

# Curriculum Vitae

Mai Gehrke

## 1 Personal data

Mai Gehrke; born 10 May 1964, Paris, France; Danish national

### 1.1 Professional address

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## 2 Career

### 2.1 Education

- 1987: Ph.D. in Mathematics, University of Houston.
- 1985: M.S. in Mathematics, University of Houston.
- 1982–1987: Teaching Assistantship, University of Houston.

### 2.2 Professional positions

#### *Permanent*

- 2011–present Senior Research Director (DR2), CNRS, Informatics
- 2007–2011: Professor (Chair of Algebra) at Radboud University Nijmegen.
- 1999–2002: Part-time consultant at the Physical Science Laboratory, Las Cruces.
- 1990–2007: Professor of Mathematical Sciences at New Mexico State University (Assistant Professor until 1993, Associate Professor until 2000).

#### *Temporary*

- 2–7/2010: Senior Researcher, Research in Paris, Ville de Paris, LIAFA, Paris 7.
- 7/2008: Visiting Professor, PPS, Paris 7.
- 2006–2007: Visiting Researcher and Lecturer (Christ Church), University of Oxford.
- 5–8/2006: CNRS Visiting Researcher (3 months), LIAFA, CNRS et Paris 7.
- 5–6/2005: Visiting Professor (2 months), IMM, Denmark's Technical University.
- 2004–2005: Visiting Lektor, Department of Mathematics, University of Copenhagen.
- Spring 1997: Visiting Professor, Department of Mathematics, Vanderbilt University.
- Fall 1996: Visiting Lektor, Department of Mathematics, University of Copenhagen.
- 1988–1990: Postdoc, Department of Mathematics, Vanderbilt University.
- Spring 1988: Assistante Associée, Université de Nice.
- Fall 1987: Assistante Associée, Université de Haute Alsace.

### 2.3 Scientific Boards and steering committees

- Member, CoNRS, section 41, 2012–2016
- Editorial Board, The Houston Journal of Mathematics, 2009–2014, 2014–2019.

- Scientific Board, The Lorentz Center, International Center for workshops in the Sciences, since 2009–2013.
- Executive Board of DIAMANT (Discrete, Interactive & Algorithmic Mathematics, Algebra & Number Theory: One of the four Dutch national ‘mathematics clusters’ (including Theoretical Computer Science)), 2009-2013.
- Steering Committee, conference series Topologies, Algebras, and Categories in Logic (TACL), since 2003.

## 2.4 Awards

- Best Paper Award, ICALP Track B (with Grigorieff and Pin), 2008.
- Plumer Visiting Fellowship Award, Oxford, 2006.
- Amelia Earhart International Fellowship Award, 1987.
- Outstanding Teaching Assistant Award, University of Houston, 1985.

## 2.5 Research publications

Over 60 research publications including 43 in international peer-reviewed scientific journals, 13 in international peer-reviewed scientific conferences, and 3 chapters in books.

### *Ten most significant publications*

- [1] Sheaf representations of MV-algebras and lattice-ordered abelian groups via duality, with Sam van Gool and Vincenzo Marra. *Journal of Algebra* **417** (2014), 290–332.
- [2] A topological approach to recognition, with Serge Grigorieff and Jean-Eric Pin. In S. Abramsky et al. (Eds.): *ICALP 2010, LNCS 6199*(2) (2010), 151–162.
- [3] Duality and equational theory of regular languages, with Serge Grigorieff and Jean-Eric Pin. In L. Aceto et al. (Eds.): *ICALP 2008, LNCS 5126* (2008), 246–257. Best Paper Award in Theoretical Track B.
- [4] Canonical extensions of double quasioperator algebras: An algebraic perspective on duality for certain algebras with binary operations, with H. A. Priestley, *Journal of Pure and Applied Algebra* **209**(1) (2007), 269–290.
- [5] MacNeille completions and canonical extensions, with John Harding and Yde Venema, *Transactions of the American Mathematical Society* **358** (2) (2005), 573–590.
- [6] Canonical extensions and relational completeness of some substructural logics, with J. Michael Dunn and Alessandra Palmigiano, *Journal of Symbolic Logic* **70**(3) (2005), 713–740.
- [7] A Sahlqvist Theorem for distributive modal logics, with Hideo Nagahashi and Yde Venema, *Annals of Pure and Applied Logic* **131** (1-3) (2005), 65–102.
- [8] Bounded distributive lattice expansions, with Bjarni Jónsson, *Mathematica Scandinavica* **94** (2004), 13–45.
- [9] Bounded Lattice Expansions, with John Harding, *Journal of Algebra* **238** (2001), 345–371.
- [10] Bounded Distributive Lattices with Operators, with B. Jónsson, *Mathematica Japonica* **40** (2) (1994), 207–215.

