & Translational Approaches to Disaster Management Research – *Reflections on the PhD process*

Zeno Franco, PhD (Clinical Psychology)

*Graduate Assignment:* National Center on the Psychology of Terrorism

Pacific Graduate School of Psychology, Stanford University, VA Medical Center

*Currently:* Post Doc Fellow, Dept. Family & Community Medicine, Medical College of Wisconsin

# Roadmap

- Explore the opportunities and challenges of doing graduate work in a transdisciplinary problem space
- Provide a reflective overview of my own graduate research process as a way to discuss the specifics of these opportunities and challenges (10,000 foot level)
- How to use proximal steps (papers) to focus your research, while building your CV
- Thoughts on how to transition your research agenda as you move toward post doc and/or early faculty appointments

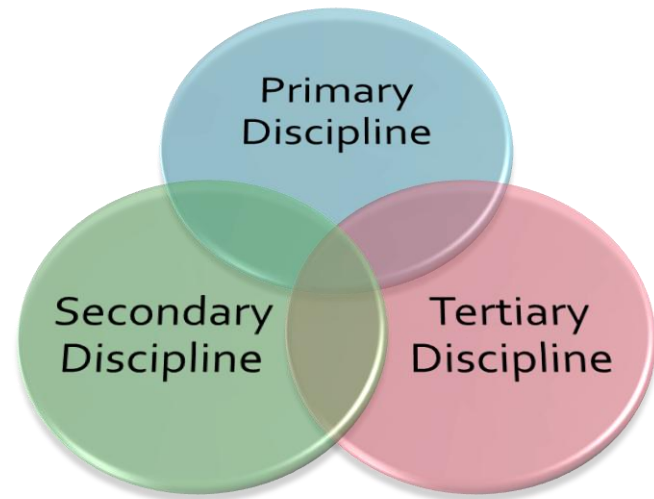
# Transdisciplinarity & Translational Science

- Different than interdisciplinary or multidisciplinary research
  - Not better or worse: Different
  - Working at the margins of several disciplines
  - Attempts to solve difficult societal problems
  - Create new theories & methods – incipient stages of a new discipline
  - Translating findings from the lab to the real world and back
- How is interdisciplinarity usually depicted?

# Transdisciplinarity & Translational Science

- Different than interdisciplinary or multidisciplinary research
  - Not better or worse: Different
  - Working at the margins of several disciplines
  - Attempts to solve difficult societal problems
  - Create new theories & methods – incipient stages of a new discipline
  - Translating findings from the lab to the real world and back

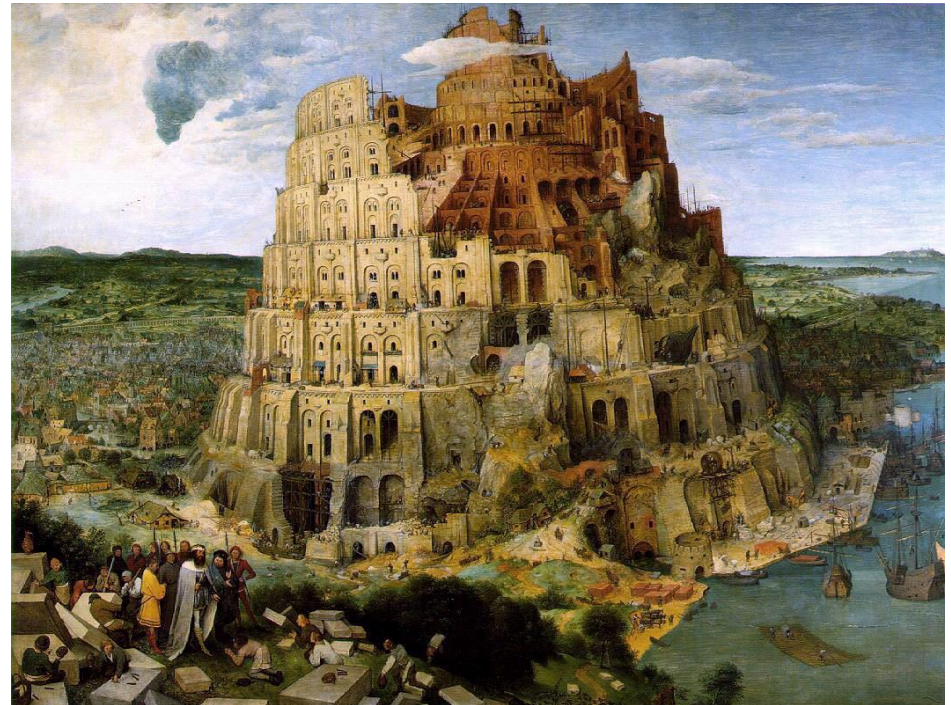
- How is interdisciplinarity usually depicted?



# Academic “Stovepipes”

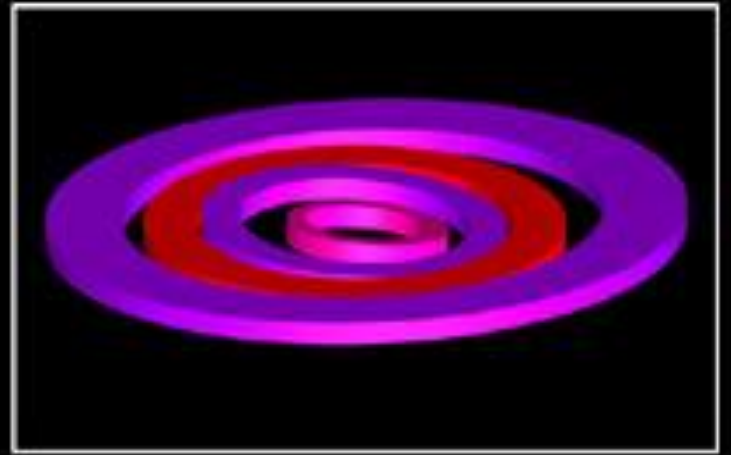
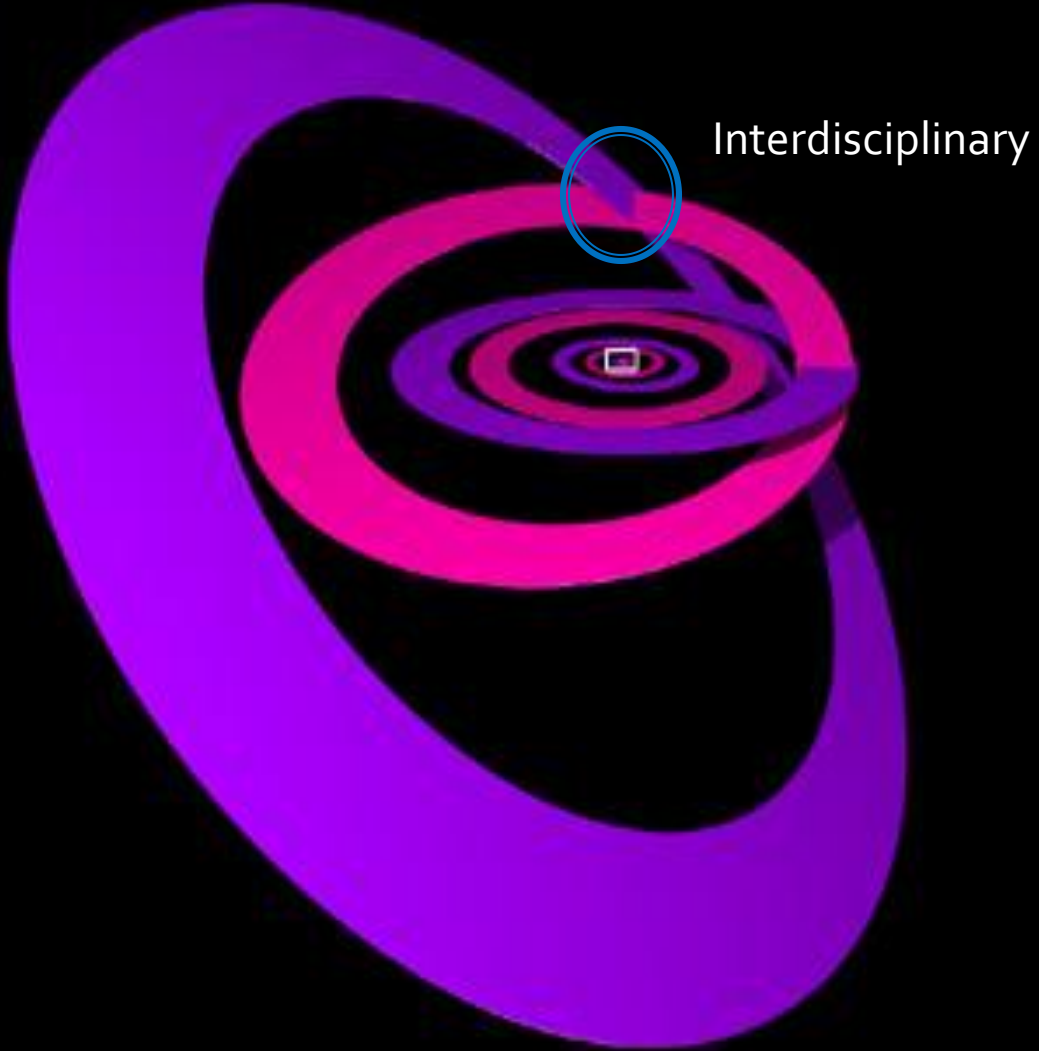
- “The United States faces a serious but silent intellectual crisis: U.S. national security elites have separated into two tribes of specialists, technical and nontechnical, who are incapable of communicating with each other. The implications of the divide between experts in science and technology on one hand and experts in politics on the other are dangerous and far-reaching. If the United States policymaking community cannot bridge the gap between these communities, we risk making mistakes with repercussions running all the way from wasting scarce resources to war.
- **This insularity begins in graduate school or during professional preparation, where young specialists are taught to revere the norms and knowledge of their own field or institution above all others”**

