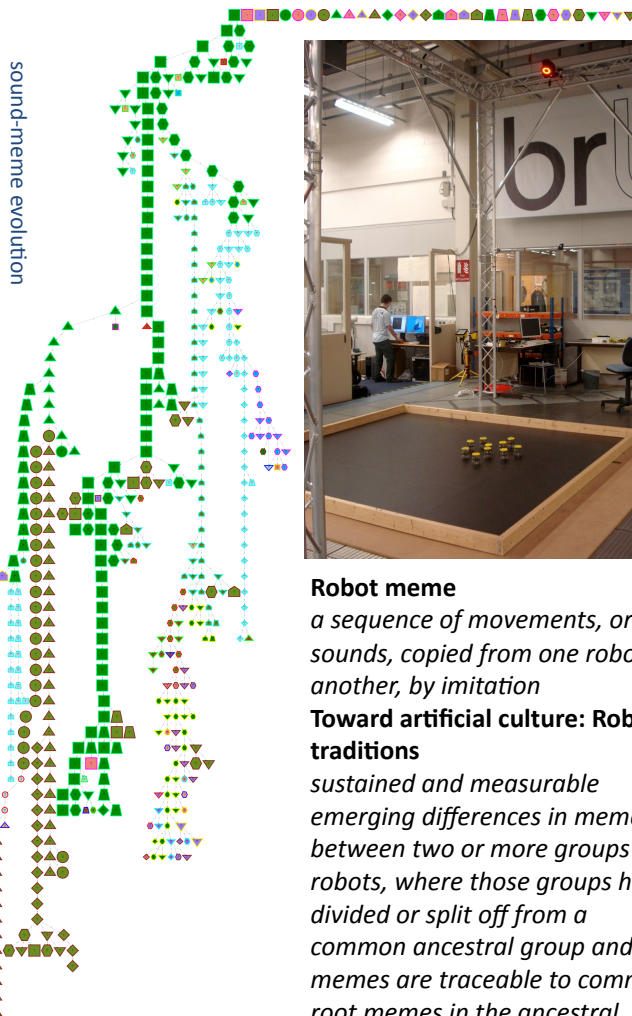Bristol Robotics Laboratory

# First steps towards Artificial Culture in Robot Societies

- Our aim is to illuminate the *processes* and *mechanisms* of the emergence of culture in social agents…
- by implementing robot-robot imitation (social learning) to study the emergence and evolution of robot 'memes' as they propagate across a robot collective

## The Artificial Culture Lab



e-puck robots



*Embodied imitation* with real robots we get *variation* for free

sound-meme evolution
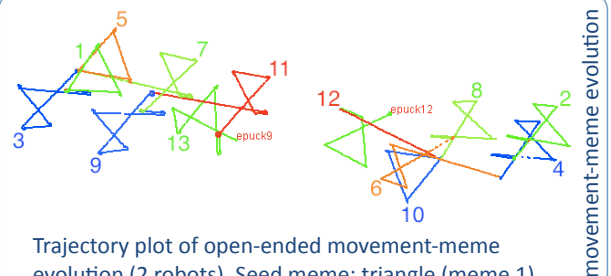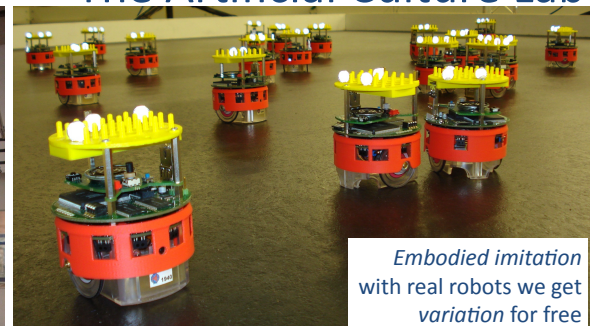


**Robot meme**
*a sequence of movements, or sounds, copied from one robot to another, by imitation*

**Toward artificial culture: Robot traditions**
*sustained and measurable emerging differences in memes between two or more groups of robots, where those groups have divided or split off from a common ancestral group and the memes are traceable to common root memes in the ancestral group*



movement-meme evolution

Trajectory plot of open-ended movement-meme evolution (2 robots). Seed meme: triangle (meme 1). Selection strategy: save every meme learned, select which one to enact at random with equal probability.



gene-meme co-evolution
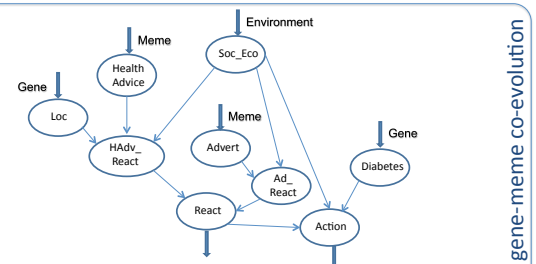
A computational model of gene-meme co-evolution (Bayesian network) with competing 'memes' (Health advice and Advertising) co-evolving with 'genes' for Diabetes and Self-control.

A *memeograph* showing the evolution and emergence of sound memes in a population of 8 robots (simulation)

Key:
Shapes identify robots
Colours identify sound memes
Large nodes = seed memes
Small nodes = emergent memes

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