# Résumé

## Norbert Preining

# Contents

# 1 Curriculum Vitae

Born in Vienna on 24 November 1971, son of Dr. Konrad und Dkfm. Helga Preining. Austrian citizen. Married, one child.

## Contact

Norbert PREINING

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|---|---|
| Address: | Sanno 3-133 Fairveil C6 |
| | 921-8825 Nonoichi-shi, Ishikawa, Japan |
| Phone: | 080-3741-1984 |
| Email | norbert@preining.info |
| Web | http://www.preining.info/ |

## Affiliation

Japan Advanced Institute of Science and Technology
Research Center for Software Verification
School of Information Science
1-1 Asahidai
923-1292 Nomi-shi, Ishikawa
Japan

## Language skills

- German      native
- English      fluent
- Japanese      fluent, JLPT Level N2
- Italian      fluent
- French      basic skills
- Other      Russian, Tibetan, Latin, Ancient Greek, Sanskrit

## Education and work history

### Education

- 1977–1989      Basic education in Vienna
- 1989      Participation at the Austrian Mathematic Olympics
- 1989–1996      Study of mathematics at Vienna University of Technology
- 1991.4–9      Working in Austrian Survey Office
- 1990      Study of physics at Vienna University of Technology
- 1990      Study of classical philology at the University of Vienna
- 1996.6.27      Master degree in mathematics with excellence
- 2003.11.21      PhD degree in mathematics with excellence
  Promotio Sub Auspiciis Praesidentis Rei Publicae

**Work history**

- 2005.2–2007.1    Siena University, Italy
  European Community Marie Curie Fellowship
  Project: *Gödel logics and descriptive properties of the Reals*
- 2007.6–2009.9    Vienna University of Technology, Austria
  FWF project P19872-N13 leader
  *Semantics for Gödel logics*
- 2009.10–2013.3    Japan Advanced Institute of Science and Technology
  Research Center of Integrated Sciences, Associate Professor
- 2013.4–2016.3    Japan Advanced Institute of Science and Technology
  Research Center for Software Verification, Associate Professor

**Prizes**

- 2003.11.21    Special Assessment Award of the Ministery of Science
  Würdigungspreis der Bundesministerin für Bildung, Wissenschaft
  und Kultur

**Additional Qualifications**

- 1992    Youth Guide of the Austrian Alpine Club
- 1995    Austrian federal ski touring instructor
- 1992    Austrian federal mountaineering instructor
- 2008    International Mountain Guide (JFMGA)

# 2 Publications and Lectures

## 2.1 Publications

1. Norbert Preining.
   **Adrian Frutiger, 1928-–2015.**
   *TUGboat*, 36(3):182–183, 2015.
2. Arnold Beckmann and Norbert Preining.
   **Hyper Natural Deduction.**
   In *Logic in Computer Science (LICS), 2015 30th Annual ACM/IEEE Symposium on*, pages 547–558,
   July 2015.
3. Norbert Preining, Kazuhiro Ogata, and Kokichi Futatsugi.
   **Liveness properties in CafeOBJ – a case study for meta-level specifications.**
   In *Logic-Based Program Synthesis and Transformation – 24th International Symposium, LOPSTR
   2014*, LNCS 8981, pages 182–198, 2015.
4. Arnold Beckmann and Norbert Preining.
   **Separating intermediate predicate logics of well-founded and dually well-founded
   structures by monadic sentences.**
   *Journal of Logic and Computation*, 2014. DOI 10.1093/logcom/exu016.

5. Ana Erika Camargo Cruz, Hajimu Iida, and Norbert Preining.
   **An empirical illustration to validate a FLOSS development model using S-shaped curves.**
   In *29th IEEE Int. Conference on Software Maintenance (ICSM)*, LNCS, pages 468–471, 2013.

6. Norbert Preining.
   **TUG 2013 in Tokyo.**
   *TUGboat*, 34(3):252–258, 2013.

7. Norbert Preining.
   **TEX Live Manager's hidden gems: User mode and multiple repository support.**
   *TUGboat*, 34(3):293–296, 2013.

