

## SASBE SEMINAR: OCTOBER 2023

**Date:** 9 October, 2023

**Time:** 11:00 – 13:00 (CET)

**Title:**

Learning from living labs and built environment testing facilities

### Programme

Time	Topic	By
11:00 – 11:10	Introduction	Jeremy Gibberd
11:10 – 11:30	HSB Living Lab - Innovating with the users: What, Why, Who and How of the users engagement	Speaker 1 – Elena Malakhatka
11:30 – 11:50	The TU Delft Campus as a living lab	Speaker 2 – Andy van den Dobbelen
11:50 – 12:10	The Tropical Technologies Laboratory	Speaker 3 – Sui-Kit Lau
12:10 – 12:30	Advancing localised climate change adaptation measures	Speaker 4 – Jan Hugo
12:30 – 13:00	Panel Discussion & Questions	Jeremy Gibberd

This seminar series is organised by the Smart and Sustainable Built Environment Working Group (W116) of the CIB. The seminar introduces research and the practical implementation of testing facilities and living labs from diverse regions globally. The seminar will focus on the opportunities and constraints that these facilities present and how we can use them to leverage our research capability globally.

Seminars consist of short presentations, panel discussions and questions. They are hosted by the CIB who publicise the seminars and issue invitations. W116 schedules the seminars and presenters. If you have questions or would like to suggest a seminar, please contact: Dr Jeremy Gibberd: [jgibberd@csir.co.za](mailto:jgibberd@csir.co.za)

### Detailed programme

Detailed descriptions of the topics and an introduction to the presenters are provided on the next pages.

# HSB Living Lab - Innovating with the users: What, Why, Who And How of the Users Engagement into the Sustainable Building Innovation Process

## Abstract

Sustainable building innovation encompasses the intricate interplay between architectural design, energy efficiency, and the diverse needs of occupants. The HSB Living Lab serves as an exemplary model that illuminates the intricate dynamics of user participation within the realm of sustainable building innovation. This abstract aims to provide a comprehensive investigation into the fundamental dimensions of "What, Why, Who, and How" regarding the integration of users into this dynamic process.

**What:** Central to the HSB Living Lab paradigm is a transformative shift in traditional building development. It underscores the pivotal role of users as active contributors throughout the project's lifecycle, ranging from ideation and design to construction and ongoing operation. This approach redefines buildings as adaptive ecosystems where users become co-creators, exerting influence over building functions, technology integration, and sustainability features.

**Why:** The rationale behind the HSB Living Lab's approach is grounded in the imperative to align building designs with the evolving preferences and needs of occupants. User engagement cultivates a sense of ownership and responsibility among inhabitants, fostering sustainable behaviors, optimizing operational efficiency, and ultimately reducing environmental footprints.

**Who:** User engagement entails the involvement of diverse stakeholders, including residents, researchers, designers, and industry professionals. The HSB Living Lab's strength lies in its inclusive platform that capitalizes on this diversity, encouraging the convergence of collective wisdom from various backgrounds to steer innovative practices.

**How:** The HSB Living Lab employs an array of strategies to facilitate robust user engagement. These encompass dynamic co-creation workshops, real-time data collection, and participatory decision-making processes. Consequently, sustainability measures are not imposed but organically integrated, leading to the emergence of comprehensive and highly effective solutions.

## Presenter



### **Elena Malakhatka (PHD)**

Elena earned her MSc degree in sustainable engineering from KTH Royal Institute of Technology and has more than 5 years of experience in the Energy Management systems field. Over the last 6 years, she's been working with Living Labs, focusing on Human-Building Interaction (HBI) and involving various actors in the Building Innovation process. She successfully completed her doctoral research at KTH Live-in-Lab, focusing on 'Data-driven service design for sustainable building operation and users' wellbeing. Currently, Elena is working as a Post Doc at Chalmers University of Technology, where she continues her work with Living Labs, concentrating on User Research and Actors network analysis in various studies.

