

# Lobsters, Robots and Genes

Some cross-disciplinary case studies

Dave Griffiths  
FoAM

Where I come from:  
“Creative Industries”

## 1999-2002 Computer Artworks (PS2/XBox/PC)



## 2007-2009 Sony Computer Entertainment Eyetoy R&D (PS3)

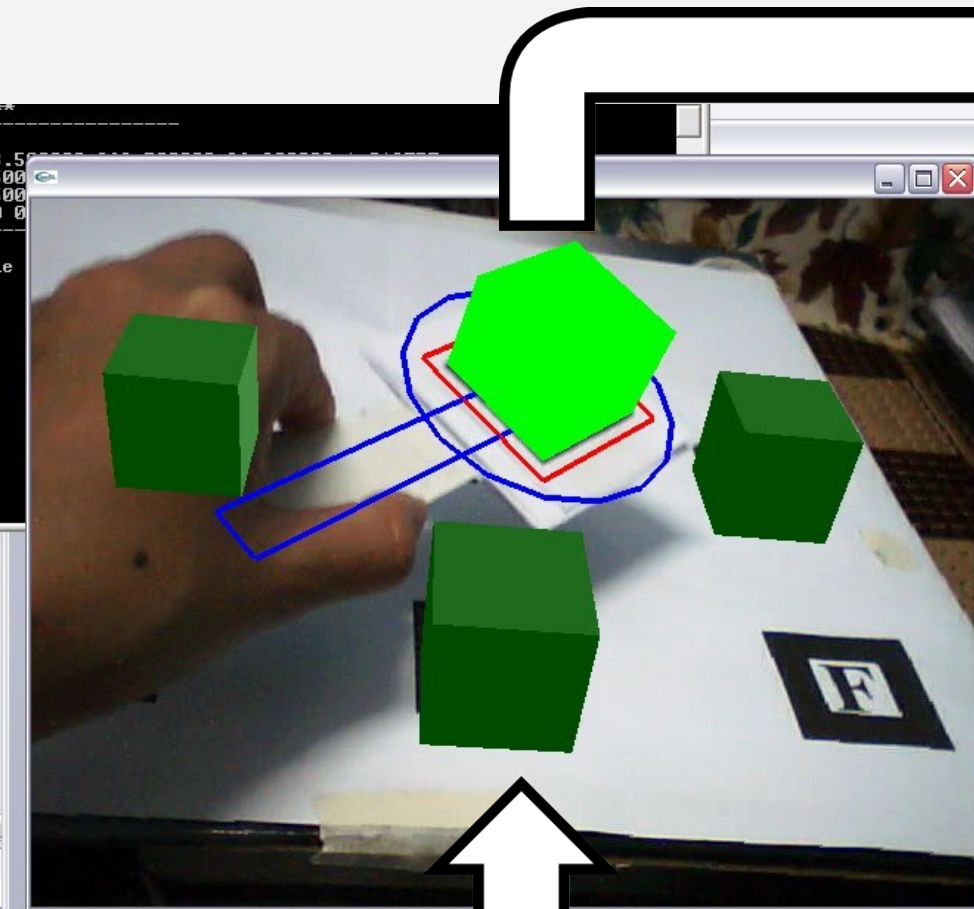




# Games Research & Development

Machine vision  
Research

Game designers,  
Playstation 3 Games





**Troy 2003 – Wolfgang Peterson**



**Kingdom of Heaven 2005 - Ridley Scott**



# Film Research & Development

Mathematics,  
Software engineering

Tools for artists

$$\rho(\theta_r, \phi_r, \theta_i, \phi_i)$$

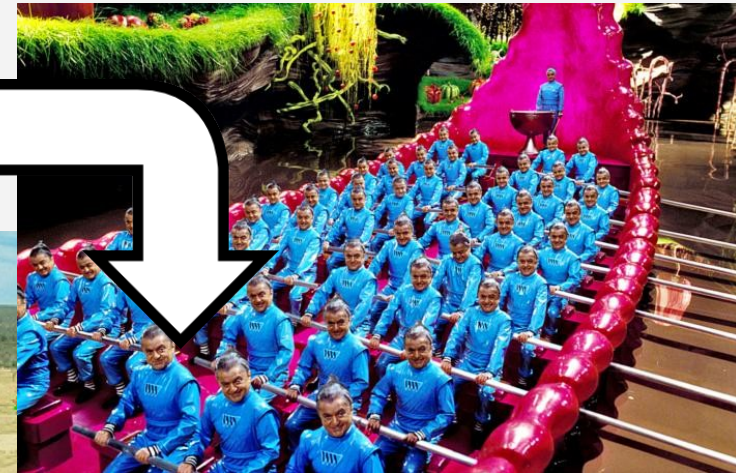
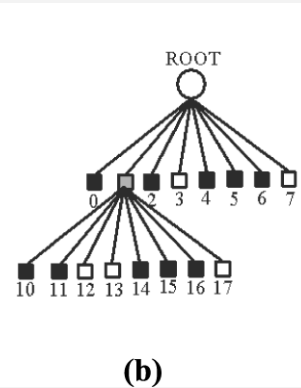
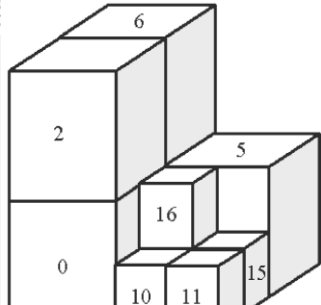
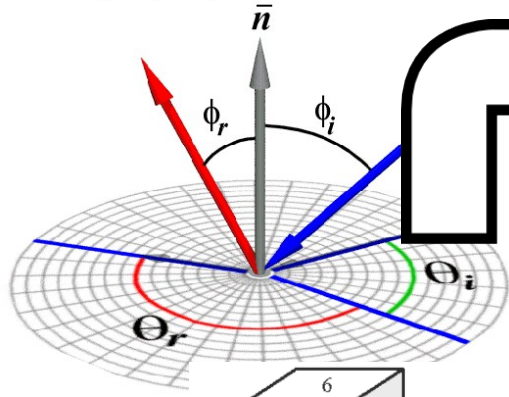
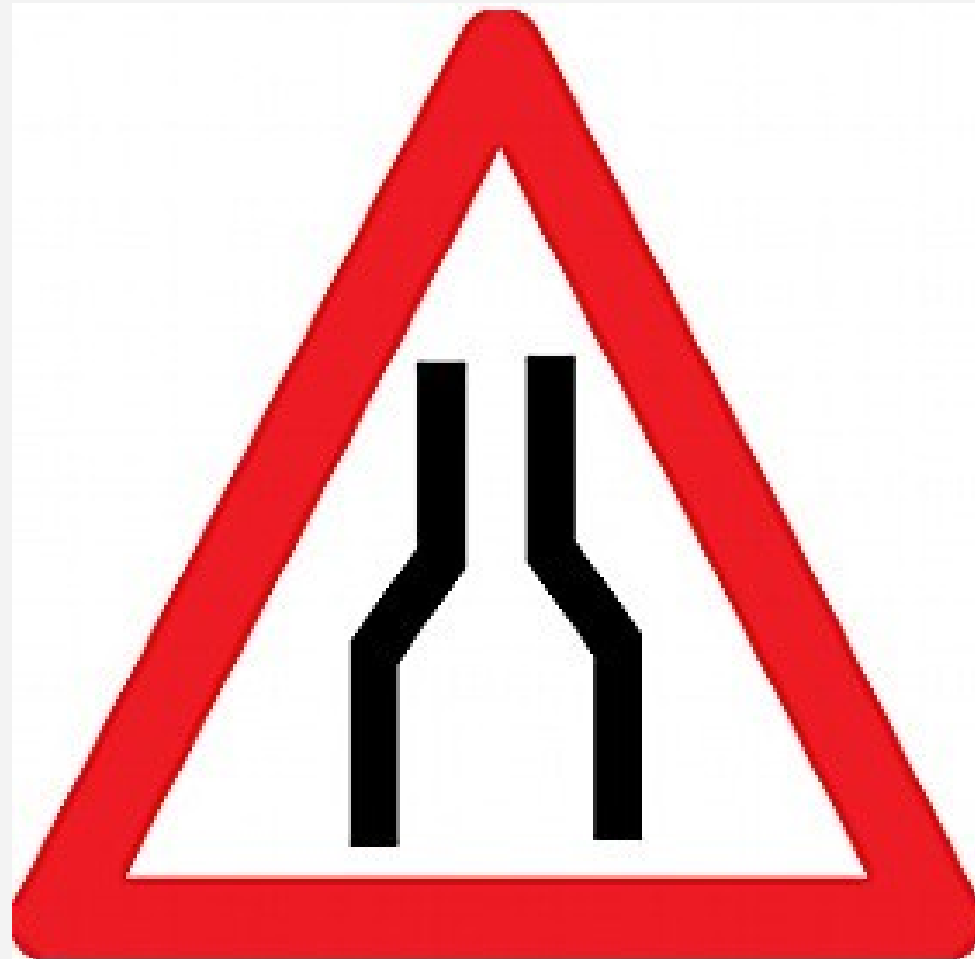
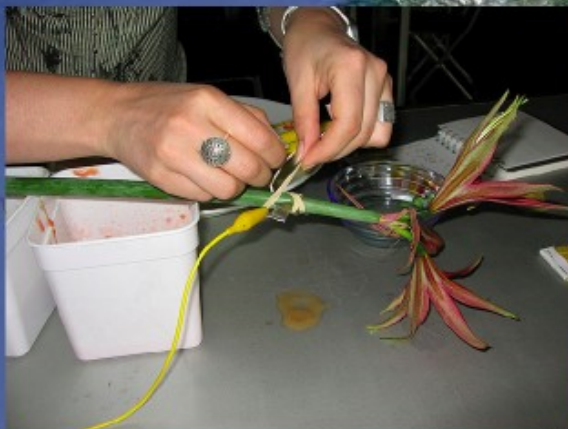


Fig. 1. 3D modeled hairstyles for pre- and post-transformation





[foam]



Stockholm



Amsterdam

Falmouth

Brussels



## **3 FoAM projects**

1. Cultural project -> Science project
2. Bioinformatics visualisation
3. Working in a large cross-disciplinary project

1. Cultural project -> Science project





**Borrowed Scenery** is a story about an alternate reality where plants are a central aspect of human society.

A magnifying glass to reveal vegetation where we would usually overlook it: in cracks between buildings, on our plates, in emerging technologies and age-old stories.









Discovering and recording extraordinary  
plants in the city of Ghent









# Zizim

the compass

English (US)



[+ AFFIX A FIELD NOTE](#)

[HOME](#)

[REMARKABLE FLORA](#)

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[BE NOTIFIED](#)

[WRITE TO US](#)

[ABOUT US](#)

**FILTERS** → [REMARKABLE FLORA](#) [BULLETIN](#)  
[PHOTOGRAPHS](#) [MOVING IMAGES](#) [ALL](#)

Zizim is a field guide to remarkable plants and gardens. A valuable tool for a patabotanical field worker, it allows you to assemble and explore a growing collection of urban plants amenable to live with humans and gardens where people cultivate, contemplate, exchange and eat plants.

Please peruse this field guide in your neighbourhood and further afield. Your contributions will be of utmost value to observation and experience of human-plant interactions in the city.

You can report your find and affix your field-note on these pages, or using our mobile notebook for Android based tracking devices.

We also need your help nurturing these plants in the [world of Aniziz](#).

