

# Karen R. Strung, Dr. rer. nat.

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CONTACT INFORMATION	Institute of Mathematics, Czech Academy of Sciences Žitná 25 115 67 Praha 1 Czech Republic	e-mail: <a href="mailto:strung@math.cas.cz">strung@math.cas.cz</a> website: <a href="https://karen.strung.me">https://karen.strung.me</a>
RESEARCH INTERESTS	Classification of $C^*$ -algebras, topological dynamical systems, quantum dynamical systems, quantum flag manifolds.	
EDUCATION	<b>Westfälische Wilhelms-Universität Münster</b> , Münster, Germany <i>Doctoral studies</i> <b>October 2011–January 2014</b> <ul style="list-style-type: none"><li>• Dr. rer. nat. awarded January 2014, <i>magna cum laude</i></li><li>• Dissertation: On classification, UHF-stability, and tracial approximation of simple nuclear <math>C^*</math>-algebras</li><li>• Advisor: Prof. Dr. Wilhelm Winter</li></ul> <b>University of Nottingham</b> , Nottingham, United Kingdom <i>Doctoral studies</i> <b>August 2009–October 2011</b> <ul style="list-style-type: none"><li>• Advisor: Prof. Dr. Wilhelm Winter</li><li>• Note: transferred to University of Münster</li></ul> <b>University of Nottingham</b> , Nottingham, United Kingdom <i>MMath (Pure Mathematics), First Class</i> <b>October 2006–June 2009</b> <ul style="list-style-type: none"><li>• Dissertation: On the classification of <math>C^*</math>-algebras of minimal dynamical systems</li><li>• Advisor: Dr. Wilhelm Winter</li></ul>	
EMPLOYMENT	<b>Institute of Mathematics, Czech Academy of Sciences</b> , Prague, Czechia <i>Researcher</i> <b>October 2019–Present</b> <b>Radboud Universiteit</b> , Nijmegen, Netherlands <i>Radboud University Excellence Initiative Fellowship</i> <b>October 2017–September 2019</b> <b>Institute of Mathematics Polish Academy of Sciences</b> , Warsaw, Poland <i>IMPACT Postdoctoral Fellowship, Adjunct Professor</i> <b>October 2015–September 2017</b> <i>Adjunct Professor (Postdoc)</i> <b>October 2014–September 2015</b> <b>Westfälische Wilhelms-Universität Münster</b> , Münster, Germany <i>Wissenschaftliche Mitarbeiterin</i> <b>June 2014–October 2014</b> <b>Fields Institute</b> , Toronto, Ontario, Canada <i>Postdoctoral Fellowship</i> <b>February 2014–June 2014</b> <ul style="list-style-type: none"><li>• Part of the Thematic Programme on Abstract Harmonic Analysis, Banach and Operator Algebras</li></ul>	
GRANTS AND AWARDS	“ $C^*$ -algebras and their interactions with topological and quantum dynamics”, Polish National Science Centre (NCN) grant no. 2015/17/D/ST1/02529 (principal investigator), 109,200 PLN (approx. 25,000 EUR), 2016–2019. Postdoctoral Grant for participation in Mittag-Leffler programme, “Classification of operator algebras: complexity, rigidity and dynamics”, 2016 (unable to attend). Azrieli Postdoctoral Fellowship (Israel), 2015 (declined). Pacific Institute for the Mathematical Sciences Postdoctoral Fellowship, 2015 (declined). Fields–Ontario Postdoctoral Fellowship, 2014 (declined). EPSRC funded PhD studentship, 2009–October 2011. Research Student Tuition Fee Scholarship, awarded by University of Nottingham, full tuition fee scholarship for overseas student, 2009–October 2011.	

Martin Pluck Award, awarded by School of Mathematical Sciences, University of Nottingham, for graduating student with highest overall average in single honours mathematics, 2009.

University Prize, awarded by University of Nottingham, for graduating student with highest average in the School of Mathematical Sciences, 2009.

Mathematics Prize, awarded by School of Mathematical Sciences, University of Nottingham, third year student with highest overall average, 2008.

Department of Philosophy Prize, University of Toronto, non-graduating student with the highest average in a philosophy programme, 2003.

PUBLICATIONS &  
PREPRINTS

Díaz Garcá, F., Krutov, A., Ó Buachalla, R., Somberg, P. and Strung, K.R., “Positive line bundles over the irreducible quantum flag manifolds”, arxiv preprint math.QA/1912.08802, 2019.

