

JEANMAIRE MOLINA

Associate Professor
Department of Biology
Pace University (NYC)

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<https://scholar.google.com/citations?user=J6tnbl8AAAAJ&hl=en>

EDUCATION

PhD Ecology & Evolution (Jan. 2009)

- Rutgers University-New Brunswick, NJ
- *Dissertation*: Evolution, pollination biology, and biogeography of the grape relative *Leea* (Leeaceae, Vitales) (Advisor: Dr. Lena Struwe)

BS Biology (April 2001)

- University of the Philippines, Diliman, Quezon City, Philippines
- *Thesis*: Expression and purification of the recombinant dengue serotype-3 nonstructural fusion protein in *Escherichia coli* (Advisor: Dr. Ronald Matias)

POST-GRADUATE TRAINING

Postdoctoral Scientist (Jan. 2009-Dec. 2010), New York University, NY

- Conducted research on the evolutionary genomics of Asian rice *Oryza sativa* (Advisor: Dr. Michael Purugganan)

TEACHING

APPOINTMENTS

Associate Professor (Sept. 2022-present) Department of Biology, Pace University, NYC

- Teaches undergraduate introductory biology, Genetics
- Develop and teaches Pharmacology, Medicinal botany
- received excellent reviews from students (see <https://drive.google.com/file/d/1oDRpvi3MTYu09YXcf2llKR7tp-DEGTJx/view?usp=sharing>)

Adjunct Associate Professor (Sept 2022-Aug 2023); **Associate Professor** (Aug 2021- Aug 2022); **Assistant Professor** (Jan. 2011-Aug 2021), Department of Biology, Long Island University-Brooklyn

- Taught undergraduate introductory biology
- Developed and taught undergraduate courses in Ethnobotany and in Anatomy & Physiology
- Developed and taught graduate courses in Medicinal Botany, Bioinformatics & Genomics, Pharmacology
- Consistently received ‘very good-to-excellent’ scores from student evaluations on the IAS system (see https://drive.google.com/file/d/1FFjev_xUS_L1Y8WbPULLzen39jZvacV/view?usp=sharing)

Adjunct Professor (Fall 2020-Spring 2022), Department of Biology, Kean University, Union, NJ

- Taught undergraduate introductory biology, Plant Biology

Visiting Professor (June 2013, June 2015, July 2023), Institute of Biology, University of the Philippines, Diliman

- Designed and taught a graduate course and workshop on DNA barcoding of Philippine medicinal plants

- Mentored students in Nanopore sequencing of *Rafflesia* samples

Teaching Assistant (Sept 2003-Dec. 2008), Rutgers University-New Brunswick, NJ

- Served as instructor for undergraduate lab courses in general biology and general microbiology

MENTORSHIP

Undergraduate mentor to the following students at Pace enrolled in capstone courses:

1. Denia Diaz (BS Behavioral Neuroscience, Spring 2023). Bio 480/ Honors Thesis: “Unveiling the microbes of the world’s largest flowers”
2. Tarika Arjune (BS Biology, Spring 2023). Bio 395 project title “Phylogenetic patterns of medicinal plants used in the treatment of infectious diseases”

Graduate thesis adviser and committee chair to the following students at LIU:

1. Shaimaa Saad (MSc Biology, Summer 2023). Thesis: Pharmaceuticals from natural products: The utility of the phylogeny for bioprospecting and drug discovery
2. Maddu Venkatasivasankar (MSc Biology, Summer 2023). Thesis: Reconstructing the germination pathway from the *Rafflesia* seed transcriptome
3. Feruza Karnitskiy (MSc Biology, Summer 2023). Thesis: Characterization of the mycobiome of *Rafflesia* seeds: their potential ecological roles and applications in *Rafflesia* propagation and conservation
4. *Brian Tomek (MSc Biology, Jan 2023). Thesis: Understanding the Development of *Rafflesia* using a transcriptomic study of seed and flower bud in comparison to *Arabidopsis thaliana*
5. Katherine Veras (MSc Biology, Jan 2023). Thesis: The host phylogeny of holoparasites—evolutionary patterns in hosts and implications in host choice
6. Pravalika Peravali (MSc Biology, Fall 2020), Thesis: The plant phylogeny identifies new sources of plant natural products with pharmacological potential in respiratory diseases including SARS cov-2
7. *Jashvanthraaj Jeevarathanam (MSc Biology, Spring 2020). Thesis: How does *Rafflesia* parasitism affect its host: Metabolite profiling of infected and non-infected host vines using LC-MS
8. Akshay Gutha Ravichandran (MSc Biology, Fall 2019), Thesis: When is a plant no longer a plant? The quest for the elusive plastid genome in the parasitic flowering plant *Rafflesia*
9. Ming Alexander (MSc Biology, Fall 2018). Thesis: New drug sources from plants for diseases of the digestive system: an example of evolutionary pharmacology
10. *Malini Prasad (MSc Biology, Spring 2018). Thesis: Phylogenetic analysis of plants with antibacterial activity reveals certain plant families relevant for antibiotic drug discovery
11. *Emily Guzman (MSc Biology, Fall 2017). Thesis: Potential new sources of cardiovascular drugs from phylogenetic and pharmacological analyses of plants with traditional medicinal uses
12. Usman Sheikh (MSc Biology, Summer 2017). Thesis: Medicinal phytochemicals extracted from plants but co-produced with symbiotic fungal endophytes: is there phylogenetic structure?
13. Badr Aljuaid (MSc Biology, Spring 2017). Thesis: Utility of plastid barcodes in delimiting tree species in the Palanan Forest Dynamics Plot
14. *Nicole Stühr (MSc Biology, Spring 2017). Thesis: Whole genome sequencing of another *Rafflesia* species using semiconductor sequencing technology: is the plastid genome really absent?
15. *Nashmiah Alrashedy (MSc Biology, Spring 2016). Thesis: Ethnobotany of psychoactive plant use: a phylogenetic perspective
16. Maryam Alshamrani (MSc Biology, Spring 2016). Thesis: An eye for an eye: phylogenetic evaluation of the medicinal uses of plants with “healing signatures”
17. Eman Asiri (MSc Biology, Spring 2016). Thesis: The phylogeny of anticancer plants reveals different mechanisms of action among confamilial species
18. Sharday Weaver (MSc Biology, Spring 2015). Thesis: Origin of symbiosis in the parasitic Rafflesiaceae: insights from molecular dating of horizontally transferred genes from its host family, Vitaceae
19. *Camilla Xavier (MSc Biology, Spring 2015). Thesis: Phylogeny of medicinal plants depicts cultural convergence among immigrant groups in New York City
20. *Claire-Iphanise Michel (MSc Biology, Summer 2014). Thesis: DNA barcoding of herbal medicines: the nuclear internal transcribed spacer 2 (ITS2) as a practical solution

*coauthor in our publications

Mentor for the Urban Barcode Research Program (Cold Spring Harbor Laboratories), a science education

initiative to involve high school students in biodiversity science and research (Fall 2016-present, 16 highschool students mentored to date)

