

# Pablo M. Berná

## PhD in Mathematics

### ACTUAL POSITION

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Profesor Contratado Doctor (Associate Professor, Tenure Track)  
Departamento de Métodos Cuantitativos (Department of Quantitative Methods)  
CUNEF Universidad  
28040, Madrid  
pablo.berna@cunef.edu



### EDUCATION

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**Universidad Autónoma de Madrid** Madrid, España  
PhD in Mathematics, Sobresaliente Cum Laude, International Mention 2017–2020  
– Title: “Thresholding greedy algorithms in Banach spaces”  
<https://repositorio.uam.es/handle/10486/688914>

**Universidad Internacional de Valencia** Valencia, Spain  
Master in Education: Mathematics and Computer Science 2018–2019

**Universidad de Valencia** Valencia, Spain  
Master in Mathematical Research 2014–2015  
– Title Final Master Project: “Teoría de aproximación greedy en espacios de Banach” (Greedy approximation theory in Banach spaces).  
– Honorific Mention.

**Universidad de Alicante** Alicante, España  
Bachelor in Mathematics 2009–2014

### GRANTS

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- **Ayudas para contratos predoctorales para la formación de doctores 2017.** 2018-2020  
*Predoctoral contract BES-2017-079834 of the program “Ayudas para contratos predoctorales para la formación de doctores” (PhD funding), Ministerio de Economía y Competitividad de España (July 2018–February 2020). Departamento de Matemáticas de la Universidad Autónoma de Madrid.*  
-Pre-Doc Period: July 2018-July 2019  
-POP Period: August 2019-February 2020.
- **FPI-UAM (rejected)** 2017-2018  
*Predoctoral contract from Universidad Autónoma de Madrid (November 2017-June 2018). Departamento de Matemáticas, Universidad Autónoma de Madrid.*
- **Grant Clay Mathematics Institute** 2016

Grant from the Clay Mathematics Institute to participate in some courses celebrated at Centre de Recerca Matemàtica, May-June 2016.

## ACCREDITATIONS

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### Profesor Ayudante Doctor

ANECA, Spain

April–2020

### Profesor Contratado Doctor

ANECA, Spain

June–2021

## Research

## PHD STUDENTS

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### Thresholding Greedy Algorithms and greedy-like bases

Student: David González Moro. CEU Universities

Advisor: Pablo M. Berná

2022-2025

### Relaxations of the optimality requirement on the

### Thresholding Greedy Algorithm for bases of Banach spaces

Student: Hung Viet Chu. University of Illinois at Urbana-Champaign

Advisors: Timur Oikhberg and Pablo M. Berná

2019-2023

## PAPERS

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- [1] M. BERASATEGUI, P. M. BERNÁ, , H. V. CHU, *Extensions and new characterizations of some greedy-type bases*, Bull. Malay. Math. Sci. Soc. **46**, 84 (2023).
- [2] F. ALBIAC, J. L. ANSORENA, M. BERASATEGUI, P. M. BERNÁ, S. LASALLE, *Bidemocratic bases and their connections with other greedy-type bases*. Constr. Approx. **57** (2023), 125-160.
- [3] F. ALBIAC, J. L. ANSORENA P. M. BERNÁ, *New parameters and Lebesgue-type estimates in greedy approximation*, Forum of Mathematics Sigma **10** (2022), e113, 1–39.
- [4] M. BERASATEGUI, P. M. BERNÁ, *Extensions of democracy-like properties for sequences with gaps*, Math. Inequal. Appl. **25**, no. 4 (2022) 1155–1189.
- [5] P. M. BERNÁ, , H. V. CHU, *On some characterization of greedy-type bases*, Expo. Math. **40** (2022), 1135-1158.
- [6] F. ALBIAC, J. L. ANSORENA, M. BERASATEGUI, P. M. BERNÁ, S. LASALLE, *Weaker forms of unconditionality of bases in greedy approximation*, Studia Math. **257** (1) (2022), 1-17.
- [7] P. M. BERNÁ, D. MONDÉJAR, *A functional characterization of almost-greedy bases*. Mathematics (2021) 9(15):1827. <https://doi.org/10.3390/math9151827>

