

# Dr. Athanasios Bouganis

University of Heidelberg,  
Institute of Mathematics,  
Im Neuenheimer Feld 288,  
Heidelberg, 69120,  
Germany

Phone: +49 (6221) 54-5690  
Fax: +49 (6221) 54-8312  
E-mail: [bouganis@mathi.uni-heidelberg.de](mailto:bouganis@mathi.uni-heidelberg.de)  
Homepage: <http://www.mathi.uni-heidelberg.de/~bouganis>

## Research interests

My main area of research is Iwasawa Theory. I am interested in the theory of  $L$ -functions and their  $p$ -adic avatars, the  $p$ -adic  $L$ -functions. I am also interested in the theory of automorphic forms, especially in its arithmetic aspects. My current research project is related to the study of some conjectural congruences between critical values of  $L$ -functions which arise from recent developments in non-commutative Iwasawa Theory. These congruences are a vast generalization of the classical Kummer congruences and motivate interesting question in the theory of Eisenstein series.

## Work Experience

- November 06 - present: Research Associate (*Akademischer Mitarbeiter*), member of the Arithmetic Geometry Group of Professor Otmar Venjakob at the Institute of Mathematics of the University of Heidelberg.
- October 05 - October 06: Research Associate (*Akademischer Mitarbeiter*), member of the Arithmetic Geometry Group of Professor Otmar Venjakob at the Institute of Mathematics of the University of Bonn.
- October 99 - May 02: Teaching Assistant, Computer Science Department, Boston University, USA.

## Education

- October 03-May 06: **Ph.D in Mathematics**,  
Department of Pure Mathematics and Mathematical Statistics, University of Cambridge, UK,  
Thesis : *L-functions of elliptic curves and false Tate curve extensions*,  
Supervisor: Professor John H. Coates.
- October 02-June 03: **Certificate of Advanced Study in Mathematics (Part III)**,  
Department of Pure Mathematics and Mathematical Statistics, University of Cambridge, UK,  
Grade: Distinction.
- October 99-June 02: **Master in Computer Science**,  
Department of Computer Science, Boston University, U.S.A,  
G.P.A: 3.96/4.00 (A),  
Thesis: *Error Correcting Codes over Algebraic Surfaces*, under the supervision of Professor Peter Gacs.
- October 94-June 99: **Diploma in Computer Engineering and Informatics**,  
School of Engineering, University of Patras, Greece,  
G.P.A: 8.82/10.00 (Excellent).

## Publications

1. Th. Bouganis, *The Möbius-Wall congruences for  $p$ -adic  $L$ -functions of CM elliptic curves*, to appear in Math. Proc. Camb. Phil. Soc. (11 pages),
2. Th. Bouganis, *Non abelian congruences between special values of  $L$ -functions of elliptic curves; the CM case*, International Journal of Number Theory, Vol 7, No. 7 (2011), pp. 1883-1934,
3. Th. Bouganis and O. Venjakob, *On the non-commutative Main Conjecture for elliptic curves with Complex Multiplication*, Asian J. Math., vol 14 (3) (2010), pp 385-416,
4. Th. Bouganis, *Special values of  $L$ -functions and false Tate curve extensions*, (with an appendix by V. Dokchitser), J. London Math. Soc., Vol. 82 (2), (2010), pp. 596-620,
5. Th. Bouganis and V. Dokchitser, *Algebraicity of  $L$ -values for elliptic curves in a false Tate curve tower*, Math. Proc. Camb. Phil. Soc. Vol. 142 (2), (2007), pp. 193-204,
6. Th. Bouganis, *Error Correcting Codes over Algebraic Surfaces*, In Applied Algebra, Algebraic Algorithms and Error-Correcting Codes, Lecture Notes in Computer Science 2643, Springer 2003, pp. 169-179,
7. Th. Bouganis and D. Coles, *A Geometric View of Decoding Algebraic Geometric Codes*, In Applied Algebra, Algebraic Algorithms and Error-Correcting Codes, Lecture Notes in Computer Science 2643, Springer 2003, pp. 180-190,
8. Th. Bouganis, I. Caragiannis, C. Kaklamanis, *Implementation Issues and Experimental Study of a Wavelength Routing Algorithm for Irregular All-Optical Networks*, Algorithm Engineering 1999, LNCS 1668, pp. 258-270.

