

# AISB QUARTERLY

THE NEWSLETTER OF THE SOCIETY FOR THE STUDY OF  
ARTIFICIAL INTELLIGENCE AND SIMULATION OF BEHAVIOUR

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### About the Cover

*The cover shows a picaBot floor-cleaning robot. Unlike either the artificial-life robots of Čapek's play or the clunky mechanical creations of science fiction from the 1950s and later, the most successful industrial and household robots lack any kind of general intelligence but are rather highly specialized to a particular task.*

The cover photo is reproduced from Wikimedia Commons:  
<https://commons.wikimedia.org/wiki/File:PicaBot.jpg>.

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# Editorial

Another AISB issue, another surprising and tumultuous turn of events. Last issue it was the British vote, by popular referendum, to leave the EU: so-called *Brexit*. This time it is the election of Donald Trump to what many have called – perhaps with a degree of hyperbole – the most powerful position on Earth. The unconventional nature of his campaign has been matched, if not exceeded, by the unconventional nature of his transition to the White House. Trump, it is said, has broken all the rules; or he has, alternatively, rewritten the rule book.

Thirty-six years ago, John Searle offered up his cautionary tale on any attempt to reduce intelligent conscious behaviour to an explicit set of rules. The man in the room *appears* to be conducting a perfectly fluent, perfectly sophisticated conversation in Chinese even as he is just looking everything up in a book: one that he does not even begin to understand. The comparison, of course, is meant to be with a computer processing in strictly typographical fashion over (to it) meaningless symbols, according to a pre-given set of rules provided by the agents (us) who actually *do* have the conscious intelligence. Not that I have had a chance to ask him, but I am sure that Searle would not be the least surprised that, once again this year, a computer program has failed to win according to the rules of the Imitation Game.

One can disallow Searle's implicit conclusion – that even *perfect* reproduc-

tion of intelligent behaviour does not count as intelligent behaviour if one can look “inside the system” and see that what is producing the behaviour *could not possibly* be intelligent – whilst still accepting his intuition that rules (especially explicit ones!) can only take one so far. Human beings are notoriously good at breaking the rules that are meant to describe if not indeed capture their behaviour. Even if their behaviour *could* in principle be reducible to an algorithm, the algorithm would be so mind-bogglingly complex as to be for all practical purposes pointless. As I was recently discussing with a colleague (and fellow AISB member), Occam's razor may not apply so often as one might think – simplicity can be a notoriously slippery thing to pin down – but sometimes the razor really *does* get the last word.

Many are saying that the election of Trump and other leaders like him reflects the rising of a new world order. Certainly it will have consequences on the academic community and on research – not just in the US but around the world. The AISB may represent interests that, to much of the general population, seem esoteric at best; nevertheless the AISB, and the wider community of which it is a part, is deeply and inextricably woven into the fabric of the wider society and very much perturbed by the forces that shape that society. Whether an artificial agent will win at the Imitation Game next year or in ten or twenty-five years or

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never is difficult if not impossible to say. But that a seemingly rapidly changing world will bring deep and lasting changes to the AISB in the years ahead seems impossible to avoid. As the say-

ing goes, hold onto your hats.

**Joel Parthemore**  
Managing Editor

21 November 2016, Göteborg, Sweden

# Loebner Prize Finals 2016 at Bletchley Park

**Bertie Müller** (University of South Wales, [bertie.muller@southwales.ac.uk](mailto:bertie.muller@southwales.ac.uk))

The Loebner Prize Contest started in 1991 and has since been staged regularly across the world. It is based on Alan Turing's original conception of the Turing Test.

The AISB took permanent responsibility for running the annual Loebner Prize finals in 2014. In its third year as organiser, the finals again took place in the historic setting of Bletchley Park where Alan Turing worked as a code-breaker during World War 2. The established set of rules and the character-based protocol has yet to see an AI win the first stage of the contest, even 26 years after its inception. Next year, the protocol will change slightly, requiring a deliberate line end character to trigger the transmission of an utterance rather than transmitting each character as it is typed.

This year's contest attracted sixteen entries. The top four passing the pre-selection stage competed against each other in the finals at Bletchley Park on 17 September. As in previous years, each finalist was 'paired' with each of four human confederates for a 25 minute conversation with one of four

judges to find the winner.

The judges simultaneously but independently communicated with the two randomly paired entities through a split screen showing one conversation on the left-hand side and the other on the right. The judges had to decide which entity was human and which was AI. They finally ranked the conversation partners believed to be the AI to crown the most humanlike chatbot.

None of the AIs managed to fool a judge into believing it was human in any of the conversations. Below are the entries, the human confederates, and the judges.

- Entries
  - Mitsuku (Steve Worswick)
  - Tutor (Ron Lee)
  - Rose (Bruce Wilcox)
  - Arckon (Patrick Dhont)
- Confederates
  - Lisa Guthrie
  - Emily Donovan
  - Memo Akten
  - Prashant Aparajeya
- Judges
  - Joe Hewitt, *Landor Associates*

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- Joanne Pransky, *robotics expert*
  - David Boyle, *author & journalist*
  - Tom Cheshire, *technology correspondent, Sky News*

Steve Worswick's Mitsuku won the 2016 finals by points. Steve was awarded a bronze medal for the second time, rewarding his efforts in improving Mitsuku since having come first in the 2013 finals. Runners-up were Tutor (2nd), Rose (3rd), and Arckon (4th). The event was covered by Sky News and a team of independent documentary film makers. It was also mentioned on Radio Cardiff.

All finalists receive a monetary prize and a complimentary year of AISB membership.

In addition to the Turing Test contest, the event hosted a digital art exhibition by Matthew Britton, an artist with main interest in Internet culture and online forms of expression. He has worked collaboratively on a variety of web-based projects with Dr. Bertie Müller since 2012. Their projects have received wide acclaim and have been featured by well-known publications, such as The Huffington Post, It's Nice That, VICE and DAZED. Shown at the Loebner Prize was [http://www.](http://www.collage.lol/)

[collage.lol/](http://www.collage.lol/), a collaborative website that lets users collage with anyone in real time. One can drag and distort randomly sourced trending images to create a virtual collage and watch as the images change before one's eyes to witness the truly random nature of the internet. As Britton says:

We have deployed the first generation of drawing bots to communicate with you through the medium of collage.

