

CV - ROBERTO HERNÁNDEZ PALOMARES, PH.D.

Email: robertohp.math@gmail.com **Last updated:** September 2025

<https://www.math.uwaterloo.ca/~r5hernan/>

200 University Avenue West Waterloo, ON, Canada N2L 3G1

RESEARCH POSITIONS

University of Waterloo, Pure Mathematics, Canada Postdoctoral Scholar	<i>January 2023 - Present</i>
Texas A&M University, Mathematics Department, USA Visiting Assistant Professor	<i>August 2021 - December 2022</i>
The Ohio State University, Dept. of Mathematics, USA Presidential Fellow	<i>Summer 2020 - Spring 2021</i>

EDUCATION

Mathematics Department at The Ohio State University, USA - Ph.D. degree awarded in May 2021. - Master in Sciences obtained in 2018.	<i>August 2015 - May 2021</i>
CIMAT/Universidad de Guanajuato, México Bachelor of Mathematics.	<i>August 2010 - June 2015</i>

RESEACH INTERESTS

Operator algebras, Quantum Information and Quantum Symmetries

RESEARCH PROJECTS AND PUBLICATIONS

Peer-reviewed published articles:

9.- *Discrete inclusions from Cuntz-Pimsner algebras*

[arXiv:2503.21515](#) (Accepted for publication at **Proceedings of the AMS**)

8.- *Inclusions of Operator Algebras from Tensor Categories: beyond irreducibility*

With L. Hataishi [arXiv:2504.05247](#) (Accepted for publication at **Glasgow Mathematical Journal**)

7.- *Discrete inclusions of C^* -algebras* [arXiv:2305.05072](#)

With B. Nelson, **Journal of Topology and Analysis**, DOI: [10.1142/S1793525325500256](#),

6.- *Quantum graphs, subfactors and tensor categories I* [arXiv:2409.01951](#)

With M. Brannan, **Internat. J. Math.** DOI: [10.1142/S0129167X25500399](#)

5.- *K-Theoretic classification of inductive limit actions of fusion categories on AF-algebras*

With Chen and C. Jones, **Commun. Math. Phys.** 405, 83 (2024). DOI: [10.1007/s00220-024-04969-w](#)

4.- *Q-System Completion for C^* 2-Categories*

With Chen, C. Jones and Penneys, **J. Functional Analysis**, Vol 283, Issue 3, (2022), 109524, ISSN 0022-1236, DOI: [10.1016/j.jfa.2022.109524](#),

3.- *Realizations of Rigid C^* -Tensor Categories as Bimodules over a GJS C^* -algebra*

With Hartglass. **J. Math. Phys.** 61 (2020), no. 8, 081703, 32 pp. DOI: [10.1063/5.0015294](#)

2.- *Classifying Module Categories for Generalized TLJ $*$ -2-Categories*

With Ferrer. **Internat. J. Math.** 31 (2020), no. 4, 2050027, 30 pp.

DOI: [10.1142/S0129167X20500275](#)

1.- *Dynein localization and pronuclear movement in the C. elegans zygote* (Side project in biology)

With D. P. Ignacio, N. Kravtsova, J. Henry and A. T. Dawes. **Cytoskeleton Journal**, Article ID: CM21733, DOI: [10.1002/cm.21733](#) (2022), Contribution: Methodology, formal analysis.

Preprints:

2.- *Remarks on C^* -discrete inclusions*

With B. Nelson [arXiv:2409.18161](https://arxiv.org/abs/2409.18161) (Under review)

1.- *Geometric Measure of Arens Irregularity* With Hu, Maierhofer and Rao.

[Fields Institute Report](#)

Ongoing projects:

4.- *Quantum graphs and spin models* (Ongoing with [Outsourcing Math Research](#))

We introduce highly-regular quantum graphs, explore relations to spin models and quantum groups.

3.- *Properly outer actions of tensor categories on C^* -algebras* (ongoing with M. Mukohara)

We investigate proper outerness for actions of tensor categories on C^* -algebras with applications.

