

# JEANMAIRE MOLINA

Associate Professor  
Department of Biology  
Pace University (NYC)

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## 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** (Tenure track, Sept. 2022-present) Department of Biology, Pace University, NYC

- Teaches undergraduate introductory biology

### **Adjunct Associate Professor** (Sept 2022-present); 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 an undergraduate course in Ethnobotany
- 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\\_x\\_gUS\\_L1Y8WbPULLzen39jZvacV/view?usp=sharing](https://drive.google.com/file/d/1FFjev_x_gUS_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), Institute of Biology, University of the Philippines, Diliman

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

### **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

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

1. Brian Tomek (MSc student, Biology, Spring 2022-present). Thesis: Genetic pathways in the *Rafflesia* seed vs *Rafflesia* flower bud
2. Katherine Veras (MSc student, Biology, Spring 2022-present). Thesis: The host phylogeny of holoparasites—evolutionary patterns in hosts and implications in host choice
3. Iman Farraj (MSc student, Biology, Fall 2021-present). Thesis: How does the pregnant gut microbiome assemble: ecology vs. phylogeny?
4. Maddu Venkatasivasankar (MSc student, Biology, Fall 2021-present). Thesis: Reconstructing the germination pathway from the *Rafflesia* seed transcriptome
5. Feruza Ibragimova (MSc student, Biology, Fall 2020-present). Thesis: Gut microbiome analysis of healthy and pathologic pregnancies: dietary factors and physiological effects
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 Stuhr (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

### Graduate thesis committee member to the following students at LIU:

1. Vasilios Mavromatis (MSc Biology, Spring 2018). Thesis: Phylogenetic/phylogeographic relationships and biogeography of the genus *Gymnopithys*. Graduate adviser: Dr. Jose Tello.
2. Tanashree Kalghatgi (MSc Biology, Spring 2018). Thesis: Study on root hair producing function of cucumber triptychon homolog in root epidermis of *Arabidopsis thaliana*. Graduate adviser: Dr. Su Hwan Kwak
3. Shamim Al Jubaer (MSc Biology, Spring 2018). Thesis: reduced risk pest management practices in apple orchards: environmental impact and arthropod response. Graduate adviser: Dr. Timothy Leslie
4. Alaa Alamoudi (MSc Biology, Summer 2017). Thesis: Environmental filtering of wild bee assemblages in New York City urban community gardens. Graduate adviser: Dr. Timothy Leslie
5. Rana Imam (MSc Biology, Summer 2016). Thesis: Detection of novel protein-protein interaction of K-RAS wild type using gold yeast two hybrid system. Graduate adviser: Dr. Joseph Morin

6. Khushbu Patel (MSc Biology, Spring 2016). Thesis: The role of TORNADO2, SCRAMBLED and PB1-domain containing proteins in *Arabidopsis* root epidermal patterning. Graduate adviser: Dr. Su Hwan Kwak
7. Stefan Fagan (MSc Biology, Spring 2015). Thesis: Using structural bioinformatics to develop cancer protein inhibitors. Graduate adviser: Dr. Lorraine Marsh
8. Pamela Reyes (MSc Biology, Summer 2014). Thesis: Phylogenetic relationships and biogeography of the genus *Onychorhynchus* (Aves: Onychorhynchidae): implications for the evolutionary history of the Neotropical lowlands. Graduate adviser: Dr. Jose Tello
9. Klodiana Jorgji (MSc Biology, Summer 2014). Thesis: A multiloci approach to resolve deep relationships in a major clade of thamnophilid antbirds (Aves: Passeriformes). Graduate adviser: Dr. Jose Tello

**Scientific Officer** for LIU female-founded genomics startup, MaMome, Inc. <https://www.mamome.io/> (July 2019-present), advises Nini Fan, MSc Biology/MBA student (LIU Brooklyn), founder and CEO of MaMome, Inc.

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

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

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

**Molina, J.** Exhuming the corpse flower: evolutionary genomics and reproductive biology of Philippine *Rafflesia* [Oral presentation]. Invited Talk. Aug. 15, 2016. Philippine National Museum.

**Molina, J.** Herbal Medicine Phylogenetics in Drug Discovery and Fraud Detection [Oral presentation]. Invited Talk. June 29, 2015. Institute of Biology, University of the Philippines.

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

**Molina J.** Asian Rice Origin: Will we ever know? [Oral Presentation]. Nov. 27, 2010. Institute of Biology, University of the Philippines-Diliman, Philippines.

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

**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 [Poster presentation]. Sixth International Rice Genetics Symposium. Nov. 16-19, 2009. Manila, Philippines.

#### GRANTS/AWARDS

- 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](https://www.nsf.gov/awardsearch/showAward?AWD_ID=2204938&HistoricalAwards=false)
- 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)

#### RESEARCH COLLABORATORS

- US Botanic Garden, Washington, DC
- Botany Division, Philippine National Museum
- Dr. Ari Novy (President & CEO), San Diego Botanic Garden
- Dr. Michael Purugganan (Professor), Center for Genomics and System Biology, New York University
- Center for Tropical Forest Science Network Scientists, Smithsonian Institution

## SERVICE

### UNIVERSITY SERVICE (LIU)

**Member, Undergraduate BS Biology Program Committee** (Fall 2017-Spring 2022)

- Evaluate curriculum, research and propose new teaching and learning opportunities

**Member, Biology Outcomes Assessment Committee** (Spring 2014- Spring 2022)

- Propose student learning outcomes and how to measure these; prepare biannual reports for university; provide ideas for changes to teaching and learning

**Coauthor, BS/MS Bioinformatics New Programs Development** (Fall 2017-Spring 2018)

- Helped developed the new BS and MS Bioinformatics programs at LIU

**Member, Teaching Narratives Initiative Conference Planning Committee** (May 2012–Sept 2015)

- Organized yearly conference that featured lectures/presentations on advancing student learning with creative and multimodal methods of teaching

### PROFESSIONAL SERVICE

**NSF Panel Reviewer** (Plant Biotic Interactions), 2022

**External reviewer**

- 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

**Editorial board member** (Dec 2013-present)

- Philippine Science Letters (PSL) ISSN 2094-2818

### 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. Michael Purugganan**

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