## Other publications

1. Th. Bouganis, *Non abelian  $p$ -adic  $L$ -functions and Eisenstein series of unitary groups*, in Algebraic Number Theory, Oberwolfach Report (2011).

## Theses

1. Th. Bouganis,  *$L$ -functions of elliptic curves and false Tate curve extensions*, Ph.D thesis, University of Cambridge, U.K. 2006,
2. Th. Bouganis, *Error Correcting Codes over Algebraic Surfaces*, Master thesis, Boston University, U.S.A. 2002.

## Submitted Work / Work in preparation

1. Th. Bouganis, *On special values of Siegel modular forms*, 33 pages, submitted,
2. Th. Bouganis, *Non-abelian  $p$ -adic  $L$ -functions and Eisenstein series of unitary groups; the CM method*, 81 pages, submitted,
3. Th. Bouganis, *Non-abelian  $p$ -adic  $L$ -functions and Eisenstein series of unitary groups; the constant term method*, in preparation,
4. Th. Bouganis, *On  $p$ -adic measures for Siegel modular forms*, in preparation,
5. Th. Bouganis and F. Nuccio, *Kongruenzen zwischen abelschen  $p$ -adischen pseudo-Massen und die Schintanische Zerlegung*, in preparation.

## Teaching Activity

*I have taught the following courses:*

In the list below, the indication “SpV” (*Spezialvorlesung*) means that the course was aimed at students in their last year of their studies and graduate students. The indication “V” (*Vorlesung*) means that the course is part of the core undergraduate syllabus.

1. *Arithmetic Theory of Modular Forms* (SpV), Heidelberg, Summer semester 2013,
2. *Algebra II* (V), Heidelberg, Summer semester 2011,
3. *Algebraic Coding Theory* (SpV), Heidelberg, Fall semester 2010,
4. *p-adic Lie groups; the algebraic theory* (SpV), Heidelberg, Summer semester 2010,
5. *p-adic Lie groups; the analytic theory* (SpV), Heidelberg, Fall semester 2009,
6. *Abelian Varieties; the algebraic theory* (SpV), Heidelberg, Summer semester 2009,
7. *Abelian Varieties; the analytic theory* (SpV), Heidelberg, Fall semester 2008,
8. *Elliptic Curves with Complex Multiplication* (SpV), Heidelberg, Summer semester 2008,
9. *Cyclotomic Iwasawa Theory* (SpV), Heidelberg, Fall semester 2007,
10. *Modular Forms and L-Functions*, Heidelberg (SpV), Summer semester 2007.

*I was a teaching assistant for the following courses:*

1. *Algebra II*, Bonn, Summer semester 2006, instructor: Prof. Otmar Venjakob,
2. *Algebra I*, Bonn, Fall semester 2005, instructor: Prof. Otmar Venjakob.

*I have been an organizer for the following undergraduate seminars:*

1. *Iwasawa Theory*, (with Otmar Venjakob) Heidelberg, Summer semester 2012,
2. *The Ikeda Lift* (with Juan Cervino and Hendrik Kasten), Heidelberg, Fall semester 2011,
3. *Representation theory of finite groups* (with Otmar Venjakob), Heidelberg, Fall semester 2011,
4. *Algebraic groups* (with Otmar Venjakob), Heidelberg, Summer semester 2009,
5. *The Riemann-Roch theorem for global fields* (with Otmar Venjakob), Heidelberg, Fall semester 2008,
6. *Algebraic K-Theory* (with Otmar Venjakob), Heidelberg, Summer semester 2008,
7. *Rational Points on Elliptic Curves* (with Otmar Venjakob), Heidelberg, Fall semester 2007,
8. *Representation theory of Finite Groups* (with Otmar Venjakob), Heidelberg, Summer semester 2007,
9. *Classical and p-adic L-Functions* (with Otmar Venjakob), Heidelberg, Fall semester 2006.

