

ALEXANDER KOLLER

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RESEARCH INTERESTS

Efficient algorithms and logic-based methods in computational linguistics; computational semantics; formal languages; generation; the language-robotics interface.

EDUCATION

- 1999 – 2004 **Dr. rer. nat. (Ph.D.), Computer Science**, Saarland University
Dissertation: *Constraint-based and graph-based resolution of ambiguities in natural language*
Advisors: Manfred Pinkal and Gert Smolka
Grade: *summa cum laude* (best possible grade, rarely given)
- 1994 – 1999 **Diplom (M.Sc.) in Computational Linguistics**, Saarland University
Grade: 1.0 (best possible grade)
- 1994 – 1999 **Diplom (M.Sc.) in Computer Science**, Saarland University
Grade: 1.0 (best possible grade)
- 1996 **Vordiplome (\approx B.Sc. degrees)** in Computational Linguistics, Computer Science, and Mathematics

PROFESSIONAL EXPERIENCE

- 09/06 – 08/07 **DFG Research Fellow**, Columbia University
Efficient algorithms for sentence generation
- 05/99 – 08/06 **Researcher (Wissenschaftlicher Mitarbeiter)**, Saarland University
Project CHORUS: Computational semantics, underspecification
- 04/00 – 06/00 **Visiting scholar**, ICCS, University of Edinburgh
- 05/98 – 04/99 **Research assistant**, Project CHORUS (Prof. Manfred Pinkal)
Scope underspecification, development of a solver for context unification

- 03/98 – 04/98 **Internship** at SRI International, Cambridge, UK
Development of a system for anaphora resolution
- 08/96 – 09/97 **Research assistant**, Project OMEGA (Prof. Jörg Siekmann)
Development of a constraint solver for ϵ - δ proofs
- 05/95 – 09/95 **Research assistant**, German Research Centre for AI (DFKI)
Development of templates for information extraction
- 03/95 – 04/95 **Student assistant** at SAP AG, Walldorf
Development of test suites for the verification of the ABAP/4 language
- 06/93 – 09/93 **Student assistant** at SAP AG, Walldorf
Porting of Remote Function Call interfaces

GRANTS

- 2006 – 2008 **DFG Research Fellowship**: “CRISP: Efficient integrated realisation and microplanning”
- 2005 – 2007 **Co-Principal Investigator**, DFG project CHORUS (within SFB 378):
“Integrated Linguistic Processing with Constraints and Preferences”.
- 2001 – 2003 **Assistant Principal Investigator**, BMBF project MiLCA: Development
of e-learning modules for Computational Semantics, Algorithms in
Computational Linguistics, and Dialogue Systems.

SCHOLARSHIPS AND AWARDS

- 2001 **Best Presentation Award** at the Third International Workshop on Inference
in Computational Semantics
- 1997 – 1999 **Scholarship** of the German National Academic Foundation (Studienstiftung
des deutschen Volkes): National honour society for the (currently) top 0.3%
of university students.

PROFESSIONAL SERVICE

- 2007 **Senior PC member**, NAACL HLT 2007
- 2007 **Member of programme committee**, Seventh International Workshop on
Computational Semantics (IWCS-7)
- 2006 **PC co-chair**, Fifth International Workshop on Inference in Computational
Semantics (with Johan Bos)

2006	Member of programme committee , 29th Annual German Conference on Artificial Intelligence (KI-2006)
2006	Member of programme committee , Seventh CICLing Conference
2004	Member of programme committee , Workshop on Recent Advances in Dependency Grammar at COLING
2003	Member of programme committee , Fourth International Workshop on Inference in Computational Semantics
2002	Student chair , 40th Annual Meeting of the ACL (with Gideon Mann) Independent organisation of the Student Research Workshop
2000 – 2002	Information Officer , European Association for Logic, Language, and Information (FoLLI) Reviewer for ACL 2005; EACL 2006; HLT/NAACL 2006; CADE 2005; RTA 2002; IJCAR 2001; ECAI 2000; ESSLLI Student Sessions 2000–01, 2003–06; HLT/NAACL Student Research Workshop 2003; EACL Demo Session 2006; CSLP Workshop 2005; Journal of Logic, Language, and Information; Linguistische Berichte; Studia Linguistica; Logic Journal of the IGPL