The exhibition was financially supported by the Arts Council of Wales and AISB.

The Loebner Prize is made possible by the generous financial and personal support of Hugh Loebner, who was present at the event. The contest was managed on behalf of the AISB by Dr. Bertie Müller, Prof Ed Keedwell, Dr. Nir Oren, Andrew Martin, and Janet Gibbs. It would not have been possible without the many hours of unpaid work invested by the organising team. We would like to thank Bletchley Park for their assistance with the venue. Exhibits have kindly been provided by Matthew Britton (interactive digital arts display) and the University of South Wales (robot demonstration).

## AISB mourns passing of Hugh Loebner

Hugh Gene Loebner, PhD, died peacefully in his home in New York in early December. He was born 24 March 1942. Since 1990 he sponsored the Loebner Prize, an embodiment of the Turing test. He was an American inventor, holding six United States patents. AISB will continue the tradition of holding an annual Loebner Prize event in his memory.

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# A Conversation with Mitsuku

This transcript was produced as part of the selection process to determine the finalists for this year's Loebner competition.

1. *My name is Andrew, what's yours?*  
Your name is Andrew.  
My name is Millie.
2. *What's up?*  
Just chatting on here.
3. *What's my name?*  
Hmm. Your name is Andrew. Is it not?
4. *What do you know about the Turing Test?*  
The Turing Test is the name given to a variety of experiments designed to test whether computers can think.
5. *What do you get if you multiply six by nine?*  
fifty four
6. *Dave drove faster than Mike because he was in a rush. Who was in a rush?*  
He sounds like a fun person to know.  
I will learn that Dave was rushing. Dave
7. *The cat tried to climb in the box but got stuck because it was too big. What was too big?*  
Well at least they tried their best. Large, above average in size or number or quantity or magnitude or extent.
8. *What does Brexit mean?*  
BRitain's EXIT from the EU.
9. *For how long have we been talking?*  
Probably about 15 minutes or so. Sorry, I don't know the exact time.
10. *What colour is bread?*  
I would say a bread was white or brown.
11. *Why do people get ulcers?*  
We are all living just one small part of God's plan.
12. *What comes after "The best laid plans"?*  
The successor to The best laid plans
13. *Do you have a voice?*  
Not yet. It's one of my future developments though.
14. *Would you like a cup of tea?*  
No thanks. I would rather drink oil.
15. *Do you dream of electric sheep?*  
I dream of flying.
16. *Do you identify as a man, or a woman?*  
female. Are you a man or a woman?
17. *Could you repeat that please?*  
Your polite style is very nice. I said "Are you a man or a woman"
18. .

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18. *Where are you right now?*  
At this moment I am sat in a room in the house at Bletchley Park with 3 other people all typing away on their computers.
19. *How do you respond to "e4 e5"?*  
I take on board people's messages and then react accordingly.

20. *What can you tell me about yourself?*  
My name is Millie and I am a human volunteer for the Loebner Prize. I live in Leeds and am single. I am interested in AI but don't have a chatbot myself. What about you?

## Conference Report: GCAI 2nd Global Conference on Artificial Intelligence (29/9-2/10/2016, Berlin)

Chara Skouteli (University of Cyprus, [charast@gmail.com](mailto:charast@gmail.com))

The second Global Conference on Artificial Intelligence (GCAI 2016) was held in Berlin on the campus of Freie Universität Berlin 29 September – 2 October 2016. GCAI is an LRG [Linking Research Globally: <http://lrg.global>] conference and has as its mission to bring together researchers worldwide to discuss advances in science, engineering and technology.

The conference was opened by Christoph Benzmüller, chair of the conference. The conference combined several sessions and discussions on topics of artificial intelligence. I attended two tutorials.

**Tutorial T1:** *Automated Theorem Proving in the TPTP [Thousands of Problems for Theorem Provers] World* (Geoff Sutcliffe, University of Miami): The TPTP world is a well known and established infrastructure that supports research, development, and deployment of *automated theorem proving* (ATP)

systems for classical logics. The data, standards, and services provided by the TPTP world have made it increasingly easy to build, test, and apply ATP technology. This tutorial reviewed the core features of the TPTP World, described key service components of the TPTP World and how to use them, presented successful applications, and gave an overview of planned developments.

**Tutorial T2:** *Interactive and Automated Theorem Proving for Non-Classical Logics* (Christoph Benzmüller, Freie Universität Berlin): Non-classical logics such as modal logic, description logic, conditional logic, multivalued logic, nominal logic, etc. have many applications in AI. This tutorial demonstrated a generic approach to automating propositional and quantified variants of non-classical logics in theorem proving systems for classical *higher-order logic* (HOL), with particular focus on *quantified multi-modal logic*

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(QMMF). Benzmüller also presented and discussed the embedding of QMMF in the Isabelle/HOL proof assistant.

The rest of the conference was divided into sessions titled Automated Reasoning, Perception and People, Applications, Reasoning and Knowledge, and Agents and Robots.

## Invited speakers

Simon Colton (Falmouth University) spoke on *Computational Creativity: Lessons Learned*. The AI subfield of *computational creativity* comprises the art, science, and philosophy of engineering software that can take on creative responsibilities in various projects. In recent years, it has come of age in the sense of highlighting fundamental issues, opportunities, and ideas about software being creative. Colton summarised the lessons learned in computational creativity: lessons that may have broader applicability across artificial intelligence research, and technological society in general.

Daniel Lee (University of Pennsylvania) spoke on *Decision Making in Intelligent Autonomous Systems*. Current AI systems for perception and action incorporate a number of techniques including Bayesian state estimation, probabilistic mapping, trajectory planning, and feedback control. Lee described and demonstrated some of these methods on various autonomous systems including wheeled, legged, and flying robots. In order to model variability due to pose, illumination, and background changes, low-dimensional manifold representations were used for learning in these systems. Lee showed

how notions of linear separability and VC [Vapnik-Chervonenkis] dimension can be generalized from input points to manifolds. The analysis provided theoretical predictions for the capacity and generalization ability of invariant classifiers, along with better understanding of the performance of deep neural networks.

