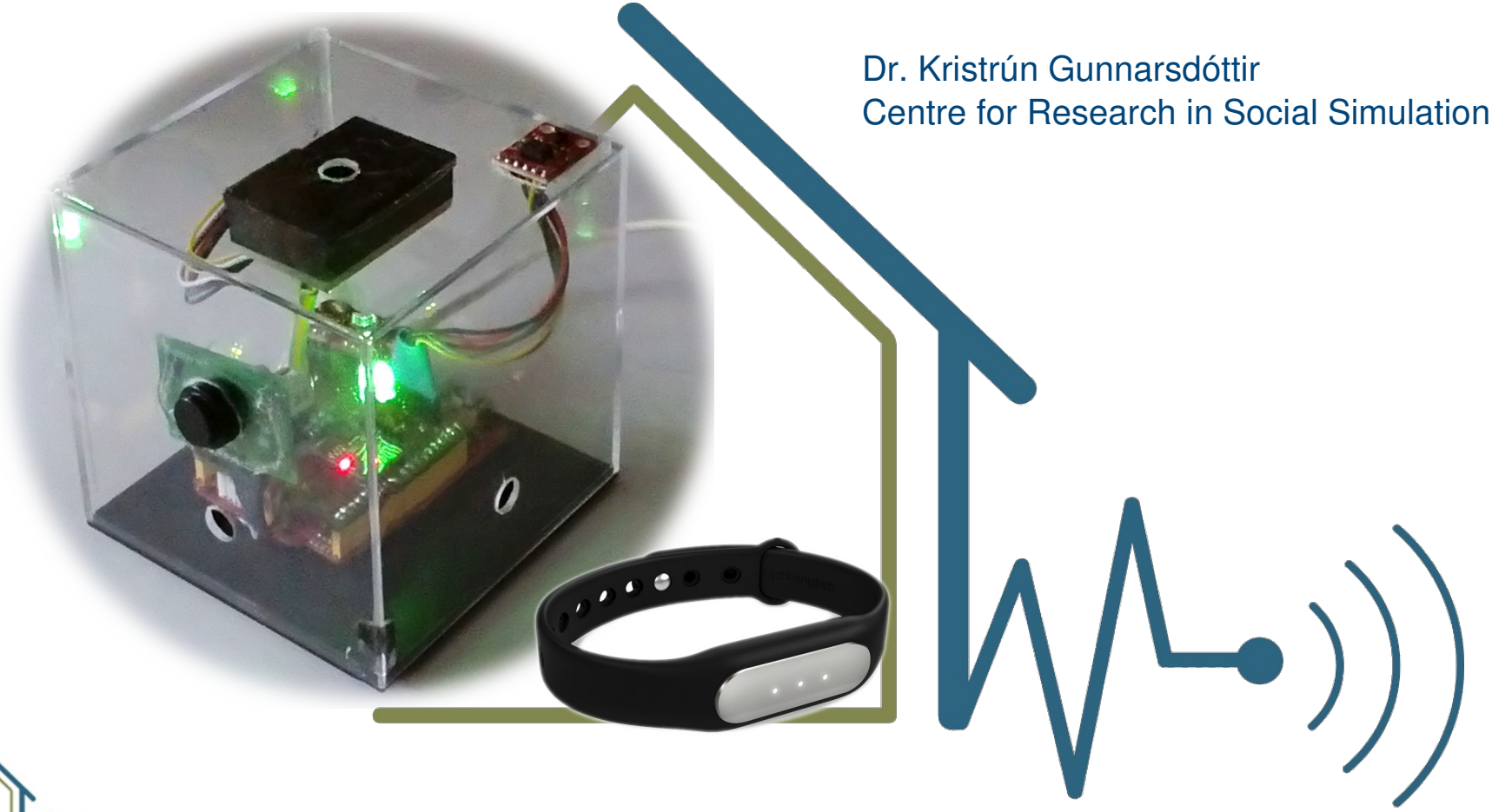
Look, we can measure all this stuff!

