CƆ⊃Ǝ 25
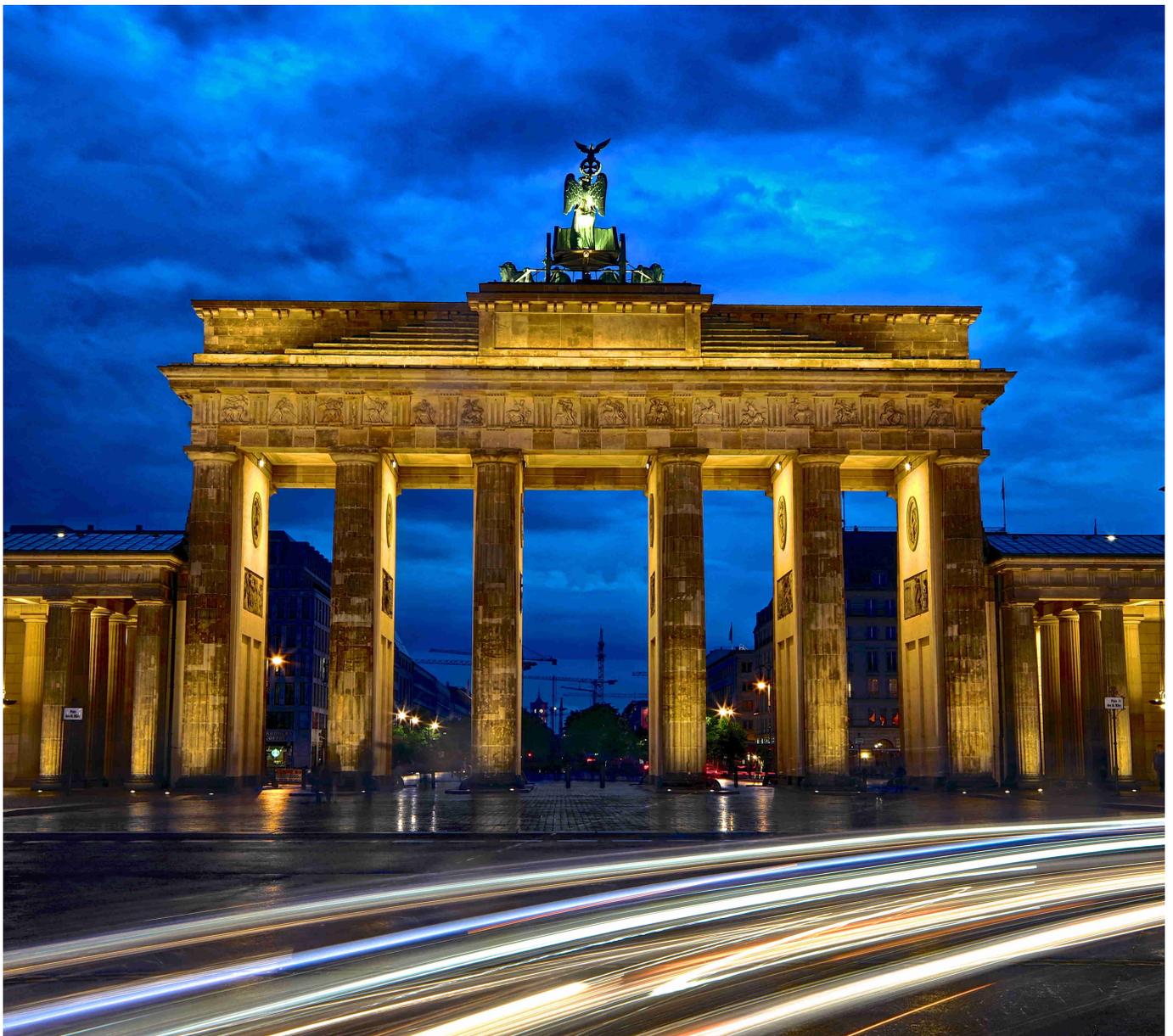
25th International Conference on Automated Deduction

Berlin, Germany | August 1-7, 2015

Conference Booklet

Welcome to CADE-25 at Freie Universität Berlin

It is my great pleasure to welcome you at the Freie Universität Berlin to celebrate the 25th edition of the Conference on Automated Deduction (CADE-25). The CADE conference started with the CADE-0 meeting in 1968 at INRIA Rocquencourt, France and the CADE-1 meeting in 1975 at Argonne National Laboratory, USA. CADE has since been held in various countries worldwide and it has become the major forum for the presentation of research in all aspects of automated deduction.

To celebrate its 25th edition, this year's CADE conference includes a special jubilee session on the *Past, Present and Future of Automated Deduction*, with invited speakers Ursula Martin (Oxford, UK), Frank Pfenning (Carnegie Mellon University, USA), David Plaisted (University of North Carolina at Chapel Hill, USA), and Andrei Voronkov (University of Manchester, UK). The invited speakers of the main conference are Ulrich Furbach (University of Koblenz, Germany) and Edward Zalta (Stanford University, USA). Moreover, since CADE-25 is collocated with the 9th International Web Rule Symposium (RuleML), organised by Adrian Paschke, a further joint invited presentation is given by Michael Genesereth (Stanford University, USA). Reception and dinner speeches are contributed by Jörg Siekmann (Saarland University) and Wolfgang Bibel (TU Darmstadt), and a short welcoming address is given by Ute Finckh-Krämer (Berlin, member of German parliament).

I want to thank all the contributors, speakers and participants of the main conference, respectively the eight satellite workshops, seven tutorials, and three competitions of CADE-25. In the end, it's us, the entire CADE community, that makes the difference.

Several awards are presented at CADE-25: the 2015 Herbrand award (Andrei Voronkov), the new Thoralf Skolem awards (Christian Urban, Christine Tasson, Hantao Zhang, Leo Bachmair, Nachum Dershowitz, Nicolaas G. de Bruijn), the best paper award (Vijay D'Silva and Caterina Urban), and the Woody Bledsoe student travel awards. My sincere congratulation to all award winners.

No conference would be possible without a team of dedicated supporters and volunteers. In particular, I am indebted to my local organisation team comprising Ulrike Geiger, Mijail Guillemard, Julian Röder, Susanne Schöttker-Söhl, Alexander Steen, Max Wisniewski, and Benjamin Vetter. This core organisation team has been supported by several further student volunteers. I am grateful also to Amy Felty and Aart Middeldorp (program co-chairs), Jasmin Blanchette and Andrew Reynolds (workshop, tutorial and competition co-chairs), Neil Murray (CADE treasurer), and Maria Paola Bonacina (CADE president). It has been a pleasure to cooperate with all of you in the preparation of CADE-25!

Moreover, I want to give thanks to Freie Universität Berlin, in particular, the Computer Science and Mathematics Department, for their professional and generous support. And, finally, I am grateful to all further supporters of CADE-25, including the Deutsche Forschungsgemeinschaft (DFG), the Artificial Intelligence Journal, Microsoft Research, the European Coordinating Committee for Artificial Intelligence (ECCAI), Berlin Mathematical School, and the City of Berlin.

Should you have any question or problems, please feel free to contact members of the CADE-25 organisation team at the registration desk, which will be open all day during the conference hours.