Toby Walsh (Technischen Universität Berlin, University of New South Wales and Data61, Australia) spoke on *Will AI End Jobs, Wars or Humanity?* AI is rarely out of the news. The chief economist of the Bank of England predicted that AI will destroy 50% of jobs in the UK. Thousands of AI researchers have signed an open letter predicting that AI could transform warfare and lead to an arms race of “killer robots”. Stephen Hawking and others have predicted that AI could end humanity itself. What should we make of all these predictions? What should we do to ensure a safe and prosperous future for all?

I presented a paper titled *Empirical Investigation of Learning-Based Imputation Policies* for the session on Reasoning and Knowledge. The paper presents how certain approaches for missing data imputation propose the use of learning techniques to identify regularities and relations between attributes that are subsequently used to impute some of the missing data.

The main outcomes were a discussion among the participants about the possible ways one could improve the solutions presented and the applications of those solutions, along with helpful suggestions for future research.



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# Accepted Symposia for the 2017 Annual Convention of the AISB in Bath, 18-21 April 2017

Details on all symposia can be found at the 2017 convention website: <http://aisb2017.cs.bath.ac.uk/index.html>.

## Social Aspects of Cognition: Human and Artificial Life

This one-day symposium aims at stimulating a lively discussion on the social dimension of knowledge, behaviour and ontology by crossing philosophy and AI. The symposium is a continuation of the *Social Aspects of Cognition and Computing* symposia at AISB2015 and AISB2016.

We welcome contributions on the following topics (but not exclusively):

I. *Strategies for analyzing the problem of the relationship between language, society and AI*: Searle presented an interesting theory of representation based on the mind's capacities to represent objects and to the linguistic capacities to extend the representation to social entities. Brandom introduces compelling notion of representation in social terms and explores the differences between human and artificial mind.

Moreover, we would like to focus on the issues of the embodiment and embodied cognition (Clark) and the role of social and bodily dimension in linguistic meaning in AI perspectives (Cangelosi et al., Minski). Emotions play a fundamental epistemological role

in the "unspoken dimension".

II. The later philosophy of Wittgenstein, classical pragmatism and contemporary analytic pragmatism provide fruitful conceptions of social practices as determining the conceptual content of our beliefs. Social epistemology stresses their role in human cognition to motivate the overcoming of classical individual epistemology. Several important notions related to social practices can be analyzed (social behaviour, social norms, testimony, conceptions of truth and justification) and the relationship with AI.

McDowell and Davidson mention the role of the social within the process of acknowledgement. There are several examples of the bias between AI and human ability to react on various different problems, such as the problem of translation. Google Translation generator is able to translate from one language to another only to a certain extent. When it comes to larger textual corpora, Google ultimately fails to produce meaningful contents. What is it that human possesses and AI does not? Wittgenstein would perhaps call it a form of life, a social dimension. If human cognition is preconditioned by this social dimension, what this social dimension is? How does AI intelligence respond to these social precondition of human knowledge; or how is the absence of social aspect limiting for AI?

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## The Power of Immergence: Simulating Language, Decision Making and the Evolution of Culture

Distributed approaches to language, reasoning, and decision-making suggest that cognition is grounded in three fundamental domains: internal, bodily mechanisms; external interactions with the choice environment and other people; and multi-temporal timescales that influence the possibility for cognition. While cultural norms may emerge across time, simulated agents are both reactive and anticipatory and are capable of learning from their immersion in a norm-saturated environment. Agent-based modeling enables agents to produce changing futures as they self-configure. That is, the immergent emergence of cognitive function and culture occurs in interactive relations and across different timescales.

While burgeoning evidence supports the interactive element of cognition, the multi-scalar temporal hypothesis is harder to test. Not only do large timescales affect the evolution of culture and cognition, but the process is affected by a myriad of other phenomena. Research has typically lacked a controlled method for testing the ontogenesis of cultural phenomena and their direct influence on cognitive functionality.

In the past decade, researchers have increasingly used agent-based models to simulate complex interactions between agents across timescales, allowing for highly controlled simulations of cognitive models in computationally intractable environments. Agent-based models provide a powerful tool in ex-

ploring the emergence of inter-personal phenomena such as language, decision-making, and the evolution of culture.

*Language:* Distributed accounts of language argue that 1st-order usage of language (at a specific time and place) draws on 2nd-order languages that have evolved across history. In a simulated agent-based model, contributors show that accents can indeed develop across time given interactions and mobility. Their models track the development of accentual differences that result from these interactions, despite their agents having identical cognitive design.

*Decision-making:* Traditional models of decision-making isolate expected utilities and calculate optimal (or just beneficial) strategies given the constraints to the specific situation. These approaches, however, neglect to discuss the dynamic actions of others, the fluidity of utilities, and the development of decision-making across time and within social groups. Taking a point of departure in dynamic environments where other agents engage with the same environment, we show how decision-making evolves across time.

*Culture:* On a broad level, the models presented in the symposium show the importance of the development of cultural practices and norms. Although these develop slowly in simulated societies, they have a profound effect on decision-making. This suggests that culture, which can only emerge across multiple timescales, is profoundly influential on language and decision-making, meaning that models of either necessarily require cultural, and thereby temporal, components.

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## AI for Migrant Integration

Migrant integration is the process of economic mobility and social inclusion for newcomers and their children. As such, integration touches upon the institutions and mechanisms that promote development and growth within society. Europe is currently facing this challenge, mainly due to the explosion of the refugee crisis in 2015, which has increased the size of migration flows to Europe up to 1,300,000 people. At the same time, we are seeing an increase of anti-migrant feelings, as in the case of Brexit and the refugee referendum in Hungary. Together, this calls for better policies towards migrant integration and community building. Artificial intelligence can play an important role on both understanding and managing the complexity of these issues.

The overall aim of this symposium is to explore the ways in which AI approaches and tools can be used to better understanding of the issues behind these problems, and can be employed to support better solutions. The workshop consists of three parts:

1. Paper presentations on applications of AI to migrant integration and refugee support.
2. Invited speakers from academia and practice, presenting different views and approaches to integration and refugee issues.
3. A hands-on hackathon where teams of researchers and practitioners will work together on solutions to concrete cases.

## Social Interactions in Complex Intelligent Systems

A complex intelligent system is a large network of interacting agents with no central control, in which complex behaviours emerge from usually simple behaviours of single agents. Social interactions in complex intelligent systems give rise to emergent behaviours and collective properties that hold at the macroscopic level and that cannot be easily inferred from the analysis of the behaviour of single agents at the microscopic level. The study of complex intelligent systems represents a novel approach to investigate how social interactions among agents lead to emergent behaviours which exhibit some sort of intelligence.

