

LogICCC Final Conference

15-18 September 2011

Berlin, Germany

Programme booklet



Welcome

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. E.g., it has been suggested that conversation can be modeled 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.

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 foundations of the sciences, computation, and the semantics of natural languages. In 2008, the European Collaborative Research programme "Modelling Intelligent Interaction. Logic in the Humanities, Social and Computational Sciences (LogICCC)" was launched on the basis of the firm conviction that present-day logic will continue to play this role in the much broader setting described here.

The LogICCC programme – with a research budget of over 6 Million Euros – includes 49 research teams from 17 countries. Some members of the LogICCC programme 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. The LogICCC Final Conference brings all programme members together after three years of intensive research collaborations and presents the achievements that have been made.

An important outcome of the initiative is that the programme as a whole has proven to be more than the sum of its parts. To present this added value, the second day of the Final Conference is structured around 4 thematic sessions that each address an issue that lies on the interface of various LogICCC CRPs and that have emerged during the running time of the programme as holding particular promise. In each session, speakers from at least two different CRPs will present their views. Apart from presenting the outcome of the programme, this structure also allows the conference to point towards new directions of research.

By way of introduction, during the first day of the conference all CRPs will be given the floor to present themselves. Rather than providing an overview of all the work that they have carried out in the past three years (which participants can find described in the accompanying Final Brochure), the CRP presentations will focus on a particular result or research line that they wish to highlight. The conference will end again in the plenary with a session that will be of interest to many CRPs, concerning the general theme of "Logic & Games".

Overall, the LogICCC Final Conference will not only be looking back but also forward. The conference will offer ample opportunities to (in)formally discuss the future challenges for this multi-disciplinary research field and will explore the possibilities for the continued development of collaborative research and research networking in this area.

The outcome and impact of this meeting rely on your contribution. We therefore encourage you to make the most of these three days.

The organising team

Schedule

Thursday 15 September

- 18:00 Registration desk opens
- 19:30 **Reception and Welcome dinner**
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Friday 16 September

- 8:30 Registration desk opens
- 9:00 – 9:30 **Opening Session**
- Welcome* by Prof. Franz Baader, Spokesperson of the Review Panel for Computer Science at the Deutsche Forschungsgemeinschaft (DFG)
- Introduction to the EUROCORES Programme LogICCC*
Dr. Eva Hoogland (LogICCC Programme Coordinator)
- Highlights from the Collaborative Research Projects**
- Chair: Dr. Eva Hoogland (Programme Coordinator)
- 9:30 – 10:15 *Dialogical Foundations of Semantics (DiFoS)*
Prof. Benedikt Löwe
- 10:15 – 11:00 *Logical Models of Reasoning with Vague Information (LoMoReVI)*
Prof. Chris Fermüller
- 11:00 – 11:30 Break
- Chair: Dr. Ilan Fischer (Review Panel)
- 11:30 – 12:15 *A simulation Based Analysis of Logico-Probabilistic Reasoning Systems*
Dr. Paul Thorn (LcpR)
- 12:15 – 13:00 *Vagueness, Approximation, and Granularity (VAAG)*
Prof. Ulrich Sauerland
- 13:00 – 14:30 Lunch
- Chair: Prof. Jean-Gabriel Ganascia (Review Panel)
- 14:30 – 15:15 *Computational Foundations of Social Choice (CFSC)*
Prof. Felix Brandt

- 15:15 – 16:00 *SOCIAL SOFTWARE for elections, the allocation of tenders and coalition/alliance formation (SSEAC)*
Prof. Harrie de Swart
- 16:00 – 16:30 Break
- Chair: Prof. Herman Ruge Jervell (Review Panel)
- 16:30 – 17:15 *Games for Analysis and Synthesis of Interactive Computational Systems (GASICS)*
Prof. Jean-François Raskin
- 17:15 – 18:00 *Logic for Interaction*
Prof. Jouko Väänänen (LINT)
- 20:00 Dinner
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**Saturday 17
September**

Thematic Sessions (parallel)
(for details, see below)