Now, I want to wish you an exciting conference, fruitful scientific exchange and many new contacts. I hope you will all enjoy and remember the CADE-25 conference here at Freie Universität Berlin.
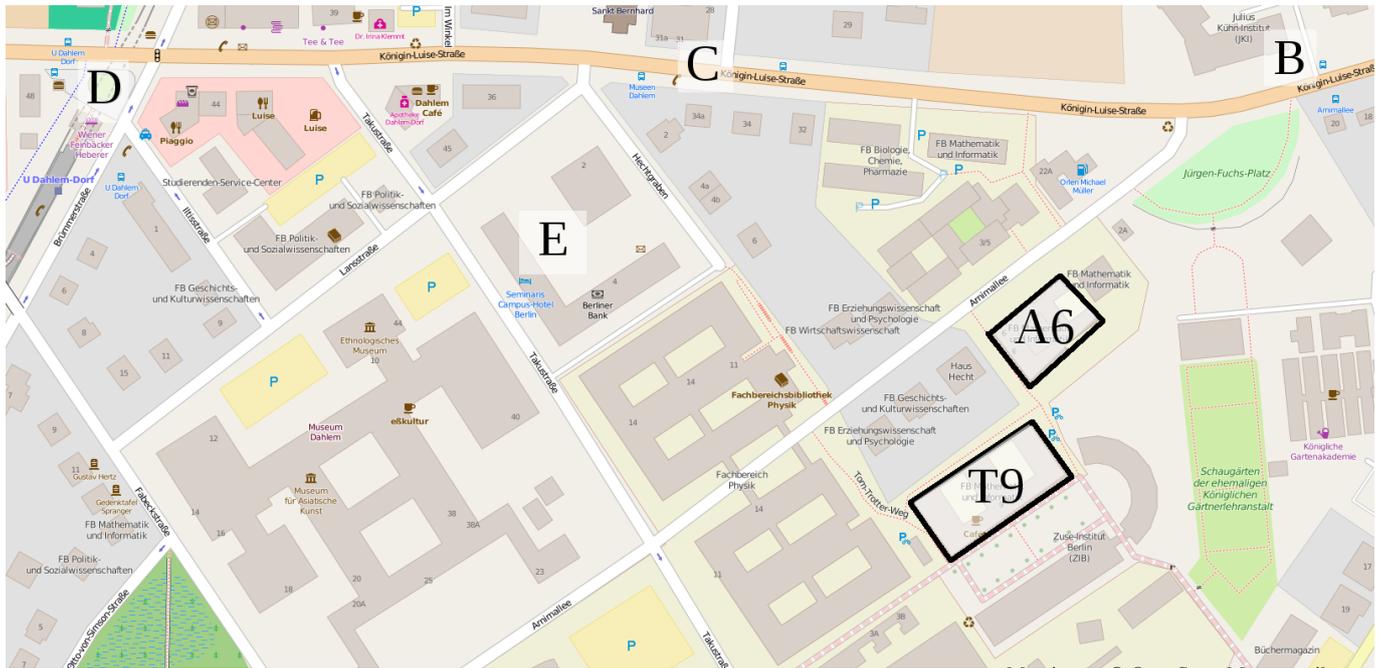

Berlin, August 2015

Christoph Benzmüller
c.benzmueller@fu-berlin.de

CADE-25 Venue

CADE-25 is located at Freie Universität Berlin in Berlin-Dahlem. Below you find an overview of the surroundings near the Institute of Computer Science where most of the events will take place.

Map image © OpenStreetMap contributors

T9 Institute of Computer Science, Takustraße 9, 14195 Berlin (*Main location for CADE-25*)
A6 Institute of Mathematics, Arnimallee 6, 14195 Berlin (*Auxiliary location*)
B Bus stop "Arnimallee", bus service of X83 line (**B** - **D**: *Connection to "S+U Rathaus Steglitz"*)
C Bus stop "Museen Dahlem", bus service of X83 line
D Bus and subway stop "U Dahlem-Dorf", X83 and M11 bus service, U3 subway service
E *Seminaris Campus Hotel*
F Botanical Garden, Königin-Luise-Straße 6-8, 14195 Berlin (*Location of Reception*)
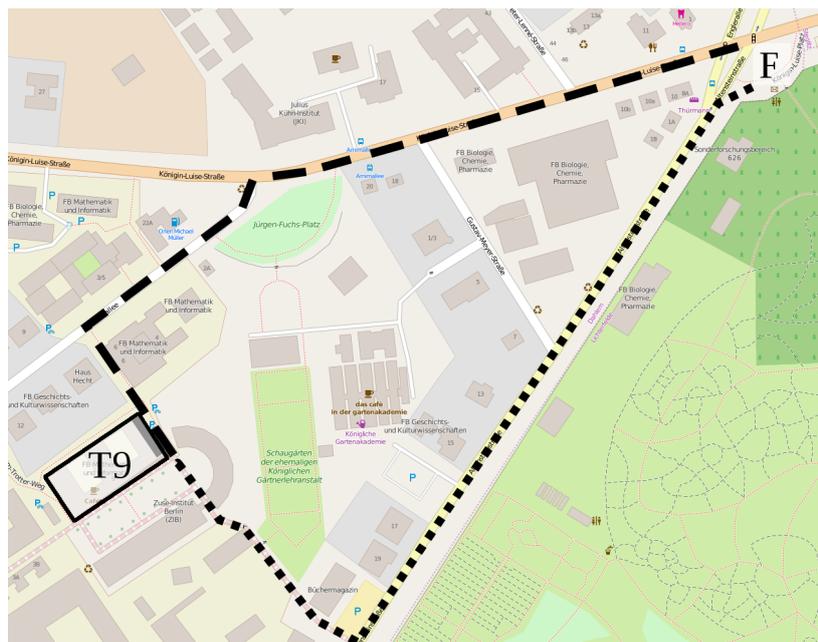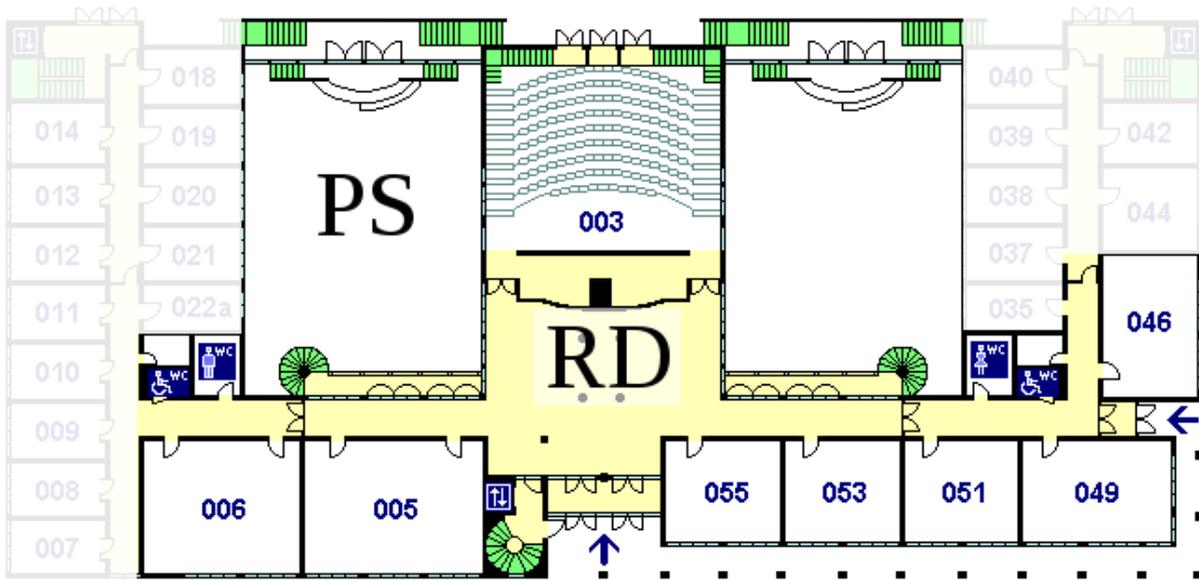