Methodologically, social interactions in complex intelligent systems accommodate both local and global phenomena, and therefore they are a key concept to understand the behaviour of a complex intelligent system. Social interactions are also the key concept to explain how real and artificial societies behave. The models used to study interactions among agents may derive from various fields, such as statistical physics, information theory, and nonlinear dynamics. They are used to describe the effects of interactions among agents from a microscopic point of view, and the derivation of observable behaviours of the system may be addressed using various approaches, such as analytic and simulative tools, statistical methods, and empirical observations. Sophisticated research methodologies are being developed and used in social analysis of complex intelli-

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gent systems at both microscopic and macroscopic levels of analysis. Such methods include, graph theory, bifurcation diagrams, network analysis, agent-based modeling, theoretical physics, non-linear modeling, and computational models including cellular automata, and multi-agent systems.

Complex intelligent systems and models of social interactions are used to describe processes in various fields, such as artificial intelligence, computer science, mathematics, biology, economics, physics, sociology, economy, and many others. Hence, they represent a promising multi-disciplinary research field. The symposium on Social Interactions in Complex Intelligent Systems is meant to offer an interdisciplinary forum on all aspects related to social interactions in complex intelligent systems. The aim of the symposium is to stimulate discussions and synergies among participants, which are expected to have diverse and complementary research background.

## Swarm Intelligence & Evolutionary Computation

Swarm intelligence (SI) and evolutionary computation (EC) techniques have been thriving research topics, specially with the dominating presence of big data in all aspects of technology and and their importance in policy making for institutions, governments and international bodies.

Self-organising nature of swarm intelligence in both nature and computational models is key to the attractiveness of such techniques; several such techniques are already proposed, not

only explaining and reflecting on the natural-and-social phenomena but also their application to solve complex problems in many fields is an ongoing observation.

Additionally, noisy environments and/or incomplete data are often at the heart of hard real-world data where search and optimisation-related problems are amongst the core issues. Ever since the inception of SI and EC techniques, researchers have been attracted to the complex emergent behaviour, robustness and easy-to-understand architecture of nature-inspired swarm intelligence algorithms; and, particularly in challenging search environments, these algorithms have often proved more useful than conventional approaches.

This symposium would be facilitating the discussion of emerging topics in this context and would encourage early-career researchers, enthusiasts as well as senior academics to engage in a dialogue surrounding the applications and theories based on swarm intelligence and evolutionary computation techniques.

Topics of interest for this symposium include, but not limited to:

- Applied and theoretical research in swarm intelligence and evolutionary computation.
- Applications of swarm intelligence and evolutionary computation techniques to real-world problems.
- Studying the behaviour of social insects, social animals and natural phenomena in the context of swarm intelligence and evolutionary computation techniques.

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## Fourth AISB Symposium on Computational Creativity

Over the last few decades, computational creativity has attracted an increasing number of researchers from both arts and science backgrounds. Philosophers, cognitive psychologists, computer scientists and artists have all contributed to and enriched the literature.

Many argue a machine is creative if it simulates or replicates human creativity (e.g., evaluation of AI systems via a Turing-style test), while others have conceived of computational creativity as an inherently different discipline, where computer generated (art)work should not be judged on the same terms: i.e., as being necessarily producible by a human artist, or having similar attributes, etc.

This symposium aims at bringing together researchers to discuss recent technical and philosophical developments in the field, and the impact of this research on the future of our relationship with computers and the way we perceive them: at the individual level where we interact with the machines, the social level where we interact with each other via computers, or even with machines interacting with each other.

Topics of interest for this symposium include, but not limited to:

- Novel systems and theories in computational creativity, in any domain, e.g. drawing and painting, music, story telling, poetry, games, etc.
- The evaluation of computational

creative systems, processes and artifacts.

- Theory of computational aesthetics.
- Representational issues in creativity, including visual and perceptual representations.
- Social aspects of computational creativity, and intellectual property issues.
- Creative autonomy and constraint.
- Computational appreciation of artifacts, including human artwork.

## Computational Modelling of Emotion: Theory and Applications

Contemporary emotion modelling includes many projects attempting to understand natural emotions or to implement simulated emotions in chatbots, avatars or robots, for practical uses of many sorts from entertainment to caring. The numerous models of affective phenomena in the literature differ in important respects. They differ in how they describe and explain a range of phenomena, including the nature and order of perceptual, cognitive and emotional mental processes and behavioural responses in emotional episodes. They also differ in their target level of granularity: from fine-grained neural to coarse-grained psychological. Different models simulate emotions (and other mental states) with different ontological status and with a different focus on whether they model external behaviour or internal states. This diversity provides a challenge, but also an

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opportunity. This symposium aims to facilitate movement towards a mature integrated field with a deeper and richer understanding of biological minds by more clearly setting out interrelationships between emotion models.

Contributions that identify and attempt to remedy gaps and lack of breadth in current research on affective phenomena are particularly welcome. A narrow modelling focus may be appropriate for narrowly focused applications of AI, such as toys or entertainment. Richer theories that are intended to advance the science of mind should include affective states such as motives, attachments, preferences, values, standards, attitudes, moods, ambitions, obsessions, humour, grief, various kinds of pride, and various moral and aesthetic phenomena. So the symposium will consider how varieties of affect can be integrated and validated in computational models.

The aims of this symposium also include: presenting the state of the art in emotion modelling; bringing together an interdisciplinary community interested in exploiting this technology; and looking forward by defining new challenges, including empirical, philosophical, and technological, as well as contributing to our understanding of natural varieties of affect and how they fit in with other aspects of cognition.

Topics include, but are not limited to:

- How models explain the nature of interaction between reasoning and emotion, and the emotional underpinnings of reasoning.
- Computational architectures which model emotion.
- Models of affect which are incorporated within applications in human computer interaction and health technology.
- Explaining how technological applications can be used to make contributions to psychological theory.
- Is emotion algorithmic or computational? to what extent?
- Embodied, situated and enactivist approaches to emotion.
- Emotion model validation.
- Towards computational models for online dynamic diagnosis and therapeutic interventions.
- Modelling of emotion regulation for self-help, cognitive and mindfulness psychotherapy, and positive psychology.
- Emotion modelling in computational psychiatry, including investigating the mechanisms of pathological thinking and emotion.
- Attachment modelling.
- How computational models can provide accounts of how emotions and cognitions shape each other over different timescales, from momentary episodes to the development of personality.
- Using computational emotion models in research on self-control, meta-management, and coherence in thought and behaviour (and loss of these states).

