



Research Consortium in Speckled Computing

# Research Overview

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**2 December 2009**



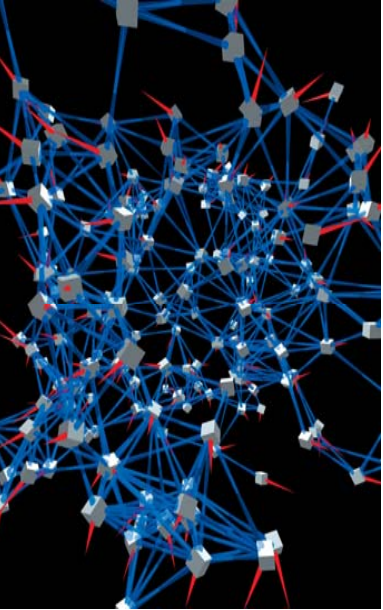
# Acknowledgements

- The Research Consortium in Speckled Computing is supported by
  - Strategic Research Development grant from the Scottish Funding Council (R32329)
  - Basic Technology grant from the Engineering and Physical Sciences Research Council (C523881)
- ... and industrial collaborators
  - Agilent
  - National Health Service (NHS Lothian)
  - Qualcomm
  - RedKite Animation Systems
  - SAS
  - SUN Microsystems
  - SELEX Galileo
- CITRIS, University of California at Berkeley

## Team

- Speckled Computing Research group at the SoI, UoE
  - Charmaine Wilson (Administrative Support)
  - Mat Barnes, Chris Conway, Martin Ling, James Mathews, Paul McEwan, Ryan McNally, Aris Valtazanos, Alex Young
- Speckled Computing Applications Centre, UoE
  - Andrew Bates, Chris Davies, Janek Mann
- 9 full-time researchers in partner universities

# Vision



- Endow persons/objects with sensing, processing and wireless networking capabilities
- Link the physical world of sensory data and virtual world of digital information

# On-body Orient Specks for Motion Capture

- Capture, analyse and understand motion using network of on-body specks
- Orient: Fully wireless, full body, 3D motion capture in real-time



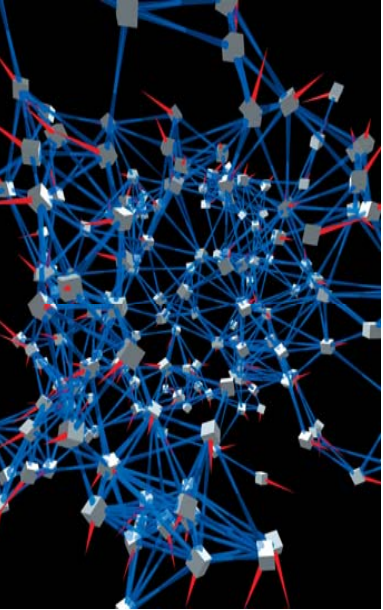
# Energy Neutral Speck (ENS)

- Investigate the limits in deploying a pervasive network of specks with modest resources and powered by scavenging energy from the environment
- Strike a balance between designing for minimal power consumption whilst retaining sufficient processing, memory and wireless communications capabilities for mesh network applications



