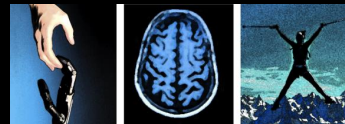


mechanisms & consequences of
attributing socialness to artificial agents

Emily S. Cross –University of Glasgow, Scotland

Artificial Intelligence & Society:
Where are we headed?

ERCEA, Brussels
26 October 2018



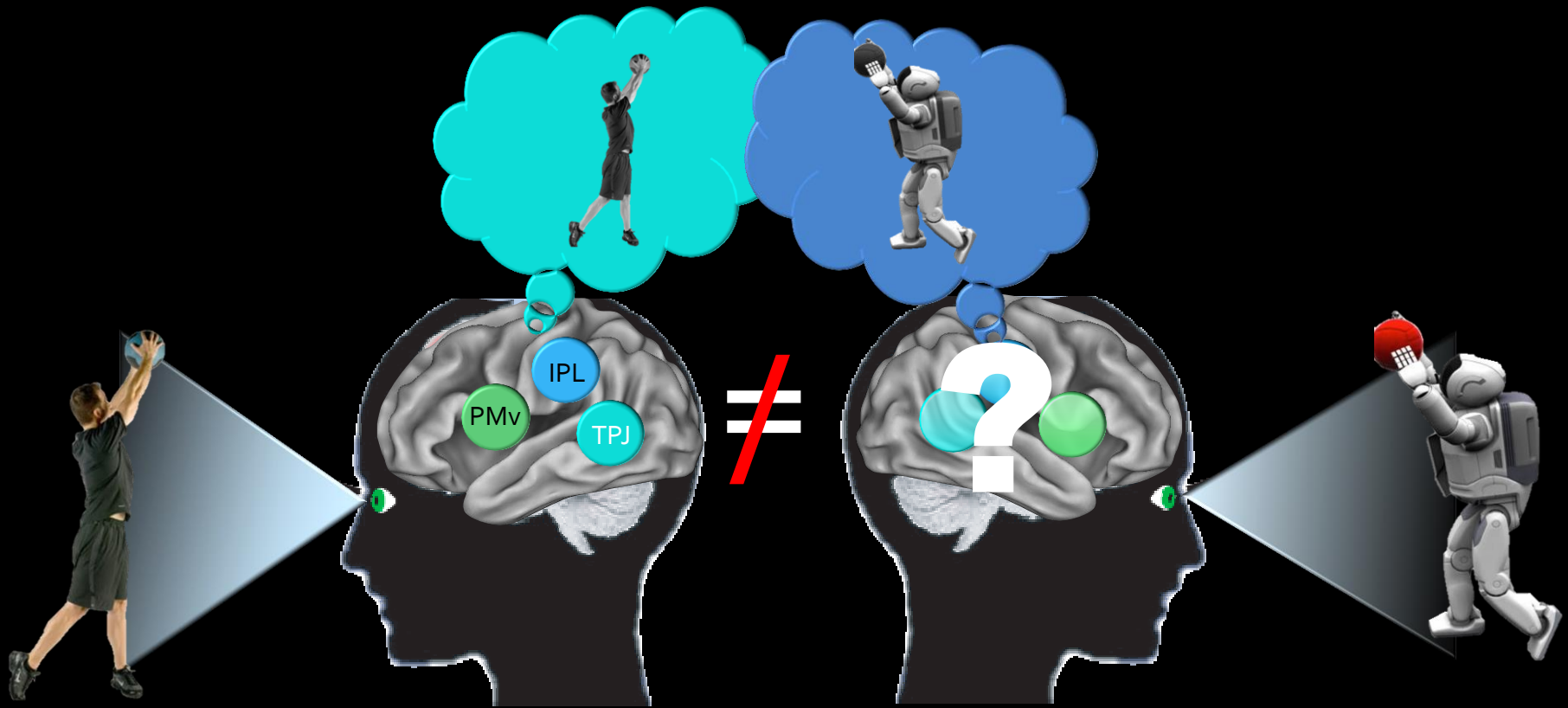
Social Brain in Action Lab



University
of Glasgow

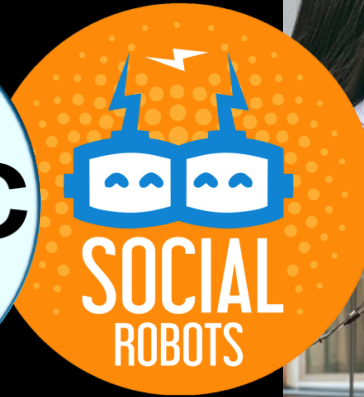
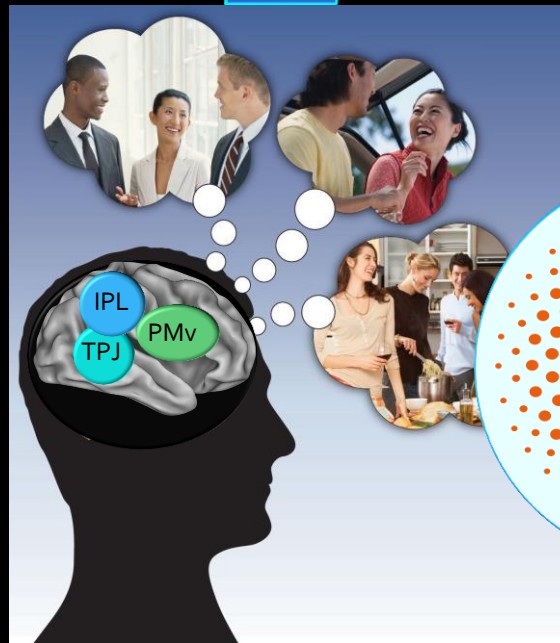


How do we make sense of others in a social world?