## 2.6 Graduate students

### *Ph.D. students*

- Sam van Gool, Radboud University (2010–2014). Subject: computationally and mathematically relevant dualities.
- Dion Coumans, Radboud University (2008–2012). Subject: topological representation theory and topos theory in logic.  
Current position: Assistant Professor, Radboud University, Nijmegen, NL.
- Jacob Vosmaer, co-advised with Yde Venema, University of Amsterdam (2006–2010). Dissertation title: Logic, Algebra and Topology.  
Current position: Software Developer at 80beans B.V.
- Candida Palma, co-advised with Raquel Santos, University of Lisbon (2001–2005). Dissertation title: Semi De Morgan Algebras.  
Current position: Emeritus teacher-researcher, CAUL, Lisbon, Portugal.
- Hideo Nagahashi, New Mexico State University (1995–2002). Dissertation title: A Sahlqvist Theorem for Distributive Modal Logics.  
Current position: Professor, University of Guam.
- Alex Pogel, New Mexico State University (1995–1998). Dissertation title: Stone Triples and Self-Duality.  
Current position: Senior Research Scientist, Physical Sciences Research Laboratory, NM.

*Master's students (Since 2003)*

- Lorian van Rooijen, Radboud University (2009–2011). Subject: Applications of logic in linguistics.
- Mirte Dekkers, Radboud University (2007–2008). Thesis title: Stone duality: An application in the theory of formal languages. Master's completed December 2008.
- Julie Manisha de Montgomery Nørgaard, University of Copenhagen (2004–2005). Thesis title: Relational semantics based on perfect posets. Master's completed June 2005.

*Graduate student committees*

21 Ph.D. Committees; 11 Masters Committees.

*Mentoring of young researchers*

- Maria Esteban, 2013, PhD student in Barcelona with R. Jansana (3 month visit), Spain.
- Giulio Manzonetto, 2010-2011.  
Current position: Assistant Professor, Université Paris 13, France.
- Nick Bezhanishvili, 2007.  
Current position: Postdoctoral Fellow, University of Utrecht, NL.
- Thomas Bolander, 2004.  
Current position: Associate Professor at IMM, Danish Technical University.
- Alessandra Palmigiano, 2005.  
Current position: Assistant Professor at ILLC, University of Amsterdam, NL.
- Guram Bezhanishvili, 2000-2001.  
Current position: Professor at New Mexico State University, USA.

## 2.7 Funding ID

*Current funding*

- ANR grant (in a team of 18), Frontiers of recognizability (FREC), 2011-2014.

*Previous funding*

- Dutch NWO grant (w. Barendregt, Geuvers, and Rutten), Categorical and Algebraic Models of Computation (1 postdoc) 2010–2014.
- Dutch NWO grant, Mathematically and Computationally Relevant Dualities (2 Ph.D. positions) 2009–2014.
- Research in Paris, 2010.
- EPSRC grants (w. Priestley and Kurz), Coalgebraic logic 2007; Relational semantics for substructural and other logics 2007; Canonicity, duality, and correspondence 2004.
- London Mathematical Society Scheme 7 grant, 2006.
- LANL (Los Alamos National Laboratories) grant (one of 5 team members), Social Dynamics, 2004–2007.
- Carlsberg Foundation, Algebraic Logic, 2004–2005.
- USCRDF/GRDF Georgian-US bilateral grant (w. Esakia), Applications of Topology and Algebra to Modal Logic, 2003–2005.
- US-NSF grants, 2002-2005 (ADVANCE), 1994 (CAREER).
- US-NSA grant (w. Finston), 1992–1994.
- A number of local research awards in New Mexico in 1990–1997.

