# Potential Research Projects

## CHEMICAL ENGINEERING

| Project Title | Supervisor(s) |
|---|---|
| • Bioinspired materials for biomedical and environmental/maritime applications<br>• Nanomaterials-based bio/chemical sensors | Dr Yen Nee Tan |
| • Food waste processing to functional materials | Dr Kent Chin<br>Dr Yen Nee Tan |
| • Analysis of system of systems – neural networks based coordinated control systems<br>• Design of sustainable industrial cities – integrating 'waste to resource' with the chemical process industry | Dr Pavan Kumar |
| • Stem cells and tissue engineering<br>• Study of occupational health issues using in-vitro cell and tissue models<br>• Sustainable bioreactor and bioprocess development for producing products | Dr Ng Yuen Ling |

# Potential Research Projects

## ELECTRICAL POWER ENGINEERING

| Project Title | Supervisor(s) |
|---|---|
| • Siting and Sizing of Battery Energy Storage Systems<br>• Smart Electric Charging Strategy for Urban Distribution Systems<br>• Uncertainty management in Urban Distribution Systems<br>• Data analytics for Fault Detection, Isolation and Restoration<br>• A Multi-Agent System Approach to Ensure a Resilient Cyber-Physical System | Dr Anurag Sharma |
| • Compensation of time delay in smart grid system<br>• Force Reflecting Control for Bilateral Teleoperation System Under Time-Varying Delay<br>• Developing a Wearable Rehabilitation Robotic Device<br>• Underwater autonomous vehicles | Dr Khalid Abidi |

# Potential Research Projects

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|---|---|
| • Solid state transformers for smart microgrid systems<br>• Advanced Power Electronics for Resilient Active Distribution Networks<br>• PE technologies for applying Energy Storage in Resilience Applications<br>• Fault tolerant DC-DC converters for mission-critical applications<br>• Advanced PE solutions for the future grid applications | Dr Naayagi Ramasamy |

## ELECTRICAL POWER ENGINEERING

| Project Title | Supervisor(s) |
|---|---|
| • Single-stage DC-AC power conversion for renewable energy system<br>• Multilevel inverters with improved reliability and fault-tolerant operation<br>• Model predictive control for power converter system<br>• Multi-terminal HVDC power transmission system using MMC | Dr Sze Sing Lee |
| • Hybridization of Physical and Virtual Energy Storage System<br>• Microgrid/Nanogrid for Future Energy Solution<br>• Microgrid Inter-operability for Resilient Power Network<br>• Investigation on Cyber-Physical Security Vulnerabilities in Microgrids | Dr Jianfang Xiao |

# Potential Research Projects

- IoT based mobile hearing monitoring system solution
- Low power environmental monitoring systems
- Artificial Intelligent (AI) hardware development: accelerators, AI power measurement systems
- Acoustic energy harvesting

Dr Noori Kim

## MECHANICAL ENGINEERING

| Project Title | Supervisor(s) |
|---|---|
| Advanced Manufacturing:<br>• Object Recognition on Mobile Devices using Machine Vision and Lean AI Analytics<br>• Smart Robo Advisors for Manufacturing Task Management using AI and Automaton | Dr Zi Jie Choong |
| Smart systems:<br>• Intelligent monitoring of structures in bridges<br>• Smart prosthesis for rehabilitation | Dr Junjie (JJ) Chong |

# Potential Research Projects

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|---|---|
| Design and prototyping of service robotic:<br>• Waiter robot<br>• Toilet cleaning robot | Dr Michael Lau |

## MECHANICAL ENGINEERING

| Project Title | Supervisor(s) |
|---|---|
| • Additive manufacturing<br>• Microwave heating of materials<br>• Lightweight metal alloys and composites<br>• Computational materials | Dr Eugene Wong |
| Composite materials:<br>• Sustainability issues: Reuse, Reduce, Recycle<br>• Repair of damaged composite materials<br>• 3D printing of composite materials<br>• Design, characterisation, modelling of novel composite materials | Dr Kheng Lim Goh |

# Potential Research Projects

## MARINE TECHNOLOGY

| Project Title | Supervisor(s) |
| --- | --- |
| • Ship and Offshore Hydrodynamics<br>• Climate Change, Sea-Level Rise and Floating Solutions<br>• Decarbonization and Alternate Fuel<br>• Renewable Energy, Energy Efficiency and Management<br>• Green Ship & Offshore Technology<br>• Shipyard Technology Management and Practice<br>• Digitalisation and Digital Twin<br>• Sustainability Development Goals in Maritime and Offshore<br>• Sustainable Ship Recycling and Offshore Decommissioning | Dr Arun Dev |

# Potential Research Projects

| | |
|---|---|
| • Intelligent Systems Design<br>• Data Mining<br>• Predictive Modelling<br>• Machine Learning<br>• Energy Storage System (Battery)<br>• PV system<br>• Acoustics | Dr Cheng Siong Chin |
| • Engineering design<br>• Efficiency Improvement<br>• LNG Transportation & Storage<br>• Modeling and Simulation<br>• ORC and Trigeneration Cycles<br>• Combustion and Emissions Control. | Dr Ivan CK Tam |

## MARINE TECHNOLOGY

| • **Project Title** | **Supervisor(s)** |
|---|---|
| • Floating terminal with different engineering applications<br>• Floating solar panel farm<br>• Floating hotel or housing<br>• Floating bridges in various scales<br>• Wave energy devices<br>• Wind turbine under various floaters<br>• Autonomous ships. | Dr Ling Wan |

# Potential Research Projects

- Design Optimization (i.e. drag/shear force reduction) using CFD
- Data Analytics and Artificial Intelligence in Fluid Dynamics
- Sustainable Energy Engineering.

Dr Mohammed Abdul Hannan

- Computational fluid dynamics applications in marine and offshore engineering: green water
- Ship energy-saving devices and techniques,
- Added ship resistance in waves
- Ship resistance in ice field
- Ship energy efficiency and performance monitoring.

Dr Xin Wang