- 9:00 – 13:00
(Incl. 30 min. break) Session 1: Vagueness
- Session 2: Proofs, dialogues, (in)dependence & integration (until 13:15)
- 13:00 – 14:30 Lunch
- 14:30 – 18:30
(Incl. 30 min. break) Session 3: Logic and Psychology
- Session 4: Computational social choice and social software
- 20:00 Dinner
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**Sunday 18
September**

Thematic Sessions (plenary)

- Session 5: Logic & Games
- Chair: Prof. Jean-François Raskin (GASICS / ESF Research Networking Programme GAMES)
- 9:00 – 9:30 *Simple games and the use of BDD for problem solving*
Prof. Rudolf Berghammer (SSEAC)
- 9:40 – 10:10 *Logic and infinite games: results and perspectives*
Prof. Wolfgang Thomas (GASICS)
- 10:20 – 10:50 Break

10:50 – 11:20	<i>Games and Dependence in Logic</i> Prof. Jouko Väänänen (LINT)
11:30 – 12:00	<i>Independence in Social Choice and Quantum Foundations</i> Prof. Samson Abramsky (LINT)
12:10 – 13:00	Closing Session Closing words by Prof. Johan van Benthem, theme-proposer LogICCC programme
13:00	Farewell Lunch

Thematic Sessions (parallel)

General note on Discussion: Short talks (up to 20 minutes) are followed by 5 minutes discussion. For longer talks (as from 25 minutes), 10 minutes time for discussion has been scheduled.

Session 1: Vagueness

Saturday 17 September, 9:00 – 13:00

Chair: Prof. Chris Fermüller

9:00 – 9:25	<i>On Mathematical Fuzzy Logic</i> Dr. Petr Cintula (LoMoReVI)
9:35 – 10:00	<i>Logical formalizations of fuzzy similarity-based reasoning</i> Prof. Lluís Godó (LoMoReVI)
10:10 – 10:35	<i>Logical models for reasoning about the uncertainty of many-valued events</i> Dr. Enrico Marchioni (LoMoReVI)
10:45 – 11:15	Break
11:15 – 11:50	<i>Vague counterfactuals</i> Dr. Libor Behounek (LoMoReVI)
11:50 – 12:15	<i>Combining vague adjectives – in theory and in practice</i> Dr. Galit Sassoon (VAAG)
12:25 – 12:50	<i>Vagueness, Imprecision and Scales</i> Dr. Stephanie Solt (VAAG)
13:00	End of Session 1

Session 2: Proofs, dialogues, (in)dependence and interaction

Saturday 17 September, 9:00 – 13:15

Chair: Prof. Peter Schroeder-Heister

- 9:00 – 9:15 *Signalling games and Independence-Friendly Logic*
Prof. Gabriel Sandu (LINT)
- 9:20 – 9:35 *Proof systems for dependence and independence logic*
Mr. Pietro Galliani (LINT)
- 9:40 – 9:55 *Implications in the team semantics setting*
Ms. Fan Yang (LINT)
- 10:00 – 10:15 *Complexity results for dependence logic*
Dr. Juha Kontinen (LINT)
- 10:20 – 10:40 *Relevant agents*
Dr. Ondrej Majer (LoMoReVI)
- 10:45 – 11:15 Break
- 11:15 – 13:15 Round table session on "*Dialogical foundations of semantics? An assessment*"
- Participants:
- Dr. Jesse Alama (DiFoS)
 - Prof. Benedikt Löwe (DiFoS)
 - Mr. Thomas Piecha (DiFoS)
 - Dr. Luca Tranchini (DiFoS)
 - Dr. Bartosz Wieckowski (DiFoS)
 - Dr. Sara Uckelman (DiFoS)
- 13:15 End of Session 2