Questions concerning the use of sensors in social research



Dr. Kristrún Gunnarsdóttir
Centre for Research in Social Simulation

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Look, we can measure all this stuff!

Questions concerning the use of sensors in social research

The HomeSense project

Developing and adapting sensors for households and persons

Some issues in bringing sensors into social research

The case of households: what we observe, what we expect

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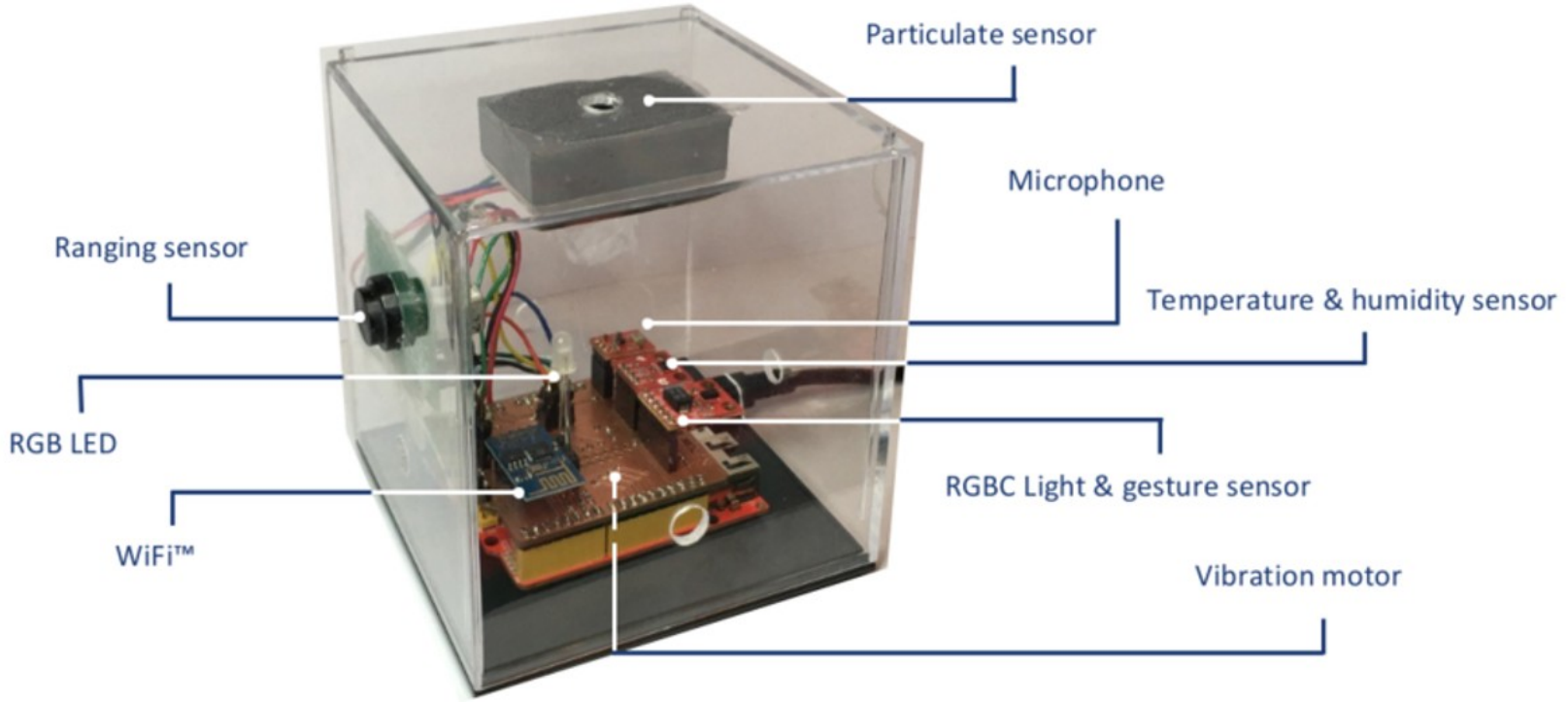
HomeSense: digital sensors in social research

The project: aims and objectives

To make it easier and more productive for social researchers to use the kinds of sensors that are now available as part of a growing 'internet of things' and ubiquitous computing.



