



Intercontinental hotel, the site of BICA 2013

BICA 2013



Annual International Meeting on Biologically Inspired Cognitive Architectures (BICA), Fourth Annual Meeting of the BICA Society

Kiev, Ukraine, September 14-15
(Saturday-Sunday)

<http://bicasociety.org/meetings/2013>

Initial submission: by arrangement

Final submission deadline: **July 16th**

Point of Contact: Alexei Samsonovich
alexei@bicasymposium.com

Sponsored by:

- The BICA Society (<http://bicasociety.org>)
- V.M. Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine (<http://www.icyb.kiev.ua/?lang=en>)
- O.O. Bogomoletz Institute of Physiology of the National Academy of Sciences of Ukraine (http://biph.kiev.ua/en/Main_Page)
- Taras Shevchenko National University of Kyiv (<http://www.univ.kiev.ua/en/>)
- National Technical University of Ukraine (Kyiv Polytechnic Institute: <http://inter.kpi.ua/>)

FINAL CALL FOR PAPERS

The challenge of creating a real-life computational equivalent of the human mind, known as the BICA Challenge, calls for our joint efforts to develop biologically-inspired intelligent agents and co-robots that can be accepted and trusted by the human society as partners in various roles. To do this, we need to better understand at a computational level how natural intelligent systems develop their cognitive and learning functions.

Specific task for BICA 2013 is to put together four major thrusts: neuro-, social, cognitive and computer sciences, approaching the same BICA Challenge from four different perspectives (B, I, C, A):

B: Neuroscience, the goal of which is to understand how the brain works.

I: Integration with social, economic, educational science, arts and humanities.

C: Cognitive sciences, pursuing the goal to understand how the mind works.

A: Artificial intelligence, attempting to replicate the complete complex of human intelligent behavioral capabilities in a machine.

Therefore, specific topics spanning, but not limiting, the scope of BICA 2013 can be quite arbitrarily grouped as follows (the lists are sorted alphabetically):

Thrust B: Neuroscience

- "B" in BICA and useful biological constraints for cognitive architectures
- Bridging the gap between artificial and natural information processing
- Cognitive and learning mechanisms informed by neuroscience
- Functionality and phenomena implicated in the natural brain-mind
- Neural correlates of cognitive and metacognitive processes
- Neuromorphism as a basis for robustness, scalability and adaptability
- Neurophysiological underpinnings of reinforcement learning
- Physiological mechanisms of memory formation and (re)consolidation
- Representation of conceptual knowledge in neural systems
- The mystery of allocentric representations of space in the brain

Thrust I: Integrating Social, Economic, Educational Science, Arts and Humanities

- Agents capable of inducing the sense of human-like co-presence
- Agents possessing human-level social and emotional intelligence
- Applications of BICA-related technologies in art and entertainment
- BICA in learning and tutoring technologies and education
- Development of persistent human-robot personal relationships
- Life-long learning and cognitive growth in humans and in artifacts
- Models of consciousness and the self and their mapping to BICA
- New concept formation and symbol grounding
- Recognition of virtual agents as potentially equal minds by humans
- Representation, perception, recognition and expression of emotions
- Roadmap to a complete human-equivalent artifact
- Social compatibility and human-like ethical values in BICA
- Utility of emotional intelligence in virtual agents
- Virtual characters and artificial personalities

Thrust C: Cognitive sciences

- Combining natural and artificial approaches to cognition
- Comparison of different forms of learning

- Episodic memory, the Self and personality in BICA
- Higher-order thoughts, introspection and metacognitive reasoning
- Human-specific forms of episodic and semantic memory
- Metacognition, Theory-of-Mind and self-awareness in BICA
- Models of learning and memory: robustness, flexibility, transferability
- Perception, cognition and action in BICA
- Psycho-linguistic inspirations and natural language
- Unifying frameworks for cognitive architectures
- Vital psychological constraints for BICA