Arici, F., Debets, B. and Strung, K.R., “Pure infiniteness and paradoxicality for graph  $C^*$ -algebras”, arxiv preprint math.OA/1907.05215, 2019.

Deeley, R.J., Putnam I.F. and Strung, K.R., “Non-homogeneous extensions of Cantor minimal systems”, arxiv preprint math.DS/1907.04153, 2019.

Deeley, R.J., Putnam I.F. and Strung, K.R., “Constructions in minimal amenable dynamics and applications to the classification of  $C^*$ -algebras”, arxiv preprint math.OA/1907.03851, 2019.

Jacelon, B., Strung K.R., Vignati, A. “Optimal transport and unitary orbits in  $C^*$ -algebras”, arxiv math.OA/1808.03181.

Strung, K.R. “An introduction to  $C^*$ -algebras and the classification programme” (book), Preprint at <https://karen.strung.me/CStarIntroDraft>, to appear in the series Advanced Courses in Mathematics CRM Barcelona, Birkhauser, Basel.

Deeley, R.J., Strung, K.R. “Group actions on Smale space  $C^*$ -algebras”, arxiv math.OA/1709.01897. To appear in Ergodic Theory Dynam. Systems.

Deeley, R.J., Strung K.R. “Nuclear dimension and classification of  $C^*$ -algebras associated to Smale spaces”, Trans. Amer. Math. Soc., Vol. 370, No. 5, pp. 3467-3485, 2018.

Deeley, R.J., Putnam I.F., Strung, K.R. “Minimal homeomorphisms of point-like spaces and a dynamical presentation of the Jiang–Su algebra”, J. Reine Angew. Math. Vol. 742, pp. 241–261, 2018.

Jacelon, B., Strung, K.R., Toms, A. “Unitary orbits of self adjoint operators in simple  $\mathcal{Z}$ -stable  $C^*$ -algebras”, J. Funct. Anal., Vol. 269, No. 10, pp. 3304-3315, 2015.

Strung, K.R. “On the classification of  $C^*$ -algebras associated to minimal product systems of a Cantor set and an odd dimensional sphere”, J. Funct. Anal., Vol. 268 No. 3, pp. 671-689, 2015.

Strung, K.R., Winter, W. “UHF slicing and classification of nuclear  $C^*$ -algebras”, *J. Topol. Anal.* Vol. 6, No. 4 pp. 465–540, 2014.

Strung, K.R., Winter, W. “Minimal dynamics and  $\mathcal{Z}$ -stable classification”, *Internat. J. Math.*, Vol. 22, No. 1, pp. 1–23, 2011.

EXPERIENCE

**University of Münster, Münster, Germany**

*Course lecturer*

**14 May 2018–18 May 2018**

Short course on  $C^*$ -algebras, Dynamical Systems, and Classification. 3 lectures at the 2018 Noncommutative Geometry and Operator Algebras meeting.

**Centre de Recerca Matemàtica, Bellaterra, Spain**

*Course lecturer*

**8 March 2017–21 March 2017**

Introductory course on  $C^*$ -algebras. 8 hour lecture series aimed at graduate students and advanced undergraduates.

**Institute of Mathematics, Polish Academy of Sciences, Warsaw, Poland**

Course lecturer

**19 September 2016–14 October 2016**

Introductory course on  $C^*$ -algebras. Series of 20 lectures aimed at graduate students and nonexperts.

**University of Nottingham, Nottingham, United Kingdom**

Postgraduate Demonstrator

**October 2009–June 2010**

Demonstrator in undergraduate modules. Algebra and Number Theory (year 2), Calculus, Linear Mathematics, Analytical and Computational Foundations, Maple (year 1)

**University of Nottingham, Nottingham, United Kingdom**

Summer Research Student, School of Mathematical Sciences

**June 2008–August 2008**

Modelling of notch-mediated tip cell angiogenesis. Supervised by Professor Helen Byrne and Dr. Marcus Owen

INVITED TALKS (49 talks in 15 countries)