Map image © OpenStreetMap contributors

*Walking paths from CADE-25 venue to botanical garden (approx. 500m)*

CADE-25 Venue

Institute of Computer Science, Takustraße 9 (cf. bulding T9 on page 4)

RD Registration Desk   **T9/055** Working and coffee rooms
PS Poster session   **T9/051** Working room
T9/003 Lecture Hall   **Remaining rooms T9/XXX** Workshops and Tutorials

---

Reception Venue: Botanical Garden Berlin

Botanical Garden, Königin-Luise-Straße 6-8, 14195 Berlin (cf. area F on page 4)
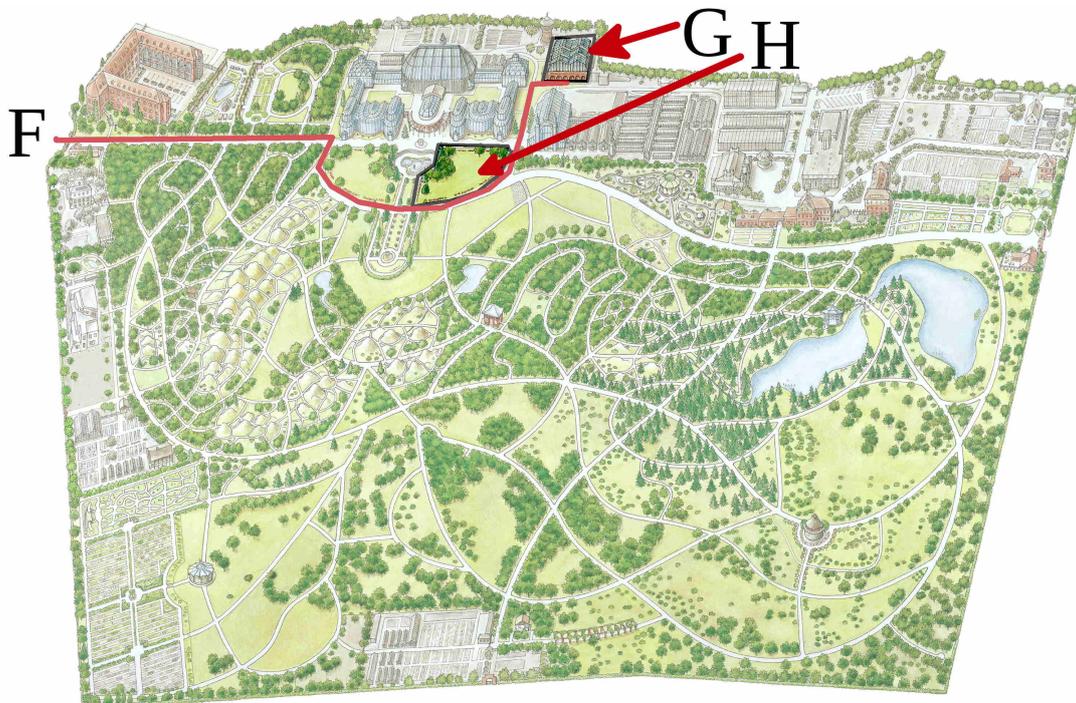
F Botanical Garden Entrance (cf. page 4)   **H** Picnic area
G Reception Hall

Instructions for Participants

General Information

- For general enquiries or projector/computer/internet problems please see the registration desk.
- University security: +49 30 838 55555
- Emergency services:
    - Police: 110
    - Fire and Rescue Service: 112

Internet access

- You may use our conference network:
  SSID: `conference`   Password: `4j848bpd`

- If you already have an eduroam account you can use that.

Instructions for Speakers

- Each room will have a digital projector.
- Speakers can bring their own laptops or they may use the laptops as provided by the session chairs.
- Please arrive 10 minutes before the session starts to check the equipment works, and, if you will not be using your own laptop, to upload your slides from your USB drive.
- In case of problems please see the reception desk for help; we will also have several volunteers around.

Instructions for Session Chairs

- Please arrive 10 minutes before the session starts to check the equipment works.
- Please stick to the schedule.
- Please moderate questions.

Online Proceedings and Other Resources

Proceedings and other resources related to CADE-25 are available at:

http://conference.mi.fu-berlin.de/cade-25/onlineresources

This includes:

- Springer free online access for CADE-25 proceedings
- Workshop proceedings
- Tutorial resources
- Selected slides, pictures, etc. from the conference

CADE-25 Event Overview

Special Session on the Past, Present and Future of Automated Deduction

Invited Speakers (August 3)

- Ursula Martin (University of Oxford),
- Frank Pfenning (Carnegie Mellon University),
- David Plaisted (University of North Carolina at Chapel Hill),
- Andrei Voronkov (University of Manchester)

Main Conference

Invited Speakers (August 4 and 6)

- Ulrich Furbach (Universität Koblenz),
- Michael Genesereth (Stanford University, joint invited speaker with RuleML),
- Edward Zalta (Stanford University)

Award Ceremonies: Herbrand Award and Skolem Award (August 4)

Competitions

- CASC: The CADE ATP System Competition (August 4)
  Organizer: Geoff Sutcliffe
- CoCo: The 4th Confluence Competition (August 2)
  Organizers: Takahito Aoto, Nao Hirokawa, Julian Nagele, Naoki Nishida and Harald Zankl
- termCOMP: Termination Competition (August 5-6)
  Organizers: Johannes Waldmann, Stefan von der Krone

Workshops

- Bridging: Bridging the gap between human and automated reasoning (August 1)
  Organizers: Ulrich Furbach, Natarajan Shankar, Marco Ragni and Steffen Hölldobler
  Invited Speaker: Marco Ragni
- DT: 29. Jahrestreffen der GI-Fachgruppe Deduktionssysteme (August 2-3)
  Organizers: Christoph Benzmüller, Matthias Horbach, Alexander Steen, Max Wisniewski
  Invited Speakers: Renate Schmidt, Wolfgang Lenzen
- HOL4: HOL4 Workshop (August 2-3)
  Organizers: Ramana Kumar, Invited Speaker: Michael Norrish
- IWC: The 4th International Workshop on Confluence (August 2)
  Organizers: Takahito Aoto and Ashish Tiwari, Invited Speakers: Koji Nakazawa and Stefan Hetzl
- LFMTP: International Workshop on Logical Frameworks and Meta-Languages: Theory and Practice
  Organizers: Kaustuv Chaudhuri and Iliano Cervesato, (August 1)
  Invited Speakers: Frank Pfenning, Vivek Nigam, Marc Lasson
- PxTP: Workshop on Proof eXchange for Theorem Proving (August 2)
  Organizers: Cezary Kaliszyk and Andrei Paskevich, Invited Speakers: Bart Jacobs, Georges Gonthier
- QUANTIFY: 2nd International Workshop on Quantification (August 3)
  Organizers: Hubie Chen, Florian Lonsing and Martina Seidl, Invited Speakers: Olaf Beyersdorff

