CECILIA ZUMAJO-CARDONA

cezumajo.github.io
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czumajo@nybg.org

EDUCATION

The New York Botanical Garden & The Graduate Center- CUNY - *2021*
Ph.D. in Biology, Plant Science subprogram

The New York Botanical Garden & The Graduate Center- CUNY - *2019*
Master of Philosophy Biology

B.Sc. in Biology, Universidad de Antioquia, Medellín, Colombia - *2015*

PROFESSIONAL POSITIONS

Assistant Curator - New York Botanical Garden *2025 - Currently*
Adjunct - The graduate Center, CUNY Plant science subprogram*2025 - Currently*

LANGUAGES

Spanish (Mother tongue), English, Italian, French.

ACADEMIC EXPERIENCE

STARS@UNIPD Postdoctoral researcher - May 2024 to January 2025
Universita degli Studi di Padova. Project title: "Deciphering the molecular mechanisms behind seed diversity in non-model species: case of study in *Cycas* and *Wollemia*."

EMBO Postdoctoral researcher - October 2021 to April 2024
Universita degli Studi di Milano. Project title: "Deciphering the maternal role in seed formation using transcriptome and genetic variation analyses."

Lab. assistant, Evo-Devo in Plants. November 2015 to August 2016
Universidad de Antioquia. P.I. Natalia Pabón - Mora. Project title: "Functional Evolution of the *FRUITFULL* gene lineage in the tomato family (Solanaceae)"

EDEN, Evo-Devo-Eco Network Undergraduate Fellowship. June to August, 2015
New York Botanical Garden, Genomics program, PI: Barbara Ambrose *"Can the fruit developmental network of Arabidopsis thaliana be extrapolated to early diverging eudicots?".*

Cathedra teacher assistant. January- June 2015
Maths for High school, Medellín, Colombia

Young researcher. 2013 - 2014
Project *'Duplicacion de genes FUL-like en Ranunculales y su impacto en la diversificación morfológica de amapolas'.* PI: Natalia Pabón - Mora, CODI, Universidad de Antioquia, Medellin, Colombia

Herbarium assistant - 2013
Universidad de Antioquia, Medellín, Colombia
Assistant herbarium workshop: 'Herbario Universidad de Antioquia' (HUA)

PUBLICATIONS [ORCID: 0000-0002-9516-6112] ZUMAJO-LAB MENTEES#

Preprints & in preparation:

Stevenson et al., **The genome of the Wollemi pine, a critically endangered "living fossil" unchanged since the Cretaceous, reveals extensive ancient transposon activity** *BioRXiv.* doi: https://doi.org/10.1101/2023.08.24.554647 *Submitted to Cell.* 2026.

Luther, E[#]., **Zumajo-Cardona, C. Sustained co-expression of LEAFY – AGAMOUS (GGM3) during ontogeny of Gnetum gnemon cones** *Annals of Botany* In Rev.

Published:

Zumajo-Cardona, C., Dvorkin, A., Yu, Y[#]., Nigris, S. 2026. **Botanical Gardens: the Eden for evo-devo studies** *Trends in Plant Science.* Accepted.

Sondervan,V.M., Eshel, G., Varala, K., Frangos, S., Katari, M.S., Jeffers, T.L., **Zumajo-Cardona, C.**, Nigris, S., DeGironimo, L., Smalls, T., McCombie, R.W., Little, D.P., Ambrose, B.A, Stevenson, D.W., Coruzzi, G. 2025. **Developmentally regulated genes drive phylogenomic splits in ovule evolution** *Nature communications* 16, 9589 (2025). https://doi.org/10.1038/s41467-025-65399-3

Zumajo-Cardona, C., Ambrose, B. A., Madrigal, Y., Pabón-Mora, N. 2025. **Dehiscent fruits in Brassicaceae and Papaveraceae: convergent morpho-anatomical features with divergent underlying genetic mechanisms.** *Annals of Botany.* https://doi.org/10.1093/aob/mcaf079

Zumajo-Cardona, C., Gabrieli, F., Anire, J., Albertini, E., Ezquer, I., Colombo, L. 2023. **Evolutionary studies of the bHLH transcription factors belonging to MBW complex: revisiting their role in seed development** *Annals of Botany.* https://doi.org/10.1093/aob/mcad097