SPECIAL TRAINING/ CONTINUING EDUCATION

- Certificate in “Responsible Conduct of Research” and certificate in “Biomedical Researchers and Students Working with Human Subjects” (completed Oct 7, 2020, as part of IRB requirement to conduct clinical trials for Mamome, Inc)
- Plant Care Intensive Course (21 hrs) and Multiplying Plants: Propagation 101 (3 hrs). Continuing Adult Education. Brooklyn Botanical Garden, NY (July 2019)
- NSF Bioscience Industry Fellowship Program (included boot camp training in sterile gowning, cell culture, downstream processing, cGMPs, HPLC, GC-MS, and various bioscience industry site visits). June 11-June 29, 2018. Various institutions in NC.
- Ion Torrent Personal Genome Machine (PGM next generation sequencer) training. March 8-9, 2016. LIU-Brooklyn.
- Phylogenomics symposium and software school. June 19-20, 2014. Raleigh Convention Center, Raleigh, NC.
- iPLANT Workshop, bioinformatics Tools for Plant Science. July 28, 2013. Hilton-Riverside, New Orleans, LA.
- Medical Botany, 12 hrs, Continuing Adult Education. New York Botanical Garden, NY (Spring 2013)
- Perl I. Basics of Perl Programming. School of Continuing and Professional Studies, New York University, NY (January-May 2010)
- Summer Institute in Statistical Genetics, University of Washington, Seattle, WA (June-July 2009)
- International Field Biology Course, CTFS-AA, Lambir Hills National Park, Sarawak, Malaysia (July 15-Aug. 15, 2004)

RESEARCH AND SCHOLARSHIP

APPOINTMENTS

Principal Investigator for the following research projects (Jan 2011-present)

- Phylogenetics and biogeography of Philippine plants
- Community ecology of Philippine forests
- Evolutionary genomics and reproductive biology of Philippine *Rafflesia*
- DNA Barcoding and ethnobotany of herbal medicines

Doctoral researcher and research assistant (Sept. 2003-Dec. 2008), Rutgers University-New Brunswick, NJ

- Worked on the systematics of Leeaceae, Loganiaceae, Gentianaceae, under Dr. Lena Struwe

Botany Research Associate (Nov. 2001-Jun 2002), Center for Tropical Forest Science-Arnold Arboretum (CTFS-AA) and Conservation International (CI)-Philippines

- Performed taxonomic identification/floristic monitoring for various ecological sites in the Philippines and collated the data in the form of publications and field guides

Research Assistant/ Scientific Writer (Jun 2001-Jan. 2002), Research and Biotechnology Division (RBD), St. Luke’s Medical Center, Philippines

- Performed research for the director on various biomedical technologies; assisted the director in producing presentations and scientific write-ups

PUBLICATIONS

Molina J., A. Wicaksono, T. Michael et al. 2023. The seed transcriptome of *Rafflesia* reveals horizontal gene transfer

and convergent evolution: implications for conserving the world's largest flower. *Plants, People & Planet* <https://doi.org/10.1002/ppp3.10370>. [Featured by [Flipsience](#) and [Mongabay](#). Part of this research was funded by Molina's NSF award]

Molina J, Nikolic D, Jeevarathanam JR, et al. 2022. Living with a giant, flowering parasite: metabolic differences between *Tetrastigma loheri* Gagnep. (Vitaceae) shoots uninfected and infected with *Rafflesia* (Rafflesiaceae) and potential applications for propagation. *Planta* 255: 4. [Featured in Mar. 2022 issue of *Scientific American* <https://www.scientificamerican.com/article/giant-rotten-smelling-parasite-flower-rafflesia-evokes-host-defenses/>]

Setubal RB, CL Frasier, **J Molina**, BM Torke, RC Forzza, L Struwe. 2021. A Toxic story: phylogeny and classification in *Strychnos* L. (Loganiaceae). *Systematic Botany* 46: 639-655.

Wicaksono A*, Mursidawati S*, **Molina J***. 2020. A plant within a plant: insights on the development of the *Rafflesia* endophyte within its host. *Botanical Review* 87: 233–242 (*equal authorship).

Prasad MA, Zolnik C, **Molina J**. 2019. Leveraging phytochemicals: the plant phylogeny predicts sources of novel antibacterial compounds. *Future Science OA* doi: 10.2144/fsoa-2018-0124.

Molina J, Sherpa C, Ng J, Sonam T, Stuhr, N. 2018. DNA barcoding of online herbal supplements: crowd-sourcing pharmacovigilance in high school. *Open Life Sciences* 13:48-55.