- Vampire: The Vampire Workshop　　　　　　　　　　　　　　　　　　(August 2)
  Organizers: Laura Kovacs and Andrei Voronkov
  Invited Speakers: Geoff Sutcliffe and Leonardo de Moura

Tutorials

- Abella: Reasoning about Computational Systems using Abella　　　　　(August 2)
  Lecturers: Kaustuv Chaudhuri, Gopalan Nadathur
- Beluga: Programming proofs about formal systems　　　　　　　　　　(August 2)
  Lecturer: Brigitte Pientka
- CPROVER: From Programs to Logic: The CPROVER verification tools　　(August 3)
  Lecturers: Daniel Kroening, Martin Brain, Peter Schrammel
- Isabelle: Isabelle Tutorial　　　　　　　　　　　　　　　　　　　　(August 1)
  Lecturer: Makarius Wenzel
- KeY: The Sequent Calculus of the KeY Tool　　　　　　　　　　　　　(August 3)
  Lecturers: Reiner Hähnle, Peter Schmitt
- Lean: Lean Theorem Prover: A Tutorial　　　　　　　　　　　　　　(August 3)
  Lecturers: Leonardo de Moura, Soonho Kong, Jeremy Avigad and Floris van Doorn
- Superposition: 25th Anniversary of Superposition: Status and Future　　(August 1)
  Lecturers: Stephan Schulz and Christoph Weidenbach

Poster Event

EPS: The CADE-25 Taskforce towards an Encyclopedia of Proof Systems
Organizer: Bruno Woltzenlogel Paleo

Sports Events

- CADE-25 Beach volleyball
  On Saturday, Sunday, and Thursday, from 18:00 to 19:00 and Tuesday from 19:00 to 20:00 we offer recreational beach volleyball at the playgrounds near the FU mensa building. See the reception desk for more information.
- CADE-25 Squash Tournament
  This will take place on Sunday evening at a Squash center in Kleinmachnow. If you haven't signed up already, please do so at the reception desk. Meeting point: Sunday, August 2, 17:50 at Seminaris Hotel Lobby/Entrance.

Co-located/Affiliated Events *(the local organizer of these co-located events is Adrian Paschke)*

- RuleML 2015: 9th International Web Rule Symposium　　　　　　　　　(August 2-5)
- RuleML Industry Track 2015: 9th International Web Rule Symposium　　(August 2-5)
- RW 2015: 11th Reasoning Web Summer School　　　　　　　　(July 31 - August 4)
- RR 2015: 9th International Conference on Web Reasoning and Rules　　(August 4-6)
- FOMI 2015: 7th Workshop on Formal Ontologies meets Industry　　　　(August 5)
- 9th International Rule Challenge 2015　　　　　　　　　　　　　　　(August 2-5)
- 5th RuleML Doctoral Consortium 2015　　　　　　　　　　　　　　　(August 4)
- Challenge on Recommender Systems for the Web of Data　　　　　　　(August 2-5)
- Berlin Semantic Web Meetup　　　　　　　　　　　　　　　　　　　(August 2-5)
- ISR 2015: The International School on Rewriting, Leipzig　　　　　　(August 10-14)

Invited Talks

of the Special Session and Main Conference (by date and time)

Special Session

David A. Plaisted

August 3, 14:00, Room T9/003 (Lecture Hall)

History and Prospects for First-Order Automated Deduction

Abstract. On the fiftieth anniversary of the appearance of Robinson's resolution paper, it is appropriate to consider the history and status of theorem proving, as well as its possible future directions. Here we discuss the history of first-order theorem proving both before and after 1965, with some personal reflections. We then generalize model-based reasoning to first-order provers, and discuss what it means for a prover to be goal sensitive. We also present a way to analyze asymptotically the size of the search space of a first-order prover in terms of the size of a minimal unsatisfiable set of ground instances of a set of first-order clauses.

Andrei Voronkov

August 3, 14:45, Room T9/003 (Lecture Hall)

AVATAR

Abstract. We describe a new architecture for first-order resolution and superposition theorem provers called AVATAR (Advanced Vampire Architecture for Theories and Resolution). Its original motivation comes from the problem well-studied in the past — dealing with problems having clauses containing propositional variables and other clauses that can be split into components with disjoint sets of variables. Such clauses are common in problems coming from applications, for example in verification and program analysis, where many ground literals occur in the problems and even more are generated during the proof-search.

This problem was previously addressed by adding various versions of splitting. The addition of splitting resulted in considerable improvements in the performance of theorem provers. However, even with various versions of splitting implemented, the performance of superposition theorem provers is nowhere near SMT solvers on purely ground problems or SAT solvers on propositional problems. In AVATAR ground problems are solved with the same efficiency as that of the underlying SMT solver. On problems with quantifiers the introduction of AVATAR in Vampire resulted in drastic improvements over all previous implementation of splitting. Several hundred TPTP problems previously unsolvable by any first-order theorem prover, including Vampire itself, have been proved, including an open problem in semigroups.

Frank Pfenning

August 3, 16:00, Room T9/003 (Lecture Hall)

On the Role of Proof Theory in Automated Deduction

Abstract. Since the seminal work by Gentzen, who developed both natural deduction and the sequent calculus, there has been a line of research concerned with discovering deep structural properties of proofs in order to control the search space in theorem proving. This is particularly important in non-classical logics where traditional model-theoretic techniques may be more difficult to apply. We will walk through some of the key developments, starting with cut elimination and identity expansion, followed by focusing, polarization, and the separation of judgments and propositions. These concepts have been surprisingly robust, applicable to many non-classical logics, to the extent that one may consider them a litmus test on whether a set of rules or axioms form a coherent logic. We illustrate how each of these ideas affect proof search. In some cases, proofs are sufficiently restricted so that proof search can be seen as a fundamental computational mechanism, giving rise to logic programming.

Ursula Martin

Stumbling Around in the Dark: Lessons from Everyday Mathematics

Abstract. The growing use of the internet for collaboration, and of numeric and symbolic software to perform calculations it is impossible to do by hand, not only augment the capabilities of mathematicians, but also afford new ways of observing what they do. In this essay we look at four case studies to see what we can learn about the everyday practice of mathematics: the polymath experiments for the collaborative production of mathematics, which tell us about mathematicians attitudes to working together in public; the minipolymath experiments in the same vein, from which we can examine in finer grained detail the kinds of activities that go on in developing a proof; the mathematical questions and answers in math overflow, which tell us about mathematical-research-in-the-small; and finally the role of computer algebra, in particular the GAP system, in the production of mathematics. We conclude with perspectives on the role of computational logic.

