13\textsuperscript{th} European conference on Artificial Life

(ECAL 2015)

20–24 July 2015, York, UK
Prof Susan Stepney – General Chair
Prof Jon Timmis – Programme Chair
Dr Paul Andrews – Local Chair
Dr Fiona Polack – Tutorial Chair
Dr Simon Hickinbotham – Workshop Chair
Dr Leo Caves – Special Sessions Chair
Dr Rene Doursat – Education Chair
Dr Tim Taylor – Technical Chair
Mr Bob French – Local Support
Mrs Sarah Christmas – Local Support
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>9:00</td>
<td>registration</td>
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<tr>
<td>10:00</td>
<td>ISAL summer school (start 9:30)</td>
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<td>workshop: ITiALife</td>
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<td>tutorial: JIDT (start 13:30)</td>
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<td>9:00</td>
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<td>Game Theory and Networks</td>
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<td>17:30</td>
<td>poster video session</td>
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<td>18:00</td>
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<tr>
<td>9:00</td>
<td>artist: Andy Lomas</td>
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<td>10:00</td>
<td>Computational Biology, Programming ALife, Behavioural and Evo Robotics 1</td>
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<td>11:20</td>
<td>Evolutionary Dynamics 3, Agent Strategies, Communication and Language</td>
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<td>conference trip: Castle Howard</td>
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### schedule: Thursday 23 July

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<tr>
<td>9:00</td>
<td>keynote: Justin Werfel</td>
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<td>Collective Behaviours Shape and Form</td>
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<td>Artificial Chemistries 1 Learning and Evolutionary Software Systems</td>
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<td>Social Networks 1 Artificial Chemistries 2 special session:</td>
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<td>Awards &amp; ISAL mtg</td>
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<tr>
<td>19:30</td>
<td>Conference dinner, Railway Museum</td>
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## Schedule: Friday 24 July

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<tr>
<td>09:00</td>
<td>RCH/037 Lecture theatre</td>
<td>keynote: Paulien Hogeweg</td>
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<td>10:00</td>
<td>RCH/248 Lakehouse 1</td>
<td>Agent Control</td>
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<td>RCH/250 Lakehouse 2</td>
<td>Ecosystems</td>
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<td>RCH/204 seminar room</td>
<td>Late breaking papers 2</td>
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<td>RCH/204 seminar room</td>
<td>Behavioural and Evolutionary Robotics 3</td>
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<td>RCH/204 seminar room</td>
<td>Agent and Robot Morphologies</td>
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<td>Late breaking papers 4</td>
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Monday 20 July

**RCH/037 Lecture theatre**  
ISAL Summer School

09:30  Welcome and introduction, Rene Doursat  
09:40  “Introduction to the Modeling and Analysis of Complex Systems” Hiroki Sayama  
11:30  “Autonomic Computing and Self-Adaptive Networks” Ada Diaconescu  
14:00  “Historical and Philosophical Perspectives on Artificial Life” Mark Bedau  
15:50  “Origins of Life and Protocells” Steen Rasmussen  
17:10  “Model Driven Engineering and Biomedical Simulations” Fiona Polack and Louis Rose

**RCH/248 Lakehouse 1**

10:00  ITiALife workshop  
14:00  PhyChip workshop

**RCH/250 Lakehouse 2**

10:00  SteerComplex/FoCAS workshop  
14:00  CoSMoS workshop

**RCH/017 Teaching Room**

10:00  ToProB workshop

**RCH/204 Seminar Room**

10:00  OEE #1 workshop  
14:00  EvoPhysSys workshop

**RCH/103 Teaching Room**

13:30  JIDT tutorial  
16:00  ICoNMAP tutorial
Tuesday 21 July

Tuesday 21 July 9:00

RCH/037 Lecture theatre
keynote: Rachel Armstrong: Design Thinking for Origins of Life studies

