Lashi Bandara

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Personal

Full name	Menaka Lashitha Bandara
Gender	Male
Citizenship	Australia
Languages	English (native), Sinhalese (fluent), German (B1), Swedish (A2)

Education

2009–2013 **Doctor of Philosophy**, *Australian National University*.
Thesis: *Geometry and the Kato Square Root Problem*
(http://hdl.handle.net/1885/10690),
Supervisor: Alan McIntosh,
Date of award: 24 Oct 2013.

2005–2006 **Honours Degree in Science (Pure Mathematics)**, *Monash University*.
Overall Grade: 94% H1 (first class honours),
Thesis: *White's Compactness Theorem for Integral Currents*,
Supervisors: Maria Athanassenas, Robert Bartnik, Alan Pryde.

2001–2004 **Bachelor of Science**, *Monash University*.
Specialisation: Mathematics.

2001–2004 **Bachelor of Computer Science**, *Monash University*.

Employment

Aug 2021-(ongoing) **Lecturer in Mathematics**, *Brunel University London*, Department of Mathematics.

Sep 2017 - Aug 2021 **Wissenschaftlicher Mitarbeiter (Postdoc)**, *University of Potsdam*, Institut für Mathematik, funded under SPP2026 Geometry at Infinity project "Boundary value problems and index theory on Riemannian and Lorentzian manifolds".

Sep 2014 - Sep 2017 **KAW Postdoc**, *University of Gothenburg*, Mathematical Sciences, funded by "Knut Alice Wallenberg (KAW 2013.0322)".

Jan 2015 - May 2015 **Visitor**, *Hausdorff Research Institute for Mathematics*, funded by "Junior Trimester in Optimal Transport".

Oct 2013 - Sep 2014 **Postdoc**, *Australian National University*, Mathematical Sciences Institute.

Grants, awards, honours

2019–2021 **Postdoctoral Grant, SPP2026 Priority Program**, *216000€*.
Co-investigator for grant "Boundary value problems and index theory on Riemannian and Lorentzian manifolds" in collaboration with Christian Bär acting as PI within the German Science Foundation (DFG) priority program SPP2026 "Geometry at Infinity".

<table>
<tr><td>2015</td><td>Junior Trimester Program in Optimal Transport Working Grant, 22050€.
Principal investigator, along with Mike Munn (formerly New York University, now Google) and Sajjad Lakzian (Isfahan University of Technology), for our work group to be funded for the full term of the trimester program.</td></tr>
<tr><td>2011–2012</td><td>Australian-American Fulbright, AUD$35000.
Competitive grant for research visit to Steve Hofmann (University of Missouri) and Richard Schoen (Stanford University).</td></tr>
<tr><td>2009–2013</td><td>Australian National University Mathematics Department Supplementary Scholarship, AUD$24000.
Supplementary stipend in recognition of high achievement.</td></tr>
<tr><td>2009–2013</td><td>Australian Postgraduate Award, AUD$73500.
Stipend for undertaking doctoral studies awarded by the Australian Government.</td></tr>
<tr><td>2006</td><td>Monash Pure Mathematics Prize for Top Honours.</td></tr>
<tr><td>2002–2004</td><td>Dean's List Fellow in Science.</td></tr>
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Publications and submitted papers

[1] Christian Bär and Lashi Bandara. Boundary value problems for general first-order elliptic differential operators. *Journal of Functional Analysis*, 282(12):109445, 2022.

[2] Lashi Bandara. The relative index theorem for general first-order elliptic operators. *arXiv:2111.12352*, November 2021.

[3] Lashi Bandara, Magnus Goffeng, and Hemanth Saratchandran. Realisations of elliptic operators on compact manifolds with boundary. *arXiv: 2104.01919*, April 2021.

[4] Lashi Bandara, Medet Nursultanov, and Julie Rowlett. Eigenvalue asymptotics for weighted laplace equations on rough riemannian manifolds with boundary. *Annali Scuola Normale Superiore - Classe di Sienze*, pages 1843–1878, dec 2021.

