Introduction of the research group “Control of Renewable Energy Systems (CRES)”

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Technische Universität München (TUM)
Munich School of Engineering (MSE)
Research group “Control of Renewable Energy Systems (CRES)”

www.cres.mse.tum.de

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WindForS, Stuttgart

Outline

Outline

Technische Universität München (TUM)

Main campuses

Departments

154 programs - 13 departments - 3 locations

Munich

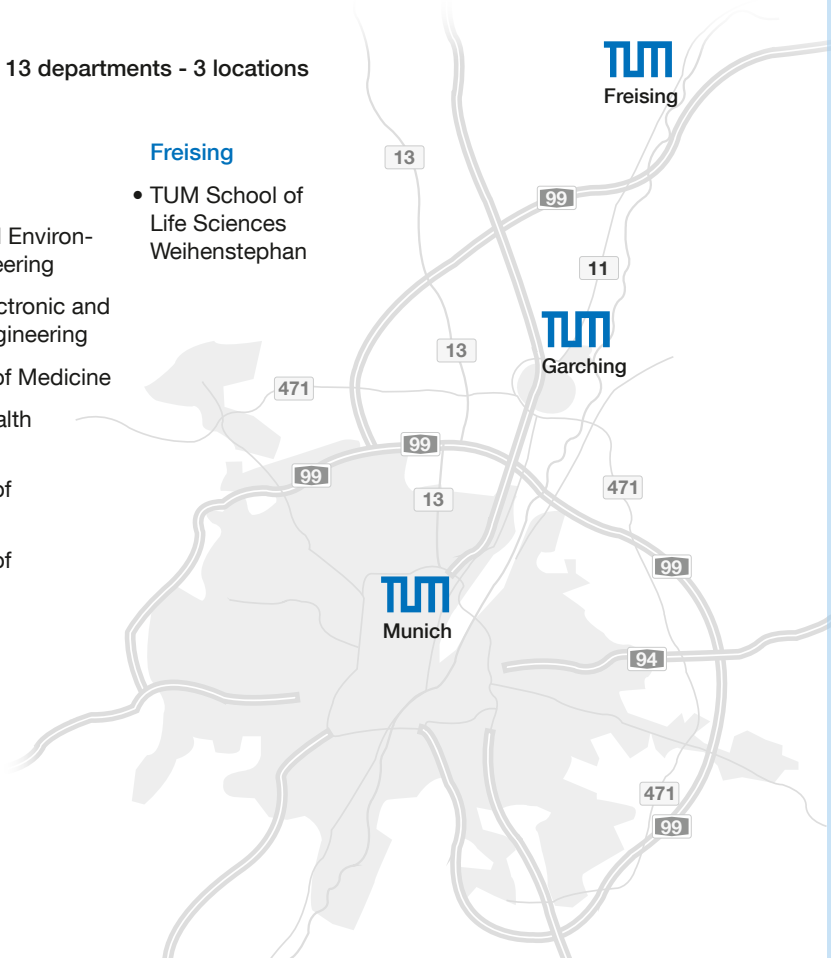
- Architecture
- Civil, Geo and Environmental Engineering
- Electrical, Electronic and Computer Engineering
- TUM School of Medicine
- Sport and Health Sciences
- TUM School of Education
- TUM School of Management