### 3 Track Record

#### 3.1 Conference and workshop program committees

2015

- Duality in Computer Science, Dagstuhl
- Scandinavian Logic Symposium Summer School, Helsinki
- Topology, Algebra, and Categories in Logic (TACL), Ischia

2014

- Advances in Modal Logic (AiML), Groningen

2013

- Duality in Computer Science, Dagstuhl
- Topologies, Algebras, and Categories in Logics (TACL), Nashville
- Algebra and Coalgebra in Computer Science (CALCO), Warsaw

2012

- Coalgebraic Methods in Computer Science (CMCS), Tallinn
- Algebra and Coalgebra meet Proof Theory (ALCOP), Prague

2011

- Topologies, Algebras, and Categories in Logics (TACL), Marseille.
- European Women in Mathematics (EWM) Summer School, Leiden.

2010

- Mathematical Logic in the Netherlands (MLNL), Utrecht.
- Conference on Mathematical Logic and Set Theory (ICM satellite), Chennai.
- International Workshop on Hybrid Logic and Applications (HyLo), Edinburgh.

2009

- Methods for Modalities (M4M-6), Copenhagen.
- Topological and Algebraic methods in Logic (TACL) (Chair), Amsterdam.

- Mathematical Logic in the Netherlands (MLNL), Nijmegen.
- Third Indian Conference on Logic and its Applications (ICLA) (PC member and workshop organiser), Chennai.

2007

- Algebraic and Topological Methods in Non-Classical Logics (TANCL), Oxford.
- International Conference on Order, Algebra and Logics, Nashville.
- International Workshop on Hybrid Logic (HyLo), Dublin.

2005

- Algebraic and Topological Methods in Non-Classical Logics (TANCL), Barcelona.

2004

- North American Summer School in Logic, Language and Information (NASSLLI), Los Angeles.

### 3.2 Conference organisation

- 2015: Workshop Duality in Computer Science, Dagstuhl.
- 2013: Workshop Duality in Computer Science, Dagstuhl.
- 2013: Topology and Informatics Days, LIAFA, Paris.
- 2009: Mathematical Logic in the Netherlands (MLNL), Nijmegen.
- 2008: Sheaves in Geometry and Quantum Theory, with Heunen et al., Nijmegen.
- 2007: Algebraic and Topological Methods in Non-Classical Logics, with Priestley, Oxford.
- 1999: Algebraic Structures for Logic, 23rd Holiday Mathematics Symposium, with Harding, Las Cruces.

### 3.3 Lectures

*Plenary lectures at international conferences*

- 2014: Scandinavian Logic Symposium, Tampere.
- 2013: Boolean algebras, Lattices, Algebraic logic, Set theory, and Topology (BLAST 2013), Chapman University, CA.
- 2011: Concept Lattices and their Applications (CLA 2011), Nancy.
- 2011: Ordered Groups and Lattices in Algebraic Logic, Tbilisi.
- 2011: 36th Int. Symposium on Mathematical Foundations of Comp. Sci. (MFCS), Warsaw.
- 2011: Second International Conference on Orders, Algebras and Logics (OAL), Krakow.
- 2010: Logic Colloquium, Paris.
- 2009: Conference on Algebra and Coalgebra in Computer Science (CALCO), Udine.
- 2009: Seventh Panhellenic Logic Symposium (PLS7), Patras.
- 2009: Arbeitstagung Allgemeine Algebra (AAA78), Bern.
- 2008: Advances in Modal Logic (AiML), Nancy.
- 2008: Boolean Algebras, Lattice Theory, Algebra, Set-theory, Topology (BLAST), Boulder.
- 2008: Beth Centenary Minisymposium on Mathematical Logic, 5th European Congress of Mathematics (5ECM), Amsterdam.
- 2008: Applications of topological dualities in many-valued logic (ManyVal), Milano.

- 2008: 29th Linz Seminar on Fuzzy Set Theory: Foundations of Lattice-Valued Mathematics with Applications to Algebra and Topology (LINZ), Linz.
- 2007: Arbeitstagung Allgemeine Algebra (AAA75), Darmstadt.
- 2006: International Symposium on Ordered Structures in Many-Valued Logic (ManyVal), Massa Lubrense.
- 2004: 19th Summer Topology Conference, Cape Town.
- 2003: International Conference on Algebraic and Topological Methods in Non-Classical Logics (TANCL), Tbilisi.
- 2003: Lattices, Universal Algebra and Applications, Lisbon.
- 2001: Tarski Centenary Conference, Warsaw.
- 2000: 21th Linz Seminar on Fuzzy Set Theory: Mathematical Aspects of Non-Classical Logics and Fuzzy Inference (LINZ), Linz.
- 1999: 20th Linz Seminar on Fuzzy Set Theory: Topological and Algebraic Structures (LINZ), Linz.
- 1996: Conference on Modern Algebra and its Applications, Nashville.

