

# Francisco Javier Correa Santander

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Place of birth: Arica, Chile  
Date of Birth: May 24, 1983  
Nationality: Chilean  
Marital Status: Single  
Languages: Spanish, English, German (A1)

## Education

- 2005 B.Sc. in Applied Physics, Universidad de Santiago de Chile.  
2009 Ph.D. in Physics, Universidad de Santiago de Chile.  
Thesis: “Hidden supersymmetry”, Advisor: M. S. Plyushchay.

## Positions held

- 2009 - 2011 Postdoctoral Research Associate, Centro de Estudios Científicos, Chile.  
2011 - 2014 Junior Researcher, Centro de Estudios Científicos, Chile.  
2014 - 2016 Humboldt Postdoctoral Researcher, Leibniz Universität Hannover, Germany.  
2016 - to date Honorary Visiting Professor, Department of Mathematics, City, University of London, United Kingdom.  
2016 - to date Associate Professor, Universidad Austral de Chile, Chile.

## Current projects funded by national agencies

- 2021 - 2023 Fondecyt Regular 1211356. “*Modern Challenges In Quantum Physics, Symmetries And Integrability*”. Principal Investigator.

## Past projects

- 2017 - 2020 Fondecyt Regular 1171475. “*New Approaches in Integrable Systems and Quantum Symmetries with Applications to Physics*”. Principal Investigator.  
2017 - 2018 Return Fellowship, “*Quantum symmetries of many-particle systems*”, Alexander Von Humboldt Foundation, Germany. Principal Investigator.

- 2015 - Project I+D+I “Retos Investigación”; “*New challenges in supersymmetric and superintegrable systems*”, MINECO, Spain. Associate researcher.  
2018
- 2014 Humboldt Research Fellowship for Postdoctoral Researchers, Humboldt Foundation, Germany. Principal Investigator.
- 2012 Initiation into research III21651, Fondecyt. Principal Investigator.
- 2011 Integration of Advanced Human Capital in Academia grant 79112034, Conicyt.
- 2009 Postdoctoral grant 3100123, Fondecyt. Principal Investigator.
- 2009 - Doctoral grant; Conference participation support grant; Research visit grant; Support grant for thesis realization; Conicyt.  
2005

### Honors & awards

- 2019 Teaching quality award, Universidad Austral de Chile
- 2019 Becas Santander Iberoamérica for professor and young researchers
- 2018 Teaching quality award, Universidad Austral de Chile
- 2016 Lindau Nobel Laureate Meetings Alumni
- 2014- Humboldt Fellow Alumni  
to date

### Professional Service

Journal referee for

Journal of High Energy Physics  
Physical Review A, Physical Review D, Physical Review E  
Annals of Physics  
European Physical Journal C  
The European Physical Journal Plus  
Journal of Nonlinear Mathematical Physics  
New Journal of Physics  
Zeitschrift für Naturforschung A,  
Mathematical Methods in the Applied Sciences  
Modern Physics Letters A  
Canadian Journal of Physics

Reviewer of Fondecyt Regular Grants ANID (Chile) and Dutch Research Council NWO (Netherlands).

### Editorial Service

- 2020 *Virtual seminar series on Pseudo-Hermitian Hamiltonians in Quantum Physics (PTSeminar) 2020*, Editors: Carl Bender, Francisco Correa, Andreas Fring.  
Journal of Physics: Conference Series, IOP Publishing.