[5] Lashi Bandara and Paul Bryan. Heat kernels and regularity for rough metrics on smooth manifolds. *Mathematische Nachrichten*, 293(12):2255–2270, 2020.

[6] Lashi Bandara. Functional calculus and harmonic analysis in geometry. *São Paulo Journal of Mathematical Sciences*, 2019.

[7] Lashi Bandara and Andreas Rosén. Riesz continuity of the Atiyah–Singer Dirac operator under perturbations of local boundary conditions. *Communications in Partial Differential Equations*, 44(12):1253–1284, 2019.

[8] Lashi Bandara, Alan McIntosh, and Andreas Rosén. Riesz continuity of the Atiyah-Singer Dirac operator under perturbations of the metric. *Mathematische Annalen*, 370(1-2):863–915, 2018.

[9] Marta Vidal-García, Lashi Bandara, and Scott J. Keogh. Shaperotator: An R tool for standardized rigid rotations of articulated three-dimensional structures with application for geometric morphometrics. *Ecology and evolution*, 8(9):4669–4675, 2018.

[10] Lashi Bandara and Hemanth Saratchandran. Essential self-adjointness of powers of first-order differential operators on non-compact manifolds with low-regularity metrics. *Journal of Functional Analysis*, 273(12):3719–3758, 2017.

[11] Lashi Bandara. Continuity of solutions to space-varying pointwise linear elliptic equations. *Publicacions Matemàtiques*, 61(1):239–258, 2017.

[12] Lashi Bandara, Sajjad Lakzian, and Michael Munn. Geometric singularities and a flow tangent to the Ricci flow. *Annali della Scuola Normale Superiore di Pisa. Classe di Scienze. Serie V*, 17(2):763–804, 2017.

[13] Lashi Bandara. Rough metrics on manifolds and quadratic estimates. *Mathematische Zeitschrift*, 283(3-4):1245–1281, 2016.

[14] Lashi Bandara and Alan McIntosh. The Kato Square Root Problem on Vector Bundles with Generalised Bounded Geometry. *Journal of Geometric Analysis*, 26(1):428–462, 2016.

[15] Lashi Bandara and Ognjen Milatovic. Self-adjointness of the Gaffney Laplacian on vector bundles. *Mathematical Physics, Analysis and Geometry*, 18(1):Art. 17, 14, 2015.

[16] Lashi Bandara. Density problems on vector bundles and manifolds. *Proceedings of the American Mathematical Society*, 142(8):2683–2695, 2014.

[17] Lashi Bandara, A. F. M. ter Elst, and Alan McIntosh. Square roots of perturbed subelliptic operators on Lie groups. *Studia Mathematica*, 216(3):193–217, 2013.

[18] Lashi Bandara. Quadratic estimates for perturbed Dirac type operators on doubling measure metric spaces. In *AMSI International Conference on Harmonic Analysis and Applications*, Proceedings of the Centre for Mathematics and its Applications.

Books

[18] Lashi Bandara. *Boundary Value Problems and Index Theory*. Submitted to publisher for review, 2021.

[19] Pascal Auscher with the assistance of Lashi Bandara. *Real Harmonic Analysis*. ANU eView, 2012.

Theses

[19] Lashi Bandara. *Geometry and the Kato square root problem*. PhD thesis, College of Physical & Mathematical Sciences, Australian National University, 2013.

[20] Menaka Lashitha Bandara. *White's Compactness Theorem for Integral Currents*. Honours thesis, School of Mathematical Sciences, Monash University, 2006.

[21] Menaka Lashitha Bandara. *Zermelo-Frankel Set Theory and Well Orderings*. Honours essay, School of Mathematical Sciences, Monash University, 2006.

[22] Menaka Lashitha Bandara. *Graph Colouring with Small Monochromatic Components*. Bachelors of Computer Science project thesis, School of Computer Science and Software Engineering, Monash University, 2004.