8. Norbert Preining.
   **Redistributing TEX and friends.**
   *TUGboat*, 34(3):297–301, 2013.

9. Matthias Baaz and Norbert Preining.
   **Gödel-Dummett logics.**
   In Petr Cintula, Petr Hájek, and Carles Noguera, editors, *Handbook of Mathematical Fuzzy Logic, volume 2*, chapter VII, pages 585–626. College Publications, 2011.

10. Matthias Baaz, Agata Ciabattoni, and Norbert Preining.
    **First-order satisfiability in Gödel logics: an NP-complete fragment.**
    *Theoretical Computer Science*, 412:6612–6623, 2011.

11. Matthias Baaz, Agata Ciabattoni, and Norbert Preining.
    **SAT in monadic Gödel logics: A borderline between decidability and undecidability.**
    In R. Queiroz H. Ono, M. Kanazawa, editor, *WoLLIC 2009*, LNCS, pages 113–123, 2009.

12. Matthias Baaz and Norbert Preining.
    **Quantifier Elimination for Quantified Propositional Logics on Kripke Frames of Type $\omega$.**
    *Journal of Logic and Computation*, 18(4):649–668, 2008.

13. Norbert Preining.
    **TEX Live 2008 and the TEX Live manager.**
    *ArsTEXnica*, 6:67–75, Ottobre 2008.

14. Arnold Beckmann, Martin Goldstern, and Norbert Preining.
    **Continuous Fraïssé conjecture.**
    *Order*, 25(4):281–298, 2008.

15. Norbert Preining.
    **TEX (Live) on Debian.**
    *TUGboat*, 29(1):136–139, 2008.

16. Norbert Preining.
    **TEX Live's new infrastructure.**
    *ArsTEXnica*, 4:69–73, Ottobre 2007.

17. Matthias Baaz, Norbert Preining, and Richard Zach.
    **First-order Gödel logics.**
    *Annals of Pure and Applied Logic*, 147:23–47, 2007.

18. Arnold Beckmann and Norbert Preining.
    **Linear Kripke frames and Gödel logics.**
    *Journal of Symbolic Logic*, 71(1):26–44, 2007.

19. Matthias Baaz, Norbert Preining, and Richard Zach.

**Completeness of a hypersequent calculus for some first-order Gödel logics with delta.**
In *Proceedings of ISMVL'06*, page 9–14, 2006.

20. Norbert Preining.
**TEX Live on Debian.**
*TUGboat*, 26(3):241–242, 2005.

21. Christian G. Fermüller and Norbert Preining.
**A dialogie game for intuitionistic fuzzy logic based on comparison of degrees of truth.**
In *Proceedings of the INTECH'03*, pages 142–151, 2003.

22. Matthias Baaz, Christian G. Fermüller, Angel J. Gil, Norbert Preining, and Gernot Salzer.
**MUltlog and MUltseq reanimated and married.**
In B. Konev and R. Schmidt, editors, *Proc. 4th Int. Workshop on the Implementation of Logics*,
Technical Report ULCS-03-018, 2003.

23. Norbert Preining.
**Complete Recursive Axiomatizability of Gödel Logics.**
PhD thesis, Vienna University of Technology, Austria, 2003.

24. Matthias Baaz, Norbert Preining, and Richard Zach.
**Characterization of the axiomatizable prenex fragments of first-order Gödel logics.**
In *Proceedings of ISMVL'03*, pages 175–180, 2003.

25. Norbert Preining.
**Gödel logics and Cantor-Bendixon analysis.**
In M. Baaz and A. Voronkov, editors, *Proceedings of LPAR'2002*, LNAI 2514, pages 327–336,
October 2002.

26. Norbert Preining.
**Proof theory and proof systems for projective and affine geometry.**
Technical Report TR-2002-FE01, Institut f. Computersprachen 185.2, August 2002. Position paper at the TABLEAUX 2002, Kopenhagen, Denmark.

27. Matthias Baaz, Agata Ciabattoni, Norbert Preining, and Helmut Veith.
**A guide to quantified propositional Gödel logic.**
IJCAR workshop QBF 2001, June 2001. Siena, Italy.

28. Norbert Preining.
**Sketch-as-proof.**
In G. Gottlob, A. Leitsch, and D. Mundici, editors, *Computational Logic and Proof Theory,
Proc. 5$^{th}$ Kurt Gödel Colloquium KGC'97*, Lecture Notes in Computer Science 1289, pages
264–277, Vienna, Austria, 1997. Springer.

