CURRICULUM VITAE · NOVEMBER 2026

Bernat Espigulé

Self-similar sets, topology, and scientific computation.
PhD candidate at the Universitat de Girona.

Public thesis defence · 12 November 2026, 11:00–14:00 CET · Aula 09, Escola Politècnica Superior II

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Education

2022–present
PhD candidate in mathematics
Universitat de Girona
Thesis deposited 9 September 2026. Public defence scheduled for 12 November 2026. Doctoral programme in Technology. Thesis: Collinear Fractals and Connectedness Loci: Topology, Finite Capture, and Restricted Polynomial Roots. Supervisors: David Juher, Joan Saldaña.

2021
MSc in Advanced Mathematics
Universitat de Barcelona
Thesis: Complex trees and their families of connected self-similar sets. Thesis completed in 2018; degree awarded in 2021. Supervisors: Núria Fagella, Xavier Jarque. Read the thesis ↗

2012
BSc in Physics
Universitat Autònoma de Barcelona
International study at UC Santa Barbara (2010–2011) and Heidelberg University (2011–2012).

Research & professional experience

2022–2025
Predoctoral researcher
Universitat de Girona
Research and scientific software development for the doctoral thesis, supported by IFUdG funding.

2013–2017; 2020–2021
Consultant
Wolfram Research
Mathematical content, symbolic and numerical prototypes, interactive demonstrations, and technical communication in an international environment. Author of eight Wolfram Blog articles.

2019–2020
Content consultant
CosmoCaixa Barcelona
Mathematical and scientific content and participatory activities for museum visitors.

Research member, HOLODYN, Universitat de Barcelona (2017–2022). Long-term participant, *Illustrating Mathematics*, ICERM, Brown University (2019).

Research

I study the topology of self-similar sets and their parameter spaces, including connectedness, holes, contacts, and polynomial-root approximation. My work brings together symbolic dynamics, exact computation, and interactive visualization.

- Collinear fractals and connectedness loci — doctoral research on topology, finite capture, and restricted polynomial roots.
- Collinear Fractals Explorer — linked parameter and dynamical views for finite computational exploration.
- 4D Connectedness Atlas — planar binary similarity families, contact geometry, and finite numerical signatures.

Selected publications & preprints

2026 **Contact multiplicity and a sharp six-map bound for collinear self-similar dendrites** Preprint
Bernat Espigulé
arXiv:2611.01291 · v1, 31 October 2026
arXiv ↗ PDF ↗

2026 **Regular closedness off the real axis for root closures of bounded-height integer polynomials** Preprint
Bernat Espigulé
arXiv:2610.38971 · v1, 28 October 2026
arXiv ↗ PDF ↗

2024 **Collinear Fractals and Bandt's Conjecture** Journal article
Bernat Espigule, David Juher, Joan Saldaña
Fractal and Fractional 8(12), 725
DOI ↗ arXiv ↗ PDF ↗

2026 **Semialgebraic interior layers in root closures of bounded-height integer polynomials** Preprint
Bernat Espigulé, David Juher
arXiv:2603.07397 · v2, 18 October 2026
arXiv ↗ PDF ↗ Explorer ↗

2026 **Infinitely many holes in connectedness loci for collinear affine iterated function systems** Preprint
Bernat Espigule
arXiv:2606.01467
arXiv ↗ PDF ↗

2026 **Explicit interpolations among the Sierpiński, Rauzy, and Apollonian gaskets** Preprint
Bernat Espigule
arXiv:2606.23278
arXiv ↗ PDF ↗ Explorer ↗

2019 **A Family of Fern-like Ternary Complex Trees** Proceedings article
Bernat Espigulé
Bridges 2019, pp. 147–154
Publication ↗ arXiv ↗ PDF ↗

Full publication list, sources & citations ↗

Teaching & workshops

2025 and 2026	**Bojos per les Matemàtiques** Universitat de Barcelona Designed and taught four-hour workshops for advanced secondary-school students on fractals, polynomial roots, computational exploration, conjectures, and proofs.
2014–2017	**Wolfram Educational Summer Programs** Massachusetts Teaching and project mentoring across four editions, covering computational mathematics, Wolfram Language, visualization, and the development of research questions.
10 January 2022	**Arbres complexos i fractals** FANJAC Online workshop.
2019	**Invited session on fractal geometry and design** UIC Barcelona
2018	**Barcelona Tech Math Summer Camp** Universitat Politècnica de Catalunya Computational mathematics outreach.

Communication & mathematical art

- History of Mathematics Project — eight interactive learning journeys with Wolfram Research and the National Museum of Mathematics.
- Eight Wolfram Blog articles, 2014–2021.
- Complex Trees art portfolio — mathematical images, animation, and sculpture; exhibitions include the Joint Mathematics Meetings, Bridges, and ICERM.

Selected research presentations

- Institut Henri Poincaré, Paris — March 2026. Recorded talk ↗
- One World Numeration Seminar — June 2026.
- ICERM Illustrating Mathematics Reunion/Expansion — online, 2025.

Tools & languages

Wolfram Language / Mathematica | Python | JavaScript / TypeScript | GLSL / WebGL

Git / GitHub | LaTeX | Exact algebraic computation | Interval arithmetic

Catalan: native. Spanish and English: fluent in academic and professional contexts.