2020-21 ABI Undergraduate Research Scholar Mentor List

SAMPLE:

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Research Project: Design of a human assist device to aid in walking

Head injuries, spinal cord injuries, or serious medical diagnoses such as cerebral palsy, spina bifida, and muscle atrophy severely impact the lives of those affected. All these conditions present restrictions to the body's ability to function normally. Medical treatments are still unable to cure many of the conditions that result in lack of proper mobility or complete immobility. Many patients have difficulty walking unassisted, thereby requiring assistance. Technology has developed to the extent that systems can be designed and developed in order to mechanically assist those individuals who suffer from immobility. The proposed project's primary focus will be to design a functional human movement assistance device to allow a person to walk with natural leg movements (essentially the lower body). This will include but is not limited to the use of a support system which in turn will incorporate a programmable logic controller (PLC) as well as mechanical actuators and motors and the entire system will be powered using standard batteries. Several industrial systems ("exoskeletons") are available, but they are prohibitively expensive. The aim in this project is to keep the cost low and the design simple and more focused on the application at hand. Comfort for the end user and actual effectiveness will also be the key objectives to maximize during the projects design. It is imperative that there is a continuous effort to advance in this area of biomechanical engineering to achieve a device that once again allows a person with illness or injury to walk again.

ABI Mission compatibility: This type of a project fits into ABI's mission of providing meaningful research and projects in medical/health related areas. This project can be extended further to other health and rehabilitation related applications.

Contributions to the scholarly or creative community: The proposed project is unique and involves good amount of research and development activity which will enable a prospective student to learn about different areas. Due to the nature of the problem being addressed, this project can lead to possible solutions to several other health/medical-related applications. Such projects contribute significantly towards a student's learning and exposure to practical hands-on type research. This will also be helpful if a student has plans to pursue graduate studies in areas such a Biomedical or Biomechanical Engineering, not to mention Physical Therapy and related areas.

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