Pablo Miranda

Curriculum Vitae

Departamento de Matemática y Ciencia de la Computación
Universidad de Santiago de Chile
Las Sophoras 173. Estación Central. Santiago. Chile.
✆ *+56 961870790*
☎ *+56 227181983*
✉ *pablo.miranda.r@usach.cl*

Personal Data

Born November 22, 1983, in Santiago, Chile

Citizenship Chilean

Positions

2022- Associate Professor, Departamento de Matemática y Ciencia de la Computación Universidad de Santiago de Chile.

2017-2022 Assistant Professor, Departamento de Matemática y Ciencia de la Computación Universidad de Santiago de Chile.

2014-2015 Postdoctoral Research Fellow, Facultad de Matemática, P. Universidad Católica de Chile. Advisor: Rolando Rebolledo.

2011-2013 Postdoctoral Research Fellow, Facultad de Física, P. Universidad Católica de Chile. Advisor: Rafael Benguria.

Education

2006–2011 Doctorado en Matemáticas, Universidad de Chile

2002–2005 Licenciatura en Matemáticas, Universidad de Chile

Ph.D. thesis

Title *Spectral Properties of Magnetic Quantum Hamiltonians*

Supervisor Georgi Raikov

Research Interest

Mathematical Physics and Spectral Theory, in particular:

○ Magnetic Schrödinger Operators
○ Resonances in Quantum Systems
○ Spectral properties of Discrete Operators

Publications

-*Singularities of the magnetic spectral shift function for potentials of variable sign*, to appear in Journal of Spectral Theory. (with V. Bruneau and G. Levitina)

-*Clusters of resonances for a non-selfadjoint multichannel discrete Schrödinger operator*, in Journal of Mathematical Physics 66, 073504 (2025). (with M. Assal, O. Bourget and D. Sambou)

- *Eigenvalue Asymptotics Near a Flat Band in the Presence of a Slowly Decaying Potential*, in Asymptotic Analysis 142, Issue 4 (2025) (with D. Parra)
- *Semiclassical resolvent estimates for matrix Schrödinger operators and applications*, in Reviews in Mathematical Physics 37, Issue No. 05, Article No. 2450043 (2025) (with M. Assal and M. Zerzeri)
- *Continuum Limit for a Discrete Hodge-Dirac Operator on Square Lattices*, in Letters in Mathematical Physics 113, 45 (2023). (with D. Parra)
- *Spectral Asymptotics at Thresholds for a Dirac-type Operator on $\mathbb{Z}^2$*, in Journal of Functional Analysis. 284 Number 2 (2023). (with D. Parra and G. Raikov).
- *Eigenvalue and Resonance Asymptotics in Perturbed Periodically Twisted Tubes: Twisting Versus Bending*, in Annales Henri Poincaré. Number 21 (2020), 377-403. (with V. Bruneau, D. Parra and N. Popoff).
- *Band functions of Iwatsuka models: power-like and flat magnetic fields*, in Revue Roumaine de Mathématiques Pures et Appliquées. 2-3, 315-324, (2019). (with N. Popoff).
- *Spectrum of the Iwatsuka Hamiltonian at Thresholds*, in Journal of Mathematical Analysis and Applications, 460, Number 2, 516-545, (2018). (with N. Popoff).
- *Resonances near Thresholds in Slightly Twisted Waveguides*, in Proceedings of the American Mathematical Society. 146, 4801-4812, (2018). (with V. Bruneau and N. Popoff).
- *Threshold Singularities of the Spectral Shift Function for a Half-Plane Magnetic Hamiltonian,* in Journal of Functional Analysis, 274, Number 9, 2499-2531, (2018). (with V. Bruneau).
- *Eigenvalue Asymptotics for a Schrödinger Operator with Non-Constant Magnetic Field Along One Direction,* in Annales Henri Poincaré, 17, Number 7, (2016), 1713-1736.
- *Dirichlet and Neumann Eigenvalues for Half-Plane Magnetic Hamiltonians,* in Reviews in Mathematical Physics, 26, Number 2, (2014). (with V. Bruneau and G. Raikov)
- *Discrete spectrum of quantum Hall effect Hamiltonians II. Periodic edge potentials*, in Asymptotic Analysis, 79, Number 3-4, (2012), 325-345. (with G. Raikov)
- *Discrete spectrum of quantum Hall effect Hamiltonians I. Monotone edge potentials* in Journal of Spectral Theory, 1 (2011), 237–272. (with V. Bruneau and G. Raikov)

Other Scientific Publications

- *Spectral theory and mathematical physics*, STMP 2018, Santiago, Chile. Proceedings of the conference held at the Pontificia Universidad Católica de Chile (PUC). Latin American Mathematics Series. Springer, Cham. Editor together with Nicolas Popoff and Georgi Raikov

Grants and Fellowships

- Research Grant Fondecyt Regular "Spectral properties f continuous and discrete quantum Hamiltonians". 1241983. 2024-2027.
- Visiting Scholar program Université de Bordeaux "Physique-Mathématique Bordeaux-Santiago". February-June 2024.
- Research Grant Fondecyt Regular "Resonances and Spectral Shift Function for Magnetic Systems". 1201857. 2020-2023.

