



*Call for Participation*

# 2009 AAAI Fall Symposium Series

November 5–7, 2009  The Westin Arlington Gateway, Arlington, Virginia

*Sponsored by the Association for the Advancement of Artificial Intelligence*

445 Burgess Drive, Menlo Park, California 94025 

1-650-328-3123  1-650-321-4457 (fax)  [www.aaai.org/fss09.php](http://www.aaai.org/fss09.php)

## Important Deadlines

May 29, 2009: Submission due to organizers

June 12, 2009: Notifications of acceptance sent by organizers

September 11, 2009: Accepted camera-ready copy due to AAAI.

## URL

[www.aaai.org/fss09.php](http://www.aaai.org/fss09.php)



*Photo courtesy Arlington Convention and Visitors Bureau*

The Association for the Advancement of Artificial Intelligence is pleased to present the 2009 Fall Symposium Series, to be held Thursday through Saturday, November 5–7, at the Westin Arlington Gateway in Arlington, Virginia. The Symposium Series will be preceded on Wednesday, November 4 by a one-day AI funding seminar. The titles of the seven symposia are as follows:

- Biologically Inspired Cognitive Architectures
- Cognitive and Metacognitive Educational Systems
- Complex Adaptive Systems and the Threshold Effect: Views from the Natural and Social Sciences
- Manifold Learning and Its Applications
- Multi-Representational Architectures for Human-Level Intelligence
- The Uses of Computational Argumentation
- Virtual Healthcare Interaction

An informal reception will be held on Thursday, November 5. A general plenary session, in which the highlights of each symposium will be presented, will be held on Friday, November 6.

Symposia will be limited to 40–60 participants each. Participation will be open to active participants as well as a limited number of interested individuals on a first-come, first-served basis. Each participant will be expected to attend a single symposium. Working notes will be prepared and distributed to participants in each symposium. Registration information will be available on the AAAI web site in August 2009. To obtain registration information, write to:

AAAI Fall Symposium Series  
445 Burgess Drive, Suite 100  
Menlo Park, CA 94025-3442  
Telephone: (650) 328-3123\*  
Fax: (650) 321-4457\*  
E-mail: [fss09@aaai.org](mailto:fss09@aaai.org)\*  
[www.aaai.org/Symposia/Fall/fss09.php](http://www.aaai.org/Symposia/Fall/fss09.php)

## Submission Requirements

Interested individuals should submit a paper or abstract by the deadline listed in the box above. For AAAI formatting guidelines, please see the Author pages on the AAAI website. Please mail your submissions directly to the chair of the individual symposium according to their directions. Do not mail submissions to AAAI. See the appropriate section in each symposium description for specific submission requirements.

The challenge of designing a human-level learner is central to creating a computational equivalent of the human mind. It demands the level of robustness and flexibility of learning that today is available in biological systems only. Therefore, it is essential that we better understand at a computational level how biological systems naturally develop their cognitive and learning functions. In recent years, biologically inspired cognitive architectures (BICA) have emerged as a powerful new approach toward gaining this kind of understanding. The impressive success of BICA-2008 was clear evidence of this trend. As the next event in a series, BICA-2009 is expected to be a similar success, with the overall atmosphere of excitement and possibility, brainstorming and collaboration.

The narrow focus of the symposium is on the idea to replicate natural cognitive growth in artifacts using a cognitive chain reaction: so that new functions and learning abilities would emerge from interaction and integration of existing ones, allowing the artifact to reach a human level of intelligence in selected domains via bootstrapped learning scaffolded by an instructor. Specific tasks defining this challenge (and panel discussion topics) include the following:

- To identify essential components of a critical mass that enables humanlike bootstrapped learning in BICA
- To understand how biological constraints help enabling self-regulated cognitive growth
- To design curricula, tests, scalability metrics, and a roadmap to solving the challenge.

Broader topics include embodied cognitive architectures, language acquisition by artifacts, theories and models of biological cognitive and learning functions (including metacognition, emotions and episodic memory), and potential applications of BICA. A joint session on self-regulated learning is planned with the parallel symposium on Cognitive and Metacognitive Educational Systems.