Session 3 : Logic and Psychology

Saturday 17 September, 14:30 – 18:30

Chair : Prof. Frank Veltman

- 14:30 – 15:00 *Probability and logic in psychology: a new form of psychologism?*
Dr. Niki Pfeifer (LcpR)
- 15:10 – 15:30 *The Human Understanding of Conditionals*
Prof. Gernot Kleiter (LcpR)
- 15:35 – 15:55 *Conjunction and Quasi Conjunction of Conditionals in Coherence-Based Probabilistic Nonmonotonic Reasoning*
Prof. Angelo Gilio (LcpR)
- 16:00 – 16:20 *Kripke Type Semantics for Indicative Conditionals: The case of Chellas-Segerberg Semantics*
Dr. Matthias Unterhuber (LcpR)
- 16:25 – 16:55 Break
- 16:55 – 17:15 *Developments in thinking about counterfactual conditionals*
Dr. Sarah Beck (LcpR)

- 17:20 – 17:45 *The interpretation of vague predicates – experimental insights*
Ms. Nicole Gotzner (VAAG)
- 17:55 – 18:20 *How Vague are Quantifiers?*
Mr. Rasmus Bååth, Prof. Uli Sauerland and Prof. Sverker
Sikström (VAAG)
- 18:30 End of Session 3

Session 4: Computational social choice and social software

Saturday 17 September, 14:30 – 18:30

Chair: Prof. Felix Brandt

- 14:30 – 14:50 *Aspects of Power overlooked by Power Measures*
Prof. Hannu Nurmi (SSEAC)
- 14:55 – 15:15 *The allocation of tenders using a distance-based extension of
Majority Judgment*
Miss Edurne Falcó (SSEAC)
- 15:20 – 15:40 *Influence and Centrality*
Dr. Agnieszka Rusinowska (SSEAC)
- 15:45 – 16:05 *Modelling Resource Allocation in Linear Logic*
Dr. Daniele Porello (CFSC)
- 16:15 – 16:45 Break
- 16:45 – 17:05 *Strategyproof Irresolute Social Choice Functions*
Mr. Markus Brill (CFSC)
- 17:15 – 17:35 *ATL and extensions*
Dr. Nicolas Markey (GASICS)
- 17:40 – 18:00 *Nash equilibrium in quantitative games played on graphs*
Ms. Julie de Pril (GASICS)
- 18:05 – 18:25 *UppAal Tiga*
Prof. Kim Larsen (GASICS)
- 18:30 End of Session 4

Participants

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Abstracts

HIGHLIGHTS FROM THE COLLABORATIVE RESEARCH PROJECTS

Dialogical Foundations of Semantics

Prof. Peter Schroeder-Heister, University of Tübingen & Prof. Benedikt Löwe, University of Amsterdam (DiFoS)

In our project, we investigated dialogical and interaction-based approaches from various angles. In our presentation we highlight some of our activities and research, and discuss whether and how our opinion towards logic and interaction has changed over the past four years.

Logical Models of Reasoning with Vague Information

Prof. Chris Fermüller, Vienna University of Technology (LoMoReVI)

We provide a high level overview of research achievements from LoMoReVI by briefly sketching a few key results from all three involved IPs. We then describe in some more detail a specific approach that might be of particular interest to other LogICCC CRPs as well: Giles-style dialogue games and their relation to theories of vagueness. We will conclude with comments on the lessons learned from the interdisciplinary outlook on modeling reasoning with vague information enabled and encouraged by the LogICCC frame.

A Simulation Based Analysis of Logico-Probabilistic Reasoning Systems

Dr. Paul Thorn and Prof. Gerhard Schurtz, University of Düsseldorf (LcpR)

Systems of *logico-probabilistic* (LP) reasoning characterize inference from conditional assertions that are taken (semantically) to express high conditional probabilities. There are several existent LP systems. These systems differ in the number and type of inferences they licence. An LP system that licenses a greater number of inferences offers the opportunity of deriving more true informative conclusions. But with this possible *reward* comes the *risk* of drawing more false conclusions. By means of computer simulations, we investigated four well known LP systems, systems **O**, **P**, **Z** and **QC**, with the goal of determining which system provides the best balance of *reward* versus *risk*. In this talk, we explain why each of the four systems (**O**, **P**, **Z** and **QC**) is a *prima facie* contender to be the correct prescriptive theory of LP reasoning. We then present data which suggests that (of the four systems) system **Z** has the best claim to be the correct prescriptive theory of LP reasoning, since it offers the best balance of reward versus risk.

