



Engineering + Social Work

Convergent Research and Innovation to Address Grand Challenges

Shinyi Wu, PhD

*Associate Professor of Social Work &
Industrial and Systems Engineering*

Email: shinyiwu@usc.edu



How much is 2^{50} ?

Moore's law since 1965



The Era of Constant Accelerations

We're in the middle of three **nonlinear accelerations** all at the same time, with the three largest forces on the planet

- climate
- globalization
- **technology**

~ Thomas Friedman, 2016



Social Work Values are Key to Thrive in the Era of Accelerations

“You want **resilience**. You need to be able to take a blow, because you don't know when the **disruption** is going to come, but there will be disruptions. At the same time, you want **propulsion**. You want to be able to move ahead. You don't want to be just curled up in a ball.”

~ Thomas Friedman

Social Work Values





Grand Challenges



NAE GRAND CHALLENGES
FOR ENGINEERING



Grand Challenges
for Social Work

- Increasing complexity addressed by exponentially advancing technology
- This allows tackling Grand-Challenge-like problems
- Powerful technology brings powerful unintended consequences (ethics, societal)
- Convergence of disciplines, but also web of partnerships



The Power of Convergence

Engineering + Social Work

Three pathways:

E2X (Engineering Empowers Social Work)

X2E (Social Work empowers Engineering)

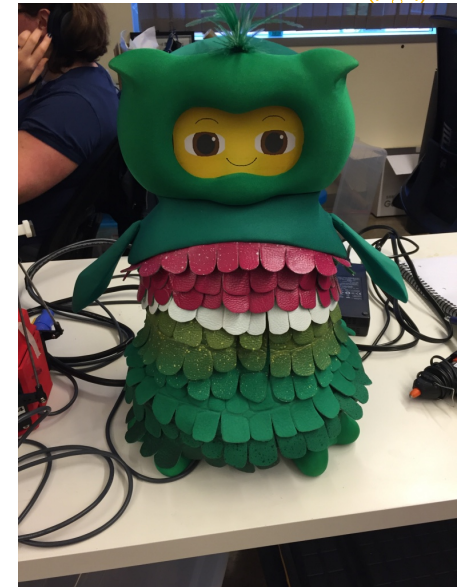
EUX (Engineering and Social Work commingle)



Engr+SW Research Examples at USC



- Piloting the Use of Artificial Intelligence to Enhance HIV Prevention Interventions for Youth Experiencing Homelessness
- Using Automated Telephonic Assessment to Improve Comorbid Depression in Low-Income, Minority Diabetes
- Developing a Clinical Forecasting Model to Predict Comorbid Depression among Diabetes Patients
- Understanding Social Interactions with Socially Assistive Robotics in Intergenerational Family Groups
- Innovating Diabetes Self-Management Support with Mobile Applications and Intergenerational Support
- Co-Designing a Mobile App with Caregivers for Health



The Force Awakens....



Gen-4 Engineering Research Centers (ERC) **Convergent Research and Innovation through Inclusive Partnerships and Workforce Development**

PROGRAM SOLICITATION
NSF 19-503

REPLACES DOCUMENT(S):
NSF 15-589



National Science Foundation

Directorate for Engineering
Engineering Education and Centers



Letter of Intent Due Date(s) (*required*) (due by 5 p.m. submitter's local time):

November 30, 2018

Preliminary Proposal Due Date(s) (*required*) (due by 5 p.m. submitter's local time):

January 16, 2019

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

July 12, 2019

Engineering + Social Work

=> Convergent Research & Innovation to address the Grand Challenges

Thrive in the Age of Accelerations

