NRI: INT: Collaborative Research:
Buoyancy-assisted Collaborative Robots That are Cheap, Safe, and Never Fall Down.

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Challenge

Develop novel robots that are safely deployable to human daily environments.

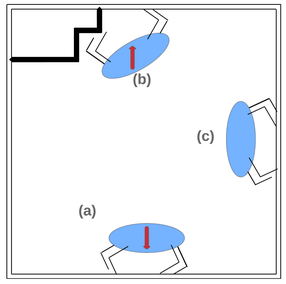
Particularly, legged robots with floating bases are more challenging due to their balancing issues.

Scientific Impact

Design new cheap and safe robots under the tight weight and volume limitations.

Invent novel algorithms to control low-fidelity, high-sensitive dynamics systems.

Thrust 1: Platform Development



Develop three BARs with different buoyancy coefficients, which have their own unique locomotion style.

Thrust 2: Learning Primitive Motor Skills

Develop learning systems and algorithms to train a motor skill for a single individual BAR, including on-robot learning systems and fast adaptation algorithms.

Thrust 3: Large-scale Multi-Agent Learning

Develop a multi-agent learning framework that can coordinate multiple heterogeneous BARs for collaboration with a modular architecture and a multi-level hierarchical system.

Impact: Indoor Human Interaction

Because these robots are safe, they can be used for indoor care and human interaction with a microphone, speaker, camera, and an internal projector. *BARs may be the only legged robots that can mingle among a crowd.*

Impact: Outdoor Monitoring

Because these robots are cheap, *thousands of BARs can be deployed* to monitor a disaster zone or wilderness in a disposable fashion. The team also plans to investigate *biodegradable* materials.

Impact: Education

BARs are suitable for STEM education due to the safety and affordable costs.

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