

Pedro Núñez

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PROFESSIONAL SUMMARY

Postdoctoral Researcher in Algebraic Geometry with research focused on birational geometry and derived categories and with extensive teaching experience in English and in German.

WORK EXPERIENCE

Postdoctoral Researcher

National Taiwan University

Sep. 2023 – Present

Taipei, Taiwan

- Postdoctoral researcher in the working group of Jungkai Alfred Chen.
- Research focused on birational geometry and derived categories of coherent sheaves.
- Participated in and organized various seminars and reading groups.

PARTICIPATION IN RESEARCH PROJECTS

Varieties of general type (NSTC114-2639-M-002-009-ASP)

Funded by National Science and Technology Council of Taiwan. PI: Jungkai Alfred Chen.

Sep. 2023 – Present

Taipei, Taiwan

GRK 1821: Cohomological Methods in Geometry

Funded by Deutsche Forschungsgemeinschaft (DFG).

Sep. 2019 – Aug. 2021

Freiburg, Germany

PUBLICATIONS

- **Extension of adapted differentials on klt orbifolds.**
Submitted for publication. Preprint: arXiv:2411.17268 (2024).
- **The Albanese morphism for hyperelliptic varieties** (with Pieter Belmans and Andreas Demleitner).
Indagationes Mathematicae (2025). DOI:10.1016/j.indag.2025.10.004. Preprint: arXiv:2411.14814.
- **Adapted differentials as a qfh-sheaf.**
Mathematische Zeitschrift 304, 68 (2023). DOI:10.1007/s00209-023-03330-6. Preprint: arXiv:2210.07968.
- **A note on semiorthogonal decompositions for Fano fibrations.**
Geometriae Dedicata 216, 20 (2022). DOI:10.1007/s10711-022-00680-z. Preprint: arXiv:2002.10987.

TEACHING EXPERIENCE

Lecturer

National Taiwan University

Sep. 2024 – Jul. 2025

Taipei, Taiwan

- Lecturer for *Calculus 1*, *Calculus 2*, *Calculus 3*, and *Calculus 4* for first-year economics majors.
- Taught theoretical classes, coordinated the course and tutors, and created exam problems.
- Taught in English.

Teaching Assistant

University of Freiburg

Oct. 2021 – Jul. 2023

Freiburg, Germany

- Teaching Assistant for *Algebra and Number Theory*, *Elementary Geometry* (twice), and *Riemann Surfaces*.
- Handled question sessions for *Linear Algebra II*.
- Created weekly exercise sheets, coordinated practice classes, offered tutoring, and discussed solutions.
- Taught in German.

Tutor

University of Bonn

Apr. 2018 – Jul. 2019

Bonn, Germany

- Tutor for *Linear Algebra for Informatics and Teachers*, and *Introduction to Algebra*.
- Graded weekly homework and discussed solutions in exercise classes.
- Taught in German.

EDUCATION

PhD in Mathematics

Sep. 2019 – Jul. 2023

University of Freiburg

Freiburg, Germany

- Thesis: *Categorical aspects of Campana orbifolds*, supervised by Stefan Kebekus.
- PhD title certified in Spain by the Autonomous University of Madrid.
- Grade: magna cum laude.

Master in Mathematics

Oct. 2017 – Jul. 2019

University of Bonn

Bonn, Germany

- Master's thesis: *Derived categories of Fano fibrations*.
- Grade: 1.2 in the german system (approx. 9.5/10 in the spanish system).

Bachelor in Mathematics

Sep. 2013 – Aug. 2017

Complutense University of Madrid

Madrid, Spain

- Bachelor's thesis: *Blow-ups in algebraic geometry*.
- Studied at LMU Munich as an Erasmus exchange student during the course 2016/2017.
- Grade: 8.34/10 in the spanish system.

LANGUAGES

Spanish: Native speaker.

English: C1 level (IELTS with score 8).

German: C1 level (Goethe-Zertifikat C1).

