WELCOME !!!

Intro meetings

Communications : email, web, p/h

Facilities

Courses for Autumn term
University Reorganisation

- EASy is the Evolutionary and Adaptive Systems group
- It is based in the (new) School of Informatics ..... that used to be the Dept of Informatics, and used to be COGS (School of Cognitive and Computing Sciences) …
- Our Research centre is the CCNR – Centre for Computational Neuroscience and Robotics – that is joint between Informatics (EASy) and Life Sciences (Sussex Centre for Neuroscience)
- For admin purposes, you are in the School of Informatics …
- But we are very interdisciplinary
People

Inman Harvey (EASy Course Convenor - Autumn)
inmanh@susx.ac.uk
inmanh@gmail.com
Office: room 4C06 in PEVENSEY 3 Building
Office hours: Mon 12:30-13:30 and Tue 12:30-13:30
or make appointment or grab in corridor

Phil Husbands (EASy Convenor after Autumn term)
philh@susx.ac.uk

Postgrad admin: via Informatics School Office
Emails

- **Oldstyle:** firstname + surname-initial @cogs.susx.ac.uk  
eg inmanh@cogs.susx.ac.uk
- **Now also works without the cogs bit:** inmanh@susx.ac.uk
- **Newstyle:** initials + 2 numbers, John Smith could be js47@susx.ac.uk  
  (NB @sussex and @susx both OK)
- **Also other aliases**
  - informatics_easymsc@susx.ac.uk
  - informatics_alergic_list@susx.ac.uk
Importance of reading your email!

Most things are dealt with online!

So we assume that you will keep in touch via email.

Wifi on campus, remote login from outside.
Facilities

NEW EASy MSc Lab ARUN-222 – specifically EASy (ready ASAP…)
24 hour access -- keycodes (1) to get in bldg (2) for EASy Lab
Computing facilities – including EASy cluster
Helpline,
Limitations on shared computing resources
Other computing resources: Univ/home
(check: any computing novices ?)
The Purpose of the EASy course

This is a **crucially** important area of study and research right now!

Opportunity for pioneering research work -- this is a **research-led** environment.

All your lecturers are active researchers, and you can do genuine research within **this** year

--- cf previous MSc conference papers, project spinoffs etc.
Constraints

To some extent this is a teaching environment, but to a greater extent it is a supportive research environment

✓ you are here to teach yourselves
✓ you will get out only as much as you put in
✓ we assume that you are keen!

✓ (For Overseas students: “Study Skills Support” workshops – do you need it ????) …
Lack of Constraints

- Question what you read/are taught -- Argue!
- Propose changes in the syllabus
- Set up discussion groups, workshops, web-sites
- Invite outside speakers
- ... some funding available ...
- Build Robots
- ... ... ...
Resources

People:
✓ Your colleagues on the course
✓ Lecturers
✓ Research students and Research Fellows

Groups:
✓ CCNR
✓ CSE
✓ Other groups in Informatics, Life Sciences and elsewhere (Dead Sciences, Life Sciences)
Talks

Talks/Discussion groups:
✓ Alergic (Artificial LifE Reading Group in Cogs)
✓ Alergic wiki on: http://alergic.pbworks.com/
✓ Mind and Life – blog on: http://lifeandmind.wordpress.com/
✓ CSE (Centre for the Study of Evolution)
✓ ... ...

✓ Voluntary Lectures

✓ Evolutionary Lectures in BIOLS etc ...
Reading

- Life Sciences library,
- Physics library
- Informatics library
- Papers on the web (Google Scholar, citeseer)
- Many available from people in the School.
- Main Library
# Timetable – Autumn Term

