Title of the project:
Sustainable campus

Assignment no.: 23.18	**Internal/external:** Internal/external
Head graduation committee: Prof.dr.ir. Arjen Hoekstra	**Daily advisor:** Charlotte Verburg
Name(s) of participating institute: Prof. Alexey Voinov, University of Technology Sydney, Australia	**Start of the project:** Flexible

Short description and objective of the project:
The idea of a sustainable campus looks attractive, but surprisingly little is done at many universities to actually work on it. A possible bottleneck is that it's not so clear what even a sustainable campus entails, what things matter most and which things are less important. Obviously one may think about energy use and greenhouse gas emissions, related to infrastructure (levels of energy use, types of energy sources), and transportation (modes of transport), sustainable water management (levels of water use and recycling, existence of green roofs, rainwater harvesting and local water storage), and management of nutrients (composting toilets, sustainable gardening practices). Sustainability also needs to be part of procurement policy; one may consider, for example, practices regarding paper (paperless office and/or use of recycled paper), work wear (sustainable cotton), cleaning (use of naturally degradable cleaning stuff), and catering (promotion of organic food and vegetarian meals). Issues that may get attention are also the extent to which sustainability is integral part of the educational programme (e.g. linking programs to grand societal challenges, education in systems analysis), the promotion and amount of research on sustainability (existence of incentives for interdisciplinary research and societal relevance) and the room for local pilots and innovation. The challenge in this project will be to develop a practical approach to measure campus sustainability.

Research objective
Develop a framework to assess the sustainability of a university campus and apply that to the campuses of the University of Twente and the University of Technology Sydney.

Approach
1. Delineate the scope of the assessment, i.e. which processes/activities directly and indirectly associated with "the university" or "the campus" are to be considered.
2. Operationalize "sustainability" into a range of indicators that can be measured.
3. Apply the sustainability assessment framework to the two case studies.
4. Identification of measures to increase sustainability ranked according to cost effectiveness.

The project can be partially carried out at the University of Technology Sydney.

References
Agdas, D., Srinivasan, R.S., Frost, K., Masters, F.J. (2015) Energy use assessment of educational buildings: Toward a campus-wide sustainable energy policy, Sustainable Cities and Society, 17: 15-21.
Sharp, L. (2009) Higher education: The quest for the sustainable campus, Sustainability: Science, Practice, and Policy, 5(1): 1-8.
Sonetti, G., Lombardi, P., Chelleri, L. (2016) True green and sustainable university campuses? Toward a clusters approach, Sustainability, 8(1): 1-23.
Too, L., Bajracharya, B. (2015) Sustainable campus: engaging the community in sustainability, International Journal of

Sustainability in Higher Education, 16(1): 57-71.