29. Norbert Preining.
**Sketch-as-proof, a proof-theoretic analysis of axiomatic projective geometry.**
Master's thesis, Vienna University of Technology, Austria, 1996.

## 2.2 Invited lectures at international conferences

30. **TBA**
Invited lecture at the *Colloquium Logicum 2016*, Annual Meeting of the DVMLG (Deutsche
Vereinigung fuer Mathematische Logik und für Grundlagenforschung der exakten Wissenschaften. September 2016, Hamburg, Germany. `http://www.math.uni-hamburg.de/spag/ml/CL2016/`

31. **TBA**
Invited lecture at the LATD 2016 *Logic, Algebra and Truth Degrees*. June 2016, Phalaborwa, South Africa.

32. **Gödel Logics – a tutorial**
Invited tutorial at the LPAR 2010, 17th International Conference on Logic Programming, Artificial Intelligence and Reasoning. October 2010, Yogyakarta, Indonesia.

33. **Gödel logics, Kripke frames, and beyond.**
Invited talk at the LPAR 2007, 3. International Workshop on Analytic Proof Systems, October 2007. Erevan, Armenia.

34. **Herbrand disjunctions and informal reasoning in projective geometry.**
LPAR 2004 Workshop on Analytic Proof Systems, March 2005, Montevideo, Uruguay.

## 2.3 Lectures at international conferences and workshops 2013-2015

35. **Sketches in Projective Geometry – Orevkov's speed up result in strange surroundings.**
Workshop on Efficient and Natural Proof Systems, December 2015, Bath, UK.

36. **A (quite) general method to prove non-re for Kripke frames and real-valued based logics.**
Logic at JAIST Workshop, December 2015, Kaga, Japan.

37. **CafeOBJ for real – Using an algebraic specification language as theorem prover ()**
Open Source Conference 2015 Fukuoka, October 2015. Fukuoka, Japan.

38. **Algebraic specifications and Functional programming with CafeOBJ**
MathLibre XXI: Mathematical Software and Free Documents XXI, September 2015. Kyoto, Japan.

39. **Zick-zacking through the CafeOBJ's vegetable garden**
43rd TRS Meeting Term Rewriting Meeting, September 2015. Morioka, Japan.

40. **CafeOBJ for real – using an algebraic specification language as theorem prover for computational reals**
CCA 2015: Twelfth International Conference on Computability and Complexity in Analysis, July 2015. Tokyo, Japan.

41. **Hyper Natural Deduction**
LICS 2015: Logic in Computer Science, July 2015. Kyoto, Japan.

42. **CafeOBJ as symbolic and algebraic computation engine**
, June 2015. Tsukuba, Japan.

43. **Liveness properties in CafeOBJ – a case study for meta-level specifications**
LOPSTR 2014: Logic-Based Program Synthesis and Transformation, September 2014. Canterbury, UK.

44. **Proving liveness properties using abstract state machines and n-visibility**
WADT 2014: 22nd International Workshop on Algebraic Development Techniques, September 2014. Sinaia, Romania.

45. **Intermediate predicate logics restricted to one monadic predicate symbol**
Logic, Algebra, and Truth Degrees LATD 2014, Vienna Summer of Logic, July 2014. Vienna, Austria.

46. **Specifying and verifying liveness properties of QLOCK in CafeOBJ**
14th Int. Workshop on Termination WST, Vienna Summer of Logic, July 2014. Vienna,

Austria.

47. **Algebraic specification and verification – CafeOBJ research group**
    1st JAIST-LORIA Workshop, April 2014. Kanazawa, Japan.

48. **Proof theory of projective geometry: Orevkov's speed up result in strange surroundings**
    CTFM 2014, Tokyo Institute of Technology, February 2014. Tokyo, Japan.

49. **Redistributing TEX and friends**
    TUG 2013, Tokyo University, December 2013. Tokyo, Japan.

50. **TEX Live Manager's hidden gems: User mode and multiple repository support**
    TUG 2013, Tokyo University, December 2013. Tokyo, Japan.