TEACHING

Summer 2006	Lecture “Semantic Theory” (with Manfred Pinkal) Montague semantics, underspecification, DRT, presupposition
Summer 2006	Seminar “Underspecification” (with Stefan Thater) Advanced techniques and recent research in scope underspecification
Winter 2005/06	Seminar “Corpus-based semantics” (with Katrin Erk) Recent methods for extraction of semantic world knowledge from corpora
Summer 2005	Lecture “Semantic Theory” (with Manfred Pinkal) Montague semantics, underspecification, DRT, presupposition
2004	Introductory course “Computational Semantics”, ESSLLI Nancy (with Aljoscha Burchardt and Stephan Walter) Montague semantics, underspecification, inference tools
Summer 2004	Software project “Talking robots” (with Geert-Jan Kruijff) Combining Lego Mindstorms robots with dialogue systems
Summer 2004	Programming course “Java I” Introduction to programming in Java
Winter 2002/03	Software project “Talking robots” (with Geert-Jan Kruijff) Combining Lego Mindstorms robots with dialogue systems

- Summer 2001 **Software project** “Computer Game”
 (with Malte Gabsdil and Kristina Striegnitz)
 Development of a text adventure based on computational linguistics
- Winter 2000/01 **Programming course** “C/C++” (with Oliver Plaehn)
 Introduction to programming in C and C++
- 1999 **Advanced course** “Scope Underspecification and Processing”,
 ESSLLI Utrecht (with Joachim Niehren)
 Scope underspecification and constraint programming

PUBLICATIONS IN REFEREED JOURNALS

- [1] Ernst Althaus, Denys Duchier, Alexander Koller, Kurt Mehlhorn, Joachim Niehren, and Sven Thiel. An efficient graph algorithm for dominance constraints. *Journal of Algorithms*, 48(1):194–219, 2003.
- [2] Markus Egg, Alexander Koller, and Joachim Niehren. The constraint language for lambda structures. *Journal of Logic, Language, and Information*, 10(4):457–485, 2001.
- [3] Katrin Erk, Alexander Koller, and Joachim Niehren. Processing underspecified semantic descriptions in the constraint language for lambda structures. *Research on Language and Computation*, 1:127–169, 2003.
- [4] Michael Kohlhase and Alexander Koller. Resource-adaptive model generation as a performance model. *Logic Journal of the IGPL*, 11(4):435–456, 2003.
- [5] Alexander Koller, Ralph Debusmann, Malte Gabsdil, and Kristina Striegnitz. Put my galakmid coin into the dispenser and kick it: Computational linguistics and theorem proving in a computer game. *Journal of Logic, Language, and Information*, 13(2):187–206, 2004.
- [6] Alexander Koller, Joachim Niehren, and Kristina Striegnitz. Relaxing underspecified semantic representations for reinterpretation. *Grammars*, 3(2–3):217–241, 2000.

CONFERENCE PUBLICATIONS

- [1] Ernst Althaus, Denys Duchier, Alexander Koller, Kurt Mehlhorn, Joachim Niehren, and Sven Thiel. An efficient algorithm for the configuration problem of dominance graphs. In *Proceedings of the 12th ACM-SIAM Symposium on Discrete Algorithms*, Washington, DC, 2001.
- [2] Ernst Althaus, Nikiforos Karamanis, and Alexander Koller. Computing locally coherent discourses. In *Proceedings of the 42nd ACL*, Barcelona, 2004.
- [3] Manuel Bodirsky, Katrin Erk, Alexander Koller, and Joachim Niehren. Beta reduction constraints. In *Proceedings of the 12th International Conference on Rewriting Techniques and Applications*, Utrecht, 2001.