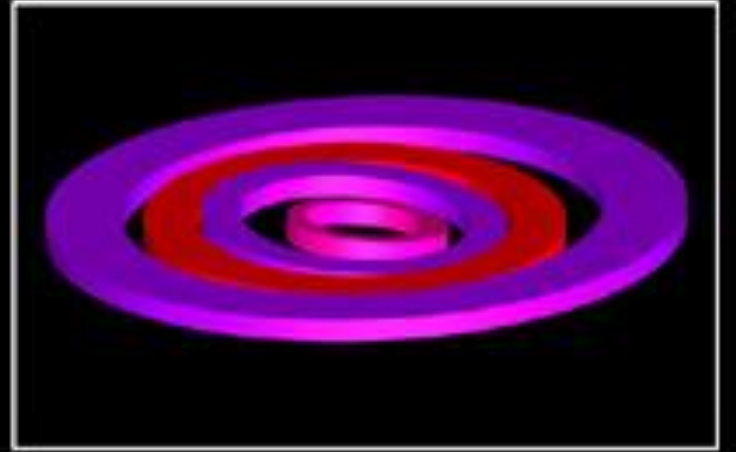
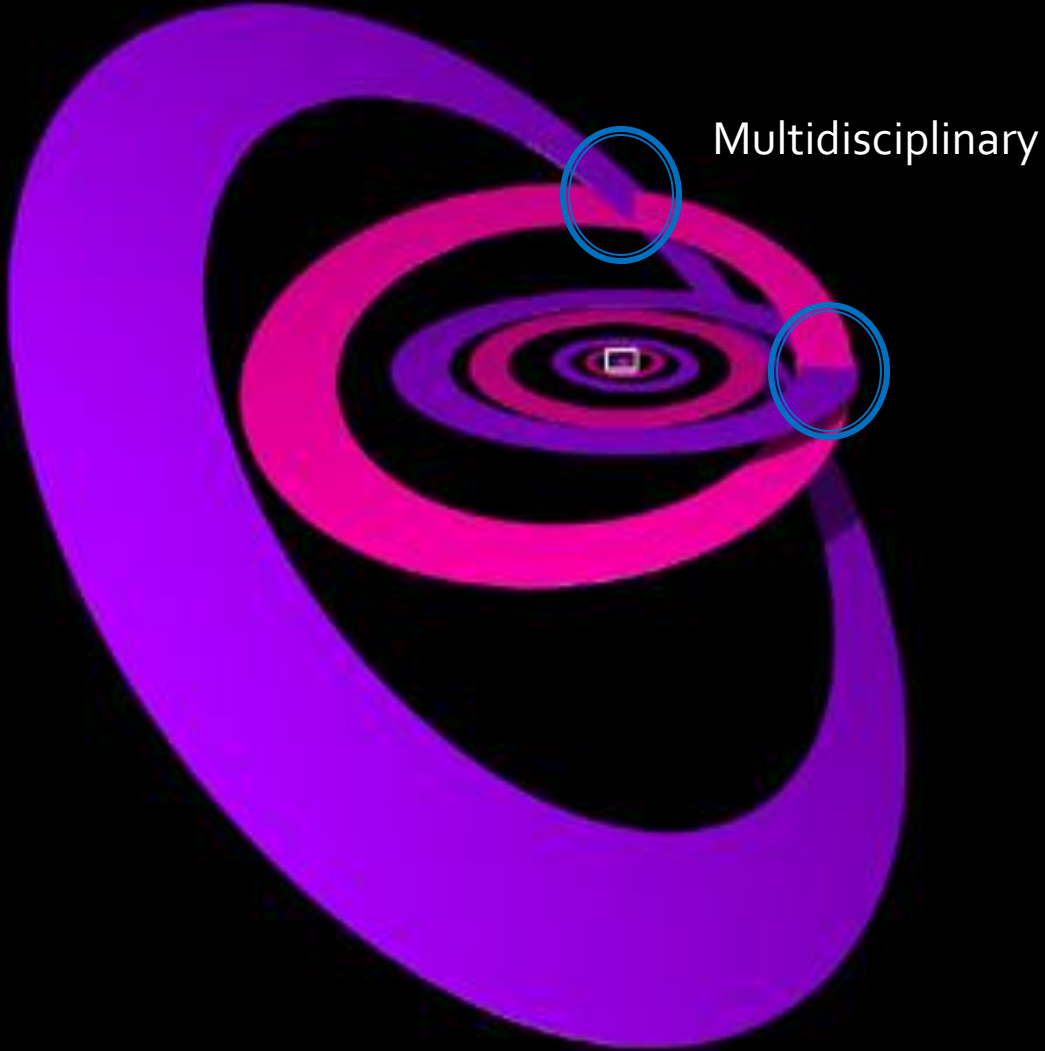
Johnson-Freese, Joan and Thomas M. Nichols.  
“Academic Stovepipes Undermine U.S. Security.”  
*World Politics Review*, April 14, 2011.



**“The Problem of Knowledge (Communication Between Disciplines!)” Pieter Bruegel: The Tower of Babel 1563) – Murray Turoff’s homepage**

We are often unaware of how differently people from other disciplines conceptualize problems, we make fundamentally different assumptions, we model the world in very different ways, we value different forms of evidence.





Initially, saw myself as a psychology researcher trying to inform information science researchers on *what they were getting wrong about human behavior in the context of crisis*

Information  
Sciences

Disaster Studies

Psychology

ISCRAM 2007 on [VIRTUALPOLITIK](#) Blog

*Danger is their Business – Liz Losh*

"I thought that one of the big stories of the conference was the lively debate between John Carroll and Zeno Franco... Franco certainly scored some points as well about the need for providing real data that shows the usability of technologies for crisis management and the role of human -- specifically political -- factors in effective disaster ...

[I was troubled by] Franco's *disciplinary power play at work in a highly interdisciplinary forum for exchanging ideas about critical and global issues*. In short, Franco made it clear that he wanted to see social science formatted papers with methods sections. Then, he even went so far as to dismiss computer science as a 'science.'"