1. *Simple constructions from  $C^*$ -correspondences over  $C(X)$* , Oberseminar Operator Algebras, University of Münster, Münster, Germany, 12 November, 2019.
2. *Constructions in minimal dynamics and applications to the classification of  $C^*$ -algebras*, Topology and Measure in Dynamics and Operator Algebras, Banff International Research Station, Banff, Canada, 9 September 2019.
3. *Constructions in minimal amenable dynamics and applications to classification of  $C^*$ -algebras*,  $C^*$ -algebras Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, 14 August, 2019.
4. *Dynamical systems, groupoids and the classification of  $C^*$ -algebras—minimal dynamics*, (plenary speaker) Groupoids, Graphs and Algebras, University of Sydney, Australia, 4 July 2019.
5. *Dynamical systems, groupoids and the classification of  $C^*$ -algebras—Smale spaces*, (plenary speaker) Groupoids, Graphs and Algebras, University of Sydney, Australia, 2 July 2019.
6. *Unitary orbits via transportation theory*, Oberseminar Operator Algebras, University of Münster, Münster, Germany, 23 April 2019.
7. *Groupoids from minimal dynamical systems*, Groupoids and operator algebras. Applications to analysis, geometry and dynamics. Université D'Orléans, Orléans, France, 23 May, 2019.
8.  *$C^*$ -algebras of minimal dynamical systems with prescribed  $K$ -theory*, Functional Analysis Seminar, University of Newcastle, Newcastle, UK, 20 November 2018.
9.  *$C^*$ -algebras of minimal dynamical systems with prescribed  $K$ -theory*, Operator Algebras Seminar, Katholieke Universiteit Leuven, Leuven, Belgium, 16 November 2018.
10. *Unitary orbits via transportation theory*, Operator Theory Seminar, University of Victoria, Victoria, Canada, 3 November 2018.
11.  *$C^*$ -algebras of minimal dynamical systems with prescribed  $K$ -theory*, Functional Analysis Seminar, University of Colorado, Boulder, USA, 25 October 2018.
12.  *$C^*$ -algebras of minimal dynamical systems with prescribed  $K$ -theory*, Operator Algebras Seminar, Fields Institute, Toronto, Canada, 18 October 2018.
13.  *$C^*$ -algebras of minimal dynamical systems and related groupoids with prescribed  $K$ -theory*, ICM Operator Algebras Satellite Conference, Florianopolis, Brazil, 26 - 30 July 2018.
14. *On the classification of  $C^*$ -algebras I and II*, National Institute for Science Education and Research, Bhubaneswar, India, 3 and 7 May, 2018.
15. *Unitary orbits via transportation theory*, Functional Analysis Seminar, University of Colorado, Boulder, USA, 1 March 2018.
16. *Unitary orbits via transportation theory*, Workshop on Computability of  $K$ -Theory, Texas A&M University, College Station, USA, February 2018.
17. *Unitary orbits via transportation theory*, Operator Algebra Seminar, University of Copenhagen, Copenhagen, Denmark, 24 January 2018.
18. *On the  $C^*$ -algebras of (weighted) quantum flag manifolds*, University of Groningen, Groningen, Netherlands, 16 January 2018. *Dynamical  $\mathcal{Z}_0$* , Facets of Irreversibility, University of Oslo, Oslo, Norway, 6 December 2017.