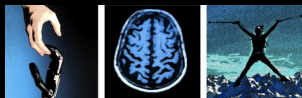


Challenge: Harness social robotics to advance our understanding of human social cognition

Social Cognition &
Social Neuroscience

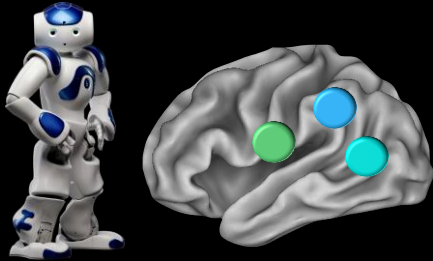


Robotics



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SOCIAL ROBOTS in a nutshell



Objective: establish behavioural & neural consequences of social robot interaction

Population: European young adults

Stream 1
Ongoing



Objective: probe malleability of socio-cognitive functioning in young and advanced age

Population: European toddlers and older adults

Stream 2
Just now starting



Objective: explore influence of cultural context on perception & plasticity of "like me"-ness

Population: Japanese young adults

Stream 3
Watch this space!

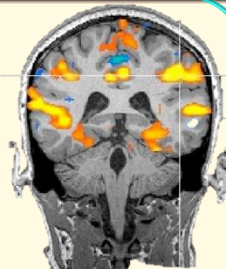
METHODS



mimicry



functional neuroimaging

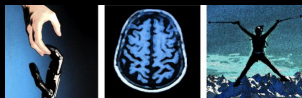
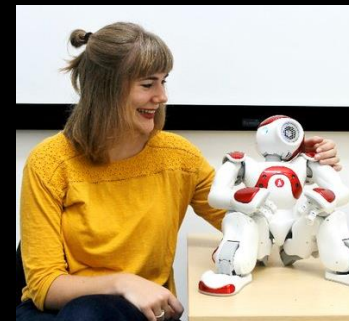
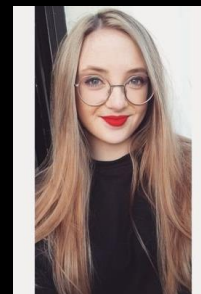


neurostimulation



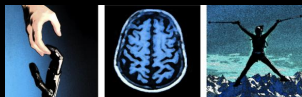
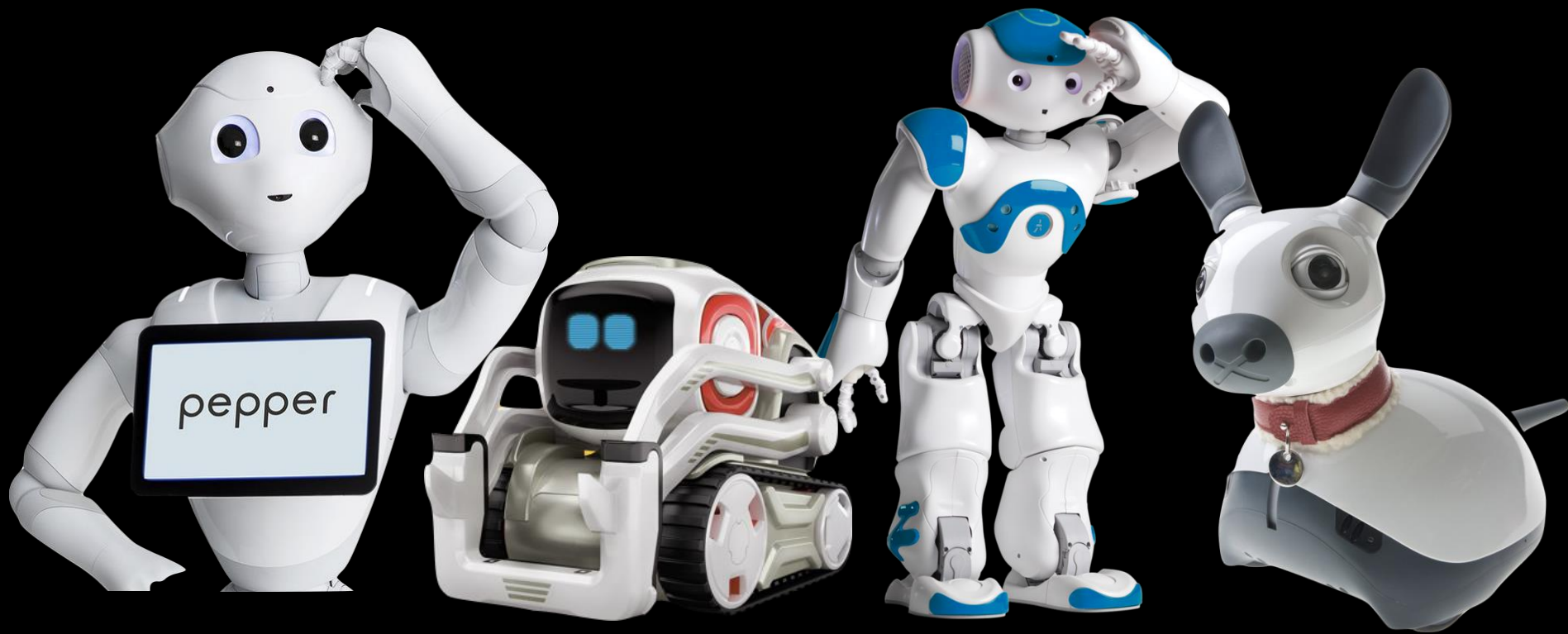
training