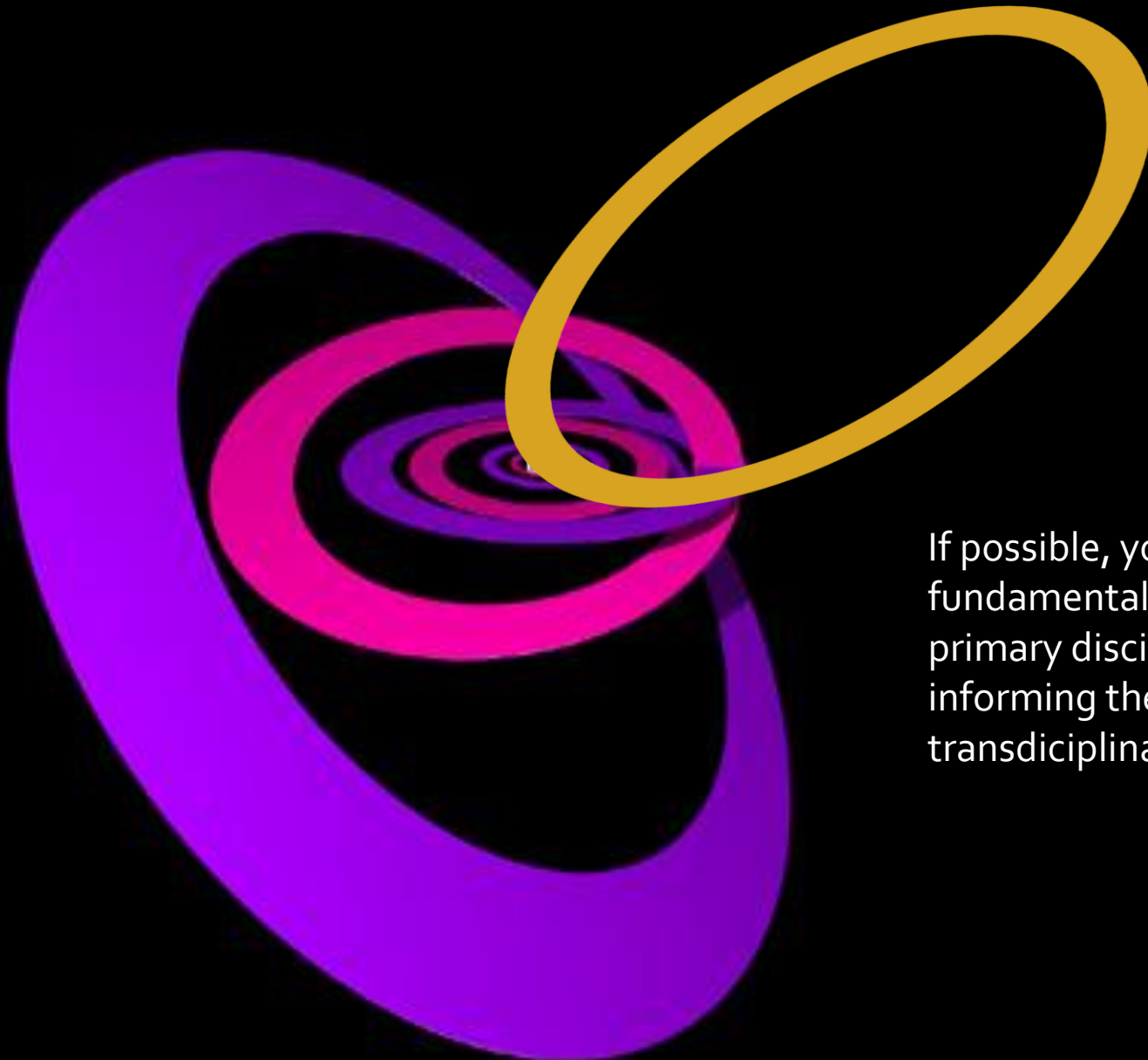
<http://bit.ly/IDBmH3>

## Transdiscipline / Nascent new discipline

- Drawn from other fields, but:*
- New assumptions
- New theories
- New methods
- New forms of evidence
- Begin to belong to a new community of practice



Transdiscipline / Nascent new discipline



If possible, your goal is to answer fundamental questions in your primary discipline, while also informing the developing transdisciplinary space

Transdiscipline / Nascent new discipline

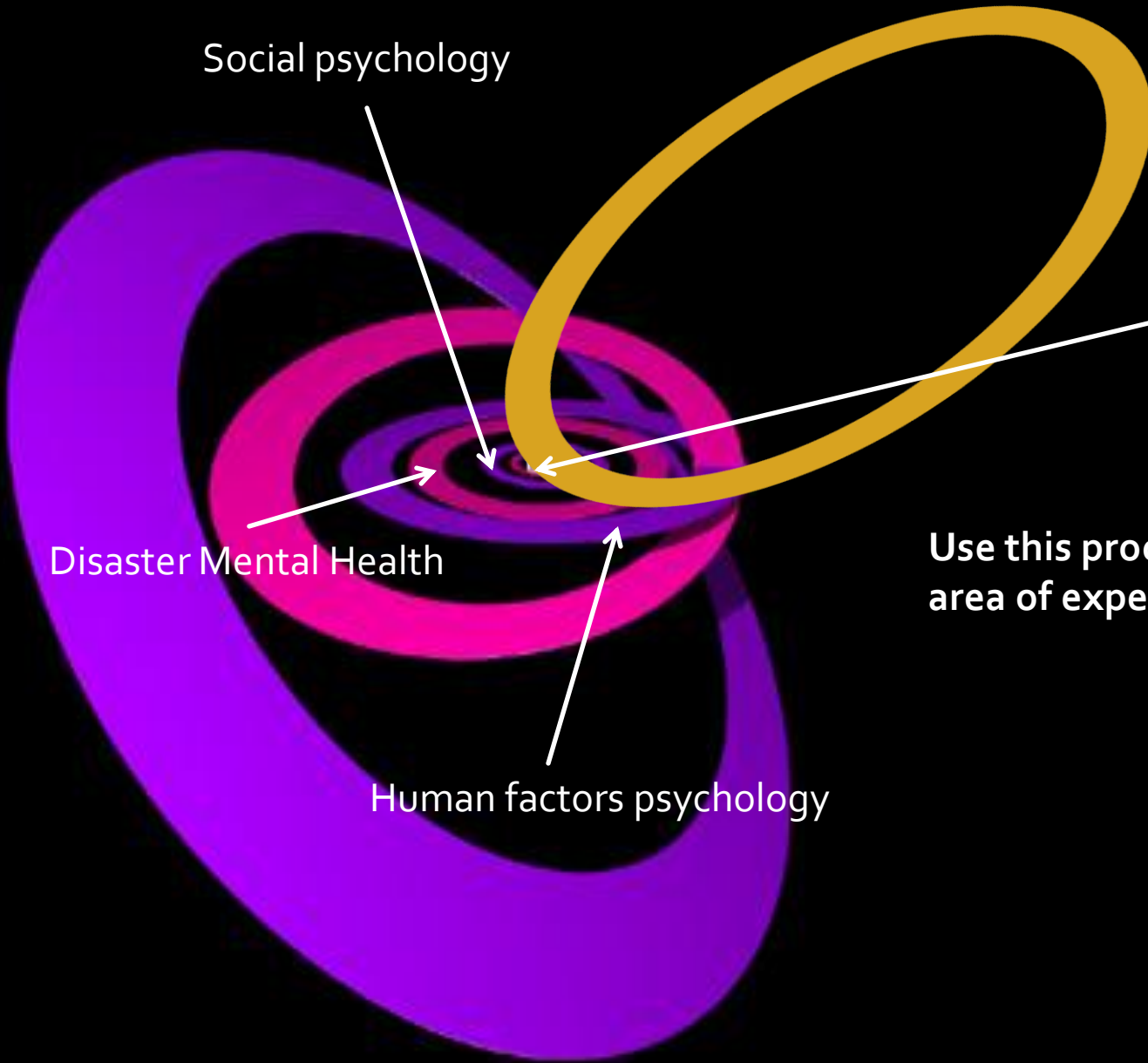
Social psychology

Human behavior  
In the context of crisis

Disaster Mental Health

**Use this process to define your  
area of expertise**

Human factors psychology



# More Than Pretty Pictures – The Struggle Toward A Theory of Disaster Management

- the *goal of constructing* a general theory of emergency management should be a top priority within the disaster research community. We are not there yet although many promising leads can be identified.

Drabek (2004). Theories relevant to emergency management versus a theory of emergency management. *FEMA Higher Education Conference*.

- Ten Barriers
  - *What is a disaster?*
  - *What is emergency management?*
  - *What hazards should we focus on?*
  - *Should we continue to give preference to the concept of hazards?*
  - *What variables should be explored in academic research?*
  - *What actors should be incorporated into academic studies?*
  - *What phases should be given priority?*
  - *What disciplines should contribute to emergency management?*
  - *What paradigms should guide our field?*
  - *What is the proper balance for knowledge generation?*

McEntire (2004). The Status of Emergency Management Theory: Issues, Barriers, and Recommendations for Improved Scholarship. *FEMA Higher Education Conference*.

