

CV - ROBERTO HERNÁNDEZ PALOMARES, PH.D.

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RESEARCH POSITIONS

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

EDUCATION

Mathematics Department at The Ohio State University, USA	<i>August 2015 - May 2021</i>
- Ph.D. degree awarded in May 2021.	
- Master in Sciences obtained in 2018.	

CIMAT/Universidad de Guanajuato, México *August 2010 - June 2015*

Bachelor of Mathematics.

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](https://arxiv.org/abs/2503.21515) **Proceedings of the AMS** DOI: [10.1090/proc/17546](https://doi.org/10.1090/proc/17546)

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

With L. Hataishi [arXiv:2504.05247](https://arxiv.org/abs/2504.05247) **Glasgow Math. J.** DOI: [10.1017/S0017089525100839](https://doi.org/10.1017/S0017089525100839)

7.- *Discrete inclusions of C^* -algebras* [arXiv:2305.05072](https://arxiv.org/abs/2305.05072)

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

6.- *Quantum graphs, subfactors and tensor categories I* [arXiv:2409.01951](https://arxiv.org/abs/2409.01951)

With M. Brannan, **Internat. J. Math.** DOI: [10.1142/S0129167X25500399](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1002/cm.21733) (2022), Contribution: Methodology, formal analysis.

Preprints:

4.- *Quantum graphs and spin models*

With Bravo Hernández and Viales Solís [arXiv:2601.01246](https://arxiv.org/abs/2601.01246) (Under review)

3.- *Properly Outer Actions of Tensor Categories on C^* -algebras*

With M. Mukohara [arXiv:2511.09991](https://arxiv.org/abs/2511.09991) (Under review)

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:

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

• • • Invited Research Visits:

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

• • • 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
- MFO: Classification of C*-Algebras and Dynamics
- Subfactors and Fusion (2-)Categories Workshop
- Twinned Conference on C*-Algebras and Tensor Categories
- Focus Semester in Quantum Information
- Topological quantum groups, tensor categories and subfactors
- Tensor categories and topological quantum field theories
- CIMPA Research School: Quantum Symmetries
- OSU Quantum Symmetries Summer Research Program
- Subfactors: planar algs, quantum symms, & random matrices

- I. Newton Inst. Cambridge, UK Nov 2024*
- Oberwolfach, Germany May 2024*
- Banff Research Station, Dec 2023*
- Fields Institute, Toronto, Nov 2023*
- Saarland U, Fall 2022*
- Waterloo, May 2022*
- MSRI, Berkeley, CA, Spring Sem 2020*
- Bogotá, Colombia, July 2019*
- Columbus OH, June 2019*
- MSRI, Berkeley, CA June 2017*

PRESENTATIONS

••• Invited Talks:

32: Analysis seminar, **UNAM Cuernavaca, MX** *Nov 2025*
 Invited speaker. *Title: Inclusiones discretas de C^* -álgebras*

31: Colloquium, **UNAM Cuernavaca, Morelos, MX** *Nov 2025*
 Colloquium speaker. *Title: Una mirada a las matemáticas cuánticas*

30: Colloquium: Classical to Quantum through Operator Algebras, **OSU, Columbus OH, USA** *Nov 2025*
 Colloquium speaker. *Title: Quantum graphs and spin models*

29: Analysis Seminar, **Univiersity of New Mexico, Albuquerque, NM, USA** *Oct 2025*
 Invited speaker. *Title: Quantum graphs and spin models*

28: Analysis Seminar, **UWaterloo** *Oct 2025*
 Seminar speaker. *Title: Quantum graphs and spin models*

27: Atlantic Category Theory Seminar, **Dalhousie University, Halifax, NS, CAN** *Sep 2025*
 Invited speaker. *Title: Quantum graphs and spin models*

26: Analysis Seminar, **York University, Toronto, ON, CAN** *Sep 2025*
 Invited speaker. *Title: Quantum graphs and spin models*

25: AMS Spring Central Sectional Meeting, **U of Kansas, Lawrence, KS USA** *Mar 2025*
 Invited speaker. *Title: Quantum graphs, subfactors and tensor categories*

24: Quantum Groups Seminar, **Paris, France** *Mar 2025*
 Invited remote speaker. *Title: Quantum graphs, subfactors and tensor categories*

23: Quantum Information and Analysis Seminar, **U of South Carolina, USA** *Feb 2025*
 Invited speaker. *Title: Quantum graphs, subfactors and tensor categories*

22: Graph Theory Seminar **UWaterloo, ON CA** *Oct 2024*
 Seminar speaker. *Title: Quantum graphs, subfactors and tensor categories*

21: South Atlantic Noncommutative Geometry Seminar, **U Buenos Aires, ARG** *Oct 2024*
 Seminar remote speaker. *Title: Quantum graphs, subfactors and tensor categories*

20: Analysis Seminar, **UWaterloo** *March 2024*
 Seminar speaker. *Title: C^* Quantum Dynamics*