Tuesday 21 July 10:00

RCH/037 Lecture theatre
Network Theory (chair: Hiroki Sayama)
10:00 38 "Contagion on Networks with Self-Organised Community Structure" Alberto Antonioni, Seth Bullock, Christian Darabos, Mario Giacobini, Bryan Iotti, Jason Moore and Marco Tomassini
10:25 95 "Planarity as a driver of Spatial Network structure" Garvin Haslett and Markus Brede

RCH/248 Lakehouse 1
In Vitro Systems (chair: Yutetsu Kuruma)
10:00 28 "Ribosome synthesis and construction of a minimal cell using a cell-free expression platform" Filippo Caschera
10:25 45 "Embodied Evolution of Artificial Cells in a Hybrid Wet/Hard-ware Platform" Leroy Cronin and Juan Manuel Parrilla Gutierrez

RCH/017 Teaching Room
10:00 SynNatSys workshop

RCH/204 Seminar Room
10:00 Physarum Machines tutorial
Tuesday 21 July 11:20

**RCH/037 Lecture theatre**

**Evolutionary Dynamics 1** (chair: Olaf Witkowski)

11:20  52 "Evolving strategies for single-celled organisms in multi-nutrient environments" Dominique Chu and David Barnes

11:45  99 "Epigenetic inheritance speeds up evolution of artificial organisms" Yoram Vadée-Le-Brun, Jonathan Rouzaud-Cornabas and Guillaume Beslon

12:10  122 "Recombination Is Surprisingly Constructive for Artificial Gene Regulatory Networks in the Context of Selection for Developmental Stability" Yifei Wang, Yinhong Lan, Daniel Weinreich, Nicholas Priest and Joanna Bryson

12:35  141 "A Metamodel for the Evolution of Evolution" Paul Andrews and Susan Stepney

**RCH/248 Lakehouse 1**

**In Materio Systems** (chair: Julian Miller)

11:20  21 "Evolving Robot Controllers Using Carbon Nanotubes" Maktuba Mohid and Julian Miller

11:45  97 "Simulating self-replicating, chemically immersed, microchip swarms" Uwe Tangen, Harold Fellermann and Steen Rasmussen

12:10  104 "Autonomous tablet locomotion and active docking by sensomotoric electroosmotic drive." John McCaskill, Abhishek Sharma and Thomas Maeke

12:35  113 "An Investigation of Square Waves for Evolution in Carbon Nanotubes Material" Odd Rune Lykkebø, Stefano Nichele and Gunnar Tufte

**RCH/250 Lakehouse 2**

**Cellular Automata** (chair: Dave Ackley)

11:20  32 "Practical Fault Tolerant 2D Cellular Automata" Steven Janke and Matthew Whitehead

11:45  116 "Evolutionary Progress in Heterogenous Cellular Automata (HetCA)" David Medernach, Jeannie Fitzgerald, Simon Carrignon and Conor Ryan

12:10  123 "Searching for non-regular neighborhood cellular automata rules applied to scheduling task and guided by a forecast dynamical behavior parameter " Tiago I. Carvalho and Gina M. B. Oliveira

**RCH/017 Teaching Room**

11:20  SynNatSys workshop (ctd)

**RCH/204 Seminar Room**

11:20  Physarum Machines tutorial (ctd)
Tuesday 21 July 14:00

**RCH/037 Lecture theatre**

**Evolutionary Dynamics 2** (chair: Barry McMullin)
14:00  26 "Where Does (Co)evolution Lead to?" Jan Paredis
14:25  111 "How Much Should You Select for Evolvability?" Andrew Webb, Joshua Knowles and Julia Handl
14:50  117 "Simpson’s Paradox, Cooperation and Individuality in Bacterial Biofilms" Alexandra Penn
15:15  135 "Does self-replication imply evolvability?" Thomas Labar, Christoph Adami and Arend Hintze