# My Dissertation

- In the beginning
  - Interested in PTSD and expected to become an expert in disaster mental health
  - Turning point – Hurricane Katrina (& article in AP)
  - Began to see that poor disaster management was a major preventable risk factor for psychological injury
  - From this perspective, *prevention* i.e. improving actual disaster management performance (not preparedness) is key to avoiding psychological harm
- The problem
  - My program was focused on clinical psychology
  - Wanted to do human-in-the-loop simulations to address the problem
  - Little local support for this work
- Solutions
  - Looking for connections – embracing chance
  - Collaboration
  - Funding
  - More collaboration

# Grant Funding

- Dissertation funded by
  - US Navy – Office of Naval Research
  - National Science Foundation Small Business Technology Transfer grant (STTR) in collaboration with Quimba Software (Award IIP-0637999)
    - US\$ 147,000 over 1 year
  - Total cost ~\$167,000
    - Salary support
    - Licenses for Aptima's DDD simulator
    - Consulting from BEST Lab at Wright State to learn DDD

# Study Design

## ■ Psychology

- Experimental problem characterization
- Interrupted Time Series Design
- Manipulation Check (FEMA ICS-100 Training)
- Characterizing Improvisation
- Ideographic predictors of improvisation
  - Integrative complexity
  - Time perspective
  - Ambiguity Tolerance
- Team focused measures (heterogeneity of teams)

## ■ Information Science

- Distributed team-in-the-loop simulator
- Maps & Geographical Information
- XML based scenario generation
- Detailed simulation logging
- Symbol sets – visual representation of situation

## ■ Other methods used

- Delphi method for score normalization

# Aptima Distributed Dynamic Decision-making (DDD) Simulator



**Simulation Status**

<b>PlayerID</b>	Fire Command
<b>Scenario</b>	Paso Robles Earthquake
<b>Score</b>	

**Unit Status**

<b>Object Name</b>	
<b>Object Class</b>	
<b>Status</b>	
<b>Location</b>	
<b>Altitude</b>	
<b>Max Speed</b>	

**Unit Controls**

Movement Capabilities SubPlatforms

Additional Options

Throttle:  Current Throttle:

Fuel Gauge:  Max Fuel:

