CAREER: Formal Methods for Human-Cyber-Physical Systems

Award #1942836 (6/15/2020 – 5/31/2025)

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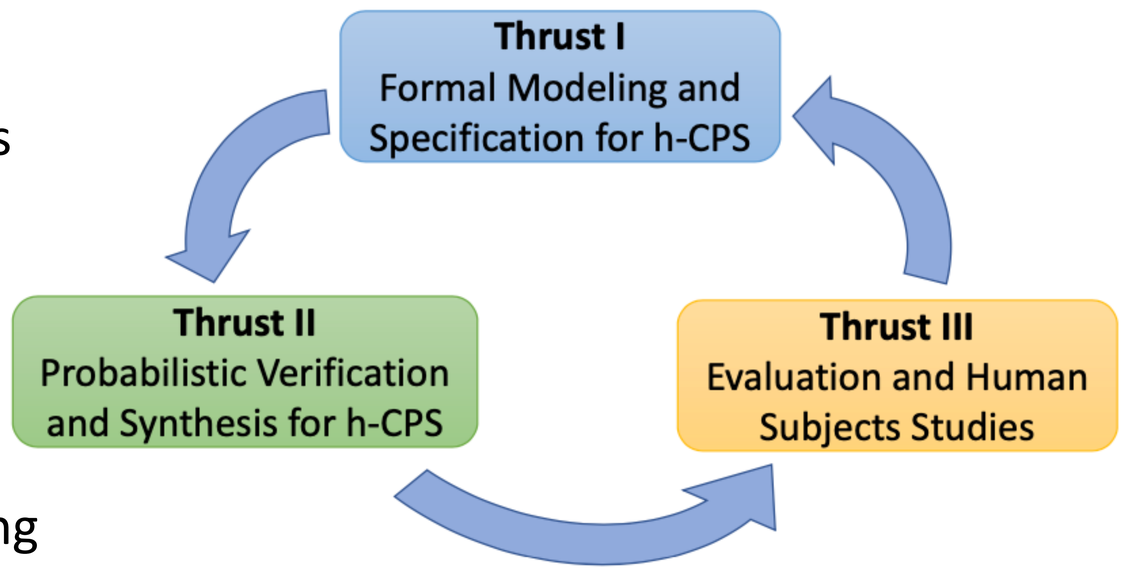
Challenge:

- How do we verify the safety of human-CPS, accounting for the uncertainty and variability of human behaviors?
- How do we synthesize CPS controllers that adapt to human intentions and preferences, and generate human interpretable explanations?

Solution:

- Multi-objective controller synthesis with uncertain human preferences [ICCPS 2022]
- Planning for Automated Vehicles with Human Trust [TCPS 2022]
- Toward Policy Explanations for Multi-Agent Reinforcement Learning [IJCAI 2022]



Scientific Impact:

- Develop theory, methods, and tools for the formal specification, verification and synthesis of human-CPS that account for the uncertainty and variability of human behaviors, intentions, and preferences

Broader Impact:

- Potential to improve safety, increase user satisfaction, and cut development cost
- Develop new CPS graduate course