The format is one-track session with intermittent open-format panel discussions. Sessions include keynotes, regular talks and poster summaries. Social agenda includes regular lunch and a banquet.

## Submissions

All presentations require submissions using the latest AAAI template. Submission categories are regular papers (4–6 pages), position papers, abstracts (1–2 pages), and invited or keynote papers (up to 12 pages). Please indicate your intent to submit as soon as possible; send all submissions and inquiries to the chair: Alexei Samsonovich (Research Assistant Professor, KIAS, George Mason University, [asamsono@gmu.edu](mailto:asamsono@gmu.edu) or [samsonovich@cox.net](mailto:samsonovich@cox.net)).

## Organizing Committee

Alexei Samsonovich, Chair (KIAS, George Mason University), Igor Aleksander (Imperial College), Antonio Chella (University of Palermo), Stan Franklin (University of Memphis), Christian Lebiere (Carnegie Mellon University), Shane Mueller (Klein/ARA), David Noelle (University of California, Merced) and Lokendra Shastri (SETLabs/Infosys)

## Additional Information

For more information about the symposium, see [binf.gmu.edu/~asamsono/bica](http://binf.gmu.edu/~asamsono/bica).

# Cognitive and Metacognitive Educational Systems

Computer-based learning environments are designed to support learning processes to facilitate acquisition, development, use, and transfer of knowledge and strategies required to solve complex tasks. These systems have to interact with different users, and support them with decisional processes that are sensitive to individual differences. A primary concern is self-regulation, which is important for developing independent learners.

Students need to plan their learning activities, to adapt their learning strategies to meet learning goals, monitor and control their cognitive processes, and self-assess their own performance. In addition, students must also regulate their affect and motivation. Students also need flexible systems that can provide visualization and browsing of multirepresentational materials that match the student's learning profile. These systems have to exhibit a very tight interaction between learner characteristics, and the mediating regulatory processes.

Teachers and human tutors need easy-to-use tools to visualize the domain for design purposes, and to control the acquisition of self-regulatory skills, to stimulate knowledge elicitation, and to integrate new knowledge. Finally, these users need to dynamically monitor and model all of the students' activities, make complicated inferences about them, to ensure that learning is maximized. Students and tutors need decision support capabilities in terms of social networks analysis, visualization tools of students' behaviors in relation to the domain knowledge to be explored and lin-

guistic tools to analyze their sentences in forums and chats.

Traditional intelligent (rational) systems have limitations in achieving all these goals. Systems in support of education have to be "cognitive." A (meta)cognitive system is self-aware — it can adapt to the user, and may propose self-regulation strategies to help the user learn and deploy self-regulatory processes. This sort of cognitive push-pull can be enabled via multimodal interaction where the linguistic modality as well as other detector (for affect, motivation, and behavioral monitoring and control) is very crucial. The possibility to define a system's "mental state" can enable it to increase autonomously its knowledge to support the user in his or her decisional processes.

This symposium is designed to stimulate the creation of a dedicated research community about the definition of what is a (meta)cognitive educational system. What aspects of cognition, metacognition, affect, and motivation have to be explored and integrated to achieve the goal of a new generation of metacognitive tools for enhancing learning with understanding and transfer in metacognitive educational systems?

## Submissions

All papers should be prepared using the AAAI author kit and should be submitted via e-mail to [mces09-submission@dinfo.unipa.it](mailto:mces09-submission@dinfo.unipa.it). An extended CFP along with important dates and instructions for authors is available at the supplementary symposium web site. For other information, please write to [mces2009-info@dinfo.unipa.it](mailto:mces2009-info@dinfo.unipa.it).

## Organizing Committee

Roberto Pirrone, Cochair (University of Palermo, Italy), Roger Azevedo, Cochair (University of Memphis), Gautam Biswas, Cochair (Vanderbilt University), Philip Winne (Simon Fraser University), James Lester (North Carolina State University), Susanne Lajoie (McGill University), Valerie Shute (Florida State University), Amy Baylor (National Science Foundation)

## Additional Information

For more information about the symposium see [www.dinfo.unipa.it/mces2009](http://www.dinfo.unipa.it/mces2009).