**RCH/248 Lakehouse 1**

**Special Session – Morphogenetic Engineering 1** (chair: Rene Doursat)
14:00  56 "Behavioral Diversities of Morphogenetic Collective Systems" Hiroki Sayama
14:25  80 "Morphogenesis and Replication of Multi-Cellular Organisms with Evolved Variable Length Self-Modifying Genomes" Stefano Nichele and Gunnar Tufte
14:50  90 "Modelling the Role of Trail Pheromone in the Collective Construction of Termite Royal Chambers" Nicholas Hill and Seth Bullock
15:15  91 "From tadpole to frog: artificial metamorphosis as a method of evolving self-reconfiguring robots" Michal Joachimczak, Reiji Suzuki and Takaya Arita

**RCH/250 Lakehouse 2**

**Special Session – Slime Mould Computers** (chair: Andy Adamatzky)
14:00  6 "Physarum Polycephalum changes polyaniline properties" Alice Dimonte, Tatiana Berzina and Victor Erokhin
14:25  16 "Majority Gates and Circular Computation in Slime Mould" Genaro Martinez, Andrew Adamatzky, Richard Mayne, Fangyue Chen and Qinbin He
14:50  17 "Slime mould actin sensoriaction networks: topology and dynamic transformations" Richard Mayne and Andy Adamatzky
15:15  148 "Mimicking the Exploration of 3D Terrains by Physarum with Cellular Automata Models" Michail-Antisthenis I. Tsompanas and Georgios Ch. Sirakoulis

**RCH/017 Teaching Room**

14:00  SynNatSys workshop (ctd)

**RCH/204 Seminar Room**

14:00  SB-AI workshop
Tuesday 21 July 16:10

**RCH/037 Lecture theatre**

**Game Theory and Networks** (chair: Lance Williams)
16:10  61 "Coevolution of cooperation and layer selection strategies in multiplex networks" Katsuki Hayashi, Reiji Suzuki and Takaya Arita
16:35  65 "The Evolution of Assortment with Multiple Simultaneous Games" Simon Tudge, Adam Jackson, Richard Watson and Markus Brede
17:00  22 "A Minimal Model for the Emergence of Cooperation in Networks" Steve Miller and Joshua Knowles
17:30  ALife 2016, ECAL 2017 announcements; poster video blitz

**RCH/248 Lakehouse 1**

**Special Session – Morphogenetic Engineering 2** (chair: Hiroki Sayama)
16:10  102 "Partial Redundancy and Morphological Homeostasis: Reliable Development through Overlapping Mechanisms" Micah Brodsky
16:35  121 "MecaCell: an Open-source Efficient Cellular Physics Engine" Jean Disset, Sylvain Cussat-Blanc and Yves Duthen

**RCH/250 Lakehouse 2**

**Late breaking papers 1** (chair: Martyn Amos)
16:10  153 “Logical gates by glider-gun dynamics – the X-rule” Andrew Wuensche and José Manuel Gómez Soto
16:35  154 “Pedestrian Behavior Mining from Data” Juan Galán-Páez and Joaquín Borrego-Díaz
17:00  160 “Maze Navigation and Memory with Physical Reservoir Computers” Chris Johnson, Andrew Philippides and Philip Husbands

**RCH/017 Teaching Room**

16:10  SynNatSys workshop (ctd)

