

Free On-Line Training Webinars; 22 and 29 September, 6 and 13 October 2021

## Dynamic Calculation Methods for Building Energy Performance Assessment



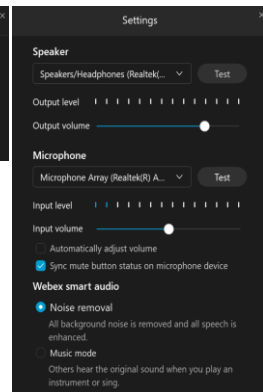
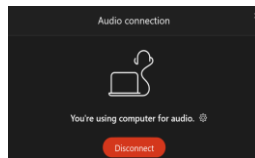
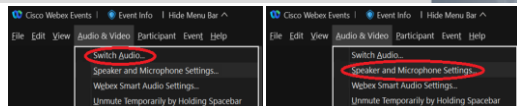
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### If you can't hear the webinar sound

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**DYNASTEE** DYNAMIC Analysis. Simulation and Testing applied to the Energy and Environmental performance of buildings

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**How to ask questions during the webinar**

Locate the Q&A box

**Note: Please DO NOT use the chat box to ask your questions!**

Unmute Share Participants Chat

Select All Panelists | Type your question | Click on Send

Q & A All (0)

Ask: All Panelists

Select a panelist in the Ask menu first and then type your question here. There's a 512-character limit.

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**DYNASTEE** DYNAMIC Analysis. Simulation and Testing applied to the Energy and Environmental performance of buildings

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**NOTES:**

1. The questions addressed to the speakers during this webinar- via the Q&A box- will be gathered and answered **during the last webinar of the series on October 13<sup>th</sup>**
2. After the end of the webinar you can also send further questions you might have, via email to Hans Bloem at: [hans.bloem@inive.org](mailto:hans.bloem@inive.org)
3. The webinar will be recorded and published at <https://dynastee.info/> within a couple of weeks, along with the presentation slides.

Organized by <https://dynastee.info/> Facilitated by **INIVE**

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## Introduction

Richard Fitton



University of  
**Salford**  
MANCHESTER

Hans Bloem



Webinar management



Maria Kapsalaki  
(INIVE, BE)



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Luk Vandaele



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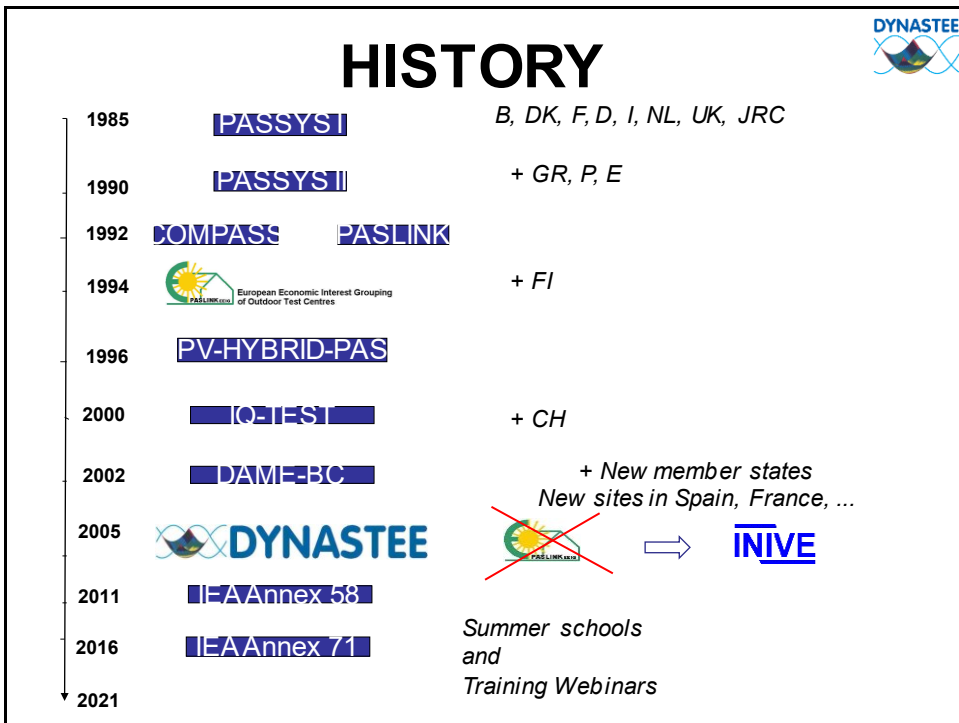
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Network for

