

The University of Queensland - IIT Delhi Academy of Research (UQIDAR)

Joint PhD Project Proposal Template

1. Project details

Project title Understanding Brain-Behavior link: Using Structural (frontal asymmetry) and Neurochemical (neurotransmitters) Basis of Cognitive and Affective Processing to Improve Prediction of Health-related Outcomes in Epilepsy patients from low socio-economic.

Project ID UQIDAR-00142

2. Supervision team

Please visit the IITD website www.iitd.ac.in and UQ website <http://researchers.uq.edu.au/> to highlight potential collaborators that would be best suited for the proposed project. Complete where possible – advise if you’d like assistance establishing contacts.

	University of Queensland	IIT Delhi	External/Industry (if applicable) [Access to Patients]
Supervisor name and title	Dr. David Reutens, Director	Dr. Varsha Singh, Assistant Prof.	Dr. Manjari Tripathi, Professor
School or department (or company, if applicable)	Centre for Advanced Imaging Foundation Professor of Experimental Neurology,	Psychology, Humanities and Social Sciences, IIT Delhi	Neuroscience Centre, All Indian Institute of Medical Sciences (AIIMS), New Delhi
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3. Other supervisors

Please provide information about other associate supervisors below.

Full name and title(s):

School/department/company details:

Phone:

Email:

URL:

2. Field Of Research (FOR) codes

Specify up to four four-digit FOR codes for your project – see [here](#) for more detail on FOR codes.

1 1701	3 1702
2 1109	4.1103

3. Keywords

Please choose up to 4 keywords for your project. E.g. Nanotechnology, data science, novel batteries, etc. Keywords will assist in classifying project and presenting projects to students on the applications portal.

1 Frontal lobe functions/ Executive functions	Cognitive Affective Processes
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2 Epilepsy

4. Endocrine system

4. Discipline background of candidate

1 Neuropsychology
(Focus: Clinical)

3. Neuroscience
(Focus: Cognitive/behavioural)

2 Clinical Psychology

4. Rehabilitation
(Focus: Neuropsychological)

5. Project description

Aims: To use structural and neurochemical basis of cognitive-affective process for improving predictions of post-surgery outcomes in epilepsy patients from low socioeconomic strata

Methodology

Sample:

Study 1 (Baseline):Forty patients with epilepsy (lateralized damage: Right hemisphere: 20)

Study 2 (follow-up): Forty patients from Study 1 will have post-surgery assessment after 4 months.

Material:

Tasks: Mental State Exam, Frontal-lobe based task (Iowa Gambling Task & Wisconsin Task), affect stimuli from international affect database (pictures: IAPS & words: ANEW), and Autobiographical Episodic Memory(AET)

Tests: Saliva sample will be analysed for cortisol (stress), serotonin-dopamine balance, testosterone-estradiol balance

Brain imaging: Functional Magnetic Resonance Image (fMRI: anatomical volumetric T1 scan) and PET-FDG will be used to assess frontal asymmetry

Procedure (study 1): Participant who meet the criterion will provide informed consent, demographic information, followed by salivary sample (T1), brain imaging session, salivary sample (T2), followed by cognitive tasks (Iowa Gambling Task, Wisconsin Task, Episodic autobiographical memory), salivary sample (T3), affect processing (counter balance order: pictures and words), salivary sample (T4). Participants will be tested individually.

Procedure (study 2): Follow-up study will be 4 months, implementing the protocol of the baseline assessment

Analysis

Frontal asymmetry, neurochemical measures from salivary sample [cortisol (stress), serotonin-dopamine balance, testosterone-estradiol balance], and pre-surgery behavioural task performance will used to predict post-surgery outcomes (4 months) (i) mental health status, (ii) cognitive and affective functioning (iii) seizure occurrence

6. Project deliverables/outcomes

Expected results: It is expected that structural and neurochemical assessment combined with frontal lobe task-based performance will improve prediction of surgery outcomes for epilepsy patients (e.g., seizure free status, alteration in cognitive and affective functioning). Improving predictions of surgery outcomes might be a necessity for all epileptic patients, but more prominently for the patients from low socioeconomic background whose economic investment in the treatment and subsequent economic decisions are more severely affected by outcomes of the surgery.

7. Research impact themes

Highlight the research impact theme(s) this project will address. Feel free to nominate more than one. For more information, see <http://www.uq.edu.au/research/impact>

1. **Healthy Ageing** ✓
2. Feeding the World
3. **Resilient Environment** ✓
4. **Technology for Tomorrow** ✓
5. **Transforming Societies** ✓

8. Type of student

This project is best suited for an:

i-student	✓
a-student	
i- or a-student	

Please note that:

- an i-student will be expected to spend year-1 at IIT-D, year-2 at UQ and the remaining time at IIT-D.
- an a-student will spend year-1 at UQ, year-2 at IIT-D and the remaining time at UQ.
- All students will be required to complete some amount of coursework in their first year.

9. Student capabilities and qualifications

Only students having a fellowship from UGC-NET, CSIR, ICAR, ICMR, DST-INSPIRE are eligible to apply

Essential capabilities: Neuropsychological assessment, Research Design and Statistical Analysis

Desirable capabilities: Programming skill (e.g., Python, Open sesame)

Expected qualifications (Courses, degrees, etc.): MA or MSc in Psychology (specialization Clinical Psychology, Neuropsychology), Cognitive Science, Neuroscience