<table>
<thead>
<tr>
<th>Mon 4/10</th>
<th>Tue 5/10</th>
<th>Wed 8/10</th>
<th>Thu 7/10</th>
<th>Fri 8/10</th>
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<tbody>
<tr>
<td>09:00 - 10:00</td>
<td>OOP Lec, PEV1-1A7</td>
<td>09:00 - 10:00</td>
<td>Alife Lec 2, PEV1-2A12</td>
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<tr>
<td>10:00 - 11:00</td>
<td>ALife Lec 1, Fulton-103</td>
<td>10:00 - 11:00</td>
<td>IAM Lec 1 – SHAW-AS2</td>
<td>16:00 - 17:00</td>
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<tr>
<td>11:00 - 13:00</td>
<td>OOP Sem-1, CHI1-204/205</td>
<td>11:00 - 12:00</td>
<td>Alife seminar S1, FUL-102</td>
<td>11:00 - 12:00</td>
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<tr>
<td>12:30 - 13:30</td>
<td>Office hour</td>
<td>12:30 - 13:30</td>
<td>Office hour</td>
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<tr>
<td>14:00 - 15:00</td>
<td>IAM p/g seminar S1, ARUN-211</td>
<td>14:00 - 16:00</td>
<td>AcadDev-3, ARUN-211</td>
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<tr>
<td>15:00 - 16:00</td>
<td>Maths &amp; CMCS Lec1, PEV1-IA2</td>
<td>15:00 - 16:00</td>
<td>Maths &amp; CMCS Lec2, PEV1-IA2</td>
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<tr>
<td>16:00 - 18:00</td>
<td>AcadDev-1, ARUN-404</td>
<td>16:00 - 18:00</td>
<td>AcadDev-2, ARUN-404</td>
<td>16:00 - 18:00</td>
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<tr>
<td>16:00 - 18:00</td>
<td>AcadDev-4, ARUN-211</td>
<td>16:00 - 18:00</td>
<td>AcadDev-5, ARUN-404</td>
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<tr>
<td>16:00 - 18:00</td>
<td>IAM u/g workshop, PEV1-1B2</td>
<td>16:00 - 18:00</td>
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</table>
Intelligence in Animals and Machines

(Was called ‘Animal and Machine Intelligence AMI’)

A course for EASy (+ some other) MSc plus some 3rd yr CSAI/BIOLS undergrads

Organised by Paul Graham, Life Sciences

With IH handling P/G seminars
IAM - lectures

2 Lectures per week  - check timetable
Tue 10:00 in SHAW-AS2
Fri 10:00 in PEV1-1A6
(Expected to start Monday week 1 -- check)

+ seminars, smaller MSc groups (1?) organised by Inman Harvey
Mon 14:00 ARUN-211,
[if a 2nd seminar group, they will be Thu 10:00 ARUN-211]

Lectures given by Biologists and myself,

Assessment: Term Paper = essay of 3500 words
AMI – what is it?

Looking at the multiple, specialised intelligences (plural) of animals,

considering the use of robot and computer modelling as experimental tools.
AMI topics

- Thinking about, Designing, Intelligent Behaviour
- Navigation in Insects
- Defining places by Landmarks
- Path planning by Spiders and Frogs
- Memory: procedural, contextual, episodic
- Motion detection in Flies
- Neural pathways, Behaviour and Algorithms
AMI – more topics

✓ Artificial Neural Nets
✓ Visual object recognition
✓ Social organisation of Honeybee foraging
✓ Culture and imitation
✓ Big brains, social intelligence and the Theory of Mind
Evolutionary and Adaptive Systems MSc
plus option for other MScs

Objectives:

✓ A broad background in Artificial Life literature
✓ Experience in designing / implementing an Artificial Life system
2 Lectures per week (Inman Harvey)
Mon 10:00 in Fulton-103 and
Tue 09:00 in PEV1-2A12
plus seminars (…depends on numbers..)
Tue 11:00 FUL-102
[... if a 2\textsuperscript{nd} seminar, Thu 11:00 FUL-207]

Week 1 –
Mon not proper lec but I shall chat to any people that turn up
Tue 09:00 first proper Lecture, and
Tue 11:00 everyone come to this first Seminar group

Assessment by a mini project/dissertation:
✓ Programming project on an (agreed) Alife topic of your choice
✓ With a 3500 word write-up on it
What is Artificial Life? (1)

God as a kid tries to make a chicken in his room.

Gary Larson
What is Artificial Life? (2)

✓ The study of life-as-it-could-be rather than just life-as-we-know-it.
✓ The synthesis of 'lifelike' behaviours for
  (a) better understanding of real life
  (b) improved technical / engineering purposes
Alife topics will include ...

- Cellular Automata - 'Game of Life', edge of chaos
- Autocatalytic sets - origin of life
- Search spaces - Genetic Algorithms
- Game theory - Iterated Prisoner's Dilemma
- Evolution of communication
- Gaia theory - the Earth as an organism?
More Alife topics

- Digital organisms - Tierra and Avida
- Developmental models - morphogenesis
- Evolutionary Robotics
- Evolvable Hardware
- Evolutionary dynamics - Neutral Networks
- ....
- ....
- ....
The Alife course also includes sessions building robots
Everybody gets some hands-on experience
Some may choose to take further with projects
… able to keep, and work on, robots in the EASy MSc lab
Lectures Mon 15:00 and Tue 15:00, PEV1-1A2
Seminar sessions by arrangement (tbc)
Andy Philippides  andrewop@sussex

Foundation in mathematic/scientific computing
“Brush up your Maths”
techniques relevant to course. Intended both for
✓ the mathematically naive (intro) and
✓ those with some experience (advanced)
Check – how many sessions, part-timers?
“Brush up your programming skills”

Natasha Beloff adrianth@sussex

1 lecture per week Mon 09:00  PEV1-1A7,

+ Lab classes of 2hrs, split into different groups on Mon 11:00, Wed 11:00,

Assessment through Programming project
Mini-course: Academic Development

This is a new mini-course with a fast option – that is compulsory this year. Basic issues of Academic Standards and Plagiarism awareness.

