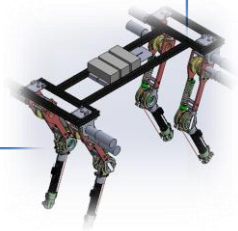
Robotics Research

Mechanical Engineering
University of Delaware

- Stochastic control
- Environmental interactions

- Locomotion from high-level motion planning
- Harnessing compliance
- Adaptation to human activity

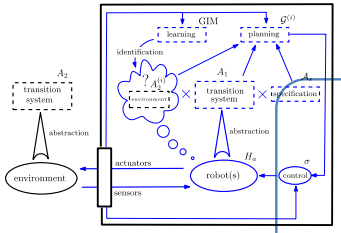


Reconnaissance & surveillance

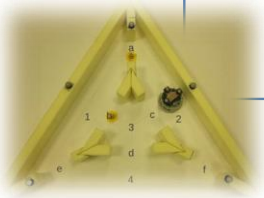
Legged locomotion

Multi-Agent Decision making

Mobile sensor networks



- Linking action to decision
- Communication, inference, & strategy



Active sensing

- Reactive reconfiguration
- Detection

- Stochastic control
- Environmental interactions

Reconnaissance & surveillance

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Mobile sensor networks

- Active sensing
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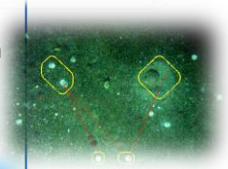
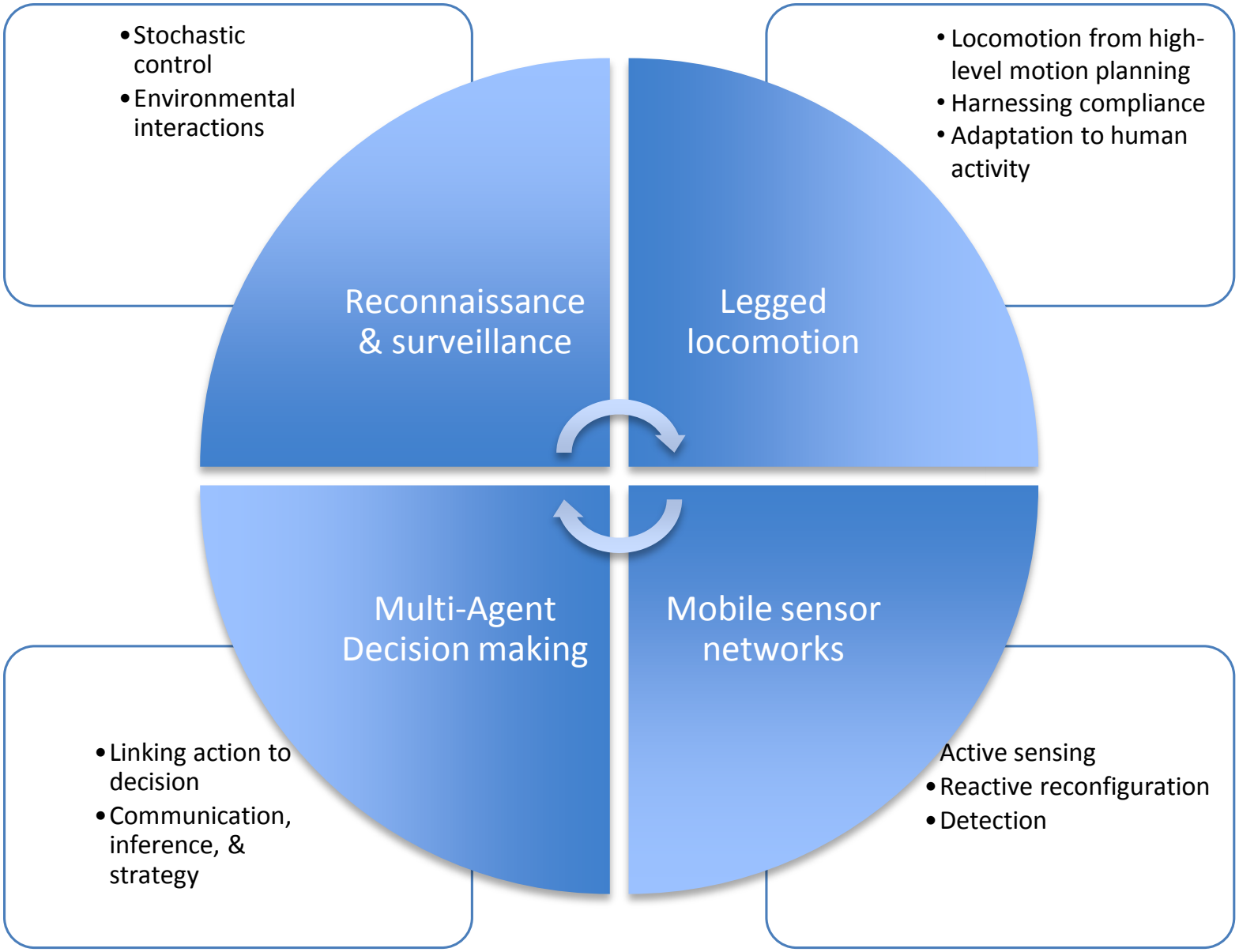
- Detection

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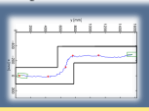
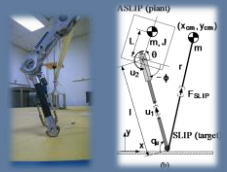
Stochastic optimal control

$$\mathrm{d}\mathbf{q}(t) = b(\mathbf{q}(t))\,\mathrm{d}t + G(\mathbf{q}(t))\left[u(i,\mathbf{q}(t))\,\mathrm{d}t + \Sigma(\mathbf{q}(t))\,\mathrm{d}W(t)\right],$$

$$V(i,\mathbf{q}) \triangleq \min_{u(i,\mathbf{q})} \mathbb{E}^{u(t_{i-1})}\left[\int_{t_{i-1}}^{t_i} L(\mathbf{q}(s), u(i,\mathbf{q}(s)))\,\mathrm{d}s + \Phi(\mathbf{q}(t_i))\right]$$



Controlled compliance & impedance control

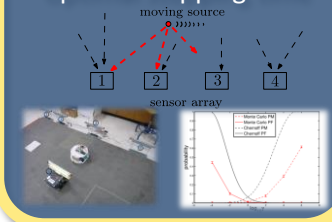


Dealing with uncertainty

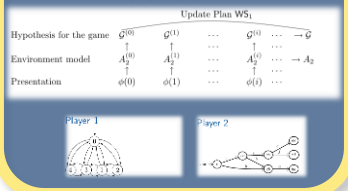
Reactive learning and adaptation

Models from data

Optimal stopping time



Game theory with grammatical inference



Guoquan Huang

Ioannis Poulakakis

Herbert Tanner