**European PhD Program in Computational Logic**

# EPCL Basic Training Camp 2011
# 7-11 November 2011, TU Dresden

Version of 6 November 2011

The annual EPCL Basic Training Camp provides a set of research talks and courses in specialized topics, covering the main areas within Computational Logic. The courses are especially tailored for young researchers.

In 2011, the EPCL Basic Training camp takes place at TU Dresden. Lecturers are Alessandro Artale from Free University of Bozen-Bolzano, Italy, Pedro Barahona from Universidade Nova de Lisboa, Portugal, James Delgrande from Simon Fraser University, Canada, as well as Franz Baader, Bernhard Ganter and Steffen Hölldobler from TU Dresden, Germany.

In addition to the course week from 7 to 11 November 2011, there will be a further research talk and course at TU Dresden, given by Alessandro Artale between 11 and 17 December. Details will be announced.

Up-to-date information about EPCL is provided at `http://www.epcl-study.eu/`.

## Research Talks

### Small is Again Beautiful in Description Logics

Franz Baader
TU Dresden, Germany
`http://lat.inf.tu-dresden.de/~baader/index-en.html`

Description Logics (DLs) are a popular family of logic-based knowledge representation languages, which have been used in various application domains such as natural language processing, databases, configuration of technical systems, biomedical ontologies, and the Semantic Web. The Description Logic (DL) research of the last 20 years was mainly concerned with increasing the expressive power of the employed description language without losing the ability of implementing highly-optimized reasoning systems that behave well in practice, in spite of the ever increasing worst-case complexity of the underlying inference problems.

OWL DL, the standard ontology language for the Semantic Web, is based on such an expressive DL for which reasoning is highly intractable. Its sublanguage OWL Lite was intended to provide a tractable version of OWL, but turned out to be only of a slightly lower worst-case complexity than OWL DL. This and other reasons have led to the development of two new families of light-weight DLs, EL and DL-Lite, which recently have been accepted as profiles of OWL 2, the next version of the OWL standard. In this talk, I will give an introduction to these new families of logics and explain the rationales underlying their design.

### Hybrid Solvers and some Applications

Pedro Barahona
Universidade Nova de Lisboa, Portugal
`http://ssdi.di.fct.unl.pt/~pb/`

### Belief Change in Horn Clause Theories

James P. Delgrande
Simon Fraser University, Canada
`http://www.cs.sfu.ca/~jim/`

This talk addresses belief change, focussing on revision, where the underlying logic is that governing Horn clauses. It proves to be the case that classical (AGM) belief revision doesn't immediately generalise to the Horn case. In particular, a standard construction based on a total preorder over possible worlds may violate the accepted (AGM) postulates. Conversely, Horn revision functions in the obvious extension to the AGM approach are not captured by total preorders over possible worlds. We address these difficulties by first restricting the semantic construction to "well behaved" orderings; and

second, by augmenting the revision postulates by an additional postulate. This additional postulate is redundant in the AGM approach but not in the Horn case. In a representation result we show that these two approaches coincide. Arguably this work is interesting for several reasons. It extends AGM revision to inferentially-weaker Horn theories; hence it sheds light on the theoretical underpinnings of belief change, as well as generalising the AGM paradigm. Thus, this work is relevant to revision in areas that employ Horn clauses, such as deductive databases and logic programming, as well as areas in which inference is weaker than classical logic, such as (perhaps) in description logic.

### Computing with Formal Concepts

Bernhard Ganter
TU Dresden, Germany
http://tu-dresden.de/Members/bernhard.ganter

## Lectures

### Introduction to Nonmonotonic Reasoning

James P. Delgrande
Simon Fraser University, Canada
http://www.cs.sfu.ca/~jim/

This course provides an introduction to the major "traditional" approaches to nonmonotonic reasoning. The closed world assumption is discussed as a simple example of nonmonotonicity. Following this, default logic, circumscription, and nonmonotonic inference relations are introduced and described. Other approaches, such as autoepistemic logic, answer set programming, and conditional logics are briefly mentioned. This course assumes only a familiarity with classical first-order logic.

### Advanced Constraint Programming

Pedro Barahona
Universidade Nova de Lisboa, Portugal
http://ssdi.di.fct.unl.pt/~pb/

Outline: 1. Introduction / 2. Constraint Propagation / 3. Global Constraints / 4. Heuristics and Symmetries

### Computational Logic Approaches to Human Reasoning

Steffen Hölldobler
TU Dresden, Germany
http://www.wv.inf.tu-dresden.de/~sh/

The Wason selection task and the Byrne suppression task are quite prominent and well-established examples of human reasoning. In the course, I will present various computational logic approaches to model both tasks. The approaches will be discussed in depth. Necessary theories, methods, and techniques will be formally developed, they will be applied to both tasks, and implementations will be presented. The course is based on the books Human Reasoning and Cognitive Science by Keith Stenning and Michiel Van Lambalgen (MIT Press, 2008) and Computational Logic and Human Reasoning by Robert Kowalksi (Cambridge University Press, 2011).