Guzman E, **Molina J**. 2018. The predictive utility of the plant phylogeny in identifying sources of cardiovascular drugs. *Pharmaceutical Biology* 56:154-164 (invited manuscript).

Molina J. 2018. Phylogenetic analysis of traditional medicinal plants: discovering new drug sources from patterns of cultural convergence. In: McKenna, D, ed. *Ethnopharmacologic Search for Psychoactive Drugs*, Vol. 2: 50 years of research. Santa Fe, NM: Synergetic Press.

Molina J, McLaughlin W, Wallick K, et al. 2017. *Ex situ* propagation of Philippine *Rafflesia* in the United States: Challenges and prospects. *Sibbaldia: the Journal of Botanic Garden Horticulture* 15: 77-96.

Alrashedy N, **Molina J**. 2016. The ethnobotany of psychoactive plant use: a phylogenetic perspective. *PeerJ* 4:e2546. doi: 10.7717/peerj.2546. eCollection 2016.

Pedales R., Damatac II A, Limbo C, Marquez C, Navarro AI, **Molina J**. 2016. DNA barcoding of Philippine herbal medicinal products. *Journal of AOAC International* 99:1479-1489.

Michel CI, Meyer RS, Taveras Y, **Molina J**. 2016. The nuclear internal transcribed spacer (ITS2) as a practical plant DNA barcode for herbal medicines. *Journal of Applied Research on Medicinal and Aromatic Plants* 3:94-100.

Xavier CG, **Molina J**. 2016. Phylogeny of medicinal plants depicts cultural convergence among immigrant groups in New York City. *Journal of Herbal Medicine* 6:1-11.

Molina J, Hazzouri KM, Nickrent DL, et al. 2014. Possible loss of the chloroplast genome in the parasitic flowering plant *Rafflesia lagascae* (Rafflesiaceae). *Molecular Biology and Evolution* 31: 793–803. [Featured in ScienceShots <https://www.science.org/content/article/scienceshot-when-plant-no-longer-plant>, Nature Reviews Genetics <https://www.nature.com/articles/nrg3717>, Quanta magazine <https://www.quantamagazine.org/dna-of-giant-corpse-flower-parasite-surprises-biologists-20210421/>, Discover magazine <https://www.discovermagazine.com/planet-earth/whats-the-big-stink-about-corpse-flowers>]

Molina J, Wen J, Struwe L. 2013. Systematics and biogeography of the non-viny grape relative *Leea* (Vitaceae). *Botanical Journal of the Linnean Society* 171: 354-376.

Huang P, **Molina J**, Flowers JM, et al. 2012. Phylogeography of Asian wild rice, *Oryza rufipogon*: A genome wide view. *Molecular Ecology* 21: 4593-4604.

Flowers, JM, **Molina J**, Rubinstein S, et al. 2011. Natural selection in gene dense regions shapes the genomic pattern of polymorphism in wild and domesticated rice. *Molecular Biology and Evolution* 29:675-687.

Molina J*, Sikora M*, Garud N, Flowers JM, et al. 2011. Molecular evidence for a single evolutionary origin of domesticated rice. *Proceedings of the National Academy of Sciences USA* 108:8351-8356. (*Equal authorship) [Featured in BBC News <https://www.bbc.com/news/science-environment-13266431>]

Xie X, **Molina J**, Hernandez R, et al. 2011. Levels and patterns of nucleotide variation in domestication QTL regions on rice chromosome 3 suggest lineage-specific selection. *PLoS ONE* 6(6): e20670.

K. Mather*, **J. Molina***, J. Flowers, et al. 2010. Migration, isolation and hybridization in island crop populations: The case of Madagascar rice. *Molecular Ecology* 19: 4892-4905. (*Equal authorship).

Molina, J. 2009. Floral biology of Philippine morphospecies of the grape relative *Leea* (Leeaceae). *Plant Species Biology* 24: 53-60.