Photo courtesy Arlington Convention and Visitors Bureau

# Complex Adaptive Systems and the Threshold Effect: Views from the Natural and Social Sciences

Most interesting phenomena in natural and social systems include transitions and oscillations among their various phases. Companies, societies, markets, and humans rarely stay in a stable, predictable state for long. Randomness, power laws, and human behavior ensure that the future is both unknown and challenging. How do events unfold? When do they take hold? Why do some initial events cause an avalanche while others do not? What are the characteristics of these threshold phenomena that differentiate a sea change from a nonevent?

Complex adaptive systems (CAS) and related technologies have proven to be powerful tools for exploring threshold phenomena. We characterize a general CAS model as having a significant number of self-similar agents that utilize one or more levels of feedback; exhibit emergent properties and self-organization; and produce nonlinear dynamic behavior.

Advances in modeling and computing technology, including CAS, have led to a deeper understanding of complex systems in many fields in the natural, physical, and social sciences. These developments have raised the possibility that similar fundamental principles may be at work across these systems, even though the underlying principles may manifest themselves in different ways. We therefore invite submissions from researchers across a wide range of disciplines, in the belief that a deep understanding in one domain may lead to greater insight into others.

## Format

Our symposium will have invited talks from leaders in the field, as well as paper presentations on both completed and speculative work. Due to the nature and the novelty of the theme, it is essential to allow ample time for both open-ended and targeted discussions; as such, we will hold panel discussions and smaller break-out groups to allow for a spirited interaction among participants.

## Submissions

Submissions for full papers should be no more than 10 pages, including references. For submission guidelines, please visit the supplemental symposium website.

## Organizing Committee

Mirsad Hadzikadic, Cochair (University of North Carolina Charlotte), Ted Carmichael, Cochair (University of North Carolina Charlotte), Didier Dréau (University of North Carolina Charlotte), Jim Walsh (University of North Carolina Charlotte), Thom McLean (Georgia Tech), Cathy Zambaka (BAE Systems), Marvin Croy (University of North Carolina Charlotte), Aaron Frank (BAE Systems), John Hummel (Argonne National Laboratory), Charles Macal (Argonne National Laboratory), John Stamper (University of North Carolina Charlotte), Alfred Hbler (University of Illinois, Urbana Champaign), Russ Abbott (California State University), Patrick Grim (SUNY Stony Brook), Andrea Jones-Rooy (University of Michigan), Scott Demarchi (Duke University), Bill Rand (University of Maryland), Bob Reynolds (Wayne State University), Anne-Marie Grisogono (Defense Science and Technology Organisation, Australia), Tony Beavers (University of Evansville), Eunice Santos (Virginia Tech)

## Additional Information

For more information about the symposium see [sites.google.com/site/complexadaptivesystems](http://sites.google.com/site/complexadaptivesystems).

# Manifold Learning and Its Applications

In recent years, an impressive number of methods have been proposed for manifold learning and nonlinear dimensionality reduction. This fact illustrates both the growing interest in the area and the myriad of possible approaches to the problem. These methods vary, for example, in terms of the preservation of global or local properties of the data, regularization methods or the application of probabilistic or geometric constraints to the embedding.

The resulting theory and methods of manifold learning can be applied to many areas. For example, in computer vision, most data sets are comprised of sparse, high dimensional data (for example, hundreds of images where each image contains millions of pixels). Manifold learning has been used to facilitate common computer vision tasks such as video content analysis, pose estimation, image or video segmentation, and object tracking. Similarly, applications of manifold learning are abundant in bioinformatics, natural language processing, and robotics.

The goal of this symposium is to identify the overlap of theory and uses of manifold across the disciplines, which both produce and consume these methods in order to consolidate the knowledge on this topic, discuss the achievements in the area, and figure out the common open problems. Topics of interest include, but are not limited to the following:

- Theory of manifold learning (including distance metrics, laplace operators, harmonic analysis, dimensionality estimation, regression and classification, sparsity and compressive sensing, approximation of manifolds, and parameterizations and embeddings)
- Manifold learning and graph-based methods (including kernel, spectral, topological, probabilistic methods, and method taxonomies)
- Applications of manifold learning (including ai, bioinformatics, computer vision, nlp, robotics, and social networks)

## Submissions

We invite submissions for original papers that introduce new research developments, directions, frameworks, results, etc. in these and related areas. Potential participants may submit full papers (up to 8 pages in length in AAAI format) or short papers (extended abstracts, 1–2 pages in length) to [www.easychair.org/login.cgi?conf=aaais09ml](http://www.easychair.org/login.cgi?conf=aaais09ml).