**RCH/204 Seminar Room**

16:10  SB-AI workshop (ctd)
Tuesday 21 July 18:00

Atrium
Poster Session

4 "Dynamic Homeostasis in Packet Switching Networks" Mizuki Oka, Hirotake Abe and Takashi Ikegami
35 "Evolving Collective Behaviors With Diverse But Predictable Sensor States" Payam Zahadat, Heiko Hamann and Thomas Schmickl
64 "Investigating a cellular automata model that performs three distance diffusion on a robot path planning" Gina M. B. Oliveira, Patricia A. Vargas and Giordano Ferreira
71 "Incorporation of Emotions in the Orphibs’ Agent Architecture" Nuno Barreto, Luis Macedo, Penousal Machado and Licínio Roque
74 "Time Series Evolution for Integrating Developmental Processes" Sebastian von Mammen and Melanie Däschinger
87 "Toward a behavior-based approach to the origins of life and the genetic system" Tom Froese
98 "Do it yourself (DIY) liquid handling robot for evolutionary search exploration" Asbjørn Müller, Aleksandra Amaldass, Kliment Yanev and Steen Rasmussen
100 "Probing models of minimal swimming vehicles in vivo with microalgae phototaxis." Colliaux David, Lia Giraud, Claude Yéprémian, Pierre Bessière and Jacques Droulez
105 "A Predator-Prey Scenario in a Virtual Ecosystem" Nesrine Ouannes, Noureddine Djedi, Hervé Luga and Yves Duthen
115 "Apparent action and apparent goal-directedness" Martin Biehl and Daniel Polani
145 "Simulating the Influence of Diet on the Intestinal Microbiome Composition" Mark Read, Andrew Holmes, Madison Hartill-Law, Samantha Solon-Biet, David Raubenheimer and Stephen Simpson
147 "Evolutionary change precedes extinction in eco-evolutionary dynamics based on a 3D virtual predator-prey system" Takashi Ito, Marcin L. Pilat, Reiji Suzuki and Takaya Arita
Wednesday 22 July

Wednesday 22 July 9:00

**RCH/037 Lecture theatre**  
*artist:* Andy Lomas: Hybrid Forms

Wednesday 22 July 10:00

**RCH/037 Lecture theatre**  
**Computational Biology** (chair: Jon Timmis)  
10:00  **144** "Simulation-Based Analysis of In Situ Cellular Motility" Mark Read, Jon Timmis and Tatyana Chtanova  
10:25  **151** "An Agent-Based Model of Avascular Tumor Growth" Ana Victoria Ponce Bobadilla, Rene Doursat and Francois Amblard

**RCH/248 Lakehouse 1**  
**Programming ALife** (chair: Soichiro Tsuda)  
10:00  **31** "Programs as Polypeptides" Lance Williams  
10:25  **126** "Artificial life programming in the robust-first attractor" David Ackley and Elena Ackley

**RCH/250 Lakehouse 2**  
**Behavioural and Evolutionary Robotics 1** (chair: John Rieffel)  
10:00  **73** "Cooperative Coevolution of Morphologically Heterogeneous Robots" Jorge Gomes, Pedro Mariano and Anders Christensen  
10:25  **112** "Evolution of Cooperation in Evolutionary Robotics : The Tradeoff Between Evolvability and Efficiency" Arthur Bernard, Jean-Baptiste André and Nicolas Bredeche

**RCH/204 Seminar room**  
10:00  Statistical Analysis tutorial
Wednesday 22 July 11:20

RCH/037 Lecture theatre
Evolutionary Dynamics 3 (chair: Guillaume Beslon)
11:20  57 "Emergence-focused design in complex system simulation" Chris Marriott and Jobran Chebib
11:45  67 "Environmental bias forces parasitism in Tierra" Simon Hickinbotham and Susan Stepney
12:10  70 "Unraveling the genotype-phenotype map of evolving digital organisms" Miguel Fortuna, Luis Zaman, Charles Ofria and Andreas Wagner
12:35  142 "Informational parasites in code evolution" Andres Burgos and Daniel Polani

RCH/248 Lakehouse 1
Agent Strategies (chair: Justin Werfel)
11:20  62 "Volatility and spatial distribution of food resources determine ant foraging strategies" Drew Levin, Joshua Hecker, Melanie Moses and Stephanie Forrest
11:45  76 "Following Strategies Reduces Accidents, but Makes Outcomes Worse: Evidence from Simulated Treefrog Mating Scenarios" Giordano Ferreira and Matthias Scheutz
12:10  81 "The Hunger Games: Embodied agents evolving foraging strategies on the frugal-greedy spectrum" Nathanael Aubert-Kato, Olaf Witkowski and Takashi Ikegami
12:35  140 "Evolving an optimal group size in groups of prey under predation" Patrick Haley, Randal Olson, Fred Dyer and Christoph Adami