↓ **CLASSIFICATION** [HIDE]

**ALL CLASSES**

**REMARKABLE PLANTS**

**REMARKABLE GARDENS**

**OTHER**

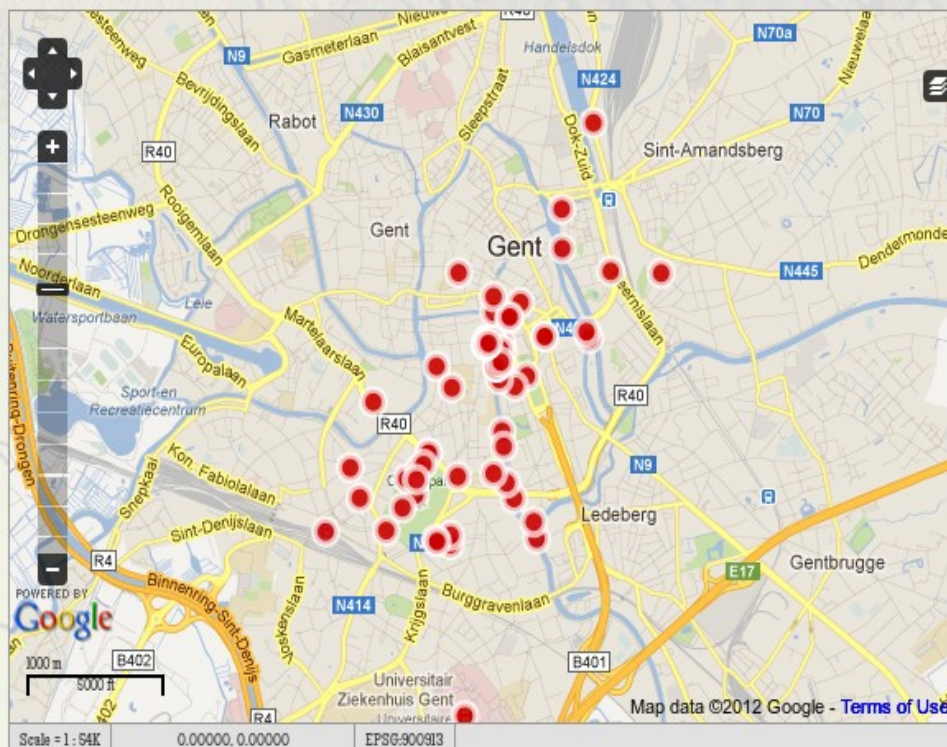
**PATA**

## How to make a field note

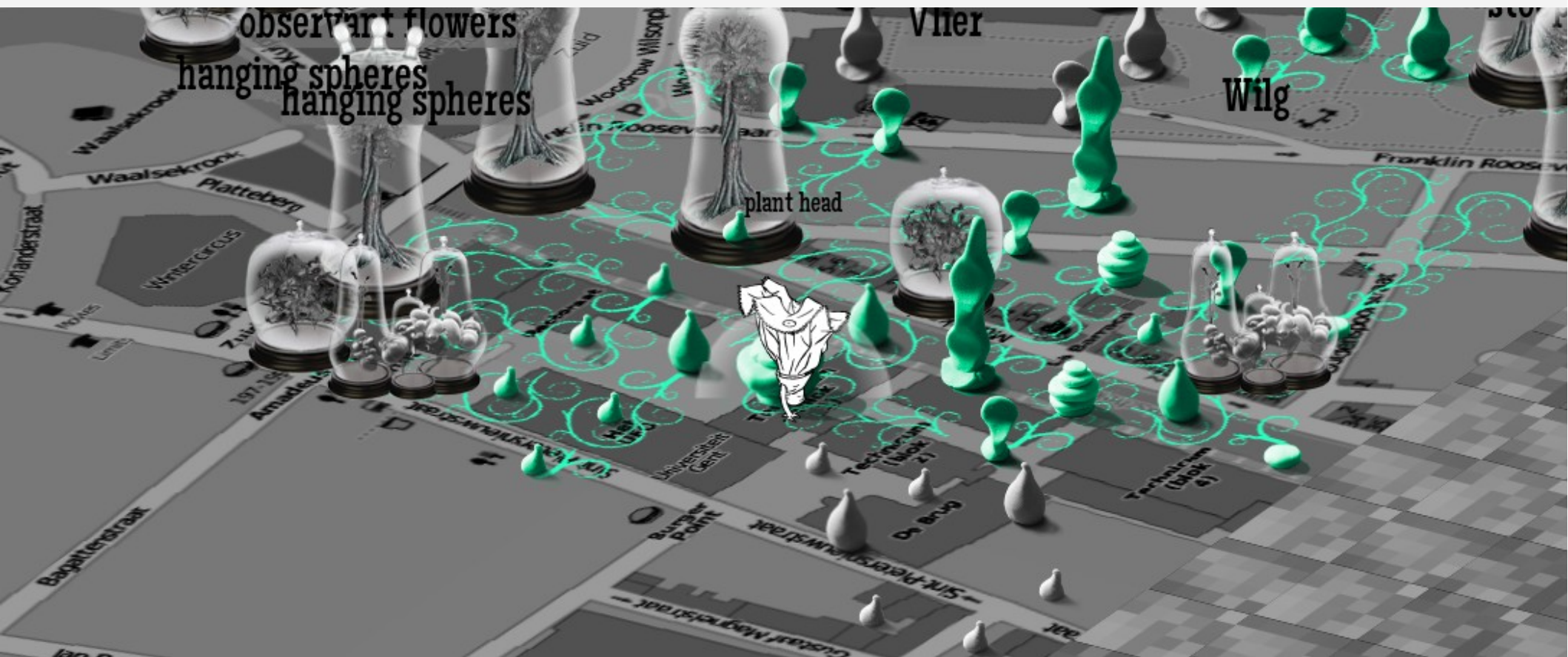
1. By using the Field Notebook on your Android tracking device
2. By sending an e-mail from other mobile tracking devices to [zizim@borrowed-scenery.net](mailto:zizim@borrowed-scenery.net)
3. By filling this [form](#)

## Download the Field Notebook

[Download Zizim for Android](#)





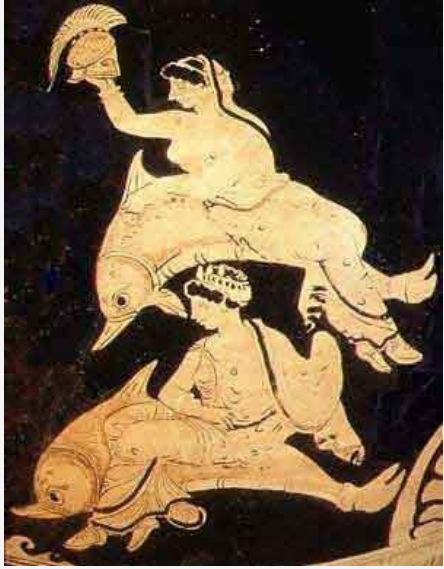






Becomes a science project...





# Doris

[www.dorismap.exeter.ac.uk](http://www.dorismap.exeter.ac.uk)

Centre for Ecology and Conservation  
University of Exeter

Charlie Ellis  
Dr Amber Teacher  
Dr David Hodgson



Charlie Ellis, PhD Student, Exeter University





# THE NATIONAL LOBSTER HATCHERY

See baby lobsters



Click on Larry to adopt a lobster today... from £2.50



Follow us on



## Conservation...

Our conservation aim is to promote the sustainability in fisheries and aquaculture. To find out more about the National Lobster Hatchery's conservation activities and aims please [click here...](#)



## Education...

We educate at every level, from pre school groups to postgraduate including aquaculture modules for Cornwall College and the University of Plymouth. For more information on our education activities [click here...](#)



## Little Shop of Lobsters



Katharine Hamnett No More Fish in the Sea T-shirt  
£10.00



Lobster Tea Towel (pack of 3)  
£10.00



Snappy - Large Lifelike Rubber Lobster Toy  
£6.50

## Rock Blogster

the life and times of a lobster hatchery in Cornwall



## Research...

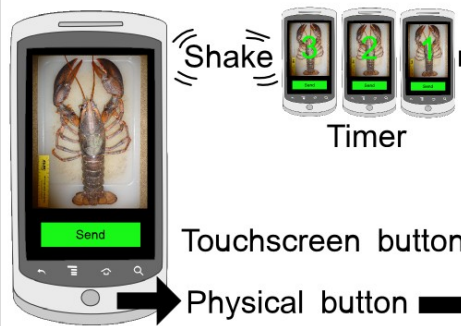
Carly Daniels pHd...

- Home
- Visitor Centre
- Shop Online
- Adopt a Lobster
- Make a Donation
- Become a Friend
- Conservation...
- Education...
- Research...
- Corporate...
- About Us...
- Volunteers