19: Math Physics & Operator Alg. seminar, **Michigan State U, Lansing, MI, USA** *Jan 2024*
 Invited speaker. *Title: C^* Quantum Dynamics*

18: C*-Algebras and Tensor Categories, **Fields Institute, Toronto, ON, CA** *Nov 2023*
 ◇◇◇ **Mini-Course Lecturer:** *Actions of tensor categories on operator algebras*

17: Carleton-Ottawa Joint Analysis Seminar, **Ottawa, ON, CA** *March 2023*
 Invited speaker: *K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algs*

16: Analysis Seminar University of Waterloo, **Waterloo** *March 2023*
 Seminar speaker: *K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algs*

15: Quantum Symmetries Seminar, **OSU** *Nov 2022*
 Remote seminar speaker: *Discrete inclusions of C^* -algebras*

14: Malý Seminar, **Karlin Univeristy, Prague, Czech Rep** *Nov 2022*
 Invited speaker: *Unitary tensor categories and their actions*

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	<i>Oct 2022</i>
Invited speaker: <i>K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algebras</i>	
11: Functional Analysis Seminar, Inst. of Mathematics, University of Oxford, UK	<i>Sep 2022</i>
Invited speaker: <i>K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algebras</i>	
10: Quantum Groups Seminar, University of Copenhagen, Denmark	<i>June 2022</i>
Remote speaker: <i>Q-systems and higher unitary idempotent completion for C^*-algs</i>	
9: Mathematics Colloquium, U. Autónoma de Yucatán-CIMAT, México	<i>May 2022</i>
Remote colloquium: <i>Qué son los espacios no-comutativos y sus simetrías cuánticas</i>	
8: Jr. Student Seminar, Universidad de Guanajuato, México	<i>March 2022</i>
Remote speaker: <i>Simetrías cuánticas y espacios cuánticos</i>	
7: ASUERAU C^* -seminar, Arizona State University, AZ, USA	<i>Feb 2022</i>
Remote speaker: <i>Applications of subfactor and categorical techniques to C^*-algebras</i>	
6: Analysis Seminar, U Waterloo	<i>Feb 2022</i>
Remote speaker: <i>C^*-algs, Q-systems and higher idempotent completion for C^* 2-cats.</i>	
5: Alg & Combinatorics Seminar, Texas A&M University, College St, TX, USA	<i>Oct 2021</i>
Seminar speaker: <i>Q-systems and higher idempotent completion for C^* 2-categories</i>	
4: Category Theory Seminar, Universidad Nacional Autónoma de México	<i>March 2021</i>
Remote seminar speaker: <i>UTC actions on C^*-algebras</i>	
3: Algebra seminar, Indiana U, Bloomington IN, USA	<i>Nov 2020</i>
Remote seminar speaker: <i>Classifying module categories for generalized TLJ $*$-2-categories</i>	
2: Brazos Analysis Seminar, Texas A&M	<i>Nov 2020</i>
Remote speaker: <i>Realizing unitary tensor categories over GJS C^*-algebras</i>	
1: Subfactors seminar, Vanderbilt, Nashville TN, USA	<i>Sep 2020</i>
Remote seminar speaker: <i>Representations of RC^*TCs over GJS C^*-algebras</i>	

••• Contributed Talks:

27: NSF/CBMS: Classifying amenable operator algebras, TX Christian U, USA	<i>June 2025</i>
Contributed talk: <i>Discrete inclusions of C^*-algebras</i>	
26: Canadian Operator Symposium 2025, U Waterloo, ON, CA	<i>May 2025</i>
Contributed talk: <i>Highly regular quantum graphs</i>	
25: Workshop on Quantum Graphs, Saarland University, Germany	<i>Feb 2025</i>
Contributed talk: <i>Quantum graphs tensor categories and subfactors</i>	
24: Quantum groups, tensor categories and quantum field theory, Oslo U, Norway	<i>Jan 2025</i>
Contributed talk: <i>Quantum graphs tensor categories and subfactors</i>	
23: Canadian Operator Symposium 2023, Western University, London, ON, CA	<i>May 2023</i>
Contributed talk: <i>Discrete inclusions of C^*-algebras</i>	
22: Great Plains Operator Theory Symposium, OSU, Columbus, OH, USA	<i>May 2023</i>
Contributed talk: <i>Discrete inclusions of C^*-algebras</i>	
21: Non-Commutative Geom. & Op. Algs., Vanderbilt, Nashville, TN, USA	<i>May 2023</i>
Contributed talk: <i>Discrete inclusions of C^*-algebras</i>	
20: Polish-German Workshop: quantum gps, graphs & symms, Saarland U	<i>Nov 2022</i>
Contributed talk: <i>Quantum symmetries for operator algebras</i>	
19: Operator Algebras: Subfactors, K-theory, CFT, Cardiff University, Wales, UK	<i>Aug 2022</i>
Contributed talk: <i>K-theoretic classif. of ind. lim. actions of fusion cats. on AF-algs</i>	
18: Topological Quantum Groups, Tensor Categories, and Subfactors, U. of Waterloo	<i>May 2022</i>
Contributed talk: <i>Q-system completion for C^* 2-categories</i>	
17: AMS JMM: Skein Theory and Quantum Algebra Section	<i>April 2022</i>
Remote contributed talk: <i>Q-System Completion for C^*-algebras</i>	
16: Young Mathematicians Conference in C^* -algs, Münster U., Münster, Germany	<i>Aug 2021</i>
Contributed talk: <i>Q-system completion for C^*-Algebras</i>	
15: Great Plains Operator Theory Symposium 2021	<i>May 2021</i>
Remote contributed talk: <i>C^*-algebras, right correspondences, and Q-systems</i>	

