

# Jolanta Marzec

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## **EMPLOYMENT** Technische Universität Darmstadt, July 2018 - June 2020

Research Assistant.

### **University of Silesia**, January 2018 - September 2018 (part-time)

Work in the project “Open Digital Research Environment Toolkit for the Advancement of Mathematics”; the project was supported by the EU Research and Innovation Program “Horizon 2020”.

### **University of Silesia**, October 2017 - September 2019

Research and Teaching Assistant in the Group of Algebra and Number Theory.  
(On an unpaid leave from October 2018.)

### **Durham University**, April 2016 - March 2017

Research Associate at Durham University, work with Thanasis Bouganis within the area of an EPSRC grant entitled “Arithmetic of automorphic forms and special  $L$ -values”.

## **EDUCATION** University of Bristol, October 2012 - June 2016

PhD in Mathematics

Thesis: *On Bessel models for  $\mathrm{GSp}_4$  and Fourier coefficients of Siegel modular forms of degree 2*

Advisor: Abhishek Saha

### **VU University Amsterdam**, September 2011 - June 2012

Master’s Degree in Theoretical Mathematics

### **University of Silesia**, September 2010 - July 2012

Master’s Degree in Theoretical Mathematics, perfect grade

Thesis: *The theorem of Mordell-Weil*

### **University of Silesia**, September 2007 - July 2010

Bachelor’s degree in Theoretical Mathematics

## **GRANTS, PRIZES**

- University of Bristol Scholarship funded by EPSRC, 2012-2016
- Ministry of Science and Higher Education Scholarship for best learning results, in three consecutive years, 2009-2012
- The VU Fellowship Programme Scholarship, 2011-2012
- Rector of the University of Silesia Scholarship for best learning results, 2011-2012
- 1st place at the competition for a best talk during the 14th International Workshop for Young Mathematicians “Algebra”, 2011
- 8th place at the Nationwide “Codebreakers” Team Competition, 2009

## **PREPRINTS, PUBLICATIONS**

1. *Meromorphic continuation of Green’s function by generating kernels* (with Y. Kara, M. Kumari, K. Maurischat, A. Mocanu, L. Smajlović); in preparation.
2. *Maass relations for Saito-Kurokawa lifts of higher levels*, 2018, 23 pages; preprint. Available at <https://arxiv.org/abs/1811.12854>.

3. *Algebraicity of special  $L$ -values attached to Siegel-Jacobi modular forms* (with Thanasis Bouganis), 2017, 20 pages; preprint.  
Available at [www.math.us.edu.pl/jmarzec/papersen.html](http://www.math.us.edu.pl/jmarzec/papersen.html).
4. *On the analytic properties of the standard  $L$ -function attached to Siegel-Jacobi forms of higher index* (with Thanasis Bouganis), 2017, 55 pages; preprint.  
Available at [www.math.us.edu.pl/jmarzec/papersen.html](http://www.math.us.edu.pl/jmarzec/papersen.html).
5. *Non-vanishing of fundamental Fourier coefficients of paramodular forms*, Journal of Number Theory, 182 (2018), p.311-324, DOI 10.1016/j.jnt.2017.07.002.
6. *Over problems of implicitization and solving polynomial equations*. In: Algebra: 14th International Workshop for Young Mathematicians; Association of Mathematicians Students of the Jagiellonian University, 2012, ISBN 978-83-929547-3-6.

