

J. Pablo Franco

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EDUCATION

- 2017 - 2021 **PhD in Decision, Risk and Financial Sciences**,
The University of Melbourne, Melbourne, Australia.
- 2014 - 2016 **Research Master's degree in Cognitive and Clinical Neuroscience - Neuroeconomics Track (Cum Laude)**,
Maastricht University, Maastricht, The Netherlands.
- 2007 - 2012 **Bachelor's degree in Mathematics**,
Universidad de Los Andes, Bogotá, Colombia.
- 2006 - 2012 **Bachelor's degree in Economics**,
Universidad de Los Andes, Bogotá, Colombia.

PUBLICATIONS

PEER-REVIEWED

- 2021 **Generic properties of a computational task predict human effort and performance**,
Franco, J. P., Yadav, N., Bossaerts, P., Murawski C., *Journal of Mathematical Psychology*,
<https://doi.org/10.1016/j.jmp.2021.102592>.
- 2017 **Asset Price Bubbles: Existence, Persistence and Migration**,
Gomez-Gonzalez, J. E., Ojeda-Joya, J. N., **Franco, J. P.** and Torres, J. E., *South African Journal of Economics*, DOI: 10.1111/saje.12108.

PREPRINTS

- 2020 **Task-independent metrics of computational hardness predict performance of human problem-solving**,
Franco, J. P., Doroc, K., Yadav, N., Bossaerts, P., Murawski C., *BioRxiv*, DOI: 2021.04.25.441300.

BOOK CHAPTERS

- 2015 **Burbujas en precios de activos financieros: existencia, persistencia y migración**,
(*Bubbles in prices of financial assets: existence, persistence and migration*)
Franco, J. P., Gomez-Gonzalez, J. E., Ojeda-Joya, J. N., Torres, J. E., In *Política monetaria y estabilidad financiera en economías pequeñas y abiertas*, DOI: 10.32468/ebook.664-314-6.

THESES

- 2021 (forthcoming) **Computational complexity of decisions: Quantifying computational hardness and its effects on human computation**,
PhD Thesis, Decision Risk and Financial Sciences,
The University of Melbourne.
Supervisors: Carsten Murawski and Peter Bossaerts.

- 2016 **Using machine learning and mechanism design to improve efficiency of economic bargaining**,
Research Master's Thesis, Cognitive and Clinical Neuroscience (Neuroeconomics),
 Maastricht University.
 Supervisors: *Colin Camerer and Arno Riedl*.
- 2012 **A study about the abilities to recognize patterns in the financial market**,
Bachelor in Economics Thesis,
 Universidad de Los Andes.
 Supervisor: *Santiago Alonso-Díaz*.
- 2012 **Convex optimization models for the coherent management of risk in financial portfolios**,
Bachelor in Mathematics Thesis,
 Universidad de Los Andes.
 Supervisor: *René Joaquín Meziat*.

REPORTS

- 2012 - 2014 **Financial stability reports**, *Banco de la República (Central bank of Colombia)*, ISSN 1692 4029,
 March 2014 - September 2013 - March 2013 - September 2012.
- 2013 - 2014 **The credit situation in Colombia**, *Banco de la República (Central bank of Colombia)*, December
 2014 - June 2013 - March 2013.

WORK EXPERIENCE

- Oct 2021 - **Postdoctoral Research Fellow**,
 Present *The University of Melbourne*, Melbourne, Australia.
- Aug 2021 - **R Shiny App Developer**,
 Oct 2021 *The University of Melbourne*, Melbourne, Australia.
 - Developing a data analysis application to inform strategic decisions.
 - Modeling stress scenarios on university enrollments and revenue.
- Mar 2021 - **Digital Skills Trainer: R/RStudio**,
 Oct 2021 *The University of Melbourne*, Melbourne, Australia.
 - Conducting intermediate- and advanced-level R/RStudio workshops for researchers at the university.
- May 2017 - **Research Community Coordinator for R/RStudio**,
 Mar 2021 *The University of Melbourne*, Melbourne, Australia.
 - Conducting R/RStudio workshops for researchers at the university.
 - Empowering and coordinating the R community at the university: Coordinated volunteers in supporting fellow researchers during trainings, drop-in sessions and via online communication.
 - Promoting use of digital tools, such as R/RStudio, in research: Co-organized the ResBaz conference, generated videos and advertising material for the promotion of digital tools.
 - Generated teaching content for the delivery of introductory- and intermediate-level R/RStudio workshops at the university.
 - Structured the online R/RStudio workshops for virtual delivery of trainings.
 - Produced e-learning content on programming in R via RStudio. This includes an online [book](#) and [videos](#).
- Nov 2015 - **Research Internship**,
 Aug 2016 *California Institute of Technology*, Pasadena, United States.
 - Conducting a research project under the supervision of Colin Camerer. This project led to my Research Master's thesis: *Using machine learning and mechanism design to improve efficiency of economic bargaining*.