## Organizing Committee

Mikhail Belkin (The Ohio State University), Mauro Maggioni (Duke University), Sridhar Mahadevan (University of Massachusetts), Richard Souvenir, Chair (University of North Carolina at Charlotte), Jerry Zhu (University of Wisconsin – Madison)

## Additional Information

For more information about the symposium see [odin.uncc.edu/aaai-manifold](http://odin.uncc.edu/aaai-manifold).

# Multi-Representational Architectures for Human-Level Intelligence

A multiplicity of representational frameworks has been proposed for explaining and creating human-level intelligence. Each has been proven useful or effective for some class of problems, but not across the board. This fact has led researchers to propose that perhaps the underlying design of cognition is multirepresentational, or hybrid, and made up of subsystems with different representations and processes interacting to produce the complexity of cognition. Recent work in cognitive architectures has explored the design and use of such systems in high-level cognition.

With the increasing interest in this topic, this seems a good time to review the state of the research. The main aim of the symposium is to bring together researchers who work on systems utilizing different types of representations to explore a range of questions about the theoretical framework and applications of such systems. Items of theoretical interest include fundamental questions about the nature and role of multiple representations in high-level cognition as well as the control mechanisms and processes by which a system leverages these representations in achieving problem solving goals. In addition, the symposium also seeks to identify problems and domains where such systems have been (or can be) successfully applied.

## Format

The symposium will include invited talks, paper presentations, working groups and discussions with expert panels. Each paper presentation session will end with a discussion where the presenters of that session form the expert panel. In addition, the working groups will foster further discussion on specific topics both theoretical and application oriented.

## Submissions

Interested participants should submit full papers (up to 6 pages in AAAI format) or position papers (up to 2 pages) in PDF format to Unmesh Kurup at [kurupu@rpi.edu](mailto:kurupu@rpi.edu). Selected papers from the symposium will be published as an AAAI technical report.

## Organizing Committee

Unmesh Kurup, Chair (Rensselaer Polytechnic Institute, USA), B. Chandrasekaran (The Ohio State University, USA), Bonny Banerjee (Securboratorion, USA), John Laird (University of Michigan, USA), Scott Lathrop (United States Military Academy, USA), Marvin Minsky (MIT Media Lab, USA), Luis Pineda (Universidad Nacional Autónoma de México, Mexico), Samuel Wintermute (University of Michigan, USA)

## Additional Information

For more information about the symposium see [www.diagrams.ukurup.com/hybrid](http://www.diagrams.ukurup.com/hybrid).



*Photo courtesy Arlington Convention and Visitors Bureau*

# The Uses of Computational Argumentation

Argumentation is a form of reasoning in which explicit attention is paid to the reasons for the conclusions that are drawn. Explicit consideration of the support for conclusions provides a mechanism, for example, to handle inconsistent and uncertain information. Argumentation has long been studied in disciplines such as philosophy, and one can find approaches in computer science from the 1970s onwards that clearly owe something to the notion of an argument. Work on computational argumentation, where arguments are explicitly constructed and compared as a means of solving problems on a computer, first started appearing in the second half of the 1980s, and argumentation is now well established as an important subfield within artificial intelligence.

We now have a good understanding of the basic requirements of argumentation systems, and there are several theoretical models that have been widely studied by researchers. We have one or two robust implementations, and the first software systems built around argumentation are beginning to appear. This, therefore, is an appropriate time to consider what these models and implementations might be used for. This symposium will provide a forum for wide-ranging discussion of the possible applications of techniques from computational argumentation. It will give special focus to strongly innovative ideas, ideas that can engage current researchers in the area and can inspire others to become researchers in the area.