- DYNamic
- Analysis
- Simulation and
- Testing of
- Energy and
- Environmental performance of buildings

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# INTERNATIONAL NETWORK



  
ensemble, sources et valider

  
Research + Develop + Inform



  
National and Kapodistrian  
UNIVERSITY OF ATHENS

**INIVE members:**

  
innovation for life

  
IBP

  
le futur en construction

  
and-ers Efficiency Research Group  
Europe's most advanced energy and building research

**INIVE projects:**

  
AIVC

  
TightVent Europe

  
Venticool

  
DYNASTE

  
BUILDUP

  
EPBD feasibility study 19a

  
QUALICHECK

  
SAVE ASIEPI

**DYNASTE**

- operates under the umbrella of INIVE as an open platform for exchange of knowledge and experience
- Presently it facilitates ST5 Network of Excellence of IEA ECB Annex 71

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## DYNASTEE - OBJECTIVE

- Global leading network on dynamic testing and evaluation of Energy Performance in Buildings
- Consolidation of existing knowledge
- Bringing together academic, industry and governmental experts
  - on the **test environment and experimental setup** as well as on the **data analysis** and **performance prediction**.
- DYNASTEE - NoE: ST5 of IEA EBC Annex 71

## FUNCTIONING

- DYNASTEE is the follow-up platform of PASLINK EEIG for information exchange
- Bringing together anyone with an interest in the dynamic calculation/measurement of the performance of buildings
- DYNASTEE Fund
  - PASLINK EEIG heritage after dissolution 2005
  - Governed by INIVE EEIG
  - Sponsoring by Industry
  - Voluntary work

# ACTIVITIES

- DYNASTEE SubTask 5 leader of Annex 71
- Facilitates interaction with target groups: CEN, Industry, IEA Annexes, EU projects, etc.
  - Organises Workshops
  - E.g. 10-11 April 2019 Bilbao “*The building as the Cornerstone of our Future Energy Infrastructure*”
- Organises training:
  - 8 Summer School and several Webinars (2020)
- Communication
  - Publishes Newsletters; # 18
  - <https://DYNASTEE.INFO> website
  - Disseminates tools, data, reports, papers, ...

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## Background to Course

The course has two main objectives:

- Train a dynamic methodology to assess the thermal performance of a building such as a wall, and a whole buildings' performance.
- Examine and understand the performance of nZEB and renewable energy technologies in built environment

The approach to these will be a combination of **building physics**, **applied mathematics** and **statistical methods**

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## What approaches will be used in the sessions?

We will use data that has been collected by experts that is high quality:

- Data from realistic and full scale buildings and envelope systems, **not generated by models.**
- Realistic and reliable data taken by experts **in-situ**

*Using this type of data we can begin to validate and examine performance of said elements with reduced uncertainty.*



## The Measurement Gap

It may be that the way that we measure things is incorrect, and not comparable other peoples studies/or the values that are used in models (which are often the results of experiments).

One of the simplest and most common value is the U value (the thermal efficiency of an element, the higher the value the quicker heat will pass thorough it)



## Summer School ( Pre- COVID-19)

One week session, held in different locations throughout the EU. However this time it will be sat from the comfort of your armchair/office!

- DYNASTEE have taken a view that for the safe of health and safety this year also the Summer School will not take place and the sessions have been edited down to several webinars.
- These sessions will all be delivered online over the course of September-October 2021. In **four - two hour sessions** 22<sup>nd</sup> of September to 16<sup>th</sup> of October 2021
- Every Wednesday, 10AM to Noon. GMT Summer Time

## Overall Topic of Sessions

- Building physics to support the development of mathematical models for energy performance assessment.
- Knowledge of thermodynamic processes, heat transfer and the impact of solar radiation.
- Thermal conduction, convection, radiation and thermal mass.
- Using benchmark data for analysis
- Complexity of the physical process and how to translate the available information in mathematical models,
- Importance of model simplification of building physics represented by measured signals.
- Variability of the environments and the uncertainty of data
- Measured data and not-measured phenomena and how to build a mathematical model based on the available input.



