

An Indian-Australian research partnership

Project Title: **Cybersecurity of Wind Power Plant**
Project Number **IMURA1270**
Monash Main Supervisor

(Name, Email Id, Phone)

Prof . Amin Sakzad

Amin.Sakzad@monash.edu
Full name, Email
Monash Co-supervisor(s)

(Name, Email Id, Phone)

Monash Head of
Dept/Centre (Name,Email)

Prof Monica Whitty

Monica.Whitty@monash.edu
Full name, email
Monash Department:

 Department of Software Systems and
 Cybersecurity

Monash ADGR

(Name,Email)

Full name, email
IITB Main Supervisor

(Name, Email Id, Phone)

Prof. Zakir Hussain Rather

 Email: zakir.rather@iitb.ac.in; Phone: +91 22
 25769341

Full name, Email
IITB Co-supervisor(s)

(Name, Email Id, Phone)

Prof. Suryanarayana Doolla

 Email: suryad@iitb.ac.in; Phone: +91 2225767872

Full name, Email
IITB Head of Dept

(Name, Email, Phone)

Prof. Manaswita Bose

 Email: head.es@iitb.ac.in; Phone: +91 2225767890

Full name, email
IITB Department:

Research Clusters:

Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? (Please nominate JUST <u>one</u> . For more information, see www.iitbmonash.org)		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	Material Science/Engineering (including Nano, Metallurgy)	1	Artificial Intelligence and Advanced Computational Modelling
2	Energy, Green Chem, Chemistry, Catalysis, Reaction Eng	2	Circular Economy
3	Math, CFD, Modelling, Manufacturing	3	Clean Energy
4	CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control	4	Health Sciences
5	Earth Sciences and Civil Engineering (Geo, Water, Climate)	5	Smart Materials
6	Bio, Stem Cells, Bio Chem, Pharma, Food	6	Sustainable Societies
7	Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng	7	Infrastructure
8	HSS, Design, Management		

The research problem

Renewable energy is being integrated rapidly with ambitious targets of renewable energy integration set at national/regional level. Wind power is one of the front runners among available renewable energy sources. However, as the penetration of renewable generation increases, the impact on power system dynamics is becoming increasingly apparent, and will become a more integral part of system planning and renewables integration studies. One such emerging, yet critical impact is cybersecurity risk. With the rise of digital technologies power system including in wind farms has introduced significant cybersecurity risks. These risks could potentially lead to system disruptions, data breaches, and even physical damage to critical infrastructure. This project aims to assess the cybersecurity landscape of wind farms and propose effective measures to safeguard these critical assets from cyber threats.

Project aims

The project aims to:

1. Identify key cybersecurity risks in wind turbine generator (WTG) and wind power plant (WPP)
2. Literature and market survey of cybersecurity standards and cybersecurity attacks on power system with main focus on wind power plants
3. Develop cybersecurity framework for wind turbine generator and wind power plants
4. Propose technical countermeasures/solutions for cybersecurity of WTG and WPP
5. Develop key recommendations/interventions/guidelines for response to cybersecurity attacks to WTG and WPP including recovery from cybersecurity attack and continuous monitoring.

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

Expected outcomes

Highlight the expected outcomes of the project

The expected outcomes are:

- A report on major cybersecurity risks in wind turbine generator (WTG) and wind power plant (WPP)
- Cybersecurity framework for wind turbine generator and wind power plant
- Technical solutions for cybersecurity of WTG and WPP including risk mitigation strategies, monitoring tools, and response protocols.
- Guidelines for response to cybersecurity attacks to WTG and WPP including recovery from cybersecurity attack and continuous monitoring.

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

Capabilities and Degrees Required

A highly motivated applicant with background in Electrical Power engineering/IT/Computer Science and strong commitment to quality research. Masters in electrical power or related area is preferred, however, an outstanding undergraduate applicant will also be considered.

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)

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.