### Publications

44 publications WoS + 4 refereed international proceedings

## International research visits: +70 weeks stays abroad

- 2019 Universidad de Valladolid, Spain ( October - November 2019, 8 weeks ).
- 2019 Doppler Institute in Department of Theoretical Physics of the Nuclear Physics Institute, Rez, Czech Republic ( September 2019, 1 week ).
- 2019 University of Queensland, Australia ( July - August 2019, 2 weeks ).
- 2018 Leibniz Universität Hannover, Germany ( August 2018, 1 weeks ).
- 2018 City, University of London, United Kingdom ( July 2018, 2 weeks ).
- 2016 Yerevan State University, Armenia ( August 2016, 4 weeks ).
- 2016 Doppler Institute in Department of Theoretical Physics of the Nuclear Physics Institute, Rez, Czech Republic ( July-August 2013, 5 weeks ).
- 2016 City University London, United Kingdom ( April-May 2016, August 2016, 5 weeks ).
- 2014 Universidad de Salamanca, Spain ( October 2014, 1 week ).
- 2013 Leibniz Universität Hannover, Germany ( June 2013, 2 weeks ).
- 2013 Doppler Institute in Department of Theoretical Physics of the Nuclear Physics Institute, Rez, Czech Republic ( July-August 2013, 2 weeks ).
- 2012 Doppler Institute in Department of Theoretical Physics of the Nuclear Physics Institute, Rez, Czech Republic ( June-July 2012, 2 weeks ).
- 2012 University of California, Davis, USA ( November 2012, 1 week ).
- 2012 University of Connecticut, USA ( October-November 2012, 7 weeks ).
- 2011 Université de Mons, Belgium ( April 2011, 1 week ).
- 2011 Universidad de Buenos Aires, Argentina ( April 2011, 1 week ).
- 2010 Cinvestav, Mexico ( June 2010, 1 week ).
- 2008 University of Connecticut, USA ( August-December 2008, 16 weeks ).
- 2007 Universidad de Valladolid, Spain ( June-July 2008, 8 weeks ).

## Conference and Workshop presentations

- 2021 “*Complex BPS Skyrmions with real energy*”, Non-Hermitian Physics, ICTS, Online.
- 2020 “*Complex and nonlocal solitons in integrable systems*”, XXII Simposio Chileno de Física (SOCHIFD), Online.
- 2019 “*Nonlocal gauge equivalence among integrable systems*”, 60 Birthday Mikhail Fest, Universidad de Santiago de Chile, Santiago, Chile.
- 2019 “*Complex and non-local solitons, integrability and quantum systems*”, Analytic and algebraic methods in physics XVI, Czech Technical University, Prague, Czech Republic.
- 2019 “*Complex and non-local solitons, integrability and quantum systems*”, Supersymmetries and Quantum Symmetries SQS'19, Yerevan, Armenia.
- 2019 “*PT-deformation of Calogero models*”, The 2nd JNMP Conference on Nonlinear Mathematical Physics, Universidad de Santiago de Chile, Santiago, Chile.
- 2018 “*PT-deformation of Calogero-Sutherland models*”, Supersymmetry in Integrable Systems - SIS'18, International Workshop, Dubna, Russia.
- 2018 “*PT-deformation of Calogero-Sutherland models*”, Non-Hermitian Physics, “*Pseudo-Hermitian Hamiltonians in Quantum Physics*” (PHHQ) XVIII, Bengaluru, India.