Thrust A: Artificial intelligence

- Affective computing, models of appraisal, motivation and intention
- BICA models of emotions and emotionally competent artifacts
- Classification and comparative analysis of BICA
- Cognitive Decathlon and the Grand Challenge for BICA
- Critical mass for cognitive growth in a learning environment
- Design, creativity, autonomy, and goal generation in BICA
- Embodied vs. ambient intelligence
- Language capabilities and social competence in BICA
- Learning by reading in BICA
- Learning by reasoning and analogy
- Learning from experience and observation
- Non-von-Neumann computational systems for BICA
- Physically or virtually embodied BICA
- Robust and scalable machine learning mechanisms
- Scalability and robustness of biologically-inspired learning
- Self-regulated learning, bootstrapped and meta-learning

General topics that unify all thrusts:

- A roadmap to the BICA Challenge
- Alternative substrates for implementation of BICA
- Critical mass of a universal human-level learner
- Evolutionary and system-theoretic approach to design of BICA
- Fundamental theoretical questions in BICA research
- Integrated cognition and grand-unification of BICA
- Metrics, tests, proximity measures and the roadmap to human-level AI

Format:

A 1.5-day Meeting including keynote talks, paper presentations, panel discussions and exhibits. Ad hoc working groups and breakout sessions together with informal panel discussions will help us to create an atmosphere

of excitement and opportunity, supporting brainstorming and development of new collaborations. Consistent with this agenda, our captivating social program includes a welcome reception, high-standard coffee breaks, pre-ordered lunches, a Think Tank boat trip with a banquet on the river Dnepr, a trip to the Caves Monastery of the Kiev Pechersk Lavra – all included in the registration fee, that also covers publications, registration materials etc. The working language is English.

Featured speakers include, alphabetically:

Confirmed

- David Aha (Naval Research Laboratory, Washington D.C.) – conditionally
- Konstantin Anokhin (Kurchatov Nat. Res. Center, Moscow)
- Roger Azevedo (McGill University, Canada)
- Gyorgy Buzsaki (New York University)
- Antonio Chella (University of Palermo)
- Benjamin Dunn (Kavli Institute for Systems Neuroscience)
- Kamilla R. Johannsdottir (Reykjavik University)
- Robert Laddaga (Massachusetts Institute of Technology)
- Paul Robertson (DOLL, USA)
- Jan Treur (VA University Amsterdam)
- Ricardo Sanz (Polytechnic University of Madrid)
- Junichi Takeno (Meiji University, Japan)
- David Vernon (Sweden)

Interested, likely to come

- Cyril Brom (Charles University, Prague)
- Balakrishnan Chandrasekaran (Ohio State U. / LAIR)
- Haris Dindo (University of Palermo)
- John Gero (University of North Carolina Charlotte)
- Jeff Hawkins (Numenta, Redwood City, CA)
- Eva Hudlicka (Psychometrix, Virginia)
- Jeff Krichmar (Neurosciences Institute, San Diego)
- Igor Linkov (US Army Corps of Engineers)
- Shane Mueller (Michigan Technological University)
- David Noelle (University of California, Merced)
- Frank Ritter (Penn State University)
- Michael Sellers (Online Alchemy and Gotland University, Visby Sweden)
- Terry Stewart (University of Waterloo, Canada)
- Hans-Georg Stork (European Commission, retired)
- Menno Witter (Kavli Institute for Systems Neuroscience)

Publication venue and submission categories are:

Special issue of the journal BICA that will be printed before the Meeting and included in the registration package.

