Sebastian Troitzsch

Nationality German
Birthday 12 June 1991

Phone +65 8302 0720 **/** +49 177 2205068
Email s@troitzs.ch **/** sebastian.troitzsch@tum.de

Education

Technical University of Munich (TUM), PhD Candidate **01/2017 – present**

- PhD Thesis "Exploration of Demand Response Options for Electric Public Transport in Singapore"
- Expected Graduation: July 2021

RWTH Aachen University, Germany, Master of Science **10/2014 – 03/2017**

- Majored in Energy Engineering, specialised in Renewable Energy Systems. Final grade: 1.8
- Awarded the Deutschland-Stipendium Scholarship for outstanding academic performance.

National University of Singapore, Student Exchange Programme **08/2014 – 12/2014**

- Specialised in advanced building energy system modelling for tropical climates.
- Engaged in cultural exchange programmes and a community aid project in the Philippines.

RWTH Aachen University, Germany, Bachelor of Science **07/2010 – 07/2014**

- Majored in Mechanical Engineering, specialised in Energy Engineering. Final grade: 1.9

Work Experience

TUMCREATE Ltd (Singapore), Research Associate / PhD Candidate **01/2017 – present**

- Projects: Flexible Distribution Grid Demonstrator (FLEDGE), Connecting Energy & Power Systems for Future Singaporean New Towns (CONCEPT)
- Modelling the spatio-temporal impact of electric public transport and private electric vehicle (EV) charging onto the electric grid in Singapore.
- Developing optimal control algorithms for flexible loads and energy storage systems to mitigate the challenges in demand hot spots.

TUMCREATE Ltd (Singapore), Master Thesis Student **04/2016 – 11/2016**

- Master Thesis "Model Predictive Control for Co-Optimization of Distribution Grid Congestion and Thermal Comfort in Office Buildings"
- Developed an optimal control framework for heating, ventilation & air-conditioning (HVAC) systems of office buildings to participate in load shifting/demand response (DR).
- Evaluated the load shifting potential of an office building in Singapore with the developed framework.

Institute for Energy Efficient Buildings, Student Assistant **06/2015 – 03/2016**

- Designed and implemented a test bed for a demand response (DR) enabled heating system for residential buildings.

Robert Bosch SEA Pte Ltd (Singapore), Research Intern **01/2015 – 04/2015**

- Conceived and discussed ideas, conducted technology research and delivered support data for the proposal of a research project on advanced control systems for air-conditioning systems.
- Designed and implemented an indoor air quality test bed.

Robert Bosch GmbH (Germany), Research Intern / Bachelor Thesis Student **10/2013 – 07/2014**

- Bachelor Thesis "Grey-Box-Modelling of Commercial Buildings using a Maximum-Likelihood-Approach"
- Developed a thermal RC model for commercial buildings along with a parameter estimation approach.
- Conducted market research on non-intrusive load management.

Institute of Power Systems and Power Economics, Student Assistant **01/2013 – 09/2013**

- Implemented improvements to a comprehensive evaluation interface for electric grid (transmission system) simulations.

Co-Curricular Activities

Project Cebu 2014 **12/2014**

Overseas community aid project to Cebu Island in the Philippines.

- Volunteered as a teacher in the preparation and conduct of IT and language lessons.

Project Velocity Aachen **01/2013 – 10/2013**

Student project to implement a bicycle rental system in the city of Aachen.

- Liaised with public stakeholders to identify rental station locations and requirements for the system.

Energie Forum Aachen, Energy Club **11/2011 – 04/2016**

Student organisation to educate and discuss energy technology and politics advancements.

- Founding member and board member from 09/2012 to 09/2013.

Skills

- Languages: Fluent in English and German.
- Software: Proficient with Python, Julia, MATLAB, Modelica, SQL and EnergyPlus.
- Methods: Experienced in convex optimization (LP / MILP / QP), robust optimization, electric grid / power flow modelling, thermal grid / district cooling system modelling, building climate modelling.
- Interested in optimal planning and operation of energy systems and district-level energy markets.

Selected Projects

Flexible Distribution Grid Demonstrator (FLEDGE) **06/2018 – present**

- Project partners: TUMCREATE and Agency for Science, Technology and Research (A*STAR).
- Outcome: Software framework for optimal operation problems of electric and thermal distribution grids along with distributed energy resources (DERs): https://github.com/TUMCREATE-ESTL/fledge

Control-oriented Building Model (CoBMo) **01/2017 – present**

- Project partners: TUMCREATE and TUM Chair of Renewable and Sustainable Energy Systems.
- Outcome: Software tool for building modelling catering specifically for the formulation of MPC problems for thermal building systems: https://github.com/TUMCREATE-ESTL/cobmo

Connecting District Energy & Power Systems in Future New Towns (CONCEPT) **01/2018 – 02/2019**

- Project partners: Singapore-ETH Centre (SEC) and TUMCREATE.
- Outcome: Method for combined electric grid planning and flexible load operation on the district level, which achieves investment cost savings of 25 % through peak shaving of air-conditioning loads.

Selected Publications (more at: https://sebastian.troitzs.ch)

S. Troitzsch, M. Grussmann, K. Zhang, and T. Hamacher, Distribution Locational Marginal Pricing for Combined Thermal and Electric Grid Operation, in IEEE PES Innovative Smart Grid Technologies Europe (ISGT Europe), The Hague, Netherlands, 2020, doi: 10.1109/ISGT-Europe47291.2020.9248832.

S. Troitzsch, B. K. Sreepathi, T. P. Huynh, A. Moine, S. Hanif, J. Fonseca, and T. Hamacher, Optimal Electric-Distribution-Grid Planning considering the Demand-Side Flexibility of Thermal Building Systems for a Test Case in Singapore, Applied Energy, 2020, doi: 10.1016/j.apenergy.2020.114917.

S. Troitzsch, S. Hanif, K. Zhang, A. Trpovski, and T. Hamacher, 'Flexible Distribution Grid Demonstrator (FLEDGE): Requirements and Software Architecture', in 2019 IEEE Power & Energy Society General Meeting (PESGM), Atlanta, GA, USA, 2019, doi: 10.1109/PESGM40551.2019.8973567.