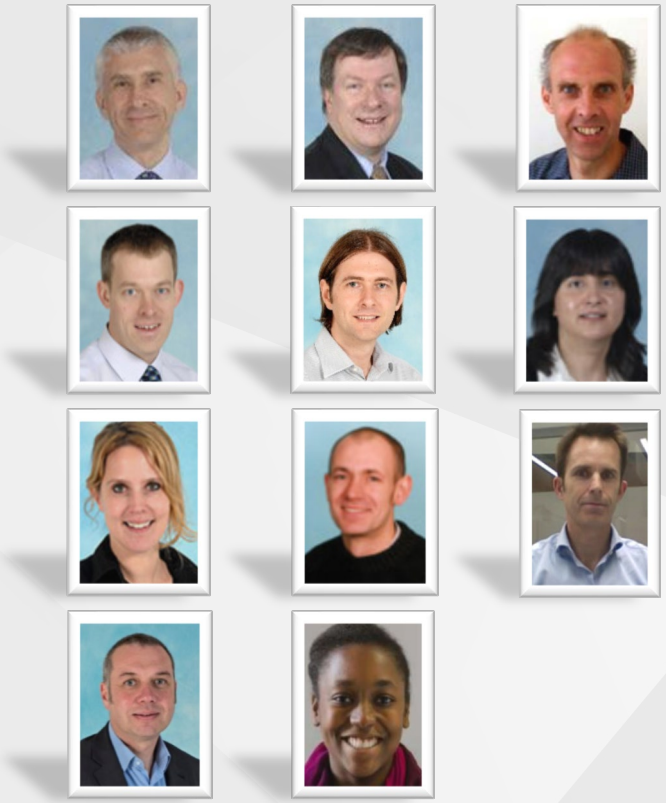
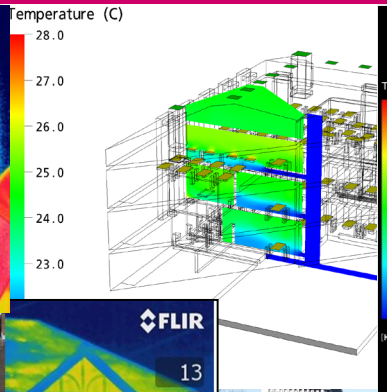
# Identification of occupancy patterns using opportunistic in-situ measurements in Smart Homes

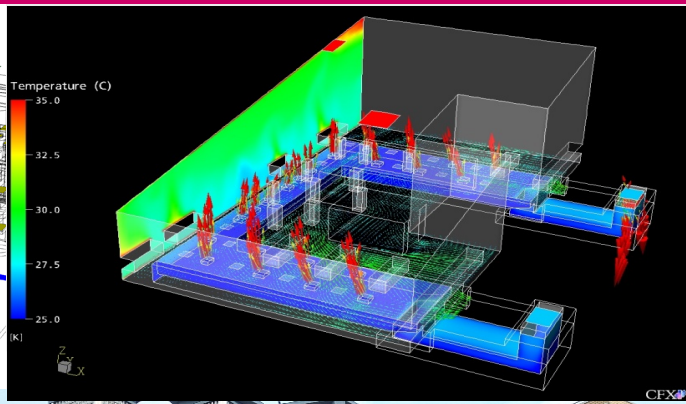
Steven Firth and Ben Halls

# 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





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# 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

ReadMe.txt (6.83 kB)

RefitXMLSchema.xsd (90.84 kB)

REFIT_BUILDIN... .xml (1.67 MB)

REFIT_TIME_SE... .zip (94 MB)

Cite | Download all (95.77 MB) | Share | Embed | + Collect (you need to log in first) | 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

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This dataset is maintained by Steven Firth (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) 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.

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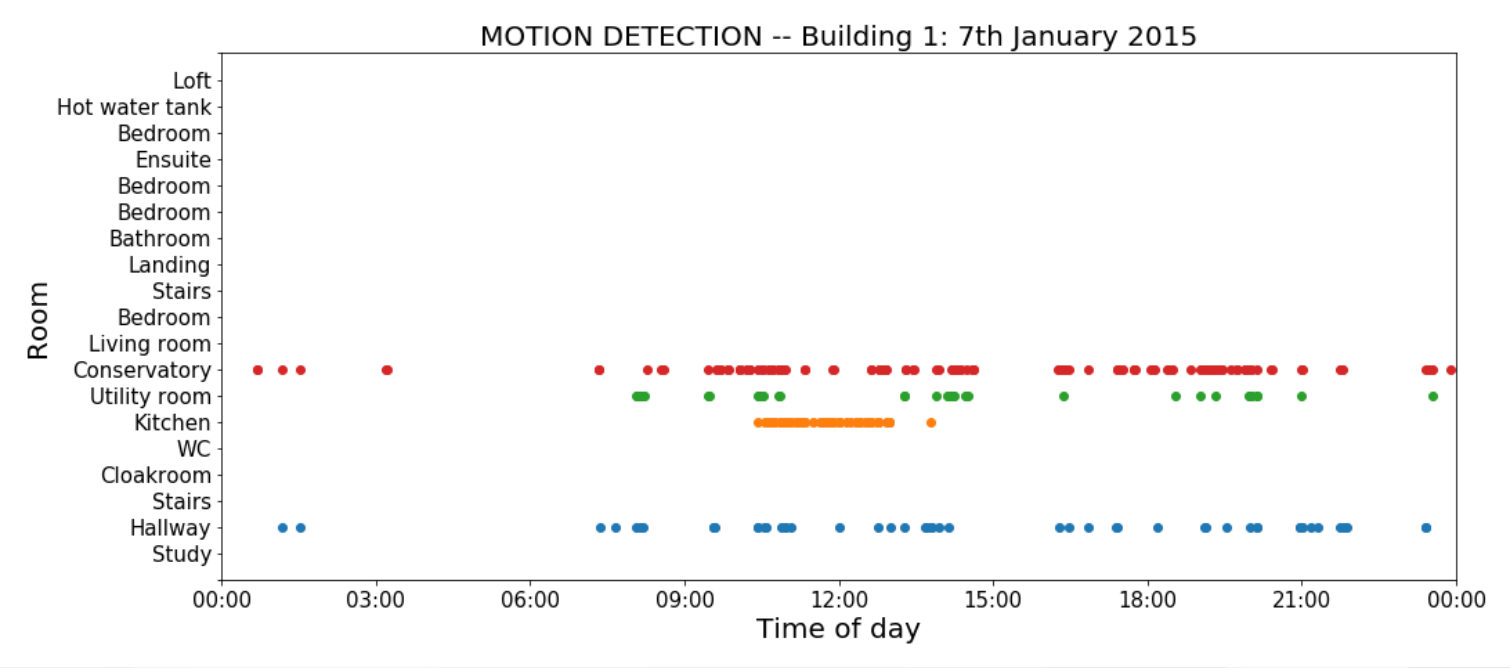
CATEGORIES