- 2018 “*PT*-deformation of Calogero-Sutherland models”, VI Workshop on Advanced Topics on High-Energy Physics and Gravitation, “The part and the whole”, Afunahue, Chile.
- 2017 “*PT* deformations of angular Calogero models”, XXX Jornada de Matemática de la Zona Sur, Universidad Católica de la Santísima Concepción.
- 2017 “Regularized degenerate multi-solitons”, V Workshop on Advanced Topics on High-Energy Physics and Gravitation, “The part and the whole”, Afunahue, Chile.
- 2016 “Regularized degenerate multi-solitons”, XX Chilean Symposium of Physics. Santiago, Chile
- 2016 “Regularized degenerate multi-solitons”, Analytic and algebraic methods in physics AAMP13, Prague, Czech Republic.
- 2016 “Spherical Calogero model with oscillator/Coulomb potential”, XXIVth International Conference on Integrable Systems and Quantum symmetries, Prague, Czech Republic.
- 2015 “Hairy black holes and its microscopic entropy”, Humboldt Kolleg “Open Problems in Theoretical Physics: the Issue of Quantum Spacetime”, Corfu Greece.
- 2015 “Solitonic defects in quantum periodic systems”, 27th Indian-Summer School of Physics on Graphene. The bridge between low and high energy physics, Prague, Czech Republic.
- 2015 “Solitonic defects in quantum periodic systems”, Supersymmetry in Integrable Systems - SIS’15, Yerevan, Armenia.
- 2015 “*PT*-symmetric invisible defects and confluent Darboux-Crum transformations”, Supersymmetries & Quantum Symmetries - SQS’2015, Dubna, Russia.
- 2014 “Exact hairy black hole solutions in different models of gravity”, Recent theoretical developments in gravity and cosmology, Hannover, Germany.
- 2014 “Nonlinear supersymmetry in the quantum Calogero model”, “Advanced topics in high energy physics and gravitation”, Afunahue, Chile.
- 2013 “Spectral singularities in *PT*-symmetric periodic finite-gap systems”, Pseudo-Hermitian Hamiltonians in Quantum Physics, Istanbul, Turkey.
- 2013 “Solitons and the microscopic entropy of hairy black holes in three dimensions”, (Invited talk) ”Advanced Topics in High Energy Physics”, Antofagasta, Chile.
- 2013 “Rotating hairy black hole and its microscopic entropy in three spacetime dimensions”, ”Advanced topics in high energy physics and gravitation”, Afunahue, Chile.
- 2012 “Hairy black hole entropy and the role of solitons in three dimensions”, (Invited talk) Workshop on Higher Spin Gravities and Related Topics, Mons, Belgium.
- 2012 “Hairy black hole entropy and the role of solitons in three dimensions”, Workshop gravUACH, Valdivia, Chile.
- 2009 “Supersymmetry in Bogoliubov-De Gennes systems”, Workshop in Fundamental Symmetries and Beyond, Afunahue, Chile.
- 2008 “Nonlinear Supersymmetries”, International Workshop Pseudo-Hermitian Hamiltonians in Quantum Physics VII, Benasque, Spain.
- 2007 “Hidden nonlinear supersymmetry in Poschl-Teller and Lamé systems”, 5th International Symposium In Quantum Theory and Symmetries, Valladolid, Spain.
- 2007 “Hidden nonlinear supersymmetry of finite-gap Lamé equation”, Workshop in Fundamentals Physics and Beyond, Santiago, Chile.

## Invited Seminars

Universidad de la Plata, Universidad de Buenos Aires (Argentina), Yerevan State University (Armenia), University of Queensland (Australia), Vienna University of Technology (Austria), Universite de Mons (Belgium), Centro de Estudios Científicos, Pontificia Universidad Católica de Chile, Pontificia Universidad Católica de Valparaíso, Universidad Austral de Chile, Universidad de Chile, Universidad de Concepción, Universidad de Santiago de Chile, Universidad de Talca, Universidad del Bío-Bío (Chile), Doppler Institute in Department of Theoretical Physics of the Nuclear Physics Institute (Czech Republic), Leibniz Universität Hannover (Germany), CINVESTAV (Mexico), Universidad Complutense de Madrid, Universidad de Salamanca, Universidad de Valladolid (Spain), University of California Davis, University of Connecticut (USA).

## Organization service

- 2020 -  
to date Co-organizer “(virtual) Pseudo-Hermitian Hamiltonians in Quantum Physics”, [vphhqp.com](http://vphhqp.com), 2020.
- 2020 Main organizer “XXII Pseudo-Hermitian Hamiltonians in Quantum Physics”, to be held in Chile, 2026.
- 2017 -  
to date Organization Committee “VII Workshop on Advanced Topics on High-Energy Physics and Gravitation”, Afunallhue, Chile.
- 2018 Organization Committee “7th International Workshop on New Challenges in Quantum Mechanics: Integrability and Supersymmetry”, Benasque, Spain, September 2019.
- 2018 Organization Committee “VII Workshop on Advanced Topics on High-Energy Physics and Gravitation”, Afunallhue, Chile, January 2019.
- 2018 Organization Committee “XXXI Jornada de Matemática de la Zona Sur”, Universidad Austral de Chile, 2018.
- 2018 Scientific Committee member and Session Organizer “Mathematical Physics “XXXI Jornada de Matemática de la Zona Sur”, Universidad Austral de Chile, 2018.
- 2017 Organization Committee “Escuela de Verano en Física Teórica UACH 2018”, Universidad Austral de Chile.
- 2017 Organizer “Workshop on Integrable systems, solitons and symmetries”, Instituto de Ciencias Físicas y Matemáticas, Universidad Austral de Chile, October 2017.
- 2017 Organization Committee “VI Workshop on Advanced Topics on High-Energy Physics and Gravitation”, Afunallhue, Chile, January 2018.
- 2013 Journal Club Organizer, Centro de Estudios Científicos (CECs).