Chinese: B1 level (HSK3 + HSKK Basic).

INVITED TALKS

Higher Dimensional Algebraic Geometry

16 Apr. 2026 (upcoming)

Title: TBA.

Taipei, Taiwan

61st Annual Meeting of the Taiwan Mathematical Society

22 Jan. 2026

Title: Campana orbifolds and their morphisms.

Chiayi, Taiwan

Taipei Postdoc Seminar

5 Nov. 2025

Title: Campana orbifolds: between projective and logarithmic geometry.

Taipei, Taiwan

KIAS Algebraic Geometry Seminar

31 Oct. 2025

Title: Adapted differentials on Campana orbifolds.

Seoul, South Korea

Colloquium talk at National Central University

23 Oct. 2025

Title: Derived categories and birational geometry.

Taoyuan, Taiwan

SJTU Algebraic Geometry Seminar

10 Oct. 2025

Title: Derived categories of threefolds on the Noether line.

Shanghai, China

Fudan University Algebraic Geometry Seminar

8 Oct. 2025

Title: Derived categories of threefolds on the Noether line.

Shanghai, China

Mathematics Seminar at CUNEF University

22 Sep. 2025

Title: Derived categories and birational geometry.

Madrid, Spain

Algebraic Geometry meets Machine Learning

29 Apr. 2025

Title: Derived categories of hyperelliptic varieties.

Tainan, Taiwan

Younger Generation of Algebraic Geometry 2025

19 Apr. 2025

Title: Indecomposability of derived categories of threefolds on the Noether line.

Penghu, Taiwan

NCTS One-Day Workshop on Arithmetic and Algebraic Geometry

20 Feb. 2025

Title: On the Albanese morphism of hyperelliptic varieties.

Taipei, Taiwan

NCKU Algebraic Geometry Seminar

18 Apr. 2024

Title: Indecomposability of derived categories of threefolds on the Noether line.

Tainan, Taiwan

NCTS Seminar in Algebraic Geometry <i>Title: Indecomposability of derived categories of hyperelliptic manifolds.</i>	20 Oct. 2023 Taipei, Taiwan
Luxembourg Algebraic Geometry Seminar <i>Title: Adapted differentials on Campana orbifolds.</i>	22 Mar. 2023 Esch-sur-Alzette, Luxembourg
NCTS Seminar in Algebraic Geometry (online) <i>Title: Adapted differentials on Campana orbifolds.</i>	6 Feb. 2023 Taipei, Taiwan
Red de Doctorandos en Matemáticas UCM (online) <i>Title: Categorías derivadas y geometría birracional.</i>	22 Mar. 2022 Madrid, Spain

CONTRIBUTED TALKS

2025 Summer Research Institute in Algebraic Geometry <i>Title: Indecomposability of derived categories of hyperelliptic varieties.</i>	22 Jul. 2025 Fort Collins, CO, USA
9th European Congress of Mathematics <i>Title: Adapted differentials as a qfh-sheaf.</i>	15 Jul. 2024 Seville, Spain
Géométrie Algébrique en Liberté XXIX <i>Title: Semiorthogonal decompositions on Fano fibrations.</i>	24 May 2022 Orsay, France
2nd BYMAT Conference <i>Title: Derived categories of Fano varieties and Mori fibre spaces.</i>	21 May 2019 Madrid, Spain