- Submit your paper at <http://www.ees.elsevier.com/bica/>
- Manuscripts should be prepared according to the Guide for Authors (<http://www.elsevier.com/journals/biologically-inspired-cognitive-architectures/2212-683X/guide-for-authors>).
- Essentials from the Guidelines: NOT camera-ready, single column, sections and references should NOT be numbered, use APA style for citations, submit all sources, including a separate high-resolution graphic file in any format for each figure. Figures can be also included in the manuscript.
- Submit with the comment in the first line of the cover letter relating your manuscript to BICA 2013
- Paper categories include: Letter (~2500 words, up to 6 pages, preferred) and Research Article (~8000 words, up to 20 journal pages including references, figures and tables)
- Registration fee payment will be due after the conditional acceptance of your paper, before its final acceptance, and before the registration deadline for Authors that will be specified. Registration will open soon.
- Notifications of submission intent are requested and should be sent via email to alexei@bicasymposium.com as soon as possible

Submission deadline was June 16th, 2013. After this date, initial submissions should be negotiated via email to alexei@bicasociety.org. Final submission deadline for accepted and revised papers is July 16th (in some cases earlier).

Meeting venue:¹

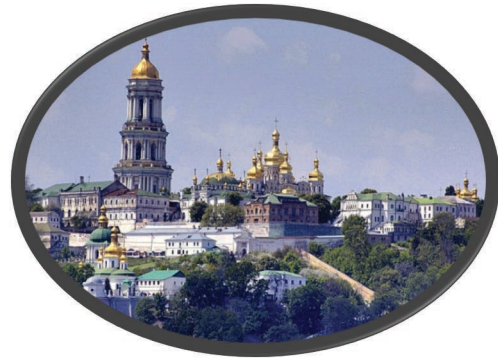
InterContinental 5 star hotel at the heart of Kiev (<http://www.intercontinental-kiev.com>; <http://www.ichotelsgroup.com/intercontinental/hotels/gb/en/kiev/kbpha/hoteldetail>) is the best possible site for BICA in Kiev. We can also help you to arrange less expensive but excellent housing at [nearby hotels under 100 EUR per night](#) or [apartments from \\$50 USD per night](#).

If you think you cannot afford the travel or would not fit it in your schedule, then we encourage you to look at our examples of flight itineraries (<http://bicasociety.org/meetings/2013/itineraries>) showing that air travel to Kiev can be cheaper than to western Europe.

¹ We are aware of the coincidence in time of Yom Kippur (http://en.wikipedia.org/wiki/Yom_Kippur) and BICA 2013. Unfortunately, it was not possible to select different dates for the Meeting. We will do our best to provide necessary services for our participants. In particular, free transportation to the local synagogue and kosher restaurant can be arranged. We ask to notify the Organizing Committee of your preferences in advance.



Dnepr



Lavra

Tentative Registration Fees:

Early: \$620 USD. Guest: \$400 USD. The registration fee covers **a Think Tank boat trip on the Dnepr River with a banquet, a post-Meeting guided tour of Kiev-Pechersk Lavra**, a volume of Meeting proceedings (*see above*), a welcome reception, two lunches, coffee-breaks, a BICA bag, a BICA shirt of the requested size depending on the availability, and a one-year complimentary BICA Society membership (with a number of benefits, including free access to the journal). It remains to add: Kiev is more beautiful now than ever. Please see pictures of Kiev at <http://bicasociety.org/PhotoAlbumsPro/kiiev2013/>.

Organizing Committee:

Core Organizing Committee

- *Alexander Letichevsky – **General Chair** (Glushkov Inst. of Cybernetics NASU)*
- *Oleg Krishtal – **Co-Chair** (Bogomoletz Institute of Physiology NASU)*
- *Alexei Samsonovich – **PC Chair** (Krasnow Inst., George Mason University)*
- Antonio Chella – **PC Chair** (University of Palermo)
- Kamilla Johannsdottir (Reykjavík University)

Extended Organizing Committee

- David Aha (Naval Research Laboratory, Washington D.C.)
- Igor Aleksander (Imperial College London)
- Konstantin Anokhin (Kurchatov National Research Center, Moscow)
- Witali Dunin-Barkowski (Sci. Res. Inst. for System Analysis RAS, Moscow)
- Ashok Goel (Georgia Institute of Technology)
- Stephen Grossberg (Boston University)
- Owen Holland (University of Sussex)
- Robert Laddaga (Massachusetts Institute of Technology)
- Christian Lebiere (Carnegie Mellon University)
- Shane Mueller (Michigan Technological University)

