

An Indian-Australian research partnership

Project Title:	Digitally fabricated design interventions for ALS/MND	
Project Number	ID00985	
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Research Clusters:

Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? <i>(Please nominate JUST <u>one</u>. For more information, see www.iitbmonash.org)</i>		Highlight which of the Academy's Theme(s) this project will address? <i>(Feel free to nominate more than one. For more information, see www.iitbmonash.org)</i>	
1	Material Science/Engineering (including Nano, Metallurgy)	1	Advanced computational engineering, simulation and manufacture
2	Energy, Green Chem, Chemistry, Catalysis, Reaction Eng	2	Infrastructure Engineering
3	Math, CFD, Modelling, Manufacturing	3	Clean Energy
4	CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control	4	Water
5	Earth Sciences and Civil Engineering (Geo, Water, Climate)	5	Nanotechnology
6	Bio, Stem Cells, Bio Chem, Pharma, Food	6	Biotechnology and Stem Cell Research
7	Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng	7	Humanities and social sciences
8	HSS, Design , Management	8	Design

The research problem

Define the problem

This project will leverage the possibilities of digital fabrication to explore the production of low volume open-source assistive aids. These will be developed together with patients to explore the potential of bespoke design and fabrication in the assistive device field. Developing frameworks and techniques to scale these interventions within developing countries and communities.

Motor Neuron Disease (MND) is a degenerative neurological disorder. The nerves affected with this stop sending messages to the muscles leading to weakness and further wasting of those muscles.

Amyotrophic Lateral Sclerosis (ALS) is the most common form of MND. It is characterised by weakness and wasting of both upper and lower limbs in the patient. As the disease progresses speech, swallowing and breathing impairment takes place. The patients gradually become completely dependent on the family members and caregivers.

Since this is a rare disease, not much design intervention has happened to make life easier for patients, caregivers or even physiotherapists and occupational therapists. The project will focus on identifying the various design opportunities, creating and testing products for selected problem areas for intervention and spread the awareness about the disease.

Project aims

Define the aims of the project

The aim of the project would be to design aids towards making the patients of early stage ALS/MND more independent so that they can lead a more respectful and confident life. It will improve the quality of life not just for the patients but also for the caregivers who are mostly family members in the Indian context. While exploring how digital fabrication can make the production of these low volume aids scalable and economically viable.

Expected outcomes

Highlight the expected outcomes of the project

A system-level intervention, products to help MND patients, and a framework for the creation of bespoke assistive aids using digital fabrication technologies.

How will the project address the Goals of the above Themes?

Describe how the project will address the goals of one or more of the 6 Themes listed above.

Project will fall under Design theme and have a practice-based approach

Capabilities and Degrees Required

List the ideal set of capabilities that a student should have for this project. Feel free to be as specific or as general as you like. These capabilities will be input into the online application form and students who opt for this project will be required to show that they can demonstrate these capabilities.

B.E./B.Tech. in Mechanical / Electrical / Electronics engineering

M.Tech. in Mechanical / Electrical / Electronics engineering

OR

M.Des. in Industrial / Product Design

Necessary Courses

Name three tentative courses relevant to the project that the student should complete during his/her coursework at IITB (the student will require to secure 8 point in these courses)

Qualitative research methods

Mini Project I

Mini Project II

Potential Collaborators

Please visit the IITB website www.iitb.ac.in OR Monash Website www.monash.edu to highlight some potential collaborators that would be best suited for the area of research you are intending to float.

Prof. Daphne Flynn and the Design Health Collab research lab work at the intersection of design and health and could work on this project. The Monash Institute of Medical Engineering could also support in addition to the Monash Young Med Tech Innovators. Dr. Page has experience working with all of these groups.

Select up to **(4)** keywords from the Academy's approved keyword list (**available at <http://www.iitbmonash.org/becoming-a-research-supervisor/>**) relating to this project to make it easier for the students to apply.

Design, Design for health