OTHER ACADEMIC ACTIVITIES

Academic visit at UCLA <i>Hosted by Joaquín Moraga.</i>	16–31 May 2026 (upcoming) Los Angeles, CA, USA
Organization of the international conference Tour de Formosa <i>Organized jointly with Flora Poon. 31 attendees.</i>	12–16 Jan. 2026 Taiwan's east coast
Academic visit at Fudan University <i>Shanghai Center for Mathematical Sciences. Hosted by Meng Chen.</i>	28 Sep. – 11 Oct. 2025 Shanghai, China
Organization of the NCTS Seminar in Algebraic Geometry <i>Invited external speakers to talk about their research.</i>	Summer Term 2025 Taipei, Taiwan
Organization of a seminar on deformation theory <i>Organized jointly with Flora Poon.</i>	Summer Term 2025 Taipei, Taiwan
Organization of a seminar on Hodge theory <i>Organized jointly with Hsueh-Yung Lin.</i>	Summer 2025 Taipei and Xitou, Taiwan
Organization of a seminar on enumerative geometry <i>Notes for the seminar are available on my homepage.</i>	Winter Term 2020/2021 Freiburg, Germany
Organization of a reading group on Grothendieck's EGA <i>Informal reading group with various other students.</i>	Winter Term 2017/2018 Bonn, Germany

SCHOLARSHIPS & FUNDING RECEIVED

2025 Summer Research Institute in Algebraic Geometry <i>Funded by the NCTS and NSTC to attend the conference.</i>	12–26 Jul. 2025 Fort Collins, CO, USA
Geometric and Arithmetic Frontiers of Orbifolds II <i>Funded by IRMA to attend their workshop.</i>	5–9 Jun. 2023 Strasbourg, France
Oberwolfach Leibniz Graduate Students (OWLG) <i>Funded by MFO to attend the Komplexe Analysis workshop.</i>	9–14 Apr. 2023 Oberwolfach, Germany
2nd BYMAT Conference <i>Funded by ICMAT to attend their conference.</i>	20–24 May 2019 Madrid, Spain
Geometry Summer School <i>Funded by Utrecht University to attend their summer school.</i>	14–25 Aug. 2017 Utrecht, Netherlands

Erasmus Scholarship <i>Funded by the European Union to study as an exchange student.</i>	Sep. 2016 – Jul. 2017 Munich, Germany
Dynamical Systems Summer School <i>Funded by the Fundação Calouste Gulbenkian to attend their summer school.</i>	6–10 Jul. 2015 Lisbon, Portugal

CONFERENCES, WORKSHOPS AND SCHOOLS ATTENDED

Higher Dimensional Algebraic Geometry <i>National Taiwan University</i>	13–17 Apr. 2026 (upcoming) Taipei, Taiwan
61st Annual Meeting of the Taiwan Mathematical Society <i>National Chung Cheng University</i>	21–22 Jan. 2026 Chiayi, Taiwan
Tour de Formosa <i>International Conference</i>	12–16 Jan. 2026 Taiwan's east coast
2025 Algebraic Geometry in East Asia <i>National Cheng Kung University</i>	10–14 Nov. 2025 Tainan, Taiwan
2025 Summer Research Institute in Algebraic Geometry <i>Colorado State University</i>	14 Jul. – 1 Aug. 2025 Fort Collins, CO, USA
Algebraic Geometry meets Machine Learning <i>National Cheng Kung University</i>	27–29 Apr. 2025 Tainan, Taiwan
Younger Generation of Algebraic Geometry 2025 <i>Conference</i>	17–19 Apr. 2025 Penghu, Taiwan
NCTS One-Day Workshop on Arithmetic and Algebraic Geometry <i>National Taiwan University</i>	20 Feb. 2025 Taipei, Taiwan
60th Annual Meeting of the Taiwan Mathematical Society <i>National Central University</i>	14–15 Jan. 2025 Taoyuan, Taiwan
Intro. to Nevanlinna Theory, Hyperbolicity and Arithm. Dynamic <i>Academia Sinica</i>	2–3 Jan. 2025 Taipei, Taiwan
Algebraic Geometry in Taipei <i>National Taiwan University</i>	2–6 Dec. 2024 Taipei, Taiwan
Mini-Workshop: Young Perspectives in Algebraic Geometry <i>National Taiwan University</i>	25–26 Nov. 2024 Taipei, Taiwan
9th European Congress of Mathematics <i>Universidad de Sevilla</i>	15–19 Jul. 2024 Seville, Spain
Transcendental aspects of algebraic geometry <i>Grand Hotel San Michele</i>	1–5 Jul. 2024 Cetraro, Italy
59th Annual Meeting of the Taiwan Mathematical Society <i>National Chengchi University</i>	22–23 Jan. 2024 Taipei, Taiwan
NCTS-Kyoto Mathematics Symposium <i>National Center for Theoretical Sciences</i>	9 Dec. 2023 Taipei, Taiwan
Birational Geometry and Algebraic Dynamics <i>University of Tokyo</i>	27 Nov. – 1 Dec. 2023 Tokyo, Japan
Algebraic Geometry in East Asia <i>KIAS (Korea Institute For Advanced Study)</i>	6–10 Nov. 2023 Seoul, South Korea
Geometric and Arithmetic Frontiers of Orbifolds II <i>IRMA</i>	5–9 Jun. 2023 Strasbourg, France
Differential and Algebraic methods in Kähler spaces <i>MFO</i>	9–14 Apr. 2023 Oberwolfach, Germany