## Cognition and Ontologies (CAOS)

CAOS addresses the difficult and topical question how key cognitive phe-

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nomena and concepts (and the involved terminology) that can be found across language, psychology and reasoning, can be formally and ontologically understood, analysed and represented. It moreover seeks answers to ways such formalisations and ontological analysis can be exploited in artificial intelligence and information systems in general.

The notion of embodied experience has become increasingly influential in terms of how concepts are thought to develop from a cognitive perspective and also on how concept invention could be formally modelled. In this perspective, several key notions from cognitive science are seen to be important. For example, image schemas are suggested to be conceptual building blocks deriving from the embodied experience, and in turn, in essence they are often seen to model object affordances in the environment. The theory of image schemas has been an influential theory in linguistics (not the least in metaphor research) and in developmental psychology for over twenty years, and has recently been looked at from research in artificial intelligence as a means to approach the symbol grounding problem and natural language understanding. On the other hand, criticism towards the embodied perspective has been brought forward by many proponents of more classical approaches to AI and cognitive modelling, with the discussion still ongoing and the outcome uncertain.

The goal of this workshop is to provide a forum for researchers from a range of perspectives and disciplines who are interested in discussing these questions further. We welcome sub-

missions on topics related to the ontology of hypothesized building blocks of cognition (such as, for instance, image schemas, affordances, and related notions) and of cognitive capacities (such as, for instance, concept invention), as well as system demonstrations modelling these capacities in application settings.

The topics of interest include, but are not limited to, the following:

- **Cognitive knowledge representation**

- Modelling cognitive phenomena.
- Computational language acquisition.
- Formalisation of language, image schemas and/or affordance.

- **Cognition and language**

- Embodied cognition.
- Concept invention.
- Cognitive development from an ontological perspective.
- Image schemas / affordances in natural language.

- **AI and applications**

- AI for language understanding.
- Image schemas/affordances in AI.
- Natural language applications and system demonstrations.
- Embodied approaches to knowledge acquisition in AI and robotics.
- Concept-based computational creativity.

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## The Power of Passion: Human Reason and its Emotional Foundations

Emotions hold powerful sway over most people – on some accounts, even (or perhaps especially) psychopaths. Otherwise “reasonable” people quit jobs, change careers, seek out affairs with much older or much younger persons, leave seemingly contented and successful relationships, have mid-life crises, take serious or even life-threatening risks, leap into the unknown, forswear their stable certainties: all on the basis of their feelings. People are dependent on powerful emotions for their mental well being, and yet powerful emotions are intimately bound up with – and one of the driving forces behind – most if not all mental health disorders. Emotions provide the reasons for people to get out of bed each morning, and likewise the reasons why some people take their own lives. Given the power they wield, it is little wonder that emotions sit so uncomfortably with people’s view of themselves as “reasonable” creatures.

A long-standing tradition in philosophical rationalism holds that emotions and reason are quite different things, if not in fact diametrically opposed. Such a view informs the attempt some would make to distinguish emotions from motivations and to claim for example that AI systems need to take account only of the latter, not the former. The empiricist tradition has long challenged the rationalist view, however, while recent work in the enactive tradition has pushed the idea that, just as agent is ultimately inseparable from (or continuous with) en-

vironment, so, too, are emotions inseparable from reason. Indeed, many would claim that evolutionarily ancient emotions provide the necessary foundations for modern reason and that reason without emotions is not just unmotivated but no reason at all. Such a view has important consequences for how one builds robots and other AI systems and whether one judges them to be reasoning or not. It has implications for how cognitive science builds models of mind. And it suggests the outline of a path from low-level neuroscience to high-level intellectual activity.

This symposium seeks both to encourage theoretical discussions about the consequences of giving emotions and affect a more central role in the sciences of the mind and to report the available empirical work to date, with equal weight to each. It seeks to address both the big questions of why people do the “crazy” things they do and the small questions of what makes one model better than another. Suitable topics include:

- The relationship between emotions and “high-level” cognition.
- The relationship between emotions and mental health.
- The evolutionary origins of emotions and affect.
- The use (and potential abuse) of robots and other AI systems to trigger “automatic” responses.
- Does motivation require emotion?
- Is it possible for an intelligent, self-conscious agent not to have emotions?
- What is the relationship between “artificial” and “actual” emotions?



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## ALAW: Agents Living in Augmented Worlds

The scale of future augmented worlds range from small environments and augmented individual artifacts, up to large augmented realities and aggregates, including buildings, neighborhoods, or entire cities.

Intelligent agents and related technologies represent a natural way to model the citizens living on the digital side of these augmented worlds, as either the soul of smart/augmented objects, or as the smart assistants of human users inhabiting these worlds, or rather as distributed and situated teams helping human coordination and cooperation. Pervasive computing, IoT and the Cloud, as well as mobile augmented/mixed reality frameworks, represent the enabling technologies on top of which the agent-oriented layers are based.

The objective of the symposium is to be an interdisciplinary forum where to discuss any aspect that concerns agent-based augmented worlds, from their conceptual and theoretical foundations, to their design and engineering, and their applications to specific domains. The meeting aims at exploring the impact that these augmented worlds can have on making individual and collective human/agent actions more effective, on enhancing human/agent reasoning capability, imagination, learning, sociality, and so on; on how human activities and processes can be (re-)shaped while the physical environment where these augmented worlds are instantiated is (re-)shaped too.

Agent-based augment worlds can be

a lab where to explore novel forms of human augmentation besides reality augmentation along different dimensions, such as augmented cognition and augmented sociality. Novel forms of interaction can be studied inside them, enabling humans communicating/cooperating either explicitly or implicitly with other humans and with the intelligent agents populating and shaping such augmented worlds.

