

# Identification of occupancy patterns using opportunistic in-situ measurements in Smart Homes

Steven Firth and Ben Halls



Loughborough  
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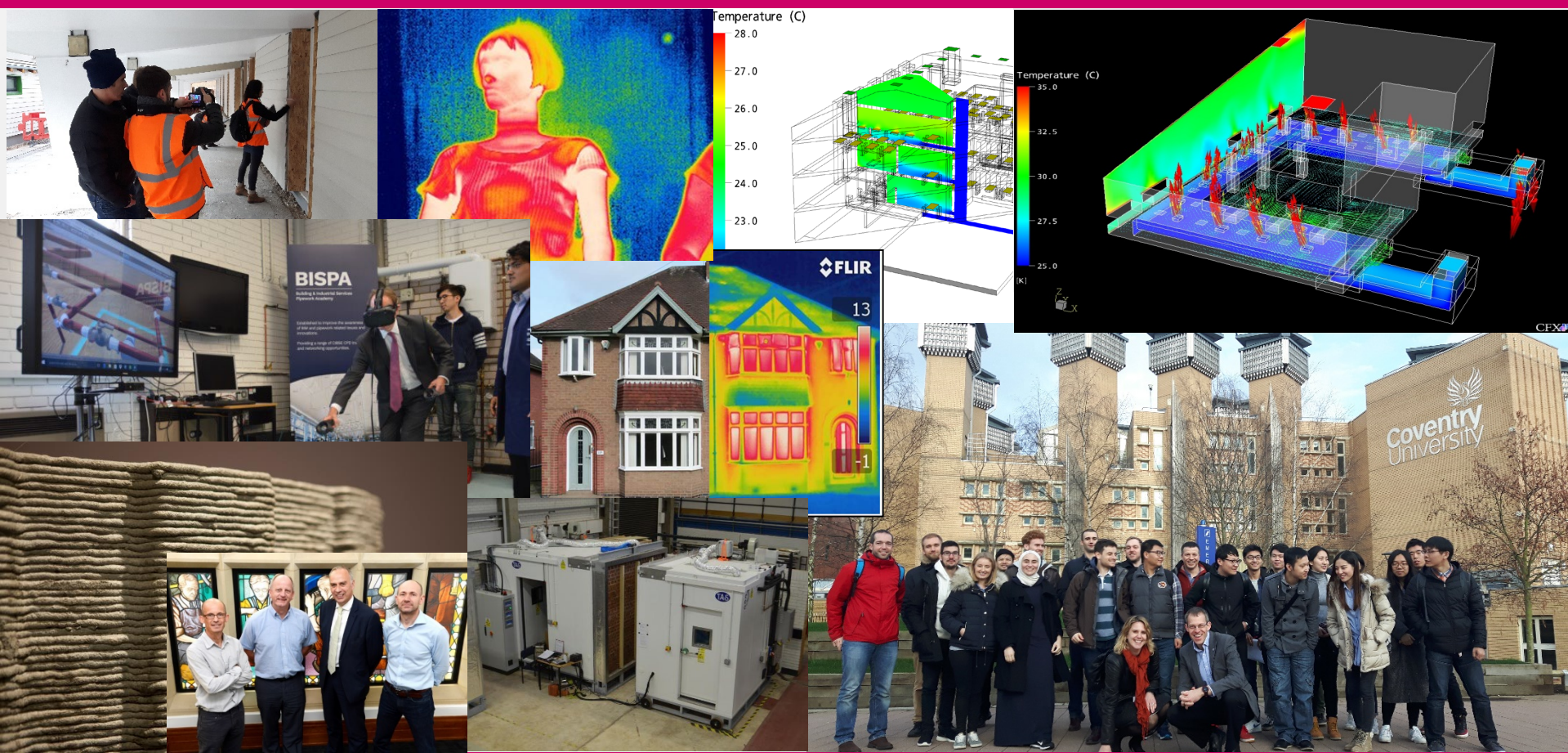




# Building Energy Research Group (BERG)

- World-leading group in Building Energy research
- Over 45 years old
- 11 academic staff
- 10 Research Associates
- 40+ PhD researchers





# About me

- Reader in Building Performance Modelling
- BERG Group Lead, MRes Programme Director
- Working in the field for 17 years
- Teach building simulation and renewable energy
- Research interests: Occupant behaviour, Open Science



# This study

- Can the measurements recorded by Smart Home devices can be used to significantly improve our understanding of occupancy patterns in residential buildings?