RCH/250 Lakehouse 2
Communication and Language (chair: Takaya Arita)
11:20  79 "Achieving Compositional Language in a Population of Iterated Learners" Lewys Brace, Seth Bullock and Jason Noble
11:45  109 "How to play the Syntax Game" Luc Steels and Emilia Garcia-Casademont
12:10  125 "Investigating the Impact of Communication Quality on Evolving Populations of Artificial Life Agents" Sadat Chowdhury and Elizabeth Sklar
12:35  132 "How Intrinsic Motivation can Speed Up Language Emergence" Miquel Cornudella, Paul Van Eecke and Remi van Trijp

RCH/204 Seminar room
11:20  Statistical Analysis tutorial (ctd)

Wednesday 22 July 14:00

14:00  Conference trip: Castle Howard
Thursday 23 July 9:00

**RCH/037 Lecture theatre**

**Keynote:** Justin Werfel: Termite-inspired robots and evolved death: environmentally-mediated coordination in artificial and natural systems

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Thursday 23 July 10:00

**RCH/037 Lecture theatre**

**Collective Behaviours: Thursday 23 July 10:00** (chair: Jeff Jones)

10:00  5 "How social networks shape collective behaviours" Daniel Franks, Jamie Wood and Nikolai Bode

10:25  133 "Coordination of collective behaviours in spatially separated agents" Rob Mills, Payam Zahadat, Fernando Silva, Damjan Mlikic, Pedro Mariano, Thomas Schmickl and Luís Correia

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**RCH/248 Lakehouse 1**

**Shape and Form: Thursday 23 July 10:00** (chair: Andy Wuensche)

10:00  23 "The Kinetic Basis of Morphogenesis" Yuri Shalygo

10:25  152 "Spatial Computing in Synthetic Bioware: Creating Bacterial Architectures" Jonathan Pascalie, Martin Potier, Taras Kowaliw, Jean-Louis Giavitto, Olivier Michel, Antoine Spicher and Rene Doursat

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**RCH/017 Teaching Room**

10:00  TRUCE workshop

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**RCH/204 Seminar room**

10:00  Aevol tutorial
Thursday 23 July 11:20

RCH/037 Lecture theatre

Swarm Intelligence  (chair: TBD)
11:20  44 "CriPS: Critical Particle Swarm Optimisation" Adam Erskine and Michael Herrmann
11:45  68 "Distributed vs. Centralized Particle Swarm Optimization for Learning Flocking Behaviors" Iñaki Navarro, Ezequiel Di Mario and Alcherio Martinoli
12:10  88 "An Efficient Ant Colony System for Edge Detection in Image Processing" Yara Khaluf and Syam Gullipalli
12:35  103 "Towards Failure-Resistant Mobile Distributed Systems Inspired by Swarm Intelligence and Trophallaxis" Arles Rodriguez, Jonatan Gomez and Ada Diaconescu

RCH/248 Lakehouse 1

Artificial Chemistries 1  (chair: Takashi Ikegami)
11:20  27 "A New View of Protocell Metabolism" Ben Shirt-Ediss, Ricard Solé and Kepa Ruiz-Mirazo
11:45  46 "Ontogeny and adaptivity in a model protocell" Eran Agmon, Alexander Gates and Randall Beer
12:10  49 "Chemical Architectures for Self-Replicating Proto-Cells" Erwan Bigan, Jean-Marc Steyaert and Stéphane Douady
12:35  94 "Emergence of Competition between Different Dissipative Structures for the Same Free Energy Source" Stuart Bartlett and Seth Bullock