Freising

- TUM School of Life Sciences Weihenstephan

Garching

- Chemistry
- Informatics
- Mathematics
- Mechanical Engineering
- Physics



Locations & Networks

TUM science network

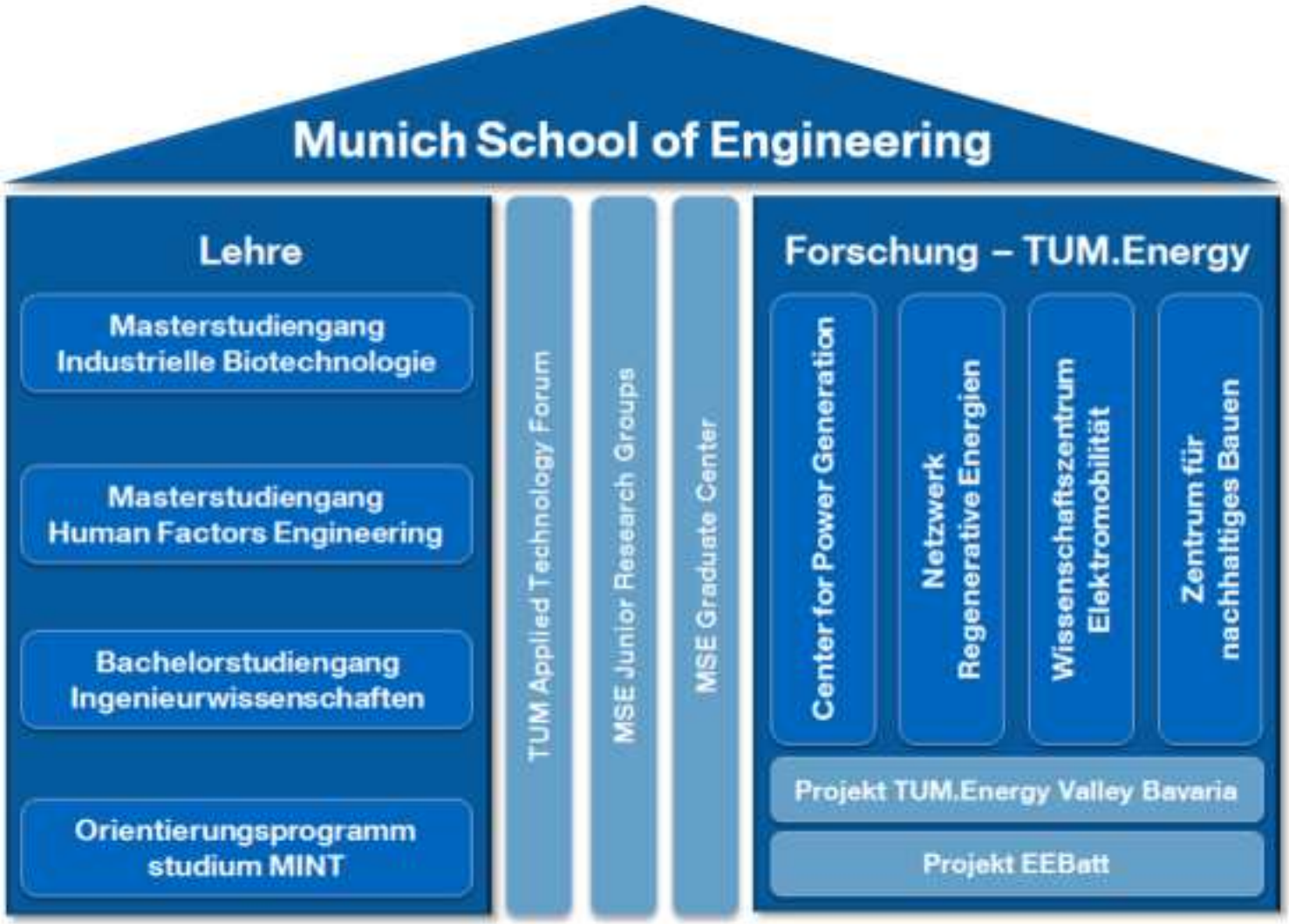
- Max Planck Institutes:
  Garching
  Martinsried
  Munich
- Helmholtz Zentrum München
- iwb Anwenderzentrum Augsburg
- Fraunhofer Institutes:
  Holzkirchen
  Freising

TUM locations

- Munich
- Garching
- Freising
- Iffeldorf
- Obernach
- Straubing
- Wettzell
- Singapore: TUM Asia
- Beijing
- Brussels
- Cairo
- Mumbai
- São Paulo

Munich School of Engineering (MSE)

Integrative research center



Group “Control of renewable energy systems (CRES)”

Team (8 PhD candidates, 3 PhD collaborations)

H. Eldeeb, M.Sc.
(CRES, 09/2015)

C. Dirscherl, M.Sc.
(CRES, 01/2014)

C. Hackl, Dr.-Ing.
(CRES, 01/2014)

J. Kullick, M.Sc.
(CRES, 10/2015)

K. Schechner, M.Sc.
(CRES, 01/2014)

M. Landerer, M.Sc.
(CRES, 06/2016)

External PhD candidates

Z. Zhang, M.Sc.
(CRES/EAL,07/2015)

S. Krüner, M.Sc.
(SINNPower,11/2015)

A. Birda, M.Sc.
(BMW, 04/2016)

. . . and collaborations with EAL (Prof. Kennel)

F. Bauer, M.Sc.
(EAL)

M. Abdelrahem,
M.Sc. (EAL)

A. Ayad,
M.Sc. (EAL)

Group “Control of renewable energy systems (CRES)”

Research projects (all related to the electrical system)

