

An Indian-Australian research partnership

Project Title: **Designing aids for supporting people with ALS/MND**
Project Number **ID01106**
Monash Main Supervisor

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Research Clusters:

Highlight which of the Academy's CLUSTERS this project will address?

 (Please nominate JUST one. For more information, see www.iitbmonash.org)

- | | |
|---|---|
| 1 | Material Science/Engineering (including Nano, Metallurgy) |
| 2 | Energy, Green Chem, Chemistry, Catalysis, Reaction Eng |
| 3 | Math, CFD, Modelling, Manufacturing |
| 4 | CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control |
| 5 | Earth Sciences and Civil Engineering (Geo, Water, Climate) |
| 6 | Bio, Stem Cells, Bio Chem, Pharma, Food |
| 7 | Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng |
| 8 | HSS, Design , Management |

Research Themes:

Highlight which of the Academy's Theme(s) this project will address?

 (Feel free to nominate more than one. For more information, see www.iitbmonash.org)

- | | |
|---|--|
| 1 | Advanced computational engineering, simulation and manufacture |
| 2 | Infrastructure Engineering |
| 3 | Clean Energy |
| 4 | Water |
| 5 | Nanotechnology |
| 6 | Biotechnology and Stem Cell Research |
| 7 | Humanities and social sciences |
| 8 | Design |

The research problem

Define the problem

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.

How skills/experience of the IITB and the Monash supervisor(s) support the proposed project

Highlight the purpose of the collaboration and/or the complementary skills/experience that you bring to the project. Do you have any joint or independent publications in the area of the proposed project?

The IITB supervisor had been working in this area for 5 years now. She has collaborated with the Hospital and NGO working with such patients and has conducted workshops for identifying possible areas of design intervention. She will provide support and guidance on context, need identification, user study testing of the products.

Monash supervisor will provide a comparative context to learn from and guide the student towards developing cost effective design solutions by incorporating latest technology.

What is expected of the student when at IITB and when at Monash?

Highlight how the project will gain from the students stay at IITB and at Monash

At IITB student will study the context, conduct workshops with doctors, therapists and patients. S/he will identify various design opportunities and areas of intervention at product as well at system-level.

While at Monash, student will study the comparative context to learn from the differences. Further, student will develop design solutions to suit the Indian context. Monash will provide help in fabrication and development of these design solutions.

On return to IITB, student would test those solutions with the patients. Based on the feedback, the designs will be further refined / altered. This may require few rounds of iterations. During this time, we shall also try to identify the industry collaborator to take it to the market or the possibility of entrepreneurship.

Expected outcomes

Highlight the expected outcomes of the project

A system-level intervention and products to help MND patients

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

How well the IITB and the Monash supervisor(s) know each other

Provide details of previous collaborations (if any). For new collaborators, have you had a chance to meet each other in person or through VC or Skype?

Dr. Rowan Page and Dr. Purba Joshi have been working on this topic for past two years with another student and would like to take new student to further the work and expand scope.

Potential RPCs from IITB and Monash

Provide names of the potential research progress committee members (RPCs) and describe why they are most suited for the proposed project

Prof. Avinash Shende – he is a faculty of product design and have been guiding various practice-oriented PhD at IDC

Prof. Daphne Flynn (Monash) is the director of Design Health Collab and has experience working with the research and development of medical devices.

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.

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