RCH/250 Lakehouse 2

Learning and Evolutionary Software Systems  (chair: Neil Vaughan)
11:20  37 "Learning by Stimulation Avoidance as a Primary Principle of Spiking Neural Networks Dynamics" Lana Sinapayen, Atsushi Masumori, Nathaniel Virgo and Takashi Ikegami
11:45  82 "Wallace: An efficient generic evolutionary framework" Christopher Steven Timperley and Susan Stepney
12:10  134 "Corpus-taught Evolutionary Music Composition" Csaba Sulyok, Christopher Harte and Andrew McPherson
12:35  149 "Optimal Mutation Rate Control under Selection in Hamming Spaces" Elizabeth Aston, Alastair Channon, Roman Belavkin, Rok Krasovec and Christopher Knight

RCH/017 Teaching Room

11:20  TRUCE workshop (ctd)

RCH/204 Seminar room

11:20  Aevol tutorial (ctd)
Thursday 23 July 14:00

**RCH/037 Lecture theatre**

**Social networks 1** (chair: Seth Bullock)

14:00 3 "Modelling Conflict within the Social Networks of Large Multi-Vendor Software Projects using Communicating Stream X-Machines" Richard Williams

14:25 8 "At the root of sociality: Working towards emergent, permanent, social affines" Ovi Chris Rouly

14:50 40 "Human Swarms, a real-time method for collective intelligence" Louis Rosenberg


**RCH/248 Lakehouse 1**

**Artificial Chemistries 2** (chair: Uwe Tangen)

14:00 19 "Conservation of Matter Increases Evolutionary Activity" Simon Hickinbotham and Susan Stepney

14:25 60 "The Lattice of Chemical Organisations" Pietro Speroni di Fenizio

14:50 75 "Heredity in Messy Chemistries" Nathaniel Virgo and Nicholas Guttenberg

15:15 130 "Achieving Closure in Enzymes in Artificial Chemistries" Matteo Monti, Tim Hutton and Piet Hut

**RCH/250 Lakehouse 2**

**Special Session – Quantifying Embodiment** (chair: Christoph Salge)

14:00 33 "Musculo-Skeletal Models as Tools to Quantify Embodiment" Daniel F. B. Haeufle, Michael Günther and Syn Schmitt

14:25 39 "Task Dynamics & the (Ecological) Information They Create" Andrew Wilson and Sabrina Golonka

14:50 48 "Quantifying Morphological Computation based on an information decomposition of the sensorimotor loop" Keyan Ghazi-Zahedi and Johannes Rauh

15:15 106 "Quantifying Self-Organzing Behavior of Autonomous Robots" Georg Martius and Eckehard Olbrich

**RCH/017 Teaching Room**

14:00 TRUCE workshop (ctd)

**RCH/204 Seminar room**

14:00 EvoRobots tutorial
Thursday 23 July 16:10

**RCH/037 Lecture theatre**

**Social networks 2** (chair: Seth Bullock)

16:10  **24** "Environmental Factors and the Emergence of Cultural – Technical Innovations" Peter Andras

16:35  **29** "The Universality of Peer-Influence in Social Networks" Flavio Pinheiro, Marta D. Santos, Francisco C. Santos and Jorge M. Pacheco

17:00  **136** "Effects of Social Network Size and Topology on Evolutionary Decision Making" Hiroki Sayama, Shelley Dionne and Francis Yammarino

17:30  Best paper awards, bursary presentations, ISAL meeting

**RCH/248 Lakehouse 1**

**Educational Systems** (chair: Chris Rouly)

16:10  **84** "Omnigram Explorer: A Simple Interactive Tool for the Initial Exploration of Complex Systems" Tim Taylor, Alan Dorin and Kevin Korb

16:35  **86** "The Digital Aquarist: An Interactive Ecology Simulator" Julian Schikarski, Oliver Meisch, Sarah Edenhofer and Sebastian von Mammen

17:00  **93** "The Overshoot Curriculum: Artificial Life, Education and the Human Predicament" Barry McMullin

**RCH/017 Teaching Room**

16:10  TRUCE workshop (ctd)

**RCH/204 Seminar room**

16:10  EvoRobots tutorial (ctd)