Großwindkraft

Effizienz+Zuverlässigkeit

Kleinwindkraft

Reluktanz-SM ($\leqslant$ 50 kW)

Flugwindkraft

Fehlertolerante Regelung

Wellenkraft (SinnPower)

Effizienz+Zuverlässigkeit

E-Mobilität (BMW)

Effizienz+Zuverlässigkeit

Geothermie

Fehlertolerante Regelung

Energienetze

Vier-Leiter-System

Group “Control of renewable energy systems (CRES)”

Funding

Computationally-efficient direct MPC for WTS

DFG Deutsche Forschungsgemeinschaft

Robust and fault-tolerant low-level control of the electrical drive system

AWESCO Airborne Wind Energy System Modelling, Control & Optimisation

Klein-Windkraftanlagen mit Reluktanz-Synchrongenerator

Bund der Freunde der Technischen Universität München e.V.

Geothermie Allianz Bayern: Teilprojekt Tauchelkreiselpumpe

Bayerisches Staatsministerium für Bildung und Kultus, Wissenschaft und Kunst

Forschergruppe CRES Fokus: Windkraftanlagen

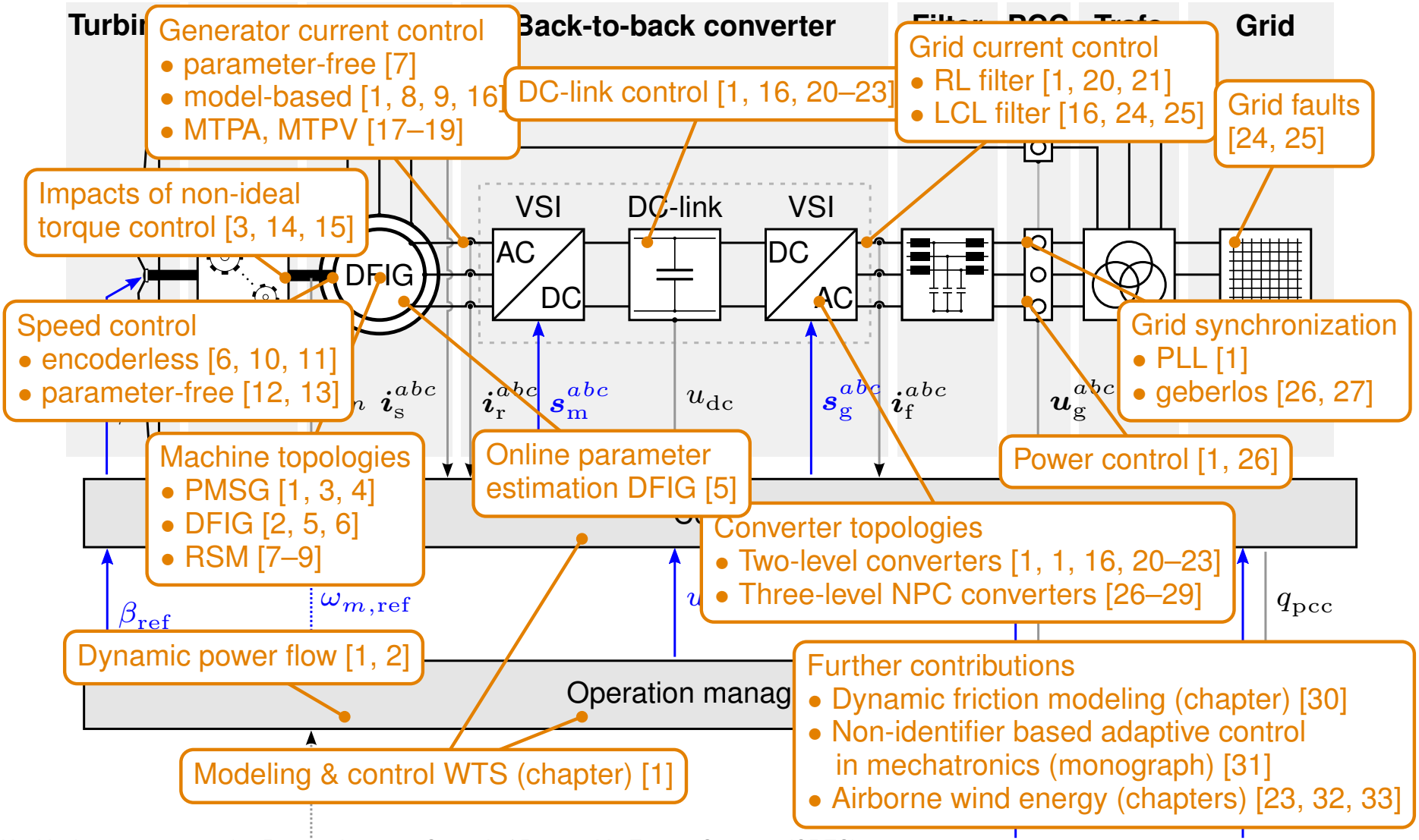
MSE

Bayerisches Staatsministerium für Bildung und Kultus, Wissenschaft und Kunst

CleanTeachCampus Projekt: Teilprojekt Stromnetze

Group “Control of renewable energy systems (CRES)”

