

# Martin Koerwien

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## Occupations in chronological order

### Education

- 2001: Master exams in mathematics and completion of Master's Thesis (Diplomarbeit) in mathematical logic (set theory), supervised by Prof. Peter Koepke (in Bonn, Germany).
- 2001-2002: DEA graduate studies (5th year University level) at Université de Paris 7 with specialization in model theory, supported by a grant from the German Academic Exchange Service (DAAD). Final exams and master's thesis about work of Prof. Simon Thomas.
- 2002-2007: Work on PhD Thesis in mathematical logic (model theory) at Université de Paris 7, supervised by Elisabeth Bouscaren (CNRS), supported by a grant from the French Government ("Allocation de Recherche"). Title of the thesis: "Complexity of the isomorphism relation for countable models of omega-stable theories". Award of the Doctorate Degree in October 2007.

### Postdoctoral Appointments

- August 2007 - August 2009: Postdoctoral position at the University of Illinois at Chicago as a Visiting Assistant Professor.
- September 2009 - August 2011: 2-year postdoctoral research position in the Infinity Project (mathematical logic; initiated and coordinated by Prof. Sy-David Friedman and founded by the John Templeton Foundation) at the Centre de Recerca Matemàtica (CRM) in Barcelona.

- September 2011 - August 2012: Postdoctoral position at the Kurt Gödel Research Center for Mathematical Logic (KGRC) in Vienna, supported by an Austrian FWF grant.
- September 2012 - August 2014: Leader of the Lise Meitner Project M1410-N25 supported by the Austrian Science Foundation FWF, hosted by the Kurt Gödel Research Center for Mathematical Logic (KGRC) in Vienna.

### **Programming Appointments**

- September 2014 - now: Work on different projects (mobile and web applications, web design) for Tekplace.de, Berlin.
- October 2015 - December 2015: Work on a web application in Vienna, Austria for the Safeguards Department of the IAEA.
- March 2016 - August 2016: Continued work on a web application in Vienna, Austria for the Safeguards Department of the IAEA.

## **Work as a programmer**

Since September 2014, Martin Koerwien is working as a programmer, currently in the startup company Tekplace (Berlin, Germany; see [www.tekplace.de](http://www.tekplace.de)).

He has accomplished two short-term programming appointments at the IAEA, Vienna: the first in October-December 2015, the second from April 2016 till August 2016.

His main expertise is programming in Java and Javascript (plain, as well as using different libraries like JQuery), but he also has former experience with programming in C++. Further technologies he has been using in his work include HTML, CSS, AngularJS, d3.js, PHP, MySQL, Oracle databases, Python.

Currently his main focus is on programming mobile applications for Android and web design / web applications.

### **Main programming accomplishments**

- A web application for creating and manipulating interactive diagrams for different purposes, including nuclear fuel cycle analysis, for the IAEA (Vienna, Austria).
- Android app Activelog (a time organizer app), published on Google Play and Opera Mobile. For more information, see [http://www.tekplace.de/de/products\\_de.php#ActiveLogTitle](http://www.tekplace.de/de/products_de.php#ActiveLogTitle)

- Dynamic Blocks (an Android game app), published on Google Play and Opera Mobile. For details, see [http://www.tekplace.de/de/products\\_de.php](http://www.tekplace.de/de/products_de.php)
- A web-application version of Dynamic Blocks (see [http://www.tekplace.de/de/dyblo\\_webg\\_de.php](http://www.tekplace.de/de/dyblo_webg_de.php)).
- Design of the website for Tekplace ([www.tekplace.de](http://www.tekplace.de)), including custom scripts and database/login integration using PHP scripts.

## Detailed academic record

### Research Interests

- Pure model theory, in particular stability theory and the investigation of classifiable omega-stable theories
- Set theory in general, constructibility and fine structure theory
- Descriptive set theory, in particular the investigation of the notion of Borel reducibility and its relationships to countable model theory
- Abstract Elementary Classes, model theory of non-elementary classes, infinitary logic

### Teaching Experience

- Rheinische Friedrich-Wilhelms-Universität, Bonn (Germany): Position of “Studentische Hilfskraft” (Teaching Assistant):
  - First semester 1999/2000: Mathematik 1 (mathematics for computer scientists)
  - Second semester 1999/2000: Mathematik 2 (mathematics for computer scientists)
  - First semester 2000/01: Mathematik 1 (mathematics for computer scientists)
  - Second semester 2000/01: Funktionentheorie (holomorphic functions)
- Université Paris 12 (France): Position of “Moniteur”:
  - First semester 2002/03: Outils Mathématiques (basic mathematics course, first year)
  - Second semester 2002/03: Algèbre II
  - First semester 2003/04: Outils Mathématiques (basic mathematics course, first year)

