

Human-Robot Collaboration on Complex Tasks

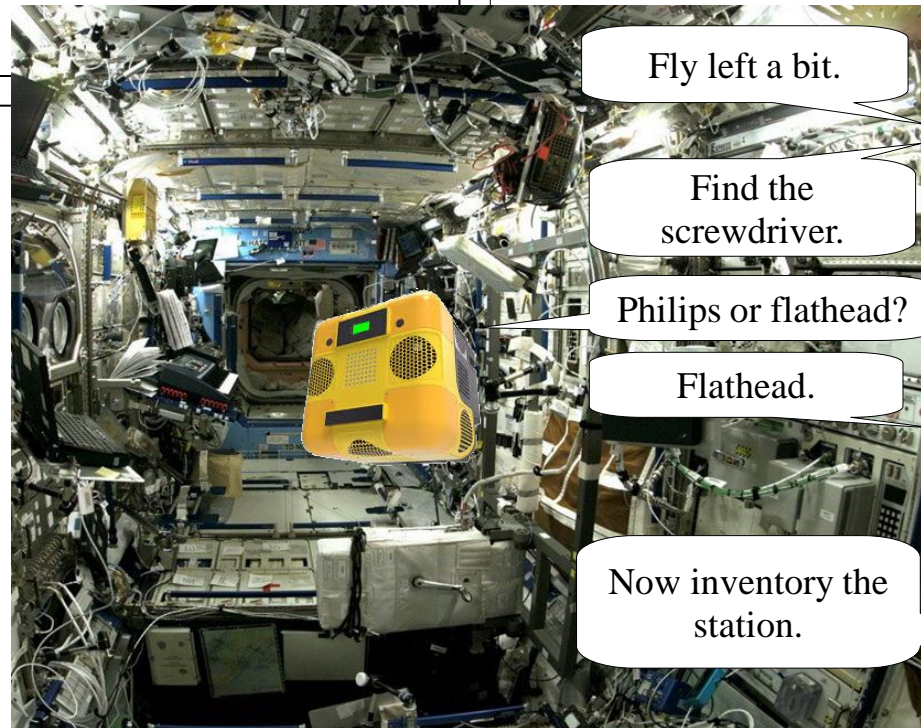
- PI: Stefanie Tellex, Human to Robots Laboratory Brown University
- Description: Stefanie Tellex is an assistant professor at Brown University. She studies human-robot collaboration and has won multiple best paper awards as well as a Sloan Fellowship and a DARPA Young Faculty Award. Her work has been featured in the press on NPR All Things Considered, MIT Technology Review, Engadget, and IEEE Spectrum.

Research Objectives

- **Increase speed and accuracy at inferring human intentions and increase the number of robots a single astronaut can supervise**
- Innovation: Formal model of HRI for inferring a person's mental state from their language utterances and asking questions when confused.
- SOA: Separate unintegrated models.
- Start TRL: TRL 1: Basic Principles. Separate models formulated for each part but not integrated.
- End TRL: TRL3: Proof of concept integrated collaborative robot for assembly and inspection.

Approach

- Human-Robot Collaborative POMDP
 - Learn to interpret language at multiple levels of abstraction.
 - Learn to ask targeted questions to recover from failure.
- Efficient inference
 - Learn to solve POMDPs with large observation spaces.
 - Learn to prune actions hierarchically.



Potential Impact

- Collaborative assembly in space exploration.
- Human control of multiple UAVs for search and rescue and inspection.
- Increased speed and accuracy at interpreting a person's requests.
- Increased robot autonomy due to failure detection and recovery.