Zumajo-Cardona, C., Aguirre, M., Castillo, R., Mizzotti, C., Di Marzo, M., Banfi, C., Mendes, M. A., Spillane, C., Colombo, L., Ezquer, I. 2023. **Maternal control of triploid seed development by the *TRANSPARENT TESTA 8* transcription factor in *Arabidopsis thaliana*** *Scientific reports* 13, 1316 (2023). https://doi.org/10.1038

Marchant, D.B., Chen, G., Cai, S. ... **Zumajo-Cardona, C.** ... et al. 2022. **Dynamic genome evolution in a model fern.** *Nature Plants* https://doi.org/10.1038/s41477-022-01226-7

Rothwell, G. W., Stockey, R. A., Stevenson, D. W., and **Zumajo-Cardona, C.** 2022. **Large Permineralized Seeds in the Jurassic of Haida Gwaii, Western Canada: Exploring the Mode and Tempo of Cycad Evolution** *International Journal of Plant Sciences,* 183(8), 000-000.

Zumajo-Cardona, C., and Ambrose, B. 2022. **Fleshy or dry: Transcriptome analyses reveal the genetic mechanisms underlying bract development in *Ephedra*** *BMC EvoDevo* 13, 10 https://doi.org/10.1186/s13227-022-00195-4

Zumajo-Cardona, C., Stevenson, D., Little D., and Ambrose, B. 2021. **Expression analyses in *Ginkgo biloba* provide new insights into the evolution and development of the seed.** *Scientific reports.* https://doi.org/10.1038/s41598-021-01483-0

Zumajo-Cardona, C., Frangos, S. and Stevenson, D. 2021. **Seed anatomy and development in Cycads and Ginkgo, keys for understanding the evolution of seeds.** *Flora* doi:10.1016/j.flora.2021.151951

Zhu, K., Zheng, X., Ye, J., Huang, Y., Chen, H., Mei, X., Xie, Z., Cao, L., Zeng, L., Larkin, R.M., Xu, Q., Perez-Roman, E., Talón, M., **Zumajo-Cardona, C.,** Wurtzel, E., Deng, X. 2021 **Regulation of carotenoid and chlorophyll pools in hesperidia, anatomically unique fruits found only in Citrus** *Plant Physiology,* 187: 829–845, https://doi.org/10.1093/plphys/kiab291

Zumajo-Cardona, C., and Ambrose, B. 2021 **Deciphering the evolution of the ovule genetic network through expression analyses in *Gnetum gnemon.*** *Annals of Botany;* 128: 217–230.

Zumajo-Cardona, C., Pabon-Mora, N., and Ambrose, B. 2021. **The evolution of *euAPETALA2* genes in vascular plants: from plesiomorphic roles in sporangia to acquired functions in ovules and fruits.** *Molecular Biology and Evolution*; https://doi.org/10.1093/molbev/msab027

Ambrose, B., Smalls, T., and **Zumajo-Cardona, C.,** 2021. **All Type II Classic MADS-genes in the Lycophyte *Selaginella moelledorffii* are broadly yet discretely expressed in vegetative and reproductive tissues.** *Evolution and Development*; https://doi.org/10.1111/ede.12375

Zumajo-Cardona, C., and Ambrose, B. 2020. **Phylogenetic analyses of key developmental genes provide insight into the complex evolution of seeds** *Molecular Phylogenetics and Evolution* Vol 147; doi: 10.1016/j.ympev.2020.106778

Zumajo-Cardona, C., Vasco, A., and Ambrose, B. 2019. **The Evolution of the *KANADI* Gene Family and Leaf Development in Lycophytes and Ferns**. *Plants.* 8:313.

Zumajo-Cardona, C., Pabon-Mora, N., and Ambrose, B. 2018. **Duplication and diversification of *REPLUMLESS* – a case study in the Papaveraceae**. *Frontiers in Plant Science. doi: 10.3389/fpls.2018.01833.*

Stevenson, D., and **Zumajo-Cardona, C.** 2018. **From Plant Ontology to Gene Ontology and back**. *Current Plant Biology.* doi: 10.1016/j.cpb.2018.09.009.

Zumajo-Cardona, C., Ambrose, B., and Pabon-Mora, N. 2017. **Evolution of the *SPATULA/ALCATRAZ* Gene Lineage and expression analyses in the Basal Eudicot, *Bocconia frutecens* L. (Papaveraceae)**. *EvoDevo* doi: 10.1186/s13227-017-0068-8.