- Second semester 2003/04: Algèbre II
- First semester 2004/05: Analyse II
- Second semester 2004/05: Mathématiques pour les Sciences de la Vie
- Université du Maine (Le Mans, France): Position of ATER (“Attaché Temporaire d’Enseignement et de Recherche”):  
Both in 2005/06 and 2006/07 teaching of:
  - Descriptive statistics
  - Discrete and continuous probability theory
  - Mathematical courses for engineering students (at ENSIM Institute)
  - Analysis course for students of computer science (at IUP)
- University of Illinois at Chicago: Position of Visiting Assistant Professor:
  - First semester 2007/08: Two classes in Calculus III (math 210)
  - Second semester 2007/08: Two classes in Calculus II (math 181)
  - First semester 2008/09: Two classes in Calculus I (math 180)
  - Second semester 2008/09: Two classes in Calculus I (math 180)
- Kurt Gödel reserach Center (Vienna):
  - Spring term 2014: Lecture in model theory

### **Research accomplishments**

- Theses:
  - Diplomarbeit (master’s thesis) “Die Theorie der Ordinalzählmengen und ihre Beziehung zur Gödelschen Konstruktibilitätstheorie” (2001, in German).
  - Mémoire du DEA de Logique Mathématique et Fondements de l’Informatique (master’s thesis) “Le problème de classification des groupes abéliens sans torsion de rang fini” (2002, in French).
  - PhD thesis “La complexité de la relation d’isomorphisme pour les modèles dénombrables des théories omega-stables” (2007, in French; a partial English translation is available with the title “Complexity of the isomorphism relation for countable models of omega-stable theories”).
- Published articles:
  - Joint article with Peter Koepke “Ordinal computations”, in Mathematical Structures in Computer Science (2006), vol. 16, pp. 867-884.

- “Comparing Borel reducibility and depth of an omega-stable theory”, in Notre Dame Journal of Formal Logic (2009), vol. 50, Number 4, pp. 365-380.
- “A complicated omega-stable theory of depth 2”, in Journal of Symbolic Logic (2011), volume 76, number 1, pp. 47-65
- Joint article with Sy-David Friedman: “On absoluteness of categoricity in Abstract Elementary Classes”, Notre Dame Journal of Formal Logic, volume 52(4), 2011, pp. 395-402.
- Joint article with Sy-David Friedman and Tapani Hyttinen: “The non-absoluteness of model existence in uncountable cardinals for  $L_{\omega_1, \omega}$ ”, Notre Dame Journal of Formal Logic, volume 54(2), 2013, pp. 137-151.
- Joint with John Baldwin, Sy-David Friedman and Chris Laskowski: “Three red herrings around Vaught’s conjecture”, Transactions of the AMS 368 (2016), 3673-3694.
- Submitted articles:
  - Joint with John Baldwin and Chris Laskowski: “Amalgamation, characterizing cardinals and locally finite Abstract Elementary Classes”, submitted in March 2014 to the Transactions of the AMS.
  - Joint with John Baldwin and Ioannis Soulatos: “The joint embedding property and maximal models”, submitted in March 2016 to the Archive for Mathematical Logic.
- Co-editor of the Proceedings of the Infinity Project (2013), published by the Centre de Recerca Matemàtica, Bellaterra, Spain.

**Recent participation at conferences and workshops:**

- 06/05/2011 - 06/11/2011 : “Recent Developments in Model Theory”, Oléron (France)
- 07/11/2011 - 07/16/2011 : Logic Colloquium 2011, Barcelona (Spain)
- 07/18/2011 - 07/22/2011 : Infinity Conference, CRM Barcelona (Spain). Talk on “Absoluteness Considerations in  $L_{\omega_1, \omega}$ ”.
- 06/16/2012 - 06/19/2012 : Model Theory in Wrocław, Poland.
- 06/20/2012 - 06/22/2012 : Miniworkshop in Set Theory at the KGRC, Vienna, Austria.
- 06/20/2012 - 06/22/2012 : Miniworkshop in Set Theory at the KGRC, Vienna, Austria.

- 04/18/2013 Midwest Model Theory, Chicago, USA. Talk on characterizing cardinals in infinitary logic.
- 07/08/2013 - 07/12/2013: Conference in Honor of Sy Friedman's 60th Birthday, KGRC, Vienna, Austria.
- 07/09/2014 - 07/11/2014: Infinity Workshop 2014, Participation and organization, KGRC, Vienna, Austria.
- 07/14/2014 - 07/19/2014: Logic Colloquium 2014, talk on "Amalgamation, characterizing cardinals and locally finite AEC", Technical University, Vienna, Austria.

**Most recent invitations to (or organization of) private work-meetings:**

- October 2009: Institute Mittag-Leffler, Djursholm (Sweden)
- June 2010: Kurt Gödel Research Center, Vienna (Austria)
- September 2010: Organization of a meeting at the CRM (Barcelona, Spain) with invited guests John Baldwin, Enrique Casanovas, Rami Grossberg, Andrés Villaveces
- May 2011: University of Maryland, College Park (USA)
- February 2013: Organization of a meeting at the Kurt Gödel Research Center with invited guests John Baldwin, Tapani Hyttinen and Chris Laskowski, as well as participation by Sy Friedman
- March 2013: Universidad Nacional, Bogotá (Colombia)
- April 2013: University of Illinois, Chicago (USA)
- December 2013: University of Illinois, Chicago (USA)

**Language Skills:**

German (mother tongue), English (fluent), French (fluent), Spanish (very good), Italian (basic), Russian (basic)