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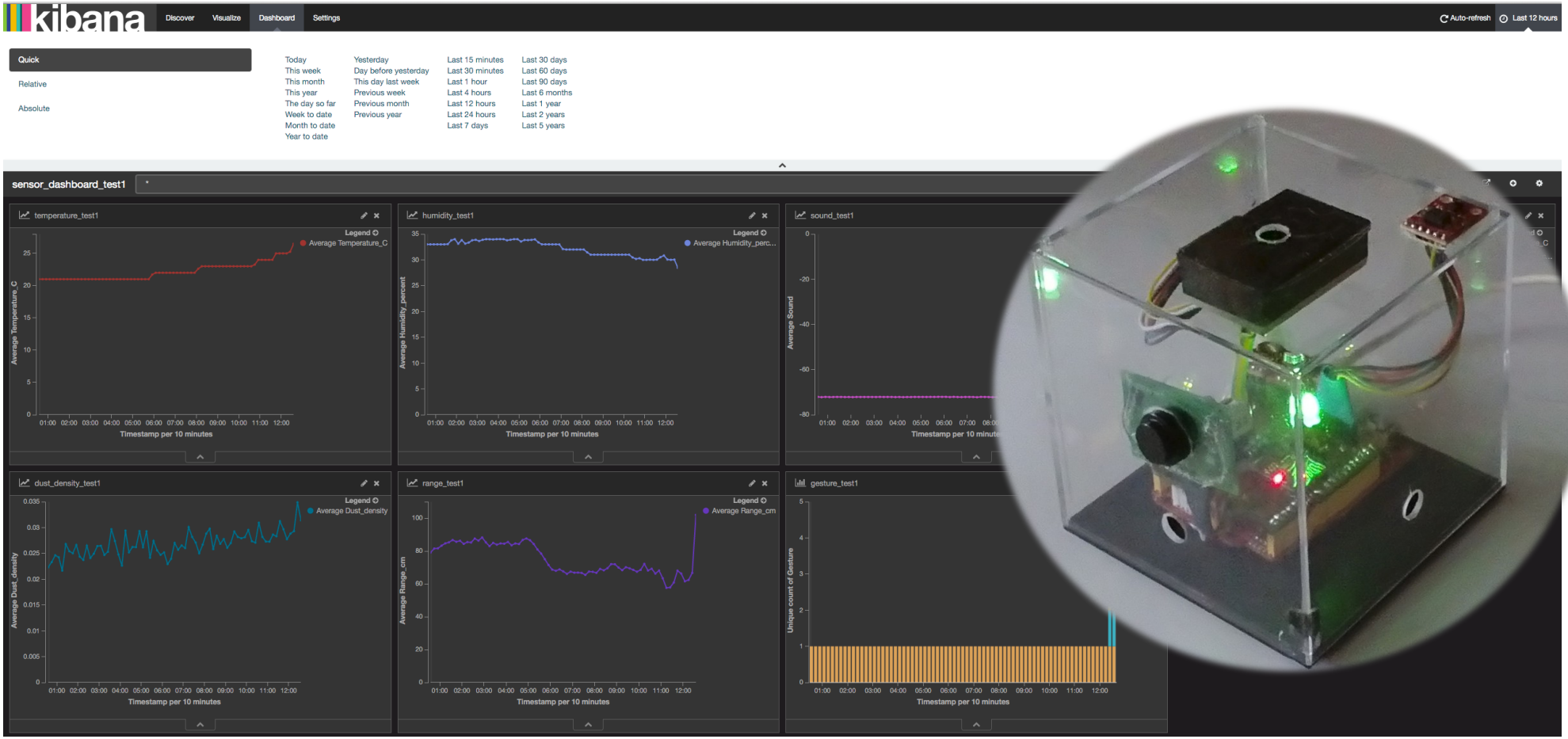
Development and adaptation