Molina, J. and L. Struwe. 2009. Utility of secondary structure in phylogenetic reconstructions using nrDNA ITS sequences – an example from Potalieae (Gentianaceae: Asteridae). *Systematic Botany* 34: 414-428.

Molina, J. and L. Struwe. 2008. Revision of ring-gentians (*Symbolanthus*, Gentianaceae) from Bolivia, Ecuador and Peru, with a first assessment of conservation status. *Systematics and Biodiversity* 6: 477-501.

Co, L., J. La Frankie, D. Lagunzad, K. Pasion, H. Consunji, N. Bartolome, S. Yap, **J. Molina**, M. Tongco, U. Ferreras, S. Davies, and P. Ashton. 2006. *Forest Trees of Palanan, Philippines: A Study in Population Ecology*. Center for Integrative and Development Studies, University of the Philippines-Diliman, Philippines.

Molina, J. and L. Struwe. 2004. *Neuburgia novocaledonica*, comb. nov. and the first record of domatia in the family Loganiaceae. *Australian Journal of Systematic Botany* 17: 399-406.

SELECTED PRESENTATIONS

Molina, J. 2023. Reviving the corpse flower: unraveling the enigmatic biology of the iconic plant parasite *Rafflesia* for ex situ conservation. July 28, 2023. Institute of Biology, University of the Philippines-Diliman [oral presentation, invited talk]

Struwe, L., B Alvestegui, B. Angell, J. Lubov, H. Adil, **J. Molina**. The floral diversity of *Symbolanthus* (Gentianaceae) –adaptations and variations in neotropical ring-gentians. July 22-26, 2023. Botany 2023, Boise, ID [poster presentation]

Diaz D, A. Kirdiianova, **J. Molina** (presenting author). 2023. A symbiotic tritecta: the world's largest parasitic flowers, their host plant, and the microbes that live within. May 6-7, 2023. Yosemite Symbiosis Workshop, Yosemite CA [poster presentation].

Prasad, M, C. Zolnik, **J. Molina** (presenting author). 2022. Leveraging phytochemicals: the plant phylogeny predicts sources of novel antibacterial compounds . May 29-June 2, 2022. Society of Economic Botany, University of West Indies, Kingston, Jamaica [poster presentation].

Molina, J. Reviving the corpse flower: Unraveling the enigmatic biology of the iconic plant parasite *Rafflesia* for ex situ conservation. May 6, 2021. California Botanic Garden (zoom seminar, invited talk).

Molina, J. Phylogenetic analysis of traditional medicinal plants: discovering new drug sources from patterns of cultural convergence. *Ethnopharmacologic Search for Psychoactive Drugs II: 50 years of research.* www.espd50.com. June 6-8, 2017. Tyningham Hall, Buckingham, England. [oral presentation, invited talk]

Molina, J. Rooted in the Philippines, branching out abroad: Utility of phylogenies in my research on Philippine plant diversity and herbal medicine. Conference on Biodiversity & Chemical Biology of Marine and Terrestrial Life in the Philippine Region. Oct. 16-20, 2016. Panglao Island, Bohol, Philippines [oral presentation, invited talk]

Molina, J. Exhuming the corpse flower: evolutionary genomics and reproductive biology of Philippine *Rafflesia*. Aug. 15, 2016. Philippine National Museum, Manila, Philippines [oral presentation, invited talk]

Molina, J. Herbal Medicine Phylogenetics in Drug Discovery and Fraud Detection. June 29, 2015. Institute of Biology, University of the Philippines-Diliman. [oral presentation, invited talk]

Molina, J. Evolutionary Genomics of *Rafflesia*. June 10, 2013. Symposium on Marine Biology, Natural Products, and Neuroscience. Marine Science Institute, University of the Philippines-Diliman. [oral presentation, invited talk]