2.- *Quantum graphs, subfactors and tensor categories II* (ongoing with M. Brannan)

We develop categorical aspects of quantum-symmetry-equivariant quantum graphs.

1.- *Complex Hadamard Matrices, Symmetries and Quantizations* (Ongoing with D. Gromada and M. Brannan) We study a hierarchy of quantum equivalence relations to classify complex Hadamard matrices.

HONORS AND GRANTS

●●● Distinctions:

14: Inst. Mittag-Leffler Jr Fellow: Operator Algebras & Quantum Info	<i>Stockholm, SWE - Sp 2026</i>
13: NSF/CBMS: Classifying amenable operator algebras	<i>Fort Worth, TX, USA - June 2025</i>
12: Newton Inst: School on Quantum groups, QI and Operator Algebras	<i>Cambridge, UK - Nov 2024</i>
11: Fields Inst. Mini-course Lecturer: C^* -Algebras and Tensor Categories	<i>Toronto - Nov 2023</i>
10: AMS-Simons Travel Grant	<i>July 2022 - June 2024</i>
9: PhD OSU's Presidential Fellowship	<i>Summer 2020 - Spring 2021</i>
8: PhD CONACyT Fellow, Mexican Science Council	<i>Spring 2019 - Spring 2021</i>
7: AMS MRC Quantum Symmetries: Subfactors and Fusion Categories	<i>Rhode Island, Summer 2018</i>
6: OSU Mathematics Department Fellowship	<i>Columbus, OH, Spring 2018</i>
5: Modeling of Cell Polarization RA (OSU)	<i>Columbus, Summer 2016</i>
4: <i>Universidad de Guanajuato</i> Medal for Distinguished Students	<i>Gto, Mex, 2015</i>
3: CIMAT Honors Mathematics Undergraduate Fellowship	<i>Gto, Mex, Aug 2010 - Aug 2015</i>
2: Honorable Mention: International Mathematics Competition	<i>Blagoevgrad, Bulgaria, June 2014</i>
1: Fields Institute Undergraduate Research Summer Program	<i>Toronto, Can, Summer 2014</i>

●●● Invited Research Visits:

8: Participant: Operator Algebraic Quantum Groups, Banff, AB Canada	<i>Nov 2025</i>
7: Research Visitor, Inst. of Mathematics, UNAM Cuernavaca, México	<i>Nov 2025</i>
6: Participant: Operator Systems and their Applications, Banff	<i>Feb 2025</i>
5: Research Visitor, Michigan State University, Lansing, MI USA	<i>Jan 2024</i>
4: Participant: Subfactors and Fusion (2-)Categories Workshop, Banff	<i>Dec 2023</i>
3: Research Visitor, Carleton University, Ottawa, Canada	<i>March 2023</i>
2: Visiting Researcher Saarland University, Germany	<i>Sep-Dec 2022</i>
1: Research Visitor, Mathematical Institute, University of Oxford, UK	<i>Aug 2022</i>

●●● Sponsored training activities:

- Operator Algebras and Quantum Information	<i>Institut Mittag-Leffler, Stockholm, Spring 2026</i>
- Operator Algebraic Quantum Groups	<i>Banff Research Station, Nov 2025</i>
- MFO: Subfactors and Applications	<i>Oberwolfach, Germany July 2025</i>
- NSF/CBMS: Classifying amenable operator algebras	<i>Texas Christian U, USA June 2025</i>
- Operator Systems and their Applications	<i>Banff Research Station, Feb 2025</i>
- School on quantum groups, qu. info and op. algebras	<i>I. Newton Inst. Cambridge, UK Nov 2024</i>
- MFO: Classification of C^* -Algebras and Dynamics	<i>Oberwolfach, Germany May 2024</i>