- [8] M. BERASATEGUI, P. M. BERNÁ, *Quasi-greedy bases for sequences with gaps*. *Nonlinear Analysis*, **208** (2021), 112294.
- [9] F. ALBIAC, J. L. ANSORENA, P. M. BERNÁ, P. WOJTASZCZYK, *Greedy approximation for biorthogonal systems in quasi-Banach spaces*. *Dissert. Math.* **560** (2021), 1-88.
- [10] P. M. BERNÁ, *A note on partially-greedy bases in quasi-Banach spaces*. *Studia Math.* **259** (2021), 225-239.
- [11] M. BERASATEGUI, P. M. BERNÁ, S. LASALLE, *Strong-partially-greedy bases and Lebesgue-type inequalities*. *Constr. Approx.* **54** (2021), 507-528.
- [12] P. M. BERNÁ, J. D. ROSSI, *Nonlocal diffusion equations with dynamical boundary conditions*. *Nonlinear Analysis* **195** (2020), 111751.
- [13] F. ALBIAC, J. L. ANSORENA, P. M. BERNÁ, *Asymptotic greediness of the Haar System in the  $L_p$  spaces for  $1 < p < \infty$* . *Constr. Approx.* **51**, 427—440 (2020).
- [14] P. M. BERNÁ, *Characterization of weight-semi-greedy bases*. *J. Fourier. Anal. Appl.* **26**, 21 (2020).
- [15] P. M. BERNÁ, Ó. BLASCO, G. GARRIGÓS, E. HERNÁNDEZ, T. OIKHBERG, *Lebesgue inequalities for Chebyshev Thresholding Greedy Algorithms*. *Rev. Matem. Complut.* **33**, 695-722 (2020).
- [16] P. M. BERNÁ, D. KUTZAROVA, S. J. DILWORTH, T. OIKHBERG, B. WALLIS, *The weighted Property (A) and the greedy algorithm*. *J. Approx. Theory* **248** (2019), 105300.
- [17] P. M. BERNÁ, A. PÉREZ, *A remark on approximation with polynomials and greedy bases*. *J. Math. Anal. App.* **478** (2) (2019), 466–475.
- [18] P. M. BERNÁ, *Equivalence between almost-greedy and semi-greedy bases*. *J. Math. Anal. App.* **417** (2019) 218–225.
- [19] P. M. BERNÁ, Ó. BLASCO, G. GARRIGÓS, E. HERNÁNDEZ, T. OIKHBERG, *Embeddings and Lebesgue inequalities for greedy algorithms*. *Constr. Approx.* **48** (3) (2018), 415–451.  
*Factor Impacto 2018: 1.146*
- [20] P. M. BERNÁ, Ó. BLASCO, G. GARRIGÓS, *Lebesgue inequalities for the greedy algorithm in general bases*. *Rev. Mat. Complut.* **30** (2017), 369–392.
- [21] P. M. BERNÁ, Ó. BLASCO, *The best  $m$ -term approximation with respect to polynomials with constant coefficients*. *Anal. Math.* **43** (2) (2017), 119–132.
- [22] P. M. BERNÁ, Ó. BLASCO, *Characterization of greedy bases in Banach spaces*. *J. Approx. Theory* **215** (2017) 28–39.

## PROCEEDINGS

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- [1] P. M. BERNÁ, *On the greedy constant of the Haar system in  $L_p[0, 1]$ ,  $1 < p < \infty$* . Proceedings of the 7th Workshop in Mathematical Analysis in Alicante (2020), 59-69.
- [2] P. M. BERNÁ, *New results about Lebesgue-type parameters in greedy approximation theory*. Proceedings of the International E-Conference on Mathematical and Statistical Science: A Selcuk Meeting (2022), 134–138  
(<https://icomss22.selcuk.edu.tr/wp-content/uploads/2022/12/Proceedings-Book.pdf>).

## OTHER PUBLICATIONS

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- [1] P. M. BERNÁ, *Aproximación avariciosa en espacios de Banach*. Revista *TEMat*, volumen 1 (2017).
- [2] P. M. BERNÁ, M. DOLORES MOLINA, OTROS, *La mentorización en la Facultad de Ciencias de la UA: una primera experiencia global*. X Jornades de xarxes d'investigació en docència universitària, pp. 992 - 1004. Alicante: 2012 Disponible en Internet en: <http://rua.ua.es/dspace/handle/10045/24277>. ISBN 978-84-695-2877-8