Testing for households and persons

Visualization of the data stream in real time



Development and adaptation

Testing for households and persons

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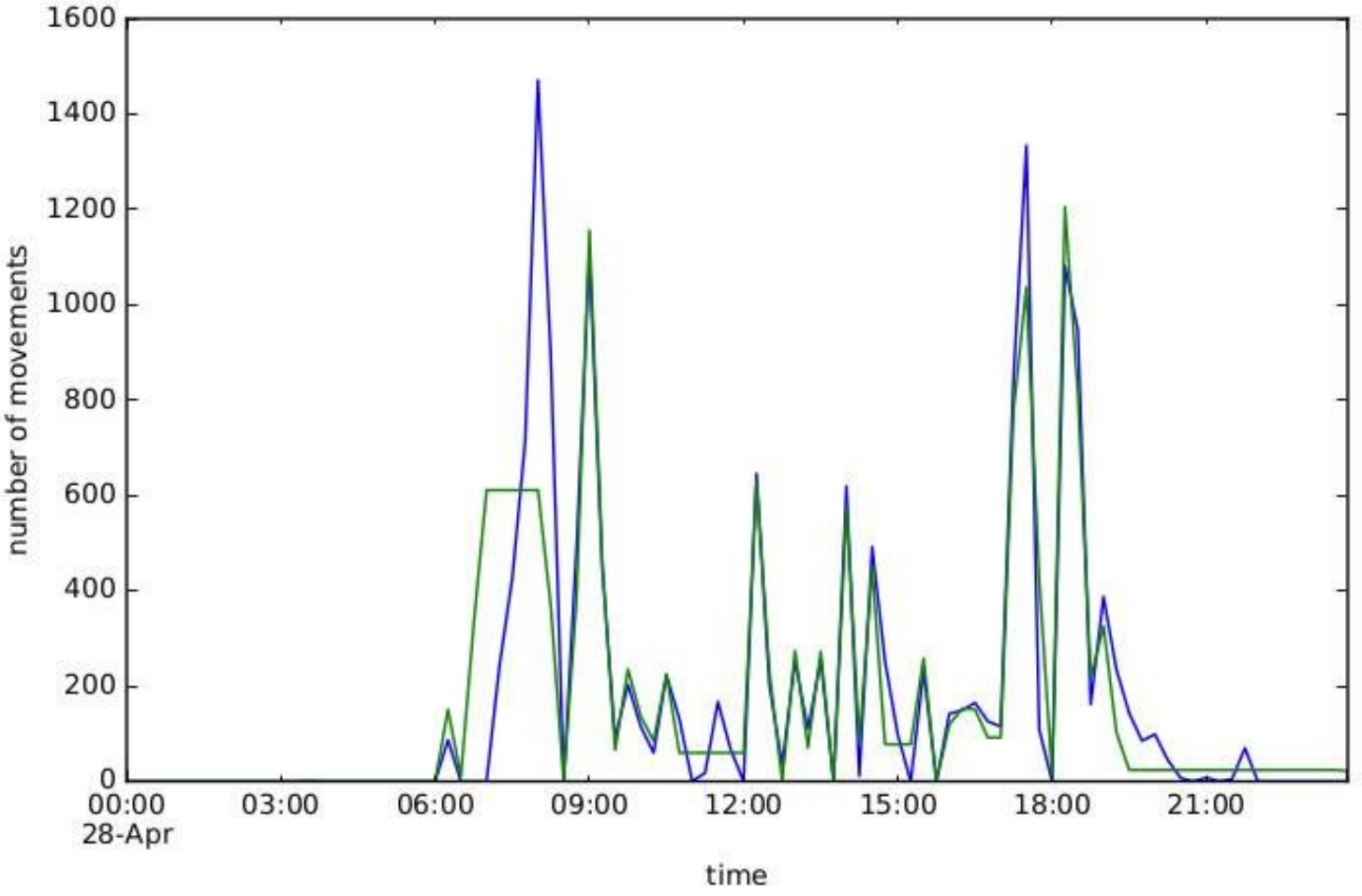
Development and adaptation

Testing for households and persons



HomeSense: Key outcome

HomeSense will yield *guidelines* for using sensors, including the technical, methodological and vulnerability issues.