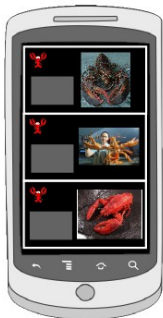
# Charity in Cornwall

# Doris Android App

Camera view



List view



Map view



Weather  
Tide  
Sea conditions

Database



Third party databases

Cache locally  
and wait for  
connectivity

Moderate  
visibility and  
edit reports

# Doris Website

Doris Lobster Mapper

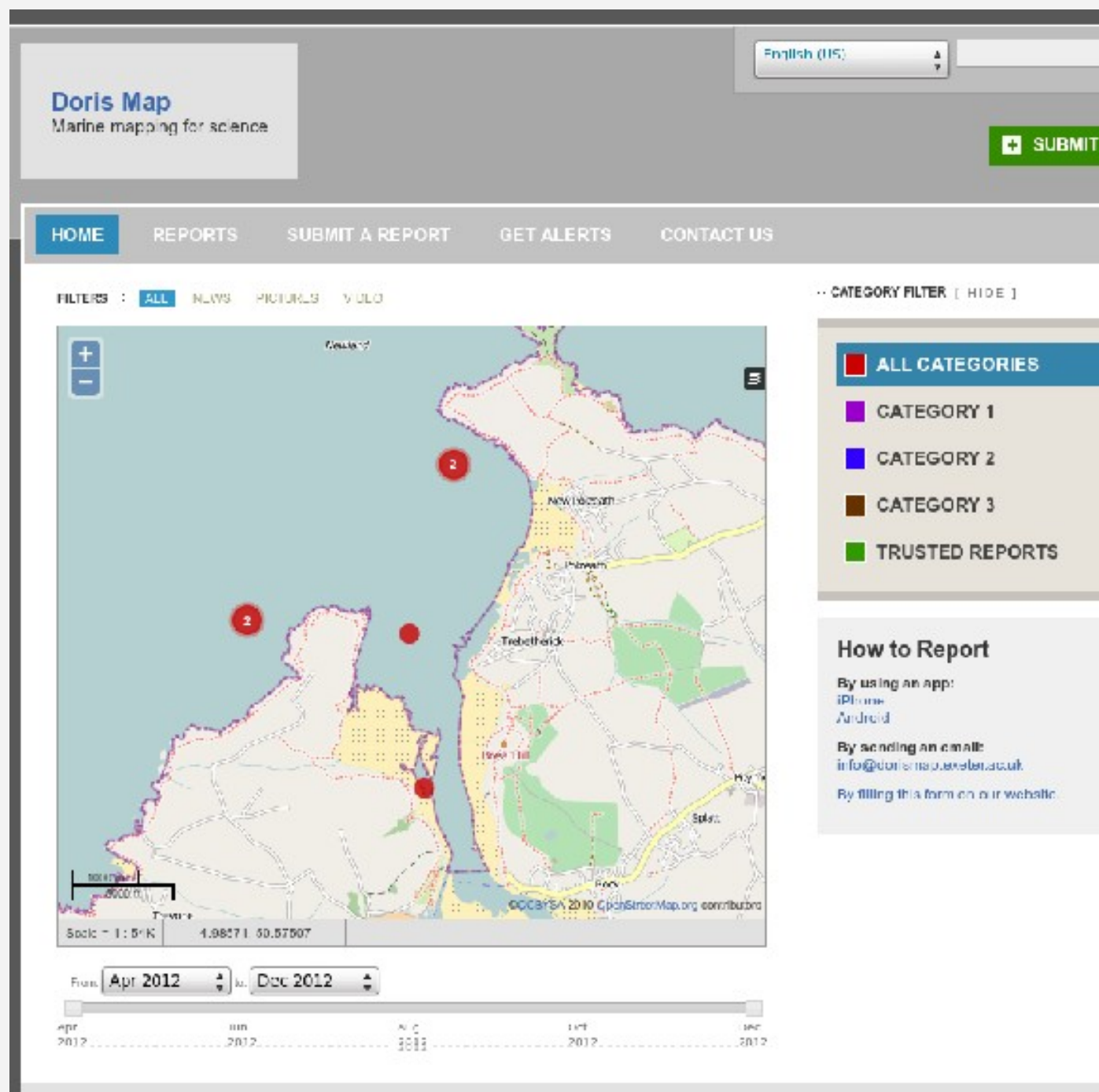
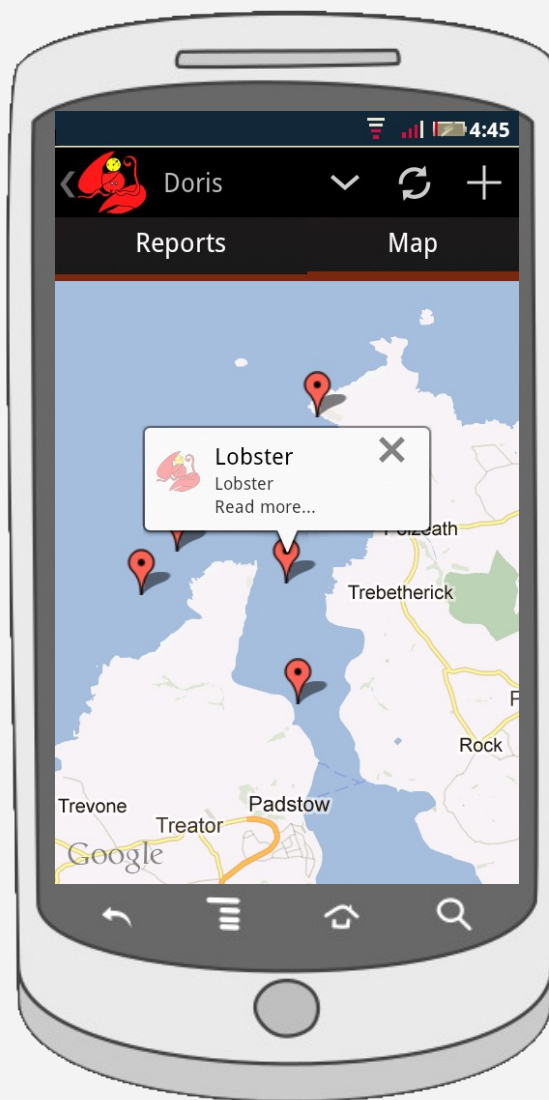


Relevant categories  
and guidelines



## **Met Office Integrated Data Archive System (MIDAS) Land and Marine Surface Stations Data**

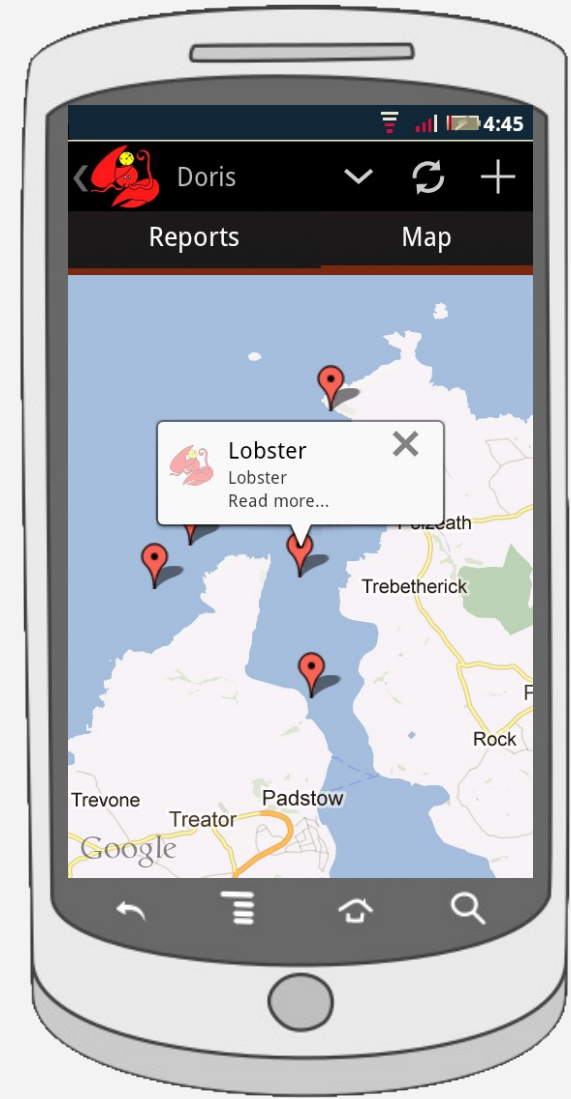
- Acoustics
- Bathymetry and topography
- Currents — horizontal and vertical velocity, Lagrangian currents and water transport rates
- Meteorology — Radiosonde, Met. stations and data buoys
- Optical properties — pigments, turbidity, irradiance
- Sea level
- Water column temperature and salinity
- Water column chemistry — nutrients, carbons, oxygen
- Waves — statistics and spectra





# Possible future uses

- General marine sampling database
- For outreach (website)
- Citizen science (rockpooling holidaymakers)
- Fishermen as users (dedicated hardware?)



## 2. Bioinformatics visualisation



# **Bioinformatics visualisation**

Haplotype networks

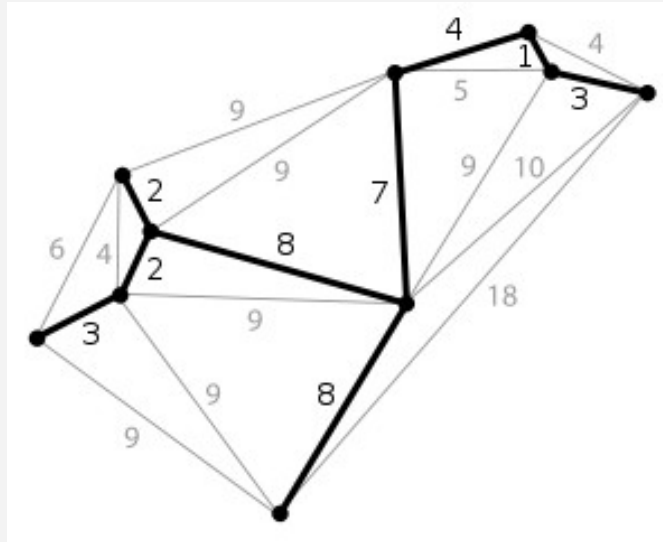
Dr Amber Teacher

Centre for Ecology and Conservation  
University of Exeter

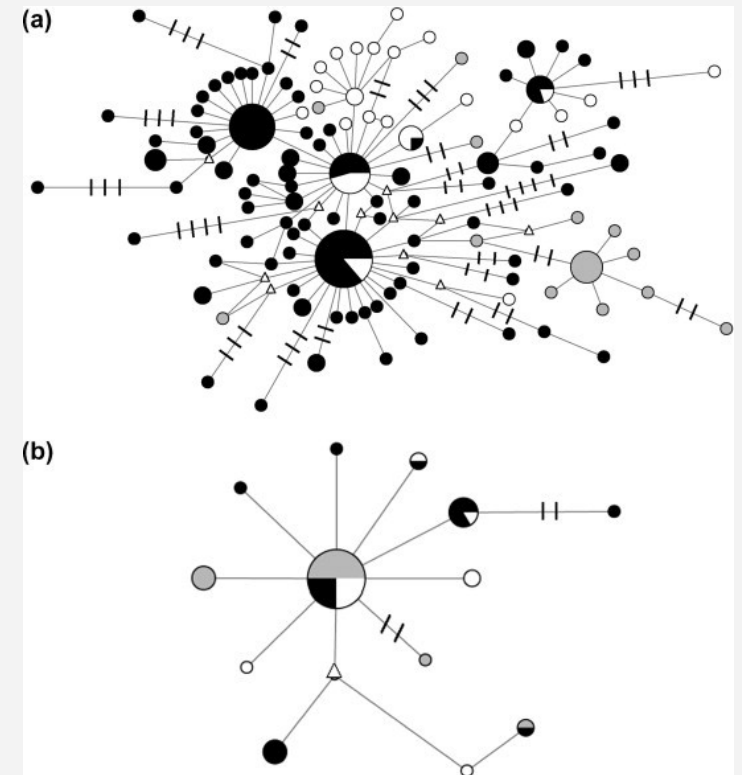
# Haplotype network (genetic distance)

1	113	0.00000
1	4	1.00000
4	6	1.00000
4	8	1.00000
4	9	2.00000
4	10	1.00000
4	14	1.00000
4	15	4.00000
15	5	1.00000
5	12	1.00000
5	13	2.00000
5	7	3.00000
5	3	1.00000
4	17	1.00000
4	18	1.00000
5	19	2.00000
17	20	1.00000
5	21	1.00000
18	23	1.00000

