Prof. Dr. Julie Rowlett

Curriculum Vitae

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US citizen, Swedish permanent resident
published as Julie (Marie) Rowlett, 罗茱莉

RESEARCH

Geometric analysis and its applications

My mathematical toolbox includes geometric, functional, and microlocal analysis; differential geometry; complex analysis and geoemetry; spectral theory; mathematical physics; dynamical systems; and game theory. Interdisciplinary collaborations harness these mathematical tools to investigate microbe ecology, human behaviors, and workplace dynamics.

WORK EXPERIENCE

CURRENT, FROM MARCH 2015

Chalmers University
Associate Professor

Program Director for Engineering Mathematics since 2020.
Master's Program Director for Engineering Mathematics 2016-2019.

2014-2015

Technische Hochschule Ingolstadt
Professor (W2)

2013-2014

Leibniz Universität Hannover
Privatdozent (docent)

2012-2013

Georg-August Universität Göttingen
Vertretungsprofessor (substitute professor, W3)

2011-2012

Max Planck Institute of Mathematics, Bonn
Researcher

2009-2011

Hausdorff Center for Mathematics & Rheinische Friedrich Wilhelms Universität Bonn
Researcher and teaching assistant

2007-2009

University of California Santa Barbara
Visiting assistant professor

2006

Centre de Recherches Mathématiques & McGill University
Researcher and teaching assistant

SUMMER 2006 & 2007

Stanford University Education Program for Gifted Youth
Teacher

EDUCATION

2013 **Habilitation**
Mathematics
Georg-August Universität Göttingen

2006 **Doctor of Philosophy**
Mathematics
Stanford University

2001 **Bachelor of Science**
CUM LAUDE AND WITH HONORS, RANKED #1 IN MAJOR
Pure Mathematics
University of Washington

AWARDS

2018 **Innovation Prize**
Chalmers University

2018 **Golden Apple Teaching Award**
Chalmers University

2016 **Halmos Ford Prize**
Mathematical Association of America

2008 **Mochizuki Memorial Fund for teaching**
University of California Santa Barbara

2007 **Pi Beta Phi sorority teaching award**
University of California Santa Barbara

2001 **Outstanding Senior Award**
University of Washington

INVITED RESEARCH VISITS

2019 & 2008 **Research Member**
Mathematical Sciences Research Institute

2016 & 2009 **Research in pairs**
Mathematisches Forschungsinstitut Oberwolfach

2011 **Bonn-Kyoto Cooperation Program**
Kyoto University

FELLOWSHIPS

2005 **Mary V. Sunseri Walker Beach fellowship**
Stanford University

2001 **Royden fellowship**
Stanford University

1996 **President's scholar**
University of Washington

PEER-REVIEWED PUBLICATIONS

C. J. Karlsson & **J. Rowlett** (2020). Decisions and disease: a mechanism for the evolution of cooperation. Scientific Reports, 10, article # 13113.

K. Fedosova, **J. Rowlett**, & G. Zhang. (2020). Second variation of Selberg zeta functions and curvature asymptotics. Ann. Glob. Anal. Geom. 57(1), 23-60.

J. Rowlett, M. Blom, H. Nordell, O. Thim & J. Vahnberg. (2020). Crystallographic groups, strictly tessellating polytopes, and analytic eigenfunctions. Accepted to American Math. Monthly.

N. Charalambous & **J. Rowlett** (2019). The heat trace for the drifting Laplacian and Schrödinger operators on manifolds. Asian J. Math. vol. 23, no. 4, 539-560.

Z. Lu & **J. Rowlett** (2019). 武侠和数学 (Martial arts and mathematics). 数学文化 (Mathematical Culture) 10, 104 –107 (in Chinese).

M. Nursultanov, **J. Rowlett** & D. Sher (2019). How to hear the corners of a drum 2017 MATRIX annals, 243-278, MATRIX Book Ser. 2, Springer, Cham.

L. Bandara, M. Nursultanov & **J. Rowlett** (2018). Eigenvalue asymptotics for weighted Laplace equations on rough Riemannian manifolds with boundary. Accepted to Annali delle Scuola Normale.