-PICS of CNRS "Opérateurs fibrés et laplacien magnétique". PICS-MAGLAP. 2018-2020.

-Research grant "Inserción de capital humano avanzado en la academia 2016", PAI79160144. 2017-2019.

-Research grant Fondecyt de Iniciación 2015 "Asymptotic Spectral Properties of Two-Dimensional Magnetic Quantum Hamiltonians", 11150865. 2015-2018.

-Research grant Inicio 43/2014 VRI-PUC. "Spectral properties of magnetic Schrödinger operators with translationally invariant magnetic fields", 2014-2015.

-Fellowship at Institut Mittag-Leffler to participate in the program "Hamiltonians in Magnetic Fields", Fall 2012.

-Postdoctoral Fellowship of FONDECYT. 2012-2013.

-Scholarship of the Milenium Nucleus of the Chilean Ministry of Planning/Ministry of Economy "Mathematical theory of quantum and classical magnetic systems", 2010-2011.

-Scholarship of CONICYT (Chilean Science Foundation) to participate in short courses abroad, January–February 2010.

-Scholarship of CONICYT (Chilean Science Foundation) for doctoral studies 2006-2009.

-Scholarship of the Science Faculty, Universidad de Chile. 2002-2005.

Postdoctoral Fellows

-Marouane Assal (PhD from University of Bordeaux), April 2021 to April 2022

-Daniel Parra (PhD from University of Lyon), April 2021 to April 2024

Research Visits

-Université de Bordeaux, France. June 2013, July 2016-2019, January 2023.

-Université d'Orléans, France. June 2022.

-Institut Henri Poincaré, France. May 2013.

-Institute Mittag-Leffler, Sweden. Sep-Dec. 2012.

-Ludwig-Maximilians-Universität München, Germany. April 2012.

-Centre Bernoulli Ecole Polytechnique Fédérale de Lausanne, Switzerland. Jan-Feb. 2010.

Organizing Committees

-Spectral Analysis for Quantum Hamiltonians, CIRM, Luminy, France, January 15-19, 2024.

-Second Chile-Japan Workshop on Mathematical Physics and Partial Differential Equations, Universidad de Santiago, Chile, September 25-28, 2023.

-International Conference Spectral Theory and Mathematical Physics 2018 (STMP 2018), Santiago de Chile, 3-7 December 2018.

-Chile-Japan Workshop on Mathematical Physics and Partial Differential Equations, Graduate School of Mathematical Sciences, University of Tokyo, September 20-22, 2018.

Talks in Conferences and Seminars

-Eigenvalue asymptotics for two dimensional magnetic Dirac operators. Séminaire Problèmes Spectraux en Physique Mathématique. Institut Henri Poincaré. Paris 2024.

-Eigenvalue asymptotics for two dimensional magnetic Dirac operators. Seminar Quantum Dynamcs. CPT. Marseille 2024.

-Eigenvalue Asymptotics near a flat band in presence of a slowly decaying potential. Bilbao-Bordeaux workshop on PDEs. Bilbao 2024.

-Eigenvalue Asymptotics for a Dirac operator on the network $\mathbb{Z}^n$. Second Chile-Japan Workshop on Mathematical Physics and Partial Differential Equations. Santiago 2024.

-Asymptotic behavior of the Spectral Shift Function for a discrete Dirac type operator in $\mathbb{Z}^2$. Conference The Dirac Equation. Bordeaux 2022.

-Asymptotic behavior of the Spectral Shift Function for a discrete Dirac type operator in $\mathbb{Z}^2$. Himeji conference in Partial differential equations 2022.

-Comportamiento asintótico de la Función de Corrimiento Espectral para un operador de tipo Dirac en $\mathbb{Z}^2$. Encuentro anual Sociedad de Matemática de Chile. Rancagua 2021

-Scattering resonances in deformed tubes. Twisting versus bending. Chile- Japan Workshop on Mathematical physics and partial differential equations. Tokyo 2018.

-Spectral asymptotics for a two-dimensional magnetic Schrödinger operator. Spectral theory and applications 2017. Krakow.

-Singularidades de la Función de Corrimiento Espectral para un Hamiltoniano magnético en el semiplano. SUMA 2016. Valparaiso.

-Threshold Singularities of the Spectral Shift Function for a Half-Plane Magnetic Hamiltonian. Séminaire de Physique Mathématique-EDP. Université Bordeaux I. Bordeaux 2016

-Singularidades de la Función de Corrimiento Espectral para un Hamiltoniano magnético en el semiplano. Seminario de teoría espectral. PUC. Santiago 2016.