Vagueness, Approximation, and Granularity

Prof. Ulrich Sauerland, Zentrum für Allgemeine Sprachwissenschaft, Berlin (VAAG)

No abstract available

Computational Foundations of Social Choice

Prof. Felix Brandt, Technical University of Munich (CFSC)

I will start by giving a brief summary of the project's main accomplishments such as organized meetings, spawned collaborations, and published research results.

This will be followed by a presentation that highlights the tournament equilibrium set (TEQ), a social choice function that exemplifies how algorithmic and axiomatic issues can go hand-in-hand in computational social choice. Starting with Arrow's seminal impossibility result, which states that a seemingly innocuous set of desiderata cannot be simultaneously satisfied when aggregating preferences, I will axiomatically characterize TEQ by relaxing one of Arrow's conditions while strengthening the other ones. Due to its unwieldy recursive definition, precious little is known about TEQ. In particular, many statements--including some new ones about TEQ's rationalizability and strategyproofness--rely on an open graph-theoretic problem that has resisted proof for more than twenty years. We tried to tackle this problem by investigating weaker as well as stronger versions and conducting brute-force computer searches for counter-examples.

TEQ is also compelling from an algorithmic point of view. While it was shown that computing TEQ is NP-hard, and thus does not admit an efficient algorithm unless P equals NP, there is currently no matching

upper bound as the best known upper bound is PSPACE. For practical purposes, we devised and evaluated a heuristic for computing TEQ that performs extremely well on realistic instances and showed that computing TEQ is fixed-parameter tractable with respect to the decomposition degree of the underlying preference relations.

SOCIAL SOFTWARE for elections, the allocation of tenders and coalition/alliance formation
Prof. Harrie de Swart, University of Tilburg (SSEAC)

No abstract available

Games for Analysis and Synthesis of Interactive Computational Systems
Prof. Jean-François Raskin, Free University of Brussels (GASICS)

No abstract available

Logic for Interaction
Prof. Jouko Väänänen, University of Helsinki (LINT)

I will start by talking a little bit about logicality, and proceed to a highlight of the LINT project concerning logical constants. Then I will talk about interaction as interaction of attributes of agents, and I relate this to logic and logicality. I will then give an overview of highlights of the LINT project related to this interaction, more specifically an overview of recent results concerning logical properties of the concepts of total dependence and total independence of such attributes. Presentation in the Thematic Session 2 (Proofs, dialogues, (in)dependence & interaction) on Saturday will have more details of these highlights.

THEMATIC SESSIONS

Session 1: Vagueness

On Mathematical Fuzzy Logic
Dr. Petr Cintula, Academy of Sciences of the Czech Republic (LoMoReVI)

One of the major aims of LoMoReVI has been to develop the formal aspects of Mathematical Fuzzy Logic. This talk will start with a light introduction to this growing area of mathematical logic, before proceeding to its main goal: summarizing, in an accessible way, the technical results in this area achieved during the run of the project. The stress will be put on showing the relation of these results to other aims of the LoMoReVI CRP.

At the end of the talk the Handbook of Mathematical Fuzzy Logic will be presented. This two-volume set summarizes the current knowledge of the area. It is edited by LoMoReVI team members and 5 of its 11 chapters are (co)authored by members of the team.

Logical formalizations of fuzzy similarity-based reasoning
Prof. Lluís Godo, Spanish Scientific Research Council (CSIC) (LoMoReVI)

Commonsense reasoning models aim at being more flexible than classical logic in order to provide knowledge representation techniques able to accommodate different kinds of imperfect information. In this sense, vagueness and uncertainty are two such kinds of imperfections of different nature that have been addressed in a number of approximate reasoning models. There is however another important notion, the notion of similarity, which plays an important role in different patterns of reasoning, like in case-based reasoning. The aim of a similarity-based reasoning model, from a logical point of view, is to allow dealing with knowledge expressing that some propositions are "near to", or in the "vicinity" of, other propositions which are taken as true. This idea of *truthlikeness*, when based on the notion of fuzzy similarity relations (studied for many years in the fuzzy sets community), gives sustenance to different kinds of graded consequence relations and related modal-like logics. In this talk we will provide the main insights of this approach that have been developed in the LoMoReVI CRP.