## Teaching experience: undergraduate courses

- 2017 -  
2021 Taught courses at Universidad Austral de Chile
- Física Básica *FSCA 025 & FSCA 030*
- Mecánica I *FSCA 031*
- Mecánica Analítica *FSCA 153*
- Mecánica Cuántica I *FSCA 173*
- Mecánica Cuántica II *FSCA 205*
- Relatividad Especial *FSCA 220*
- Iniciación a la Investigación en Física *FSCA 180*
- Seminario de Investigación *FSCA 296 & FSCA 297*
- Taller de Ciencias Integradas *FSCA 130*
- Orientación a estudios de Licenciatura en Ciencias II *LICI 001*
- 2007 “Differential Equations for Physicists”, Universidad de Santiago, Chile.
- 2008-  
2003 Teaching Assistant in several courses in graduate and undergraduate programs at the Universidad de Santiago, Chile

## Teaching experience: graduate courses

- 2014 Lecturer of the course “*Introduction to Integrable Systems*”, held at the summer school on “Gravity and Integrable Systems” from 13th - 15th January 2014, Universidad Austral de Chile.

## Thesis

- 2021 Octavio Quintana, BSc degree in Physics, Universidad Austral de Chile.
- 2020 Thesis director of Francisca Carrillo Morales, “*Symmetries and Integrability of the Quantum Calogero Model*”, BSc degree in physics, Universidad Austral de Chile.
- 2020 Committee member of Dr. Luis Inzunza. “*Supersimetrías escondidas y (Super) álgebras no lineales*”. Thesis director: Dr. Mikhail Plyushchay. Universidad de Santiago de Chile.
- 2021 Committee member of MSc. Alicia Castro. “*Dinámica de burbujas fluxónicas bajo fuerzas espaciotemporales*”. Thesis director: Dr. Mónica Garcia. Pontificia Universidad Católica de Valparaiso.

## Professional Development

- 2020 Universidad Virtual: “Roles y Funciones de la Tutoría en el Entorno de Aprendizaje Virtual”.
- 2018 Universidad Austral, “Curso de Formación en Docencia Universitaria”.

## Academic and Administrative service

- 2021 Plan Desarrollo de Talentos, Ministerio de Ciencias, Chile.
- 2020 Board member “*Analysis and academic proposal Bachelor in Science with mention in Physics*”, Instituto de Ciencias Físicas y Matemáticas, Universidad Austral de Chile.
- 2018 Board member “*Comité de Análisis Curricular (CAC) para la carrera de Licenciatura en Ciencias, con mención Matemática y Física*”, Facultad de Ciencias, Universidad Austral de Chile.
- 2017 Board member “*Diagnostic report of academic proposals in Sciences and Pedagogies*”, Facultad de Ciencias, Universidad Austral de Chile.
- 2017 Board member “*Analysis and academic proposal Bachelor in Science with mention in Physics*”, Instituto de Ciencias Físicas y Matemáticas, Universidad Austral de Chile.
- 2017 Board member “*Development plan 2017-2020*”, Instituto de Ciencias Físicas y Matemáticas, Universidad Austral de Chile.