## Further scientific activities

- Co-organizer (with Otmar Venjakob) of the *Iwasawa 2012 Conference* Heidelberg, Germany, July 30 to August 3, 2012.
- Lecturer for the *Sardinian Summer School in Iwasawa Theory*, August 6 - August 12, 2012, Sardinia, Italy.
- Visiting Fellow, Isaac Newton Institute, Cambridge, UK, November 1 - November 15 of 2009.
- Reviewer for:
  1. *International Journal of Number Theory*,
  2. *International Mathematics Research Notices*,
  3. *Journal of the AMS*,
  4. *Journal für die reine und angewandte Mathematik (Crelle)*,
  5. *Math. Proc. Camb. Phil. Soc.*
- I organized the following research seminars:
  1. *The Main Conjecture for elliptic cusp forms (after Skinner and Urban)*, (with Otmar Venjakob and Jakob Stix), Summer semester, Heidelberg, 2012,
  2. *Wiles' proof of the Iwasawa Main Conjecture* (with Otmar Venjakob), Summer semester, Heidelberg, 2011,
  3. *Modular Curves and the Eisenstein Ideal* (with Otmar Venjakob, Jakob Stix and Jochen Gärtner), Summer semester, Heidelberg, 2010,
  4. *Cup Products in Galois Cohomology* (with Otmar Venjakob and Jakob Stix), Summer semester, Heidelberg, 2009,
  5. *The Eigencurve* (with Otmar Venjakob), Fall semester, Heidelberg, 2009,
  6. *Hida families and Big Galois Representations* (with Otmar Venjakob and Peter Barth), Summer semester, Heidelberg, 2008,
  7. *p-adic Hodge theory II* (with Otmar Venjakob), Summer semester, Heidelberg, 2007,
  8. *p-adic Hodge theory I* (with Otmar Venjakob), Fall semester, Heidelberg, 2006,
  9. *The anticyclotomic Main Conjecture for Elliptic Curves* (with Otmar Venjakob), Summer semester, Bonn, 2006,
  10. *Non-commutative Iwasawa theory* (with Otmar Venjakob), Fall semester, Bonn, 2005.

## Awards / Scholarships

- Rayleigh-Knight Prize, University of Cambridge, 2005.
- Scholarship for Ph.D studies from the State Scholarships Foundation of Greece, 2003-2005.
- Teaching Fellowship, Boston University, 1999-2002.