People Behind the Science



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... and Robots!



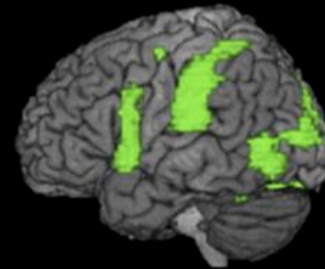
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Snapshot of Ongoing Empirical Work



1

Automatic Imitation



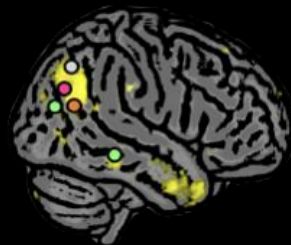
4

Empathy For Pain: Long-Term Social Intx & Modulation Of The Pain Matrix



2

Collaboration



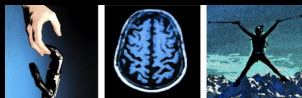
3

Shared Representations



5

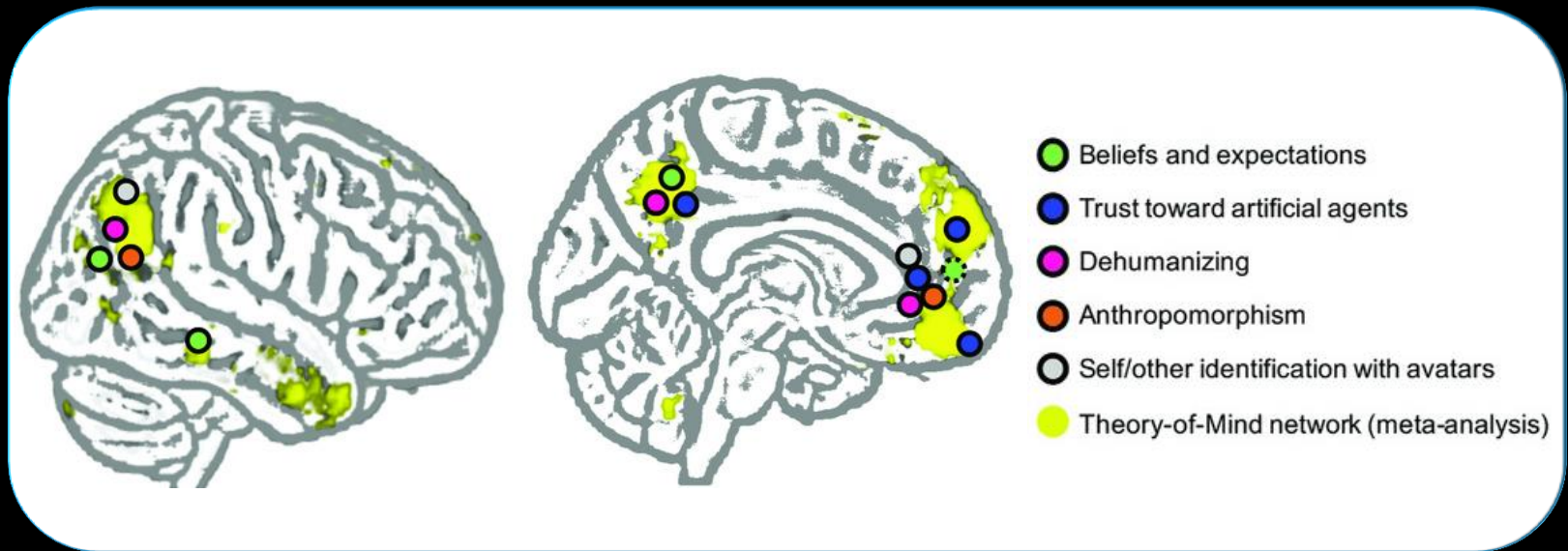