S. Menden-Deuer & **J. Rowlett** (2018). The theory of games and microbe ecology. Theor. Ecology, vol. 12, no. 1, 1–15.

C. Aldana & **J. Rowlett** (2018). A Polyakov formula for sectors. J. Geom. Anal. 28, no. 2, 1773-1839. (2019) Erratum.

H. Hezari, Z. Lu & **J. Rowlett** (2017). The Neumann isospectral problem for trapezoids. Ann. Henri Poincaré 18, no. 12, 3759-3792.

Z. Lu & **J. Rowlett** (2015). One can hear the corners of a drum. Bull. London Math. Soc. 48, no. 1, 85-93.

Z. Lu & **J. Rowlett** (2015). The sound of symmetry. Amer. Math. Monthly, 122, no. 9, 815-835. **Awarded Halmos-Ford prize.**

N. Charalambous, Z. Lu & **J. Rowlett** (2015). Eigenvalue estimates on Bakry-Émery Manifolds. Springer Proc. in Math. International Workshop on Elliptic and Parabolic Equations, Hannover, Germany, 10-12 September 2013 (2190-5614). vol. 119, 45-61.

R. Mazzeo & **J. Rowlett** (2015). A heat trace anomaly on polygons. Mathematical Proceedings of the Cambridge Philosophical Society, vol. 159, no. 02, 303-319.

K. Bever & **J. Rowlett** (2015). Love games: a game theory approach to compatibility.J. Humanistic Math. vol. 5, no. 1, 82-104.

J. Rowlett, P. Suarez-Serrato & S. Tapie (2015). Dynamics and zeta functions on conformally compact manifolds. Trans. Amer. Math. Soc. 367, 2459-2486.

Z. Lu & **J. Rowlett** (2014). The fundamental gap and one-dimensional collapse. Contemporary Mathematics, vol. 630, Amer. Math. Soc., Providence, RI, 223-246.

J. Rowlett (2014). The level sets of typical games. Notices of the A. M. S. 61, no. 8, 840-847.

S. Menden-Deuer & **J. Rowlett** (2014). Many ways to stay in the game: Individual variability maintains high biodiversity in planktonic microorganisms. J. R. Soc. Interface, vol. 11, issue 95.

GRANTS

2018–2022 Swedish Research Council

Principal Investigator, awarded **3 375 000 SEK** for the research project *geometric analysis and applications to microbe ecology*.

2019 National Science Foundation (NSF)

Awarded **$15,000** to spend the fall semester at the Mathematical Sciences Research Institute program on microlocal analysis.

2009 Association for Women in Math & NSF

Mentoring travel grant to support joint work with T. Jeffres.

2008 Mathematical Association of America

Awarded **$ 5,000** to support the activities of the Hypatian seminar for women in math.

2008 University of California Santa Barbara

Non-senate faculty research travel grant.

TEACHING

2015–present Chalmers University

Fourier analysis, calculus, fractals, spectral theory of the Laplacian, the ubiquitous heat kernel.

2014-2015 Technische Hochschule Ingolstadt

Mathematics for computer scientists, mathematics for User Experience Design, systems of differential equations.

2013-2014 Leibniz Universität Hannover

Functional analysis, mathematics for physicists, seminar pearls of mathematics, dynamical measure theory.

2012-2013 Georg-August Universität Göttingen

Functional analysis, mathematics for biologists and geologists, seminars pearls of mathematics & the mathematics of heat and waves.

2007-2009 University of California Santa Barbara

Calculus, honors seminar, transition to higher math, introduction to analysis, real analysis.

2006-2007 Stanford University

Linear algebra & multivariable calculus, number theory, mathematical Olympiad.