# The Experts

Presentations by

- María José Jiménez (CIEMAT, Spain),
- Irati Uriarte (UPV-EHU, Bilbao, Spain),
- Hans Bloem (INIVE-DYNASTEE, Brussels),
- Paul Baker (GCU, Glasgow, UK),
- Aitor Erkoreka (UPV-EHU, Bilbao, Spain),
- Peder Bacher (DTU, Lyngby, Denmark),
- Richard Fitton (University of Salford, UK),
- Luk Vandaele (INIVE-DYNASTEE, Brussels)

# Programme

**Webinar 1 - 22<sup>th</sup> September 10:00-12:00**

10:00 DYNASTEE and training

10:15 Hans Bloem; General approach

- Introduction to general approach of different analysis techniques used to perform the thermal characterisation for elements (walls, roofs etc) through to the whole building.
- We will introduce 2 software tools that will be used during series of webinars; LORD, and CTSM-R
- An easy exercise will be presented with the correct result given this will help you to build confidence in your analytics skills



11:15 Aitor Erkoreka; building physics, sensors and instruments

- Introduction to measured data, specific sensors for buildings physics and energy performance and what is important to know

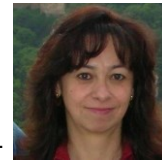


# Programme

## Webinar 2 - 29<sup>th</sup> September 10:00-12:00

10:00 Maria-Jose Jimenez; Experimental set up and data

- This session will present the experimental set up and measurement of the Plataforma Solar de Almeria (PSA), an explanation and demonstration of the data available will be given.
- An exercise that will allow of a study to be analysed with and without solar radiation .
- *Data series 16-17 will be presented here which will be used in further sessions. Data has been made available at the website [dynastee.info](http://dynastee.info); zipped folder [PSA\\_RRbox\\_DataSeries20](#)*



11:00 Paul Baker; Dynamic Calculations & LORD

- This session will provide an introduction to dynamic analysis methods
- A practical demonstration will be given of the software tool LORD on the PSA data series 16 and 17



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# Programme

## Webinar 3 - 6<sup>th</sup> October 10:00-12:00

10:00 Peder Bacher Combining two disciplines building physics and mathematical techniques

- Introduction to discrete time and continuous time methods
- Using CTSM-R with statistical tools



11:00 Irati Uriarte; application of CTSM-R to real world data

- Demonstration of the CTSM-R software will take place on data series 16, 17 from PSA



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# Programme

## Webinar 4 - 13<sup>th</sup> October 10:00-12:00

10:00 Richard Fitton;

An introduction to the analysis of metering data, the specification and limitations of the data and analysis techniques.



11:00 Questions and Answers



**After the 3<sup>th</sup> Webinar we invite all attendees to submit it questions/queries via email on all of the sessions. These will be collated and presented to the panel to provide answers at Webinar 4**

# Future; 2022

Last year is atypical; the decision was made to postpone the complete Summer School for good reasons.

However we are already planning the next summer school to take place in Almeria in Spain in 2022, this will be a full Summer School with classroom-based learning sessions and interactive sessions.



## Future; 2022 and beyond

We will be using the forthcoming year to work on new topics for the summer school as follows:

- **Use of online data platforms such as weather API, renewable energy data**
- **Use of on-board systems such as connected thermostats**
- **Use of smart metering data for energy input**

Most countries now have access to at least most of this data, and some, all of it.

- The work and findings of IEA Annex 71 which focus on the data mentioned above to deem the energy performance of a dwelling. <https://dynastee.info/new-iaa-ebc-annex-71-building-energy-performance-assessment-based-on-in-situ-measurements/>
- We will provide learning on not only the acquisition of this data using live API access to smart meter and controls, but the analytical tools to deem the energy performance.