Action Synchrony & Social Reward



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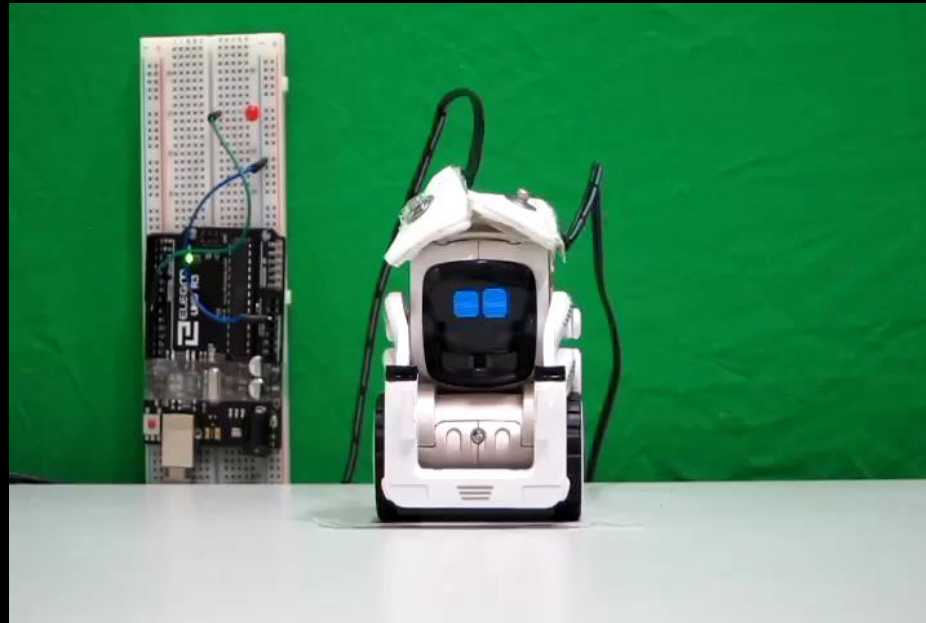
Exploring Shared Representations with Robots

- To what extent do we use similar neurocognitive mechanisms for social engagement with robots as we do with humans?



Hortensius & Cross (2018) *Annals NYAS: The Year in Cognitive Neuroscience*

Empathy for Robots

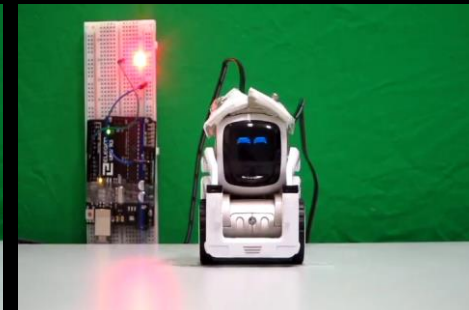
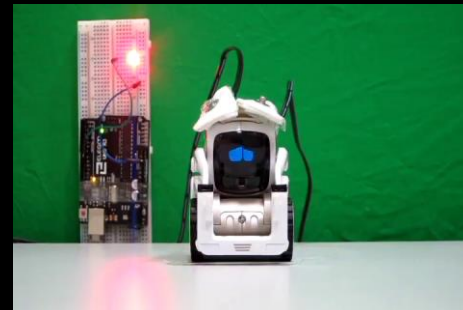


