Aingeru Fernández Bertolin

Personal and professional data

Personal data

Place and Date of Birth: Barakaldo, Spain | September 18, 1988.
Gender: Male.
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Professional data

Position: Associate Professor (Profesor Ayudante Doctor) since November 2017.
Center: Facultad de Ciencia y Tecnología, Universidad del País Vasco / Euskal Herriko Unibertsitatea (UPV/EHU).
Department: Matemáticas.
Postal address: Departamento de Matemáticas, UPV/EHU, Apartado 644, 48080 Bilbao.

Education

- Ph. D. in Matheamtics, UPV/EHU in December 2015.
  Thesis: "Uncertainty Principles and Carleman Inequalities"
  Mention: Cum Laude y Doctor International.
  Supervisor: Prof. Luis Vega González
  Thesis committee: Prof. Luis Escauriaza Zubiria, Prof. Óscar Ciaurri Ramírez, Prof Philippe Jaming
  Referees: Prof. Gustavo Ponce, Prof. Eugenia Malinnikova

- Master in Mathematical Research, UPV/EHU in October 2012.
  Thesis: "El principio de incertidumbre de Hardy y la ecuación de Schrödinger".
  Supervisor: Prof. Luis Vega González

- Bachelor in Mathematics, UPV/EHU in June 2011.

Former work experience

- Postdoctoral Researcher (October 2016 - November 2017) at the Department of Mathematics of Université de Bordeaux

- Assistant Professor (February 2016 - September 2016) at the Department of Applied Economics of UPV/EHU

- Predoctoral Researcher (January 2012 - December 2015) at the Department of Mathematics of UPV/EHU

Publications

1. *Una mirada a la mecánica cuántica*, book chapter.

2. *Discrete Uncertainty Principles and Virial Identities.* Appl. and Comput. Harm. Anal. no. 40 (2) (2016) 229–259.

3. *Uniqueness properties for Discrete equations and Carleman estimates.* (with L. Vega), J. of Funct. Anal. 272 no. 11 (2017), 4853–4869.

4. *From Heisenberg uniqueness pairs to properties of the Helmholtz and Laplace equations.* (with K. Gröchenig and Ph. Jaming). J. Math. Anal. Appl. 469 (2019), no. 1, 202–219.

5. *Hardy's uncertainty principle and unique continuation property for stochastic heat equations.* (with J. Zhong) ESAIM: Control Optim. Calc. Var. no. 26 (2020), Paper No. 9, 22pp.

6. *A discrete Hardy's Uncertainty Principle and discrete evolutions.* J. Anal. Math. 137 (2019), no.2, 507–528.

7. *Convexity Properties of Discrete Schrödinger evolutions and Hardy's Uncertainty Principle.* J. Evol. Equ. 20 (2020), no. 1, 257–278.

8. *Uniqueness for solutions of the Schrödinger equation on trees.* (with Ph. Jaming) Ann. Mat. Pura Appl. (4) 199 (2020) no.2, 681–708.

9. *An uncertainty principle for solutions of the Schrödinger equation on H-type groups.* (with Ph. Jaming and S. Pérez-Esteva) J. Aust. Math. Soc. 111 (2021), no. 1, 1–16.

10. *Dynamical versions of Hardy's uncertainty principle: a survey.* (with E. Malinnikova) Bull. Amer. Math. Soc. (N.S.) 58 (2021), no. 3, 357–375.

11. *Hardy uniqueness principle for the linear Schrödinger equation on quantum regular trees.* (with A. Greecu and L. Ignat). Submitted

12. *Discrete Carleman estimates and three balls inequalities.* (with L. Roncal, A. Rüland and D. Stan). Submitted

Communications

Oral communications at conferences

1. *Discrete Uncertainty Principles and Schrödinger evolutions.* EARCO 2014, May 2014. Girona, Spain.

2. *The Hardy Uncertainty Principle revisited.* Workshop on Harmonic Analysis & PDEs, July 2015. Bilbao, Spain.

3. *Discrete Hardy Uncertainty Principle and Schrödinger evolutions.* Journées du GDR AFHP, October 2016. Toulouse, France.

4. *Heisenberg Uniqueness Pairs and Unique Continuation for Helmholtz equation.* IV Congreso Jovenes Investigadores RSME, September 2017. Valencia, Spain.

5. *On unique continuation for solutions of the Schrödinger equation on trees.* Journées du GDR AFHP, October 2017. Bordeaux, France.

6. *Unique continuation for the Schrödinger equation on homogeneous trees.* Ninth Itinerant Workshop in PDEs, January 2018. Bordeaux, France.