# The REFIT project (2012-2015)

- UK-funded £1.5m project
- Multidisciplinary with 3 University partners
- 20 homes recruited for a 2 year period
- 100+ sensors and Smart Home devices per home

A poster titled "HOME OWNERS WANTED FOR SMART HOME TECHNOLOGY RESEARCH PROJECT". It features a blue house icon with glowing lines and dots, representing smart home technology. The poster includes logos for EPSRC, UEA, and Loughborough University. It lists three bullet points: "Keen To Experience What A 'Smart Home' Of The Future Might Be Like?", "Like To Find Out How You Can Make Your Home More Comfortable And Convenient?", and "Interested In Finding Out How Much Energy You Use In Your Home?". It also includes a paragraph about the technology and contact information for the REFIT team.

HOME OWNERS WANTED  
FOR SMART HOME TECHNOLOGY RESEARCH PROJECT

- ✓ Keen To Experience What A 'Smart Home' Of The Future Might Be Like?
- ✓ Like To Find Out How You Can Make Your Home More Comfortable And Convenient?
- ✓ Interested In Finding Out How Much Energy You Use In Your Home?

Technology can now be put into homes that can help you manage your use of energy, and let you make decisions about making your home more comfortable and more convenient to live in.

Contact us to get involved in a home based trial of Smart Home technologies starting July 2013

Loughborough University  
Interested?  
Contact the Refit team and we will tell you more  
• 01509 228741



TEXT

ReadMe.txt (6.83 kB)



.XSD

RefitXMLSchema.xsd (90.84 kB)



TEXT

REFIT\_BUILDIN... .xml (1.67 MB)



ARCHIVE

REFIT\_TIME\_SE... .zip (94 MB)

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4 files



## REFIT Smart Home dataset

Dataset posted on 20.06.2017, 11:53 by [Steven Firth](#), [Tom Kane](#), [Vanda Dimitriou](#), [Tarek Hassan](#), [Farid Fouchal](#), [Michael Coleman](#), [Lynda Webb](#)

This dataset is maintained by Steven Firth ([s.k.firth@lboro.ac.uk](mailto:s.k.firth@lboro.ac.uk)), Building Energy Research Group (BERG), School of Civil and Building Engineering, Loughborough University.

The REFIT project ([www.refitsmarthomes.org](http://www.refitsmarthomes.org)) carried out a study from 2013 to 2015 in which 20 UK homes were upgraded to Smart Homes through the installation of devices including Smart Meters, programmable thermostats, programmable radiator valves, motion sensors, door sensors and window sensors.

Data was collected using building surveys, sensor placements and household interviews.

The REFIT Smart Home dataset is one of the datasets made publically available by the project. This dataset includes:

- Building survey data for the 20 homes.

4698  
views

1022  
downloads

1  
citations



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CATEGORIES

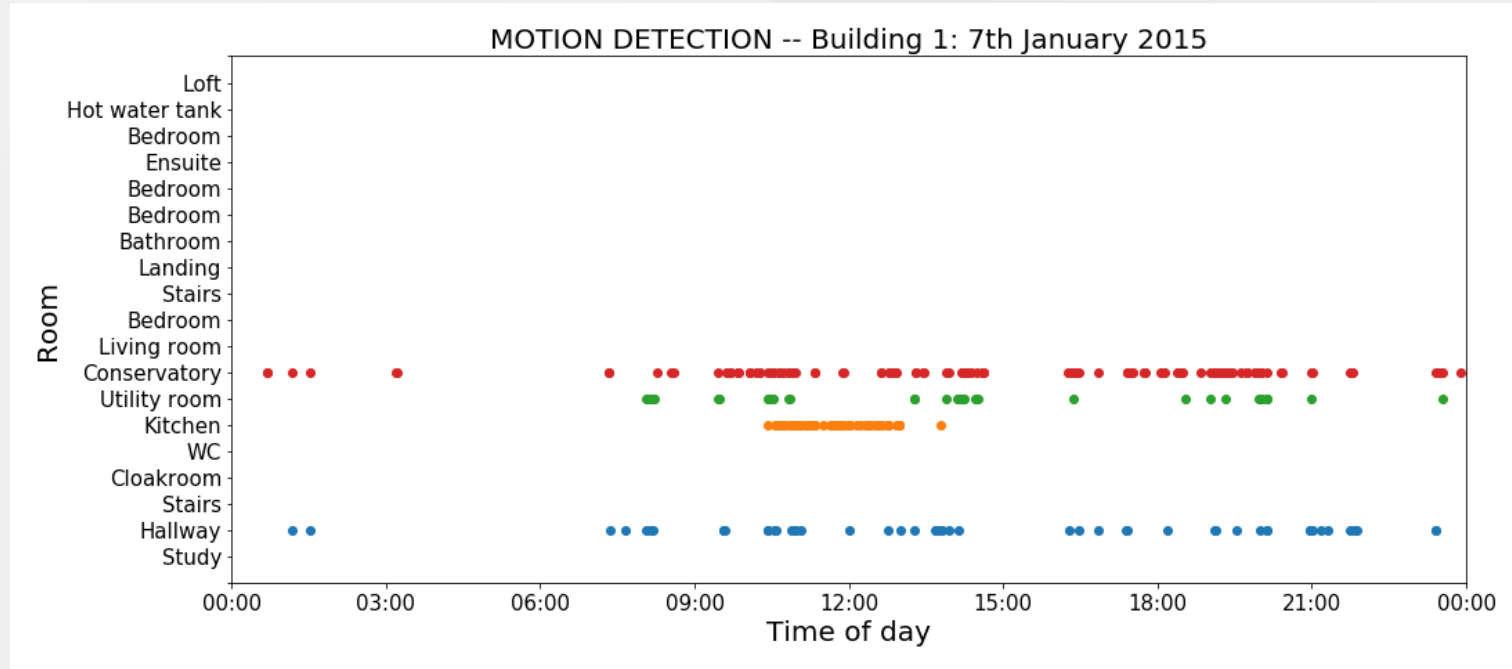
- [Building Science and Techniques](#)