## PARTICIPATION IN RESEARCH PROJECTS

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- **Análisis de Fourier y Aplicaciones (Fourier Analysis and Applications)** 2020–Presently  
*Reference PID2019-105599GB-IOO, Agencia Estatal de Investigación.*
- **La interacción entre geometría y topología en espacios de Banach** 2018–2021  
*Reference MTM2017-83262-C2-2-P, MINECO*
- **Interacción y aplicaciones en Análisis Funcional y Armónico** 2019–2022  
*Reference 20906/PI/18, Fundación Séneca, Región de Murcia.*
- **Análisis de Fourier y Aplicaciones (Fourier Analysis and Applications)** 2017–2020  
*Reference MTM2016-76566-P, Ministerio de Ciencia e Innovación.*
- **Interacción y aplicaciones en Análisis Funcional y Armónico** 2016–2018  
*Reference 19368/PI/14, Fundación Séneca, Región de Murcia.*
- **Análisis Funcional. Teoría de Operadores y Aplicaciones** 2015–2016  
*Reference GVA PROMETEOII/2013/13 (Comunidad Valenciana).*

## RESEARCH STAYS

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<b>University of Illinois</b> Stay with T. Oikhberg and H. V. Chu. One week	Urbana-Champaign, EEUU March 2023
<b>Universidad Cardenal Herrera CEU</b> Stay with A. Falcó	Elche, Alicante May 2021
<b>Universidad de Buenos Aires</b> Posdoc stay with Julio D. Rossi, 2 months	Buenos Aires, Argentina August 2019–October 2019

**University of Cambridge**

Department of Applied Mathematics and Theoretical Physics, 3 months

Cambridge, UK

February 2019–May 2019

**University of Illinois**

Department of Mathematics with T. Oikhberg, 1 month and 11 days

Urbana-Champaign, EEUU

September 2017–October 2017

**Universidad Pública de Navarra y La Rioja**

Pamplona

January 2019

## REVIEWER OF...

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Revista Matemática Complutense, Mathematics, Advances in Operator Theory, Zeitschrift für angewandte Mathematik und Physik, Annals of Functional Analysis, Jaen Journal on Approximation and Mathematical Review (AMS)

# Talks

## INVITED TALKS

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- **Sub-Riemannian Geometry Harmonic Analysis, PDEs and Applications** Bologna, July 2023  
*Talk: "Recent advances about greedy-like bases"*
- **New Bridges between Mathematics and Data Science** Valladolid, Nov 2021  
*Talk: "Lebesgue-type estimates for the Thresholding Greedy Algorithm"*
- **Approximation and Discretization (Online)** Moscú, Sept 2021  
*Talk: "The bidemocracy in the world of greedy approximation"*
- **Congreso de Jóvenes investigadores de la RSME 2020** Castellón, Jan 2020  
*Talk: "On the greedy constant of the Haar system in  $L_p([0, 1])$ ,  $1 < p < \infty$ "*
- **Workshop on Mathematical Analysis in Alicante** Alicante Jan, 2020  
*Talk: "On the greedy constant of the Haar system in  $L_p([0, 1])$ ,  $1 < p < \infty$ "*
- **EARCO 2019** Valencia, Jun 2019  
*Talk: "La avaricia de la base de Haar"*
- **Encuentros en Teoría de Aproximación (EITA) 2018** Calaceite, Oct 2018  
*Talk: "The Chebyshev Thresholding Greedy Algorithm"*
- **Congreso Jóvenes Investigadores de la RSME** Valencia, Sept 2017  
*Talk: "Estimates of Lebesgue-type constants for the greedy algorithm"*
- **Congreso Bienal de la RSME** Zaragoza, Feb 2017  
*Talk: "Greedy bases, Lebesgue inequalities and duality"*
- **I Jornadas de Doctorandos en Matemáticas** Murcia, Sept 2016  
*Talk: "Greedy Type Algorithms in Banach spaces"*
- **Primer Congr s Predoc** Valencia, Jun 2016  
*Talk: "Greedy approximation with polynomials of constant coefficients"*
- **XV Encuentros An lisis Funcional Murcia-Valencia** Alcoy, July 2016  
*Talk: "Lebesgue-type constants for greedy approximation in general bases"*

## CONTRIBUTED TALKS

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- **International E-Conference on Mathematical and Statistical Sciences** Online, October 2022  
*Talk: "New results about Lebesgue-type parameters in greedy approximation theory"*
- **Encuentros de la Red de An lisis Funcional y Aplicaciones 2021** Tenerife, Mar 2021  
*Talk: "Algoritmos avariciosos y bases bidemocr ticas"*
- **SUMA 2019** Mendoza (Argentina) Sept 2019  
*Talk: "La condici n de la avaricia en aproximaci n"*
- **First BYMAT Conference** Madrid, May 2018  
*Talk: "Some new advances in greedy approximation theory"*
- **IV Congreso INVESTMAT** Valencia, Jan 2017