Logical models for reasoning about the uncertainty of many-valued events

Dr. Enrico Marchioni, Spanish Scientific Research Council (CSIC) (LoMoReVI)

Theories of uncertainty, like probability theory, possibility theory and the theory of imprecise probabilities (among others), provide mathematical models to represent different uncertain phenomena. In their classical formulation, these theories deal with the uncertainty of precise events, i.e., events which are completely true or completely false. However, a more appropriate formalization of uncertain reasoning must take into account also events whose truth comes in degrees. For this reason, general models of uncertainty of events represented by many-valued propositions have been introduced. The purpose of this talk is to offer an overview of the main properties of such uncertainty models and their representation through many-valued logics that have been investigated in the LoMoReVI CRP.

Vague counterfactuals

Dr. Libor Behounek and Dr. Ondrej Majer, Academy of Sciences of the Czech Republic (LoMoReVI)

Counterfactual conditionals, or conditionals with false antecedents, cannot be modelled by classical material implication as it would render them always true, while intuitively many counterfactuals are false. A widely accepted account of counterfactual conditionals is provided by the Stalnaker-Lewis semantics, based on the notion of similarity of possible worlds. Since the notion of similarity is prominently studied in fuzzy mathematics, we develop a variant of Stalnaker-Lewis semantics of counterfactuals based on the fuzzy notion of similarity and formalized in higher-order fuzzy logic. We show that the resulting semantics conforms to the intuitively plausible properties of counterfactuals, and moreover accommodates in a natural manner counterfactuals that involve gradable properties.

Combining vague adjectives – in theory and in practice

Dr. Galit Sassoon, University of Amsterdam (VAAG)

We will discuss the interpretation of complex natural language predicates, in particular Boolean combinations of vague adjectives including negations (e.g., *not expensive*), conjunctions (e.g., *expensive and time consuming*) and disjunctions (*tall or bald*). Are these combinations vague? Are they associated with a graded structure in the form of a mapping of entities to degrees? We will examine the predictions of different approaches to vagueness against the results of surveys of truth judgments of English and Hebrew speakers.

Vagueness, Imprecision and Scales

Dr. Stephanie Solt, Zentrum für Allgemeine Sprachwissenschaft, Berlin (VAAG)

The relationship between vagueness and imprecision has been the subject of long debate (e.g., Pinkal 1995, Lasersohn 1999, Kennedy 2007, Sauerland & Stateva 2007). I propose a three-way division: i) expressions that may be used imprecisely, but can be 'precisified' (e.g., *(exactly) 20*, *(exactly) 3 o'clock*); ii) expressions that correspond to a precisely-defined meaning, but resist precisification to this meaning (e.g., *most* vs. *more than half*); iii) expressions without a corresponding precise meaning (e.g., *tall*, *mountain*). I argue that the interpretation of expressions of the first two types can be analyzed in terms of scale structure. Specifically, as proposed by Krifka (2007), the precise vs. imprecise use of type (i) expressions can be modeled as involving scales that differ in their granularity level. Drawing on a case study of the quantifier *most*, I propose that expressions of type (ii) involve scales whose degrees are only semi-ordered relative to one another. I discuss the relationship between these two types of scale structures, and relate the findings to the correct treatment of expressions of type (iii), i.e., classical cases of vagueness.

Session 2: Proofs, dialogues, (in)-dependence & interaction

Signaling games and Independence-Friendly Logic

Prof. Gabriel Sandu, University of Helsinki (LINT)

I will present a review of the existing notions of dependence and independence in logic, viewed from the perspective of the LINT research consortium.

Proof systems for dependence and independence logic

Mr. Pietro Galliani, University of Amsterdam (LINT)

In this talk, I will present an approach to the study of the proof theory of first-order logics of imperfect information, and in particular to that of Dependence Logic and its extensions. No proof system for such logics can be complete with respect to their standard (Hodges or game-theoretical) semantics. However, soundness and completeness results are possible if we consider partial models, containing the first-order definable teams (and perhaps other ones). The resulting system can be easily adapted to variants of Dependence Logic such as Independence Logic or Inclusion/Exclusion Logic, and furthermore it is possible to add more and more "team existence statements" to it.