Human Pain

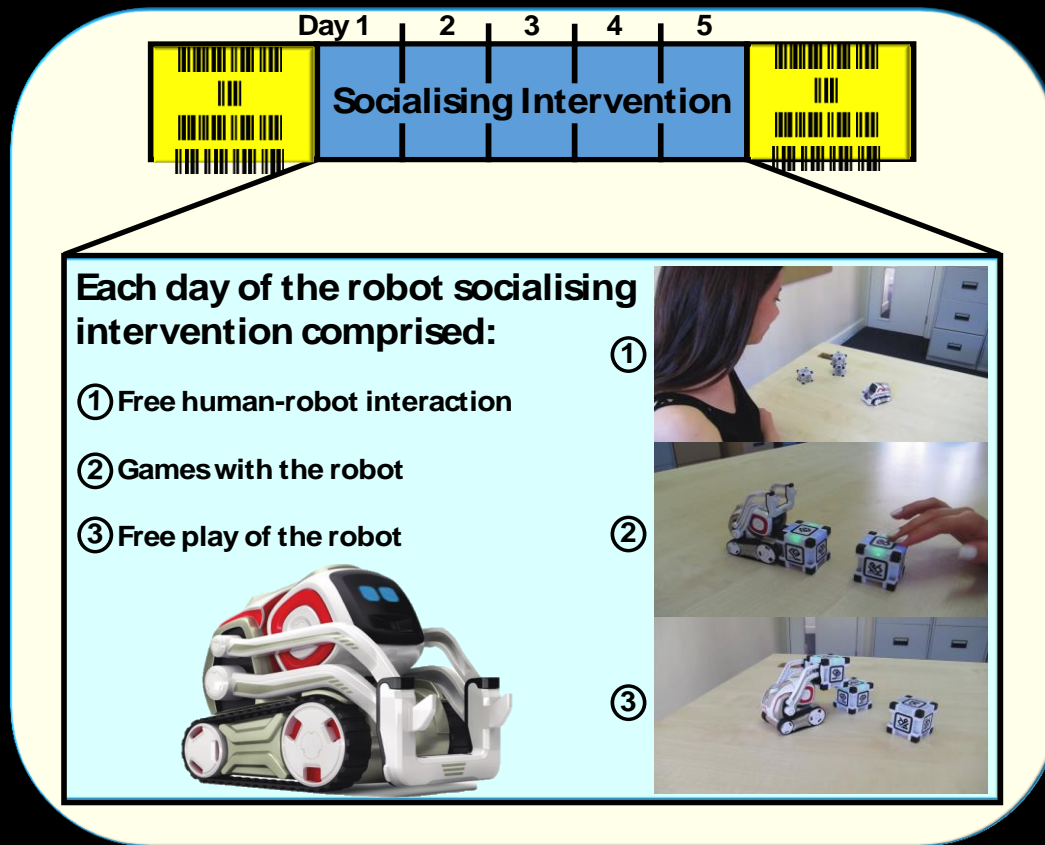
Human Pleasure

Robot Pain

Robot Pleasure



Empathy for Robots

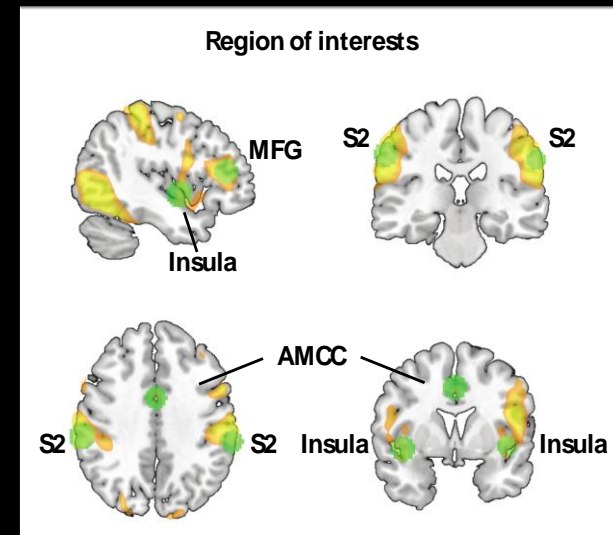
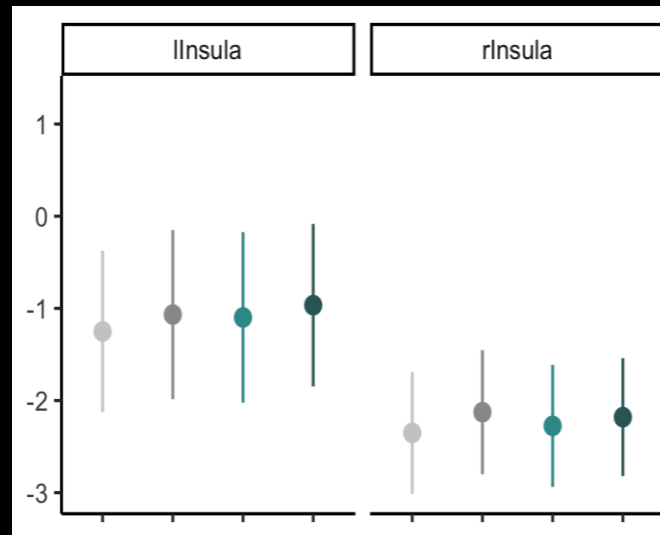


Cross et al. (under revision)

