



GDRi Workshop:  
29<sup>th</sup> November – 1<sup>st</sup> December 2017



# Energy Conversion and Storage

## Overview on Current Status of Research Collaboration

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### Coordinators

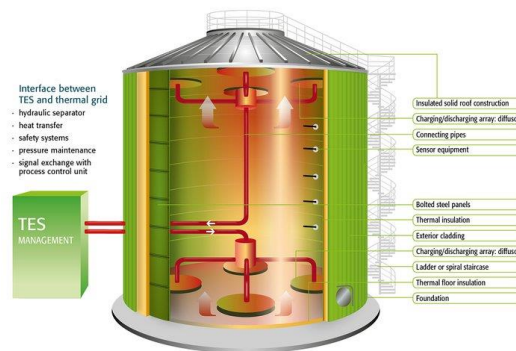
Prof. Madhavi Srinivasan (ERI@N/NTU) - Dr. Mathieu Morcrette (LRCS/CNRS)

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### Presented by

Asst. Prof. Alessandro Romagnoli (ERI@N/NTU)

Prof. Xavier Py (PROMES/CNRS)



## Summary

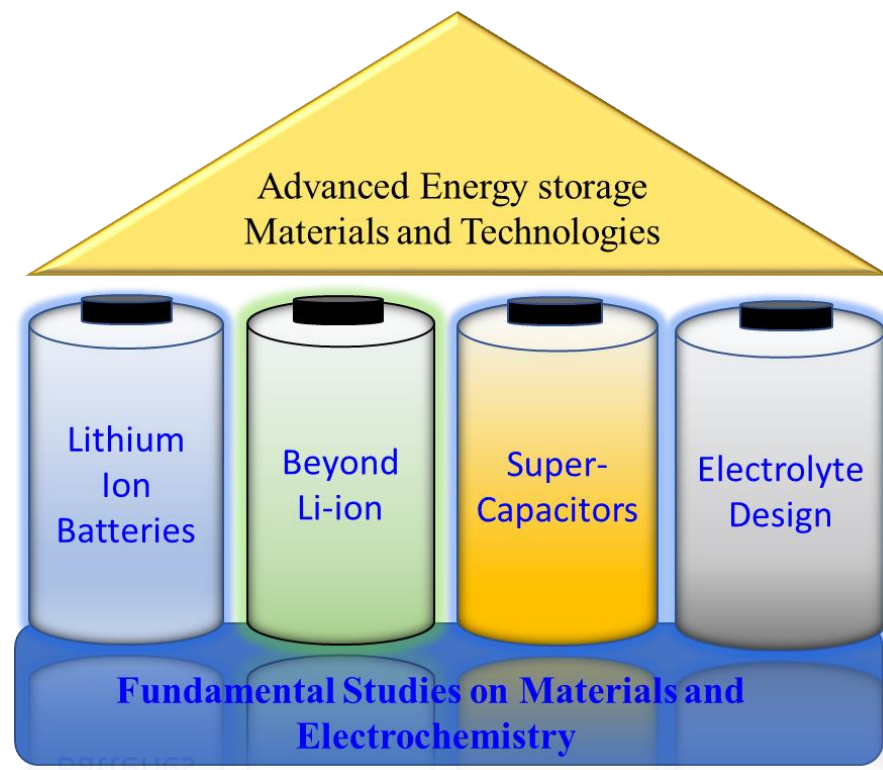
- Electrochemical Energy Systems and Storage
- Hydrogen & Fuel cells
- Thermal Energy Storage & Conversion

# Electrochemical Energy Systems and Storage

Main contacts:

- Prof. Madhavi Srinivasan, Ass. Prof. Alex Yan Qingyu** (ERI@N/NTU), **Dr. Mathieu Morcrette** (LRCS/CNRS)  
 >>> **Dr. Liang Qinghua**, Senior Research Fellow (MSE/NTU)  
 >>> **Miss. Dangol Raksha**, PhD candidate (MSE/NTU)  
 >>> **Dr. Rohit Satish**, Senior Research Fellow (MSE/NTU)