Research focus and publications: **Electrical** components of e.g. large-scale wind turbine systems



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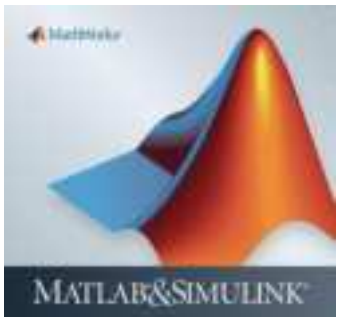
Simulation and implementation tools



Simulation & modeling

Scilab

Simulation & modeling (feasible)

GNU Octave

Simulation & modeling (feasible)

MODELICA

Simulation & modeling (feasible, planned for DAEs)

dSPACE

Real-time implementation (laboratory)

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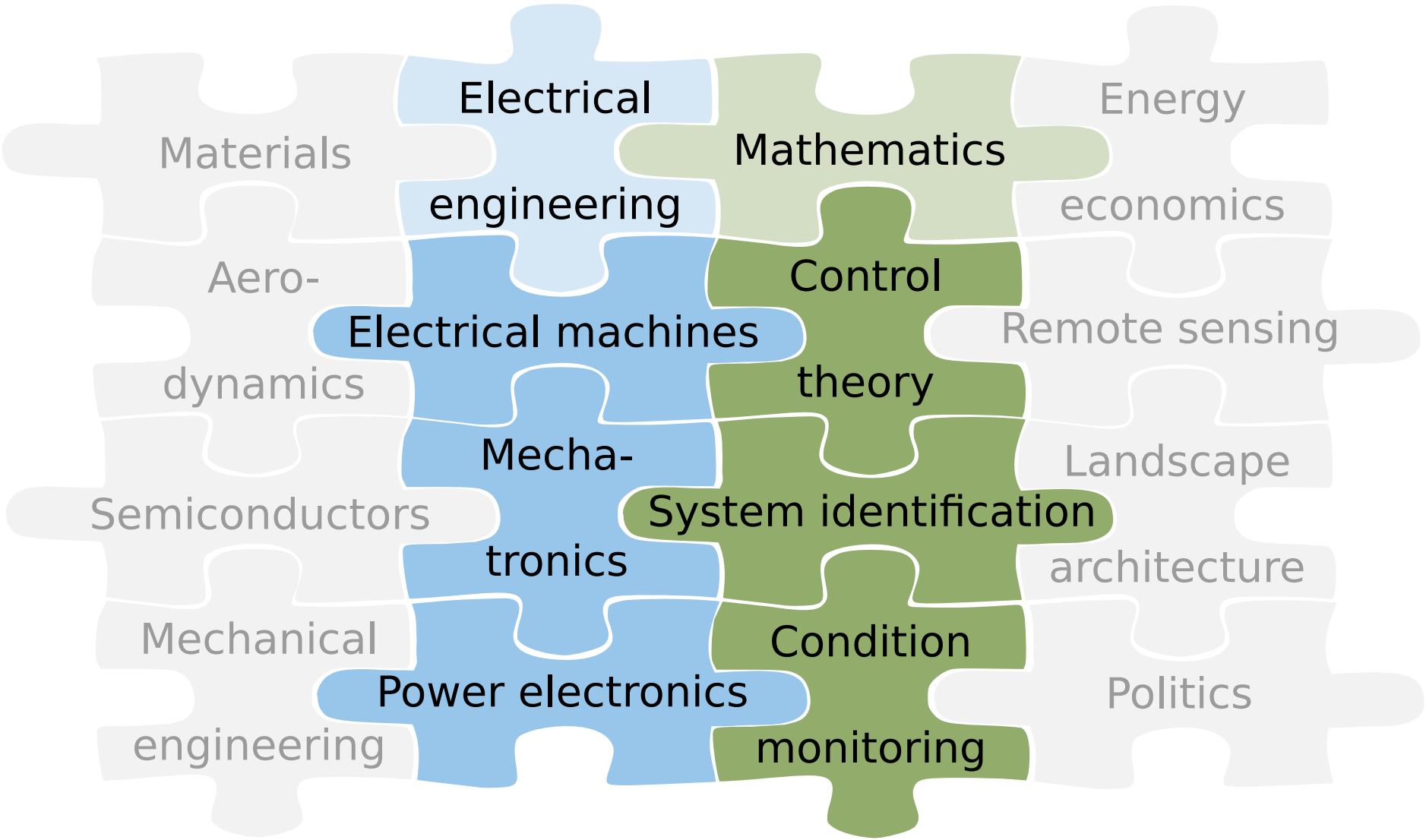
Interdisciplinary approach