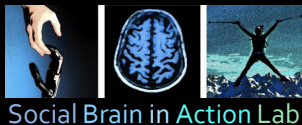


Empathy for Robots

Post-Socialising ←→ More Overlap
Less Overlap ←→

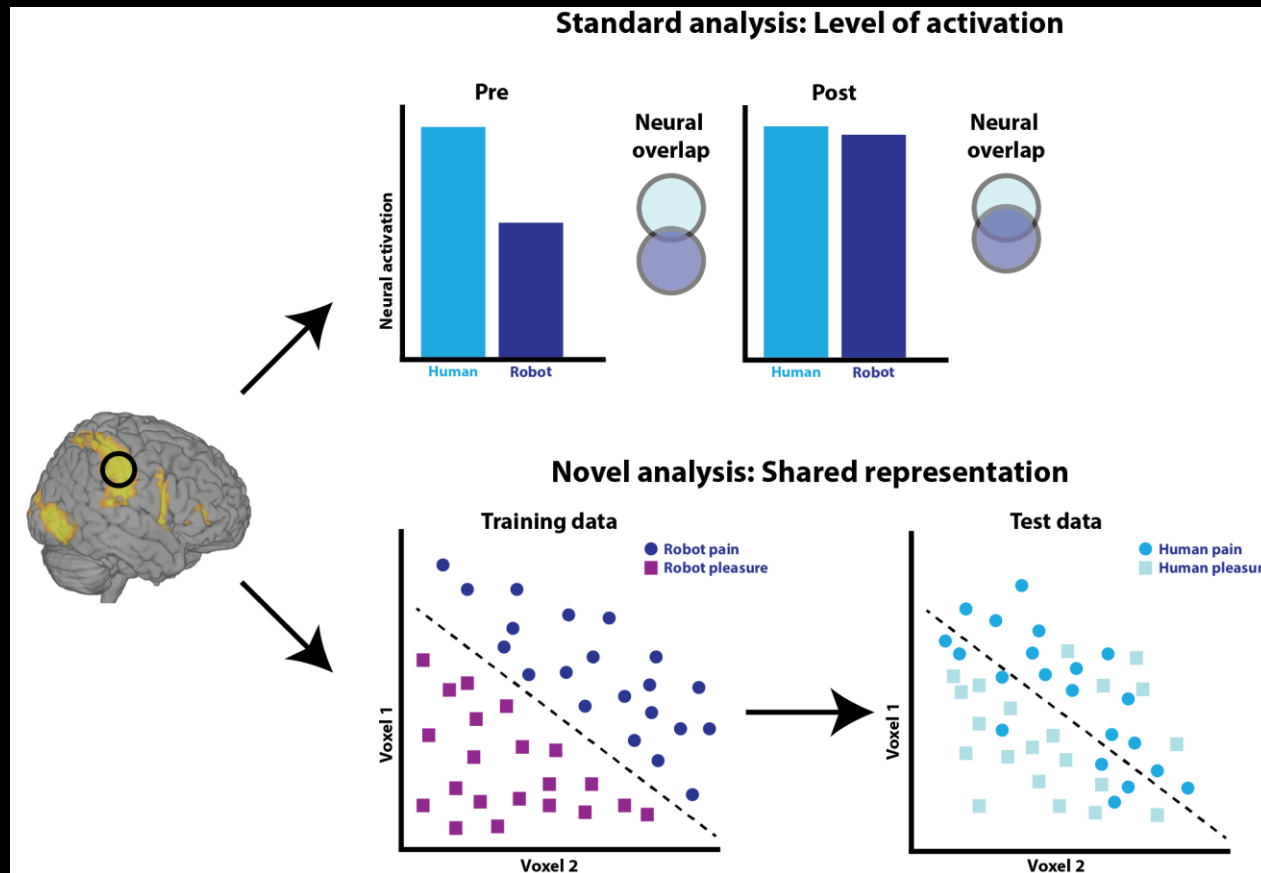


No evidence of neural mechanisms of empathy showing more overlap after socializing with robot

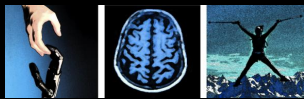
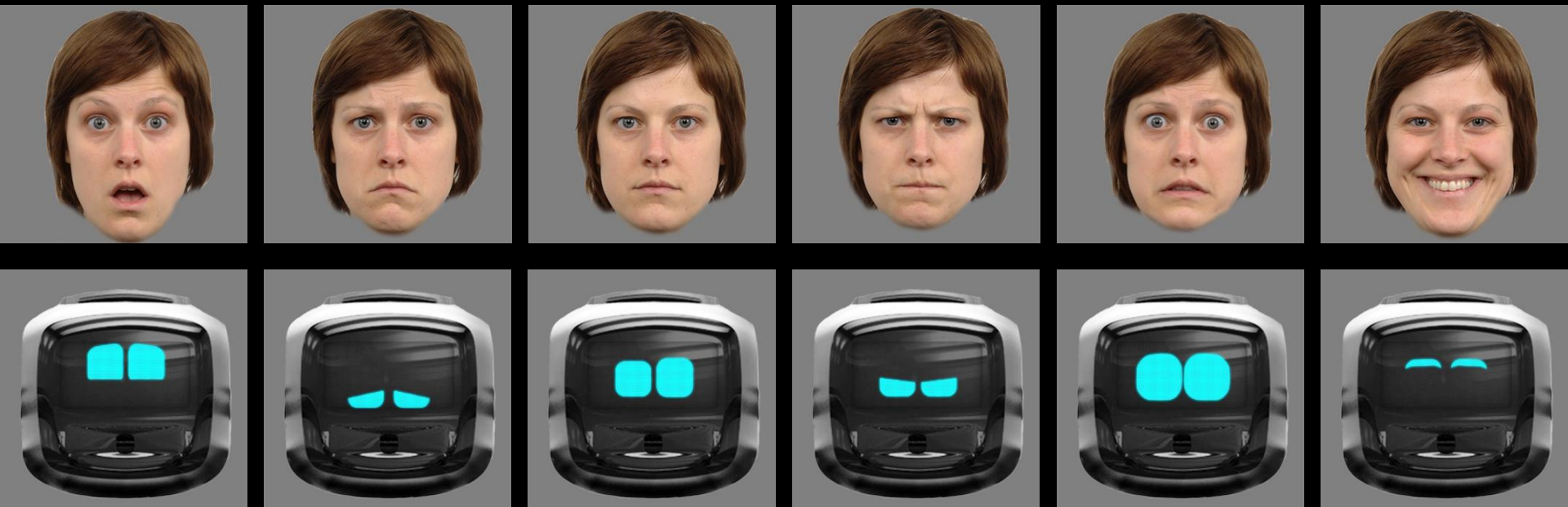


Cross et al. (under revision)