Selected invited talks

May 2022	**Geometry Seminar**, *University of York*, UK.
Feb 2021	**Microlocal and global analysis in geometry and mathematical physics**, *University of Potsdam*, Germany.
Feb 2021	**Analysis Seminar**, *University of Lund*, Sweden.
Feb 2021	**Analysis Seminar**, *University of Uppsala*, Sweden.
Dec 2020	**Geometry Analysis Seminar**, *City University of New York*, United States.
Nov 2020	**Analysis Seminar**, *Technical University of Delft*, Netherlands.
Oct 2020	**Institutskolloquium am Institut für Analysis, Dynamik und Modellierung**, *Universität Stuttgart*, Germany.
Mar 2020	**Analysis seminar**, *Gothenburg University*, Sweden.
Nov 2019	**Analysis seminar**, *Universität Bonn*, Germany.
Oct 2019	**Seminar Differentialgeometrie**, *Karlsruher Instiut für Technologie*, Germany.
Jul 2019	**Analysis Seminar**, *Universität Oldenburg*, Germany.
Jun 2019	**Geometry Seminar**, *Universität Regensburg*, Germany.
Feb 2019	**Geometry Seminar**, *Universität Hamburg*, Germany.
Nov 2018	**Bivariant K-theory in Geometry and Physics Program**, *Erwin Schrödinger International Institute for Mathematics and Physics*, Austria.
Oct 2018	**Oberseminar Geometrie**, *Universität Augsburg*, Germany.
Sep 2018	**Colloquium**, *Linköping University*, Sweden.

Jul 2018	**Geometry Seminar**, *Instituto de Matemática Pura e Aplicada (IMPA)*, Brazil.
Feb 2018	**Harmonic Analysis Conference Celebrating the Mathematical Legacy of Alan McIntosh**, *Australian National University*, Australia.
Jan 2018	**Geometry Seminar**, *Freiburg*, Germany.
Nov 2017	**Analysis Seminar**, *Universität Hannover*, Germany.
Sep 2017	**Waterloo Geometry Symposium**, *University of Waterloo*, Canada.
Jul 2017	**Geometric Analysis and PDE Seminar**, *University of Wollongong*, Australia.
Mar 2017	**Analysis Seminar**, *Technical University of Delft*, Netherlands.
Mar 2017	**Analysis Seminar**, *University of Oxford*, United Kingdom.
Jan 2017	**Geometry Seminar**, *Masaryk University*, Czech Republic.
Nov 2016	**Analysis seminar**, *University of Warwick*, United Kingdom.
Oct 2016	**Analysis seminar**, *University of Jyväskylä*, Finland.
Jun 2016	**Analysis Seminar**, *Karlsruher Instiut für Technologie*, Germany.
May 2016	**Analysis, PDE and Geometry Seminar**, *Monash University*, Australia.
Apr 2016	**PDE and Analysis Seminar**, *Australian National University*, Australia.
Apr 2016	**Geometric Analysis and PDE Seminar**, *University of Wollongong*, Australia.
Mar 2016	**Groupe de travail opérateur de Dirac**, *Université Paris-Sud*, France.
Jan 2016	**Analysis Seminar**, *Kiel University*, Germany.