## Minimum Spanning Tree

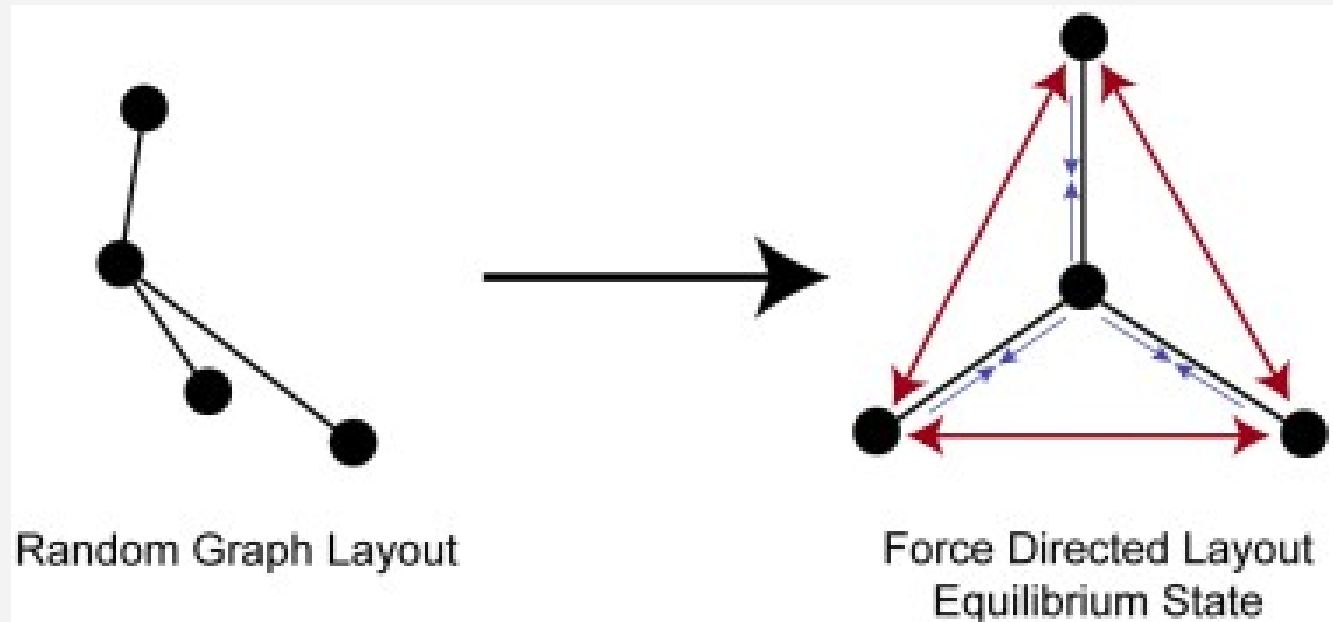


## Tree visualisation



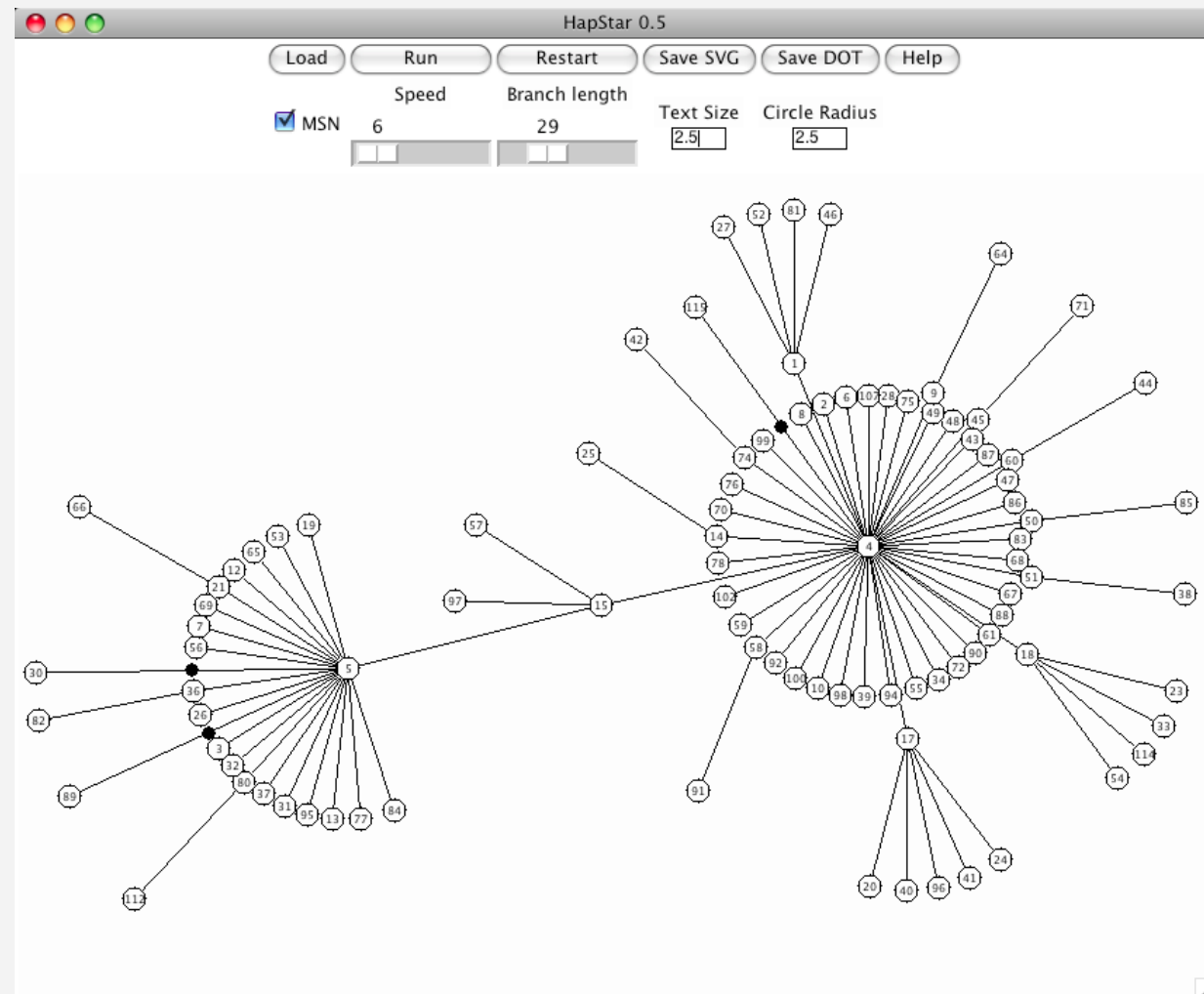


# Force directed graph layout (spring model)



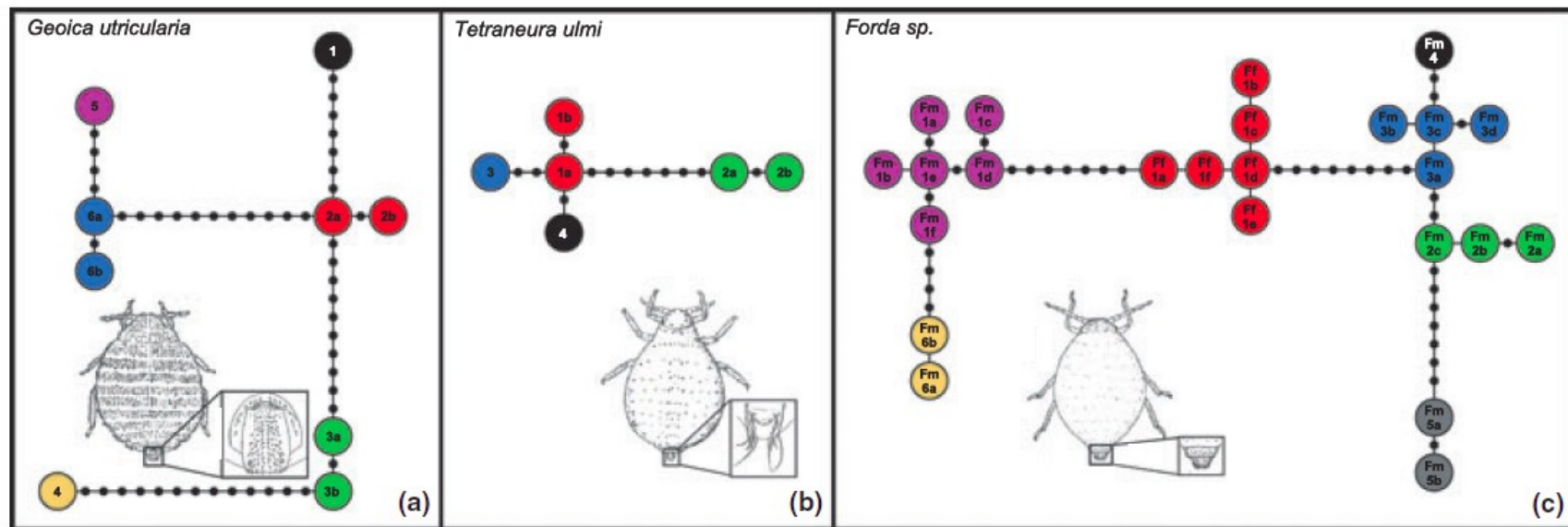
# Hapstar

- Open source
- Crossplatform via Python
- Full network or MS-tree views
- Produces publishable figures

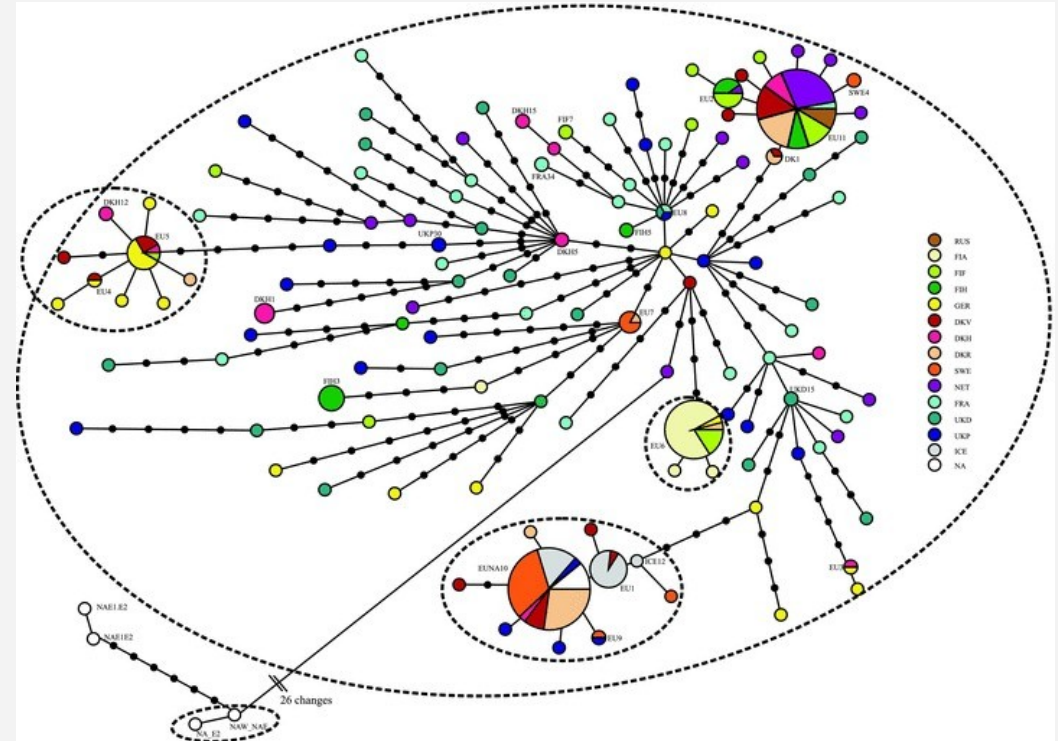
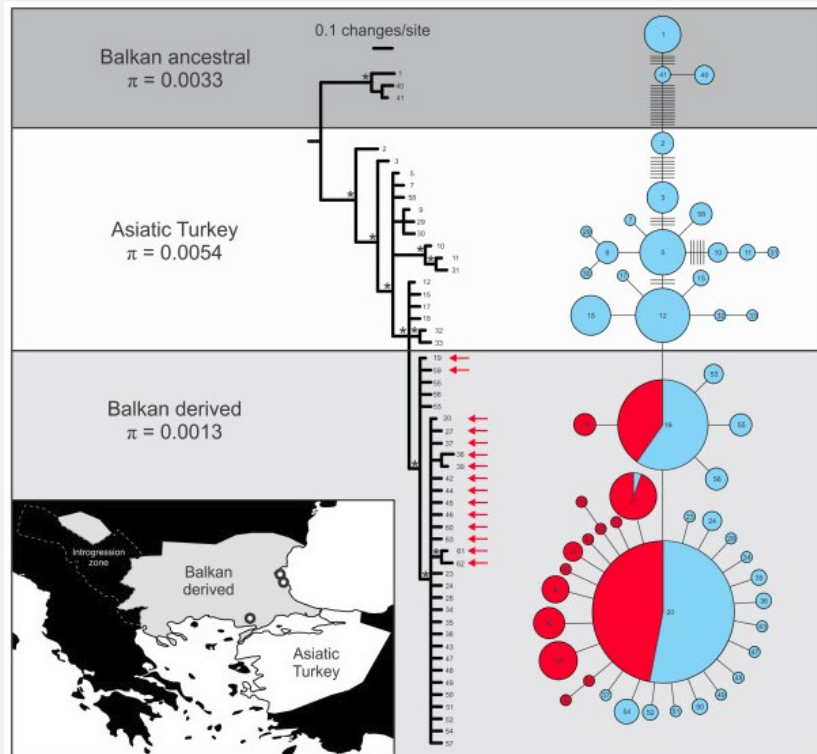


Teacher AGF & Griffiths DJ (2011) HapStar: Automated haplotype network layout and visualisation. *Molecular Ecology Resources* 11(1): 151-153.