Empathy for Robots: Pursuing New Methods



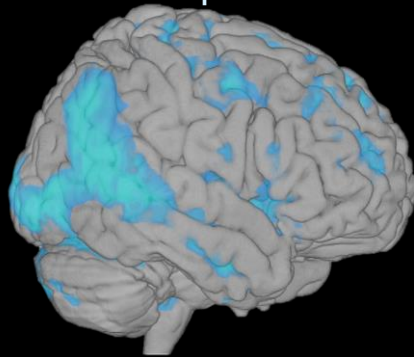
Shared Representations



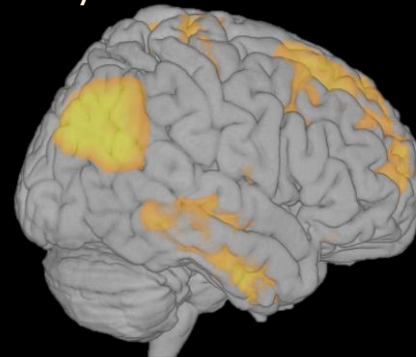
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Shared Representations

Person Perception Network

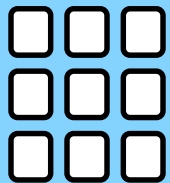


Theory-of-Mind Network



Train

ISVM



Happy



Angry

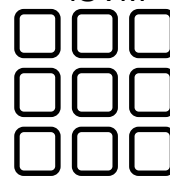


Sad



Test

ISVM



Happy



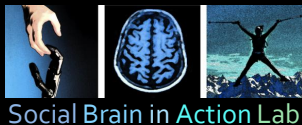
Angry



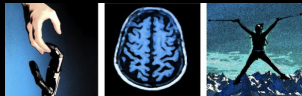
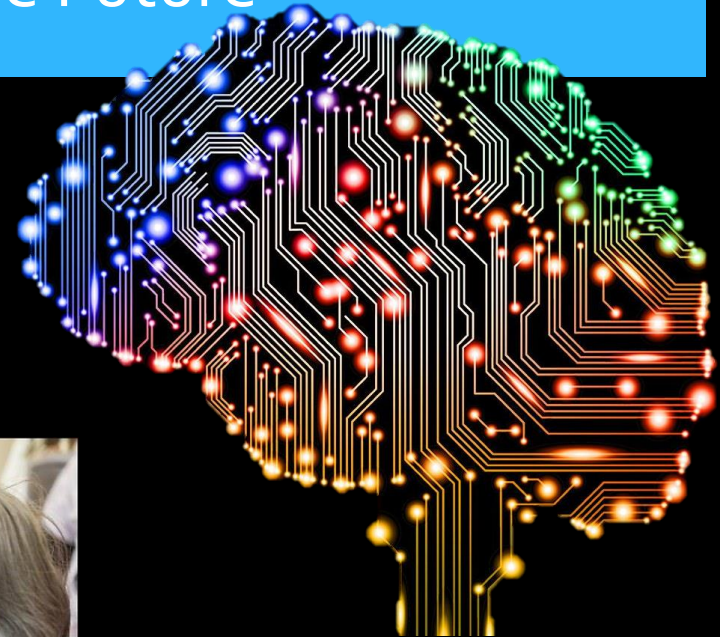
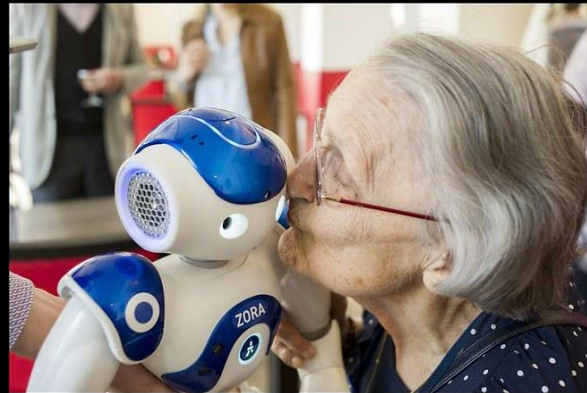
Sad



Hortensius & Cross (in prep)



SOCIAL ROBOTS & AI: Into the Future



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Upcoming PhilTrans Theme Issue (2019)

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B

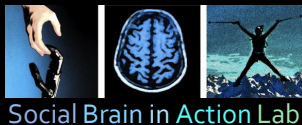
BIOLOGICAL SCIENCES

THE
ROYAL
SOCIETY
PUBLISHING

**From Social Brains to Social Robots:
Applying Neurocognitive Insights to
Human-Robot Interaction**



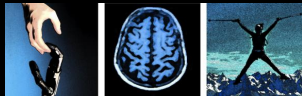
Editors: E. Cross // A. Wykowska // R. Hortensius



SOCIAL ROBOTS & AI

One of 3 primary subsections of AI, robotics is already reshaping manufacturing, military, and construction industries

Social robotics, *per se*, is poised to dramatically change the industries and domains traditionally thought of as strictly human, including education, healthcare, services, communication, and sex