# The TU Delft Campus as a living lab

## Abstract

As part of the sustainability ambitions of TU Delft (becoming carbon neutral, circular, climate adaptive, liveable and biodiverse by 2030) one of the goals is to make the campus one large living lab for sustainable innovation and experimentation. For the entire sustainable transition, a 'Vision, Ambition and Action Plan' was written and a budget of 100 million euro was made available to invest in sustainability. Of that budget, 20 million euro is allocated for innovations on the campus, for which a governance structure and decision process was designed. This is currently in use. Researchers can submit their plans for innovative projects, pilots and living labs, which are then assessed by a workgroup that advises the Campus Innovation Committee. The first six projects have been approved and are now starting. Andy will present the approach at TU Delft and specifically go into the living lab approach at the university.



### **Andy van den Dobbelen (PHD)**

Andy van den Dobbelen is full professor of Climate Design & Sustainability and Sustainability Coordinator of TU Delft. He is Principal Investigator with the AMS Institute. At TU Delft Andy teaches students how to design sustainable cities and buildings. He was 'faculty advisor' of three successful TU Delft Solar Decathlon teams and is responsible for the online course Zero-Energy Design, winner of the edX Online Prize 2020. Together with his team, Andy has conducted many national and international research projects around energy transition, climate adaptation, circularity and other sustainability themes. He publishes a lot and delivers lectures, nationally and internationally..

# THE TROPICAL TECHNOLOGIES LABORATORY

## Abstract

The Tropical Technologies Laboratory (T<sup>2</sup> Lab) was founded in April 2016 with City Development Limited (CDL) sponsorship. In line with the Technologies research cluster in the Department of Architecture, the T<sup>2</sup> lab encompasses various research interests relevant to architecture and buildings in the tropics. The current research objectives are directed towards developing passive and active building technologies appropriate to Singapore and other equatorial regions in order to achieve low/zero carbon and sustainable buildings. Special emphasis has been given to the integration of solar panels and farming systems into modular building facades and their impact on natural cross ventilation, daylight, and thermal comfort. Building-integrated photovoltaics (BIPV) on the facades and the roof will also be tested for the special conditions of a warm-humid equatorial climate. So far, several projects have been completed, covering BIPV, productive façade, natural ventilation, and tropical timber, centered on building façade technologies. In the future, the lab and its 60 m<sup>2</sup> testbed facility will continue to propitiate the conception, exploration, development, and implementation of the future integrated façade and building technologies for Singapore and tropical regions considering the challenges of climate change and the potential use of technological innovation.

## Presenters



### **Sui-Kit Lau (PhD)**

Siu-Kit Lau received a B.Eng. degree in building services engineering (with first-class honours) and a Ph.D. degree in acoustics and vibration from The Hong Kong Polytechnic University, Kowloon, Hong Kong, in 1997 and 2003, respectively. He held industry positions with Emerson Climate Technologies from 2002 to 2005, Johnson Electric Industrial Manufacturing Ltd. from 2005 to 2006, and Armstrong World Industries from 2013 to 2015. He was an Assistant Professor at The Hong Kong Polytechnic University and The University of Nebraska-Lincoln from 2006 to 2009 and 2009 to 2013, respectively. Since 2015, he has been with the National University of Singapore.

# Advancing localised climate change adaptation measures

## Abstract

Preparing for future disruptive climate change impacts requires locally appropriate adaptation measures that have been tested and verified. While the built environment can reduce our exposure to these climate change impacts, multiple regions are in dire need of increasing their local knowledge and capacity to adapt their built environments. Building testing facilities and living labs present opportunities to bridge the gap between theory and practice, as well as enhance our ability to localize and apply digital simulation models to local conditions. This pilot study project reviews selected building testing facilities and living labs to inform a larger project, namely "Flexible Facades for Climate Change Resilience" aimed at developing appropriate bioclimatic facade designs that address climate change-related challenges in the Southern African region. The pilot study reviewed a sample of testing facilities and considered their development, funding, maintenance, and research focus. We assessed the long-term sustainability of such facilities and postulates on possible measures to disseminate the findings and broaden the application of the research emanating from these facilities. The findings from this project contribute to the climate change adaptation discourse and consider the means of developing capacity in developing regions and the Global South.

## Presenters



### **Jan Hugo (PhD)**

Jan Hugo is a registered architect and lecturer in the Architecture Department at the University of Pretoria. He completed his PhD focusing on the climate change adaptation potential of building-integrated agriculture. His current research focus is on the role of the built environment in developing climate change resilient cities. Jan Hugo currently coordinates the Professional Masters in Architecture programme at UP and participates in the Regenerative and Resilient cities research group.