- **Lithium-ion (Li-ion) battery** : Design synthesis, characterisation of Lithium ion battery Materials
- **Beyond Li-ion** : develop high performance materials for applications such as Sodium and Aluminium ion based batteries
- **Supercapacitors**: developing new techniques for the synthesis of high surface area carbon based materials for supercapacitors applications.
- **Electrolyte design**: design of electrolyte solutions



# Hydrogen & Fuel Cells

Main contacts:

Prof. **Siew Haw Chan** (ERI@N/NTU), Prof. **Olivier Joubert** (IMN/CNRS)

>>> Dr. **Liu Qinglin**, Senior Research Fellow, (ERI@N/NTU)

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**Joint proposal:** “Novel perovskite as fuel electrode for high temperature electrolysis of seawater and flue gas”

**Principal Investigators:** Prof Chan Siew Hwa, Prof Rose-Noëlle Vannier (UCCS-Lille, France), Prof Olivier Joubert

*Submitted in Mar 2017 in response of 3<sup>rd</sup> ANR-NRF joint call 2017. However, not approved.*

## **Main scope of research (work packages) and leading party:**

- Investigations on the electrochemical behaviours of LSCM-based fuel electrode under seawater electrolysis and flue gas electrolysis conditions (NTU)
- Research and characterisation of new LSCM-based materials for enhanced catalytic properties (IMN)
- Understanding of mechanisms of oxygen transport to improve cell performances (UCCS)
- Fabrication and performance evaluation of SOEC stack prototype (NTU, UCCS, IMN)

# Thermal Energy Storage & Conversion

Main contacts:

Asst. Prof. **Alessandro Romagnoli** (ERI@N/NTU), Prof. **Xavier Py** (PROMES/CNRS)

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**Shared topics:** “High temperature Thermal Energy Storage“

First contact: **January 2015**

**3 years later:**

- One shared PhD Xu Haoxin >> (NTU funding) 2015-2019
  - One international paper >> Applied Energy 2017 (Tier 1 Journal)
  - One special issue paper >> Applied Energy 2017 (Tier 1 Journal)
  - Two conference proceeding >> 2016, 2017
- Several project proposed to calls: ANR, CNRS
  - Merlion Funding awarded >>> (SGD40k)
- Bilateral exchanges:
  - Dr. Fabio Dal Magro (ERI@N) – One Week in PROMES
  - Quentin Falcoz (PROMES) – One week in ERI@N
  - Miss. Xu Haoxin (NTU) – Visiting PROMES for 6 months

# Thermal Energy Storage & Conversion

Main contacts:

Asst. Prof. **Alessandro Romagnoli** (ERI@N/NTU), Prof. **Xavier Py** (PROMES/CNRS)

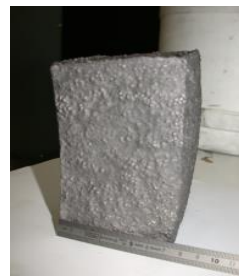
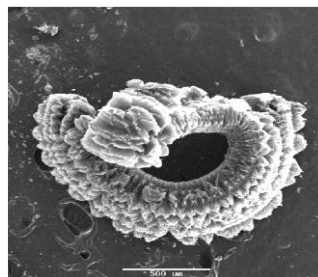
## Shared topics: “High temperature Thermal Energy Storage”

Material level:

- PCM selection methodology
- High temperature PCMs identification, characterization (alloys)
- Enhanced PCM composites
- Recycled ceramics from ind. Wastes as low-cost high T containment

System level:

- Waste to Energy plant optimization
- Industrial waste heat recovery
- Concentrating solar power TES



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#### Electrochemical Storage

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#### Hydrogen & Fuel Cells

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Prof. **Olivier Joubert**, email: [Olivier.Joubert@univ-nantes.fr](mailto:Olivier.Joubert@univ-nantes.fr)

#### Thermal Energy Storage & Conversion

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