Main Conference

Ulrich Furbach

Automated Reasoning in the Wild

Abstract. This paper discusses the use of first order automated reasoning in question answering and cognitive computing. For this the natural language question answering project LogAnswer is briefly depicted and the challenges faced therein are addressed. This includes a treatment of query relaxation, web-services, large knowledge bases and co-operative answering. In a second part a bridge to human reasoning as it is investigated in cognitive psychology is constructed by using standard deontic logic.

Michael Genesereth

The Herbrand Manifesto – Thinking Inside the Box

Abstract. The traditional semantics for (first-order) relational logic (sometimes called Tarskian semantics) is based on the notion of interpretations of constants in terms of objects external to the logic. Herbrand semantics is an alternative that is based on truth assignments for ground sentences without reference to external objects. Herbrand semantics is simpler and more intuitive than Tarskian semantics; and, consequently, it is easier to teach and learn.

Moreover, it is more expressive than Tarskian semantics. For example, while it is not possible to finitely axiomatize natural number arithmetic completely with Tarskian semantics, this can be done easily with Herbrand semantics. Herbrand semantics even enables us to define the least fixed-point model of a stratified logic program without any special constructs.

The downside is a loss of some familiar logical properties, such as compactness and proof-theoretic completeness. However, there is no loss of inferential power—anything that can be deduced according to Tarskian semantics can also be deduced according to Herbrand semantics.

Based on these results, we argue that there is value in using Herbrand semantics for relational logic in place of Tarskian semantics. It alleviates many of the current problems with relational logic and ultimately may foster a wider use of relational logic in human reasoning and computer applications. To this end, we have already taught several sessions of the computational logic course at Stanford and a popular MOOC using Herbrand semantics, with encouraging results in both cases.

Edward N. Zalta

Automating Leibniz's Theory of Concepts

Abstract. Our computational metaphysics group describes its use of automated reasoning tools to study Leibniz's theory of concepts. We start with a reconstruction of Leibniz's theory within the theory of abstract objects (henceforth 'object theory'). Leibniz's theory of concepts, under this reconstruction, has a non-modal algebra of concepts, a concept-containment theory of truth, and a modal metaphysics of complete individual concepts. We show how the object-theoretic reconstruction of these components of Leibniz's theory can be represented for investigation by means of automated theorem provers and finite model builders. The fundamental theorem of Leibniz's theory is derived using these tools.

Invited Talks

of Workshops (by date and time)

Bridging the Gap between Human and Automated Reasoning (Bridging)

Marco Ragni (Universität Freiburg)   August 1, 09:30, Room T9/005

Three-levels of Analysis: Connecting cognitive theories of reasoning with empirical results and cognitive modeling

Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP)

Frank Pfenning (Carnegie Mellon University)   August 1, 09:00, Room T9/049

Decomposing Modalities

Vivek Nigam (Federal University of Paraba)   August 1, 11:00, Room T9/049

A Linear Logic Framework with Subexponentials

Marc Lasson (Inria)   August 1, 14:00, Room T9/049

A Coq plugin for computing logical relations of parametricity

International Workshop on Confluence (IWC)

Koji Nakazawa (Kyoto University)   August 2, 09:00, Room T9/005

Lambda Calculi and Confluence from A to Z

Stefan Hetzl (TU Wien)   August 2, 14:00, Room T9/005

Herbrand-Confluence in the Classical Sequent Calculus

Vampire

Leonardo de Moura (Microsoft Research)   August 2, 09:00, Room T9/046

Lost in translation: how easy (automated reasoning) problems become hard due to bad encodings

Geoff Sutcliffe (University of Miami)   August 2, 16:00, Room T9/046

Things that you can't do with a Vampire

Deduktionstreffen (DT)

Renate Schmidt (University of Manchester)   August 2, 14:00, Room A6/032

Practical Forgetting and Uniform interpolation for Description Logics

Wolfgang Lenzen (University of Osnabrück)   August 3, 09:00, Room A6/032

Leibniz's Dream of a Logico-Mathematical Metaphysics

Proof eXchange for Theorem Proving (PxTP)

Georges Gonthier (Microsoft Research)   August 2, 09:30, Room T9/049

Reflection, of all shapes and sizes

Bart Jacobs (KU Leuven)   August 3, 09:30, Room T9/049

The VeriFast program verifier and its SMT solver interaction

HOL4 Workshop

Michael Norrish (NICTA)   August 3, 09:00, Room T9/006

Defining a Niche for HOL4

Proof eXchange for Theorem Proving (PxTP)

Olaf Beyersdorff (University of Leeds)   August 3, 09:00, Room T9/005

Proof Complexity of Quantified Boolean Formulas

CADE-25 at a Glance

	Sat 1	Sun 2	Mon 3	Tue 4	Wed 5	Thu 6	Fri 7
9:00-10:30	Workshops & Tutorials Block 1	Workshops & Tutorials Block 5	Workshops & Tutorials Block 9	ECCAI Inv. Talk (Ulrich Furbach)	CADE Session 3	Invited Talk (Edward Zalta)	CADE Session 8
10:30-11:00	Coffee	Coffee		Coffee	Coffee	Coffee	Coffee
11:00-12:30	Workshops & Tutorials Block 2	Workshops & Tutorials Block 6	Workshops & Tutorials Block 10	CADE Session 1	CADE Session 4	CADE Session 5	Competition Rslts / CADE Session 9
12:30-14:00				Lunch			
14:00-15:30	Workshops & Tutorials Block 3	Workshops & Tutorials Block 7	(David Plaisted) Special Session (Andrei Voronkov)	CADE Session 2	Excursion	CADE Session 6	CADE Session 10
15:30-16:00	Coffee		Coffee				
16:00-17:30	Workshops & Tutorials Block 4	Workshops & Tutorials Block 8	(Frank Pfenning) Special Session (Ursula Martin)	Joint with RuleML (M. Genesereth) — Skolem Award, Best Paper Award, Herbrand Award	Excursion	CADE Session 7 — Business Meeting	
17:30-19:00		17:50: Squash @CADE-25					
19:00–			19:00–21:00 Reception		19:00–23:00 Dinner		

12

CADE-25 Program Overview

Saturday, August 1

09:00-10:30	*Workshops and Tutorials, Block 1*	
	Workshop **Bridging**	*(room: T9/005)*
	Workshop **LFMTP**	*(room: T9/049)*
	Tutorial **Isabelle**	*(room: T9/053)*
	Tutorial **Superposition**	*(room: T9/046)*
10:30-11:00	*Coffee break*	
11:00-12:30	*Workshops and Tutorials, Block 2*	
	Workshop **Bridging**	*(room: T9/005)*
	Workshop **LFMTP**	*(room: T9/049)*
	Tutorial **Isabelle**	*(room: T9/053)*
	Tutorial **Superposition**	*(room: T9/046)*
12:30-14:00	*Lunch break*	
14:00-15:30	*Workshops and Tutorials, Block 3*	
	Workshop **Bridging**	*(room: T9/005)*
	Workshop **LFMTP**	*(room: T9/049)*
	Tutorial **Isabelle**	*(room: T9/053)*
	Tutorial **Superposition**	*(room: T9/046)*
15:30-16:00	*Coffee break*	
16:00-17:30	*Workshops and Tutorials, Block 4*	
	Workshop **Bridging**	*(room: T9/005)*
	Workshop **LFMTP**	*(room: T9/049)*
	Tutorial **Isabelle**	*(room: T9/053)*
	Tutorial **Superposition**	*(room: T9/046)*