- Sep 2012 - **Financial Stability Department Analyst**,
 Jun 2014 *Banco de la República (Central Bank of Colombia)*, Bogotá D.C., Colombia.
- Monitoring market, and liquidity risk in the Colombian financial markets.
 - Generating periodic reports on the financial stability of the Colombian financial markets.
 - Conducting research on methods for the detection of price bubbles in different markets across the world.
 - Conducting research on potential risks associated with the Colombian money market.
- Feb 2010 - **Risk Department (middle office) Trainee**,
 Jan 2011 *JPMorgan Financial Corporation*, Bogotá D.C., Colombia.
- Monitoring the market risk of the firm's portfolio.
 - Generating periodic regulatory reports concerning the firm's risk exposure.

OTHER TEACHING EXPERIENCE

- Feb 2015 - **Macroeconomics Tutor**, *Maastricht University*.
 Apr 2015
- Jan 2013 - **Advanced Microeconomics: Game Theory Teaching Assistant**, *Universidad de los Andes*.
 Dec 2013
- Jan 2012 - **Linear Algebra Teaching Assistant**, *Universidad de los Andes*.
 May 2012
- Aug 2011 - **Calculus 3 Teaching Assistant**, *Universidad de los Andes*.
 Dec 2011
- Jan 2010 - **Financial Mathematics Teaching Assistant**, *Universidad de los Andes*.
 May 2010

GRANTS, SCHOLARSHIPS AND AWARDS

- 2020 **Computational and Systems Neuroscience New Attendees Travel Grant for COSYNE 2020**.
 Travel Scholarship valued at \$1000 USD.
- 2019 **FBE Graduate Research Abroad Travelling Scholarship (FBE GRATS)**, *The University of Melbourne*, Melbourne, Australia.
 Travel Scholarship valued at \$2000 AUD.
- 2018 **FBE Graduate Research Abroad Travelling Scholarship (FBE GRATS)**, *The University of Melbourne*, Melbourne, Australia.
 Travel Scholarship valued at \$2000 AUD.
- 2017 **Henry Buck Scholarship**, *The University of Melbourne*, Melbourne, Australia.
 Awarded each year to the PhD student at the Faculty of Business and Economics with the highest scholarship score among the cohort entering the Faculty's doctoral programs.
- 2017 **Faculty of Business and Economics Graduate Research Scholarship**, *The University of Melbourne*, Melbourne, Australia.
 Scholarship to undertake the PhD in Decision, Risk and Financial Sciences. Covered tuition and stipend.
- 2006 **Full College Scholarship (2006-2010)**, *"Bachilleres for Colombia" ECOPEPETROL*, Bogotá D.C., Colombia.
 Awarded to the student with the best national high school exit exam (ICFES) in each state (Cundinamarca). Covered tuition for the full-length of a Bachelor's degree.
- 1999 - 2004 **Colombian National Math Olympics**, *Bogotá D.C., Colombia*.
 First place in 1999 and 2003; top ten places in 2001 and 2004.
- 2003 **Gold medal in the 4th Bolivarian Math Olympics**, (*Olimpiada Bolivariana de Matemáticas*), *Bogotá D.C., Colombia*.
 Multinational math olympics with the participation of Colombia, Venezuela, Ecuador, Peru and Bolivia

PRESENTATIONS

ORAL PRESENTATIONS

- 2020 **Neural correlates of computational complexity in a problem-solving task**, *Neuromatch Conference*, Online, Oct 2020.
- 2020 **Computational cognitive requirements of random decision problems**, *Australasian Mathematical Psychology Conference (AMPC)*, Sydney, Australia, Feb 2020.
- 2018 **Neural Correlates of computational complexity**, *Victorian Biomedical Imaging Capability (VBIC) annual network meeting*, Melbourne, Australia, Nov 2018.
- 2018 **Where the really hard choices are: A general framework to quantify decision difficulty**, *Australasian Cognitive Neuroscience Society (ACNS)*, Melbourne, Australia, Nov 2018.
- 2018 **Instance Complexity and Behaviour in Optimisation Problems**, *Asia Pacific Regional Conference on Experimental Finance*, Brisbane, Australia, Feb 2018.

