Are We Ready For A Life Interdisciplinary

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Interdisciplinary PhD

- **PhD in Education**
  - Approved in 2016
  - Incubator model
  - Umbrella, with cross-disciplinary research teams (CRTS) under
    - First CRT, Inequality
    - Second CRT, Human-technology collaboration (HTC)
- **HTC**
  - Data science, engineering, i/o psychology, cognitive neuroscience, medical informatics, business, education
  - First students, Fall 2018
  - 6 credits foundations, 6 interdisciplinary proseminar, 12 methods, 24 electives to support research from multiple disciplines, 12 dissertation

Foundations for Use Inspired Research

Mindsets
- Design Thinking
- Systems Thinking
- Execution/Getting stuff done
- Open Science
- Curiosity, Creative Inquiry
- Coalition building
- Exploratory vs Predictive
- Computation or analytical thinking
- Ethical decision making
- Partnering, Global Citizenship
- Evidence Based Decision Making
- Interdisciplinary
- Problem solving

Skillsets
- Critical thinking about research
- Python, R, GIS
- Survey, Focus Groups, Interviews
- Academic, non-academic writing
- Blogging, twitter, altmetrics, DOI, etc.
- OSF
- Performance analysis
- Teamwork, leadership
- Project management,
- Collaborative technologies
- Reading research from other disciplines

Environment
- Identity as researcher
- Risk taking
- Intellectual
- Team
- Psychological safety

Experiences
- Courses
- 2nd Year Project
- Dissertation
- Community projects
- Portfolio

Sample Research Projects

- Trusting Machines
  - Real-time trust sensor (in collaboration with Neera Jain at Purdue)
  - Applying artificial neural network to their data
  - Moving from EEG to eye monitoring
- Cognitive Load in VR
  - Measuring cognitive load during training in VR environments
  - Active monitoring of cognitive with eye monitoring
  - Intelligent technologies to monitor and respond to cognitive load in real-time
- Future
  - Technologies to monitor and respond to a variety of human agent biofeedback systems in real-time
  - Multiple sensors, multiple people, multiple machines
  - Improving learning for the future of work

Modeling Teams with Humans-Technology Collaboration
# for 2030 - 2035

Elements

Human Intelligence – multiple levels of expertise
  STEM expert, subject matter experts
  Experts in psychology, cognitive science
  Social science, education,
  Manager, communications specialists

Collaborative social machines – hardware and software
  Workplace AI (e.g., Alexa for Business)
  Cognitive Assistants
  Intelligent technologies for data mining and visualization

Support Technologies – hardware and software
  Sharable database, spreadsheet
  Decision support systems. consensus building tools
  Communication networks – local and global
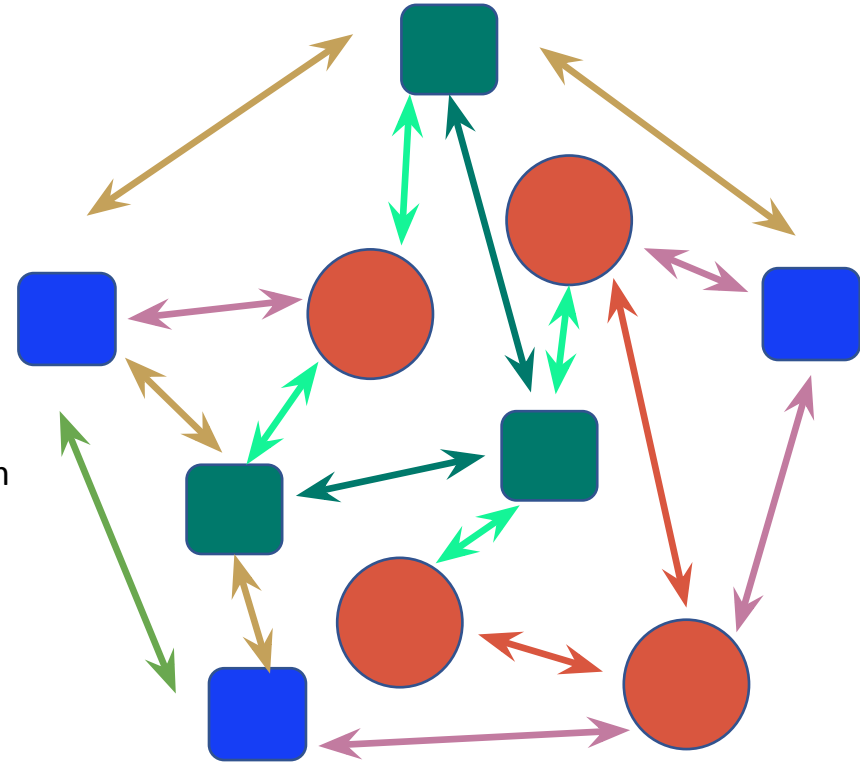
Lessons Learned Thus Far

Being interdisciplinary is hard

- Not for everyone
- Must have strong disciplines to have strong interdisciplinarity

Institutionalizing interdisciplinarity is even harder

- Incentives and structures are key
- Changing culture takes time

We can start by creating a culture of curiosity and discovery

- Identify challenges ► create solutions
- Computational thinking and skills have become foundations
- Students (in any major) can benefit, but are we ready to prepare them
- Science of team science
- Be curious, read outside of your field, connect with others, etc.

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go.gwu.edu/htc (lab)

www.ParsingScience.org (podcast)

www.SciencePods.com (curated collection of podcasts)

www.WeShareScience.com (science video abstracts)