Molina, J. Asian Rice Origin: Will we ever know? Nov. 27, 2010. Institute of Biology, University of the Philippines-Diliman, Philippines. [oral presentation, invited talk]

Molina, J. The collapse of Philippine biodiversity: A global catastrophe. Jan. 8, 2010. New York Botanical Garden. [oral presentation, invited talk]

Molina, J. (presenting author), J.M. Flowers, S. Rubinstein, K. Clemenza, N. Bhambra, P. Huang, B. Schaal, and M.D. Purugganan. The evolutionary genomics of rice domestication. Sixth International Rice Genetics Symposium. Nov. 16-19, 2009. Manila, Philippines [poster presentation].

GRANTS/AWARDS (as sole PI)

- Ex Situ Propagation of Rafflesiaceae at USBG and In Situ Cultivation of Philippine *Rafflesia* (\$45,150), Aug. 2023-Dec. 2024. Cooperative agreement between Pace Univ. and United States Botanic Garden (USBG)
- Classroom Based Undergraduate Research Experiences (CURE) Award (\$4,960), for class project “Cultural convergence in the classroom—student stories of medicinal plant use may predict new sources of pharmaceuticals on the plant phylogeny”, June 15, 2023-2024. Internal award, Pace University.
- National Science Foundation, Plant Biotic Interactions Award Abstract # 2204938. Metabolites and microbes of *Tetrastigma*: the ecology of host choice in *Rafflesia* and potential applications in ex situ conservation of the worlds largest flower (\$279,612), July 2022-July 2024
https://www.nsf.gov/awardsearch/showAward?AWD_ID=2204938&HistoricalAwards=false
- Trailblazer in STEM Award, Inaugural LIU Women’s Recognition Gala, Long Island University-Brooklyn, March 24, 2022.
- Collection and Study of Philippine *Rafflesia*, US Botanic Garden, 2014-2020 (\$43,829)
- Visiting Professorship Grant, University of the Philippines-Diliman, June 2013 and June 2015 (\$4000)
- Professional Development Fund, Long Island University, 2014 (\$2000)
- ASPB (American Society of Plant Biologists) Women Young Investigator Travel Award, 2014 (\$1000)
- DNA Barcoding of Trees in the Palanan Forest Dynamics Plot (PFDP), 2011, Smithsonian Institution (\$2000)
- Systematics Research Fund, The Linnean Society of London, 2007 (£735)
- Academic Excellence Award, Rutgers Dept. of Ecology, Evolution & Natural Resources, 2006 (\$1000)
- Annie’s Homegrown Environmental Scholarship, 2006 (\$1000)
- J. and J. Ruinen Fellowship in Tropical Biology and the Center for Tropical Forest Science-Arnold Arboretum Asia Program of Harvard University, 2005 (\$2700)
- Graduate School of New Brunswick, Rutgers University, 2004 (\$1000)

SERVICE

PROFESSIONAL SERVICE

NSF Panel Reviewer (Plant Biotic Interactions), 2022

External reviewer

- BMC Biology; Systematic Botany, Cladistics, Molecular Ecology; Molecular Biology and Evolution; Molecular Phylogenetics and Evolution; Genome Biology and Evolution; Planta; Proceedings of the Royal Society B; Pharmaceutical Biology; Philippine Journal of Science; Plants, People & Planet

Review Editor (Oct 2022-present) for Plant Systematics and Evolution, Frontiers in Plant Science

COMMUNITY SERVICE/OUTREACH

Mentor to high school students (for the Urban Barcode Research program, Fall 2016-present)

- Supervise students in basic molecular biology lab techniques, in writing a proposal and in the documentation of their results in the form of a scientific paper and poster for presentation

Field work team leader, *Rafflesia* collection (2015-present)

- Organize yearly summer field work in the Philippines to promote conservation awareness and capacity building while supporting the livelihood of the local community involved

REFERENCES

Dr. Susan Pell

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Dr. Ari Novy

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