PHD SUPERVISION

2024 CHALMERS	Carl-Joar Karlsson
2019 UNIVERSITY OF GOTHENBURG	Medet Nursultanov

MASTERS SUPERVISION

2020 UNIVERSITY OF GOTHENBURG	Felix Rydell
2019 CHALMERS	Erik Nilsson
2015 LEIBNIZ UNIVERSITÄT HANNOVER	Jil Klünder

B. Birnir & **J. Rowlett** (2013). Mathematical models for erosion and the optimal transportation of sediment. Int. J. of Nonlinear Sciences and Num. Sim. vol. 14, no. 6, 323-337.

J. Rowlett (2013). Blast into Math! A fun and rigorous introduction to pure mathematics. bookboon.com (Ventus Publishing ApS) ISBN 978-87-403-0330-8.

Z. Lu & **J. Rowlett** (2013). The fundamental gap of simplices. Comm. Math. Phys. 319, no. 1, 111-145.

Z. Lu & **J. Rowlett** (2012). Eigenvalues of collapsing domains and drift Laplacians. Math. Res. Lett. vol. 19, no. 3, 627-648.

Z. Lu & **J. Rowlett** (2012). On the discrete spectrum of quantum layers. J. Math. Phys. 53, no. 7, 073519, 22 pages.

J. Rowlett (2010). On the spectral theory and dynamics of asymptotically hyperbolic manifolds. Ann. de l'Institut Fourier, vol. 60, no. 7, 2461-2492.

T. Jeffres & **J. Rowlett** (2010). Conformal deformations of conic metrics to constant scalar curvature. Math. Res. Lett. 17, no. 3, 449-465.

J. Rowlett (2009). Dynamics of asymptotically hyperbolic manifolds. Pac. J. Math, 242, no. 2, 377-397. (2014) Erratum.

J. Rowlett (2008). Spectral geometry and asymptotically conic convergence. Comm. Anal. Geom. 16, no. 4, 735-798.

INVITED PUBLICATIONS

J. Rowlett (2020). Mathematics Indicates That an HIV-Style Strategy Could Be Applied to Manage the Coronavirus. in Mathematics Online First Collections. Springer, Cham.

Z. Lu & **J. Rowlett** (2015). Can one hear the corners of a drum? Well, yes! Oxford University Press blog.

J. Rowlett (2013). La géométrie de Bakry-Émery et l'écart fondamental. Séminaire de Théorie Spectrale et Géométrie, vol. 28, (2009–2010), 147—157, (in French).

J. Rowlett (2012). Zeta-regularized determinants of Laplacians on polygons. Oberwolfach Report, no. 25, 36-38.

PRE-PRINTS UNDER REVIEW

C. Aldana, K. Kirsten & **J. Rowlett** (2020). Polyakov formulas for conical singularities in two dimensions.

S. Menden-Deuer, M. Nursultanov, S. Collins, T. Rynearson & **J. Rowlett** (2020). Biodiversity of marine microbes is safeguarded by phenotypic variability in ecological traits.

H. Hezari, Z. Lu & **J. Rowlett** & D. Sher (2020). The Dirichlet isospectral problem for trapezoids.

M. Nursultanov, **J. Rowlett** & D. Sher (2019). The heat kernel on curvilinear polygonal domains in surfaces.

INVITED LECTURES AT CONFERENCES & WORKSHOPS

22.01.2021–23.01.2021

9^{th} Webinar on Covid-19: Forecast and Prediction.

30.09.2019-04.10.2019

Asymptotic Analysis and Spectral Theory, University Paris-Sud.

BACHELOR SUPERVISION

2019 CHALMERS	Max Blom Henrik Nordell Oliver Thim Jack Vahnberg
2018 CHALMERS	Johan Friemann Artur Karlsson Simon Larsson Albin Skiljie
2014 UNIVERSITÄT HANNOVER	Paul Bauer Annalena Dierkes Julia Kirsten Nadja Klintworth Maike Lügering Lea Mitschker Jacqueline-Mariska Raschczyk Marisa Tiede Michael Radke Daniel Vogt
2013 UNIVERSITÄT GÖTTINGEN	Kerstin Bever

INVITED SEMINAR & COLLOQUIUM LECTURES

16.12.2020

Analysis-Applied Math-Physics seminar, Dalhousie University (online).