We are interested in all areas relating to argumentation and computation, including, but not limited to the following:

- Applications of argumentation systems
- Implementations of argumentation systems
- Argumentation and inconsistent information
- Argumentation and uncertain information
- Argumentation and decision making
- Argumentation as an interaction mechanism
- Multiagent argumentation
- Formal models of argumentation

We are particularly interested in hearing of new applications of argumentation, and new areas in which argumentation could be applied. Descriptions of work in progress are welcomed.

## Submissions

Interested participants should submit papers (up to 6 pages in AAAI format) in PDF format to Simon Parsons at [parsons@sci.brooklyn.cuny.edu](mailto:parsons@sci.brooklyn.cuny.edu). Selected papers from the symposium will be published as an AAAI technical report.

## Organizing Committee

Simon Parsons, Chair (Brooklyn College, City University of New York), Pietro Baroni (University of Brescia, Italy), Trevor Bench-Capon (University of Liverpool, UK), Nancy Green (University of North Carolina Greensboro, USA), Henry Prakken (Utrecht University, The Netherlands)

## Additional Information

For more information about the symposium see [www.sci.brooklyn.cuny.edu/~parsons/events/uses](http://www.sci.brooklyn.cuny.edu/~parsons/events/uses).



**I**nteraction between healthcare providers and consumers has a central role in consumer satisfaction and successful health outcomes. The healthcare consumer, facing increasing responsibility for healthcare decisions, may turn to electronic resources to supplement the information given by his healthcare provider. Here intelligent systems can assist in retrieval and summarization of relevant and trustworthy information, in tailoring the information so that it is comprehensible, and in making it accessible to computer users with disabilities. Furthermore, intelligent systems are beginning to appear that provide virtual healthcare services to the patient: for example, monitoring the patient's health, reminding him to take his medicine, and encouraging him to exercise or eat a healthy diet. On the health care provider's side, artificial intelligence can provide virtual patients for training providers to diagnose, care for, or communicate with clients.

This symposium will focus on virtual healthcare interaction (VHI): use of intelligence artificial in interaction traditionally occurring between healthcare providers and consumers. Topics of interest include, but are not limited to the following:

- Virtual healthcare providers (for example, medication advising, counseling)
- Games, conversational agents, and dialogue systems for healthy behavior promotion (for example, STD prevention, personal exercise trainer)
- Virtual patients for training providers to diagnose, care for, or communicate with clients (for example, virtual psychiatric patient)
- Decision support for healthcare clients (for example, for cancer treatment)
- Explanation for informed consent
- Healthcare interventions (for example, cognitive prostheses, speech therapy, virtual or robotic companions)
- Tailoring health information or risk communication to patients, including low-literacy, low-numeracy, or under-served audiences
- Intelligent retrieval and summarization of healthcare information tailored for patients
- Tailored access to medical record supporting both providers and consumers
- Intelligent interfaces supporting access to healthcare services for people with HCI limitations (for example, motor, vision, hearing, cognitive).

In addition to AI researchers, the symposium invites participants from healthcare-related fields with an interest in these issues.

## Submissions

Five types of submissions related to the symposium themes are invited: (1) a paper on mature research (8 pages maximum); (2) a short paper on less mature research (4 pages maximum); (3) a position paper (4 pages maximum); (4) an abstract for software demonstration (2 page maximum); and (5) a proposal for panel discussion (2 page maximum). Submit paper in PDF format through EasyChair ([www.easychair.org/login.cgi?conf=vhi09](http://www.easychair.org/login.cgi?conf=vhi09)). Accepted papers will be available to participants as working notes, and may be published through the AAAI Symposium Technical Report series.

## Organizing Committee

Nancy Green, Cochair (University of North Carolina Greensboro), Donia Scott, Cochair (Open University), Tim Bickmore (Northeastern University), Giuseppe Carenini (University of British Columbia), Floriana Grasso (University of Liverpool), Curry Guinn (University of North Carolina Wilmington), Kathy McCoy (University of Delaware), Cecile Paris (CSIRO ICT Centre, Australia), Yan Qu, Ehud Reiter (University of Aberdeen)

## Additional Information

For more information about the symposium see [www.uncg.edu/~nlgreen/aaaifss09/VHI-09](http://www.uncg.edu/~nlgreen/aaaifss09/VHI-09)