#### INVITED TALKS

1. *Some evidence towards Resnikoff-Saldaña conjecture*, Modular Forms on Higher Rank Groups, TU Darmstadt (Germany), 17-20.09.2019.
2. *On Fourier coefficients of Siegel modular forms of degree 2*, Jubilee Congress for the 100th Anniversary of the Polish Mathematical Society, Kraków (Poland), 3-7.09.2019.
3. *Maass relations for Saito-Kurokawa lifts of higher levels*:
  - Arithmetic Study Group, Durham University (UK), 5.02.2019;
  - Number Theory seminar at University of Cologne (Germany), 22.01.2019;
  - Conference “Women in Automorphic Forms”, TU Darmstadt (Germany), 5-7.09.2018.
4. *On algebraic properties of  $L$ -functions attached to Jacobi forms of higher index*, Workshop “Arithmetic of automorphic forms and special  $L$ -values”, Durham (UK), 26-27.03.2018.
5. *On properties of standard  $L$ -functions of Jacobi forms*, The Twentieth Colloquiumfest, Szczecin (Poland), 19-22.05.2017.
6. *On standard  $L$ -functions attached to Jacobi forms of higher index*:
  - Modulfunktionen seminar, University of Heidelberg (Germany), 10.05.2017;
  - Algebra and Number Theory seminar at University of Silesia (Poland), 19.04.2017;
  - British Mathematical Colloquium, Durham (UK), 3-6.04.2017;
  - University of Bristol Number Theory seminar (UK), 22.02.2017;
  - University of Sheffield Number Theory seminar (UK), 6.12.2016;
  - University of Warwick Number Theory seminar (UK), 21.11.2016.
7. On motivation to study mathematics and a workshop *On prime numbers*, Stanisław Staszic 4th Secondary School in Sosnowiec (Poland), 19.09.2016.
8. *Non-vanishing of fundamental Fourier coefficients of Siegel modular forms*, Bianchi and Siegel Modular Forms Workshop, Sheffield (UK), 14-16.07.2014.
9. *On prime numbers*, during a mathematical competition in Cieszyn (Poland), 12.05.2010.

## OTHER TALKS

1. *Paramodularity*, Darmstadt-Frankfurt seminar (Germany), 7.11.2019.
2. *Automorphic representations*, Darmstadt-Frankfurt seminar (Germany), 6.12.2018.
3. *Relations between Fourier coefficients of Siegel modular forms*, Number Theory seminar, TU Darmstadt (Germany), 16.10.2018.
4. *Interactive open source e-book: Lectures on Linear Algebra*, International Conference of Mathematical Sciences, Istanbul (Turkey), 31.07-06.08.2018.
5. *On the standard  $L$ -function attached to Jacobi forms of higher index*, Ecole d'Été Zetas 2018, Université Savoie Mont Blanc (France), 18-29.06.2018.
6. *Maass relations for Saito-Kurokawa lifts of higher levels*, 32nd Automorphic Forms Workshop, Medford (USA), 19-22.03.2018.
7. *Maass relations for Saito-Kurokawa lifts of higher levels*, Algebra and Number Theory seminar at University of Silesia (Poland), 6.12.2017.
8. *On  $L$ -functions attached to Jacobi forms of higher index*, 31st Automorphic Forms Workshop, Johnson City (USA), 6-9.03.2017.
9. *On Siegel modular forms and their Fourier coefficients*, Arithmetic study group, Durham University (UK), 3.05.2016.
10. *Hecke eigenvalues vs Fourier coefficients*, 5-minute talk at British Mathematical Colloquium 2016, University of Bristol (UK), 21-24.03.2016.
11. *How mathematicians fell in love with modular forms*, Pure Postgraduate Seminar, University of Bristol (UK), 11.12.2015.
12. *In search of fundamental Fourier coefficients* (poster), Computational Aspects of Modular Forms and Curves of Small Genus, ICERM (USA), 28.09 - 2.10.2015.
13. *Introduction to Siegel modular forms*, postgraduate and postdoc seminar, ICERM (USA), 21.09.2015.
14. *Siegel modular forms and their fundamental Fourier coefficients*, Journées Arithmétiques, University of Debrecen (Hungary), 6-10.07.2015.
15. *A dance on the edge of number theory*, It All Adds Up: Celebrating 150 Years Of Women Across the Mathematical Sciences, University of Oxford (UK), 16-17.04.2015.
16. *Those amazing  $L$ -functions*, for the Students Mathematical Society of the University of Silesia (SMS), University of Silesia (Poland), 16.12.2014.
17. *Don't run away when you see an  $L$ -function*, MINGLE, University of Bristol (UK), 25.09.2014.
18. *Non annulation des coefficients de Fourier fondamentaux des formes modulaires de Siegel*, Colloque Jeunes Chercheurs en Théorie des Nombres, Bordeaux (France), 11-13.06.2104.
19. *Non-vanishing of fundamental Fourier coefficients of Siegel modular forms* (20 min.), 28th Automorphic Forms Workshop, Moab (USA), 12-16.05.2014.
20. *Curiosities behind numbers and wrong conjectures*, MINGLE, University of Bristol (UK), 26.09.2013.
21. *From DES to AES*, Pure Postgraduate Seminar, University of Bristol (UK), 17.05.2013.
22. *Representation Theory of Finite Groups*, for undergraduate students, University of Silesia (Poland), 5.04.2013.
23. *Introduction to SAGE*, for the SMS, University of Silesia (Poland), 13.01.2012.
24. *On problems of implicitization and solving polynomial equations*, The 14th International Workshop for Young Mathematicians "Algebra", Kraków (Poland), 10 - 16.07.2011.
25. *Jacobian properties and stability of solutions of ODEs*, 8th SMS' Summer Camp: Applications of differential equations, Zakopane (Poland), 1-7.07.2011.