Zumajo-Cardona, C., and Pabon-Mora, N. 2016. **Evolution of the APETALA2 Gene Lineage in Seed Plants**. *Molecular Biology and Evolution.* doi:10.1093/molbev/msw059.

S. Marcellini, F. González, A. F. Sarrazin, N. Pabón-Mora, M. Benítez, A. Piñeyro-Nelson, G. L Rezende, E. Maldonado, P. Neiva Schneider, M. B Grizante, R. Nunes DA Fonseca, F. Vergara-Silva, V. Suaza-Gaviria, **C. Zumajo-Cardona,** E. E Zattara, S. Casasa, H. Suárez-Baron, and F. D Brown. 2016. **Evolutionary Developmental Biology (Evo-Devo) Research in Latin America**. *J. Exp. Zool. B Mol. Dev. Evol.* doi: 10.1002/jez.b.22687

PROGRAMMING LANGUAGES

Bash - AWK - Python (+ RNA-Seq analyses)- https://github.com/cezumajo

CONGRESSES, SEMINARS AND COURSES

Botany, Palm Springs, CA July, 2025
Symposium organizer: "The evolutionary history of Gnetales"

- **International Botanical Congress (IBC), Madrid, Spain** July, 2024
  Talk: "Untangling the developmental genomics of the unique reproductive structures in Gnetales"
- **Flowering mechanisms workshop Palermo, Italy** June, 2024
  Poster and Flash talk: "Untangling the developmental genomics of the unique reproductive structures in Gnetales"
- **EMBO course: Leadership for Postdocs, Heidelberg, Germany** April, 2023
- **26th International Conference on Sexual Plant Reproduction, Prague** June 20 to 24, 2022
  Poster: "bHLH genes in the MBW complex, more than flavonoid biosynthesis genes"
- **Botany - Virtual** July 18 to 23, 2021
  "Deciphering development of the seed coat in morphologically diverse seeds in members of Gnetales: Gnetum gnemon, Ephedra californica and Ephedra antisyphilitica"

- **Botany - Virtual** July 27 to 31, 2020
  "Evolution of the seed coat."
- **The society for Integrative and Comparative Biology, SICB. Austin, TX** January 3 to 8, 2020
  Short talk: The evolution of the integument and its implication in seed plant evolution.
- **Venice summer school 2019: Mechanism in development and evolution** August 26 to 30, 2019
  EMBO. Venice, Italy. Short course.
- **Botany, Tucson, Arizona.** July 27 to 31, 2019
  Two short talks: "Evolution of the integument developmental genes in seed plants" and " Anatomical development of the ovules in Cycadales."
- **The Genome access course TGAC.** November 11 to 13, 2018
  Cold Spring Harbor and CUNY. New York, U.S.A. Short course.
- **II Joint Congress on Evolutionary Biology** August 19 to 22, 2018
  Poster. "Fleshy fruits and Fleshy seeds in gymnosperms, a case of convergent evolution?"
- **Botany, Rochester, Minnesota.** July 21 to 25, 2018
  Short talk: "Evolution of tthe RPL gene lineage in Papaveraceae"
- **IX Latin American Society of Developmental Biology Meeting** October 9 to 13, 2017
  Short talk: "Expression analyses of fruit developmental genes in selected non-core eudicots"
- **Course: Comparative Genomics and transcriptomics in non-model species - Medellín, Colombia.** October 2 to 6, 2017
  By Jeramiah Smith, University of Kentucky and Yvan Wenger, Université de Genève.
- **XIX International Botanical Congress, Shezhen, China.** July 23 to 29, 2017
  Short talk: "Lycophyte evolution and development: a transcriptomic and genetic approach" Outstanding Student Award.
- **Primer Encuentro Nacional de Biologia del Desarrollo, Bogotá, Colombia** September 24 to 26, 2015
  Short talk: "Evolution of the APETALA 2 gene lineage in seed plants"

  First Panamerican Evo-Devo meeting, Clark Kerr Campus, University of California Berkeley August 5 to 9, 2015
  Short talk: "Evolution of the APETALA 2 gene lineage in seed plants"
- **VII Colombian congress of botany: VII Congreso Colombiano de Botanica, Ibagué-Tolima, Universidad del Tolima** August 7 to 10, 2013
  Poster exhibitor, first prize undergradute Poster