27.07.2020

Spectral geometry in the clouds, Université de Montréal (online).

15.01.2020

PDE and differential geometry seminar, University of Washington.

02-03.12.2019

Departmental colloquium and analysis seminar (2 talks), University of Oregon.

28.10.2019

Spectral and scattering theory seminar, Purdue University.

21.05.2019

PDEs and applications seminar, Uppsala Universitet.

03.05.2019

Natural Sciences Seminar, New College Florida.

26.10.2018

Oberseminar Geometry, Topology & Analysis, Universität Köln.

15.06.2018

Colloquium, Fudan University.

11.4.2017

Analysis seminar, Cal State University Northridge.

28.9.2016

Analysis seminar, Linnéuniversitet, Växjö.

29.08.2019-30.08.2019

Connections for Women in Microlocal Analysis, MSRI.

05.08.2019-09.08.2019

7th Bremen Summer School and Symposium on Dynamical Systems.

21.06.2019–24.06.2019

St. Petersburg Conference in Spectral Theory, Euler Institute.

15.04.2019–19.04.2019

Probing the earth and the universe with microlocal analysis, Banff International Research Station.

04.03.2019–08.03.2019

Microlocal and global analysis, interactions with geometry, Universität Potsdam.

9.01.2019–12.01.2019

Kleindagarna, Mittag-Leffler Institute.

6.11.2018–9.11.2018

Conference on Partial Differential Equations and Applications in Memory of Professor B.Yu. Sternin, RUDN University, Moscow.

17–21.09.2018

Geometric Analysis and Mathematical Physics, University of Oldenburg.

2–6.09.2018 4th

Croatian Conference on Geometry and Graphics, Vodnjan (Peroj), **plenary speaker.**

9–13.07.2018

AMSI Winter School, lecture series, University of Queensland.

11–13.06.2018

Joint International Meeting of the Chinese and American Mathematical Societies, Special Session, Shanghai, China.

7–11.05.2018

Interfaces between geometric analysis and mathematical physics, Mittag-Leffler Institute.

19–23.03.2018

AMSI-ANU Workshop on Microlocal Analysis and its Applications, Murramarang.

10.03.2018

Women and Mathematics: Differential Geometry, Istanbul Center for Mathematical Sciences.

23–27.10.2017

Elliptic PDE of second order: celebrating 40 years of Gilbarg and Trudinger's book, Matrix Research Institute, Australia.

11–15.9.2017

Mathematical methods in inverse scattering and spectral theory, University of Leeds.

7–9.4.2017

Geometry and analysis on manifolds, UCSB.

3–5.4.2017

Young Women in Geometry, Max Planck Institute for Mathematics, **plenary speaker.**

7–10.3.2017

7.6.2016

Rainwater (Analysis) seminar, University of Washington.

11.12.2015

Analysis seminar, University of Cyprus.

6.5.2015

Analysis seminar, University of Loughborough.

14.7.2015 & 5.12.2014

Oberseminar Analysis, Universität Hannover.

29.10.2014

Colloquium, Universität Potsdam.

6.3.2014

Colloquium, Australian National University.

24.2.2014

Analysis Seminar, Australian National University.

6.11.2012

Oberseminar Analysis und Theoretische Physik, Universität Hannover.

7.6.2016 &11.10.2012 & 3.11.2010

Differential geometry and analysis seminars, University of Washington.

14.06.2012

Mathematisches Kolloquium, Universität Mainz.

30.04.2012

Born-Hilbert-Seminar, Universität Göttingen.

12.01.2012

Oberseminar Analysis, Universität Oldenburg.

26.07.2011

Oberseminar Geometrie, Universität Jena.

02.12.2010

London Analysis Seminar, Kings College.

29.11.2010

Analysis Seminar, University of Bristol.

18.11.2010

Graduierten Kolloquium, Universität Göttingen.

12.12.2014 & 8.10.2010 & 9.02.2010

Seminaire de la géométrie, Université de Nantes, (in French).