Teaching experience and training

Feb 2022 - Apr 2022	**Lecturer**, *Brunel University London*, Institute for Mathematics. Subjects: Mathematical Programming.
Sep 2021 - Jan 2022	**Lecturer**, *Brunel University London*, Institute for Mathematics. Subjects: Fundamentals of Mathematics (NCUT Beijing delivery).
Apr 2021 - Jul 2021	**Lecturer**, *University of Potsdam*, Institute for Mathematics. Subjects: Boundary Value Problems and Index Theory, (graduate).
Oct 2019 - Mar 2019	**Lecturer**, *University of Potsdam*, Institute for Mathematics. Subjects: Lorentzian Geometry, (graduate).
Jan 2017 - Mar 2017	**Lecturer**, *Gothenburg University*, Mathematical Sciences. Subjects: Fourier Analysis.
Jan 2016 - Mar 2016	**Lecturer**, *Gothenburg University*, Mathematical Sciences. Subjects: Fourier Analysis.
Sep 2014 - Dec 2014	**Lab demonstrator**, *Chalmers University of Technology*, Mathematical Sciences. Subjects: Engineering Mathematics, Mathematics for Architects, 12 weeks, 2 hours per week.
Aug 2011	**Tutor training workshop**, *Australian National University*, Mathematical Sciences Institute.
Jul 2011 - Nov 2011	**Tutor**, *Australian National University*, Mathematical Sciences Institute. Subjects: Discrete Mathematical Models, 1 hour/week
Oct 2010 - Jun 2011	**Mathematicians in Schools Lecturer**, *Commonwealth Scientific and Industrial Research Organisation (CSIRO)*. Designed and ran a course *Logic and Mathematics* for high school students year 10 - year 12 at Hawker College, Canberra. See: www.math.uni-potsdam.de/~bandara/documents/mins.pdf.
Feb 2009 - Jun 2009	**Tutor**, *Australian National University*, Mathematical Sciences Institute. Subjects: Analysis 1.
Jul 2005 - Jul 2007	**Tutor**, *Monash University*, School of Mathematical Sciences. Subjects: Real Analysis, Algebra and Number theory, Engineering Mathematics.

Mar 2003 - Nov 2004	**Tutor**, *Monash University*, Faculty of IT.
	Subjects: Data Structures and Algorithms, Formal Methods (Automata Theory), Formal Methods 2 (Computability and Complexity Theory), Operating Systems, Object Oriented Software Engineering, C Programming, Technical Documentation.
Mar 2000 - Sep 2000	**Volunteer Lecturer**, *Advanced Technical Institute (Sri Lanka)*.
	Designed and ran a course on Linux and C programming during during gap year as international developments were missed due to lack of access to internet in 2000.

Supervision

Mar 2022	**Integer Linear Programming**, *BSc*, Brunel University London.
Mar 2022	**Curve optimisation via Genetic Algorithms**, *BSc*, Brunel University London.
May 2021	**Boundary value problems and graph theory**, *MSc*, Free University of Berlin.
Nov 2020	**An introduction to wavefront sets and pseudodifferential operators**, *MSc* , University of Potsdam.
Oct 2020	**Globally hyperbolic Lorentzian manifolds**, *BSc*, Technical University of Berlin.

Teaching material

Dec 2021	**Author**, *Brunel University London*.
	Production of lecture materials for the *Fundamentals of Mathematics* course to be modified in delivery for Trans-National Exchange with NCUT, Beijing.
Jul 2021	**Author**, *Potsdam University*.
	Book written from graduate course *Boundary Value Problems and Index Theory*.
Feb 2010	**Transcriber**, *Australian National University*.
	Transcribed the graduate course *Harmonic Analysis* by Pascal Auscher into a monograph (published).
Jul 2009	**Transcriber**, *Australian National University*.
	Transcribed the graduate course *Operator Theory and Functional Calculus* by Alan McIntosh into a monograph (unpublished).
Jul 2006	**Transcriber**, *Monash University*.
	Transcribed the advanced Bachelors/graduate course *Differential Geometry* by Pengzi Miao into a monograph (unpublished).

Editorial boards and Refereeing

(ongoing)	**Special Issue on Global Analysis on Manifolds in honor of Christian Bär for his 60th birthday**, *SIGMA*, Editor.
(ongoing)	**Journal of Functional Analysis**, Referee.
(ongoing)	**Journal of Geometric Analysis**, Referee.