  Course: 'Curso de Ómicas, Actualización en genómica, transcriptómica y proteómica' 2013
  Universidad de Antioquia, Medellín, Colombia
- **Course: 'Estrategias para la conservacion ex situ de recursos fitogenéticos'** 2013
  Corganized by the Instituto Nacional de Ciencias Agricolas (INCA) Cuba, dictated by: Maria Esther Gonzalez Vega.
- **VI Colombian congress of botany: 'VI Congreso Nacional de Botánica'** August 11 to 15, 2011
  Universidad Javeriana, Cali, Colombia

AWARDS AND GRANTS

Pending:

NSF collaborative research
Title: *Origins and divergence of seed gene regulatory networks: a comparative genomic dissection across gymnosperms* - Cecilia Zumajo-Cardona (PI) and Prof. Shao-Shan C. Huang - NYU (Co-PI) total 1.130.000USD

Simons Foundation plant synthetic biology
Title: *Priming plants for extreme weather: developing a chemically inducible molecular switch to regulate Callose synthase activity* - Prof. Francesca Vallese - CUNY, ASRC (PI) and Cecilia Zumajo-Cardona (Co-PI) total 1.300.000USD

Awarded:
NYBG - Pilot project (2025) Cecilia Zumajo-Cardona (Co-PI) and Dr. Ana Bedoya (PI) *5000USD*

- **STAR@UNIPD - STARs starting grant by Universita degli studi di Padova (2024)** Postdoctoral Fellowship 170.000Euros

EMBO - European Molecular Biology Organization (2022) Postdoctoral Fellowship 132.000Euros

Seal of Excellence by the European Commission, MSCA Postdoctoral Fellowships In 2022.

Katherine Esau Award by the Botanical Society of America In 2020.

Bill Dahl Graduate Student Research Award by the Botanical Society of America $1500 in July 2019.

Doctoral Student Research Grant - The Graduate Center, CUNY. $1500. In 2019.

BSA Development and Structural Section with the publication *Expression and functional studies of basal eudicot REPLUMLESS homologs during flower and fruit development.* In 2018.

First Prize, Student Research Award, with the publication *Evolution of the APETALA2 Gene Lineage in Seed Plants.* Universidad de Antioquia, Medellín, Colombia. In 2016.

EDEN, Evo-Devo-Eco Network Undergraduate Fellowship in 2015 $3000

Best undergradute Poster VII Colombian congress of botany: VII Congreso Colombiano de Botánica, Ibagué, Tolima. In 2013.

FIELD EXPERIENCE

Boyaca, Colombia- With Dr. Favio Gonzalez and Dr. Natalia Pabon-Mora November 2022 Parasitic species collections

Whitewater preserve, California, February 2019 *Ephedra californica* collections

Palo Pinto Co., Texas, February 2019 *Ephedra antisyphilitica* collections

TEACHING EXPERIENCE

Plant Structure *Online*, NYBG - Continuing Education program- (24hrs)
October 2026 - December 2026

- **Plant Structure *in Person*, NYBG - Continuing Education program- (24hrs)**
February 2026 - April 2026
- **Plant-Soil interactions *In person*, new course for the NYBG - Continuing Education program- (co-taught with Dr. Sebastiano Nigris)**
November 2025 - December 2025
- **Plant Structure *Online*, NYBG - Continuing Education program- (24hrs)**
October 2025 - December 2025

- **Invited lecturer, Plant Evolution and Development class at SUNY courtland, NY, USA.**
  Topic: Seed development and evolution
  April 5 - 2023
- **Invited lecturer, Molecular Genetics class at Otterbein University, Ohio, USA.**
  Topic: expression analyses: in situ hybridiation and RNA sequencing
  August 29 - 2022
- **Plant Structure, NYBG - Adult Education program**
  February 2021 - April 2021
- **Plant Diversity, NYBG - Adult Education program**
  October 2020 - November 2020
- **Principles of Biology Lab 167: Organisms. Lehman College, CUNY**
  February 2020 - June 2020
- February 2019 - June 2019 *Three sections, 7.5 hours weekly*
- February 2019 - June 2019 *Three sections, 7.5 hours weekly*
- February 2018 - June 2018 *Two sections, 5 hours weekly*