## Invited research talks

1. *On special values of Siegel modular forms*, Number Theory Seminar, Bielefeld, Germany 2013,
2.  *$p$ -adic measures for Hermitian modular forms and the Rankin-Selberg method*, Workshop on Iwasawa Theory and Galois Representations, Warwick U.K. 2013,
3. *Non-abelian  $p$ -adic  $L$ -functions and Eisenstein series*, Iwasawa 2012 conference, Heidelberg, Germany, 2012,
4. *Non-abelian  $p$ -adic  $L$ -functions and Eisenstein series of unitary groups*, Number Theory Seminar, University of Cambridge, UK, October 2011,
5. *Non-abelian  $p$ -adic  $L$ -functions and Eisenstein series of unitary groups*, Number Theory Seminar, University of Warwick, UK, October 2011,
6. *Non-abelian  $p$ -adic  $L$ -functions and Eisenstein series of unitary groups*, LMS Regional meeting on Iwasawa Theory, University of Exeter, UK, October 2011,
7. *Non-abelian  $p$ -adic  $L$ -functions and Eisenstein series of unitary groups*, Seminar “Groupes Réductifs et Formes Automorphes”, Jussieu, Paris, France, October 2011,
8. *Non-abelian  $p$ -adic  $L$ -functions and Eisenstein series of unitary groups*, Oberwolfach, Algebraic Number Theory conference, Germany, June 2011,
9. *Non-abelian congruences of  $L$ -values and Eisenstein series*, Instructional workshop on the noncommutative Main Conjectures, Münster, Germany, April 2011,
10. *Non-abelian Iwasawa Theory and Elliptic Curves*, Mathematical Seminar, Department of Mathematics, NTUA, Athens, Greece, June 2010,
11. *Eisenstein Reihen und nicht-kommutative Kongruenzen von speziellen  $L$ -Werten*, DFG-Forschergruppe “Algebraische Zykel und  $L$ -Funktionen”, Regensburg, Germany, January 2010,
12. *Congruences between  $L$ -values and Eisenstein series*, Number Theory Seminar, Nottingham, UK, October 2008,
13. *Congruences between  $L$ -values and Eisenstein series*, Number Theory Seminar, Cambridge, UK, October 2008,
14.  *$L$ -values of elliptic curves and non-commutative Iwasawa theory*, Nachwuchskonferenz “Arithmetische Geometrie”, University of Regensburg, Germany, July 2008,
15. *Special values of  $L$ -functions and false Tate curve extensions*, Number Theory Seminar, Cambridge, UK, May 2006,
16. *Error-Correcting Codes over Algebraic Surfaces*, Applied Algebra, Algebraic Algorithms and Error-Correcting Codes, Toulouse, France, 2002.

## Conferences attended

1. *Modular Forms,  $p$ -adic  $L$ -functions and Selmer groups*, NIO (Oriahovitza), Bulgaria 2013,
2. *Higher Rank Automorphic Forms and  $L$ -Functions*, Warwick, U.K. 2013,
3. *Iwasawa Theory and Galois Representations*, Warwick, U.K., 2013

4. *Applications of Iwasawa Algebras*, Banff, Canada, 2013
5. *Iwasawa Conference 2012*, Heidelberg, Germany August 2012,
6. *Algebraic Cycles and L-functions*, Johannes Kepler Research Center Regensburg, Regensburg, Germany, February 2012,
7. *LMS regional meeting on Iwasawa Theory*, University of Exeter, UK, October 2011,
8. *Computations with Modular Forms*, University of Heidelberg, Germany, September 2011,
9. *Algebraische Zahlentheorie*, Oberwolfach, Germany, June 2011,
10. *Instructional workshop on the noncommutative Main Conjectures*, University of Münster, Germany, April 2011,
11. *The Arithmetic of Fundamental Groups*, University of Heidelberg, Germany, February 2010,
12. *Non-commutative Algebras and Non-commutative Iwasawa Theory*, University of Edinburgh, UK, September 2009,
13. Opening conference of the programme *Non-abelian Fundamental Groups in Arithmetic Geometry*, University of Cambridge, UK, July 2009,
14. *Algebraische Zahlentheorie*, Oberwolfach, Germany, June 2009,
15. *Iwasawa Conference 2008*, Augsburg, Germany, July 2008,
16. *Nachwuchskonferenz Arithmetische Geometrie*, University of Regensburg, Germany, July 2008,
17. *Algebraische Zahlentheorie*, Oberwolfach, Germany, June 2007,
18. *Iwasawa Conference 2006*, Limoges, France, July 2006,
19. *L-functions and Galois Representations, London Mathematical Society Conference*, Durham, UK, June 2004,
20. *Non-commutative Aspects of Number Theory*, Durham, UK, September 2003,
21. *Applied Algebra, Algebraic Algorithms and Error-Correcting Codes*, Toulouse, France 2002.

## Languages

Greek (native), English, German, French (modest).