## Public engagement & Outreach

### Public engagement projects

- 2018 “*Física en acción: experimentando en tu colegio y primera jornada estudiantil de física en la Región de los Ríos*”. Main Director. Proyectos de Vinculación 2018, Dirección de Vinculación con el Medio, Universidad Austral de Chile.  
Physics outreach project where approximately 700 students have participated.  
<https://labsfísica.wixsite.com/fisicaenaccion>

### Physics Olimpiads and related events

- 2021 “*XX Olimpiadas de Regionales de Física*”, Co-organizer, Región de los Ríos.
- 2018 “*Training workshops in theoretical and experimental physics*”, Co-organizer Región de los Ríos.
- 2018 “*XVIII Olimpiadas de Regionales de Física*”, Co-organizer Región de los Ríos.
- 2018 “*Olimpiada Chilena de Física*”, Local Co-organizer. Students from the Región de los Ríos obtained a gold (best overall score) and two bronze medals.

### Scientific expositions in schools

- 2018 “*Experimentando con la Física*”, Liceo Vicente Pérez Rosales, Río Bueno.
- 2018 “*Experimentando con la Física*”, Liceo Polivalente Camilo Henríquez, Lanco

### Outreach talks and other activities

- 2019 Outreach talk: “*Un viaje multisensorial por el Universo*”, Astronomy Day, Universidad Austral de Chile.
- 2018 Outreach talk: “*Nebulosas*”, Escuela Felipe Barthou Corbeaux, Lanco.
- 2018 Outreach talk: “*Explorando el Universo*”, Liceo Vicente Pérez Rosales, Río Bueno.
- 2018 Outreach talk: “*Nebulosas*”, Astronomy Day, Colegio Proyecto Futuro Paillaco, Par EXPLORA Región de los Ríos. .
- 2017 Outreach talk: “*Agujeros negros: Escuchando lo invisible*”, Opening invited talk, scientific school meeting “*Helveciencia Austral*”, Universidad Austral de Chile.

- 2017 Outreach talk: “¿Qué son los solitones?”, Mathematical workshop, Universidad Austral de Chile.
- 2017 Outreach talk: “*Sinfonía Cósmica: Agujeros Negros y Melodías del Universo*”, Ciclo de Charlas Facultad de Ciencias 2017, Universidad Austral de Chile.
- 2017 Research school project Colegio Helvecia.
- 2017 Outreach talk: “*Gravitación y agujeros negros*”, Seminars series: Ciencias para Tod@s, Instituto de Ciencias Físicas y Matemáticas, Universidad Austral de Chile.
- 2014 Outreach talk: “*Gravitación y agujeros negros*”, Liceo Alexander Fleming A-67, Santiago. Supported by the project Initiation into research 11121651, Fondecyt.
- 2014 - Coordination of guided visits in the physics area at Centro de Estudios Científicos.  
2009 More than 20 presentations and scientific talks focused for schools and visitors.
- 2013 Ciclo de Tertulias Científicas, Centro de Estudios Científicos. Outreach talk: “*El extraño mundo microscópico: Los electrones y su doble personalidad*”.
- 2012 “*Encuentro de Jóvenes en la Ciencia: Chile Va!*”, Centro de Estudios Científicos. Scientific presentation about the physics and impact of the Foucault pendulum for 120 students from Región de Los Ríos.
- 2011 “*Olimpiadas Regionales de Física*”, Universidad Austral de Chile. Scientific presentation for students.
- 2010 Coordination and tutoring of the physics group in the outreach program “*Científicos por un mes*”, Centro de Estudios Científicos.
- 2009 “*1000 Científicos 1000 aulas*” (Explora CONICYT). Outreach talk, Instituto Alemán “Carlos Anwandter”, Valdivia, Chile.

## References

Prof. Gerald Dunne

Physics Department  
University of Connecticut  
United States

Prof. Andreas Fring

Department of Mathematics  
City, University of London  
United Kingdom

Prof. Olaf Lechtenfeld

Institut für Theoretische Physik  
Leibniz Universität Hannover  
Germany

Prof. Mikhail Plyushchay

Departamento de Física  
Universidad de Santiago y de Chile  
Chile

Prof. Jorge Zanelli

Centro de Estudios Científicos  
Chile