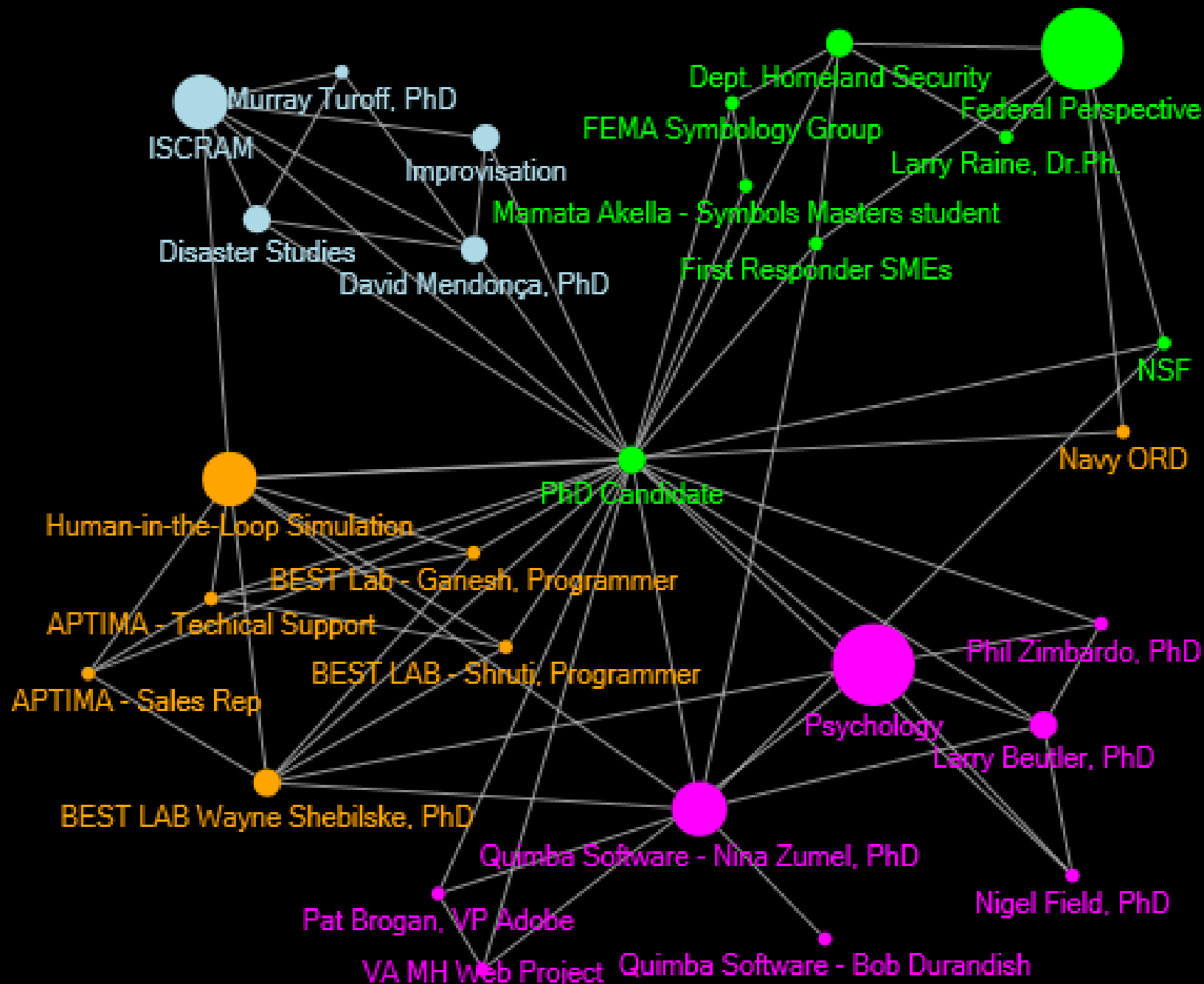
Vulnerabilities

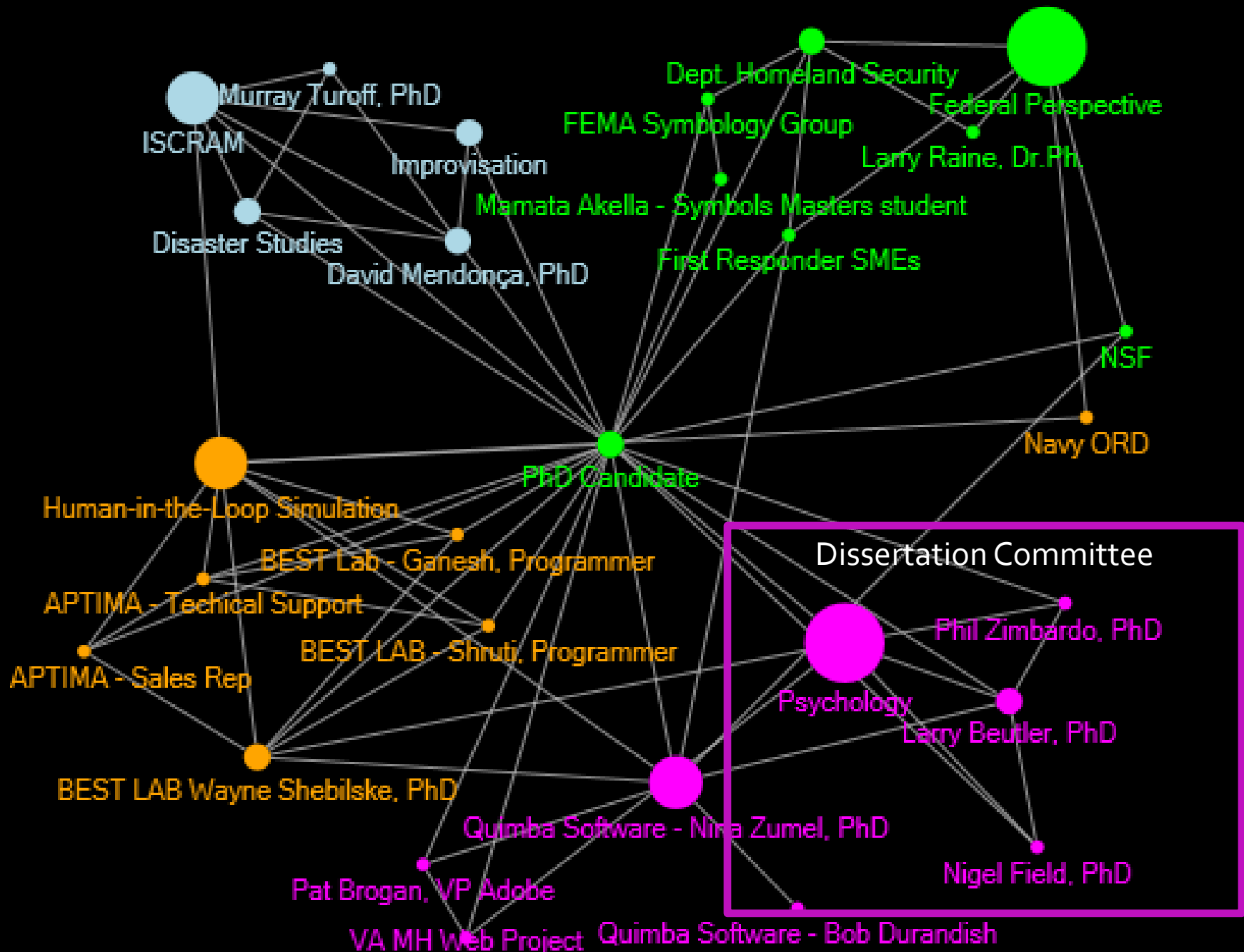
PasoRobles300dpi

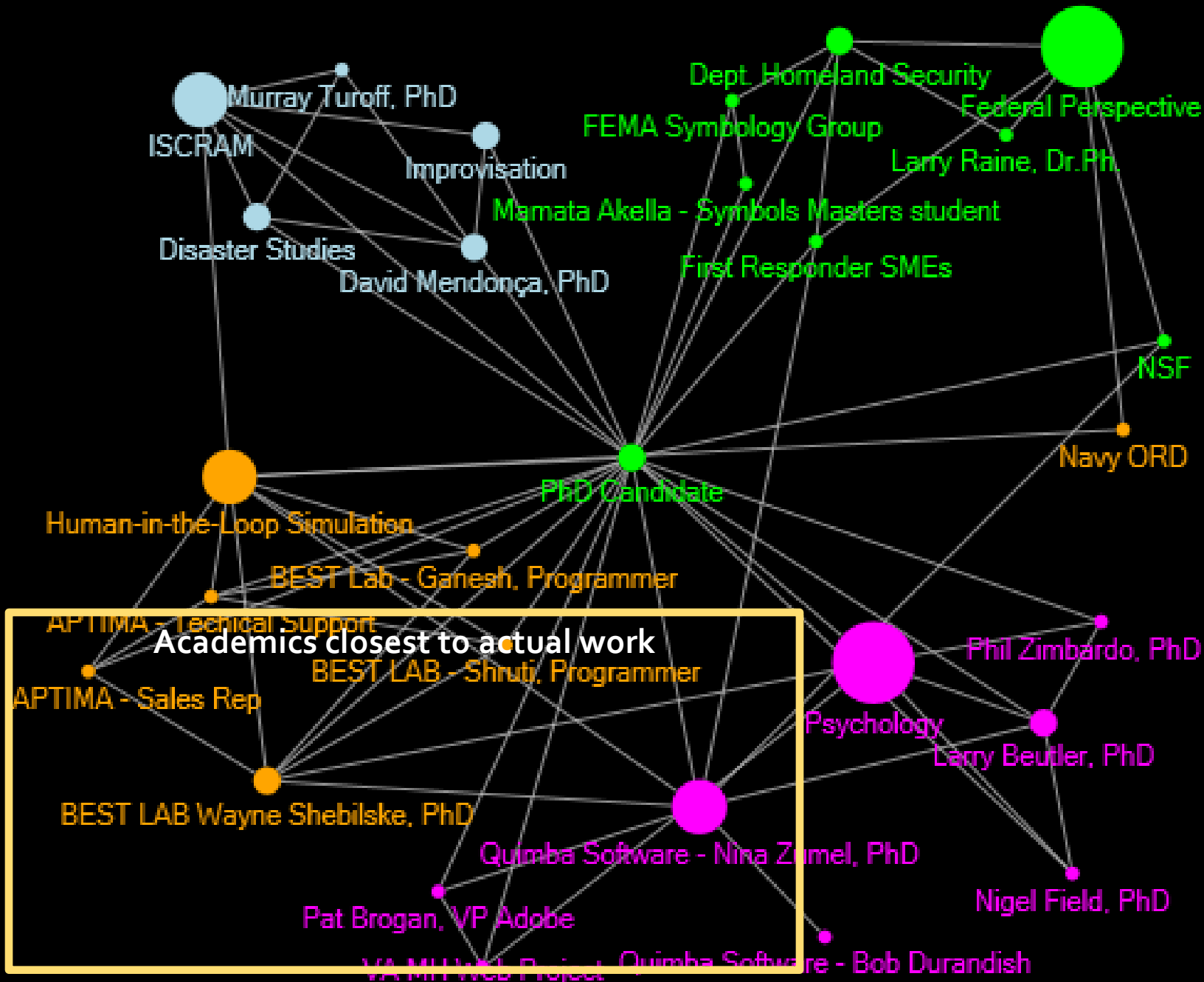
Zoom:  Unit Finder Category: Managed Units Unit Finder:

