Improving reproducibility in building simulation: a pure-Python approach to geometry creation

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My background

- I joined Loughborough University in 2008
- My job title is Reader in Building Performance Modelling
- I teach building simulation, energy data analysis, sustainable building design and renewable energy.
- I was a member of the University's Open Research Working Group in 2019.
- I was awarded the CALIBRE Winter 2019 Award for Open Research
- In 2015 I published the Refit Smart Home dataset on the University's Data Repository (14,307 views, 3,997 downloads)
- I publish papers on FAIR data and open research methods using Python and Jupyter Notebooks
- I maintain the GitHub pages for the Building Energy Research Group

The problem I am trying to solve

- I would construct a building simulation model of a 4 bed house and to simulate the energy performance of the house using the EnergyPlus software.
- I would like to do this in an open, transparent way so that the whole process is reproducible.

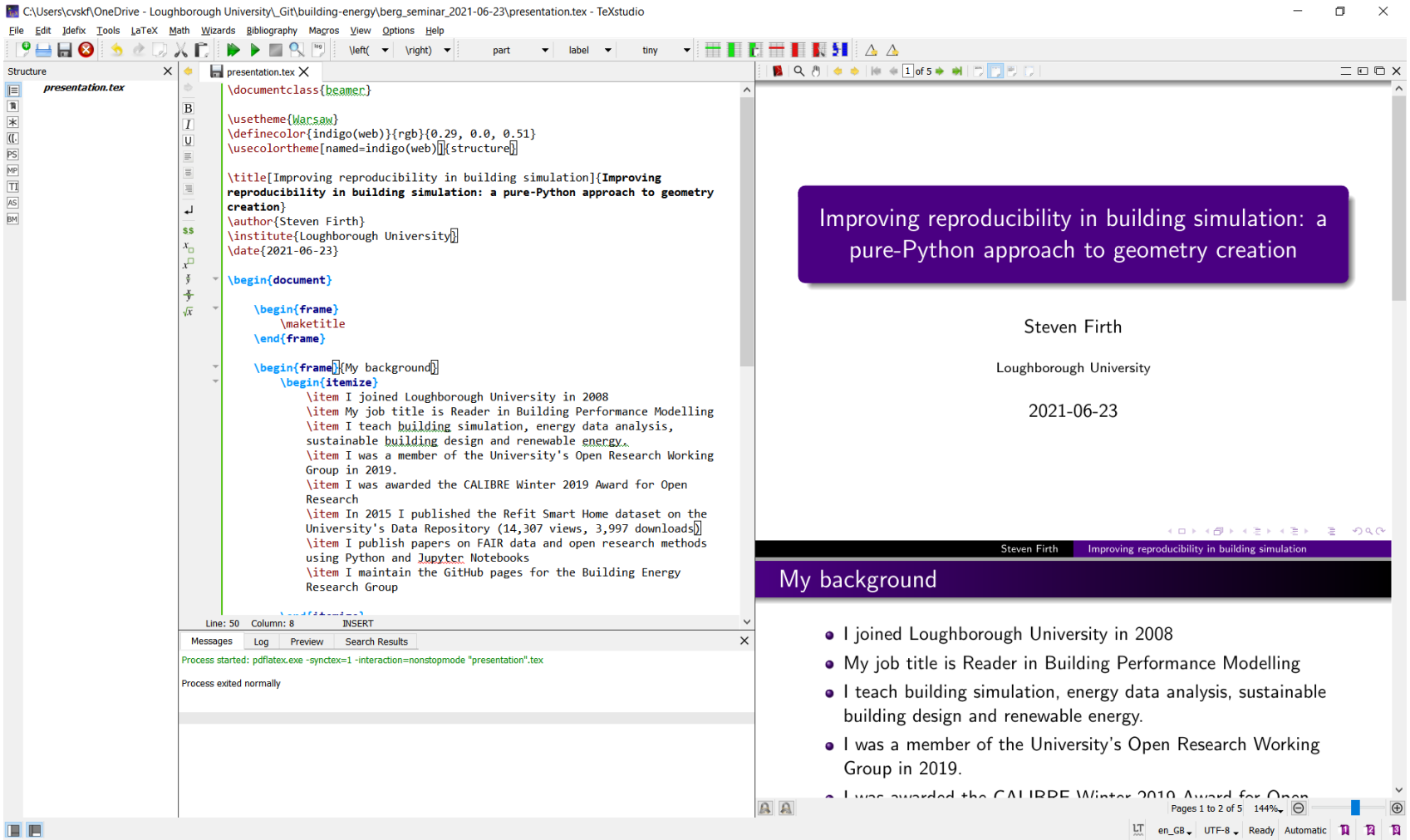
What is "Reproducible"?

The Alan Turing Institute in its publication 'The Turing Way' defines reproducible research for data science as:

> *Work that can be independently recreated from the same data and the same code that the original team used.*

An Example of Reproducibility

This presentation is reproducible as it is written in code (Latex)



An Example of Open Reproducibility

This presentation is also open as the code is hosted on the BERG Github repository