EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE

EUROCORES Programme
European Collaborative Research

LogICCC – Modelling Intelligent Interaction

Logic in the Humanities, Social and Computational Sciences

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LogICCC – Modelling Intelligent Interaction. Logic in the Humanities, Social and Computational Sciences

Recent decades have seen major changes in the field of logic. Moving far beyond the traditional emphasis on philosophical argument, formal grammar or mathematical proof, modern logic has become a much richer inter-discipline which transcends the usual borderlines between academic 'cultures'.

Within the framework of logic, ideas from one discipline can effectively cross into another. For example, it has been suggested that conversation can be modelled as computation, thus taking a paradigm from the physical sciences into the humanities. But by the same token, modern computation can be understood as conversation between different processors, in which case ideas from the humanities enter the computational sciences. At the same time there is a more societal dimension to all this fundamental theory: enhancing rational communication is of eminent practical value in today's world, both in education and in the development of effective and human-oriented information technology.

A full analysis of these issues requires a common language and a framework which makes major structures visible across the humanities, social, computational and cognitive sciences and integrates them into comprehensive systems. Logic has played this role in the past for the foundation of the sciences, computation, and the semantics of natural languages. The EUROCORES programme LogICCC is based on the firm conviction that present-day logic will continue to play this role in the much broader setting described here.

LogICCC, with a budget of €6.5 million supported by 13 national funding organisations, has invited researchers from a wide variety of disciplines to team up. Some of these researchers are logicians, others are not. But what all participants in LogICCC projects have in common is their interest in understanding interaction, pursued with the common language and models provided by logic in its modern, pluriform and outward-looking guise.

List of funded Collaborative Research Projects (CRPs)

Computational Foundations of Social Choice (CFSC)

(DFG, ISF, NWO, TÜBITAK)

CFSC will address some of the key issues in computational social choice, an interdisciplinary field of study at the interface of social choice theory and computer science. It aims at deepening our understanding of algorithmic and complexity-theoretic issues in social choice, at developing logic-based languages for modelling and reasoning about choice problems and preference structures, and at applying established techniques from AI, such as preference elicitation and learning, to problems of collective decision making.

Further information:
http://www.tcs.ifi.lmu.de/~brandtf/cfsc.html

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Dialogical Foundations of Semantics (DiFoS)

(DFG, FCT, NWO)

Incorporating interaction and dialogue into logical semantics promises to overcome certain shortcomings of more traditional static approaches. The DiFoS project aims to assess the foundational value of dialogue semantics and to examine its potential to lay the foundations for logical reasoning in mathematics, computer science and linguistics. It will compare dialogical and game-theoretical semantics with inferentialist approaches, and also investigate the historical roots of dialogues in logic, especially within medieval theories of *obligationes*.

Further information:
http://www-ls.informatik.uni-tuebingen.de/difos/

Project Leader:

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Games for Analysis and Synthesis of Interactive Computational Systems (GASICS)

(DFG, FIST, FNRS)

This project studies game theoretic formalisations of interactive complex computational systems and algorithms for their analysis and synthesis. Our goal is to overcome the limitations of the existing notions of games played on graphs introduced by computer scientists, most of them being of the kind 'two players-zero sum'. We aim to extend them to 'multiple players-nonzero sum' games, and show the applicability of the new theory to the analysis and synthesis of interactive computational systems.

Further information:
http://www.ulb.ac.be/di/gasics

Project Leader:

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The Logic of Causal and Probabilistic Reasoning in Uncertain Environments (LcpR)

(DFG, FWF, GAČR)

The project combines expertise from probability logic and non-monotonic reasoning, probability and coherence, causality, conditional independence, models, human reasoning and empirical research on mental probability logic, counterfactuals and cognitive development.
It focuses on:
(i) foundational topics such as rationality and evolution;
(ii) algorithms and implementation of local knowledge representation in non-graphical models (alternatives to Bayesian networks);
(iii) actual human reasoning in children and adults.