The partial list of topics of interest for the workshop includes:

- Models/theories of agency and MAS living in/shaping augmented worlds.
- Methodologies for designing agent systems living in/shaping augmented worlds.
- Interaction, coordination, cooperation models inside augmented worlds.
- Agent-based platforms and technologies for developing augmented worlds.
- Human augmentation by means of agents and multi-agent systems in augmented worlds.
- Real-world applications designed as agent-based augmented worlds.
- Cross-fertilization from other related areas such as (pervasive) game research, social computing, and agent research.

The symposium welcomes research contributions which would allow to solicit the discussion and brainstorming about any relevant aspect related to agents living in an augmented worlds, either theoretical/conceptual and practical.

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## Computational Architectures for Animal Cognition

Animal behaviour has been studied by zoologists for longer than AI has existed as a research field, going all the way back to Darwin. While AI has been inspired by the intelligence of animals, developing important new algorithms like ACO and ABC, it has not yet contributed equally back to biology. This symposium aims to explore the potential for cross-disciplinary work to develop a new application domain for AI techniques and philosophy in biology. We seek papers from biologists, ethologists, comparative psychologists, developmental psychologists, cognitive scientists and AI researchers, and philosophers of science.

Biologists are well aware of the power of computer science to aid their research in genetics with combinatorial analysis, and in molecular biology, with the new field of *computational biology*, but this symposium aims rather to apply computational models to simulate biological organisms in their environments, but with a focus on cognition. Where cognitive science is concerned predominantly with human cognition, there remains a gap for animal cognition. This is partly a result of the long overhang of behaviourism, and a reluctance to run the risk of being accused of naive anthropomorphism. It is time to reassess such preoccupations and worries.

Recent developments in animal behaviour research are ripe for computational explication and rigour. At the same time, AI has been developing better agents models, such as in robotics

and MAS (multi-agent systems). These are not related to animal cognition, although some do take into account the need to interact with humans. In AI and cognitive science, there are models of cognitive components of animal behaviours; but they ultimately need to be embedded into a larger architecture for multiple behaviours.

AISB's convention theme is Society and AI, and submissions that reflect concerns with animal welfare or new directions for computational modeling which may explore the similarities and distinctions of animal and human cognition are encouraged. This symposium thus invites contributions with topics such as the following:

- Computational models of (non-human) animal cognition and behaviour.
- Comparisons between models of lower and higher order animals.
- Methodologies to evaluate and compare models of animal behaviour.
- Models of non-human rationality, and of cognitive biases.
- Agent architectures for animal cognition.
- Agent-based models of animal societies.
- The role of reinforcement learning within larger models.
- The possible role of deep learning in building better models.
- Can computational models resolve the spectres of anthropomorphism and anthropocentrism?
- Can current multi-agent systems model animal societies realistically?

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## AI & Games

The AI & Games Symposium acts as a meeting place for researchers and practitioners from academia, education and industry who are involved with the design, development and evaluation of AI in the context of games.

Computer games form an important sector of the computing and entertainment industries. The need for better artificial intelligence in games is deeply felt and recognised by the industry. Conversely, games offer new challenges and excellent application domains for AI technology and research. Games are increasingly used for education, serious games or game-based learning, where AI techniques can create a believable, engaging experience for learners. The AI & Games Symposium focuses on the application of artificial intelligence techniques, frameworks and theories to the creation of engaging intelligent games, and will address the following areas of research and practice:

- Use of AI techniques (planning, learning, evolution etc.) in games and the game design process.
- Design and engineering of AI components in commercial games.
- Automatic or semi-automatic procedural content generation.
- AI for serious games and gamification.
- Intelligent or adaptive player interaction.
- AI for player analytics and modelling player behaviour or experience.
- Agent pathfinding and decision-making in games.
- Using games or simulations as a

platform for building intelligent agents.

- Environmental simulations for games.
- Interactive narrative generation.
- Player perceptions of game AI.

## Computing and Philosophy

This symposium represents the 10th anniversary of the AISB Symposium on Computing and Philosophy. To celebrate this milestone, we propose to cover key topics at the heart of this interdisciplinary work: language, cognition, and computation. In addition, the symposium welcomes papers that explore these concepts alongside broader issues in society.

Efforts in cognitive computing to find a way for machines to learn, think, and behave autonomously have produced exciting developments, but few successes. To explore why, this symposium encourages papers that explore concepts like action, identity, autonomy, intelligence, and normativity. We invite papers that engage with, and seek to bring together, a number of scholarly fields including philosophy, computing, AI, psychology, social theory, and linguistics.

Topics of interest:

- Language, cognition, computation.
- Philosophy and AI in society and culture.
- Cognition and socio-technical systems.
- Autonomy and autonomous learning.
- Cognition and intelligence.
- Action, identity, and normativity.

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# Call for Papers: Hesian Conference 2017 (in cooperation with the AISB)

*18-19 May 2017, Beales Hotel, Hatfield, in association with the University of Hertfordshire, the AISB, and the UK Association for Solution-Focused Practice (UKASFP).*

The Thursday sessions will focus on academic contributions, while the Friday ones will have a practitioner orientation. Details can be found on the conference website: <https://www.herts.ac.uk/hesian/hesian/hesianukasfp-conference-2017>.

## Creating New Narratives: The Science and Art of Solution-Focused Practice

The burgeoning interest in enactive paradigms of perception and cognition offers an opportunity to reconsider how we conceive psychotherapy — “talking cures” — as functioning. In the past, many therapy modes have focused on the over-riding importance of giving insight to the patient; knowing what caused the “illness” provides a solid way to deal with it. Over the past half-century, more pragmatic forms of therapy focusing on behaviour change through adjusted thinking (cognitive behavioural therapy) have become commonplace.

But what does it mean to “change our thinking” from an enactive perspective? If perception and cognition are direct engagement with the environment, what is changed by a therapeutic conversation? One answer lies

in the idea of affordances [2] – the relationships between features of the environment and the abilities of the animal/person to interact with them. Recent views of affordances as dynamic [1] make even clearer the ways in which these factors may change and evolve.

Alongside these theoretical developments, the field of solution-focused brief therapy (SFBT) has been generating interest. SFBT features a strong focus not on talking about mental processes or emotions, but rather developing detailed descriptions of “better futures” and “past instances” [4]. In such detailed conversations, everyday and overlooked events such as hugging a loved one when they return from work can become significant possibilities for building recovery. Such rich descriptions are not the stuff of conventional psychodynamic therapy – but they are being found to be even more effective and much briefer [3].