-Singularidades de la Función de Corrimiento Espectral para un Hamiltoniano magnético en el semiplano. Coloquio de matemáticas, Santiago. 2016.

-Eigenvalue Asymptotics for a Schrödinger Operator with Non-Constant Magnetic Field Along One Direction. Young Researcher Symposium, ICMP15. Santiago 2015.

-Distribución asintótica de los valores propios de un operador de Schrödinger bidimensional con campo magnético variable en una dirección. Jornadas Matemáticas de la zona sur. Chillán 2015.

-Eigenvalue asymptotics for a perturbed Iwatsuka Hamiltonian. Seminario de Teoría Espectral. PUC Chile. Santiago 2015.

-2013. Correcciones por gradiente a la desigualdad de Lieb-Oxford. Coloquio Austral de Matemáticas, Universidad Austral. Valdivia 2014.

-Eigenvalue Asymptotics for Dirichlet and Neumann Half-Plane Magnetic Hamiltonians. The 6th Pacific RIM Conference on Mathematics. Sapporo 2013.

-Some Spectral Properties of a Translationally Invariant 2D Magnetic Hamiltonian. Young Seminar IHP, Paris. 2013.

-Discrete Spectrum of an Iwatsuka Hamiltonian with decaying Electric Potential. Séminaire de Physique Mathématique-EDP. Université de Bordeaux I. Bordeaux 2013.

-Comportamiento asintótico para los valores propios de un Hamiltoniano magnético en el semiplano bajo condiciones de Dirichlet y Neumman. Seminario de Teoría Espectral. PUC Chile. Santiago 2013.

-Eigenvalue Asymptotics for Dirichlet and Neumann Half-Plane Magnetic Hamiltonians. Institut Mittag-Leffler. Stockholm 2012.

-Threshold Singularities of the Spectral Shift Function for a Half-Plane Magnetic Hamiltonian. Young Researcher Symposium, ICMP12. Aalborg 2012.

-Propiedades asintóticas del espectro discreto de un Hamiltoniano magnético. Coloquio Austral de Matemáticas, Universidad Austral. Valdivia 2012.

-Threshold Singularities of the Spectral Shift Function for a Half-Plane Magnetic Hamiltonian. Oberseminar Analysis, LMU. Munich 2012.

-Propiedades espectrales de un hamiltoniano cuántico con potencial periódico. Encuentro anual de la Sociedad Matemática de Chile. Los Andes 2011.

-Discrete spectrum for a quantum Hall effect Hamiltonian. Conference Spectral Days. Santiago 2010.

-Discrete spectrum for a quantum Hall effect Hamiltonian. Centre Bernoulli École Polytechnique Fédérale de Lausanne. 2010.

Teaching Experience: Graduate Curses

-Topology and Geometry I, regular curse, Universidad de Santiago de Chile. 2020 and 2023

-Spectral Theory II, tutorial curse, Universidad de Santiago de Chile. 2021

-Spectral Theory, optional curse, Universidad de Santiago de Chile. 2021

-Analysis I, regular curse, Universidad de Santiago de Chile. 2018 and 2019

Teaching Experience: Undergraduate Curses

-Differential Geometry. Universidad de Santiago de Chile. 2022

-Measure Theory. Universidad de Santiago de Chile. 2022

-Calculus II. Universidad de Santiago de Chile. 2021

-Functional Analysis. Universidad de Santiago de Chile. 2021

-Measure Theory. Universidad de Santiago de Chile. 2019

-Functional Analysis. Universidad de Santiago de Chile. 2018

-Calculus II. Universidad de Santiago de Chile. 2017

-Calculus I. Universidad de Santiago de Chile. 2017

-Calculus I. P. Universidad Católica de Chile. 2016

-Calculus II. P. Universidad Católica de Chile. 2016

-Calculus III. P. Universidad Católica de Chile. 2016

-Calculus I. P. Universidad Católica de Chile. 2015

-Calculus II. P. Universidad Católica de Chile. 2015

-Calculus I. Universidad Técnica Federico Santa María. 2015

-Calculus I. Universidad Técnica Federico Santa María. 2014

-Calculus II. P. Universidad Católica de Chile. 2014

-Calculus III. P. Universidad Católica de Chile. 2014

-Calculus II. Universidad Técnica Federico Santa María. 2014

-Mathematics I. Universidad de Chile 2014

-Mathematics I. Universidad de Chile 2012

Administrative experience

-Head of the master program DMCC, Universidad de Santiago de Chile. 2022 to present.

-Deputy director of research. DMCC, Universidad de Santiago de Chile. april 2022 to december 2023.

-Coordinator of the curse Calculus 2. Faculty of Engineering, Universidad de Santiago de Chile. 2019-2022.

Others

-Member of the Mathematical Society of Chile