*Talk: “¿Cómo pasar de ser casi avaricioso a ser avaricioso?”*

- **Sexto Encuentro de Jóvenes Investigadores en Matemáticas 2016** Tenerife, Dec 2016  
*Talk: “Relación entre ser avaricioso, ser democrático y ser incondicional”*
- **X Workshop of Young Researchers in Mathematics 2016** Madrid, Sept 2016  
*Talk: “Greedy approximation with regard to bases”*
- **Workshop on Function Spaces and High-dimensional Approximation** Barcelona, May 2016  
*Talk: “Characterization of greedy bases in Banach spaces”*
- **XII Encuentro de la Red de Análisis Funcional y Aplicaciones** Cáceres, May 2016  
*Talk: “Caracterización de bases greedy en espacios de Banach”*
- **Tercer Congreso INVESTMAT** Valencia, Jan 2016  
*Talk: “Caracterizando Bases Avariciosas”*
- **V Escuela-Taller de la Red de Análisis Funcional y Aplicaciones** Madrid, March 2015  
*Talk: “Teorema de Mazur Ulam”*
- **Segundo Congreso INVESTMAT** Valencia, Jan 2015  
*Talk: “Loz números afortunados de Euler”*

## POSTERS

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- **FoCM 2023** Paris, June 2023  
*Poster: “Approximation spaces and greedy-like bases”*
- **BYMAT 2020** Online, Dic 2020  
*Poster: “Quasi-greedy and bidemocratic bases”*
- **XVIII Encuentros de Análisis Real y Complejo** Málaga, May 2018  
*Poster: “Equivalence between almost-greedy and semi-greedy bases”*
- **XIV Encuentro de la Red de Análisis Funcional y Aplicaciones** Bilbao, March 2018  
*Poster: “The weighted Property (A) and the greedy algorithm”*
- **Congreso Bienal de la RSME 2017** Zaragoza, Feb 2017  
*Poster: “Lebesgue-type constants for greedy approximation”*
- **Conference on Harmonic Analysis and Approximation Theory** Barcelona, June 2016  
*Poster: “Lebesgue-type constants for greedy approximation in general bases”*
- **X Encuentro de Investigación en Teoría de Aproximación** Zaragoza, Oct 2015  
*Poster: “Bases with the  $Q$ -property and Lebesgue type inequalities”*
- **XVI Encuentro de Análisis Funcional Murcia-Valencia** Valencia, Sept 2015  
*Poster: “Some Remarks on Greedy Approximation”*
- **Congreso Jóvenes Investigadores de la RSME** Murcia, July 2015  
*Poster: “Greedy Approximation Theory in Banach Spaces”*

## SEMINARS

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- **Analysis Seminar** U. of Illinois at Urbana-Champaign, Apr 2023  
*Title: "New advances in greedy approximation theory"*
- **Seminario de Matemática Aplicada y Estadística** U. San Pablo CEU de Madrid, Nov 2020  
*Title: "Ser avaricioso en un mundo incondicional y democrático"*
- **Seminario de Análisis Matemático y Aplicaciones** U. Autónoma de Madrid, May 2020  
*Title: "¿Se puede ser avaricioso en espacios quasi-Banach?"*
- **Seminario de Análisis Matemático y Aplicaciones** U. Autónoma de Madrid, May 2019  
*Title: "Threhsolding Greedy Algorithms in Banach spaces"*
- **Seminario Junior** U. Autónoma de Madrid-ICMAT, Oct 2018  
*Title: "Conditions to characetize the greediness"*
- **Seminario de Análisis Matemático y Aplicaciones** U. Autónoma de Madrid, Feb 2018  
*Title: "El crecimiento de la avaricia en función de la democracia"*
- **Seminario de Análisis Matemático** U. Pública de Navarra, Jan 2018  
*Title: "¿Cómo crece la avaricia?"*
- **Seminario de Matemática Aplicada y Análisis Matemático** U. de la Rioja, Jan 2018  
*Title: "¿Cuánto pesa la avaricia?"*
- **Analysis Seminar** U. of Illinois at Urbana-Champaign, Oct 2017  
*Title: "Greedy bases and Lebesgue-type constants"*
- **Seminari Pre-Doc** U. de Valencia, June 2015  
*Title: "Aproximación Greedy en Espacios de Banach"*
- **Seminario de Wilhelm Blascke** U. de Alicante, June 2015  
*Title: "Aproximando con Bases Avariciosas"*