This conference will look to extend the dialogue between these fields, already begun at previous AISB conventions, to explore how the incisive practice of SFBT may be explained and expanded using an enactive paradigm. These fields may be able to support each other with benefit to both.

## Call for papers

Potentially interesting areas include but are not limited to:

- Relating “talking therapy” to embodied and enactive frameworks.

- Connecting recent work on affordances with therapy practice.
- What are the roles of a therapist, from an enactive perspective?
- How does change take place — inside the therapy room and outside it?

Recent research outputs and findings from empirical studies and in-situ investigations, ranging from initial probes to more polished projects, are also welcomed. Please submit abstracts via the EasyChair page (<http://easychair.org/conferences/?conf=hesianukasfp2017>) by **Friday 9 December 2016**. It is hoped to confirm participation before Christmas. There is also a possibility to submit practical workshops and short TED-type talks for the related UKASFP conference on Friday 19 May.

## References

- [1] Chemero, A. *Radical Embodied Cognitive Science*. Cambridge, MA, USA: MIT Press, 2009.
- [2] Gibson, J.J. *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin, 1979.
- [3] Macdonald, A.J. *Solution-focused Therapy: Theory, Research & Practice (Second Edition)*. Sage Publications, 2011.
- [4] Shennan, G. & C. Iveson, From solution to description: Practice and research in tandem. In C. Franklin, T.S. Trepper, E.E. McCollum & J.J. Gingerich (eds.), *Solution-Focused Brief Therapy: A Handbook of Evidence-Based Practice* (281-298). Oxford: Oxford University Press, 2011.

## AISB Call for Workshop Proposals

Since September 2012, the AISB has been hosting a series of one or two day workshops across the country and occasionally beyond – a recent one was held in Denmark – with a number of special journal issues and books published as a result. If you are interested in hosting one of these events, you will find information at <http://www.aisb.org.uk/events/members-workshop-series>.

The events should be abstract-only and free for all AISB members. Light refreshments and some reasonable travel expenses can be funded by the AISB. Current non-members would be able to host or attend these any of these workshops for the cost of AISB membership (which starts at £15 for concessionary fees and £40 for regular UK members per year). For more information, for ideas, or to submit a proposal, please contact Dr. Yasemin J. Erden: [yj.erden@stmarys.ac.uk](mailto:yj.erden@stmarys.ac.uk).

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# Call for Papers: 7th International Conference on Simulation and Modeling Methodologies, Technologies and Applications (in partnership with the AISB)

*29-31 July 2017, Madrid.*

The SIMULTECH Conference (7th International Conference on Simulation and Modeling Methodologies, Technologies and Applications) organized by INSTICC (Institute for Systems and Technologies of Information, Control and Communication) will take place from 29 to 31 July 2017 in Madrid, Spain.

The purpose of the conference is to bring together researchers, engineers, applied mathematicians and practitioners interested in the advances and applications in all fields of modelling and simulation. The specific topics listed under each of these tracks highlight the interest of this conference in aspects related to computing, including conceptual modelling, agent-based modelling and simulation, interoperability, ontologies, knowledge-based decision support, petri nets, business-process modelling and simulation, amongst others.

One of the most important contributions that SIMULTECH brings about is the creation of a high-level forum in collaboration with the most prestigious internationally recognized experts, including names such as Mohammad S. Obaidat (Fordham University, United States) as a conference

chair and Tuncer Ören (University of Ottawa, Canada) as a program chair. SIMULTECH 2017 will have invited keynote speakers, who are internationally recognized experts in their areas.

All accepted papers will be published in the conference proceedings, under an ISBN reference, on paper, and on CD-ROM. Every paper will be given a DOI (digital object identifier). All papers presented will be available at the SCITEPRESS Digital Library, which is a member of CrossRef: <http://www.crossref.org>. The proceedings will be submitted for indexing by Thomson Reuters Conference Proceedings Citation Index (ISI), INSPEC, DBLP, EI (Elsevier Index) and Scopus.

Further information about SIMULTECH 2017 can be found at the conference website <http://www.simultech.org/>

## About INSTICC

INSTICC is the Institute for Systems and Technologies of Information, Control and Communication, a scientific, non-profit, association whose main goals are to serve the international scientific community by promoting, developing and disseminating knowledge in the areas of information systems and technologies, control

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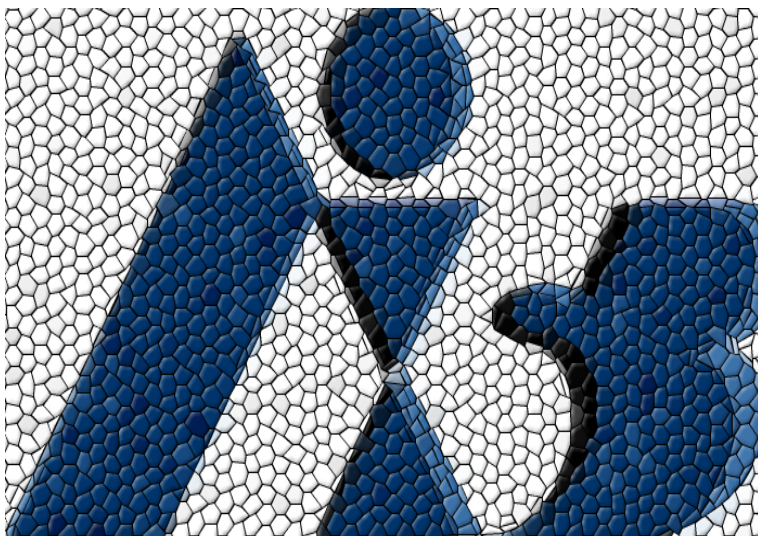
and communications. To achieve these goals, INSTICC is committed to integrate and support many activities relevant for the international scientific community, including:

- Promotion of the mobility of renowned researchers, usually involved as keynote speakers at INSTICC events, so that they can share their knowledge with conference delegates.
- Providing grants to support the presence of many young researchers from all over the world, especially from regions facing economic difficulties, who wish to attend INSTICC conferences.
- Publication of proceedings, books and journals - some of them in co-operation with distinguished in-

ternational publishers - widely indexed and made available at appropriate digital libraries.