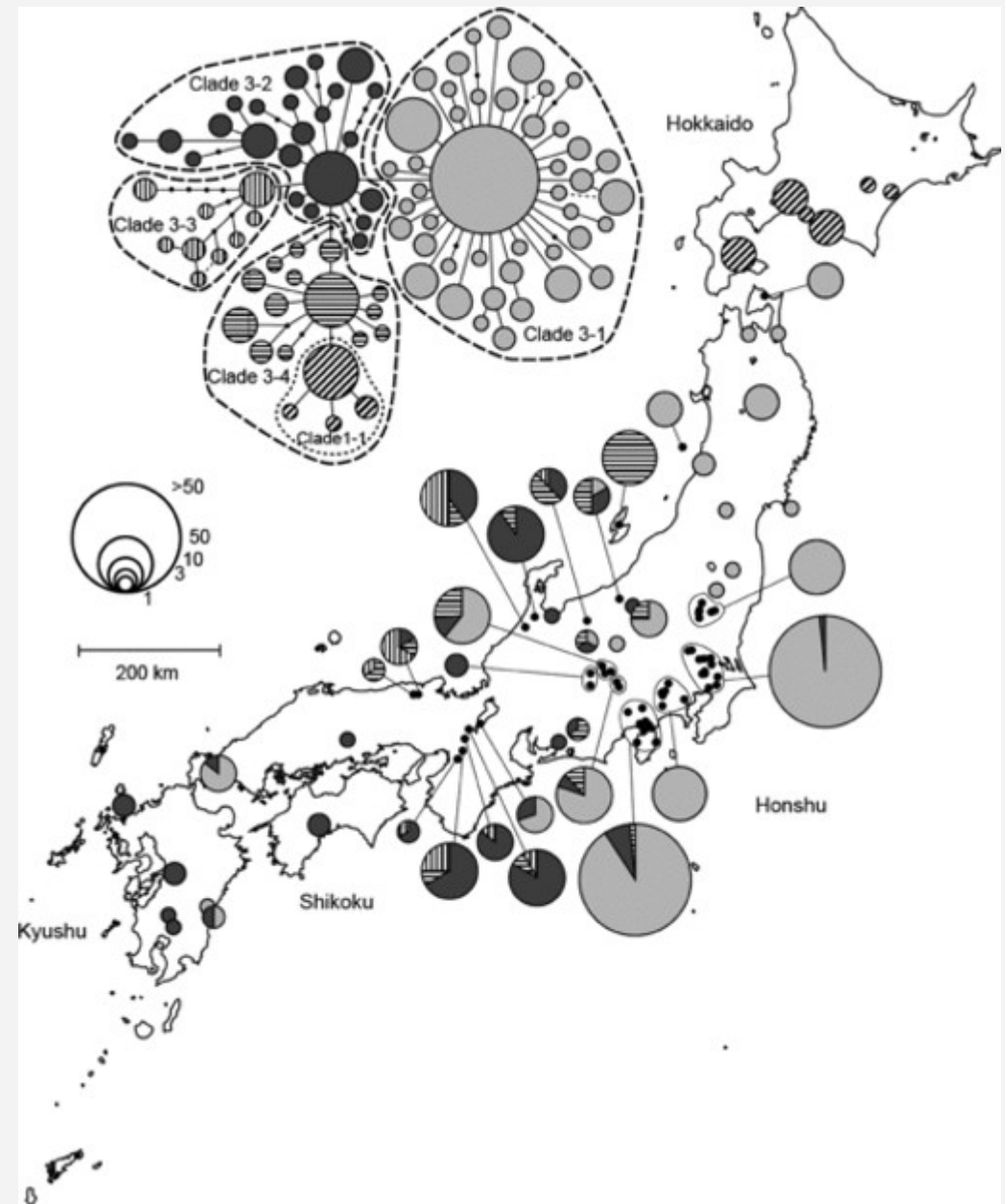
IVENS, ABF, et al. "Reproduction and dispersal in an ant-associated root aphid community." *Molecular Ecology* (2012).



Wielstra, Ben, and Jan Arntzen. "Postglacial species displacement in *Triturus* newts deduced from asymmetrically introgressed mitochondrial DNA and ecological niche models." *BMC Evolutionary Biology* 12.1 (2012): 161.

# Future directions

- Visualising the set of possible minimum spanning trees?
- Incorporating geographic data?
- Web app (server-side graph balancing)?



### 3. Working in a large cross-disciplinary project





LIVING WITH ROBOTS  
AND INTERACTIVE COMPANIONS

LIREC aims to establish a multi-faceted theory of **artificial long-term companions** ... robots, synthetic characters, interactive and sociable technology

- Modelling of relationships and emotional state
- Expressive embodiments
- Emotional recognition
- Long term user studies



## Partner organisations

### Universities:

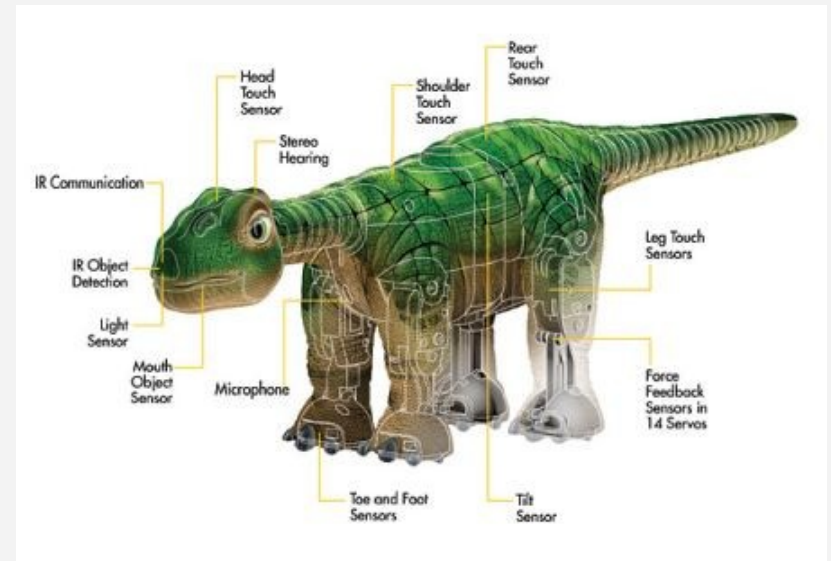
Queen Mary University London (UK)  
The University of Hertfordshire (UK)  
Heriot-Watt University (UK)  
Otto-Friedrich – Universität Bamberg (Germany)  
Eötvös Loránd University (Hungary)  
Wroclaw University of Technology (Poland)

### Research institutes:

Swedish Institute of Computer Science (Sweden)  
INESC-ID - Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento (Portugal)

### Companies:

FoAM (Belgium)  
Cnotinfor Ltd (Portugal)





RTL  
NNE KLUB  
TERED

12

**Dog Ethology**

**Eötvös Loránd University  
Budapest**





# Outlook appearance

friendliness,  
attractiveness:  
light-coloured, soft,  
long hair, floppy  
ears



**Friendly**  
English setter  
Cocker spaniel  
St Bernard



**Attractive**  
English setter  
Cocker spaniel  
Dobermann



**Good-natured**  
English setter  
St Bernard  
Dackel



**Appealing**  
English setter  
Cocker spaniel  
Weimaren



**Intelligent**  
Weimaren  
English setter  
Basset hound



**Imposing**  
Dobermann  
Schnauzer  
Caucasian



**Determined**  
Dobermann  
Schnauzer  
Cocker spaniel



**Strong-backed**  
Dobermann  
Caucasian  
Schnauzer



**Energetic**  
Dobermann  
Foxterrier  
Schnauzer



**Dependable**  
Weimaren  
Caucasian  
Bloodhound



**Self-contented**  
Schnauzer  
Dobermann  
English setter



**Sensitive**  
Basset hound  
Weimaren  
Bloodhound



**Dutiful**  
St Bernard  
Pincher  
Basset hound



**Extraordinary**  
Mops  
Shih-tzu  
Poodle



**Cheerful**  
Foxterrier  
Shih-tzu  
Poodle

Welcome, **Guest**. Please login or register.  
Did you miss your activation email?

Login with username, password and session length

**Shout Box**  
Commands History UseSound  
Yesterday at 03:42:39 PM – **RedwoodsMama**: Hi Kat, sent you 4 Photo emails, did u get them?

Yesterday at 04:11:41 PM – **RedwoodsMama**: Kat did u get the email photos I sent?

Yesterday at 04:12:13 PM – **RedwoodsMama**: Hello from the Redwoods, Sunny and nice 2day.

Yesterday at 04:29:42 PM – **Talon**: Evening everyone! At least it's evening here.

Yesterday at 04:34:55 PM – **kat**: Hi RWM got your emails ☺

Yesterday at 06:46:13 PM – **Talon**: Nearly nine o'clock here. Off to bed.

News:  
RedWoodsMama's new battery store is open in the Weedovia Mall! Nova's

Necessities

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[\\*](#)
[The Bob Project](#)
[Comics](#)

**7-Axis Humanoid Robot Arm** With graphical software for tasking from a PC. Starting under \$4K. [www](#)

**Parallax robotic kits** Programmable robots, sensors accessories and robotic softwares [www.generationro](#)

**Automation Technology** Vision Systems, Robotics, Motion Control, Machine Design & Build [www.auton](#)

# Bob the Pleo Forums

General Stuff			
	<b>Info, FAQs, and Forum Tips</b> General information and how-to's and for people to learn about these forums.	214 Posts 24 Topics	<b>Last post by</b> Crewella in Re: New Pleo owners FAQ ... on February 19, 2011, 07:57:49 AM
	<b>Related Boards:</b> Forum Help and Tips		
Pleo Stuff			
	<b>Pleo News</b> News and information about Pleo, its maker, and distributors.	1107 Posts 27 Topics	<b>Last post by</b> OzPleo in Re: Your opinions/sugges... on February 19, 2011, 12:59:40 PM
	<b>Pleo Problems</b> Is your Pleo having a problem? Then here's the place to tell us about it!	644 Posts 43 Topics	<b>Last post by</b> b52 in Re: Pleo RB walking issu... on February 18, 2011, 09:17:59 PM
	<b>Pleo Hardware</b> Discussions about the physical side of pleo. Skin, batteries, neck & tail, etc.	798 Posts 52 Topics	<b>Last post by</b> Malfie in Re: Scary Episode – Neck... on February 19, 2011, 06:37:21 PM
	<b>Pleo Software</b> Programming, applications, and OS. Skits and Personalities.	1075 Posts 65 Topics	<b>Last post by</b> Crewella in Re: statsRB - tool for d... on February 19, 2011, 12:04:44 PM
	<b>Related Boards:</b> PDK, Programming, and code, Software downloads & tutorials		
	<b>Pleo Behaviours</b> Discussions about how pleo operates and behaves. His actions, tricks, personality, evolving.	476 Posts 44 Topics	<b>Last post by</b> Crewella in Re: are some pleos harde... on Today at 12:58:48 AM
	<b>Pleo Experiences</b> All about life with our pleos. A place to share our experiences with our pleos.	2902 Posts 86 Topics	<b>Last post by</b> saratogaspringer in Re: Kermit my Pink Pleo ... on Yesterday at 05:00:56 PM
	<b>Related Boards:</b> Crafter's Corner		
	<b>Bob the Pleo</b> All things related to the Bob the Pleo comic strip	1312 Posts 14 Topics	<b>Last post by</b> Crewella in Re: 2011 calendar: event... on February 04, 2011, 02:01:52 AM
	<b>Pleo Cafe</b> Feel free to talk about anything and everything in this board.	1208 Posts 48 Topics	<b>Last post by</b> Crewella in Re: damaged pleo anyuse ... on Today at 12:49:58 AM
	<b>Pleo Archives</b> Where all the old topics go once dead. If you wish to revive one, please notify the admin! Moderators: Sally, Crewella	13574 Posts 974 Topics	<b>Last post by</b> Crewella in Re: PLEO RB for Sale on January 14, 2011, 02:44:58 PM
	<b>Related Boards:</b> Archive – Technical, Archive – General, Archive – Welcome, Archive – Non-pleo		

**Forum Stats**

26748 Posts in 1560 Topics by 725 Members. Latest Member: LaviniaGillian22  
 Latest Post: "Re: are some pleos harde..." ( Today at 12:58:48 AM )  
 View the most recent posts on the forum.  
[\[More Stats\]](#)

**Users Online**

62 Guests, 7 Users  
 Users active in past 60 minutes:  
 PWOKristy, Pleo Power, Crewella, 49er, cowpatches, InmemoryofRomeo, degers  
 No user is in chat.