- Subfactors and Fusion (2-)Categories Workshop	Banff Research Station, Dec 2023
- Twinned Conference on C^* -Algebras and Tensor Categories	Fields Institute, Toronto, Nov 2023
- Focus Semester in Quantum Information	Saarland U, Fall 2022
- Topological quantum groups, tensor categories and subfactors	Waterloo, May 2022
- Tensor categories and topological quantum field theories	MSRI, Berkeley, CA, Spring Sem 2020
- CIMPA Research School: Quantum Symmetries	Bogotá, Colombia, July 2019
- OSU Quantum Symmetries Summer Research Program	Columbus OH, June 2019
- Subfactors: planar algs, quantum symms, & random matrices	MSRI, Berkeley, CA June 2017

PRESENTATIONS

••• Invited Talks:

32: Colloquium, UNAM Cuernavaca, Morelos, MX	Nov 2025
Colloquium speaker. <i>Title: TBD</i>	
31: Analysis seminar, UNAM Cuernavaca, MX	Nov 2025
Invited speaker. <i>Title: TBD</i>	
30: Quantum Information and Computing Sem., U of Delaware, Newark, DE USA	Nov 2025
Invited speaker. <i>Title: Quantum graphs and spin models</i>	
29: Analysis Seminar, University of New Mexico, Albuquerque, NM, USA	Oct 2025
Invited speaker. <i>Title: Quantum graphs and spin models</i>	
28: Analysis Seminar, UWaterloo	Oct 2025
Seminar speaker. <i>Title: Quantum graphs and spin models</i>	
27: Atlantic Category Theory Seminar, Dalhousie University, Halifax, NS, CAN	Sep 2025
Invited speaker. <i>Title: Quantum graphs and spin models</i>	
26: Analysis Seminar, York University, Toronto, ON, CAN	Sep 2025
Invited speaker. <i>Title: Quantum graphs and spin models</i>	
25: AMS Spring Central Sectional Meeting, U of Kansas, Lawrence, KS USA	Mar 2025
Invited speaker. <i>Title: Quantum graphs, subfactors and tensor categories</i>	
24: Quantum Groups Seminar, Paris, France	Mar 2025
Invited remote speaker. <i>Title: Quantum graphs, subfactors and tensor categories</i>	
23: Quantum Information and Analysis Seminar, U of South Carolina, USA	Feb 2025
Invited speaker. <i>Title: Quantum graphs, subfactors and tensor categories</i>	
22: Graph Theory Seminar UWaterloo, ON CA	Oct 2024
Seminar speaker. <i>Title: Quantum graphs, subfactors and tensor categories</i>	
21: South Atlantic Noncommutative Geometry Seminar, U Buenos Aires, ARG	Oct 2024
Seminar remote speaker. <i>Title: Quantum graphs, subfactors and tensor categories</i>	
20: Analysis Seminar, UWaterloo	March 2024
Seminar speaker. <i>Title: C^* Quantum Dynamics</i>	
19: Math Physics & Operator Alg. seminar, Michigan State U, Lansing, MI, USA	Jan 2024
Invited speaker. <i>Title: C^* Quantum Dynamics</i>	
18: C^* -Algebras and Tensor Categories, Fields Institute, Toronto, ON, CA	Nov 2023
♦♦♦ Mini-Course Lecturer: <i>Actions of tensor categories on operator algebras</i>	
17: Carleton-Ottawa Joint Analysis Seminar, Ottawa, ON, CA	March 2023
Invited speaker: <i>K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algs</i>	
16: Analysis Seminar University of Waterloo, Waterloo	March 2023
Seminar speaker: <i>K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algs</i>	
15: Quantum Symmetries Seminar, OSU	Nov 2022
Remote seminar speaker: <i>Discrete inclusions of C^*-algebras</i>	
14: Malý Seminar, Karlin Univeristy, Prague, Czech Rep	Nov 2022
Invited speaker: <i>Unitary tensor categories and their actions</i>	
13: NCG&T Sem, Inst. of Math. Czech Academy of Sciences, Prague	Nov 2022
Invited speaker: <i>K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algebras</i>	
12: Operator algebras Seminar, KU Leuven, Belgium	Oct 2022