14: Actions of Tensor Categories on C*-algebras, IPAM, Los Angeles, CA, USA	<i>Remote contributed talk: Actions of UTCs on GJS C*-algebras</i>	<i>Jan 2021</i>
13: AMS JMM: Advances in Operator Algebra	<i>Remote contributed talk: Representations of unitary categories on C*-algebras</i>	<i>Jan 2021</i>
12: AMS JMM: Hopf Algebras and Tensor Categories	<i>Remote cont. talk: Classifying module categories for generalized TLJ *-2-categories</i>	<i>Jan 2021</i>
11: OSU-Oxford Meeting	<i>Remote contributed talk: Realizations of RC*TC and Hilbertification</i>	<i>May 2020</i>
10: Hayes Graduate Forum, OSU Columbus, OH, USA	<i>Poster presentation: Quantum symmetries of quantum spaces</i>	<i>Feb 2020</i>
9: Quasy-Con, University of Illinois, Urbana-Champaign, IL, USA	<i>Contributed talk: Realizing RC*T categories as bimodules over C*-algebras</i>	<i>Nov 2019</i>
8: QAQT Student Seminar, OSU Cbus, OH	<i>Seminar speaker: Unitary modules for the generalized TLJ *-2-categories</i>	<i>Oct 2019</i>
7: CIMPA School: Quantum Symmetries, U. de los Andes, Bogotá, Colombia	<i>Poster presentation: Classifying Module Categories for TLJ *-2-Categories</i>	<i>July 2019</i>
6: OSU QAQT Seminar, OSU, Cbus, OH	<i>Seminar speaker: Computing the fusion algebra of a subfactor</i>	<i>March 2019</i>
5: Quantum Algebra & Quantum Topology Student Seminar, OSU Cbus, OH	<i>Seminar speaker: Radon-Nikodym theorem in von Neumann Algebras</i>	<i>Oct 2018</i>
4: Non-Commutative Geom Op Algs Seminar, OSU, Cbus, OH	<i>Seminar speaker: Representing some RC*TC over Hilbert C*-Bimodules</i>	<i>Summer 2018</i>
3: Non-Commutative Geom Op Algs Seminar, OSU, Cbus, OH	<i>Seminar speaker: Uniqueness of Separable Hyperfinite II₁ Factor</i>	<i>Spring 2018</i>
2: Non-Commutative Geom Op Algs Seminar, OSU, Cbus OH	<i>Seminar speaker: Measuring Geometric Arens Irregularity</i>	<i>Fall 2017</i>
1: Quantum Algebra & Quantum Topology Seminar, OSU, Cbus, OH	<i>Seminar speaker: Index Rigidity Theorem: Quantized and Continuum Spectra</i>	<i>Spring 2017</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 *Winter-Summer 2025*
- Research mentor for 3 Mexican, 1 Colombian & 1 Costa Rican student *June 24-June25*
- Sponsored and supervised UGto, Mexican undergrad researcher Héctor Zepeda *Spring 2023*
- Sponsored and supervised UGto undergraduate researcher Violeta Mtz. Escamilla *Summer 2022*
- Sponsored and supervised UGto undergraduate researcher José Barrientos Lpz. *Summer 2022*

Research Experience for Undergraduates:

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

OSU Directed Reading Program:

- Mentored physics undergraduate Ian de la Cruz on Classical Mechanics *Spring 2019*

Physics Institute UGto Physics Sundays:

- Guiding experiments with students from public elementary and middle-schools *Fall 2014*

Organization:

- Member of organizing committee: Harmonic Analysis on Tensor Categories Seminar *Fall 2023*
- Member of organizing committee: OSU Mathematics Department Colloquium *Fall 2020 - Sp 2021*
- Organizer: Quantum Symmetries Student Seminar [\(QSSS Website\)](#) *Fall 2018 - Sp 2021*

Administrative:

- Presided Math Undergraduate Students Org., U of Guanajuato, MX *Fall 2014 - Spring 2015*

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: (~ 675 undergrad and masters students)

10- Math 237 Calculus 3 for Honours Mathematics, (~ 90 students) U Waterloo, CA	Fall 2025
9- Math 237 Calculus 3 for Honours Mathematics, (~ 70 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