51. **Intermediate predicate logics restricted to one monadic predicate symbol**
    *PCV Seminar*, Swansea University, November 2013. Swansea, Wales, UK.

52. **Gödel Logics – a short survey**
    Logic Seminar, Bath University, November 2013. Bath, UK.

53. **Verification with CafeOBJ - part 2**
    9. International Tbilisi Summer School in Logic and Language, October 2013. Tbilisi, Georgia.

54. **Verification with CafeOBJ - part 1**
    9. International Tbilisi Summer School in Logic and Language, October 2013. Tbilisi, Georgia.

55. **Separating intermediate predicate logics of some linear orders**
    *TbiLLC 2013, Workshop on Algebraic Proof Theory*, September 2013. Gudauri, Georgia.

56. **Managing diversity - distributing and supporting TEX Live**
    *Software Design and Analysis Laboratory Seminar*, NAIST, April 2013. Nara, Japan.

57. **What can one monadic predicate symbol express on linear orders**
    *3rd Workshop on Proof Theory and Rewriting*, March 2013. Kanazawa, Japan.

58. **Gödel Logics, Order Theory, (Continuous) Fraïssé Conjecture**
    *PCV Seminar*, Swansea University, February 2013. Swansea, Wales, UK.

59. **Distributing TeX and friends**
    *FOSDEM 2013, Distribution Miniconf*, February 2013. Brussels, Belgium.

# 3 Professional activities

## 3.1 Organization of conferences and workshops

- *Workshop on Proofs as Processes II*                    7/2015 Suzu, Japan
- *Workshop on Proofs as Processes*                       1/2014 Kanazawa, Japan
- *Workshop on Proof Theory and Rewriting* (PR 2013)      2/2013 Kanazawa, Japan
- *Logic, Algebra, and Truth Degree* (LATD 2012)          9/2012 Kanazawa, Japan
- *Asian Workshop on Philosophical Logic*                 2/2012 Nomi, Japan
- *Workshop on Logic and Computation*                     2/2011 Kanazawa, Japan
- *Algebra and Substructural Logic Take 4* (AsubL4)       6/2010 Nomi, Japan
- *Horizonts of Truth – Gödel Centenary*                  2006 Vienna, Austria
- *Challenge of Semantics*                                2004 Vienna, Austria

- *Computer Science Logic* (CSL 2003)           8/2003 Vienna, Austria
- *European Summer School in Logic, Language, Information* (ESSLLI)   8/2003 Vienna, Austria
- *Logic Colloquium* (LC 2001)           8/2001 Vienna, Austria

## 3.2   Editorial activity

- Editor of *Tribute to Hiroakira Ono – On the occasion of his 70th birthday*
- Editor of *Annals of Pure and Applied Logic, Volume 161, Issue 2, Festschrift on the occasion of Franco Montagna's 60th birthday*
- Editor of *Collegium Logicum Volumes v, vi, ix*

## 3.3   Membership in professional association

- 2015–        ACM, ACM SigLog
- 2015–        Japan Society for Symbolic and Algebraic Computation
- 2015–        DVMLG (Deutsche Vereinigung für Mathematische Logik und für Grundlagenforschung der Exakten Wissenschaften)
- 2015–        TeX User Group, Board of Directors
- 2000–        Kurt Gödel Society, Publicity Chair
- 1999–2000   Kurt Gödel Society, Vice-secretary

# 4   Research Grants

- 2014.1–2015.12    Royal Society Daiwa Anglo-Japanese Foundation International Exchanges Award
Project: Hypersequents and communication
Budget: 12440 GBP
- 2013.4–2014.3    JAIST Research Grant
Project: Expressivity of Monadic Logic over Linear Orders
Budget: 485000 Yen
- 2012.4–2013.3    JAIST Research Grant
Project: Quantification for logics based on lin. ordered truth values
Budget: 680000 Yen
- 2011.4–2012.3    JAIST Research Grant
Project: Satisfiability and Decidability in Many-Valued Logics
Budget: 1280000 Yen
- 2007.6–2009.9    Austrian Research Fund (FWF)
Project: Semantics for Gödel Logics
Budget: 259238 EUR
- 2005.2–2007.1    European Community Marie Curie Fellowship, Siena University, Italy
Project: Gödel Logics and Descriptive Properties of the Reals
Budget: 120000 EUR