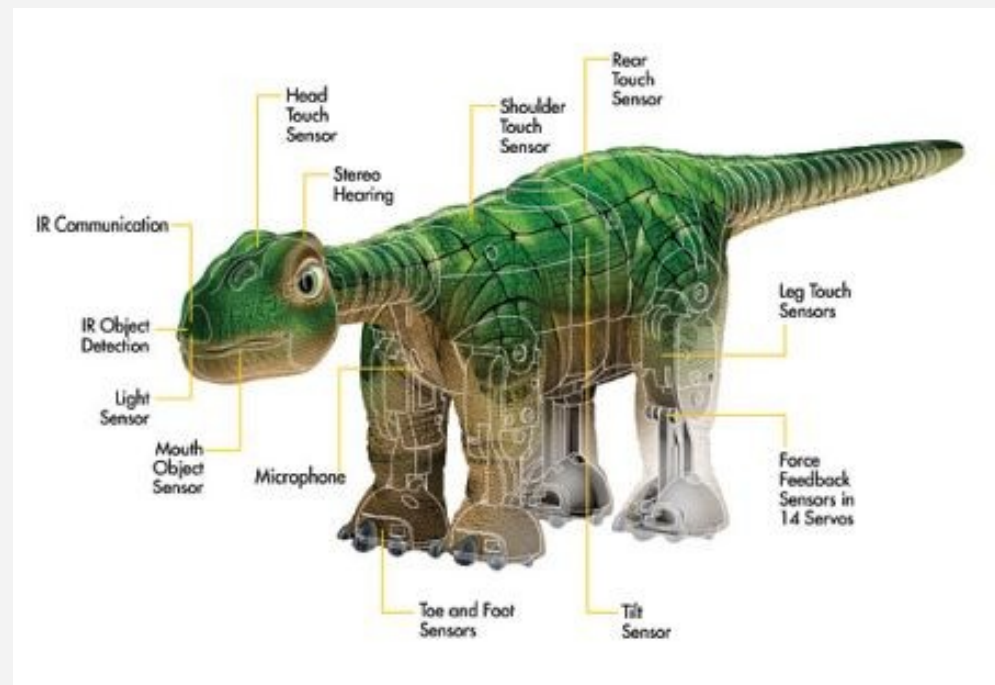
Most Online Today: 72. Most Online Ever: 241 (June 16, 2009, 04:37:13 PM)

**Login** (Forgot your password?)

# Swedish Institute of Computer Science (SICS):

## “Play, Belief and Stories about Robots: A Case Study of a Pleo Blogging Community”

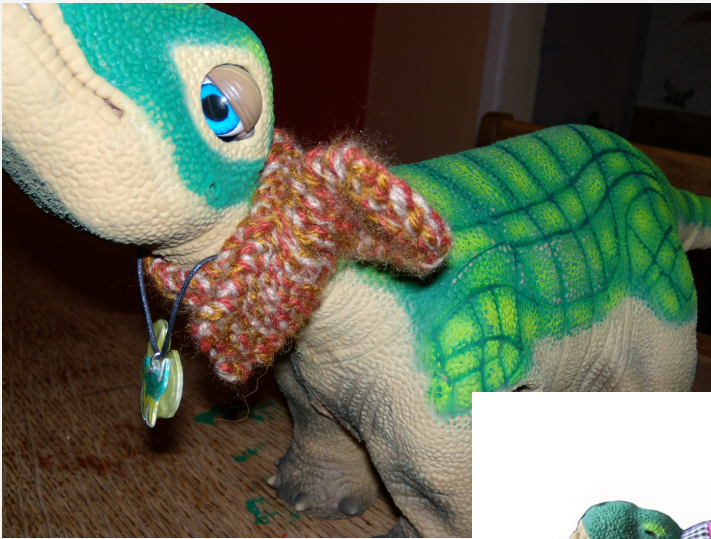
Proceedings of the International Symposium on Robot and Human Interactive Communication (Ro-Man 2009)





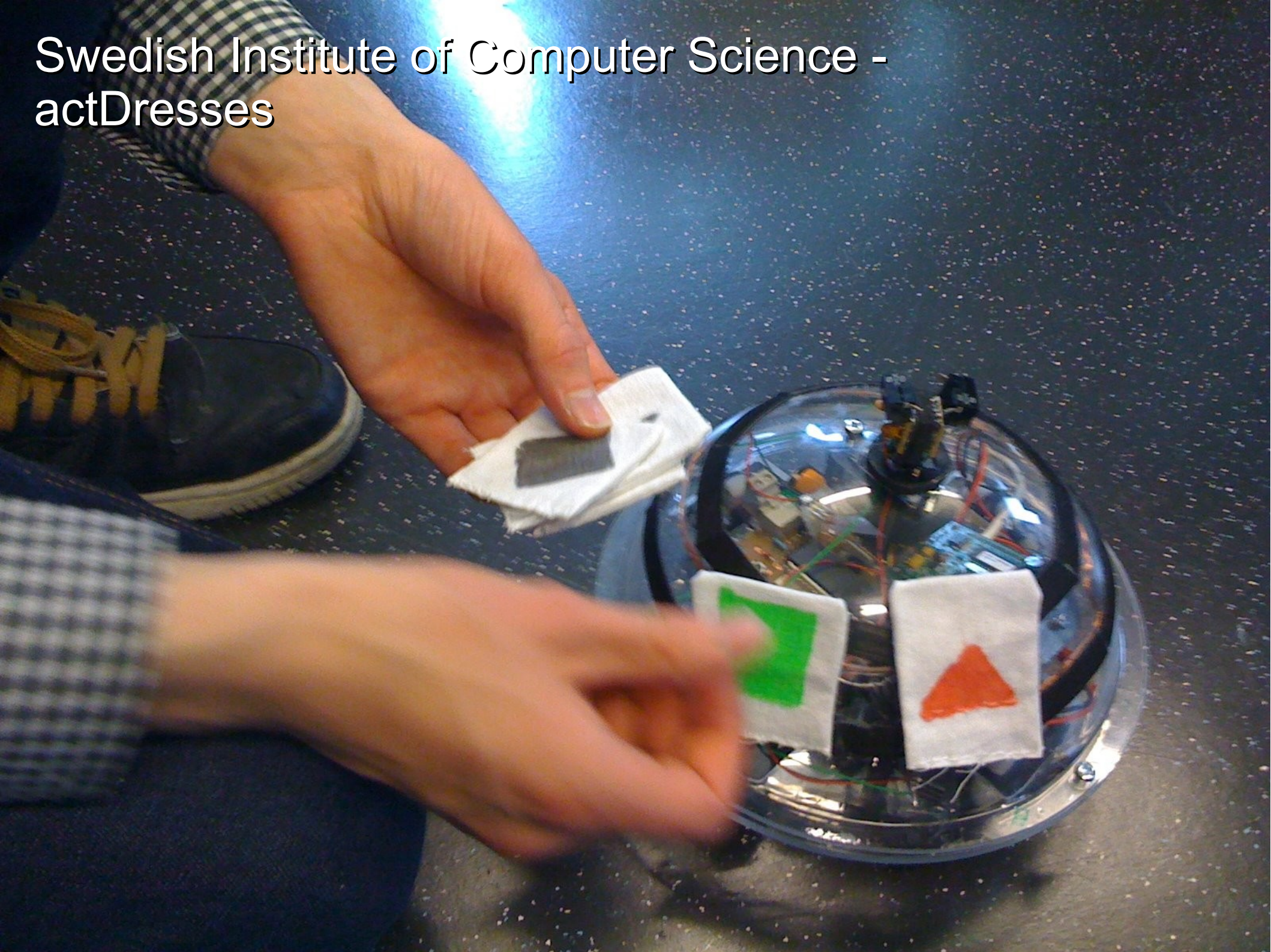
“Today, I am beading a crystal necklace for Pleo, and adding a fossil charm! His crocheted wardrobe will consist of a “floppy hat”, walking boots, cape and of course, sunglasses, for our walks and sidewalk surf days!

He will be styling!”





# Swedish Institute of Computer Science - actDresses



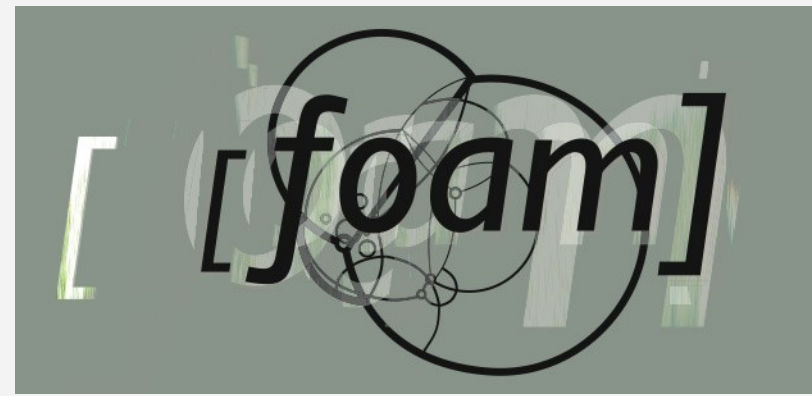












As an SME partner – FoAM's roles:

- Provide exposure of research to the public
- Demonstrate commercial relevance
- Some extra software engineering experience
- Our own research

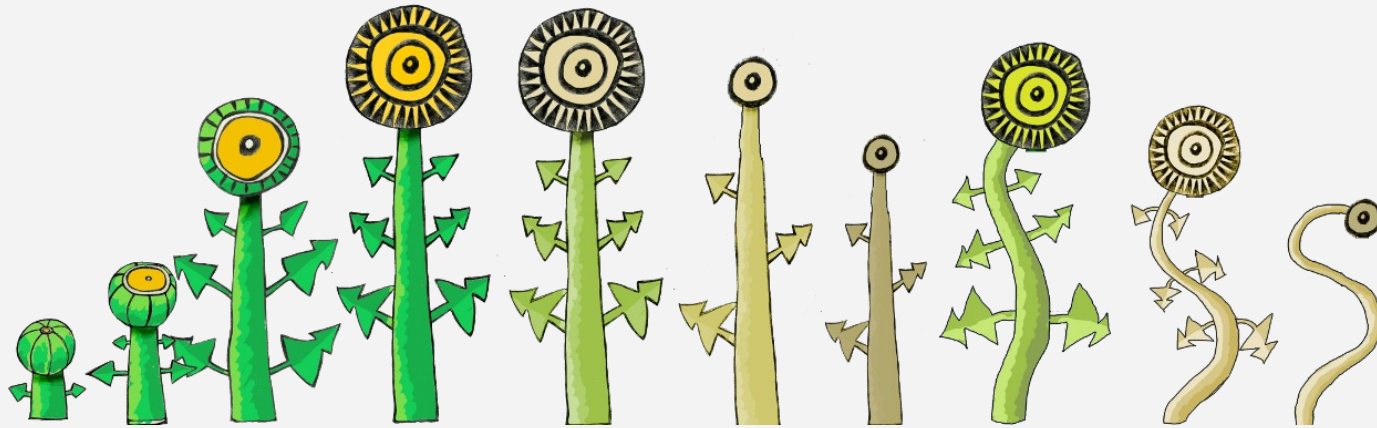
+ Add Coins & Cash

6

Calf







## **Germination X**

An online social game about permaculture  
(Farmville + Alternative agriculture)





I'm happy spanner's clover plant is providing my plants with nutrients



spanner's clover plant has just germinated!



spanner's clover plant has just germinated!



spanner's clover plant has died.