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**Thursday 23 July 19:30**

19:30  Conference dinner: National Railway Museum
Friday 24 July

Friday 24 July 9:00

RCH/037 Lecture theatre
**keynote:** Paulien Hogeweg: Non-random random mutations: a signature of evolution of evolution (EVOEVO)

Friday 24 July 10:00

RCH/037 Lecture theatre
**Agent Control** (chair: Georg Martius)
10:00  43 "An Integrated Neuromechanical Model of Steering in C. elegans" Eduardo J. Izquierdo and Randall D. Beer
10:25  77 "Incremental Neuroevolution of Reactive and Deliberative 3D Agents" Adam Stanton and Alastair Channon

RCH/248 Lakehouse 1
**Ecosystems** (chair: Alex Penn)
10:00  9 "The Circular Logic of Gaia: Fragility and Fallacies, Regulation and Proofs" Inman Harvey
10:25  139 "Cascading Transitions in Coupled Complex Ecosystems" Iain Weaver

RCH/250 Lakehouse 2
**Late breaking papers 2** (chair: TBD)
10:00  159 “An open-ended evolution in a web system” Mizuki Oka, Yasuhiro Hashimoto and Takashi Ikegami
10:25  163 “Simulated Robotic Autonomous Agents with Motion Evolution” Neil Vaughan

RCH/017 Teaching Room
10:00  EvoEvo workshop

RCH/204 Seminar room
10:00  HieDy workshop
Friday 24 July 11:20

**RCH/037 Lecture theatre**

**Behavioural and Evolutionary Robotics 2** (chair: John Rieffel)

11:20  **63** "Applying homeostatic neural controller to multi-legged robot and adaptivity to novel disruptions" Hiroyuki Iizuka, Hiroki Nakai and Masahito Yamamoto

11:45  **83** "Emergence of Sense-Making Behavior by the Stimulus Avoidance Principle: Experiments on a Robot Behavior Controlled by Cultured Neuronal Cells." Atsushi Masumori, Norihiro Maruyama, Lana Sinapayen, Takeshi Mita, Urs Frey, Douglas Bakkum, Hirokazu Takahashi and Takashi Ikegami

12:10  **89** "Abnormality Detection in Robots Exhibiting Composite Swarm Behaviours" Danesh Tarapore, Anders Christensen and Jon Timmis

12:35  **107** "Cooperative Object Transport Using Evolutionary Swarm Robotics Methods" Muhanad Mohammed, Chuan Lu and Elio Tuci

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**RCH/248 Lakehouse 1**

**Complexity** (chair: TBD)

11:20  **50** "A population of information processing objects as a model of evolutionary dynamics" Richard Carter, Stephen Mann and Karoline Wiesner

11:45  **66** "Exploring the organisation of complex systems through the dynamical interactions among their relevant subsets" Alessandro Filisetti, Marco Villani, Andrea Roli, Marco Fiorucci and Roberto Serra

12:10  **120** "Steering a Complex Adaptive System: a complexity science design methodology applied to an industrial ecosystem in the Humber region, UK" Alexandra Penn

12:35  **127** "Towards a methodology for describing the relationship between simulation and reality" Eric Schneider, Elizabeth Sklar, M. Q. Azhar, Simon Parsons and Karl Tuyls

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**RCH/017 Teaching Room**

11:20  EvoEvo workshop (ctd)

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**RCH/204 Seminar room**

11:20  HieDy workshop (ctd)

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Friday 24 July 14:00

**RCH/037 Lecture theatre**

**Behavioural and Evolutionary Robotics 3** (chair: Andrea Roli)

14:00  **41** "A Passive Mechanism for Goal-Directed Navigation using Grid Cells" Vegard Edvardsen

14:25  **96** "Emotional modulation of peripersonal space impacts the way robots interact" Marwen Belkaid, Nicolas Cuperlier and Philippe Gaussier

14:50  **108** "Closed-loop acquisition of behaviour on the Sphero robot" Oswald Berthold and Verena Hafner
**RCH/250 Lakehouse 2**