26. *The Bernstein set*, XXX SMS' Session: Pathologies and paradoxes in mathematics, Szczyrk (Poland), 29.04 - 03.05.2011.
27. *Triangles and the principle of duality in Galilean geometry*, for the SMS, University of Silesia (Poland), 16.12.2010.
28. *The Rijndael algorithm*, XXIX SMS' Session: Mathematics and Computing Science, Szczyrk (Poland), 26 - 28.11.2010.
29. *PageRank algorithm*, Summer Maths Workshop, Toruń (Poland), 23 - 27.08.2010.
30. *Haar measure*, 7th SMS' Summer Camp: Measure Theory, Zakopane (Poland), 19 - 25.07.2010.
31. *The law of quadratic reciprocity*, XXVIII SMS' Session: Alternative proofs, 30.04 - 03.05.2010.
32. *Parametrizability for equations on words*, VIth International Students Conference on Analysis, Sífőkút (Hungary), 31.01-03.02.2010.
33. *The Solovay-Strassen primality test*, for the SMS, University of Silesia (Poland), 17.12.2009.
34. *The ancient problems vs quadratics*, XXVII SMS' Session: Mathematics in pictures, Szczyrk (Poland), 6 - 8.11.2009.
35. *Introduction to the theory of ordered fields*, Summer Maths Workshop, Toruń (Poland), 31.08 - 04.09.2009.
36. *The theory of ordered fields*, Ist Summer School of Technical University in Cracow, Krynica (Poland), 4 - 8.07.2009.
37. *The classic inequalities and their integral equivalents*, XXVI SMS' Session: Equations and Inequalities, Szczyrk (Poland), 30.04 - 03.05.2009.
38. *The form of perfect numbers*, XXV SMS' Session: Numbers, Szczyrk (Poland), 28 - 30.11.2008.
39. *Cryptography*, XXIV SMS' Session: Applications of mathematics, Szczyrk (Poland), 30.05 - 01.06.2008.

## TEACHING EXPERIENCE

### TU Darmstadt

2019/2020, term 1: organizer of Darmstadt-Frankfurt seminar "The paramodularity conjecture". Plan of the seminar is available at the website of AG Algebra.

2018/2019, term 2: course "*L-functions and applications*", for master students.

(Lectures and tutorials prepared together with Michalis Neururer)

Content:

various types of  $L$ -functions (Riemann, Dedekind, Hecke, Artin), splitting behaviour of primes in algebraic extensions, Galois representations, Chebotarev density theorem, connections with modular forms.

Moreover, during tutorials students used a mathematical software system SageMath.

2018/2019, term 1: mini-course "*Automorphic representations*", for Algebra group.

Content (own design):

overview of automorphic representations of  $GL(n)$  and  $GSp(n)$ , examples, connection with  $L$ -functions.

### University of Silesia

**Tutor** of the following courses: *Introduction to Algebra and Number Theory*, *Introduction to Computer Science*, *Elements of Abstract Algebra*, *Mathematics for Chemists*. My work also involved preparation of tests and assignments, and marking.

Preparation and leading of an interactive one hour workshop “Workshop on de(en)cryption” for the  $\pi$ -Day celebrations. The workshop was repeated 6 times for students from primary schools and high schools.

## Durham University

Preparation of an interactive 20 minute workshop “Encryption” in the Durham University Schools’ Science Festival 2017, which would be repeated a few times. This also involved training a few PhD students to help running the workshop.