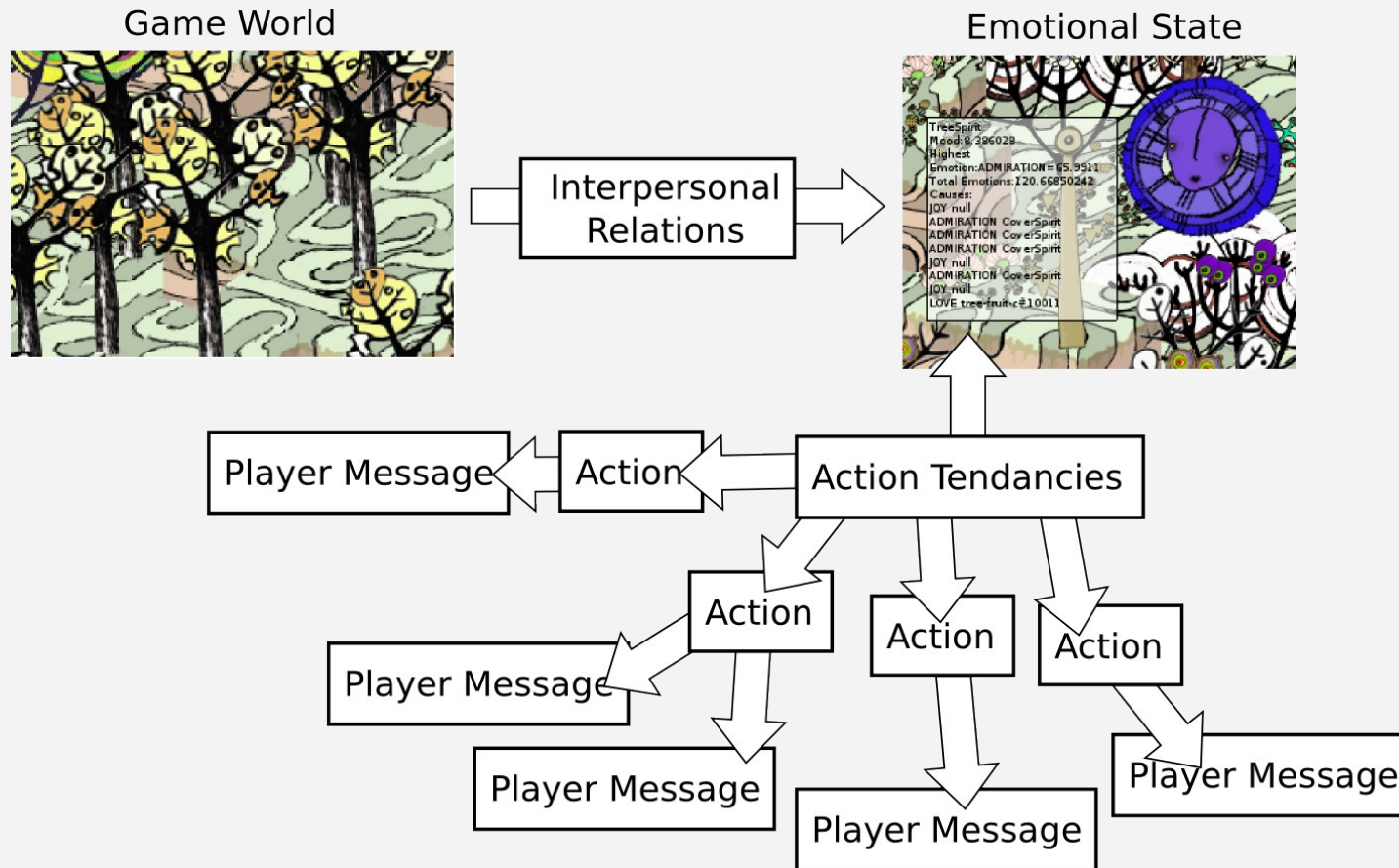
spanner, your clover plant needs a cherry plant nearby for protection.



spanner, your clover plant needs a cherry plant nearby for protection.



# Multi-agent social modelling AI (FATIMA)



- Tech demonstration in a different, new context
- Public access (in web browser)



# Plant Spirits

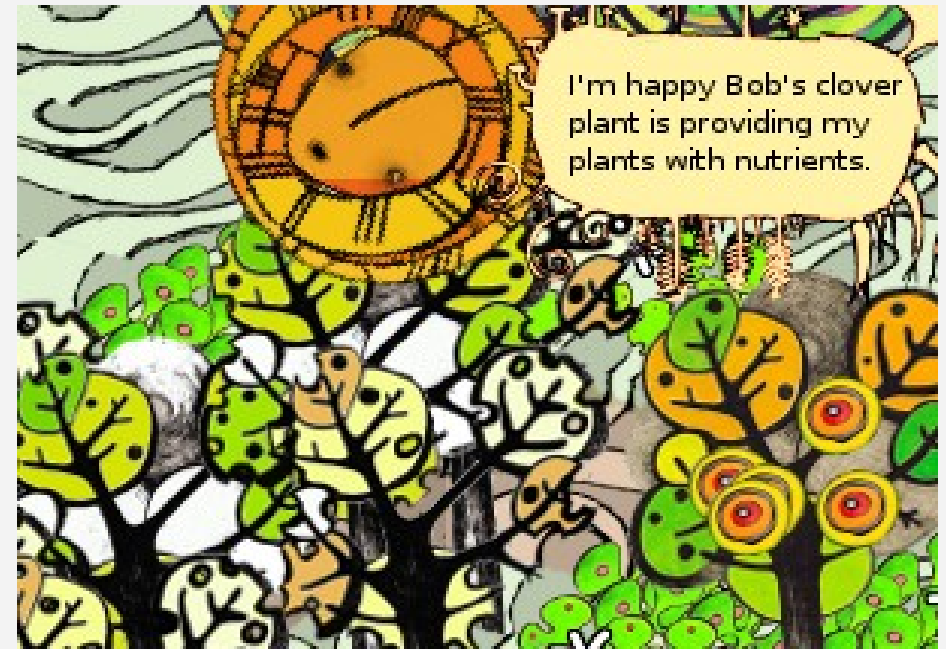


Tell you what's wrong with your plants



Ask other players to help you



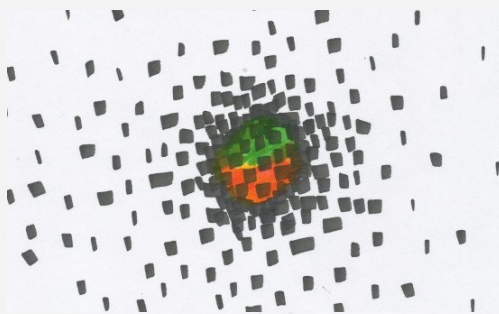
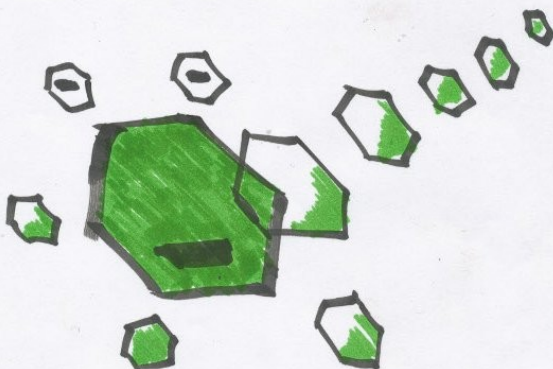


Praise and thank players appropriately

# Pixelache Helsinki









Not just dissemination and arts - feeding back  
into Human Computer Interaction research

