

Mihajlo Cekić

CONTACT INFORMATION

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RESEARCH INTERESTS

Geometric inverse problems. Dynamical systems. Calderón inverse problem. X-ray transforms. Inverse spectral problems. Anosov flows. Pollicott-Ruelle resonances. Ruelle zeta functions. Eigenfunction concentration.

EDUCATION

University of Cambridge (Trinity College)

Ph.D., Mathematics **10.2014 - 9.2017**

- Thesis title: “The Calderón problem for connections”
- Advisor: Gabriel P. Paternain

Master of Mathematics **10.2013 - 6.2014**

- Graduated with Distinction
- Wrote an essay “Statistical Properties of Geometric Flows and Equidistribution” supervised by Vladimir Marković

Bachelor of Arts in Mathematics **10.2010 - 6.2013**

- Graduated with First Class Honours from all three years.

WORK AND TEACHING EXPERIENCE

CNRS, Université Paris-Saclay (Orsay) **9.2019 - now**

Postdoctoral fellowship

- Advisor: Colin Guillarmou

Max-Planck Institute for Mathematics, Bonn **10.2017 - 8.2019**

Postdoctoral fellowship

- Advisors: Herbert Koch and Werner Ballmann

University of Bonn **10.2018 - 6.2019**

- Taught a Masters course on: “Introduction to Microlocal Analysis with applications” (Winter Semester 2018/19).
- Organised a seminar on the Steklov spectrum with A. Siffert (Summer Semester 2019).

Trinity College, University of Cambridge **October 2014 - June 2017**

Supervisor, Mathematical Tripos

Supervised the following subjects:

- Part II: Differential Geometry (Lent 2015, Michaelmas 2016, Easter 2017), Riemann Surfaces (Easter 2016, Lent 2017), Linear Analysis (Easter 2016 and 2017)
- Part IB: Linear Algebra (Michaelmas 2015), Analysis II (Michaelmas 2014), Metric and Topological Spaces (Michaelmas 2014)
- Part IA: Analysis I (Lent 2015), Pure revision (Easter 2015).

University of Cambridge **June 2013 - August 2013**

Summer undergraduate research project

Undertook a research project with the title “ A^r Khovanov homology of rational knots” under the guidance of Dr Jacob Rasmussen. Worked on determining various coloured HOMFLY polynomials related to Khovanov homology and writing a computer program that computed these polynomials.

Gave several lecture series to talented high school students; supervised and designed several summer projects for students.

Mathematical Grammar School, Serbia **December 2012 - December 2014**
Teaching Assistant

Gave several lecture series aimed at preparing high school students for mathematical competitions, based on undergraduate-level topics.

**HONOURS /
AWARDS**

- Third prize for the Smith-Rayleigh and Knight-Rayleigh Prize essay, January 2016
under the title “The Calderón problem for connections”
- Trinity College Internal Graduate Scholarship (Ph.D. full funding) 10.2014 - 9.2017
- Senior Scholar, Trinity College October 2013
- Trinity College Overseas Bursary (funding for undergraduate studies) 10.2010 - 6.2014
- Bridgewater summer research scholarship June - August, 2013
- International Mathematical Olympiad – two silver medals July 2009, 2010
- Balkan Mathematical Olympiad – silver and bronze medal May 2009, 2010
- Winner of competition Mathematical All-around in competition of November, 2009
over 200 competitors, held in Kolmogorov High School, Moscow, Russia

PUBLICATIONS

1. M. Cekić, *Calderón problem for connections*, Comm. Partial Differential Equations **42** (2017), no. 11, 1781–1836.
2. M. Cekić, *Calderón problem for Yang-Mills connections*, J. Spectr. Theory **10** (2020), 463–513.
3. M. Cekić, Y.-H. Lin, A. Rüländ, *The Calderón problem for the fractional Schrödinger equation with drift*, Calc. Var. Partial Differential Equations **59** (2020), no. 3, Paper No. 91, 46 pp.
4. M. Cekić, B. Georgiev, M. Mukherjee, *Polyhedral billiards, eigenfunction concentration and almost periodic control*, Commun. Math. Phys. **377** (2020), 2451–2487.
5. M. Cekić, G.P. Paternain, *Resonant spaces for volume preserving Anosov flows*, accepted in Pure and Applied Analysis (2020).

PREPRINTS

6. M. Cekić, *Harmonic determinants and unique continuation*, arXiv preprint (2018), arXiv:1803.09182.
7. M. Cekić, T. Lefeuvre, *Generic dynamical properties of connections on vector bundles*, arXiv preprint (2020), arXiv:2008.09191.
8. M. Cekić, S. Dyatlov, B. Küster, G. P. Paternain, *The Ruelle zeta function at zero for nearly hyperbolic 3-manifolds*, arXiv preprint (2020), arXiv:2009.08558.
9. M. Cekić, C. Guillarmou, *First band of Ruelle resonances for contact Anosov flows in dimension 3*, arXiv preprint (2020), arXiv:2011.05959.