*Plenary lectures at international workshops*

- 2015: Duality in Computer Science, Dagstuhl.
- 2014: Beyond 2014, Florence.
- 2014: Arbeitstagungen Allgemeine Algebra (AAA88), Warsaw.
- 2014: International Workshop on Topological Methods in Logic IV (TOLO IV), Tbilisi.
- 2014: Workshops on Duality and Probabilistic Systems, Holetown.
- 2013: Duality in Computer Science, Dagstuhl.
- 2013: A scientific meeting in honor of Antonino Salibra.
- 2013: Algebra & Coalgebra meet Proof Theory (ALCOP), Utrecht.
- 2012: Duality theory in algebra, logic, and computer science, Oxford.
- 2011: Workshop on Universal models, Amsterdam
- 2010: Algebra & Coalgebra meet Proof Theory (ALCOP), London.
- 2010: International Workshop on Topological Methods in Logic II, Tbilisi.
- 2010: Colloque International Logique, catégories, sémantique, Bordeaux.
- 2010: Categorical information flow in quantum physics and linguistics, Oxford.
- 2009: Dagstuhl Seminar on Coalgebraic Logics, Schloss Dagstuhl.
- 2009: Workshop in honour of Dick de Jongh and Leo Esakia, Eighth International Tbilisi Symposium on Language, Logic and Computation, Bakuriani.
- 2008: DIAMANT/EIDMA Symposium, Leiden.
- 2006: Algebra & Substructural Logic – Take Three (ASL III), Krakow.
- 2006: Amsterdam-London Workshop on Modal Logic, Amsterdam.
- 2005: Workshop on Modal Logic, Model Theory and (Co)Algebras, Amsterdam.
- 2001: Workshop on Modal Logic, Amsterdam.
- 2000: Workshop on Algebraic methods in Substructural Logic (ASL I), Kanasawa.

*International research Schools*

- 2013: Ph.Ds in Logic IV, 2013, 24 April, Munich, Germany.
- 2013: CUSO Winter School in Mathematics and Computer Science: Proof and Computa-

tion, 27-31 January, Les Diablerets, Switzerland.

- 2011: European Women in Mathematics (EWM) Summer School, Lorentz Center, Leiden.
- 2011: Ph.D.s in Logic III, Brussels.
- 2009: Eighth International Tbilisi Symposium on Language, Logic and Computation, Bakuriani.
- 2008: Second Indian Winter School on Logic, Kanpur.
- 2001: 13th European Summer School in Logic Language and Information (ESSLLI), Helsinki.
- 2000: Complexo Interdisciplinar da Universidade de Lisboa, Lisbon.
- 1999: First Southern African Summer School and Workshop on Logic, Universal Algebra, and Theoretical Computer Science (LUATCS), Johannesburg.

*Outreach/general audience lectures*

- 2009: Professorial Oratie, Radboud University Nijmegen.
- 2008: NWO-EW (Dutch Science Foundation-Exact Sciences Division) Parallele Werelden Symposium, Muziekgebouw aan 't IJ, Amsterdam.
- 2003: Panelist at Shaping Careers Workshop, Association for Women in Mathematics (AWM) at the Joint Mathematics Meetings, Baltimore.