Sunday, August 2

09:00-10:30	*Workshops and Tutorials, Block 5*	
	Workshop **IWC**	*(room: T9/049)*
	Workshop **PxTP**	*(room: T9/005)*
	Workshop **Vampire**	*(room: T9/046)*
	Tutorial **Abella**	*(room: T9/053)*
10:30-11:00	*Coffee break*	
11:00-12:30	*Workshops and Tutorials, Block 6*	
	Workshop **IWC**	*(room: T9/049)*
	Workshop **PxTP**	*(room: T9/005)*
	Workshop **Vampire**	*(room: T9/046)*
	Tutorial **Abella**	*(room: T9/053)*
12:30-14:00	*Lunch break*	
14:00-15:30	*Workshops and Tutorials, Block 7*	
	Workshop **IWC**	*(room: T9/049)*
	Workshop **PxTP**	*(room: T9/005)*
	Workshop **Vampire**	*(room: T9/046)*
	Workshop **HOL4**	*(room: T9/051)*
	Workshop **Deduktionstreffen**	*(room: T9/006)*
	Tutorial **Beluga**	*(room: T9/053)*
15:30-16:00	*Coffee break*	
16:00-17:30	*Workshops and Tutorials, Block 8*	
	Workshop **IWC**	*(room: T9/049)*
	Workshop **PxTP**	*(room: T9/005)*
	Workshop **Vampire**	*(room: T9/046)*
	Workshop **HOL4**	*(room: T9/051)*
	Workshop **Deduktionstreffen**	*(room: T9/006)*
	Tutorial **Beluga**	*(room: T9/053)*
18:30-21:00	*CADE-25 Squash Tournament*	

Monday, August 3

09:00-10:30	*Workshops and Tutorials, Block 9*	
	Workshop **HOL4**	*(room: T9/051)*
	Workshop **PxTP**	*(room: T9/005)*
	Workshop **QUANTIFY**	*(room: T9/049)*
	Workshop **Deduktionstreffen**	*(room: T9/003)*
	Tutorial **CPROVER**	*(room: T9/046)*
	Tutorial **KeY**	*(room: T9/006)*
	Tutorial **Lean**	*(room: T9/053)*
10:30-11:00	*Coffee break*	
11:00-12:30	*Workshops and Tutorials, Block 10*	
	Workshop **HOL4**	*(room: T9/051)*
	Workshop **PxTP**	*(room: T9/005)*
	Workshop **QUANTIFY**	*(room: T9/049)*
	Workshop **Deduktionstreffen**	*(room: T9/003)*
	Tutorial **CPROVER**	*(room: T9/046)*
	Tutorial **KeY**	*(room: T9/006)*
	Tutorial **Lean**	*(room: T9/053)*
12:30-14:00	*Lunch break*	

14:00-15:30   *Special Session Invited Talks: Past, Present and Future of Automated Deduction (chair: Aart Middeldorp)*

David Plaisted: History and Prospects for First-Order Automated Deduction *(45min)*

Andrei Voronkov: AVATAR *(45min)*

15:30-16:00   *Coffee break*

16:00-17:30   *Special Session Invited Talks: Past, Present and Future of Automated Deduction (chair: Amy Felty)*

Frank Pfenning: On the Role of Proof Theory in Automated Deduction *(45min)*

Ursula Martin: Stumbling Around in the Dark: Lessons from Everyday Mathematics *(45min)*

19:00-21:00   *Reception (joint with RuleML) at Botanical Garden*

Christoph Benzmüller, Adrian Paschke: Opening of CADE-25 and RuleML *(5-10min)*

Ute Finckh-Krämer (Berlin, member of German Parliament): Welcome Address *(5-10min)*

Wolfgang Bibel: Opening Speech *(20min)*

Tuesday, August 4

09:00-10:00 *ECCAI Invited talk* *(chair: Christoph Benzmüller)*
Ulrich Furbach: Automated Reasoning in the Wild

10:00-10:30 *Coffee break*

10:15 *Start of CASC-25* *(room: T9/055 and Foyer)*

10:30-12:30 *Session 1: Rewriting* *(chair: Christophe Ringeissen)*
Sakai/Oyamaguchi/Ogawa: Non-*E*-Overlapping, Weakly Shallow, and Non-Collapsing TRSs are Confluent *(30min)*
Shintani/Hirokawa: CoLL: A Confluence Tool for Left-Linear Term Rewrite Systems *(15min)*
Jacquemard/Kojima/Sakai: Term Rewriting with Prefix Context Constraints and Bottom-Up Strategies *(30min)*
Sato/Winkler: Encoding Dependency Pair Techniques and Control Strategies for Maximal Completion *(15min)*
Iborra/Nishida/Vidal/Yamada: Reducing Relative Termination to Dependency Pair Problems *(30min)*

12:30-14:00 *Lunch break*

14:00-15:30 *Session 2: Decision Procedures* *(chair: Deepak Kapur)*
Passmore: Decidability of Univariate Real Algebra with Predicates for Rational and Integer Powers *(30min)*
Reynolds/Blanchette: A Decision Procedure for (Co)datatypes in SMT Solvers *(30min)*
David: Deciding ATL* Satisfiability by Tableaux *(30min)*

15:30-16:00 *Coffee break*

16:00-17:00 *RuleML/CADE Invited talk* *(chair: Adrian Paschke)*
Michael Genesereth: The Herbrand Manifesto - Thinking Inside the Box

17:00-17:15 *Short break*

17:15-18:45 *CADE-25 Awards Session* *(chair: Maria Paola Bonacina)*
    Opening *(Bonacina, 5min)*
    Skolem Awards *(Kirchner or Bonacina, 10min)*
    Best Paper Award *(Felty, 5min)*
    Woody Bledsoe Awards *(Benzmüller, 5min)*
    Presentation of Herbrand Award to Andrei Voronkov *(Bonacina, 5min)*
Herbrand Award Acceptance Speech *(chair: Konstantin Korovin, Laura Kovács)*
Andrei Voronkov: My Life with Vampire *(45min)*

Wednesday, August 5

09:00-10:30	*Session 3: Interactive/Automated Theorem Proving and Applications (chair: Laura Kovács)*

Paulson: A Formalisation of Finite Automata using Hereditarily Finite Sets *(30min)*

Gransden/Walkinshaw/Raman: SEPIA: Search for Proofs using Inferred Automata *(15min)*

Marić/Janičić/Maliković: Proving Correctness of a KRK Chess Endgame Strategy by using Isabelle/HOL and Z3 *(30min)*

Pientka/Cave: Inductive Beluga: Programming Proofs *(15min)*

10:30-10:45 *Coffee break*

10:45-12:15 *Session 4: New Techniques for Automating and Sharing Proofs* *(chair: Brigitte Pientka)*