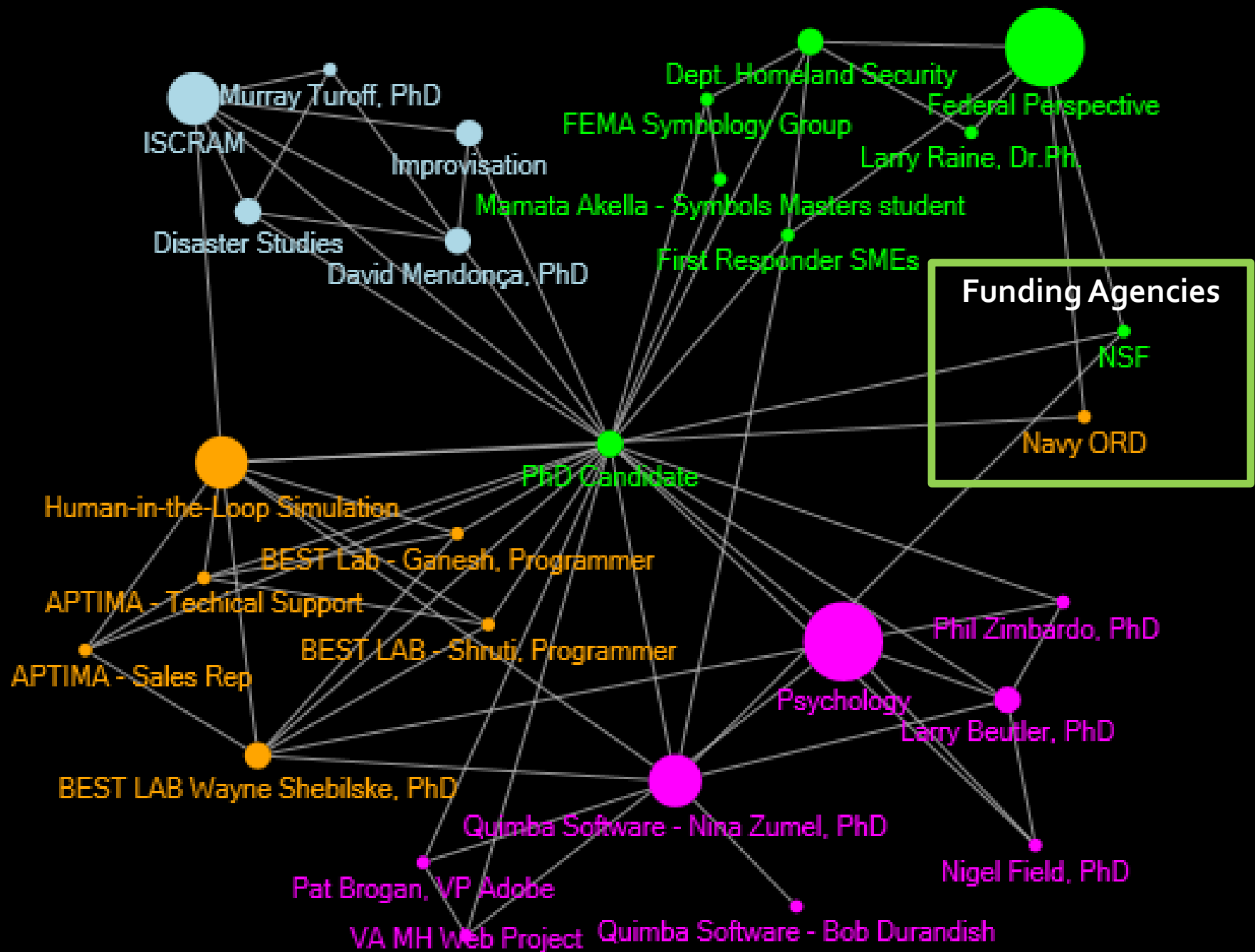
Send

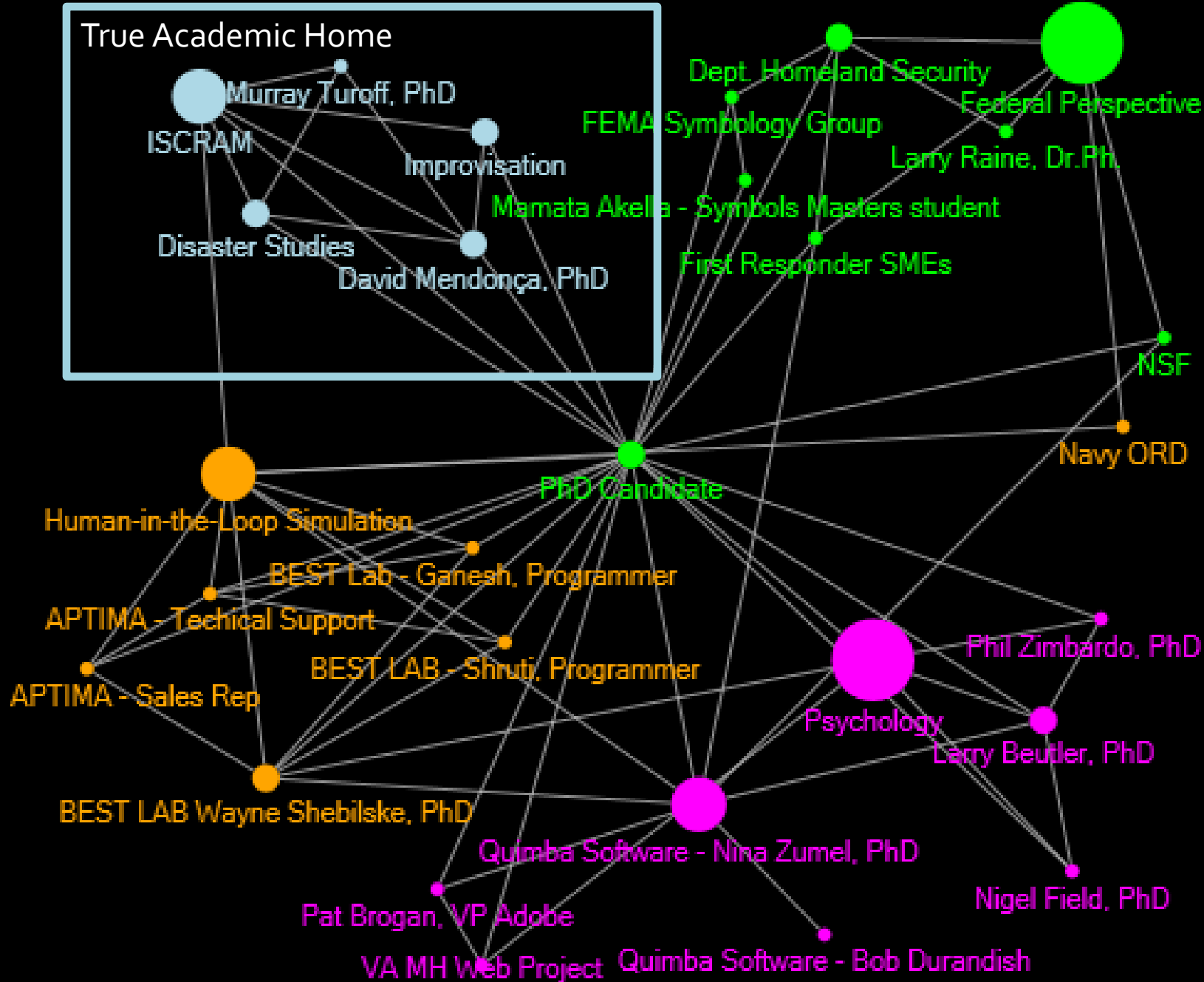
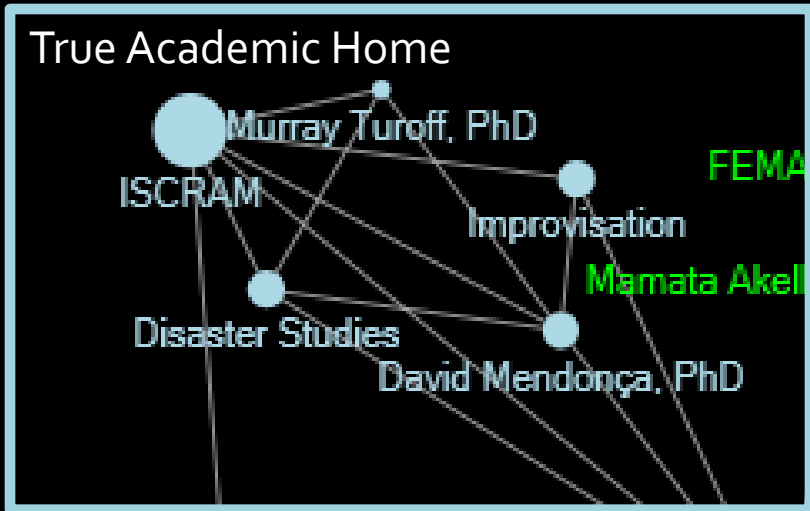
(00:05:21) Fire Command: I NEED HELP IDING FIRES  
 (00:05:26) Fire Command: where are they??  
 (00:05:26) Police Command: EMS, can you assist?  
 (00:06:31) EMS Dispatch: i am going.