Implications in the team semantics setting

Ms. Fan Yang, University of Helsinki (LINT)

In this talk, we study intuitionistic implication, as well as linear implication, in dependence logic and independence logic. We also give some comments on classical implication in team semantics setting.

Complexity results for dependence logic

Dr. Juha Kontinen, University of Helsinki (LINT)

Dependence Logic is a new logic that incorporates the concept of dependence into first-order logic. It was introduced by Jouko Väänänen in his monograph "Dependence Logic" in 2007. The expressive power of dependence logic coincides with that of existential second-order logic, and the complexity class NP over finite structures. We review some recent results regarding the expressive power and complexity of certain fragments and extensions of dependence logic.

Relevant agents

Dr. Ondrej Majer, Academy of Sciences of the Czech Republic (LoMoReVI)

No abstract available

Session 3: Logic and Psychology

Probability and logic in psychology: a new form of psychologism

Dr. Niki Pfeifer, Ludwig-Maximilians-University Munich (LcpR)

Since the dawn of the psychology of reasoning (Störring, 1909, 1926; Lindworsky, 1916), classical logic (in the form of Aristotelian syllogistics and the propositional calculus) was taken for granted to be the right framework of rationality for decades. Consequently, classical logic strongly influenced the experimental paradigms, the evaluation of the participants' rationality, and the psychological theories. Recently, probabilistic models became popular among psychologists of reasoning and formal epistemologists. In this talk, I critically discuss the current place of probability and logic in psychology. I argue that experimental philosophers should extend their domain to uncertain reasoning. Moreover, while some experimental philosophers seem to undermine standard methods of "armchair philosophy", I illustrate how philosophy and psychology can fruitfully interact. Finally, I discuss whether the roles that probability and logic play in current experimental research lead to a new form of psychologism.

The Logic of Causal and Probabilistic Reasoning in Uncertain Environments

Prof. Gernot Kleiter, University of Salzburg (LcpR)

No abstract available

Conjunction and Quasi Conjunction of Conditionals in Coherence-Based Probabilistic Nonmonotonic Reasoning

Prof. Angelo Gilio, University of Rome, La Sapienza and Dr. Giuseppe Sanfilippo, University of Palermo (LcpR)

The coherence-based probabilistic reasoning allows to directly assess conditional probabilities and to exactly propagate them. Then, we can study with full generality the notion of probabilistic entailment (p-

entailment, Adams 1975) in nonmonotonic reasoning, with a precise analysis of the degradation of inference rules when the number of premises increases (Gilio 2002, Gilio 2011).

We illustrate some results obtained in (Gilio & Sanfilippo 2010, 2011) on the quasi conjunction of conditionals, looked at as conditional events, and QAND rule (Dubois & Prade 1994).

A family of conditionals F p-entails the quasi conjunction $C(S)$, for every subset S of F ; moreover, the p-entailment of a conditional $E|H$ from F is equivalent to the p-entailment of $E|H$ from $C(S)$, for some non-empty subset S of F .

We can also determine, by a suitable algorithm, the additive class K of the subsets S of F such that $C(S)$ implies $E|H$ in the sense of Goodman & Nguyen.

Finally, we examine the notion of conjunction of two conditionals (Kaufmann 2009), a conditional random quantity which, in special cases, is a conditional event.

We study the extension of a probability assessment on two conditionals to their conjunction, by obtaining the classical probability lower/upper bounds. We illustrate the relationship between conjunction and quasi conjunction, by introducing a CONJUNCTION rule which allows to obtain the QAND rule and, as particular cases, the well known inference rules AND, CM, OR and CUT.