All Informatics MScs need to attend & pass this otherwise they will be disbarred from the possibility of Merit or Distinction with their MSc.

It may be useful for some of you, superfluous for others – so there is a fast option.
Pick one 2-hour session per week:

Mon 16:00 OR Tue 16:00 OR Thu 16:00 in ARUN-404
OR Wed 14:00 OR 16:00 in ARUN-211

But (last year’s version…) if you pass a test after Week 2 you can complete the course and take no more !!!!!!!
EASY MSc in the New Year

- Spring term: 2 compulsory
  - Neural Networks
  - Adaptive systems

  plus 2 options chosen from available courses

- Summer, from May till end of August:
  - main MSc project and dissertation
Flexibility -- other course options.

Note: some options not available in any year, some new ones become available

http://www.sussex.ac.uk/informatics/prospectivestudents/masterdegrees/programmes/2010/G8501T
<table>
<thead>
<tr>
<th>Year Term</th>
<th>Status</th>
<th>Course</th>
<th>Level</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 AUTUMN</td>
<td>Core course</td>
<td>Academic Development (Informatics) (938G5)</td>
<td>M</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
<td>Artificial Life (819G5)</td>
<td>M</td>
<td>15</td>
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<tr>
<td></td>
<td></td>
<td>Intelligence in Animals and Machines (826G5)</td>
<td>M</td>
<td>15</td>
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<td></td>
<td>Mathematics and Computational Methods for Complex Systems (817G5)</td>
<td>M</td>
<td>15</td>
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<tr>
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<td></td>
<td>Object Oriented Programming (823G5)</td>
<td>M</td>
<td>15</td>
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</tbody>
</table>

Students who can demonstrate high standards of relevant programming competence may substitute one of the Autumn options (Models of Creativity, Machine Learning or Digital Image Processing & Analysis) for Object Oriented Programming, subject to the permission of the programme convenor.

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>Digital Image Processing and Analysis (827G5)</td>
<td>M</td>
<td>15</td>
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<tr>
<td>Machine Learning (934G5)</td>
<td>M</td>
<td>15</td>
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<tr>
<td>SPRING</td>
<td>Core course</td>
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<tr>
<td>2 of these options</td>
<td><strong>Sensory and Motor Functions of the Nervous System (C8835)</strong> 3 15</td>
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<td><strong>Computational Neuroscience (820G5)</strong> M 15</td>
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<td></td>
<td><strong>Generative Creativity (940G5)</strong> M 15</td>
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<td><strong>Neuroscience of Consciousness (993C8)</strong> M 15</td>
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<td><strong>Sensory Systems and Receptors (514C2)</strong> M 30</td>
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**Core course**

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<th>Core course</th>
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<tbody>
<tr>
<td><strong>Adaptive Systems (825G5)</strong> M 15</td>
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<tr>
<td><strong>Neural Networks (807G5)</strong> M 15</td>
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</tbody>
</table>

Students who can demonstrate relevant expertise in Neural Networks (e.g. by having passed a similar course to a high standard) may substitute another of the Spring options (Generative Creativity), subject to the permission of the programming convenor.

**SUMMER Core course**

<table>
<thead>
<tr>
<th>Core course</th>
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<tbody>
<tr>
<td><strong>Generative Creativity (940G5)</strong> M 15</td>
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**Dissertation (MSc EASY)** 60
Part-timers

Split the same courses over 2 years
First term: just the “brush up maths/programming” courses
Come and see me afterwards about any timetabling problems.

N.B.: If people have good reasons, we try to be flexible about changing full/part-time, even intermitting if necessary.
Summary

- It’s hard work during the terms.
- No real vacations – assessments handed in next term
- Biggest break is Easter vacation, then you have to get into gear for your major project.
- This is an elite course
- Opportunity to do real publishable research during year
- We expect at least 50% of you to be qualified to do doctoral research or equivalent
- It’s hell as far as work load goes – but we hope you enjoy it!
For everyone’s benefit, I would like to put up a EASy-MSc-pic-page on

http://www.informatics.susx.ac.uk/users/inmanh/easy/easy.html

(Data Protection Issues: if you don’t want your face/email put up this way, tell me – email addresses will not be harvestable by spam-robots)

That same page should give links to your relevant courses etc. Also to my FAQ page – please check this out.
Questions?

- Any Questions ??
- Move to EASy MSc Lab