Further information:
http://www.users.sbg.ac.at/~probnet/

Project Leader:

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Logic for Interaction (LINT)

(AKA, DFG, NWO, VR)

LINT is a collaborative research project aimed at developing mathematical foundations for interaction. Intelligent interaction involves agents in complex scenarios such as conversation, teamwork or games. Contours of a broad mathematical description are starting to emerge today, based on several individual research developments that now need to be brought together. LINT gathers logicians, computer scientists and philosophers from six European countries in an effort to lay the ground for a unified account of the logic of interaction.

Project Leader:

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Göteborg University, Sweden

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Logical Models of Reasoning with Vague Information (LoMoReVi)

(CICYT, FWF, GAČR)

Vagueness is a ubiquitous phenomenon pervading almost all forms of human interaction. This project focuses on logical aspects of processing vague information and aims at formal models that may serve as bridges between deductive fuzzy logics and various theories of vagueness. It also examines relationships to other forms of imperfect information and connections to data extraction.

Project Leader:

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Vienna University of Technology, Austria

Principal Investigators:

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SOCIAL SOFTWARE for Elections, the Allocation of Tenders and Coalition/Alliance Formation (SSEAC)

(AKA, CICYT, DFG)

All familiar election systems are known to have very bad properties and to yield counterintuitive results. The same holds for the allocation of tenders, resulting in many court cases. In this project we want to study the topics mentioned above in the new framework recently introduced by Balinski and Laraki, avoiding the paradoxes. Making use of relational reasoning we will develop appropriate software.

Project Leader:

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Vagueness, Approximation, and Granularity (VAAG)

(DFG, NWO, NZZ, VR)

Vagueness is a pervasive property of human language and cognition. While vagueness has often been regarded as undesirable, the VAAG project is based on a growing recognition that vagueness is actually in many respects useful. The VAAG project targets a broad, interdisciplinary reassessment of vagueness with contributions to general cognitive science, linguistic semantics, experimental psychology, formal pragmatics and computer science.

Further information:
http://www.zas.gwz-berlin.de/research/projects/vaag/

Project Leader:

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The aim of the European Collaborative Research (EUROCORES) Scheme is to enable researchers in different European countries to develop collaboration and scientific synergy in areas where European scale and scope are required to reach the critical mass necessary for top class science in a global context.
The scheme provides a flexible framework which allows national basic research funding and performing organisations to join forces to support excellent European research in and across all scientific areas.
Until the end of 2008, scientific coordination and networking is funded through the EC FP6 Programme, under contract no. ERAS-CT-2003-980409. As of 2009, the National Funding Organisations will provide the funding for the scientific coordination and networking in addition to the research funding.-research-nfo

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THE FOLLOWING NATIONAL FUNDING ORGANISATIONS SUPPORT THE LogICCC PROGRAMME:

Fonds zur Förderung der wissenschaftlichen Forschung (FWF)
Austrian Science Research Fund, Austria

Fonds National de la Recherche Scientifique (FNRS)
National Fund for Scientific Research, Belgium

Nacionalna zaklada za znanost, visoko skolstvo i tehnologijski razvoj Republike Hrvatske (NZZ)
The National Foundation of Science, Higher Education and Technological Development of the Republic of Croatia, Croatia

Grantová agentura České republiky (GAČR)
Academy of Sciences of the Czech Republic, Czech Republic

Forsknings – og Innovationsstyrelsen (FIST)
Danish Agency for Science, Technology and Innovation, Denmark

Suomen Akatemia/Finlands Akademi (AKA)
Academy of Finland, Finland

Deutsche Forschungsgemeinschaft (DFG)
German Research Foundation, Germany

Israel Science Foundation (ISF)
Israel

Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)
Netherlands Organisation for Scientific Research, The Netherlands

Fundação para a Ciência e a Tecnologia (FCT)
Foundation for Science and Technology, Portugal

Comisión Interministerial de Ciencia y Tecnología (CICYT)
Interministerial Committee on Science and Technology, Spain

Vetenskapsrådet (VR)
Swedish Research Council, Sweden

Türkiye Bilimsel ve Teknolojik Arastırma Kurumu (TÜBITAK)
The Scientific and Technological Research Council of Turkey, Turkey

Woman and Man as Folding Diagram
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Print run: 500 – September 2008