Kripke Type Semantics for Indicative Conditionals: The Case of Chellas-Segerberg Semantics

Dr. Matthias Unterhuber, Heinrich-Heine-University Düsseldorf (LcpR)

Chellas-Segerberg (CS) semantics is a Kripke type semantics, which has not received much attention in the literature, but which can - as I argued in my PhD thesis - be used to model a qualitative version of the Ramsey test. In my talk I will describe the CS semantics' modeling of the Ramsey test and argue that this qualitative version of the Ramsey test is fruitful for psychological research on indicative conditionals, in which qualitative versions of the Ramsey test have so far been largely ignored.

Developments in thinking about counterfactual conditionals

Dr. Sarah Beck, University of Birmingham (LcpR)

Studying children's thinking can offer insights in to psychological processes that are not available when we focus exclusively on adults. I will review some surprising limits identified by the LCPR group in children's reasoning and emotional experience. A combination of experimental and individual differences methodology has been used to analyse the underlying cognitive processes involved. Finally, I will present examples of theoretical consequences of our research for developmental and reasoning researchers.

The interpretation of vague predicates – experimental insights

Ms. Nicole Gotzner Zentrum für Allgemeine Sprachwissenschaft, Berlin, Dr. Marijan Palmovic, University of Zagreb & Dr. Stephanie Solt, Zentrum für Allgemeine Sprachwissenschaft, Berlin (VAAG)

In this presentation, we report on the results of a series of experimental studies exploring 'ordinary' speakers' interpretation and processing of vague gradable adjectives. The first set of experiments seeks to understand how speakers behave when presented with a gradable adjective (e.g., *large*) coupled with a set of visual images representing a Sorities series (e.g., pictures of suitcases ranging from very large to very small). The second set of experiments explores how the distribution of items in a comparison class affects the interpretation of gradable adjectives. Finally, the third set of experiments uses an Event Related Potential (ERP) technique to profile brain activity during processing of vague color words (e.g., *red*) when paired with clear case vs. borderline stimuli. Taken together, these new empirical findings provide a potentially valuable testing ground for formal theories of vagueness.

How Vague are Quantifiers?

Mr. Rasmus Bååth and Dr. Sverker Sikström, Lund University, Prof. Ulrich Sauerland, Zentrum für Allgemeine Sprachwissenschaft, Berlin (VAAG)

This talk answers the following two questions: When do 'ordinary' people use which quantifier and what does this tell us about vagueness?

Session 4: Computational social choice and social software

Aspects of Power Overlooked by Power Measures

Prof. Hannu Nurmi, University of Turku (SSEAC)

The a priori indices of voting power concentrate on actor resource distributions and decision rules to determine the theoretical influence over outcomes by various actors. That these indices sometimes seem to be at odds with the intuitive distribution of real power in voting bodies follows naturally from their a priori nature. Indices based on actor preferences address this by equating an actor's voting power with the proximity of voting outcomes to his/her ideal point. With a simple argument using aggregation paradoxes we show that the preference-based indices may, in some circumstances, be just as misleading measures of power as the classic ones. Our main aim is to delineate the proper scope for power indices. In the pursuit of this aim we try to show that the procedures resorted to in making collective decisions are as important (if not more so) as the actor resource distribution. We review some results on agenda-systems to drive home this point. The proper role of power indices then turns out to be in the study of actor influences over outcomes when the actors are on the same level of aggregation and comparable in the sense of having similar sets of voting strategies.

The allocation of tenders using a distance-based extension of Majority Judgment

Prof. José Luis García-Lapresta and Miss Edurne Falcó, University of Valladolid (SSEAC)

Recently Balinski and Laraki have introduced a new voting system called Majority Judgment (MJ) which tries to solve some of the inconsistencies and paradoxes that voting systems usually have. In MJ agents have to assess the candidates through linguistic terms belonging to a common language. From this information, MJ assigns as the collective assessment the lower median of the individual assessments and it considers a sequential tie-breaking method for ranking the candidates. The present paper provides an extension of MJ focused to reduce some of the drawbacks that have been detected in MJ by several authors. The model assigns as the collective assessment a label that minimizes the distance to the individual assessments. In addition, we propose a new tie-breaking method also based on distances. In this contribution, this new aggregation process is applied to the allocation of tenders.