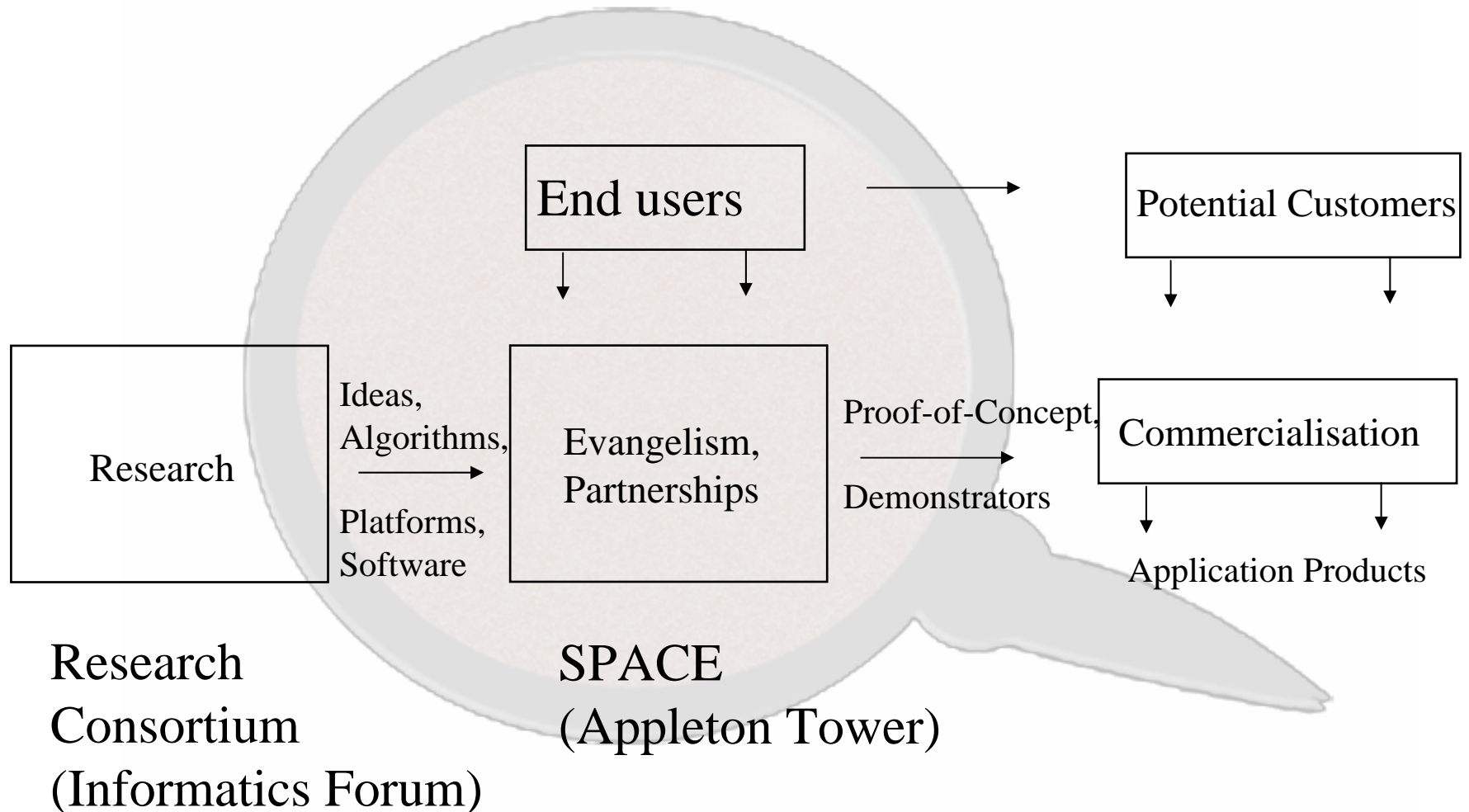
# Research Topics

- Speck architecture and System Level Integration of Radio, Processor, Sensor, Battery and Energy Scavenging in platforms: Prospeckz, Orient, ENS, 5Cube specks
- Network services and protocols for hubless, transient network of resource-constrained specks
- Design environments for specknets
- Distributed algorithms for clustering, localisation, motion tracking
- Learning algorithms for classification of motion (gait analysis, skill acquisition)



- What is the traction from end-users for this new class of information processing devices ?
- Speckled Computing Applications Centre (SPACE)

# Structure for collaboration



# – Speckled Interaction – Session 1 - 2

## Biomechanics of movement skills

### Learning behaviours in bipedal robots

## Human Computer Interface

## Speckled Healthcare



## 3-D Animation

## Music from Motion

## Dialogue and Interaction

## Classification of Movement Data using Machine Learning

# – Speckled Environments – Session 3 - 4

Tracking People

**ENS Platform &  
Networks**

Microbial Fuel Cells

**Photovoltaics**

**Optimisation  
of Microbial  
Electricity  
Generation**

**Hybrid Simulation**

Routing Protocols

**MAC Protocols**

**Monitoring Crop  
Stress**

**Monitoring the Natural  
Environment**