Three research strands:

1. Adapt and develop devices with purpose-of-use in social research, and with households as a test bed
2. Develop data collection methods and trial them in a sample of households
3. Create tools for analysing data streams from sensors, and evaluate the data in reference to other data sources: walking interviews, questionnaires and time use diaries

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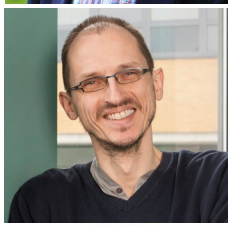
HomeSense: The people



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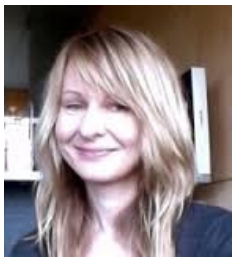
Klaus Moessner, 5G Innovation Centre
Kristrún Gunnarsdóttir, CRESS / Sociology
Jie Jiang, CRESS / Sociology

Ewa Luger, Microsoft Research Cambridge



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Corinna Elsenbroich, CRESS / Sociology
Rob Meadows, Sociology

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Bringing sensors into social research

Assuming sociological interest:

- Activities: work, hobbies, entertainment
- Meals: practices surrounding food and drink
- Sleep: when households sleep
- Care: healthcare, self care, family care

Psychology/cognitive-based research with sensors:

- Behaviour in public places (transport, transits, traffic)
- Behaviour in organisations (problem-solving, coalition/consensus building)
- Health-related behaviour (fitness, care, sport)
- Food-related behaviour (shopping and eating choices)

MIT Media Lab 2003: "*Sensing and Modeling Human Networks*" and the *Sociometer*, sensing proximity, speech and motion

Purpose specificities: Systems that can learn human behaviour and interactions and then act intelligently with and on behalf of persons

Assistive 'smart' gadgets (work, life, well-being and entertainment)

Behaviour screening (security and the social order)

Behaviour intervention (public health and public safety)

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Considerations

Bringing sensors into social research

Efficiency arguments:

- Sensors, NOT surveys
- More accurate than self-reporting

Technical / methodological considerations:

- Overcome practical problems of installing sensors
- Simplify assembly and configurations of sensor suites
- Overcome uncertainty in sensor measurements

Wearability / acceptability:

- Comfort and easiness
- Assurances
- Motivation

Vulnerabilities:

- *Privacy concerns*
- *Who consents, and to what?*
- *Data and security protection*

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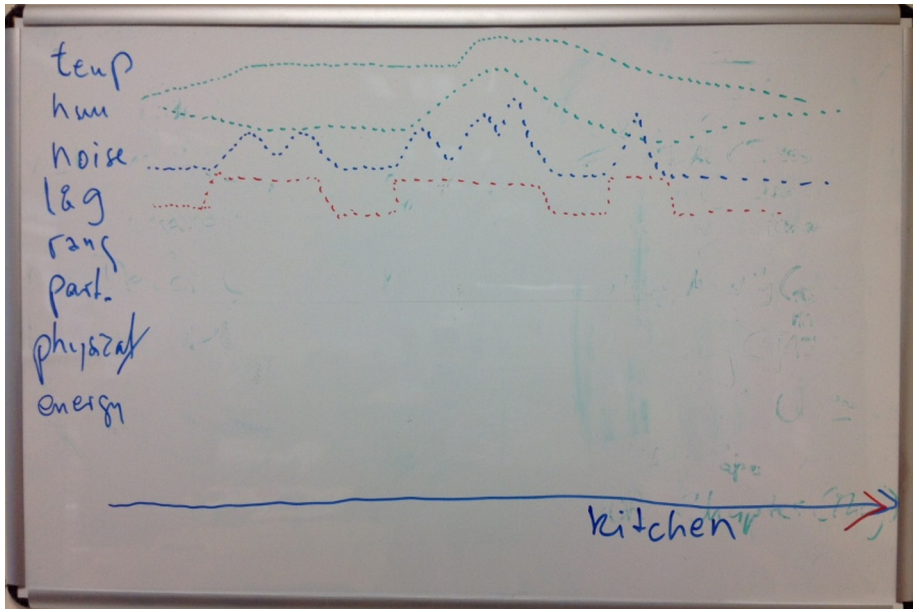
Using sensors in households