- Invited speaker: *K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algebras*
- 11: Functional Analysis Seminar, **Inst. of Mathematics, University of Oxford, UK** Sep 2022
Invited speaker: *K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algebras*
- 10: Quantum Groups Seminar, **University of Copenhagen, Denmark** June 2022
Remote speaker: *Q-systems and higher unitary idempotent completion for C^* -algs*
- 9: Mathematics Colloquium, **U. Autónoma de Yucatán-CIMAT, México** May 2022
Remote colloquium: *Qué son los espacios no-conmutativos y sus simetrías cuánticas*
- 8: Jr. Student Seminar, **Universidad de Guanajuato, México** March 2022
Remote speaker: *Simetrías cuánticas y espacios cuánticos*
- 7: ASUERAU C^* -seminar, **Arizona State University, AZ, USA** Feb 2022
Remote speaker: *Applications of subfactor and categorical techniques to C^* -algebras*
- 6: Analysis Seminar, **U Waterloo** Feb 2022
Remote speaker: *C^* -algs, Q-systems and higher idempotent completion for C^* 2-cats.*
- 5: Alg & Combinatorics Seminar, **Texas A&M University, College St, TX, USA** Oct 2021
Seminar speaker: *Q-systems and higher idempotent completion for C^* 2-categories*
- 4: Category Theory Seminar, **Universidad Nacional Autónoma de México** March 2021
Remote seminar speaker: *UTC actions on C^* -algebras*
- 3: Algebra seminar, **Indiana U, Bloomington IN, USA** Nov 2020
Remote seminar speaker: *Classifying module categories for generalized TLJ *-2-categories*
- 2: Brazos Analysis Seminar, **Texas A&M** Nov 2020
Remote speaker: *Realizing unitary tensor categories over GJS C^* -algebras*
- 1: Subfactors seminar, **Vanderbilt, Nashville TN, USA** Sep 2020
Remote seminar speaker: *Representations of RC^*TC s over GJS C^* -algebras*
- **Contributed Talks:**
- 27: NSF/CBMS: Classifying amenable operator algebras, **TX Christian U, USA** June 2025
Contributed talk: *Discrete inclusions of C^* -algebras*
- 26: Canadian Operator Symposium 2025, **U Waterloo, ON, CA** May 2025
Contributed talk: *Highly regular quantum graphs*
- 25: Workshop on Quantum Graphs, **Saarland University, Germany** Feb 2025
Contributed talk: *Quantum graphs tensor categories and subfactors*
- 24: Quantum groups, tensor categories and quantum field theory, **Oslo U, Norway** Jan 2025
Contributed talk: *Quantum graphs tensor categories and subfactors*
- 23: Canadian Operator Symposium 2023, **Western University, London, ON, CA** May 2023
Contributed talk: *Discrete inclusions of C^* -algebras*
- 22: Great Plains Operator Theory Symposium, **OSU, Columbus, OH, USA** May 2023
Contributed talk: *Discrete inclusions of C^* -algebras*
- 21: Non-Commutative Geom. & Op. Algs., **Vanderbilt, Nashville, TN, USA** May 2023
Contributed talk: *Discrete inclusions of C^* -algebras*
- 20: Polish-German Workshop: quantum gps, graphs & symms, **Saarland U** Nov 2022
Contributed talk: *Quantum symmetries for operator algebras*
- 19: Operator Algebras: Subfactors, K-theory, CFT, **Cardiff University, Wales, UK** Aug 2022
Contributed talk: *K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algs*
- 18: Topological Quantum Groups, Tensor Categories, and Subfactors, **U. of Waterloo** May 2022
Contributed talk: *Q-system completion for C^* 2-categories*
- 17: **AMS JMM: Skein Theory and Quantum Algebra Section** April 2022
Remote contributed talk: *Q-System Completion for C^* -algebras*
- 16: Young Mathematicians Conference in C^* -algs, **Münster U., Münster, Germany** Aug 2021
Contributed talk: *Q-system completion for C^* -Algebras*
- 15: Great Plains Operator Theory Symposium 2021 May 2021
Remote contributed talk: *C^* -algebras, right correspondences, and Q-systems*
- 14: Actions of Tensor Categories on C^* -algebras, **IPAM, Los Angeles, CA, USA**
Remote contributed talk: *Actions of UTCs on GJS C^* -algebras* Jan 2021