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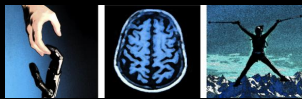
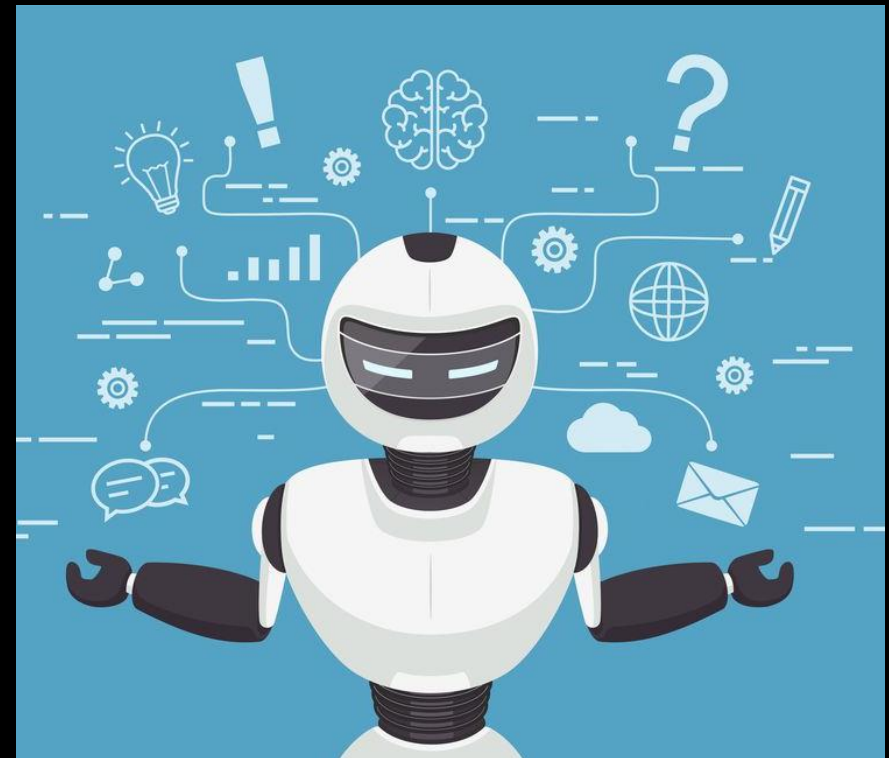
SOCIAL ROBOTS & AI

How best to capitalize upon this potential, while avoiding pitfalls?

Interdisciplinarity to ensure crosstalk between experts across domains

Openness to updating our understanding of human-AI relationship

Clear delineation of boundaries between humans and machines (i.e., are the jobs/tasks for which we would never want to robots to enter?)

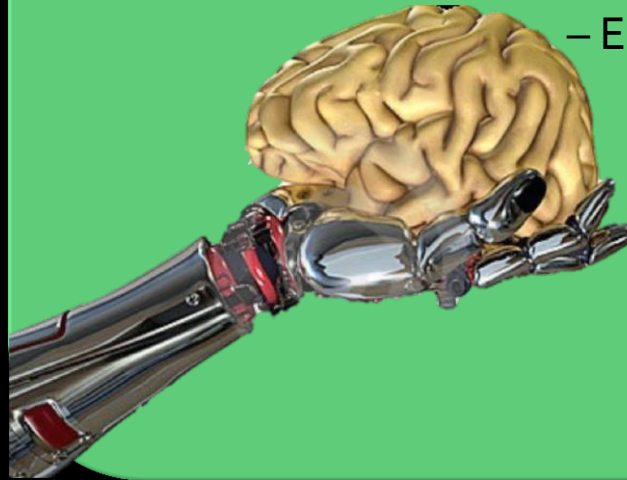


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Final Thought

"We're only barely scratching the surface of the brain's social algorithms, which become even more complicated and unpredictable when we interface with technology."

– Erik Sofge



Many Thanks!

Social Robots Team Members:

Bishakha Chaudhury

Lina Davitt

Anna Henschel

Ruud Hortensius

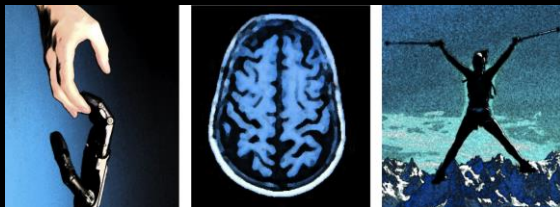
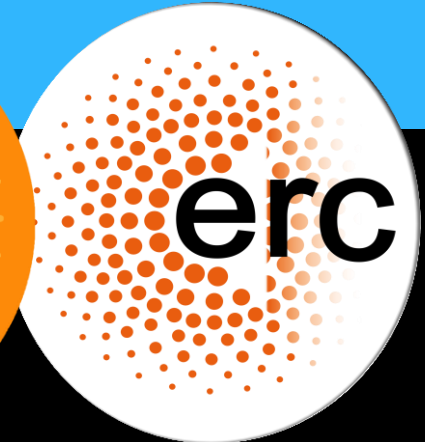
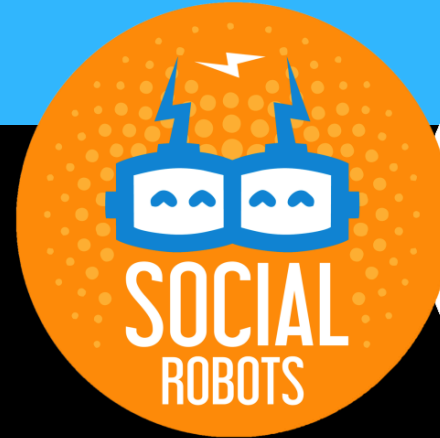
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