

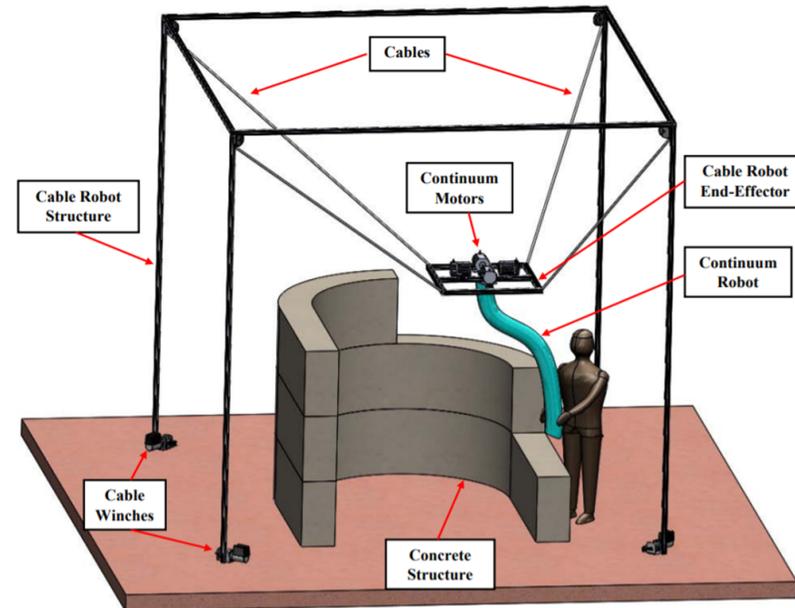
NRI:FND: 3D Concrete Printing with Macro-Micro Robots



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Challenge

- Interactively assist construction workers to dexterously deploy concrete-delivery hoses in congested spaces for 3D printing of concrete



Solution

- Intelligent co-robot: novel cable-driven macro/micro design:
 - Cable-robot acts as macro-base
 - Continuum robot (integrated with concrete delivery hose) as micro-unit
 - Field Intelligence: Situational awareness and physical-assist
 - Field-deployable with large workspace/load carrying capability



Scientific Impact

- Fundamental research in rheology of 3D-printable concrete
- New generalizable modeling of coupled cable-driven macro-micro robot systems
- Intelligent assist for concrete delivery in construction industry

Broader Impact

- Fall 2019:
 - 2 Female Ph.D. students and 1 REU student hired
 - Industry and conference presentations;
- Spring 2020:
 - 1 additional Ph.D. student hired
 - Outreach seminars to high-schools and industry and REU hires planned for summer