## 4.1 Participation in scientific projects

Participation in the following research projects of the Austrian Research Fund (FWF):
- P17503-N12    Skolem functions
- P16539-N04    Decision Procedures and Automated Model Building for Fuzzy Logics
- P16254-N05    Proof Transformation by Resolution
- P15477-MAT    Gödel Logics: Propositional Quantifiers and Concurrency
- P14126-MAT    Tools for the automated analysis of proofs
- P11934-MAT    Cut Elimination and Cut Introduction

# 5 Educational Activities

## 5.1 University courses

- **Logic and Mathematics** (JAIST, Japanese and English, 2014–)
  Targeting all new graduate students, this transition course aims at conveying the basic concepts of logic and mathematics.

- **Fundamental mathematics for computer science** (JAIST, Japanese, 2015–)
  This course teaches the basics of differentiation, integration and linear algebra, including linear differential equations.

- **Algebraic Formal Methods** (JAIST, English, 2014–)
  Teaching software development with the algebraic specification language CafeOBJ.

- **Logic Decision Procedures** (JAIST, English, 2015–)
  Targeting advanced PhD students, this course teaches a mixture of logic decision procedures and software verification tools.

- **Logic Seminar** (JAIST, English, 2009–2012)
  This seminar brought together researchers and students of the JAIST, discussing recent developments in logic.

- **Intermediate Logics** (Siena University, Italy, Italian, 2006–2007)
  A course for PhD students on Intermediate logics, their syntax and semantics.

- **Other** (Vienna University of Technology, German, 1998–2005)
  Several courses for engineering and physics students.

## 5.2 Invited talks at conferences and schools

- **Algebraic Specification and Verification – an Introduction to CafeOBJ** (Bolzano, Italy, English)
  ESSLLI 2016 European Summer School in Logic, Language and Information `http://esslli2016.unibz.it/`

- **Proof Theory** (Beijing, China, English)
  A 'Proof Theory Week' at the Tsinghua University.

- **International Tbilisi Summer School in Logic and Language** (Tbilisi, Georgia, English, 2006, 2008, 2011, 2013)
  Regular teaching at the Tbilisi Summer School which brings together students from the region to support the development of logic and language studies.

# 6  Software Development

For many years, I have been actively involved in the development of open source projects, some with a large number of users. Software developed varies from practical applications to academic study tools. For more information see my web page 'software projects' [1].

## 6.1  Development of (logic) programming languages

**CafeOBJ**                                    `http://cafeobj.org`
Algebraic specification language        Language: Common Lisp, CafeOBJ
Using CafeOBJ I have specified several protocols. Furthermore, together with the group at JAIST we are developing the language and interpreter CafeOBJ. 2Publications [9,10,12,13,19,20]

## 6.2  Application development

**Debian Developer**                           `http://www.debian.org`
Open source operating system (Linux OS)        Language: Shell, Perl, C
As Debian Developer I am responsible for the packaging of several p packages related to TeX and fonts.

**TeX Live**                                   `http://tug.org/texlive`
main TeX Distribution                          Language: Perl, C
I am the programmer and maintainer of the whole TeX Live infrastructure and distribution system, including the TeX Live Manager (tlmgr). The TeX Live system is developed by the TeX User Group (TUG). 2Publications: [3-5,15,16,22,25]

**Shotwell**                                   `http://wiki.gnome.org/Apps/Shotwell`
Photo Organizer of the GNOME Desktop           Language: Vala
I have contributed to the Gnome photo organizer Shotwell two features: the complete comment system, as well as the connection to the Web photo album Piwigo.

**PiwigoPress**          `http://wordpress.org/plugins/piwigopress`
Connecting WordPress and Piwigo           Language: PHP, JavaScript
The plugin PiwigoPress for the content management system WordPress allows to reuse photos from the web photo album Piwigo within WordPress blogs.

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[1]`http://www.preining.info/blog/software-projects/`

## 6.3   Hardware support

**Linux Kernel**                    `http://www.linuxfoundation.org`
Free operating system kernel                         Language: C
   Support for Sony laptop via a kernel module, Sony laptop control
module for the Gnome desktop, US Robotics model control programs.