Crash Course Condensed Mathematics <i>University of Freiburg</i>	13–17 Mar. 2023 <i>Freiburg, Germany</i>
Abschlusskolloquium of GK ”Cohom. Methods in Geometry” <i>University of Freiburg</i>	14–15 Jul. 2022 <i>Freiburg, Germany</i>
Birational Geometry conference <i>EPFL</i>	13–17 Jun. 2022 <i>Lausanne, Switzerland</i>
Géométrie Algébrique en Liberté XXIX <i>Laboratoire de Mathématiques d’Orsay</i>	23–27 May 2022 <i>Orsay, France</i>
Workshop Higher Algebra <i>Technical University of Darmstadt</i>	16–18 Mar. 2022 <i>Darmstadt, Germany</i>
New Techniques in Resolution of Singularities (online) <i>MFO</i>	24–30 Oct. 2021 <i>Oberwolfach, Germany</i>
K-theory, algebraic cycles and motivic homotopy theory <i>Isaac Newton Institute for Mathematical Sciences</i>	13–17 Jan. 2020 <i>Cambridge, UK</i>
o-Minimal Structures in Algebraic Geometry Summer School <i>University of Freiburg</i>	9–13 Sep. 2019 <i>Freiburg, Germany</i>
Moduli and Stability conditions Summer School <i>University of Hannover</i>	29 Jul. – 2 Aug. 2019 <i>Hannover, Germany</i>
2nd BYMAT Conference <i>ICMAT</i>	20–24 May 2019 <i>Madrid, Spain</i>
Geometry Summer School <i>Utrecht University</i>	14–25 Aug. 2017 <i>Utrecht, Netherlands</i>
Partial Differential Equations Summer School <i>Fundação Calouste Gulbenkian</i>	4–8 Jul. 2016 <i>Lisbon, Portugal</i>
Dynamical Systems Summer School <i>Fundação Calouste Gulbenkian</i>	6–10 Jul. 2015 <i>Lisbon, Portugal</i>
Algebraic Geometry Summer School <i>Fundação Calouste Gulbenkian</i>	14–18 Jul. 2014 <i>Lisbon, Portugal</i>

OTHER INTERESTS AND ACTIVITIES

Lean Algebra Exercises <i>Formalization of abstract algebra concepts using Lean, with step-by-step hints for students.</i>	Oct. 2021 – Mar. 2022 <i>Freiburg, Germany</i>
Internship at the WSO-UV space telescope project <i>Time-series analysis from ultraviolet spectroscopy measurements using Matlab.</i>	1–31 Jul. 2015 <i>Madrid, Spain</i>
International Astronomical Youth Camp 2014 <i>Observational astronomy and climate modeling using Matlab.</i>	20 Jul. – 9 Aug. 2014 <i>Weyer, Austria</i>
Android application development I, II and III <i>Courses taken at TEIDE Centros de Formación.</i>	Jan. – Jun. 2013 <i>Madrid, Spain</i>