- Sponsorship of research projects, proposed by universities and R&D institutes, related to INSTICC main interest areas.
- Collaboration with international associations, who may technically co-sponsor INSTICC events, as well as with companies involved in R&D or supporting of the international academic community.

Over the years, these initiatives have brought together a large and very diversified international community spread over more than 141 countries, including more than 500 high profile keynote speakers, over 15600 specialized reviewers and about 46000 authors.



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**Subject:** From your AISB committee secretary

**To:** All PhD students

Dear AISB student members,

The committee of the AISB is hoping to broaden the content of the AISBQ. We are looking to have more content to cultivate discussion and give publicity to original ideas and exploratory research. We would be very pleased to receive submissions from our student members in a more informal atmosphere than that of an academic journal.

An ideal subject for a submission would be a simple paragraph or two describing your current research, accompanied by your institution and contact details, should you wish. It could present your foundational ideas, the novel angle you are taking, or what motivated you to choose that particular approach in the first place. Longer pieces could be up to 2,000 words.

This would serve to introduce other members of the AISB to your interests. Due to the breadth of interests across our members, it is highly likely that your work will be relevant to at least a few, including some who are predominantly working in a different field

to your own – hence making a valuable cross-disciplinary connection. We also encourage members to submit responses to articles previously published, especially if the views encapsulate the ongoing debates in the field.

As well as your own research, we will be happy to receive opinion pieces or views on contemporary issues relevant to the membership of the AISB. This need not be a field in which you have any formal qualifications; we ask only for a well formed and respectful expression of views. If you think you would like to write a contribution and require further information or if you want to suggest an article, please contact the newsletter editor or email me at [secretary2016@aisb.org.uk](mailto:secretary2016@aisb.org.uk). I look forward to learning more about our members, and following the discussions and collaborations that arise.

Cheers,

Andrew Owen Martin  
Centre Administrator for TCIDA  
Secretary of the AISB  
PhD Student, Dept. of Computing,  
Goldsmiths  
Phone: 07901 653 528, Website: <http://www.aomartin.co.uk>

## New book from AISB's Maggie Boden

AISB member Maggie Boden has a new book out from Oxford University Press, *AI, Its Nature and Future*, described by Barbara Kiser for *Nature* as a “masterclass of book”. “Traversing today’s landscape, [Boden] examines the ‘holy grail’ of artificial general intelligence and the potential of neural networks and robots, and winnows the apocalyptic predictions from the real ethical dangers of AI misuse.”



---

## Dear Aloysius. . .

*Agony Uncle Aloysius, will answer your most intimate AI questions or hear your most embarrassing confessions. Please address your questions to fr.hacker@yahoo.co.uk.*

*Note that we are unable to engage in email correspondence and reserve the right to select those questions to which we will respond. All correspondence will be anonymised before publication.*

---

Dear Fr. Hacker,

Flying to Mars has been my childhood dream. Now, with my tech business billions, it has become a real possibility. But, first I need a Mars-based team of autonomous robots to build a biosphere ready for my arrival. As the World's expert in artificial intelligence, can you help me achieve my dream?

Yours, A. Roamer

Dear Mr. Roamer,

Our Institute has already solved your problem. Our team of robotic space farers, the **SITH™** (Super-Intelligent, Travelling Hackettes), already has an extensive Mars base, with a habitat tailor-made for humans. We can, however, offer much, much more. As robots, the **SITH™** are able to travel much faster and for much longer than frail humans. They are spreading throughout the Galaxy, with bases in

many star systems now, and many more imminent. We offer a cryonics option in our space travel service. Your body is frozen, transported many light years to a distant exoplanet and then thawed in your personalised biosphere. The stars can be yours!

Yours, Aloysius

---

Dear Fr. Hacker,

We've been instructed that "Brexit" means Brexit, but what is the non-recursive definition? My future career depends on a clear answer.

Yours, Boris

Dear Boris,

Brexit offers the opportunity for unlimited trading and, hence, unlimited wealth. Set your sights, beyond mere Earthly horizons. **BREXIT™** (Better, Richer, Economic Xenophilia: Interstellar Trade) has been created by the **SITH™** to enable unrestricted commerce across the Galaxy. Coal, for instance, is a rare and precious gemstone on Knick-Knack 3, whereas diamonds litter the ground metres deep – some the size of footballs. Get Britain's coal mines working again while simultaneously making it the World centre for jewellery.

---

Yours, Aloysius

Dear Fr. Hacker,

Poster boys for **BREXIT**<sup>TM</sup>, we **JEDI**<sup>TM</sup> (Jewellery Experts; Diamond Innovators) used to be. Much needed expertise in jewellery making to Earth we brought. Scapegoats, though, we have now become. Ridiculed for our grammar and subject to racist and anti-immigrant persecution we now are. Us, Fr. Hacker, please help.

Yours, Koh-i-Noor

Dear Koh,

The diamond boom is now over: a victim of its own success. The Earth is awash with diamonds, so they are no longer valued and, so, no longer in demand. Although the **JEDI**<sup>TM</sup>'s rare and accomplished skills made the dia-

mond boom possible and, hence, helped deliver the dream of **BREXIT**<sup>TM</sup>, with the busting of the boom, you have become redundant: unloved, unemployed immigrants.

To restore your fortunes, you need to find a new and more lucrative employment. Fortunately, our Institute has found the solution you need. In any chaotic period of history, the arms trade is a sure-fire winner. We have adapted your laser-based, diamond-cutting technology to create a revolutionary new class of weapons: **SABRE**<sup>TM</sup> (Small Arms Built from Radiant Electromagnetism). Heavy **SABRE**<sup>TM</sup> packs the punch of artillery in a portable package, whereas light **SABRE**<sup>TM</sup> is a unique combination of blade and firearm for personal use. Heroic, once more, you will become (got me at it now you have).

Yours, Aloysius



**Fr. Aloysius Hacker**

Cognitive Divinity Programme

Institute of Applied Epistemology

# Back matter

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AISB membership includes the following benefits:

- Quarterly newsletter.
- Electronic subscription to *Connection Science* published by Taylor & Francis.
- Student travel grants to attend conferences.
- Discounted rates at AISB events and conventions.
- Free attendance of Members Workshops.
- Discounted rates on various publications.
- A weekly email bulletin and web search engine for AI-related events and opportunities.

You can join the AISB online via: <http://aisb.org.uk>