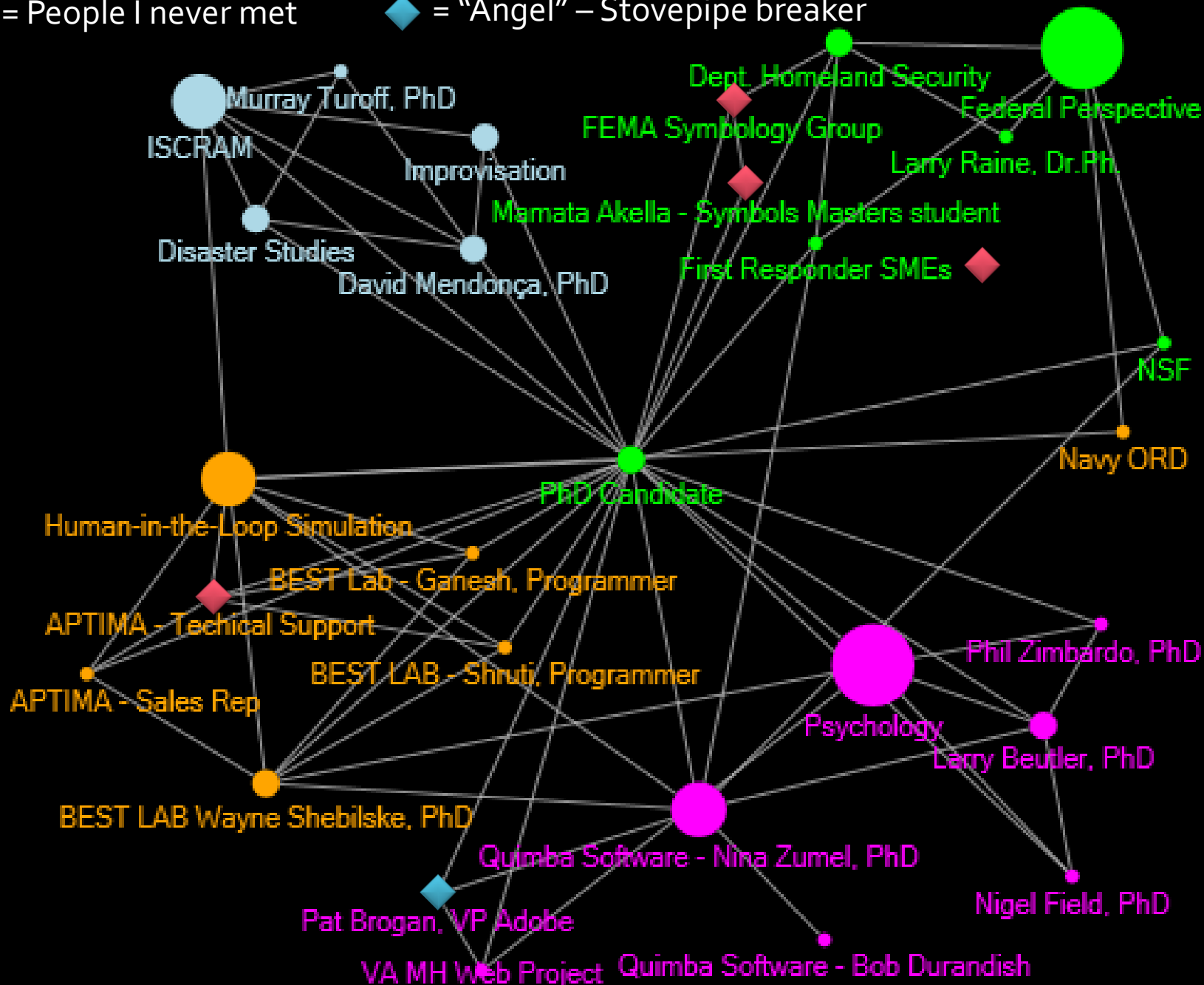






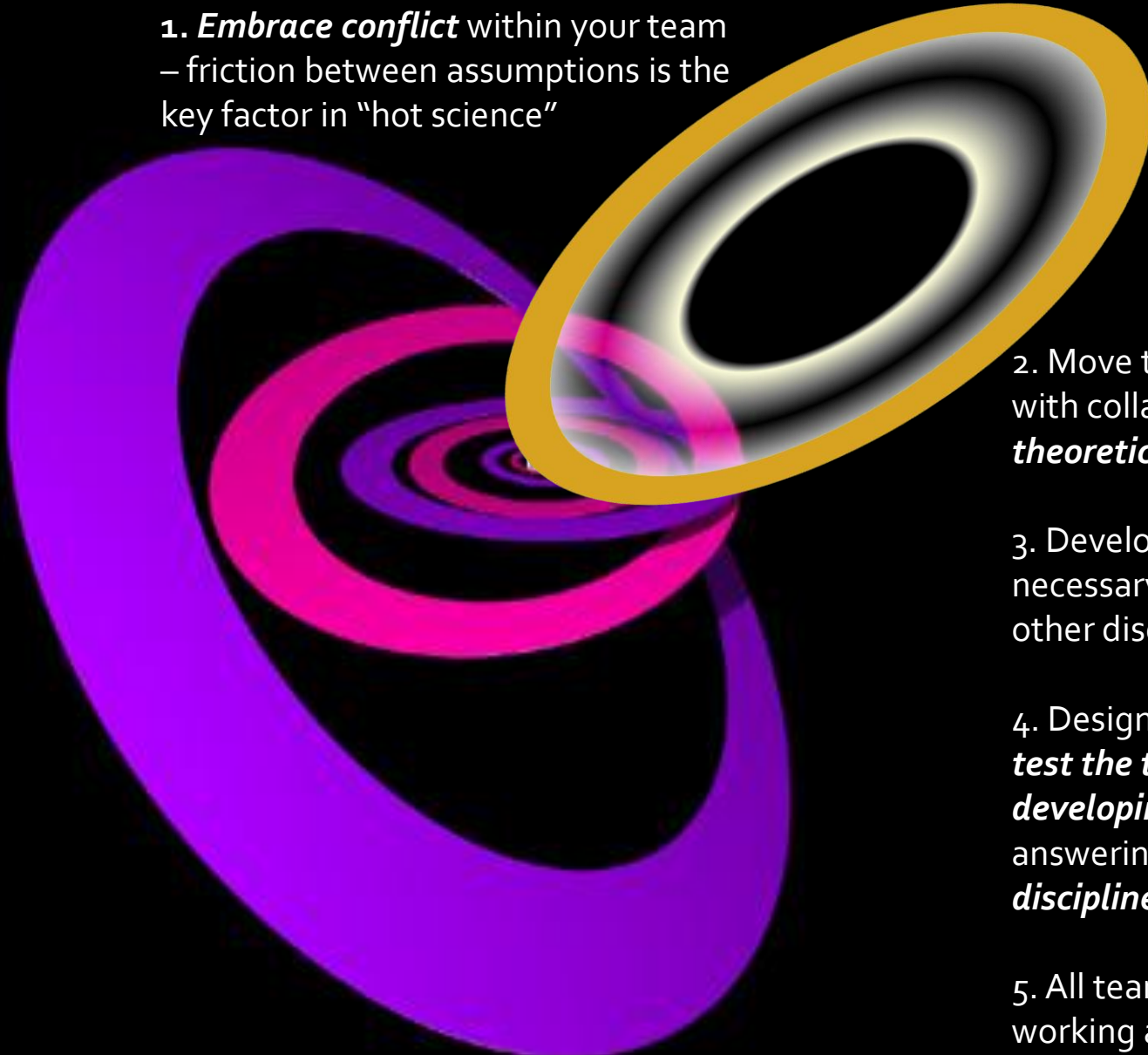
◆ = People I never met

◆ = "Angel" – Stovepipe breaker



# Keys to Creating a Transdisciplinary Community of Practice that Supports Your Work

1. **Embrace conflict** within your team  
– friction between assumptions is the key factor in “hot science”

An abstract graphic consisting of several overlapping, glowing rings. One prominent ring is yellow with a white-to-black gradient, positioned in the upper right. Below and to the left, there are several overlapping rings in shades of purple and pink, also with a gradient effect. The rings appear to be part of a larger, complex structure, possibly representing a network or a multi-layered system.

2. Move toward a **common language** with collaborators and **shared theoretical space**

3. Develop new methods only when necessary – **borrow and modify** from other disciplines where ever you can

4. Design projects that **inform and test the theoretical models of the developing discipline** while answering questions **in your primary discipline of interest**

5. All team members should be working at the **edge of their expertise**

## Evaluating the Impact of Improvisation on the Incident Command System: A Modified Single Case Study using the DDD Simulator

*Proceedings of the 6<sup>th</sup> International ISCRAM Conference – Gothenburg, Sweden, May 2009*  
*J. Landgren, U. Nulden and B. Van de Walle, eds.*

100 *Int. J. Emergency Management, Vol. 5, Nos. 1/2, 2008*

---

### Causality, covariates and consensus in ISCRAM research: towards a more robust study design in a transdisciplinary community

---

---

### The Dirty Dozen

---

*Twelve Failures of the Hurricane Katrina Response and*

*How Psychology Can Help*

---

118

February–March 2007 • American Psychologist

Copyright 2007 by the American Psychological Association 0003-066X/07/\$12.00  
Vol. 62, No. 2, 118–130 DOI: 10.1037/0003-066X.62.2.118

**Improving Military-Civilian Coalition Disaster Management Performance:  
Using Simulations to Evaluate the Role of Social Modeling on Emergent Leadership**

ISCRAM PHD  
COLLOQUIM PAPER

## Evaluating the Impact of Improvisation on the Incident Command System: A Modified Single Case Study using the DDD Simulator

*Proceedings of the 6<sup>th</sup> International ISCRAM Conference – Gothenburg, Sweden, May 2009*  
J. Landgren, U. Nulden and B. Van de Walle, eds.

100 *Int. J. Emergency Management, Vol. 5, Nos. 1/2, 2008*

---

### Causality, covariates and consensus in ISCRAM research: towards a more robust study design in a transdisciplinary community

---

---

## The Dirty Dozen

---

*Twelve Failures of the Hurricane Katrina Response and*

*How Psychology Can Help*

---

118

February–March 2007 • American Psychologist

Copyright 2007 by the American Psychological Association 0003-066X/07/\$12.00  
Vol. 62, No. 2, 118–130 DOI: 10.1037/0003-066X.62.2.118

MAJOR PSYCHOLOGY  
JOURNAL, RELATING  
OBSERVATIONS &  
THEORY TO PRIMARY  
DISCIPLINE

### Improving Military-Civilian Coalition Disaster Management Performance: Using Simulations to Evaluate the Role of Social Modeling on Emergent Leadership

## Evaluating the Impact of Improvisation on the Incident Command System: A Modified Single Case Study using the DDD Simulator

*Proceedings of the 6<sup>th</sup> International ISCRAM Conference – Gothenburg, Sweden, May 2009*  
J. Landgren, U. Nulden and B. Van de Walle, eds.