- David Noelle (University of California, Merced)
- Roberto Pirrone (University of Palermo)
- Vladimir Redko (Sci. Res. Inst. for System Analysis RAS, Moscow)
- Paul Robertson (DOLL, USA)
- Hans-Georg Stork (European Commission, retired)
- Junichi Takeno (Meiji University, Japan)
- Valery Tarassov (Bauman Moscow State Technical University)
- Jan Treur (VA University Amsterdam)
- Vadim Ushakov (MEPHI, Moscow)
- Vladimir Yakhno (IAP RAS, Nizhny Novgorod, Russia)

Local Organizing Committee

- Alexander Letichevsky – **Chair** (Glushkov Institute of Cybernetics NASU)
- Dmitry Alekseev (Glushkov Institute of Cybernetics NASU, Kiev)
- Pavel Belan (Bogomoletz Institute of Physiology NASU, Kiev)
- Yuriy Belov (Taras Shevchenko National University of Kyiv)
- Oleg Krishtal (Bogomoletz Institute of Physiology NASU, Kiev)
- Kate Pereverza (Kiev Polytechnic Institute)
- Yuriy Valkman (IRTCITS NASU and Kiev Polytechnic Institute)

Program Committee:

Chairs

- Antonio Chella (Robotics, University of Palermo)
- Alexander Letichevsky (Glushkov Institute of Cybernetics NASU)
- Alexei Samsonovich (Krasnow Institute, George Mason University)

Members

- Myriam Abramson, Tsvi Achler, Samuel Adams, Giovanni Adorni, Liliana Albertazzi, Colin Allen, Leonardo F. Almada, Yiannis Aloimonos, Heather Ames, Giuseppe Anastasi, Michael Anderson, Konstantin Anokhin, Kenji Araki, Itamar Arel, Raul Arrabales, Roger Azevedo, Joscha Bach, Allan Kardec Barros, Gary Berg-Cross, Robert Berwick, Rajan Bhattacharyya, Perrin Bignoli, John Mark Bishop, Gautam Biswas, Piotr Boltuc, Jonathan Bona, Tibor Bosse, Michael Brady, Bert Bredeweg, Cyril Brom, Andrew Browning, Andrea Carbone, Aiello Carlucci, Gail Carpenter, Ritu Chadha, Balakrishnan Chandrasekaran, Suhas Chelian, Antonio Chella, Wei Chen, Yushing Cheung, Susan Chipman, Robert Clowes, Vasile Coman, Robert Coop, Roberto Cordeschi, Massimo Cossentino, Andrew Coward, Jose Cruz-Albrecht, Antonella D Amico, Sidney D’Mello, Mike Daily, Christopher L Dancy, Son K. Dao, Kerstin Dautenhahn, Hugo De Garis, Kenneth De Jong, Haris Dindo, Simona Doboli, Keith Downing, Daniel Dubois, Wlodek Duch, Jim Eilbert, Chris Eliasmith, Thomas Eskridge, Elena Fedorovskaya, Stanley