**IN
PREPARATION**

10. M. Cekić, *Calderón problem for systems in product geometries via a complex ray transform*.
11. M. Cekić, T. Lefeuvre, *Stability estimates for connections over Anosov manifolds*.
12. M. Cekić, G.P. Paternain, *Resonant spaces for non-volume preserving Anosov flows*.
13. M. Cekić, A. Siffert, *Inverse magnetic Steklov problems on surfaces*.
14. M. Cekić, F. Torres de Lizaur, *On Anosov flows with zero helicity*.

**UPCOMING
TALKS**

- Séminaire: Problèmes Spectraux en Physique Mathématique (postponed) 20 April, 2020
- Advanced Topics in PDE seminar, Bonn 13 November, 2020
- Heidelberg Analysis Seminar 19 November, 2020
- Paderborn geometric analysis seminar 8 December, 2020
- Workshop: Ruelle-Pollicott Resonances in Dynamics and in 12-16 April, 2021
Semi-classical Analysis, Lausanne

TALKS

- Séminaire ANH, Orsay 20 January, 2020
- Seminar semiklassische Analysis und Darstellungstheorie, Köln 3 December, 2019
- Oberseminar differentialgeometrie, MPIM, Bonn 21 November, 2019

- MSRI seminar, Berkeley, USA 29 October, 2019
- Workshop on Symplectic Topology, Belgrade, Serbia 20 August, 2019
- Workshop: Probing the Earth and the Universe with
Microlocal Analysis, Banff, Canada 18 April, 2019
- Dynamics, geometry and interactions seminar, MPIM, Bonn 2 April, 2019
- 10th Itinerant Workshop in PDE's, IN δ AM, Rome Sapienza 31 January, 2019
- Symplectic Topology Seminar, Mathematical Faculty, Serbia 28 December, 2018
- Second Annual Meeting, SANU, Serbia 25 December, 2018
- Dynamics, geometry and interactions seminar, MPIM, Bonn 6 November, 2018
- Conference: Inverse and Spectral Problems for
(Non)-Local Operators, Leipzig, Germany 10 September, 2018
- Summer school: Inverse problems and Unique continuation, Kopp 4 September, 2018
- Workshop: Inverse problems, PDE and geometry, Jyväskylä, Finland 20 August, 2018
- Oberseminar Differentialgeometrie, MPIM Bonn 28 June, 2018
- Workshop: Analytic study of flows, Peyresq, France 5 June, 2018
- Analysis and PDE seminar, UC Berkeley, USA 19 March, 2018
- Geometry and analysis seminar, UC Santa Cruz, USA 16 March, 2018
- Program for Inverse Problems, Imaging and PDEs,
HKUST Institute for Advanced Study, Hong Kong 29 November, 2017
- Geometric Analysis learning seminar: Ergodicity of the geodesic
flow in negative curvature, MPIM, Bonn 14, 21 November, 2017
- MPI-Oberseminar, MPIM, Bonn 2 November, 2017
- Graduate Seminar on Advanced Topics in PDE, University of Bonn 20 October, 2017
- Conference: Mathematical Methods in Inverse Scattering
and Spectral Theory, University of Leeds 15 September, 2017
- Differential Geometry and Topology seminar, University of Cambridge 10 May, 2017
- Conference: 100 Years of the Radon Transform, Linz 30 March, 2017
- Inverse Problems seminar, University College London 24 March, 2017
- LMS Workshop on Geometric Inverse Problems,
Manchester (poster presentation) 28 February, 2017
- Junior Geometry Seminar, University of Cambridge 27 January, 2017
- Inverse Problems and Imaging seminar, University of Manchester 1 December, 2016
- Junior Geometry Seminar, University of Cambridge March 2016
- Mathematical Institute SANU, Serbia September 2015
- Junior Geometry Seminar, University of Cambridge March 2015
- Mathematical Institute SANU, Serbia December 2014
- Mathematical Institute SANU, Serbia December 2013

VISITS /
CONFERENCES
ATTENDED

- Microlocal Analysis Program, MSRI, USA September - November 2019
- International Congress of Mathematicians, Rio de Janeiro August 2018
- Workshop on Groups, Geometry and Dynamics, Montevideo July 2018
- Visit to UC Berkeley analysis group March 2018
- Visiting Professor Uhlmann at the Program for Inverse Problems,
Imaging and PDEs, Institute for Advanced Study, Hong Kong December 2017
- Mathematical Methods in Inverse Scattering and
Spectral Theory, Leeds, UK September 2017
- Summer School in Microlocal Analysis, Cardiff, UK June 2017
- Geometric Inverse Problems, Paris, France June 2015
- Applied Inverse Problems, Helsinki, Finland May 2015

OTHER

Languages: Serbian (native), English (fluent), German, Russian (intermediate).
 Technical Skills: C++, C#, LaTeX, Matlab.
 Interests: sports (football, skiing, tennis, running), reading.