Baumgartner: SMTtoTPTP - A Converter for Theorem Proving Formats *(15min)*

Ji: CTL Model Checking in Deduction Modulo *(30min)*

Echenim/Peltier/Tourret: Quantifier-Free Equational Logic and Prime Implicate Generation *(30min)*

Kissinger/Zamdzhiev: Quantomatic: A Proof Assistant for Diagrammatic Reasoning *(15min)*

12:15-18:00 *Excursion*:

Excursion A: Bundestag/Spree

Departure at 12:15, meeting point: Foyer of CADE venue (Takustr. 9)

13:00 Security Check at Bundestag

13:30 Start of the guided tour

15:30 Short boat trip

16:00 Sightseeing at Berlin Cathedral

17:00 at Lustgarten: Departure return fare to Seminaris Campus Hotel

Excursion B: Long boat trip

Departure at 13:45 at Seminaris Campus Hotel

14:30 Arrival near Paul-Löbe-Haus

15:00 Start of boat trip 18:00 End of boat trip, arrival at wannsee (near dinner location)

19:30-23:00 *Dinner (joint with RuleML): Restaurant Fischerhütte at Schlachtensee*

Jörg Siekmann: Dinner Speech

Dinner transfer at 18:15, 19:00, 19:45 from Seminaris Campus Hotel

Return fare to Seminaris Campus Hotel at 23:00 and 0:00

Thursday, August 6

09:00-10:00   *Invited talk*   *(chair: Geoff Sutcliffe)*

                      Edward Zalta: Automating Leibniz's Theory of Concepts

10:00-10:30   *Coffee break*

10:30-12:30   *Session 5: Automating First-Order Logic*   *(chair: Jasmin Blanchette)*

                      Reger/Suda/Voronkov: Playing with AVATAR   *(30min)*

                      Woltzenlogel-Paleo/Gorzny: Towards the Compression of First-Order Resolution Proofs by Lowering Unit Clauses   *(15min)*

                      Baumgartner/Bax/Waldmann: Beagle - A Hierarchic Superposition Theorem Prover   *(15min)*

                      de Moura/Kong/Avigad/van Doorn/van Raumer: The Lean Theorem Prover *(15min)*

                      Kaliszyk/Schulz/Urban/Vyskočil: System Description: E.T. 0.1   *(15min)*

                      Reger/Tishkovsky/Voronkov: Cooperating Proof Attempts   *(30min)*

12:30-14:00   *Lunch break*

14:00-15:30   *Session 6: Combinations*   *(chair: Alwen Tiu)*

                      Chocron/Fontaine/Ringeissen: A Polite Non-Disjoint Combination Method: Theories with Bridging Functions Revisited   *(30min)*

                      Saghafi/Danas/Dougherty: Exploring Theories with a Model-Finding Assistant *(30min)*

                      D'Silva/Urban: Abstract Interpretation as Automated Deduction   *(30min)*

15:30-16:00   *Coffee break*

16:00-17:00   *Session 7: Hybrid Systems and Program Synthesis*   *(chair: Reiner Hähnle)*

                      Platzer: A Uniform Substitution Calculus for Differential Dynamic Logic *(30min)*

                      Tiwari/Gascón/Dutertre: Program Synthesis using Dual Interpretation   *(30min)*

17:00-18:00   *CADE Business Meeting*

Friday, August 7

09:00-10:30   *Session 8: Logics and Systems for Program Verification*   *(chair: Renate Schmidt)*

Hóu/Goré/Tiu: Automated Theorem Proving for Assertions in Separation Logic with all Connectives   *(30min)*

Din/Bubel/Hähnle: KeY-ABS: A Deductive Verification Tool for the Concurrent Modelling Language ABS   *(15min)*

Fulton/Mitsch/Quesel/Völp/Platzer: KeYmaera X: An Axiomatic Tactical Theorem Prover for Hybrid Systems   *(15min)*

Balbiani/Boudou: Tableaux Methods for Propositional Dynamic Logics with Separating Parallel Composition   *(30min)*

10:30-11:00   *Coffee break*

11:00-11:30   *Presentation of Competition Results*   *(chair: Aart Middeldorp)*

11:30-12:30   *Session 9: Unification*   *(chair: Stephan Schulz)*

Libal: Regular Patterns in Second-order Unification   *(30min)*

Backeman/Rümmer: Theorem Proving with Bounded Rigid E-Unification*(30min)*

12:30-14:00   *Lunch break*

14:00-15:30   *Session 10: SAT/SMT*   *(chair: Andrew Reynolds)*

Heule/Hunt/Wetzler: Expressing Symmetry Breaking in DRAT Proofs   *(30min)*

Zulkoski/Ganesh/Czarnecki: MathCheck: A Math Assistant based on a Combination of Computer Algebra Systems and SAT Solvers   *(30min)*

Bromberger/Sturm/Weidenbach: Linear Integer Arithmetic Revisited   *(30min)*

15:30-16:00   *End of CADE-25*

Restaurants and Coffee shops

(near the CADE-25 venue)

Special recommendation: Das Cafe in der Gartenakademie, atmospheric experience, highly recommended, easy to reach in 5min, ask Christoph about it (map: https://goo.gl/maps/zaOBq)

- Luise, German and international food, beer garden (map: https://goo.gl/maps/l9NLe)
- Alter Krug, German food, beer garden, lunch for 7,90€ (map: https://goo.gl/maps/XCGxS)
- Restaurant Engler's, German and international food, business lunch for 9,90€ (map: https://goo.gl/maps/hhbWo)
- Ristorante Piaggio, Italian food, lunch (map: https://goo.gl/maps/stWSu)
- Fabeck's, German food, 9 different varieties of beer (map: https://goo.gl/maps/22aQ6)
- Ristorante Galileo, Italian food (map: https://goo.gl/maps/bxqa9)
- Ristorante Villa Rosa, Italian food (map: https://goo.gl/maps/2m7vV)
- Esskultur, in the ethnological museum Dahlem, international and asian food, lunch from 11:30am to 14:00pm (map: https://goo.gl/maps/cznJt)
- Asia Snack Dahlem (map: https://goo.gl/maps/aaCLy)
- Asia light, asian food and sushi (map: https://goo.gl/maps/mCT6F)
- Two snack bars (at U-Bahn station Dahlem-Dorf), Döner Kebap, Bratwurst, Pommes Frites and alike. (map: https://goo.gl/maps/aF6GD)
- Cafe Kornfeld, coffee, cakes, snacks and daily soup (map: https://goo.gl/maps/enKFP)
- Cafe Cross, coffee, cakes, sandwiches and snacks (map: https://goo.gl/maps/vuGGD)
- Chirag, Indian food, business lunch (map: https://goo.gl/maps/c9t3Q)
- Pesetas, Spanish food, tapas and cocktails (map: https://goo.gl/maps/Mubvc)
- Ko Phai, Thai food (map: https://goo.gl/maps/9Chkr)
- La Favorita, Italian food (map: https://goo.gl/maps/YjTIH)
- EisZeit, ice cream and coffee (map: https://goo.gl/maps/xVKjf) Mensas

FU Berlin has several mensas with excellent price-value ratios. In particular, FU Campus Mensa II is reachable in about 5 minutes from the CADE venue (map: https://goo.gl/maps/vmQgH). **All CADE-25 participants can use cash payment (without using a *Mensacard*) upon display of their conference badges.** More information on all nine mensas and cafeterias of FU Berlin is available at http://www.studentenwerk-berlin.de/en/mensen/mensen_cafeterien/index.html.