19. *On the  $C^*$ -algebras of (weighted) quantum flag manifolds*, Future Targets in the Classification Program for Amenable  $C^*$ -algebras, Banff International Research Station, Banff, Canada, 8 September 2017.
20. *On the  $C^*$ -algebras of weighted quantum Grassmannians*, Barcelona Conference on  $C^*$ -algebras: Structure, Classification and Dynamics, 19 June 2017.
21. *Dynamic asymptotic dimension of groupoids associated to Smale spaces and nuclear dimension of their  $C^*$ -algebras*, Asymptotic Decomposition Methods in Geometry, Dynamics and Operator Algebras, University of Southampton, Southampton, UK, 30 March 2017.
22. *Group actions on Smale spaces and their  $C^*$ -algebras*, Scottish Operator Algebra Research meeting, University of Glasgow, Glasgow, UK, 25 March 2017.
23. *Group actions on Smale spaces and their associated  $C^*$ -algebras*, Workshop on  $C^*$ -algebras and Dynamical Systems, Centre de Recerca Matemàtica, Bellaterra, Spain, 21 March 2017.
24. *Group actions on Smale spaces and their associated  $C^*$ -algebras*, Geometry Seminar, Technische Universität Dresden, Germany, 13 December 2016.
25. *Topological dynamics and  $C^*$ -algebra classification*, University of Hawaii Manoa, USA, 17 November 2016.
26. *Smale spaces and  $C^*$ -algebras*, Forum Matematyków Polskich z Udziałem Matematyków Ukraińskich, (session on topological dynamics and ergodic theory), University of Olsztyn, Poland, 13 September, 2016.
27. *Group actions on Smale spaces and their  $C^*$ -algebras*, Operator Algebra Seminar, University of Copenhagen, Copenhagen, Denmark, 7 September 2016.
28. *Classification results for  $C^*$ -algebras associated to Smale spaces*,  $C^*$ -algebras Workshop, Mathematisches Forschungsinstitut, Oberwolfach, Germany, 26 August 2016.
29. *Classification results for  $C^*$ -algebras associated to Smale spaces*, Refining  $C^*$ -algebraic Invariants for Dynamics using KK-theory, University of Melbourne, Creswick, Australia, 26 July 2016.
30. *Minimal dynamics and the Jiang–Su algebra*, Workshop on  $C^*$ -algebras: Geometry and Actions, University of Münster, Münster, Germany, 13 July 2015.
31. *Minimal dynamics and the Jiang–Su algebra*, Graduate Forum on Operator Algebras, Research Centre for Operator Algebras, East China Normal University, Shanghai, China, 24 March 2015.
32.  *$C^*$ -algebras associated to minimal dynamical systems*, Operator Algebras Seminar, Purdue University, West Lafayette, Indiana, USA, 15 January 2015.
33. *The classification of  $C^*$ -algebras and minimal dynamical systems*, Special Session on Classification Problems in Operator Algebras, AMS Joint Mathematical Meeting, San Antonio, Texas, 11 January 2015.
34. *The classification problem for  $C^*$ -algebras associated to minimal dynamical systems*, Analysis Seminar, University of Oregon, Eugene, Oregon, 4 November 2014.
35. *Classification of  $C^*$ -algebras of minimal homeomorphisms on odd dimensional spheres*, West Coast Operator Algebra Seminar, University of Denver, Denver, Colorado, 1 November, 2014.
36. *Classification of  $C^*$ -algebras of minimal diffeomorphisms on odd dimensional spheres*, Operator Theory Seminar, University of Victoria, Victoria, British Columbia, 29 October 2014.
37. *A proof that the crossed products by minimal property (P) homeomorphisms of odd dimensional spheres are classified by their tracial state spaces*, Dynamics and  $C^*$ -Algebras: Amenability and Soficity, Banff International Research Station, Banff, Alberta, Canada, 21 October, 2014.
38. *Classification of  $C^*$ -algebras and minimal dynamics*, Methods of Noncommutative Geometry in Analysis and Topology, Leibniz Universität, Hannover, Germany, 7 October 2014.
39. *On the classification of  $C^*$ -algebras of minimal dynamical systems of a product of a Cantor set and an odd dimensional sphere*, Classification, Structure, Amenability and Regularity (CStar), University of Glasgow, 4 September 2014.
40. *On the classification of  $C^*$ -algebras of minimal dynamical systems* Workshop on  $C^*$ -algebras and Dynamical Systems, Fields Institute, Toronto, Canada, 16 June 2014.
41. *On the classification of  $C^*$ -algebras of minimal dynamical systems* Analysis Seminar, University of Waterloo, Waterloo, Canada, 28 March 2014.
42. *UHF-stable tracial approximation and classification*, Operator Algebra Seminar, University of Copenhagen, Copenhagen, Denmark, 27 February 2013.
43. *UHF slicing and classification of nuclear  $C^*$ -algebras*, Miniworkshop on operator algebras, University of Tokyo, Tokyo, Japan, 11 January 2013.