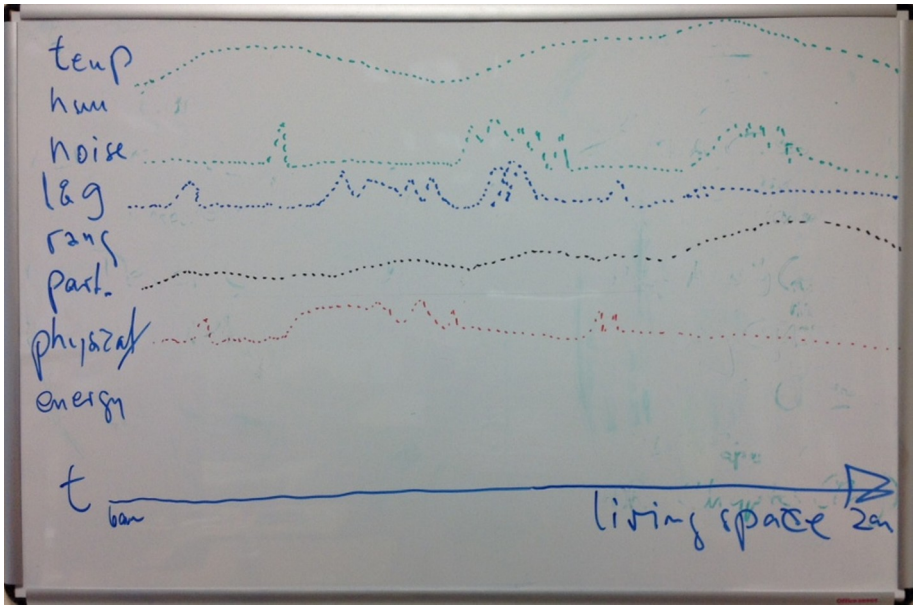
Persons and practices

Location: identify location of persons in households

(**In**)**activity**: detect activities and idleness

(**Non**)-**interactions**: detect communications and silences

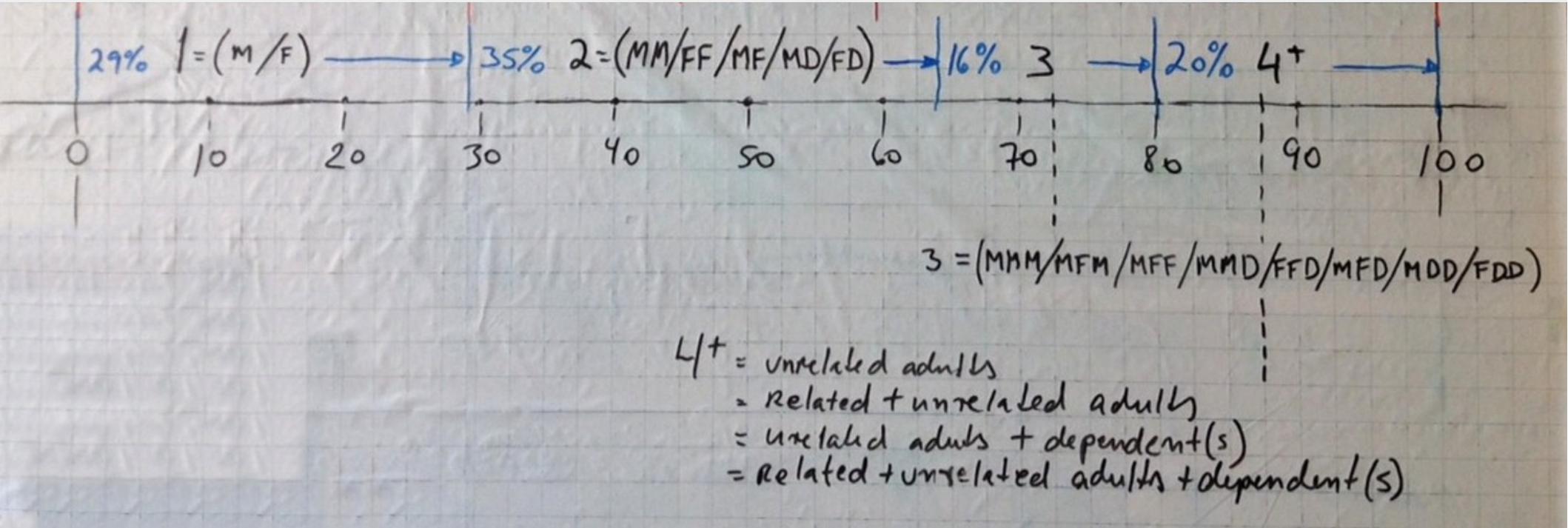




Households for HomeSense

The ONS on families and households in 2015 (Nov 2015):

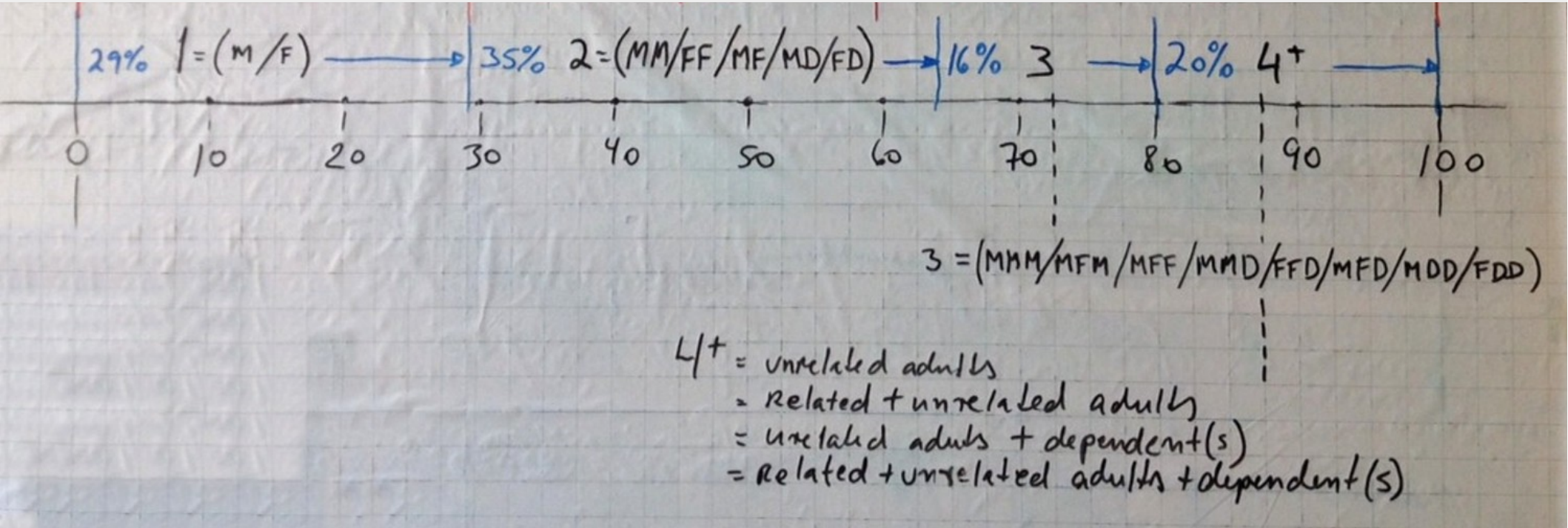
- 27.0 million households
  - 18.7 million families (69%)
    - 12.5 million married/civil partners with/without dependent children
    - 3.2 million cohabiting couples with/without dependent children
    - 3 million lone parents with/without dependent children
  - 7.7 million households with one person
  - 1 million households with two or more unrelated adults



