One of our motivations:

**Advanced engines push the limits to improve efficiencies,**

*but require high levels of precise and characterization*

![60° Injector (Optimized)](image)

Tatschl et al. (2009)
Int Multi-dim Engine Modeling Users

**Predictive simulations accelerate development**
Our approach (I):
Bridging the scales from science to engineering

High-accuracy prediction at any scale informed by data at all scales
Our approach (II):

**Pushing the limits of automation**

**Informatics software:**
1) Identifies most useful experiments/calculation
2) Sends out jobs to automated experiments/calculation
3) Collects and processes data
4) Returns high-accuracy sub-models to energy simulation

**ROBOTIC SCIENTIFIC “COMMUNITY”**

- Automated High-Throughput Experiments
- Automated theoretical calculations

**Self-Improving Simulations of Advanced Energy Conversion Systems**