Synformax

Synthetic Forms. Maximum Potential.

Abstract / Mission

Synformax develops advanced soft robotic systems designed to embody artificial intelligence. Our research integrates novel actuation technologies (HASEL, dielectric elastomers, pneumatic elastomers) with intelligent control architectures to achieve safe, flexible, and lifelike robotic performance. We aim to establish foundational platforms for embodied AI across industrial, healthcare, and defense sectors.

Technical Approach

• Material Science: Investigation of high-strain, biocompatible polymers for repeatable and scalable actuation.
• Actuation Systems: Development of pneumatic and electroactive artificial muscles.
• Control Integration: ROS 2-based architectures for AI-driven motion control.
• Safety Compliance: Alignment with ANSI/RIA and ISO collaborative robot standards.

Impact

Synformax will accelerate U.S. leadership in robotics and AI embodiment by enabling flexible, lifelike machines. Our technology impacts multiple sectors: adaptive warehouse automation, precision healthcare robotics, assistive devices for aging populations, and defense-grade resilient machines. Broader impacts include workforce training, STEM outreach, and ethical AI integration.

Alignment with NSF/DARPA/DOE Priorities

• NSF: Robotics and AI convergence (Future of Work, Cyber-Physical Systems).
• DARPA: Embodied AI and novel actuation for defense robotics.
• DOE: Energy-efficient synthetic actuators and automation.
• ARM Institute: Workforce training and manufacturing deployment.

Facilities & Partnerships

Synformax is building collaborations with makerspaces, innovation hubs (MassRobotics), and academic labs to accelerate prototyping and validation. We are positioned for NSF SBIR Phase I proposals, DARPA project calls, and ARM Institute collaborative programs.