KEYWORD(S)

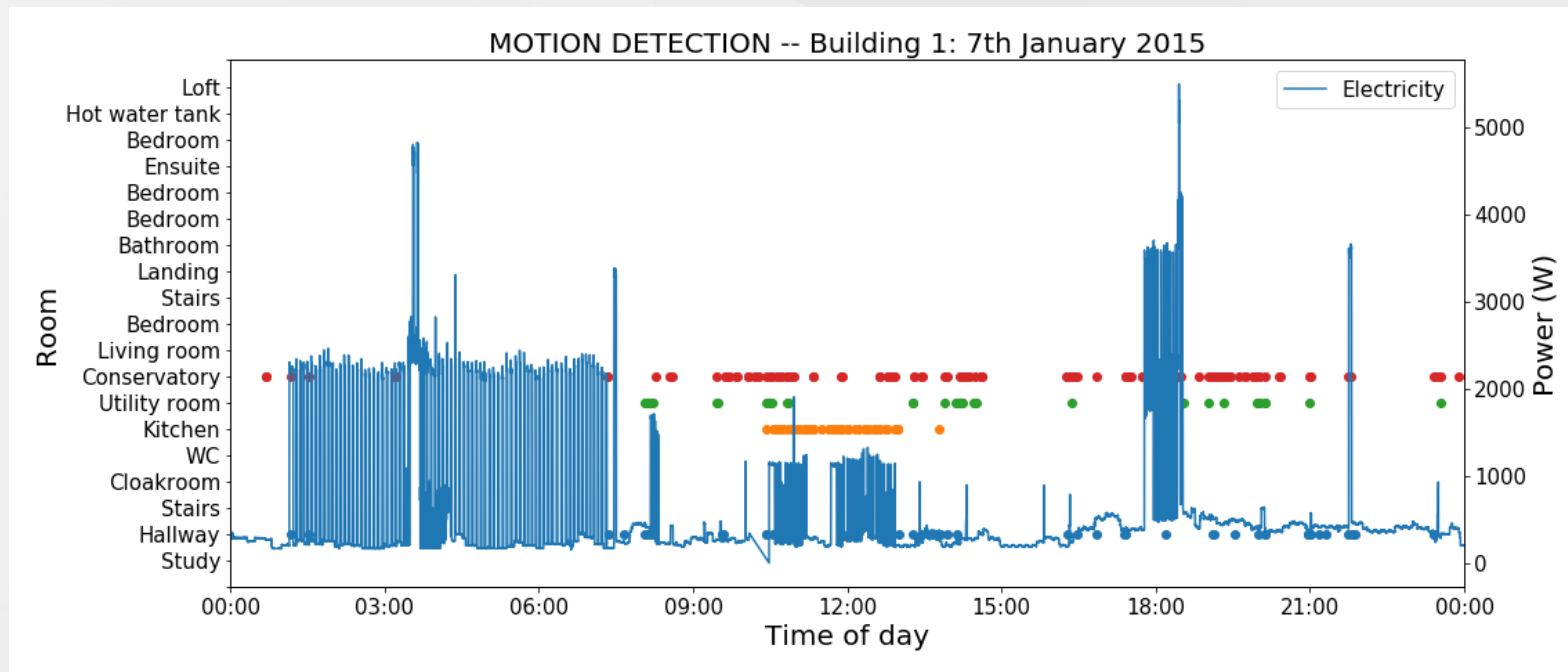
REFIT



# Results



# Results



# Outcome

	Motion	Presence	Number of people	Who
<b>Whole house</b>	YES	?	X	X
<b>Individual rooms</b>	YES, for monitored rooms	?	X	X





# Thank you

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Github: <https://github.com/building-energy>

REFIT Smart Home Dataset: <https://doi.org/10.17028/rd.lboro.2070091.v1>



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