- [4] Manuel Bodirsky, Katrin Erk, Alexander Koller, and Joachim Niehren. Underspecified beta reduction. In *Proceedings of the 39th ACL*, Toulouse, 2001.
- [5] Ralph Debusmann, Denys Duchier, Alexander Koller, Marco Kuhlmann, Gert Smolka, and Stefan Thater. A relational syntax-semantics interface based on dependency grammar. In *Proceedings of the 20th COLING*, Geneva, 2004.
- [6] Katrin Erk and Alexander Koller. VP Ellipsis by Tree Surgery. In *Proceedings of the 13th Amsterdam Colloquium*, Amsterdam, 2001.
- [7] Dan Flickinger, Alexander Koller, and Stefan Thater. A new well-formedness criterion for semantics debugging. In *Proceedings of the 12th International Conference on HPSG*, Lisbon, 2005.
- [8] Ruth Fuchss, Alexander Koller, Joachim Niehren, and Stefan Thater. Minimal recursion semantics as dominance constraints: Translation, evaluation, and analysis. In *Proceedings of the 42nd ACL*, Barcelona, 2004.
- [9] Malte Gabsdil, Alexander Koller, and Kristina Striegnitz. Natural language and inference in a computer game. In *Proceedings of the 19th COLING*, Taipei, 2002.
- [10] Jan Jaspars and Alexander Koller. A calculus for direct deduction with dominance constraints. In *Proceedings of the 12th Amsterdam Colloquium*, Amsterdam, 1999.
- [11] Alexander Koller and Geert-Jan Kruijff. Talking robots with LEGO Mindstorms. In *Proceedings of the 20th COLING*, Geneva, 2004.
- [12] Alexander Koller, Kurt Mehlhorn, and Joachim Niehren. A polynomial-time fragment of dominance constraints. In *Proceedings of the 38th ACL*, Hong Kong, 2000.
- [13] Alexander Koller and Joachim Niehren. On underspecified processing of dynamic semantics. In *Proceedings of the 18th COLING*, Saarbrücken, 2000.
- [14] Alexander Koller and Joachim Niehren. Constraint programming in computational linguistics. In D. Barker-Plummer, D. Beaver, J. van Benthem, and P. Scotto di Luzio, editors, *Words, Proofs, and Diagrams*. CSLI Press, Stanford, 2002.
- [15] Alexander Koller, Joachim Niehren, and Stefan Thater. Bridging the gap between underspecification formalisms: Hole semantics as dominance constraints. In *Proceedings of the 10th EACL*, Budapest, 2003.
- [16] Alexander Koller, Joachim Niehren, and Ralf Treinen. Dominance constraints: Algorithms and complexity. In Michael Moortgat, editor, *Logical Aspects of Computational Linguistics, Third International Conference, LACL'98, Grenoble, France, December 14-16, 1998, Selected Papers*, volume 2014 of *Lecture Notes in Computer Science*. Springer, 2001.
- [17] Alexander Koller and Kristina Striegnitz. Generation as dependency parsing. In *Proceedings of the 40th ACL*, Philadelphia, 2002.
- [18] Alexander Koller and Stefan Thater. An improved redundancy elimination algorithm for underspecified descriptions. In *Proceedings of the 44th ACL/21st COLING*, Sydney, 2006.

- [19] Joachim Niehren and Alexander Koller. Dominance constraints in context unification. In Michael Moortgat, editor, *Logical Aspects of Computational Linguistics, Third International Conference, LACL'98, Grenoble, France, December 14-16, 1998, Selected Papers*, volume 2014 of *Lecture Notes in Computer Science*. Springer, 2001.

WORKSHOP PUBLICATIONS

- [1] Peter Dienes, Alexander Koller, and Marco Kuhlmann. Statistical A* dependency parsing. In Denys Duchier, editor, *Prospects and Advances in the Syntax/Semantics Interface*, Lorraine-Saarland Workshop Series, pages 85–89, Nancy, 2003.
- [2] Malte Gabsdil, Alexander Koller, and Kristina Striegnitz. Building a text adventure on description logic. In *Proceedings of KI-2001 Workshop on Applications of Description Logics*, Vienna, 2001.
- [3] Malte Gabsdil, Alexander Koller, and Kristina Striegnitz. Playing with description logic. In *Proceedings of Second Workshop on Methods for Modalities (Application Description)*, Amsterdam, 2001.
- [4] Michael Kohlhase and Alexander Koller. Towards a tableaux machine for language understanding. In *Proceedings of the Second Workshop on Inference in Computational Semantics (ICoS-2)*, 2000.
- [5] Alexander Koller. Evaluating context unification for semantic underspecification. In *Proceedings of the Third ESSLLI Student Session*, Saarbrücken, Germany, 1998.
- [6] Alexander Koller, Joachim Niehren, and Kristina Striegnitz. Relaxing underspecified semantic representations for reinterpretation. In *Proceedings of the Sixth Meeting on Mathematics of Language (MOL6)*, Orlando, Florida, 1999.
- [7] Alexander Koller and Stefan Thater. Efficient solving and exploration of scope ambiguities. In *Proceedings of the ACL-05 Demo Session*, Ann Arbor, 2005.
- [8] Alexander Koller and Stefan Thater. The evolution of dominance constraint solvers. In *Proceedings of the ACL-05 Workshop on Software*, Ann Arbor, 2005.
- [9] Alexander Koller and Stefan Thater. Towards an efficient redundancy elimination algorithm for underspecified representations. In *Proceedings of the Fifth International Workshop on Inference in Computational Semantics (ICoS-5)*, Buxton, UK, 2006.

