1. Problem
- It is currently difficult to use technology to automatically determine people's location indoors.
- GPS works well in many outdoor contexts, but generally does not work indoors.
- Current indoor positioning technology is:
  - Expensive to install
  - Complex to set up
  - Requires design of specialised maps
- Often map information is unavailable; either it does not exist in suitable form or it is private.

2. Our Approach
We aim to provide a new form of flexible and powerful location tracking and display that can:
- Exploit arbitrary symbolic maps
- Exploit arbitrary positioning technology

3. Motivation
Where are you? A considerable amount of work has gone into solving this very simple question. The yet unsolved problem is how to use low-cost information from available existing infrastructure for dynamic and personalised mobile displays.

We have designed a new mechanism that enables people to determine their location on a range of symbolic, intuitive maps that best meet their current task.

4. Overview of Architectural Elements
- Model for storing information regarding:
  - Symbolic maps relating to particular tasks (see examples, Figure 3)
  - Indoor positioning infrastructure for indoor environments
- Administration interface (see example, lower Figure 2) for configuring:
  - New buildings and maps (see Figure 2B)
  - Buildings with available symbolic maps (see Figure 2C)
  - Positioning infrastructure on a per-map basis (see Figure 2D)
- Exposed web (REST) service for queries relating to:
  - Nearby buildings supported by RoughMaps
  - Symbolic maps available for a particular building
  - Searches for nearby buildings supported by RoughMaps
- Prototype client written for the Android platform:
  - List available RoughMaps buildings and symbolic maps (see Figure 3A)
  - Interface for viewing symbolic maps (see Figure 3)
  - Display calculated position based on available infrastructure information for current symbolic map (see Figure 2A)

5. Contributions
- Design of Architecture for Indoor Location Modelling
- Architecture implementation in RoughMaps platform (see Figure 1)
- Operates in terms of locations on a symbolic map:
  - For modelling
  - For display
  - Validation
- Five listed buildings
- Several symbolic maps: 5 based on existing high quality maps; 4 based on hand-drawn task-orientated maps.