Influence and Centrality

Dr. Agnieszka Rusinowska, CNRS - Université Paris 1 Panthéon-Sorbonne (SSEAC)

We deliver a very short overview of different centrality measures and influence concepts in social networks, and present the relation-algebraic approach to the concepts of power and influence. First, we briefly discuss four kinds of measures of centrality: the ones based on degree, closeness, betweenness, and the eigenvector-related measures. Centrality of a node and of a network can be considered. Moreover, one can deliver a different classification of the centrality measures, the one based on a topology of network flows. A project on measuring centrality in dynamic networks is mentioned. Furthermore, we present a certain model of influence in a social network and discuss some applications of relation algebra and RelView to this model.

Modelling Resource Allocation in Linear Logic

Dr. Daniele Porello, University of Amsterdam (CFSC)

We show how to embed a framework for resource allocation into linear logic. In this model, multisets of goods, allocations of resources, preferences of agents, and deals are all modelled as formulas of linear logic. Whether or not an allocation is feasible or a proposed deal is rational, given the preferences of the agents concerned, reduces to a question of provability of sequents in linear logic.

Strategyproof Irresolute Social Choice Functions

Mr. Markus Brill and Prof. Felix Brandt, Technical University of Munich (CFSC)

In this talk, I will summarize the results of two recent papers on the strategic manipulation of irresolute social choice functions. While the Gibbard-Satterthwaite theorem states that every non-dictatorial and resolute, i.e., single-valued, social choice function is manipulable, we have shown that a number of appealing irresolute Condorcet extensions are strategyproof according to Kelly's preference extension. We have furthermore studied whether these results carry over to stronger preference extensions due to Fishburn and Gärdenfors.

ATL and extensions

Dr. Nicolas Markey, Ecole Normale Supérieure (GASICS)

No abstract available

Nash equilibrium in quantitative games played on graphs

Ms. Julie de Pril, Université de Mons (GASICS)

In this talk, we will show how game theory can be used in the domain of verification of computer systems. First, we will briefly review the well-studied two-player, qualitative, zero-sum games which can model the interactions between a controller and its environment. Then, in order to represent more complex systems, we need to consider multiplayer, quantitative, non zero-sum games. We will conclude with our personal contribution in this area.

UppAal Tiga

Prof. Kim Larsen, Aalborg University (GASICS)

Techniques for solving timed and priced timed games will be given with a tool demonstration and an illustration of industrial application.

THEMATIC SESSIONS (PLENARY)

Session 5: Logic and Games

Simple games and the use of BDDs for problem solving

Prof. Rudolf Berghammer, Christian-Albrechts-University Kiel (SSEAC)

Simple games are yes/no cooperative games which arise in many practical applications. In the talk we demonstrate how reduced ordered binary decision diagrams and quasi-reduced ordered binary decision diagrams (abbreviated as ROBDDs and QOBDDs, respectively) can be used for the representation of simple games and for the algorithmic solution of some problems appearing in their context. Examples for the latter are the identification of some key players, the computation of the desirability relation on individuals, the identification of proper and strong games and the computation of QOBDD-representations for the minimal winning, the shift-minimal winning and the blocking coalitions.

Logic and infinite games: results and perspectives

Prof. Wolfgang Thomas, Aachen University (GASICS)

A survey is given on the status of the algorithmic theory of infinite games in the context of automatic synthesis of systems, focusing on the results that were obtained in the project GASICS. Central topics are (1) a new approach to connect the format of winning conditions (requirements) and winning strategies (programs) and (2) quantitative refinements concerning properties of infinite plays. Finally, some directions of current and future research are outlined.

Games and Dependence in Logic

Prof. Jouko Väänänen, University of Helsinki (LINT)

I will start with an overview of three important games manifesting themselves in logic, and will point out that they are essentially one and the same game. Then I will show how dependence logic emerges naturally from this game and generalizes, in some sense even transcends, it. I then move to the new independence logic, a product of LINT, and describe how this brings - in a new way - elements of the important realm of scientific theories, e.g., in the areas of social choice and quantum mechanics, within the reach of logic.

Independence in Social Choice and Quantum Foundations

Prof. Samson Abramsky, Oxford University (LINT)

No abstract available