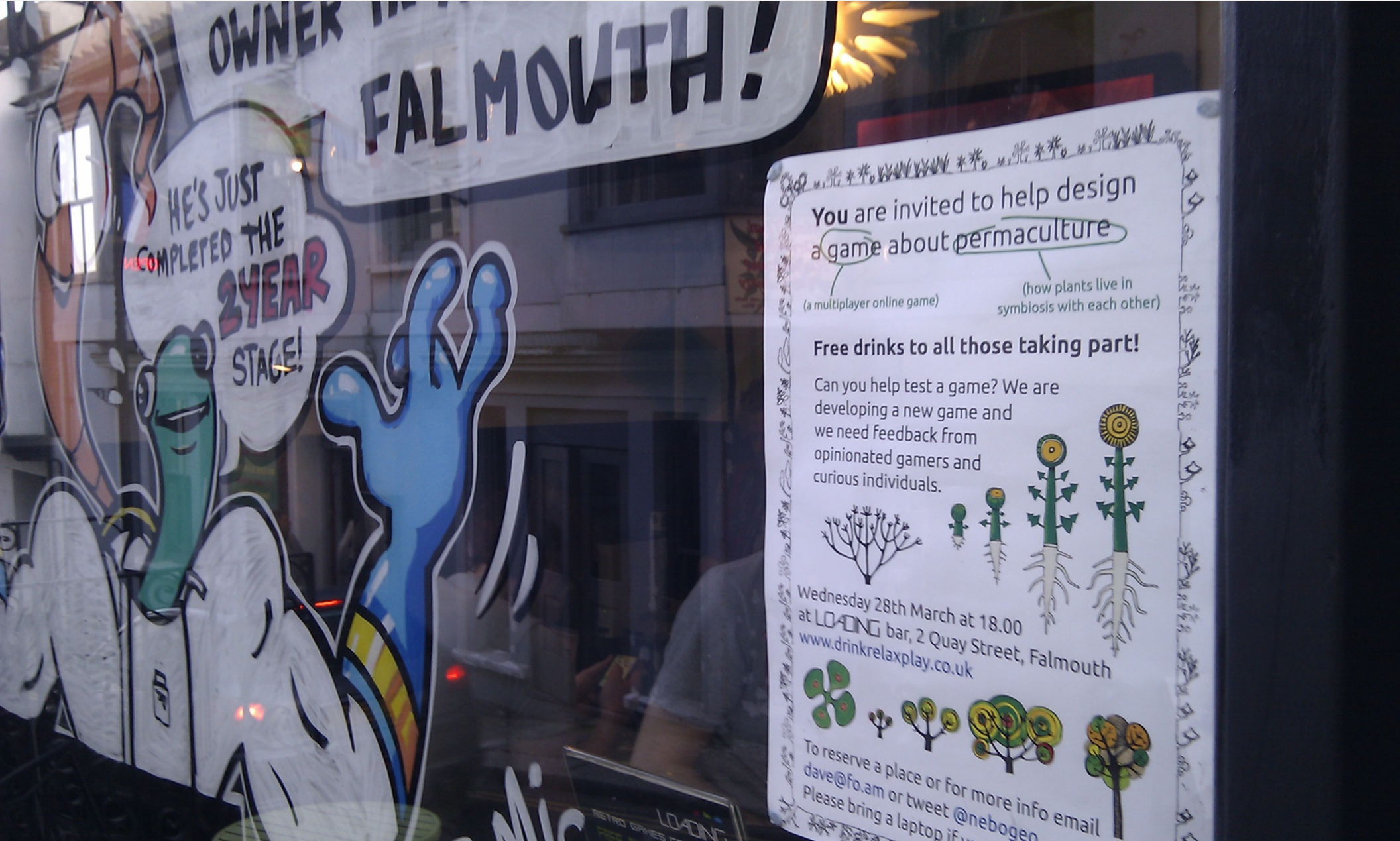
SICS

Mobil@IT



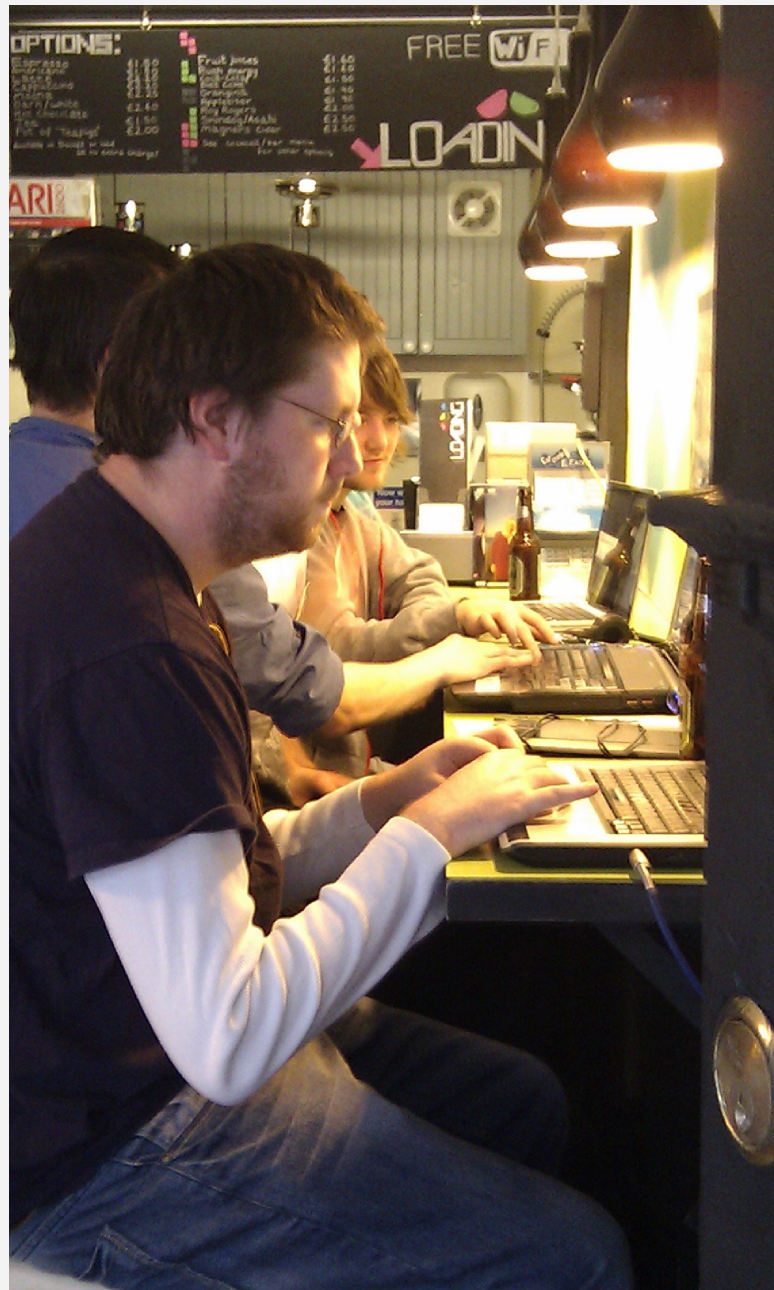
Studying interactions in a rich online environment  
User centred design/participatory design





Public focus studies





# User centred design methodology

What is your role in the game world?

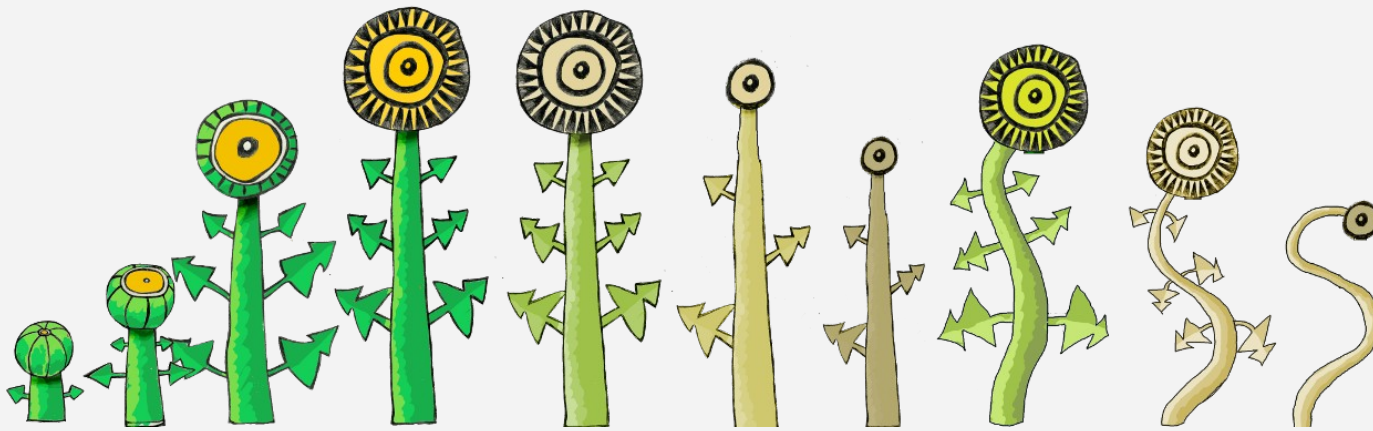
What were your aims?

Do you own the plants you've sown?

What is the role of the AI characters?

Did anyone help you?

Did you help anyone?







ent  
g  
Belongs  
trees  
grass  
spirit  
mudrow

PETER WOJNYLUK

## The Game World

to plant/nurture  
botanical plants  
in order to support  
the landscape / other  
players plant

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

The only time I  
noticed other people  
was  
A clear view of the  
edge  
8 days I did not  
know how to help them

• Two seeds  
- two seeds  
- they are  
- more than  
- change

Other players  
werent very  
obvious. No idea  
where they were

• I tried to  
help them but  
they were  
not in the  
game

• I tried to  
help them but  
they were  
not in the  
game

• I tried to  
help them but  
they were  
not in the  
game

• I tried to  
help them but  
they were  
not in the  
game

• I tried to  
help them but  
they were  
not in the  
game

Are they different  
another? If so, why?

Did they pay?

## The Plant Spirits

PLANT SPIRITS  
TELL ME  
TO ME

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

## Ownership

• I did not realize  
they were spirit of  
plants - more subtle  
More subtle help  
So only suggest  
things I could do

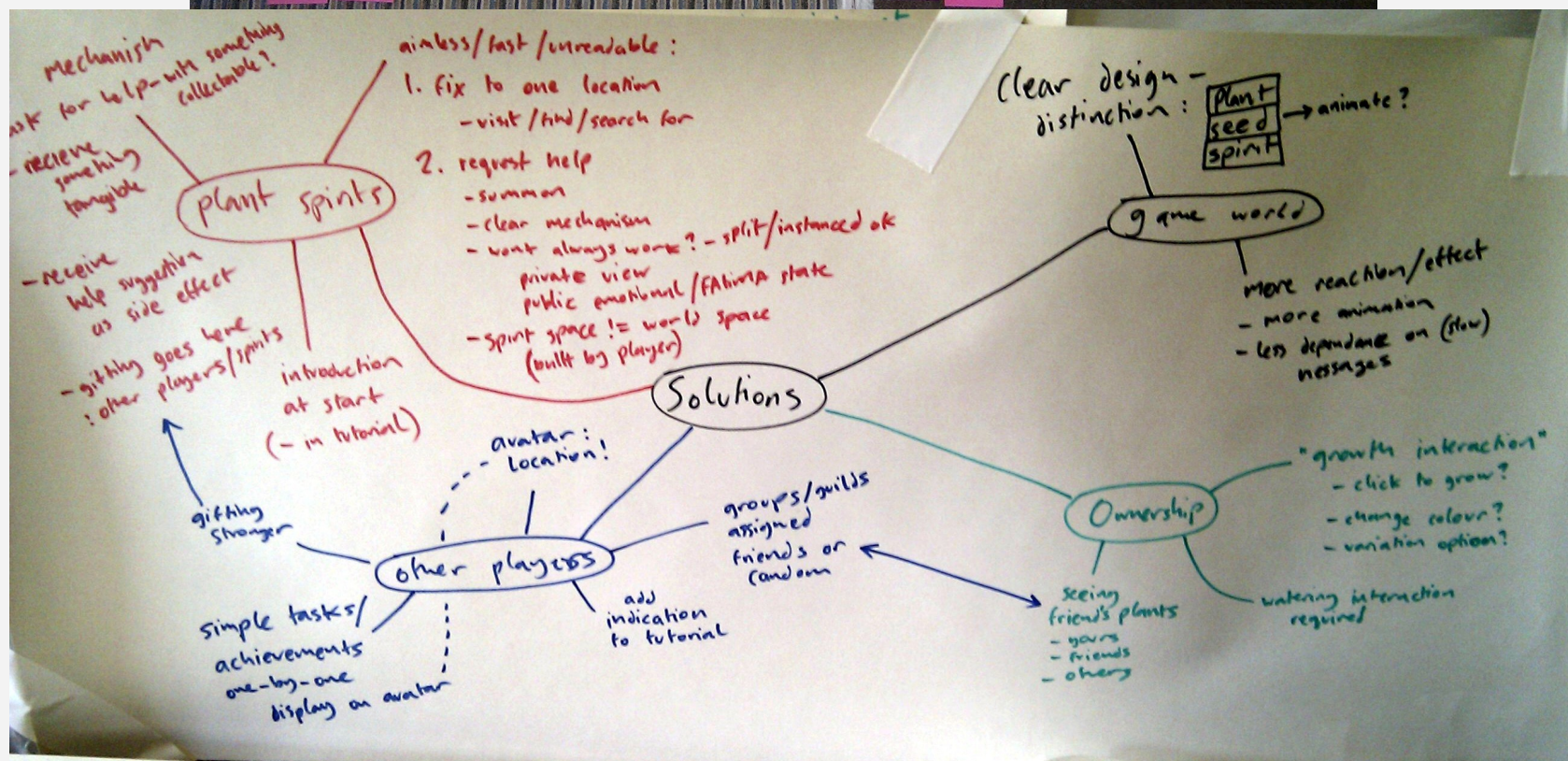
• I did not realize  
they were spirit of  
plants - more subtle  
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# Outcomes

- SICS
  - Long term interactions in “always on” situation
  - Studies of user centred design in game development context
- FoAM
  - Working knowledge of user centred design methodology
  - Commercial impacts



# Some observations of cross-disciplinarity

Other peoples problems are generally more interesting than your own

Sometimes we can't see problems because we are too close to our own work

It has to be a two way transaction – 'everyone comes away with their own balloon'





Questions?

& contact info:

[dave@fo.am](mailto:dave@fo.am)

[@nebogeo](#)

<http://www.pawfal.org/dave/blog>

<http://fo.am>