Conference organisation and administration

(ongoing)	**Mathematics and Statistics Seminar**, *Brunel University London*, Organiser.
(ongoing)	**Global Analysis on Manifolds**, Conference organiser.
(ongoing)	**Geometric Analysis: Past, Present, Future group on Facebook**, Admin.
Sep 2018- Aug 2021	**Colloquium**, *University of Potsdam*, One of three organisers of the colloquium.
Sep 2013	**HIM Junior trimester program follow-up meeting**, *Hausdorff Research Institute for Mathematics*, Member of main organising committee.

Jul 2013	**Australian Mathematical Sciences Student Conference**, *Australian National University*, Member of main organising committee, grant application writer (AUD$20000 or 12230€).
Sep 2010	**Organiser**, *Australian National University*. Organised for the CMA Proceedings Series to be digitised and be made part of Project Euclid.

Computer skills

Mathematics: MatLab, Octave, Sage, Maxima, Gnuplot.
Languages: C, C++, C#, Java, Python, PERL, R, ML, Bash/Sh, LaTeX.
Operating Systems: Linux, BSD, Windows, MacOSX.
Software: Blender 3D, Vi/ViM, GNU Debugger.

Equality, diversity and inclusiveness efforts

(ongoing)	**Member of the Committee for Women and Diversity in Mathematics.**, *London Mathematical Society.*.
(ongoing)	**Mentorship of post-Bachelor student in Sri Lanka**.
(ongoing)	**Active promoter of the exhibition**, *Women of mathematics throughout Europe. A gallery of portraits*. womeninmath.net/
(ongoing)	**Opportunity project**, in collaboration with Claudio Paganini (University of Regensburg), aimed at helping discriminated students from developing countries gain access to scholarships and education in Germany. thehappyproton.ch/wp-content/uploads/2019/11/Opportunity_eng.pdf
Jan 2022 - Jul 2022	**Project coordinator for the study of the attainment gap for BAME students.**, *Brunel University London.*.

Media and outreach

(ongoing)	**Volunteer tutor for maths circles for primary and high school students**. wesolveproblems.org.uk.
(ongoing)	**YouTube Channel: Lashi's Maths Channel**, *recordings of lectures given*. www.youtube.com/channel/UCEvCFLCgX089WgoTykpGotA.
Nov 2016	**Article: Lashi Bandara: "Um problema de Matemática é como uma amante" in Observador (in Portuguese)**, *interviewed as an early career mathematician*. observador.pt/especiais/lashi-bandara-um-problema-de-matematica-e-como-uma-amante.
Oct 2016	**Window of Science - Science Slam, Gothenburg University**, *winner of 3 minute showcasing of my research to high school students*. www.youtube.com/watch?v=VYOkB5-y_mM#t=5m54s.
Dec 2014	**Global Week Science Slam, Gothenburg University**, *showcasing of my research to the Gothenburg community in 3 minutes*. www.youtube.com/watch?v=h3kJrTjT0wU&feature=youtu.be#t=14m55s.
Jan 2014	**Featured in *100 Faces of Science***, *exhibition of old and young high impact researchers in Australia*. Exhibition at CSIRO Discovery Centre.
Oct 2013	**Radio appearance on Fuzzy Logic, Canberra Community Radio 2XX**, *interviewed, along with Alex Amenta, to explain the role of mathematics research to the Canberra public*. fuzzylogicon2xx.podbean.com/2013/10/20/fuzzy-with-numbers.

Nov 2011   **Article: Taking maths to the masses**, *interview about life as a maths PhD after willing Fulbright award*.
ANU Reporter Canberra Times Supplement.

Aug 2011   **The Conversation article: The point of pure mathematics**, *author of article to describe the significance of pure mathematics to the public*.
theconversation.edu.au/explainer-the-point-of-pure-mathematics-2385.

May 2011   **ABC Catalyst Profile: Mad for Maths**, *interview showcasing the life of a PhD student on Catalyst program of the Australian Broadcasting Corporation*.
www.abc.net.au/catalyst/mad-for-maths—lashi-bandara-profile/11012904.