PhD position at NUS Department of Architecture relating to Digital Twin

Looking for a PhD applicant to work within the Future Resilient Systems II research programme on the development of a digital twin for resilience analysis and management of airport energy systems and on the development of digital twin-based collaborative and interactive decision support.
The digital twin aims to bring together everything that's happening in airport energy systems to create the operations control interface of the future. The application case will address the data and technical principles necessary to model, simulate and mitigate infrastructure vulnerability of airport energy systems and to study their future resilience. The role of having a dynamic electricity management model deals with airport power system, renewable energy sources, batteries, and diesel generators using digital-twin based analysis will be investigated. Using the digital twin, scenarios for the impact of different hazards, risks vulnerabilities on airport energy systems having microgrid and allied multi-grid infrastructure can be simulated considering the interdependencies between them. This will address both infrastructure and operational resilience issues of airport energy systems.
The digital twin will form the basis for making more informed decisions when planning and operating airport energy systems in the future. Decision making is a collaborative and interactive process involving different stakeholders, and it relies on simulation and optimization to provide input to the decision-making process; in addition, it involves modeling and visualization to support interaction and posing hypothetical scenarios. In particular, we consider the use of data analytics techniques, such as clustering and archetypal analysis, in order to identify and present archetypes as potential planning strategies, and provide insights into the relationships between performance and design parameters. A single archetype or optimization can be visualized both as a network and spatial configuration, and multiple archetypes or optimizations can be compared using multivariate visualizations. We also consider prototyping a configurable and interactive web-based dashboard tool in parallel with the characterization of spatial and logical energy networks. Interactive visualizations improve stakeholders' understanding. In the case of visualizing a single archetype or optimization, the interaction may include modeling hypothetical scenarios through changes in its configuration and the simulation to yield additional feedback to the users.
The PhD candidate is expected to start in August 2020 or January 2021. Funding will be available for the full 4-year duration of the PhD study.
General admission requirements for the PhD programme can be found at
http://www.nus.edu.sg/admissions/graduate-studies/graduate-admissions.html and
http://www.sde.nus.edu.sg/acad/SDE_Grad_ByResearch.html
The official application deadline is 15 November 2019 for August 2020 intake and 15 May 2020 for January 2021 intake, although late submissions can be accepted up to six weeks after the deadline.
For any other questions regarding the PhD research position you may contact Rudi Stouffs at
stouffs@nus.edu.sg

Kind regards,
Rudi Stouffs

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