## Social Events

### Dinner at the Villandry Restaurant

Villandry Dresden
Jordanstraße 8 & 10
01099 Dresden / Neustadt
http://www.villandry.de/

The closest tramway stop is *Louisenstraße* (Tramway 7,8). It can be reached from stop *Münchner Platz* in about 25 minutes: At *Münchner Platz* take Tramway 3 in direction *Wilder Mann*. After about 15 minutes, change at *Albertplatz* to Tramway 7 (direction *Weixdorf*) or 8 (direction *Hellerau*). Another possibility is to walk about 15 minutes from Albertplatz through Alaunstraße to Jordanstraße.

The Google Maps link is: http://maps.google.de/maps?q=jordanstrasse+8+dresden&hl=de&ie=UTF8&ll=51.068599,13.749561&spn=0.007942,0.015557&sll=51.068585,13.74954&sspn=0.007942,0.015557&vpsrc=0&gl=de&hnear=Jordanstra%C3%9Fe+8,+Dresden+01099+Dresden,+Sachsen&t=m&z=16

### Gemäldegalerie Alte Meister with Exhibition "Heavenly Splendour"

We will visit the *Gemäldegalerie Alte Meister* at *Zwinger*, with the current special exhibition *Heavenly Splendour – Raphael, Dürer and Grünewald paint the Madonna*, joint with the Vatican Museums.

http://www.skd.museum/en/special-exhibitions/heavenly-splendour/index.html

We meet at the *Zwinger*, *Semperbau*, in front of the entrance of *Gemäldegalerie Alte Meister*.

The closest tramway stop is *Theaterplatz* (Tramway 4,8,9). It can be reached from stop *Münchner Platz* in about 20 minutes: At *Münchner Platz* take Tramway 3 in direction *Wilder Mann*. After about 7 minutes, change at *Walpurgisstraße* to Tramway 8 or 9, departing from the same platform at which Tramway 3 stops.

The Google Maps link is: http://maps.google.de/maps?q=gem%C3%A4ldegalerie+alter+meister&hl=de&ie=UTF8&ll=51.054061,13.734949&spn=0.007257,0.015557&fb=1&gl=de&hq=gem%C3%A4ldegalerie+alter+meister&cid=0,0,7851980771486674068&t=m&z=16&vpsrc=0.

## Location

The Basic Training Camp takes place in

Room 2026

of the building of the *Fakultät Informatik* of TU Dresden, Nöthnitzer Straße 46, 01187 Dresden.

The site is close to the tramway stop *Münchner Platz* (Tramway 3) and bus stop *Helmholtzstraße* (Bus 85). Its Google Maps link is: `http://maps.google.de/maps?q=noethnitzer+str+46+google+map&hl=de&ie=UTF8&hnear=N%C3%B6thnitzer+Stra%C3%9Fe+46,+Plauen+01187+Dresden,+Sachsen&gl=de&t=m&z=16&vpsrc=0`

## Monday, 7 November

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| 13.00 – 14.00 | JOINT LUNCH<br>We meet a 13.00 in the foyer of the *Fakultät Informatik* of TU Dresden, Nöthnitzer Straße 46 |
| 14.00 – 14.30 | WELCOME RECEPTION |
| 14.30 – 16.00 | LECTURE: James P. Delgrande<br>*Introduction to Nonmonotonic Reasoning – Part I* |
| 16.00 – 16.30 | COFFEE BREAK |
| 16.30 – 18.00 | LECTURE: Pedro Barahona<br>*Advanced Constraint Programming* |
| 19.30 | JOINT DINNER<br>Restaurant Villandry<br>Jordanstraße 8 & 10, 01099 Dresden / Neustadt |

## Tuesday, 8 November

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| 10.15 – 11.45 | RESEARCH TALK: Bernhard Ganter<br>*Computing with Formal Concepts* |
| 11.45 – 13.15 | LUNCH BREAK |
| 13.15 – 14.45 | RESEARCH TALK: James P. Delgrande<br>*Belief Change in Horn Clause Theories* |
| 14.45 – 15.10 | COFFEE AND TEA |

## Wednesday, 9 November

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|---|---|
| 10.15 – 11.45 | RESEARCH TALK: Franz Baader<br>*Small is Again Beautiful in Description Logics* |
| 11.45 – 13.15 | LUNCH BREAK |
| 13.15 – 14.45 | RESEARCH TALK: Pedro Barahona<br>*Hybrid Solvers and some Applications* |
| 14.45 – 15.10 | COFFEE AND TEA |
| 16.15 | SOCIAL EVENT<br>Visit of the *Gemäldegalerie Alte Meister* with the special exhibition *Heavenly Splendour – Raphael, Dürer and Grünewald paint the Madonna*.<br>We meet at 16.15 in front of the entrance of *Gemäldegalerie Alte Meister* |

## Thursday, 10 November

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| 10.15 – 11.45 | LECTURE: Pedro Barahona<br>*Advanced Constraint Programming* |
| 11.45 – 13.15 | LUNCH BREAK |
| 13.15 – 14.45 | LECTURE: James P. Delgrande<br>*Introduction to Nonmonotonic Reasoning – Part II* |

## Friday, 11 November

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| 8.15 – 9.45 | LECTURE: Steffen Hölldobler<br>*Computational Logic Approaches to Human Reasoning – Part I* |
| 9.45 – 10.15 | COFFEE BREAK |
| 10.15 – 11.45 | LECTURE: Steffen Hölldobler<br>*Computational Logic Approaches to Human Reasoning – Part II* |
| 11.45 – 12.00 | FAREWELL COFFEE AND TEA |