13: AMS JMM: Advances in Operator Algebra	<i>Jan 2021</i>
Remote contributed talk: <i>Representations of unitary categories on C^*-algebras</i>	
12: AMS JMM: Hopf Algebras and Tensor Categories	<i>Jan 2021</i>
Remote cont. talk: <i>Classifying module categories for generalized TLJ $*$-2-categories</i>	
11: OSU-Oxford Meeting	<i>May 2020</i>
Remote contributed talk: <i>Realizations of RC^*TC and Hilbertification</i>	
10: Hayes Graduate Forum, OSU Columbus, OH, USA	<i>Feb 2020</i>
Poster presentation: <i>Quantum symmetries of quantum spaces</i>	
9: Quasy-Con, University of Illinois, Urbana-Champaign, IL, USA	<i>Nov 2019</i>
Contributed talk: <i>Realizing RC^*T categories as bimodules over C^*-algebras</i>	
8: QAQT Student Seminar, OSU Cbus, OH	<i>Oct 2019</i>
Seminar speaker: <i>Unitary modules for the generalized TLJ $*$-2-categories</i>	
7: CIMPA School: Quantum Symmetries, U. de los Andes, Bogotá, Colombia	<i>July 2019</i>
Poster presentation: <i>Classifying Module Categories for TLJ $*$-2-Categories</i>	
6: OSU QAQT Seminar, OSU, Cbus, OH	<i>March 2019</i>
Seminar speaker: <i>Computing the fusion algebra of a subfactor</i>	
5: Quantum Algebra & Quantum Topology Student Seminar, OSU Cbus, OH	<i>Oct 2018</i>
Seminar speaker: <i>Radon-Nikodym theorem in von Neumann Algebras</i>	
4: Non-Commutative Geom Op Algs Seminar, OSU, Cbus, OH	<i>Summer 2018</i>
Seminar speaker: <i>Representing some RC^*TC over Hilbert C^*-Bimodules</i>	
3: Non-Commutative Geom Op Algs Seminar, OSU, Cbus, OH	<i>Spring 2018</i>
Seminar speaker: <i>Uniqueness of Separable Hyperfinite II_1 Factor</i>	
2: Non-Commutative Geom Op Algs Seminar, OSU, Cbus OH	<i>Fall 2017</i>
Seminar speaker: <i>Measuring Geometric Arens Irregularity</i>	
1: Quantum Algebra & Quantum Topology Seminar, OSU, Cbus, OH	<i>Spring 2017</i>
Seminar speaker: <i>Index Rigidity Theorem: Quantized and Continuum Spectra</i>	

ACADEMIC SERVICES AND OUTREACH

Outsourcing Math Research: ([OMR Website](#))

Mentoring and sponsoring young researchers based in underdeveloped countries:

- Research mentor for 1 Panamanian student	<i>Winter-Summer 2025</i>
- Research mentor for 3 Mexican, 1 Colombian & 1 Costa Rican student	<i>June 24-June 25</i>
- Sponsored and supervised UGto, Mexican undergrad researcher Héctor Zepeda	<i>Spring 2023</i>
- Sponsored and supervised UGto undergraduate researcher Violeta Mtz. Escamilla	<i>Summer 2022</i>
- Sponsored and supervised UGto undergraduate researcher José Barrientos Lpz.	<i>Summer 2022</i>

Research Experience for Undergraduates:

- Mentor for undergraduate researchers at U Waterloo, joint with Michael Brannan Project: "Quantum graphs with no classical symmetries"	<i>Summer 2023</i>
- Mentor for undergraduate Giovanni Ferrer (U. of Puerto Rico)	<i>Summer 2018 and 2019</i>

OSU Directed Reading Program:

- Mentored physics undergraduate Ian de la Cruz on Classical Mechanics	<i>Spring 2019</i>
--	--------------------

Physics Institute UGto Physics Sundays:

Guiding experiments with students from public elementary and middle-schools	<i>Fall 2014</i>
---	------------------

Organization:

- Member of organizing committee: Harmonic Analysis on Tensor Categories Seminar	<i>Fall 2023</i>
- Member of organizing committee: OSU Mathematics Department Colloquium	<i>Fall 2020 - Sp 2021</i>
- Organizer: Quantum Symmetries Student Seminar (QSSS Website)	<i>Fall 2018 - Sp 2021</i>

Administrative:

- Presided Math Undergraduate Students Org., U of Guanajuato, MX	<i>Fall 2014 - Spring 2015</i>
--	--------------------------------

TEACHING AND STUDENT SUPERVISION

Theses directed:

- 3.-** Pure Mathematics Master's thesis adviser for Violeta Martínez Escamilla
CIMAT, Gto, Mexico *Summer 23-Spring 24*
- 2.-** Pure Mathematics Master's thesis adviser for José Barrientos López
CIMAT, Gto, Mexico *Summer 23-Spring 24*
- 1.-** UW-EPFL Mathematics Bachelor's thesis adviser for Laurent Costa
École Polytechnique Fédérale de Lausanne, Switzerland *Spring 24*

Leading Lecturer Positions: (~ 735 undergrad and masters students)

- 10-** Math 237 Calculus 3 for Honours Mathematics, (~ 110 students) U Waterloo, CA *Fall 2025*
- 9-** Math 237 Calculus 3 for Honours Mathematics, (~ 110 students) UW *Winter 2025*
- 8-** PMath/AMath 331 Applied Real Analysis (~ 90 students), UW *Fall 2024*
- 7-** Math 135 Algebra for Honours Mathematics (~ 60 students), UW *Winter 2024*
- 6-** PMath 451/651 Measure and Integration (~ 15 students), UW *Fall 2023*
- 5-** PMath 343 Intro to Math of Quantum Info (~ 20 students), UW *Winter 2023*
- 4-** Math 308 Differential Equations Sec 504 (~ 65 students), Texas A&M, USA *Spring 2022*
- 3-** Math 308 Differential Equations Sec 505 (~ 65 students), TAMU *Spring 2022*
- 2-** Math 251 Engineering Mathematics III Sec 520 (~ 100 students), TAMU *Fall 2021*
- 1-** Math 251 Engineering Mathematics III Sec 521 (~ 100 students), TAMU *Fall 2021*

Teaching Assistant Positions: (~ 500 undergrad students)

- 11-** 1156 Calculus for students in the Biological Sciences (~ 65 students), OSU, USA *Fall 2019*
- 9-** 1156 Calculus for students in the Biological Sciences (~ 65 students), OSU *Fall 2018*
- 8-** 2568 Linear Algebra grader, OSU *Fall 2017*
- 7-** 1152 Calculus II (~ 65 students), OSU *Spring 2017*
- 6-** 1156 Calculus for students in the Biological Sciences (~ 65 students), OSU *Fall 2016*
- 5-** 1172 Engineering mathematics (~ 65 students), OSU *Spring 2016*
- 4-** 1151 Calculus I (~ 65 students), OSU *Fall 2015*
- 3-** Complex Variables (~ 20 honors students), UGto, MX *Fall 2014*
- 2-** Vector Calculus (~ 25 honors students), UGto *Spring 2014*
- 1-** Abstract Algebra I (~ 25 honors students), UGto *Fall 2013*