UNIVERSITY of WASHINGTON

THE UNIVERSITY OF TEXAS AT AUSTIN

Autonomy Protocols: From Human Behavioral Modeling to Correct-by-Construction Scaleable Control

Behçet Açıkmeşe, UWashington (PI)
Mary Hayhoe, UTexas (Co-PI)
Ufuk Topçu, UTexas (Co-PI)
Dana Ballard, UTexas (Co-PI)

NSF CPS PI Meeting, Nov 2017

UNIVERSITY of WASHINGTON

THE UNIVERSITY OF TEXAS AT AUSTIN

Team

Hierarchical autonomy architecture

Mission Planning

Tactical Planning

Motion Planning

Motion Control

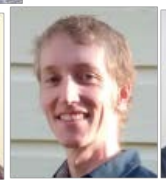
Mary Hayhoe

Dana Ballard

Ufuk Topcu

Chia-Ling Li

Ruohan Zhang



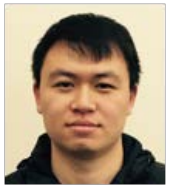
Leif Johnson

Constantin Rothkopf

Matt Tong

Nils Jansen

Behçet Açıkmeşe



Yue Yu

Michael Szmuk

Mahmoud El Chamie

Daniel Dueri

Yuanqi Mao

Nazli Demirer

UNIVERSITY of WASHINGTON

THE UNIVERSITY OF TEXAS AT AUSTIN

Scaleable autonomy protocols with provable correctness, incorporating models of human behavior

Experimentally “learn” how humans decompose visually guided behavior into subtasks, “decision modules”

- Modular Reinforcement Learning
- Modular MDPs

Synthesize, corrrect-by-construction, reactive decision policies via formal methods

Decode high-level directives to actionable motion planning specifications

Compute and robustly execute optimal motion plans

- Convexification
- Real-time IPMs