7. *Hardy-ren ziurgabetasunaren printzipio diskretua.* III. Euskal Matematikarien topaketa, July 2018. Eibar, Spain

8. *Heisenberg Uniqueness Pairs and Unique Continuation for the Helmholtz equation.* XV Encuentro de la Red de Análisis Funcional y Aplicaciones en memoria del profesor Bernardo Cascales, March 2019. Bilbao, Spain.

9. *The Hardy Uncertainty Principle and uniqueness for Schrödinger evolutions.* Ninth Workshop for Young Reserachers in Mathematics, June 2019. Bucharest, Romania.

10. *Three balls inequalities for discrete Schrödinger operators* 8th European Congress of Mathematics, June 2021, Portoroz, Slovenia (via zoom).

Written communications at conferences

1. *Determining point distributions from their projections.* (with K. Gröchenig and Ph. Jaming), short paper in Proc. of SAMPTA 2017.

2. *The Hardy uncertainty principle on homogeneous trees.* (poster) October 2017. Marseille, France.

Talks in other events and seminars

1. *El doctorado en Álgebra, Análisis Matemático y Geometría y Topología: Algunas experiencias.* (with O. Garaialde, V. Manero and I. Mozo). IV Jornadas de Investigación de la Facultad de Ciencia y Tecnonología, Februrary 2014. UPV/EHU, Spain.

2. *An introduction to Uncertainty Principles.* April 2015. UPV/EHU, Spain.

3. *Discrete Uncertainty Principles and Schrödinger evolutions.* May 2015, U. of Helsinki, Finland.

4. *The Hardy Uncertainty Principle in a discrete setting.* December 2015. MSRI, Berkeley, CA, United States.

5. *Discrete Hardy Uncertainty Principle and Schrödinger evolutions.* June 2016 U. of Bordeaux, France.

6. *Discrete Hardy Uncertainty Principle and Schrödinger evolutions.* November 2016 NTNU, Trondheim, Norway.

7. *Discrete Hardy Uncertainty Principle and Schrödinger evolutions.* December 2016 U. of Vienna, Austria.

8. *Heisenberg Uniqueness Pairs and Unique Continuation for Helmholtz equation.* April 2017, U. of Bordeaux, France.

9. *Heisenberg Uniqueness Pairs and Unique Continuation for Helmholtz equation.* November 2017, UPV/EHU, Spain.

10. *Heisenberg Uniqueness Pairs and Unique Continuation for Helmholtz equation.* November 2017 U. de Zaragoza, Spain.

11. *Unique continuation for the Schrödinger equation on homogeneous trees.* January 2018, U. of Lille, France.

12. *Mathematical Control Theory of Evolution Equations* (with J. Apraiz). VI Jornadas de Investigación de la Facultad de Ciencia y Tecnonología, March 2018. UPV/EHU, Spain.

13. *Heisenberg Uniqueness Pairs and Unique continuation for Helmholtz equation.* June 2018, IMAR, Bucharest, Romania.

14. *Dynamic interpretations of the uncertainty principle.* October 2019, U. de Cantabria, Santander, Spain.

15. *Dynamic versions of Hardy's Uncertainty principle.* February 2020. Stanford University, USA.

16. *Three balls inequalities for discrete Schrödinger operators.* April 2020. UPV/EHU, Spain. (online)

17. *Three balls inequalities for discrete Schrödinger operators.* June 2020. Univ. of Bordeaux, France. (online)

Written communication in other events

1. *Mathematical Analysis: Mathematical Physics* (poster with all members of the research group). V Jornadas de Investigación de la Facultad de Ciencia y Tecnonología, April 2016. UPV/EHU, Spain.

2. *Mathematical Analysis and Applications* (poster with all members of the research group). VI Jornadas de Investigación de la Facultad de Ciencia y Tecnonología, March 2018. UPV/EHU, Spain.

Research Stays

- 21-26 June 2015, 23-30 November 2016 and 20-25 March 2017. NTNU, Trondheim, Spain. Visit to Eugenia Malinnikova and Yuri Lyubarskii.

- August-December 2015. MSRI, Berkeley, CA, United States. Member of the research program: New Challgenes in PDE: Deterministic Dynamics and Randomness in High and Infinite Dimensional Systems.

- 10-21 July 2018. Park City Mathematics Institute. Member of the research program: PCMI 2018.

- 15 October - 2 November 2018. Institute for Advanced Studies, Princeton, NJ, United States. Visit to Eugenia Malinnikova.
- 2 February - 15 February 2020. Stanford University, CA, United States. Visit to Eugenia Malinnikova.