Principles of Biology Lab 166: Cell and Genes. Lehman College, CUNY
August 2019 - December 2019
August 2018 - December 2019 *Three sections, 7.5 hours weekly*

- February 2018 - June 2018 *Two sections, 5 hours weekly*

STUDENT MENTORING EXPERIENCE

Ph.D. dissertation advisor, to Santiago Perez Ospina, City University of New York (CUNY-NYBG joint program)
"evo-devo in Ephedra species"
August 2026- present

Master dissertation advisor, to Keguang Chen, New York University (NYU)
"Transcriptomic analyses of the different tissues of Podostemum ceratophyllum"
January 2026 - present, planned graduation date December 2027

Master dissertation advisor, to Emma Luther, New York University (NYU)
"Molecular reproductive development of Gnetum gnemon and its implications in seed plant evolution"
January 2026 - present, planned graduation date December 2027

Master dissertation advisor, to Yihe Yu, New York University (NYU)
"Deciphering the role of cytokinins in seed development and triploid block"
October 2025 - May 2026

Master dissertation advisor, to Rachel Wayne, New York University (NYU)
"Deciphering the role of cytokinins in seed development and triploid block"
October 2025 - May 2026

Master dissertation co-tutoring, to Eleonora Cavalera, University of Milano, Italy
"Deciphering the role of cytokinins in seed development and triploid block"
October 2021 - June 2022

Undergraduate dissertation co-tutoring, to Eliana Mendelson, Brandeis University *"Expression analyses of fruit genes in selected basal angiosperms"* Excellence in Research Award, August 2019 - May 2020

Undergraduate dissertation co-tutoring, to Dominique Jeton Groffman, Columbia University Student *"Evolution of the SPOROCYTELESS/SPEAR gene family across land plants"* February 2018 - August 2019

Mentor, PLANTS Program (Preparing Leaders and Nurturing Tomorrow's Scientists: Increasing diversity of plant scientists) Botanical Society of America, *"Botany 2020 Virtual & Botany 2021 Virtual"* 2020 -2021

OUTREACH

Mendelson, E., **Zumajo-Cardona, C.,** and Ambrose, B. **What is a leaf?** *Front. Young Minds.*10:659623. doi: 10.3389/frym.2022.659623 (Science communication paper).

Mendelson, E., **Zumajo-Cardona, C.,** and Ambrose, B. 2020. **What is a fruit?** *Frontiers for Young Minds* 8:27. doi: 10.3389/frym.2020.00027 (Science communication paper).

Zumajo-Cardona, C., and Pabón-Mora, N., 2017 ***APETALA2* un gen que forma flores y frutos**. *Experimenta - Universidad de Antioquia* (Science communication article in spanish)

Podcast episode **In Defense of plants,** Episode 319. *Evolution of the seed* https://www.indefenseofplants.com/podcast/2021/5/30/4fvzoezmxbz791g2hh3cb7lige7oy9

SERVICES

BSA International affairs committee - Student representative 2019 – 2021

Plant Science advisory committee meeting, Lehman College CUNY 2019 – 2020

Plant Science Executive committee Student Representative, CUNY 2018 – 2019

EDITORIAL ROLES

-*Associate Editor* Botanical Review (NYBG journal), Springer.
-*Subject Editor* FLORA, Elsevier.
-Special issue editor for Annals of Botany (2026), *Gnetales - Controversies of Seed Plant Evolution* Co-edited with Dr. Stefanie Ickert-Bond and Dr. Dmitry Sokoloff.
-Focus issue editor for FLORA (2026), *Evolution of reproductive structures in Embryophytes: insights from convergence of evidence and interdisciplinary approaches* co-edited with Dr. Mario Coiro.

-*Reviewer Editor* Evolutionary Developmental Biology- Frontiers

PROFESSIONAL REFERENCES

Dr. Dennis W. Stevenson
Emeritus Curator NYBG and Editor, Botanical Review
email: dws@nybg.org

Dr. Natalia Pabón - Mora
Associate Professor, Universidad de Antioquia
email: lucia.pabon@udea.edu.co

Dr. Lucia Colombo
Professor, Universita degli Studi di Milano
email: lucia.colombo@unimi.it