*Talks at universities (since 2005)*

- 2014 (November) Mathematics Colloquium, University of Bern;
- 2014 (April) Séminaire ‘Des Mathématiques’, DMA, École Normale Supérieure (ENS Ulm), Paris;
- 2010 (June) Séminaire Complexité, Logique et Informatique, Paris 7; (June) Séminaire de l’institut Gaspard-Monge, Marne-la-Vallée; (July) Groupe de travail Logique et Sémantique, Bordeaux.
- 2009 (May) Semantics Colloquium, Radboud University Nijmegen; (April) Mathematics Colloquium, Radboud University Nijmegen; (April) Mathematics Colloquium, Leiden University; (January) Algebra and Geometry Seminar, Laboratoire de Mathématiques Nicolas Oresme, Caen.
- 2008 (September) Student exchange programme Radboud University - Jagelonian University; (May) Mathematics Colloquium, University of Groningen; (February) Mathematics Colloquium, University of Utrecht;
- 2007 (October) ILLC Algebra&Coalgebra Seminar, University of Amsterdam; (April) Mathematics Colloquium, Radboud University.
- 2006 (December) Computer Science Seminar, University of Leicester; (December) Foundations of Computer Science Lunch Seminar, University of Oxford; (October) Databases Seminar, University of Oxford; (May) LIAFA Automata seminar, Paris 7; (May) Seminar of the PPS, Paris 7; (April) Computer Science Colloquium, New Mexico State University;
- 2005 (December) Mathematics Colloquium, University of Houston; (September) Mathematics Colloquium, New Mexico State University; (August) Category Theory Seminar, Cambridge University; (July) The Oxford Advanced Seminar on Informatic Structures, University of Oxford; (May) Computer Science and Engineering Seminar, Denmark’s Technical University; (April and May) Seminar of the Copenhagen Logic Group, Roskilde University.

### 3.4 Research management and promotion

*Member of the CoNRS, section 41 (Mathematics) and of the INSMI Scientific Board, 2012–2016*

The National Committee for Scientific Research (CoNRS) is a collective body comprising the Scientific Board, Institute Scientific Boards, specialized sections in each discipline, and Interdisciplinary Commissions. The CoNRS plays a key role in French science. Its members are representatives of the scientific community who apply their expertise to support the core mandate of CNRS: “To identify, carry out (or have carried out), either alone or with partners, all research that advances science or contributes to the country’s economic, social, and cultural progress”.

The CoNRS manages around 20,000 files each year and helps define the scientific policy of the CNRS, analyze the current situation and outlook, recruit researchers and promote their careers, as well as monitor research unit activity.

*Chair of the Algebra & Logic group at Radboud University, 2007–2011*

The group is one of three making up the department of mathematics. It counts 12 researchers (6 tenured faculty members, and a fluctuating number of post docs, and PhD students). The work of the group is centred on the interplay between algebra, logic, and theoretical computer science. Locally, the group has strong ties with the computer science groups of Barendregt (Foundations of Computer Science) and Jacobs (Security of Systems). The chair has the responsibility for research and teaching management of the group.

*Consulting, 1999–2002*

Complex adaptive systems, Physical Science Laboratory, New Mexico. Start-up of logic group, development of initial research directions, hiring (3 full-time researchers), organiser of working seminar, competitive awareness assessments.

*Committees*

- Hiring Committees:
  - Assistant Professor of Informatics, Université de Provence, 2012
  - Professor of Algebra, KDV, University of Amsterdam, 2011.
  - Professor of Logic, ILLC, University of Amsterdam 2010.
  - (as Chair) Assistant Professor of Algebra&Logic, Radboud University Nijmegen 2008.
  - Assistant Professor of Informatics and Security, Radboud University Nijmegen 2008.
  - (as Chair) Professor of Stochastics, Radboud University Nijmegen 2008.
  - Professor of Formal Philosophy, Roskilde University 2008.
  - Assistant Professor of Informatics, Aalborg Universitet at Esbjerg 2007.
  - Department of Mathematical Sciences, New Mexico State University 1997.
- Tenure and Promotion Committees:
  - New Mexico State University Computer Science, 1999–2004, 2005–2006 (Chair promotion to Professor 2003–2004).
  - New Mexico State University Mathematical Sciences, (to Associate Professor) 1998–1999, (to Professor) 2000–2004 (Chair 2001–2004).

In addition I have served on Committees Advisory to the Department Chair and a great number of Teaching Committees, local and national.

*Scientific reviewing and refereeing*

- National grant review panels:



VIDI NWO-EW 2007–2010 (this is the most prestigious mid-career grant scheme for the exact sciences in the Netherlands; the panel of 4-6 researchers makes the final recommendation through a three-step process: pre-selection and assignment of 3-5 international expert reviewers; shortlisting of candidates to be interviewed; interviewing and final selection jointly by the three panels for computer science, mathematics, and astronomy, respectively).