## University of Bristol

### Tutor

2014/2015: Analysis 1, Calculus

2013/2014: Analysis 1, Calculus

2012/2013: Analysis 1, Number Theory and Group Theory,  
Further Topics in Analysis

### Marking

- Exams from Analysis and Further Topics in Analysis (in 2013 and 2015).
- Homework assignments: as a tutor of the courses above, Number Theory (in 2013), Algebraic Number Theory (in 2013 and 2014; also involved preparation of solution sheets).

## University of Silesia and schools in Poland

### Workshops for broad audience (own design and organisation)

14.03.2011: Origami (celebrations of the  $\pi$ -Day)

24.09.2010: Encryption (the Silesian Scientists’ Night)

11-12.03.2010, 12-13.03.2009: Encryption (celebrations of the  $\pi$ -Day)

### Workshops for high school students preparing to mathematical competitions (own design and organisation)

24.04.2010: Polynomials - continuation

10.04.2010: Polynomials

27.03.2010: Mathematical games and logic puzzles - continuation

20.03.2010: Mathematical games and logic puzzles

23.01.2010: Inequalities

12.12.2009: Combinatorial geometry - coloring

21.11.2009: Mathematical induction - part 2

14.11.2009: Mathematical induction

24.10.2009: Diophantine equations

10.10.2009: Congruences

### Lectures for students of secondary schools

19.09.2016: On prime numbers (4th Secondary School in Sosnowiec)

5.04.2013: Representation theory of finite groups

6.05.2011: Ceva and Menelaos theorems

10.12.2010: Colorful exercises (1st Secondary School in Tychy, the Day of Science)

29.10.2010: A look at Lobaczewski's geometry  
 23.04.2010: The power of a point  
 12.03.2010: Prime numbers on the Euclidean plane (celebrations of the  $\pi$ -Day)  
 18.12.2009: Numeral systems  
 23.10.2009: Diophantine equations  
 8.05.2009: Why shouldn't you resign from taking the negative numbers' roots?  
 19.03.2009: Colorful exercises (1st Secondary School in Tychy, the Day of Science)  
 13.03.2009: War negotiations (celebrations of the  $\pi$ -Day)  
 9.01.2009: Euler's function  
 24.10.2008: Congruences

#### **Lectures for students of junior high schools**

17.12.2010: Metrics - different ways of measuring distance (5th Junior High School in Tychy)  
 12.05.2010: On prime numbers (during a mathematical competition in Cieszyn)

#### **Lectures for students of the children university UNIKIDS in Bielsko Biala, Poland**

19.03.2011: Optics of a mathematician  
 19.02.2011: Mysteries of the number  $\pi$

**Private lessons** for students of the age 8-19 in the years 2007-2011.

#### **EXTRA-CURRICULAR ACTIVITIES**

- referee for *Mathematika, Fundamenta Informaticae*
- since 2008: populariser of mathematics among pupils and students by talks and participation in popularising events:  $\pi$ -Days, Festival of Science, etc.
- co-organiser of Pint of Science 2016: Tech Me Out in Bristol (event manager)
- 2013-2015: organiser of a reading group "Automorphic representations",
- 2007-2013: member of the Students' Mathematical Society (SMS) of the University of Silesia,
- 2007-2012: co-organiser of  $\pi$ -Day's celebration at University of Silesia (event manager),
- 2009-2011: deputy director of the Students' Mathematical Society of the University of Silesia,
- 2009-2011: member of the Committee of the Institute of Mathematics, University of Silesia,
- 2009-2010: organiser of a course preparing to mathematical competitions.

#### **ADDITIONAL INFORMATION**

**Computing:** SageMath

**Languages:** native Polish, fluent English, Spanish (level B1), French (level B1), German (level B1)

#### **Certificates:**

- Certificate of Participation in the [2-day] course "Supervising Bachelor and Master Theses", 2019
- Cambridge ESOL Certificate in Advanced English (level C1), 2010
- Staatsexamen, Nederlands als tweede taal, Programma 1 (certificate in Dutch, level B1), 2012
- Sport rock climbing certificate, signed by Mateusz Kilarski, 2009

**Hobbies:** all kinds of dance, rock climbing, hiking, theatre, origami, logical games and puzzles

**REFERENCES**

**Abhishek Saha**

*School of Mathematical Sciences  
Queen Mary University of London  
abhishek.saha@qmul.ac.uk*

**Ralf Schmidt**

*Department of Mathematics  
University of Oklahoma  
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**Thanasis Bouganis**

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Durham University  
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