**Late breaking papers 3** (chair: Martin Biehl)

14:00 **164** “Reaction-Diffusion Risk: Chemical Signaling in a Conquest Game” Nathanael Aubert and Olaf Witkowski

14:25 **155** “Shaping the body to shape the behavior: a more active role of the morphology in the brain-body trade-off” Francesco Corucci, Marcello Calisti, Helmut Hauser and Cecilia Laschi

14:50 **157** “Engineering artificial extraterrestrial life?” Alex Ellery

15:15 **161** “An unexpected discrepancy in a well-known problem: Kraskov estimators applied to spiking neural networks” Pedro A.M. Mediano and Murray Shanahan

**RCH/017 Teaching Room**

14:00 EvoEvo workshop (ctd)

**RCH/204 Seminar room**

14:00 HieDy workshop (ctd)

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**Friday 24 July 16:10**

**RCH/037 Lecture theatre**

**Agent and Robot Morphology** (chair: TBD)

16:10 **34** "Evaluating the Effect of a Flexible Spine on the Evolution of Quadrupedal Gaits" Jared Moore, Philip Mckinley and Craig McGowan


**RCH/250 Lakehouse 2**

**Late breaking papers 4** (chair: TBD)

16:10 **156** “Multi-level evolution, differential gene mobility, and the persistence of population diversity” Bram van Dijk and Paulien Hogeweg

16:35 **162** “Analysis of causality network from interactions between nonlinear oscillator networks and musculoskeletal system” Jihoon Park, Hiroki Mori and Minoru Asada

17:00 **158** “Thresholding Urban Connectivity by Local Connected Fractal Dimensions and Lacunarity Analyses” Bashar Swaid, Eleonora Bilotta, Pietro Pantano and Roberta Lucente

**RCH/017 Teaching Room**

16:10 OEE #2 workshop (ctd from Monday)

**RCH/204 Seminar room**

16:10 HieDy workshop (ctd)
Anti-harassment policy for ISAL conferences

This policy is adapted from the example available from the one written and promoted by the Ada Initiative co-founders.

ECAL 2015 is dedicated to providing a harassment-free conference experience for everyone, regardless of gender, sexual orientation, disability, race, or religion. We do not tolerate harassment of conference participants in any form. Sexual language and imagery is not appropriate for any conference venue, including presentations. Conference participants violating these rules may be sanctioned or expelled from the conference at the discretion of the conference organisers.

Harassment includes: offensive verbal comments related to gender, sexual orientation, disability, race, religion; sexual images in public spaces; deliberate intimidation, stalking, following, harassing photography or recording; sustained disruption of talks or other events; inappropriate physical contact; unwelcome sexual attention. Participants asked to stop any harassing behaviour are expected to comply immediately.

We expect participants to follow these rules at all conference venues and conference-related social events.

If a participant engages in harassing behaviour, the conference organisers may take any action they deem appropriate, including warning the offender or expulsion from the conference. If you are being harassed, or notice that someone else is being harassed, or have any other concerns, please contact a member of conference staff immediately.

Conference staff will be happy to help participants contact venue security or local law enforcement, provide escorts, or otherwise assist those experiencing harassment to feel safe for the duration of the conference. We value your attendance.

Contact details

- Email address for organisers: ecal2015-management-group@york.ac.uk
- Local non-emergency support: go to reception in the Ron Cooke Hub, or call 01904 325120
- If you are using an internal phone: 5120
- Campus security: freephone 0800 43 3333 (urgent) or 01904 32 4444 (non-urgent)
- If you are using an internal phone: 3333 (urgent) or 4444 (non-urgent)
- Emergency medical/fire/police: freephone 0800 43 3333 (campus) or 999 (external)
- If you are using an internal phone: 3333 (campus) or 9999 (external)
- Local taxi company: Streamline, 01904 656565
- Local sexual assault helpline: Survive, 01904 642830