(US)NSF Division of Mathematical Sciences Interdisciplinary Program 2003 (this was at the time the NSF's only interdisciplinary program; the panel of 10-12 researchers spent 2-3 days in Washington in panel discussion making the final recommendation based on the proposals and 3-5 expert reviews for each application).

- Review of individual grant proposals:
  - Polish Academy of Sciences;
  - Swiss Science Foundation;
  - (South Africa) NRF;
  - (Netherlands) NWO;
  - (US) NSF;
  - New York Academy of Sciences.
- Reviewing, Zentralblatt für Mathematik.
- Refereeing for international research journals: Currently 5–8 papers per year. Journals: Logical Methods in Computer Science; Mathematica Scandinavica; Archive for Mathematical Logic; Applicable Algebra; Annals of Pure and Applied Logic; Journal of Pure and Applied Algebra; Journal of Symbolic Logic; Matematische Nach.; Graphs and Combinatorics; Questiones Mathematicae; Studia Logica; Order; International Journal of Mathematics and Mathematical Sciences; Fuzzy Sets and Systems; The International Journal of Uncertainty, Fuzziness, and Knowledge-based Reasoning; Semigroup Forum; Houston Journal of Mathematics; Algebra Universalis.

### 3.5 Teaching

#### *Courses*

M2 course of the Master programme *Logique Mathématique et Fondements de l'Informatique* at Université Paris Diderot (Spring 2014 and Spring 2015): Duality theory in logic and informatics (50 hours).

Taught in the Dutch national master, at Radboud University, New Mexico State University, University of Houston, Vanderbilt University, Université de Haute-Alsace, Université de Nice, University of Copenhagen, Denmark's Technical University, and University of Oxford.

- Service courses: Numbers, Mathematics Appreciation, Calculus I, Calculus II, Calculus III, Linear Algebra, Linear Programming, Calculus for Business Majors, Finite Mathematics for mathematics and computer science majors.
- Advanced undergraduate courses: Discrete Mathematics, Abstract Algebra, Rings and Fields, Differential Equations, Analysis I and II, Algebra I and II, Linear Algebra for Mathematics Majors, Linear Algebra for Engineers, Mathematical Logic, Communicating Mathematics.
- Honours courses: Spirit and Evolution of Mathematics, Great Theorems: The Art of Mathematics.

- Graduate courses: Model Theory, Modern Algebra I and II, Lattice Theory, Universal Algebra, Mathematical Logic, Applied Mathematical Logic, Set Theory, Non-Standard Analysis, Algebraic Logic, Formal Concept Analysis, Lattices and duality.

*Other education related activities*

- La théorie de la dualité en Logique et en informatique, Séminaire des Mathématiques, École Normale Supérieure (ENS Ulm), Paris.
- Place Value systems, Calculating, and Bar codes, with Dion Coumans and Lorijn van Rooijen, Nijmeegse 2-daagse (course for visiting high-school students), Nijmegen, NL, October 2009.
- Sierpinski triangle, with Dion Coumans and Marleen Kock, Outreach project at Dominicus College, Nijmegen, NL, May 2009.
- Polemic presentation on primary school mathematics education, NVORWO Lustrumsymposium in Utrecht, December 2007.
- Mathematics: an intellectual endeavour, Dominicus College, opening of new building, Nijmegen, December 2007.
- Pure mathematics tutorials, Christ Church, University of Oxford, in charge of the pure maths tutorials at Christ Church for the academic year 2006-2007.
- Logik, Tro, Viden, Interdisciplinary seminar series (3 x 2 hrs.) for the special focus area: Religion in the 21. century, University of Copenhagen, September 2004.
- Helping Students Become Active Learners of Mathematics, US National Science Foundation Chautauqua Series, three day teachers' workshops, with D. Pengelley, UT Austin, April 1996 and March 1995.
- Student Projects at New Mexico State University and their Recent Migration into Classroom Activities, two hour Mathematicians and Education Reform (MER) workshop for Calculus Reform: Issues, Policies and Programs, Bowdoin College, Maine, July 1992.
- Other outreach activities: Outreach coordinator 2002–2004; Mathematics projects in elementary school, middle and high school; career day presentations; Pi Mu Epsilon talks; Prefreshman program presentations (e.g. STEP).