100 *Int. J. Emergency Management, Vol. 5, Nos. 1/2, 2008*

**Causality, covariates and consensus in ISCRAM research: towards a more robust study design in a transdisciplinary community**

## The Dirty Dozen

*Twelve Failures of the Hurricane Katrina Response and*

*How Psychology Can Help*

118

February–March 2007 • American Psychologist

Copyright 2007 by the American Psychological Association 0003-066X/07/\$12.00  
Vol. 62, No. 2, 118–130 DOI: 10.1037/0003-066X.62.2.118

**Improving Military-Civilian Coalition Disaster Management Performance:  
Using Simulations to Evaluate the Role of Social Modeling on Emergent Leadership**

MOVING  
METHODS &  
MEASUREMENT  
APPROACHES  
FROM BEHAVIORAL  
SCIENCES INTO  
TRANSDICIPLINARY  
SPACE

SUMMARY OF DISSERTATION  
ISCRAM BEST PAPER, 2009

## Evaluating the Impact of Improvisation on the Incident Command System: A Modified Single Case Study using the DDD Simulator

*Proceedings of the 6<sup>th</sup> International ISCRAM Conference – Gothenburg, Sweden, May 2009*  
J. Landgren, U. Nulden and B. Van de Walle, eds.

100 *Int. J. Emergency Management, Vol. 5, Nos. 1/2, 2008*

---

## Causality, covariates and consensus in ISCRAM research: towards a more robust study design in a transdisciplinary community

---

---

## The Dirty Dozen

---

*Twelve Failures of the Hurricane Katrina Response and*

---

*How Psychology Can Help*

---

118

February–March 2007 • American Psychologist

Copyright 2007 by the American Psychological Association 0003-066X/07/\$12.00  
Vol. 62, No. 2, 118–130 DOI: 10.1037/0003-066X.62.2.118

**Improving Military-Civilian Coalition Disaster Management Performance:  
Using Simulations to Evaluate the Role of Social Modeling on Emergent Leadership**



Each Step Focused Dissertation Planning

## Evaluating the Impact of Improvisation on the Incident Command System: A Modified Single Case Study using the DDD Simulator

*Proceedings of the 6<sup>th</sup> International ISCRAM Conference – Gothenburg, Sweden, May 2009*  
J. Landgren, U. Nulden and B. Van de Walle, eds.

100 *Int. J. Emergency Management, Vol. 5, Nos. 1/2, 2008*

---

### Causality, covariates and consensus in ISCRAM research: towards a more robust study design in a transdisciplinary community

---

---

## The Dirty Dozen

---

*Twelve Failures of the Hurricane Katrina Response and*

---

*How Psychology Can Help*

---

118

February–March 2007 • American Psychologist

Copyright 2007 by the American Psychological Association 0003-066X/07/\$12.00  
Vol. 62, No. 2, 118–130 DOI: 10.1037/0003-066X.62.2.118

## Improving Military-Civilian Coalition Disaster Management Performance: Using Simulations to Evaluate the Role of Social Modeling on Emergent Leadership

# The Next Step – Post Doc & Beyond

- Transitioned from a Department of Psychology to Family & Community Medicine at an academic medical center
- As we transition to post doc and early faculty appointments, there are many changes
  - Priorities of Department
  - Resources
  - Relocation = lost connections
  - Life changes

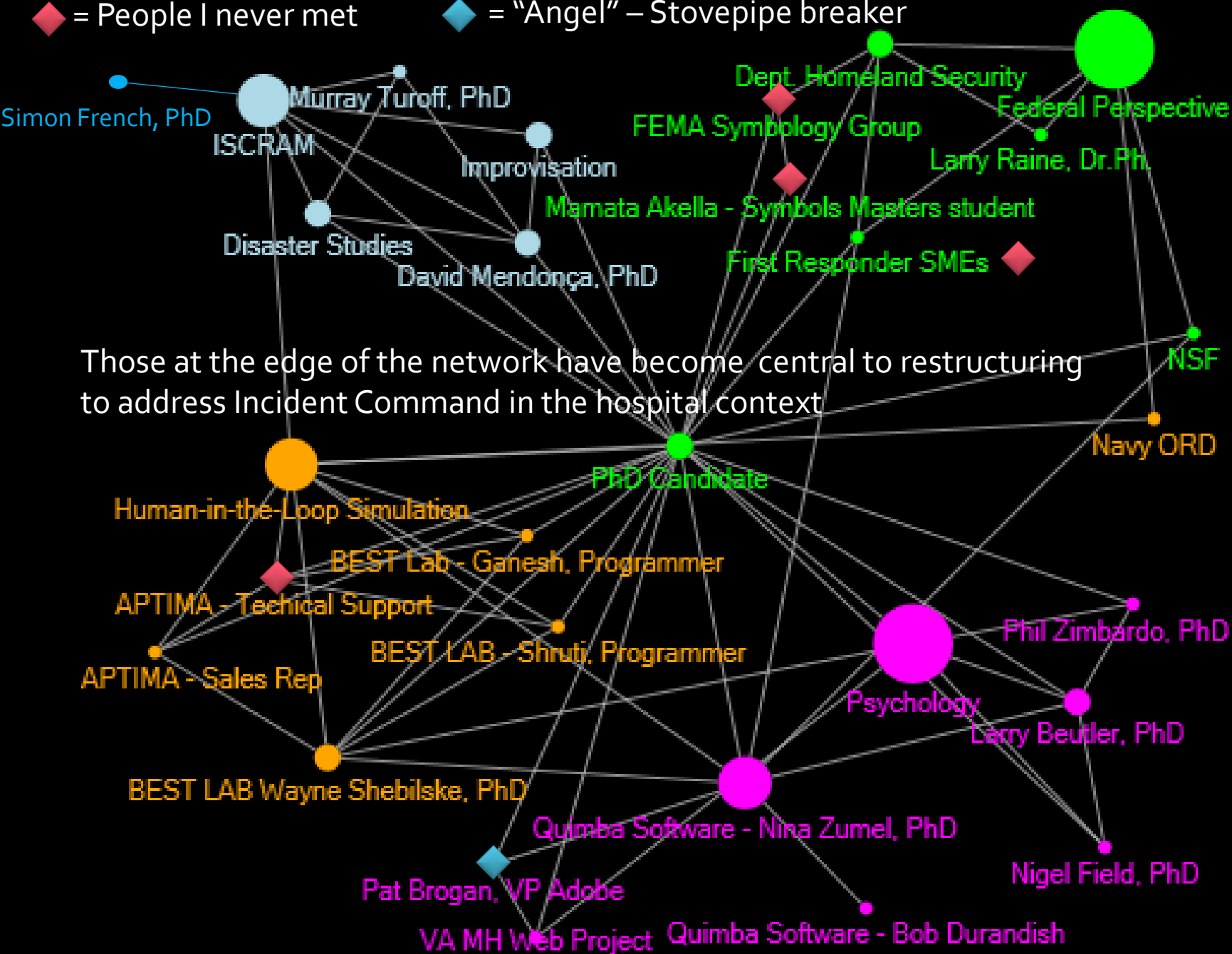


# Restructuring Research

- Given transition, important to find relevance for Family & Community Medicine
- Connections to related departments
  - Emergency Medicine
- Begin building connections with local SMEs
  - Sat on a local panel, approached by Regional FBI WMD coordinator
- **Look to the edges of your network for ways to reposition your work**

◆ = People I never met

◆ = "Angel" – Stovepipe breaker



Those at the edge of the network have become central to restructuring to address Incident Command in the hospital context

# What this looks like at a Personal Level

- Researcher (in this case YOU) must come to embody the disciplines represented at the intersection of the activity
- Tensions collaborators and representatives from primary disciplines (including your PhD committee) are possible *and necessary*
- The project may fall apart at times, you may panic, etc. Get advice, and keep making decisions that move you forward – even if the decisions are not perfect
- There will be moments when you question your sanity – **why didn't I just stick with a simple dissertation that is just CS or Psychology, or whatever???**
- Have faith – the process will end
- **Realize that your success is tied up with the relationships you have – be a good collaborator and others will invest in ensuring your project is successful.**



# Lessons Learned

- Embrace chance (unplanned meetings, etc.)
- Go with solutions that are not dependent on grant funding
- Don't run away from friction with your team – where there is friction there is “hot science”
- Involve & mentor junior students
- Keep your objectives (outcome variables) limited and focused
- Spend as much time thinking about what your results actually mean as you can