REFEREED CONFERENCE PRESENTATIONS

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| July 2006 | “An improved redundancy elimination algorithm for underspecified descriptions”. 44th ACL/21st COLING, Sydney. |
| June 2005 | “The Evolution of Dominance Constraint Solvers”. ACL-05 Workshop on Software, Ann Arbor. |

- July 2004 “Computing locally coherent discourses”. 42nd ACL, Barcelona.
- July 2002 “Generation as Dependency Parsing”. 40th ACL, Philadelphia.
- September 2001 “Building a Text Adventure on Description Logic”. KI-2001 Workshop on Applications of Description Logic, Vienna.
- October 2000 “A Polynomial-Time Fragment of Dominance Constraints”. 38th ACL, Hong Kong.
- December 1999 “A Calculus for Direct Deduction with Dominance Constraints”. Twelfth Amsterdam Colloquium.
- May 1999 “Semantic Underspecification and Constraints over Lambda Structures”. Eighth Workshop on Logic, Language, and Computation, Stanford University.
- February 1999 “Towards Underspecified Processing of Dynamics”. Workshop on Dynamic Logic, Schloss Dagstuhl. (With Joachim Niehren.)
- December 1998 “Dominance Constraints: Algorithms and complexity”. Third International Conference on Logical Aspects of Computational Linguistics, Grenoble.
- August 1998 “Evaluating Context Unification for Semantic Underspecification”. ESSLLI Student Session, Saarbrücken.

INVITED WORKSHOP TALKS

- January 2005 “Towards a Grand Unified Theory of Underspecification”. Sixth International Workshop on Computational Semantics (IWCS-6), Tilburg.
- September 2003 “Applying Description Logic: Natural Language Interaction with a Computer Game”. Description Logic Day, Nancy Inference Week. (With Kristina Striegnitz.)
- June 2001 “Put the galakmid into the slot then kick the dispenser: Computational Linguistics and Theorem Proving in a Computer Game”. Third International Workshop on Inference in Computational Semantics (ICOS-3), Siena.
- August 2000 “A Polynomial-Time Fragment of Dominance Constraints”. Workshop on Trees in Logic, Computer Science, and Linguistics. ESSLLI, Birmingham.

INVITED TALKS AT OTHER UNIVERSITIES

- October 2004 “Computing Locally Coherent Discourses”. PARC.
- October 2004 “Dominance Graphs: Some Gory Details”. XTAG project meeting, University of Pennsylvania.

- October 2004 “Towards a Grand Unified Theory of Underspecification”. Computer Science Colloquium, University of Iowa; Clunch, University of Pennsylvania; CLSP Seminar, Johns Hopkins University; Stanford University.
- December 2002 “Put the galakmid in the slot then kick the dispenser: Computational Linguistics and Theorem Proving in a Computer Game”. Linguistics Colloquium, University of Iowa.
- May 2002 “Put the galakmid in the slot then kick the dispenser: Computational Linguistics and Theorem Proving in a Computer Game”. Carnegie Mellon University.
- April 2002 “TAG Generation as Dependency Parsing”. University of Pennsylvania.
- December 2001 “Scope Underspecification with Tree Descriptions”. University of Manchester.
- November 2001 “Underspecified Beta Reduction”. University of Cambridge.
- May 2000 “Processing Tree Descriptions”. Grammatical Theories Workshop, University of Edinburgh.
- April 1998 “Tree Constraints for Semantic Underspecification”. SRI International, Cambridge, England.

PERSONAL DATA

Born: 28 February 1975, Heidelberg
 Marital status: Single
 Citizenship: German
 Languages spoken: German (native), English (fluent), French (intermediate)

REFERENCES

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