- Building Science and Techniques

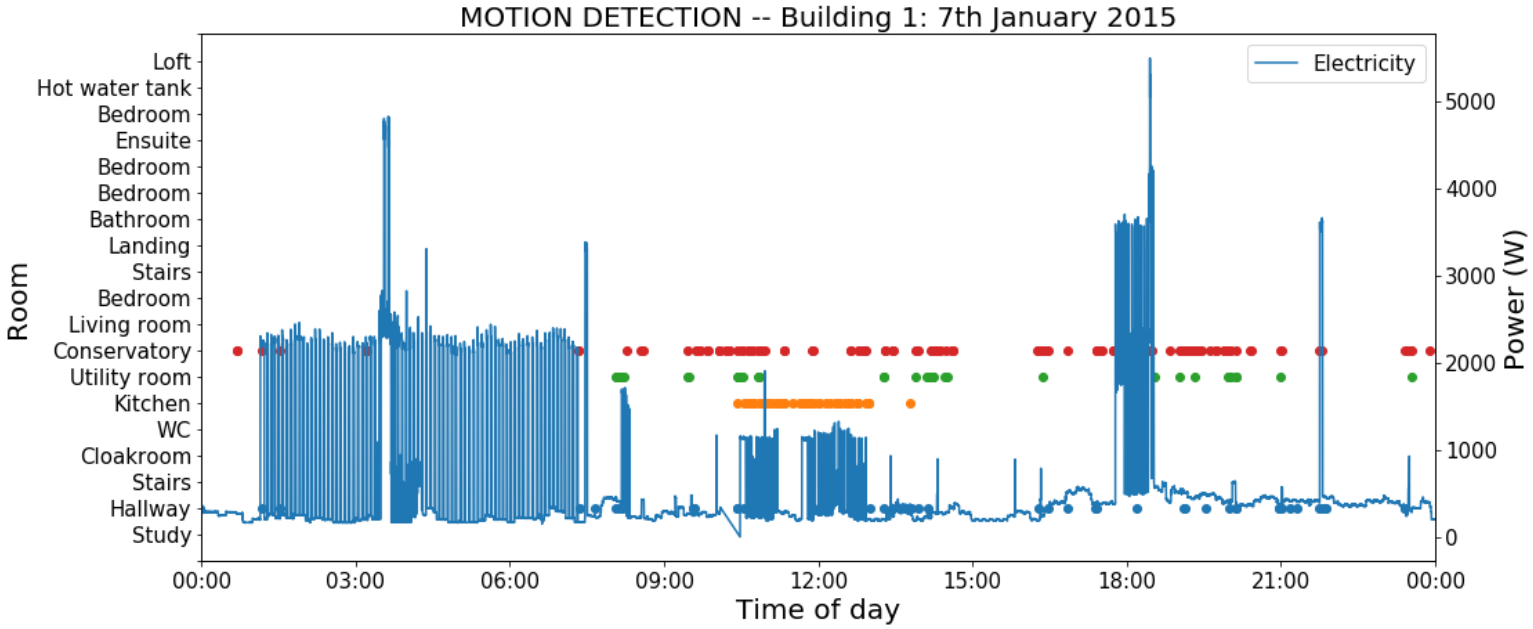
KEYWORD(S)

REFIT

# Results


MOTION DETECTION -- Building 1: 7th January 2015
Loft
Hot water tank
Bedroom
Ensuite
Bedroom
Bedroom
Bathroom
Landing
Stairs
Bedroom
Living room
Conservatory
Utility room
Kitchen
WC
Cloakroom
Stairs
Hallway
Study
Room
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time of day

# Results


MOTION DETECTION -- Building 1: 7th January 2015
Electricity
Loft
Hot water tank
Bedroom
Ensuite
Bedroom
Bedroom
Bathroom
Landing
Stairs
Bedroom
Living room
Conservatory
Utility room
Kitchen
WC
Cloakroom
Stairs
Hallway
Study
Room
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Time of day
5000
4000
3000
2000
1000
0
Power (W)

# Outcome

| | Motion | Presence | Number of people | Who |
|---|---|---|---|---|
| **Whole house** | YES | ? | X | X |
| **Individual rooms** | 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