Scholarships

- 2011 Collaboration Scholarship (with L. Escauriaza) at UPV/EHU, Spain.
- 2012/2015 Basque Government Predoctoral Scholarship at UPV/EHU, Spain.
- 2015 Basque Government Scholarship for short stays in international research centers at MSRI, Berkeley CA, United States.

Participation in research projects

- Ecuaciones de Evolución, Análisis de Fourier y Análisis Numérico (MTM2011-24054), of the Spanish Government. PI: L. Vega, 2012/2015.
- Mathematical Physics, Mathematical Analysis and Partial Differential Equations, and Numerical Analysis (IT641-13), of the Basque Government. PI: Luis Vega, 2013/2018.
- Análisis teórico y numérico de ecuaciones de evolución (MTM2014-53145-P), of the Spanish Government, PI1: L. Vega, PI2: C. Cuesta, 2015/2018.
- Harmonic Analysis and Differential Equations: New Challenges (HADE), 2014 ERC Advanced Grant. PI: L. Vega, 2015/2019.
- Partial Differential Equations Difference Equations and Unique Continuation (PDEUC), of IdEx Post-Doctoral Program. PI: A. Fernández-Bertolin 2016/2017.
- Interplays Between Harmonic Analysis and Inverse Problems (IHAIP PGC2018-094528-B-I00), of the Spanish Government. PI1: P. Caro, PI2: I. Parissis, 2019/2021.
- Ecuaciones de Evolución, Análisis de Fourier y Análisis Numérico (IT1247-19), of the Basque Government. PI: Carlos Pérez Moreno, 2019/2021.

Organization of events

- Member of the organizing committee of the BCAM meeting on sampling, uncertainty principles, and combinatorial methods in harmonic analysis. January 2018, Bilbao, Spain.
- Member of the organizing committee of the parallel session "Análisis armónico y teoría de operadores" in the V Congreso de Jóvenes investigadores de la RSME. January 2020, Castellón, Spain.
- Member of the organizing committee of the workshop Harmonic Analysis and Differential equations: new questions and challenges. July 2021, Bilbao, Spain. (postponed due to covid19).
- Member of the organizing committee of 3rd Bilbao meeting on Analysis and PDEs. June 2020, Bilbao, Spain. (postponed due to covid19).
- Member of the organizing committee of the workshop Mathematics and Machine Learning: new interplays and opportunities. September 2020, Bilbao, Spain. (postponed due to covid19).

Given courses

- Unique continuation and uncertainty principles. (with D. Stan). November 2018. Bilbao, Spain (10 hours).

Received courses

- *The Mellin Transform and Its Applications* (by G. Pagnini). December 2013. Bilbao, Spain (10 hours).
- *Singularity Theory as a tool in Applied Mathematics* (by D. Chillingworth). January 2014. Bilbao, Spain (10 hours).
- *Introduction to Dispersive equations* (by L. Vega). March 2015, Bilbao, Spain (14 hours).
- *On Singularity Formation in PDE's: A constructive approach* (by P. Raphäel). Fall 2015, U. of California at Berkeley.
- *Introduction to the mathematical theory of the Navier-Stokes equations* (by G. Seregin). May 2016, Bilbao, Spain (8 hours).

- *Introduction to Machine Learning* (by A. Pérez, E. Irurozki and C. E. Hernández). October 2019, Bilbao, Spain (10 hours).

Further information

- IdEx prize for young researches. Award received at Journées du GDR AFHP, Bordeaux, France, October 9-11, 2017.
- Extraordinary prize of the degree given by UPV/EHU
- Organizer of the BCAM-UPV/EHU APDE Seminar. Fall 2019 – Spring 2020.
- Webmaster of the website (`http://www.ehu.es/amaplicado`) and coordinator of the
  Análisis Matemático y Aplicaciones research group seminar in the Department of Mathematics of the UPV/EHU
- One of the coordinators of the
  Math Phd Seminar (`https://sites.google.com/site/seminarioupvehuen/`) of the Department of Mathematics of the UPV/EHU, 2014/2015.
- Voluntary in the exposition RSME-Imaginary held in Bilbao, Spain in May 2011
- Voluntary in the exposition Con A de astrónomas, held in Bilbao, Spain in October and November 2011.
- Voluntary in the XVIII Semana de la Ciencia, Tecnología e Innovación, held in Bilbao, Spain, in November 2018.
- B2 English Level (June 2013).
- C1 Basque Level (July 2013).
- TOPTULTE certificate of the UPV/EHU to teach in English. July 2018.