Moreover, there is the cantina of the Julius Kühn-Institut in close proximity to the CADE venue (map: https://goo.gl/maps/ccvZE).

ATMs

- An ATM in the Seminaris Hotel: https://goo.gl/maps/vD8RB
- An ATM near to the FU campus mensa II: https://goo.gl/maps/jirNs
- An ATM near to the underground station Dahlem-Dorf: https://goo.gl/maps/VOLyi

Organized Excursions

Excursion A: Bundestag/Spree

http://www.bundestag.de/htdocs_e/visits/besgrupp/fuehr
We offer a guided tour explaining the functions, working methods and composition of the German parliament, as well as the history and architecture of the Reichstag building. Afterwards we plan a short boat trip to the museums island, where you can visit museums or the dome or just relax and enjoy the beautiful scenery.

Price: 45€ per person

Meeting point: next to the entrance of the Reichstag (https://goo.gl/maps/EmQW5)

Includes: Bus transfer to Bundestag, lunch box, guided tour (in English) of the Reichstag building, short boat trip on the Spree to Museumsinsel, transfer back to the hotel

Duration: 3-4 hours

Excursion B: Boat trip - A great view from the water!

http://www.ms-heiterkeit.de/bildergalerie-heiterkeit.htm
On this boat trip you will see the main sights of Berlin and the surroundings from the water. The boat will take us from Berlin Mitte to Wannsee.

Price: 45€ per person

Landing stage: Ludwig-Erhard-Ufer; 10557 Berlin (https://goo.gl/maps/oNiAX) ("Anlegestelle Reichstag / Paul-Löbe-Haus")

Includes: Bus transfer to Berlin Mitte, guided tour (in English), includes non-alcoholic beverages, coffee/tea, and alcoholic beverages such as beer, wine, sparkling wine; and cake; transfer back to the hotel

Duration: 3-4 hours

RuleML Excursion: Boat trip - A great view from the water!
Also available to CADE-25 participants!
http://www.ms-heiterkeit.de/bildergalerie-heiterkeit.htm
On this boat trip you will see the main sights of Berlin and the surroundings from the water. The boat will take us *from Wannsee to Berlin Mitte*.

Price: 45€ per person

Includes: Bus transfer to Berlin Mitte, guided tour (in English), includes non-alcoholic beverages, coffee/tea, and alcoholic beverages such as beer, wine, sparkling wine; and cake; transfer back to the hotel

Duration: 3-4 hours

Ticket Booking (via RuleML conference):

http://www.csw.inf.fu-berlin.de/ruleml2015/registration.html

Recommendations for independent activities

Bike Tour- Berlins Best

http://berlinonbike.de/en/bike-tour/berlins-best/
Our "Berlin's Best" bike tour begins in Prenzlauer Berg, once a working class area and now endlessly trendy, with its painstakingly restored historical houses that were built during the Industrial Era of the Wilhelminian boom. After that, it's off to Berlin's historical city center, where Museum Island, the Brandenburg Gate and the Reichstag are just a few of the many sites you will experience first hand. You'll see how 40 years of the GDR (communist East Germany) left its mark on the city, and you'll get a feeling for contemporary Germany with the breathtaking architecture of the new government district.

Price: 25€ incl. a bike per person

Bike rental point

Knaackstraße 97; 10435 Berlin (https://goo.gl/maps/GpqPh)
Duration: 3-4 hours

The Underground of Berlin: Guided Tour, Subways and Bunkers in the Cold War

http://berliner-unterwelten.de/tour-3.15.1.html
This tour follows the traces of the Cold War in the underground. In West Berlin civil defence shelters were reactivated or newly built in preparation for a possible nuclear war. Particularly after the building of the Berlin Wall, the West German government and the West Berlin senate invested millions in these projects. Some of these were built as 'multi-purpose structures' and are currently used as underground stations, parking garages and storage facilities. By explaining the practical preparations made to help people survive, this tour attempts to make the realities and horrors of such conflict easy to comprehend.

Price: 11€ per person
Meeting point: Brunnenstrasse 105; 13355 Berlin (https://goo.gl/maps/vNSI5)
Duration: 90 minutes

Trabi-Safari (The Wall-Ride)

http://www.trabi-safari.de/berlin-wild-east/?language=de
We will take you to where the Cold War was "hot" and show you Berlin from a really unique perspective. Driving past historical places which have been and still are the focus of world politics, we will guide you through the formerly divided city of Berlin - a hands-on experience on both Berlin's exciting past and presence!

Price: 89€ per person
Meeting point: Zimmerstraße 97; 10117 Berlin (https://goo.gl/maps/gphxu)
Duration: 2 hours

Segway- Tour Sights of Berlin

http://www.kultigste-tour-berlins.de/en/die-segway-kult-tour-in-berlin

A city tour by Segway offers a much more intense experience than the mere passing with - for example - a bus.

Price: 59€ per person

Meeting point: Tempelhofer Feld (https://goo.gl/maps/r4Fcw)

Duration: 3 hours

It is necessary to have a driving license for moped or car.

Further recommended activities:

- Berliner Fernsehturm -There you will have a great view in 203 meters over the city (http://www.tv-turm.de)

- Wannsee - A great place for relaxing and swimming! (http://www.strandbadwannsee.de/Inhalt.htm)

- Ferry from Wannsee to Kladow (with public transportation AB-Ticket)

- Ferry to the Pfaueninsel

- Domäne Dahlem - 5 min footwork from venue (http://www.domaene-dahlem.de/home/)

- Botanischer Garten - There you can find a lot of plants and the park is near to the Freie Universität! (http://www.bgbm.org/en/how-get-here)

- Tempelhofer Feld - In the past it was a airport an now it is a big park. It is a good place to relax or to do some sport! (http://www.thf-berlin.de)

- Hochseilklettergarten Jungfernheide - A good place to climb in a team (http://www.waldhochseilgarten-jungfernheide.de)

- The Room - Can you get out of the room? (http://www.the-room-berlin.com/en/the-room)

- Potsdam - Sanssouci Palace (http://www.spsg.de/en/travel-trade/groupoffers/single-view-objects/schloss-sanssouci/), easy to reach from venue via public transportation (line S1)

- Potsdam - Cecilienhof Palace (http://www.spsg.de/en/travel-trade/groupoffers/single-view-objects/schloss-cecilienhof-1/), easy to reach from venue via public transportation (line S1)

Find the most recent information about events in the city on the following webpages:

- Exberliner (http://www.exberliner.com/)
- berlin.de (http://www.berlin.de/en/events/)
- angloinfo (http://berlin.angloinfo.com/whatson/)
- visit berlin (http://www.visitberlin.de/en/experience/events)
- tip (http://www.tip-berlin.de/)
- zitty (http://www.zitty.de/)
- 030 (http://www.berlin030.de/)

Overview of CADE-25 Venue (See page 4 for details)

Supported by

Map image © OpenStreetMap contributors