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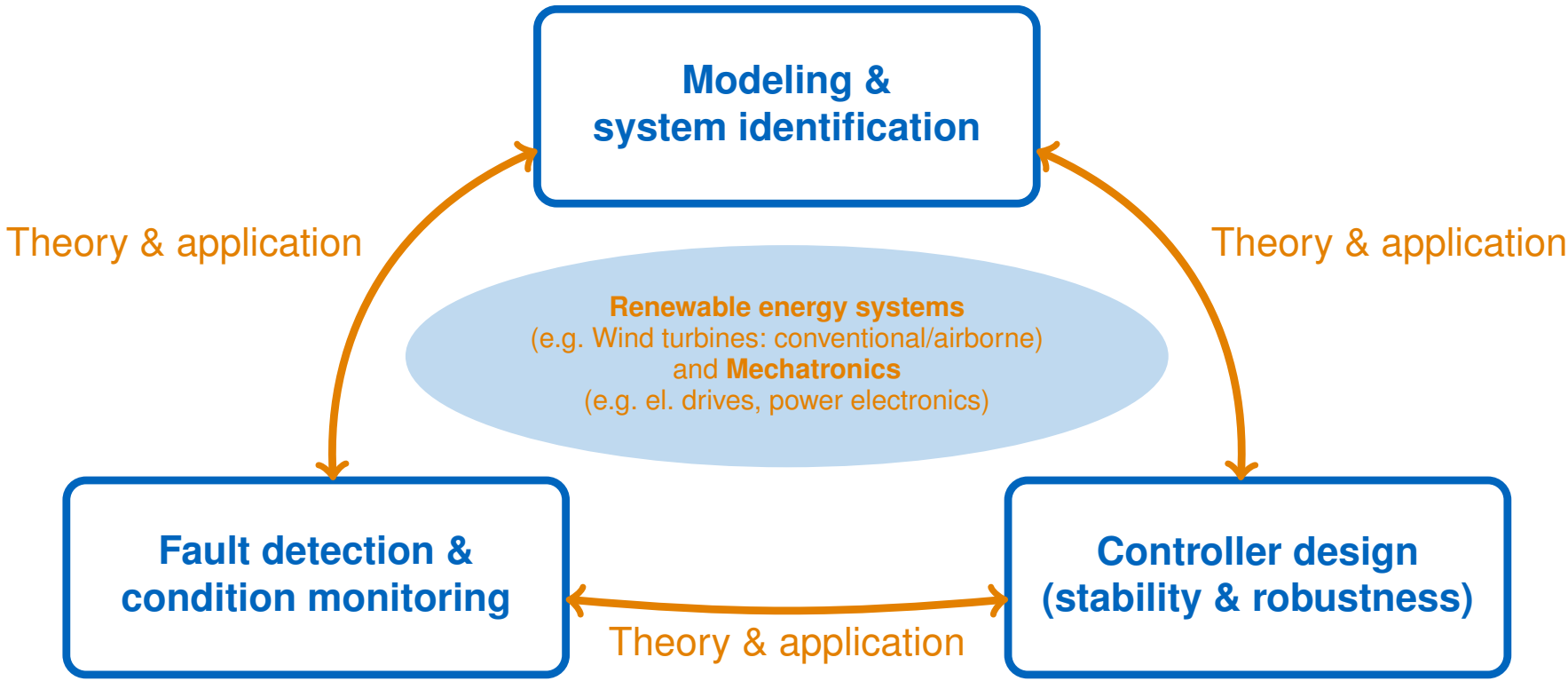
Research concept



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Laboratory setup: Some photos

Reluctance and Permanent-magnet SMs

Electrically-excited SM and doubly-fed IM

Real-time system and VSIs

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