# Teaching

## TEACHING

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- **CUNEF Universidad** (Madrid, España) 2022-2023
  - Análisis Matemático II. Double Degree in Mathematical Engineering and Economics (60 h).
  - Análisis Matemático III. Double Degree in Mathematical Engineering and Economics (60 h).
  - Inferencia Estadística. Degree in Mathematical Engineering (60 h).
  - Probabilidad e Inferencia Estadística. Informatics Engineering (60 h).
- **CUNEF Universidad** (Madrid, España) 2021-2022
  - Análisis de Datos y Estadística. ADE+Informática (60 horas).
  - Análisis y Explotación de la Información. Grado en Economía (60 horas).
- **Universidad CEU San Pablo** (Madrid, España) 2021-2022
  - Mathematics I. Degree in Business Administration + Marketing (English) (120h).
  - Dynamical Systems and Optimization Theory. Degree in Economy (English) (60h).
- **Universidad Europea** (Madrid, España) 2021-2022
  - Matemáticas empresariales. Grado en Administración de empresas (120h).
  - Bioestadística. Grado en Biomedicina (60h).
  - Calculus II. Degree in Aerospace Engineering (English) (60 h).
  - Calculus II. Degree in Biomedical Engineering (60 h).
- **Universidad CEU San Pablo** (Madrid, España) 2020-2021
  - Matemáticas I. Grado en Marketing (60 horas).
  - Mathematics I. Degree in Business Administration (English) (60 h).
  - Dynamical systems and Optimization Theory. Degree in economics (English) (60 h).
  - Mathematics for economists II. Degree in economics (English) (60 h).
  - Probabilidad y Estadística. Degree in Business Intelligence (60 h).
  - Visualización de datos. Degree in Business Intelligence (30 h).
- **Universidad Europea** (Madrid, España) 2020-2021
  - Matemáticas empresariales. Grado en Administración de empresas (58 h).
  - Estadística para ingeniería. Grado en Ingeniería de Sistemas (62 h).
  - Cálculo II. Grado en Ingeniería de Aeronaves (Docencia en inglés, 60 h).
  - Estadística y Análisis de Datos. Grado en Física (60 h).
- **Universidad CEU San Pablo** (Madrid, España) 2019-2020
  - Estadística aplicada a Ciencias de la Salud. Grado en Fisioterapia (50 h)).
  - Bioestadística. Degree in Medicine (63 h).
- **Universidad Autónoma de Madrid** (Madrid, Spain) 2018-2019
  - Matemáticas. Grado en Ciencias Ambientales (30 h).
- **Universidad de Alicante** (Alicante, Spain) 2012-2013
  - Matemáticas. Grado de Óptica (Programa de mentorización).

## TEACHING INNOVATION PROJECT

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### Exploria Project

Facultad de Económicas y Empresariales de la USP CEU

### Teaching Innovation Project

2020-21

## SUPERVISED STUDENTS

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### **The Markus-Yamabe conjecture and the Cournot duopoly**

Student: Ignacio Bonet Osuna. Degree in Economy, Universidad San Pablo CEU, Madrid, June 2021

### **Statistical analysis of the impact of COVID-19 in the hospitality and tourism sectors**

Student: Francisco J. Fernández González. Degree in Business Administration, Universidad San Pablo CEU, Madrid, June 2021

## Some more information

### TOOLS

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- MatLab, SPSS, RStudio
- GeoGebra
- C, C++
- LaTeX

### LANGUAGES

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- **Spanish:** Mother tongue
- **English:** PET
- **English:** C1-level course at Universidad San Pablo CEU

### SCIENTIFIC SOCIETIES

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- **Member of the Spanish Mathematical Royal Society**  
*2014–Presently*
- **Editor of the Spanish Mathematical Royal Society Bulletin**  
*September 2015–July 2017*

### MANAGEMENT AND ORGANIZATION

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- **Seminar of Applied Mathematics and Statistics, CEU San Pablo**  
*Member of the Organizing Committee of the Applied Mathematics and Statistics Seminar since November 2020*
- **Member of the editorial committee of TEMat magazine**