POSTER PRESENTATIONS

- 2021 **The neural dynamics of problem-solving are associated with computational complexity**, *Computational Cognition (ComCo)*, Online, Sep 2021, *Best poster award*.
- 2020 **Computational cognitive requirements of random decision problems**, *Cognitive Science Society Conference (CogSci)*, Online, Jul 2020.
- 2020 **How hard are NP-complete problems for humans?**, *Organization for Computational Neurosciences Conference (CNS)*, Online, Jul 2020.
- 2020 **Computational cognitive requirements of random decision problems**, *Computational and Systems Neuroscience (Cosyne)*, Denver, USA, Feb 2020.
- 2019 **Computational cognitive requirements of random decision problems**, *Australasian Cognitive Neuroscience Society (ACNS)*, Launceston, Australia, Nov 2019.
- 2019 **Computational cognitive requirements of random decision problems**, *Interdisciplinary Symposium on Decision Neuroscience (ISDN)*, Durham, USA, Jun 2019.
- 2018 **Where the really hard decisions are - A general framework to quantify decision difficulty**, *Australian Appetitive Motivation Symposium (AAMS)*, Melbourne, Australia, Nov 2018.
- 2018 **Where the really hard decisions are - A general framework to quantify decision difficulty**, *Society for Neuroscience (SfN)*, San Diego, USA, Nov 2018.

OTHER

- 2019 **Supporting the modernisation of research practices: Efficiency, Scalability, Openness**, *Discussion co-chair*, *Interdisciplinary Meta-research and Open Science conference (AIMOS)*, Melbourne, Nov 2019.
- 2019 **Panel discussion on open science**, *Panel Moderator*, *The University of Melbourne*, Melbourne, Apr 2019.

PROGRAMMING SKILLS

DATA ANALYSIS

- 2011 - **R, Python, MATLAB.**
- present I have used R and python extensively throughout my PhD to manipulate, clean and visualize data. Additionally, I have used them to perform statistical analysis, including approaches such as machine learning and bayesian statistics. Before my doctoral studies, I employed R and MATLAB to analyze data and make simulations as part of my job at the central bank as well as for the dissertation projects of my master's and bachelors' degrees.

2018 - **fMRI data analysis,**

present *AFNI, Nipy, SPM.*

During my doctoral studies I have analysed fMRI data employing predominantly AFNI. Additionally, I have used the Nipy collection of python packages to visualize data and perform machine learning analyses. Finally, I have also had experience with SPM for the implementation of dynamic causal modeling analysis.

2018 - **Cloud computing,**

present *Bash, SSH tunneling, Slurm.*

During my doctoral studies I performed data analysis employing different cloud computing systems. These include cloud computer systems such as Nectar (Australian research cloud) as well as a university-specific high performance computing system that operates via job scheduler (Slurm).

2018 - **Version control,**

present *Git, Github.*

2011 - **Documentation,**

present *Latex, Rmarkdown, Jupyter notebooks.*

I have written several documents in latex, including all of my dissertations. More recently, since 2018 I have been employing Rmarkdown and Jupyter notebooks to generate documentation on data analysis for research projects.

DEVELOPMENT OF TASKS/GAMES FOR RESEARCH

I have designed and programmed several experimental behavioral tasks using different programming tools to perform human behavior research experiments.

2017 - 2019 **Unity 3D (C#).**

As part of my PhD I employed Unity 3D to program several experimental tasks.

2015 - 2016 **Dynamic web content,**

Javascript, HTML, PHP, SQL.

I have programmed experimental tasks via PHP, HTML, MySQL and Javascript as part of my research internship at Caltech.

2010 - 2011 **Java.**

As part of my Bachelor's degrees I had courses on object oriented programming in Java, which I then used to program the experimental tasks for my Bachelor of Economics dissertation.

WORKSHOPS AND SUMMER SCHOOLS ATTENDED

2019 **Complex Systems Summer School, Santa Fe Institute, Santa Fe, USA.**

2019 **Building tidy tools workshop, RStudio, Sydney, Australia.**

2018 **Sloan Nomis Workshop on the Cognitive Foundations of Economic Behavior, Alfred P. Sloan Foundation, NOMIS Foundation, and New York University, Vitznau, Switzerland.**

2018 **Advanced Scientific Programming in Python - Asia-Pacific Summer School, INCF, The University of Melbourne, and the Florey Institute of Neuroscience and Mental Health, Melbourne, Australia.**

EXTRACURRICULAR AND VOLUNTEER EXPERIENCE

Jan 2019 - **Treasurer of the Pride in Action (LGBTQIA+) Network committee, The University of Melbourne, Melbourne, Australia.**
May 2020

Apr 2018 - **President of the Faculty of Business and Economics PhD student society committee,**
Apr 2019 *The University of Melbourne, Melbourne, Australia.*

Apr 2017 - **Member of the Faculty of Business and Economics PhD Student Society committee,**
Mar 2018 *The University of Melbourne, Melbourne, Australia.*

Nov 2014 - **Student Representative (Neuroeconomics track)**, *Maastricht University*, Maastricht, The Netherlands.
Oct 2015

Jan 2013 - **Volunteer high school mathematics and english teacher**, *Colombia Crece*, Bogotá D.C.,
Dec 2013 Colombia.

LANGUAGES

Spanish Native Language

English Fluent

German Intermediate Level (Level B2.3 Goethe Institut, Bogotá D.C., Colombia - May 2013)

REFEREES

References available on request.