1.05.2010

Seminaire de la géométrie, Université de Provence, (in French).

15–16.04.2010

Geometric analysis seminar and Optimal transportation seminar, Princeton University.

18.03.2010

Max Planck Institut für Mathematik, Bonn.

25.02.2010

Spectral theory and geometry seminar, Institut Fourier

14.04.2015 & 12.01.2010 & 4.03.2008

International Conference on PDEs, Geometric Analysis and Functional Inequalities, University of Sydney, Australia.

9–13.1.2017

Youth geometric analysis, TSIMF, Sanya, China.

11-16.12.2016

Geometric and spectral methods in PDE, CMO-BIRS, Oaxaca, Mexico.

6–8.10.2016

Elmar Schrohe 60th Birthday Conference on Analysis, Hannover.

25–29.4.2016

Evolution equation on singular spaces, CIRM, Luminy, France.

29.6–3.7.2015

Shape optimization and spectral geometry, ICMS, Edinburgh.

9–12.9.2014

Summer school on spectral geometry, Universität Göttingen.

12–13.6.2014

PDE Days, Universität Köln.

24–28.3.2014, 25–29.3.2013, 12–16.03.2012, 07–11.03.2011

Geometric and singular analysis, Universität Potsdam.

10.9–12.9.2013

Elliptic and Parabolic PDEs Workshop, Universität Hannover.

08.02–10.02.2013

Texas Geometry and Topology Conference.

07.05–11.05.2012, 27.06–03.07.2010, and 19–26.08.2007

Analysis and geometric singularities, MFO.

18–19.02.2011

Geometry Workshop, University of Tsukuba, Japan.

9–13.08.2010

Topics in spectral and scattering theory, Penn. State University.

8–12.03.2010

Operators on singular spaces, Universität Potsdam.

15.01.2010 and 08.01.2008

Joint Mathematics Meetings Special Session.

23–26.10.2009

Microlocal analysis and spectral theory on singular spaces, Penn. State Univ.

1–5.06.2009

Spectral theory and geometry, Institut Fourier, Grenoble.

OUTREACH

2018 UNIVERSITY OF QUEENSLAND	Public lecture.
2012 UNIVERSITÄT GÖTTINGEN	Nacht des Wissens.
2012 UNIVERSITÄT BONN	Kinder-Uni.
2011 UNIVERSITÄT BONN	Schülerwoche.

Geometry seminar, U.C. Irvine.

13.12.2011, 7.12.2010, 9.11.2009, 15–16.08.2007

Oberseminar Globale Analysis, Universität Bonn.

24.04.2009

Geometry seminar, U.C. San Diego.

5.01.2009

Dynamics seminar, University of Chicago.

19.09.2008

Postdoctoral seminar, MSRI.

29.04.2008

Geometry seminar, Duke University.

30.11.2007

Geometry seminar, California Institute of Technology.

19.10.2006

Geometry & Analysis seminar, Columbia University.

18.10.2006

PDE & Analysis seminar, MIT.

COMMISSIONS OF TRUST

2020 UNIVERSITÄT OLDENBURG	PhD Committee Mohammad Talebi.
2019 KUNGLIGA TEKNISKA HÖGSKOLA	PhD Committee Simon Larson.
2019 MSRI	Graduate student seminar organizer.
2018–PRESENT CHALMERS	Vice-president Math faculty advisory board.
2017–PRESENT ROYAL ACADEMY	Swedish National Committee for Math.
2017 HUMBOLDT UNIVERSITY BERLIN	PhD Committee Asylia Suleymanova.
2015 LEIBNIZ UNIVERSITÄT HANNOVER	PhD Committee Karsten Bohlen.
2014 UNIVERSITÄT POTSDAM	Co-organizer Geometric & singular analysis workshop.
2006–PRESENT REVIEWER FOR	Math.Annalen, Scientific Reports, JDG, Trans AMS, JMAA, Proc. LMS, Australian Math. Soc., Acta Math., CCM, J. Geom. Anal., J. Public Health Pol., Math. Nach.