Franklin, Marcello Frixione, Alexander A Frolov, Karl Fua, Salvatore Gaglio, David Gamez, Ross Gayler, John Gero, Laurie Gibson, Ashok Goel, Ben Goertzel, Jaime Gomez, Diane Gromala, Claudius Gros, Horst-Michael Gross, Paul Hasler, Nick Hawes, Seth Herd, Laura Hiatt, Steve Ho, Ian Horswill, Mike Howard, Eva Hudlicka, Dusan Husek, Christian Huyck, John Irvine, David Israel, Kamilla Jóhannsdóttir, Magnus Johnsson, Benjamin Johnston, William G. Kennedy, Deepak Khosla, Anastasia Kitsantas, Paul Kogut, Jeffrey L. Krichmar, James Kroger, Giuseppe La Tona, John Laird, Richard Lau, Christian Lebiere, Emmanuel Lesser, Simon Levy, Mei Yii Lim, Igor Linkov, Giuseppe Lo Re, Shoshana Loeb, Andras Lorincz, Brad Love, Thomas Lu, Wei Lu, Rose Luckin, Evie Malaia, Maria Malfaz, Riccardo Manzotti, Thomas Martin McGinnity, Patrick Mcknight, Christophe Menant, Emanuele Menegatti, Elena Messina, Michele Migliore, Zaruhi Mnatsakanyan, Steve Morphet, Shane Mueller, Hector Munoz-Avila, Catherine E. Myers, Waseem Naqvi, Daniele Nardi, Sergei Nirenburg, David Noelle, Tatsuya Nomura, Andrew Nuxoll, Andrea Omicini, Marco Ortolani, Enrico Pagello, Jaehyon Paik, Charles Peck, Carlo Penco, Jacques Penders, Alfredo Pereira, Peter Petre, Alex Petrov, Giovanni Pezzulo, Robinson Pino, R. Pirrone, Roberto Poli, Chris Poulin, Michal Ptaszynski, Paavo Pylkannen, Uma Ramamurthy, Vladimir Redko, Jim Reggia, Scott Reilly, Mark Reimers, Paul Robertson, Brandon Rohrer, Pablo Enrique Roman, Derek Rose, Paul Rosenbloom, David Rosenbluth, Pier-Giuseppe Rossi, Christopher Rouff, Miguel Salichs, Joseph Salvo, Giulio Sandini, Amy Santamaria, Ricardo Sanz, Michael Schader, Theresa Schilhab, Juergen Schmidhuber, Walter Schneider, Michael Schoelles, Stan Sclaroff, Valeria Seidita, Mike Sellers, Ignacio Serrano, Antonio Sgorbissa, Murray Shanahan, Bruno Siciliano, Hava Siegelmann, Tomas Singliar, Timothy Smith, Javier Snaider, Donald Sofge, Meehae Song, Rosario Sorbello, John Sowa, Narayan Srinivasa, Terry Stewart, Andrea Stocco, Adrian Stoica, Susan Stuart, Doug Summers-Stay, Eugene Surowitz, Junichi Takeno, Gheorghe Tecuci, Marco Temperini, Serge Thill, Knud Thomsen, Guglielmo Trentin, Jan Treur, Eric Van Den Berg, Akshay Vashist, Rodrigo Ventura, Paul Verschure, Craig Vineyard, Adam Vogel, Paul Vogt, Yongjia Wang, Roseli Suzi Wedemann, Andrew Weiss, Mitch Wilkes, Mary-Anne Williams, Menno Witter, Neil Yorke-Smith, Daniele Zambuto, Changkun Zhao, Tom Ziemke, Terry Zimmerman.

Tentative Schedule:

Friday, September 13th

14:00 - 18:00 Optional pre-Meeting workshop

19:00 - 21:00 ***Welcome reception***

Saturday, September 14th

8:00 - 8:15 Registration / coffee

8:15 - 10:00 Plenary sessions

10:00 - 10:30 Coffee

10:30 - 12:30 Concurrent sessions

12:30 - 14:00 Organized BICA lunch

14:00 - 16:00 Concurrent sessions

16:00 - 16:30 Coffee

16:30 - 18:15 Plenary sessions

19:00 - 22:00 ***Think Tank boat trip with a banquet on the Dnepr River***

Sunday, September 15th

8:00 - 8:15 Registration, coffee

8:15 - 11:00 Concurrent sessions

11:00 - 11:30 Coffee

11:30 - 13:00 Plenary sessions

14:00 - 15:00 Organized BICA lunch

15:00 - 17:00 ***Post-Meeting guided tour of the Kiev-Pechersk Lavra***

Further Information:

Further information about BICA 2013 can be found on the Meeting web page at <http://bicasociety.org/meetings/2013>.

We are looking forward to seeing you in Kiev in September!

--Organizing Committee