Households for HomeSense

The ONS on families and households in 2015 (Nov 2015):

- 27.0 million households
  - 18.7 million families (69%)
    - 12.5 million married/civil partners (without dependent children, 7.8)
    - 3.2 million cohabiting couples (without dependent children, 1.95)
    - 3 million lone parents (without dependent children, 1.05)
  - 7.7 million households with one person
  - 1 million households with two or more unrelated adults



Households for HomeSense

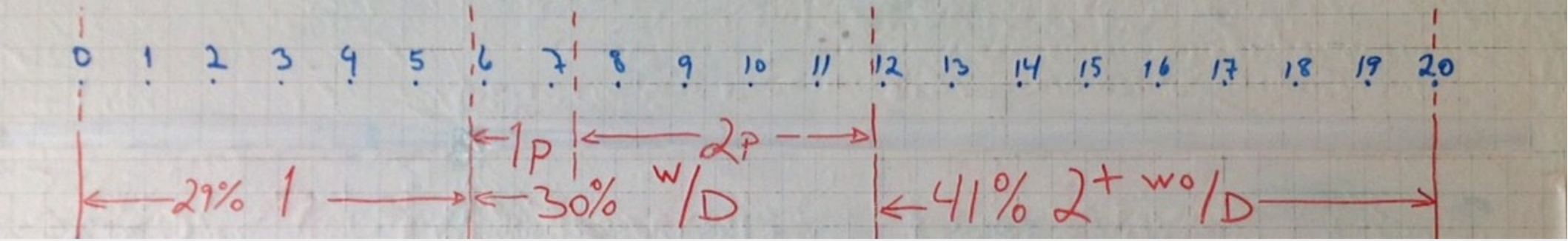
6 — 5-6 w/ 1 person

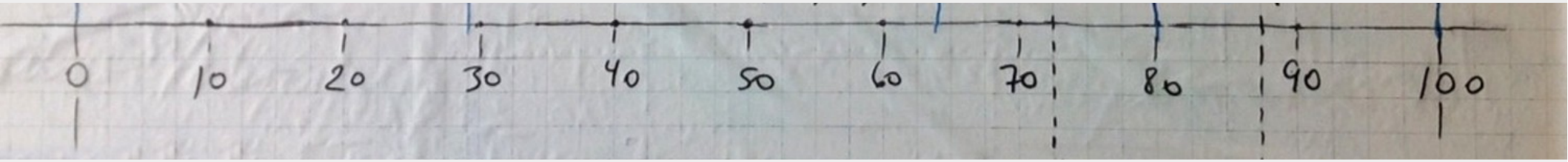
(1/2) — 1-2 w/ lone parent + dependent(s)

(5/4) — 4-5 w/ 2 parents + dependent(s)

8 — 8-9 w/ 2+ adults of any configuration

break up





Using sensors in social research

Beyond the house and the household

Observe activities in neighbourhoods?

Observe energy waste in neighbourhoods?

Study shopping activities or commuter habits?

Observe activities around major operations?

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Using sensors in social research

Beyond the house and the household

Study group problem-solving activities?

Observe management/administration activities?

Observe communication and networking trends?

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