

# **Thesis Project Portfolio**

## **W.E.A.R. Bot - Wrist Elbow Automated Rehabilitation Robot**

(Technical Report)

## **Combating Ableism: Disability Advocacy in the United States**

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelors of Science, School of Engineering

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## **Sociotechnical Synthesis**

How may the disadvantages of physical disability best be mitigated?

How can people who have suffered a neuromuscular injury improve the function of their arms and enhance their recovery? To regain the neuromuscular connection, patients perform repetitive movements, typically in a medical setting with the assistance of a medical professional. The research team developed a prototype wearable exoskeleton with two degrees of freedom to compensate for the debilitating effects of the wearer's neuromuscular injuries. The prototype's advantages over existing products include lighter weight, lower cost, and greater versatility. In the prototype, a pneumatic muscle and servo motor induce flexion at the elbow and wrist. Rehabilitation movement sequences developed from experimental data will be programmed into the device. The device successfully contracts the elbow and wrist 78 and 53 degrees, respectively.

In the US since 2010, how have persons with physical disabilities, the advocacies that represent them, government agencies, and other social groups pursued initiatives and public policy that takes their needs into account? Persons with physical disabilities and their advocates have pursued legislation to ensure accommodations, demanded funding for disability research, and centered the voices of disabled people. Advocacy for persons with disabilities lies in the tradition of advocacy for other marginalized groups.