44. *UHF slicing and tracial approximation*, Analysis Seminar, University of Glasgow, Glasgow, United Kingdom, 2 March 2012.
45. *On tracial approximation of some simple UHF-stable  $C^*$ -algebras*, Yorkshire Functional Analysis Group Seminar, University of Leeds, Leeds, United Kingdom, 28 February 2012.
46. *On the classification of  $C^*$ -algebras of minimal dynamical systems*, Workshop on Dynamical Systems at the British Mathematical Colloquium, University of Leicester, Leicester UK, 20 April 2011.
47. *Simple unital locally semihomogeneous  $C^*$ -algebras of bounded dimension are rationally TAI*, Workshop on Dynamics and  $C^*$ -algebras, Centre de Recerca Matemàtica, Bellaterra, Spain, 6 April 2011.
48.  *$C^*$ -algebras of minimal dynamical systems and  $\mathcal{Z}$ -stable classification*, Analysis seminar, University of Glasgow, Glasgow, Scotland, UK, 6 October 2010.
49. *A technique to show that certain  $C^*$ -algebras are TAI after tensoring with a UHF algebra*, Classification of Amenable  $C^*$ -Algebras, Banff International Research Station, Banff, Alberta, Canada, 22 September 2010.

UPCOMING  
INVITATIONS

- Invited Speaker* Special Session on Operator Algebras, Joint Mathematics Meetings 2020, Denver, Colorado, January 15 - 18, 2020.
- Invited Speaker* Young Functional Analysts' Workshop, Lancaster University, 31 March - 2 April, 2020.
- Invited Speaker* XXXIX Workshop on Geometric Methods in Physics, Bialowieza, Poland, 28 June - 4 July 2020.
- Invited Speaker* Mini-symposium on Operator Algebras, 8th European Congress of Mathematics, Piran-Portoroz, Slovenia, July 5 - 11, 2020.

CONTRIBUTED  
TALKS

*Contributed talks at workshops, conferences and seminars* >25 talks in 10 countries.

FURTHER  
RESEARCH  
PRESENTATIONS

*Noncommutative Kähler Structures, Schubert Calculus for Quantum Flag Manifolds,  $C^*$ -algebras and Quantum Flag Manifolds*, series of three posters at International Festival in Schubert calculus, Sun Yat-Sen University, Guangzhou, China, November 2018. Posters available online at the following link: [karen.strung.me/Quantum\\_Flag\\_Manifolds.html](http://karen.strung.me/Quantum_Flag_Manifolds.html)

OTHER SERVICE

*Co-organiser, Quantum Flag Manifolds in Prauge* 16–20 September 2019  
5-day workshop at Charles University, Prague, Czechia.

*Research group co-leader, WOA: Women in Operator Algebras*  
Co-leader of 7-person research group “Regularity properties of generalised crossed products” initiated at Banff International Research Station during the workshop WOA: Women in Operator Algebras.

*Co-organiser, WOA: Women in Operator Algebras* 4–9 November 2018  
5-day workshop at Banff International Research Station which focussed on active research with the aim of developing a network of women in operators.

*Mentor group leader, Young Women in  $C^*$ -algebras (YWC\* A)* 11–12 August, 2018  
Led discussions on the experience of being a mathematician and in particular, a female mathematician, in the field of operator algebras.

*Co-organiser, Cuntz–Pimsner Cross-Pollination* 25–19 June 2018  
5-day workshop at Lorentz Center, Leiden, Netherlands.

*Co-organiser, Workshop on Quantum Flag Manifolds* 19 January 2018  
1-day workshop at Radboud University, Nijmegen, Netherlands.

*Co-organiser, Working Seminar on the Geometry of Flag Manifolds,* May 2017–September 2017  
Working seminar held approximately once per week, IMPAN, Warsaw.

*Co-organiser, Structure and Classification of  $C^*$ -Algebras* 21–25 November 2016  
5-day conference at the Banach Center, Warsaw part of Noncommutative Geometry semester.

*Reviewer* Ongoing  
Referee work for various journals

*Webmaster, WOA: Women in Operator Algebras* Ongoing  
Maintain the website for Women in Operator Algebras hosted by the Association for Women in Mathematics. URL: [awmadvance.org/research-networks/woa](http://awmadvance.org/research-networks/woa)

*Committee member, Family Friendly Group* February 2010–September 2011  
Committee to address gender issues and work-life balance in the School of Mathematical Sciences at the University of Nottingham. Self-assessment team for Athena Swan Silver Award.

*London Mathematical Society Good Practice Award Workshop* 19 May 2011  
Workshop on good practice in mathematics departments for women in mathematics.

*PhD student participant, International Review of UK Mathematics* 6 December 2010  
Met with international assessors to discuss the present state of mathematics in the United Kingdom.

LANGUAGES

- English (native)
- French (C2)
- German (B1)
- Polish (A2)