

# IVAN MIJAIL DE LA CRUZ ARGUELLO

*Mexico City, Mexico*

*Birth: 03-August-1989*

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## RESEARCH INTERESTS

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Evolutionary ecology, coevolution, plant genomics and local adaptation, quantitative genetics, evolution of plant defense to herbivory, chemical ecology, genome assembly and genome evolution, comparative genomics, bioinformatics, ecology

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## EDUCATION

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2020	<b>Postdoctoral Fellow</b> , Laboratory of Molecular Ecology, Institute for Research on Ecosystems and Sustainability, National Autonomous University of Mexico (UNAM) <i>Project: Ecology and Molecular evolution of Quercus in Mexico</i> Supervisor Dr. Ken Oyama Nakagawa
2020	<b>PhD in Philosophy (Honorable Mention)</b> , Department of Evolutionary Ecology, Institute of Ecology, National Autonomous University of Mexico (UNAM) <i>Thesis: Adaptive evolution of resistance against herbivores in Datura stramonium</i> Supervisor Dr. Juan Núñez Fárfan
2015	<b>M.Sc. in Biology</b> , Department of Biology, Metropolitan Autonomous University (UAM), Mexico <i>Thesis: Microdistribution and microhabitat selection of small mammals in a forest of Central Mexico</i> Supervisor Dr. Alondra Castro Campillo
2011	<b>B.S. in Biology</b> , Department of Biology, Metropolitan Autonomous University (UAM), Mexico

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## APPOINTMENTS/OVERSEAS RESEARCH EXPERIENCE

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01/09/2019 - 08/06/2020	<b>Visiting Scientist</b> , Ecological Genetics Research Unit, University of Helsinki, Finland Genomics of <i>Datura stramonium</i> , Supervisor Dr. Juha Merilä
26/03/2018 - 30/06/2018	<b>Visiting Graduate Student</b> , Department of Molecular Ecology, Max Planck Institute for Chemical Ecology, Germany Chemical ecology of plants, Supervisors Dr. Meredith Schuman, Dr. Rayko Halitsche
3/03/2015 - 30/12/2015	<b>Research assistant</b> , Ecological Economy Group, Department of Economy Production, UAM, Mexico Ecology and sustainability, Supervisor Dr. David Barkin Rappaport

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## AWARDS/FELLOWSHIPS

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2020	<b>Honorific Mention – PhD</b> , highest honors for my PhD studies at the Institute of Ecology, UNAM, Mexico
2020	<b>Genetics Society of America Presidential Membership award</b> , Genetics Society of America, USA.
2015	<b>University Merit Medal - MSc</b> , highest honors for my MSc studies, UAM, Mexico
2020	<b>Encouragement of timely graduation award</b> , UNAM, Mexico.
2016 - 2020	<b>Graduate Research Fellowship (PhD)</b> , National Council of Science and Technology (CONACyT), Mexico
2012 - 2014	<b>Graduate Research Fellowship (MSc)</b> , CONACyT, Mexico
2019 - 2020	<b>Finnish National Agency for Education Fellowship (nine months)</b> , Visiting Scientist, University of Helsinki, Finland

2018	<b>Max Planck Society Fellowship (internship; three months)</b> , Department of Molecular Ecology, Max Planck Institute for Chemical Ecology, Germany
2018	<b>Postgraduate Studies Support Program Fellowship (UNAM)</b> , internship at Max Planck Institute for Chemical Ecology, Germany
2020	<b>Tree of Life Award - <i>Datura stramonium</i></b> . Dovetail Genomics. Improving the genome of <i>D. stramonium</i> .
2019	<b>Postgraduate Studies Support Program Fellowship (UNAM)</b> , workshop, University of Copenhagen, Denmark
2017	<b>Postgraduate Studies Support Program Fellowship (UNAM)</b> , conference attendant at Mexican Scientific Society of Ecology, Mexico
2016	<b>Postgraduate Studies Support Program Fellowship (UNAM)</b> , field work, Teotihuacán, Mexico
2015	<b>PhD fellowships (declined)</b> , University of Bristol, Universidad de Chile

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## PUBLICATIONS *peer-reviewed*

Full text can be found in [https://www.researchgate.net/profile/Ivan\\_De\\_La\\_Cruz\\_Arguello](https://www.researchgate.net/profile/Ivan_De_La_Cruz_Arguello)

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### PhD studies

- De-la-Cruz, I. M.**, Hallab, A., Olivares, U., Tapia-López, R., Velázquez-Márquez, S., Piñero, D., Oyama, K., Usadel, B., and Núñez-Farfán, J. (2020). Genomic signatures of the evolution of defence against its natural enemies in the poisonous and medicinal plant *Datura stramonium* (Solanaceae). *Scientific Reports*. <https://doi.org/10.1038/s41598-020-79194-1>
- De-la-Cruz, I. M.**, Merilä, J., Valverde, P. L., Flores-Ortiz C. M., and Núñez-Farfán, J. (2020). Genomic and chemical evidence for local adaptation in resistance to different herbivores in *Datura stramonium*. *Evolution*. <https://doi.org/10.1111/evo.14097>
- De-la-Cruz, I. M.**, Cruz, L. L., Martínez-García, L., Valverde, P. L., Flores-Ortiz, C. M., Hernández-Portilla, L. B., and Núñez-Farfán, J. (2020). Evolutionary response to herbivory: Population differentiation in microsatellite loci, tropane alkaloids and leaf trichome density in *Datura stramonium*. *Arthropod-Plant Interactions*. <https://doi.org/10.1007/s11829-019-09735-7>
- De-la-Cruz, I. M.**, Velázquez-Marquez, S., and Núñez-Farfán J. (2020). What do we know about the genetic basis of plant defensive responses to herbivores? a minireview. In: *Evolutionary Ecology of Plant-Herbivore Interaction* (Eds. Juan Núñez-Farfán and Pedro Valverde). pp 295-314. Springer Nature. [https://doi.org/10.1007/978-3-030-46012-9\\_16](https://doi.org/10.1007/978-3-030-46012-9_16)
- De-la-Cruz, I. M.**, Núñez-Farfán, J. (2020). The complete chloroplast genomes of two Mexican plants of the annual herb *Datura stramonium* (Solanaceae). *Mitochondrial DNA Part B*. <https://doi.org/10.1080/23802359.2020.1789516>

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### MSc studies

- De-la-Cruz, I. M.**, Castro-Campillo, A., Zavala-Hurtado, A., Salame-Méndez, A., and Ramírez-Pulido, J. (2019). Differentiation pattern in the use of space by males and females of two species of small mammals (*Peromyscus difficilis* and *P. melanotis*) in a temperate forest. *Therya*. DOI: [10.12933/therya-19-668](https://doi.org/10.12933/therya-19-668)

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## COURSES, WORKSHOPS AND DIPLOMAS (last five years)

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- Diploma:** Multivariate statistical analysis, UAM
- Diploma:** Conservation and ecology of species in risk of extinction, UAM
- Diploma:** Introduction to GIS theory and remote Perception with emphasis on open source software, UAM
- Diploma:** Desertification and sustainable agriculture in fragile or degraded agroecosystems
- Course:** Statistical analysis applied to the distribution patterns of species, UAM
- Course:** Use of space and habitat selection models UAM
- Course:** Ecological and evolutionary theory (modules I, II, III), UAM
- Course:** Mathematical models in biology, UAM
- Course:** Biostatistical analyses, UAM
- Course:** Regression and multivariate analyses, UAM
- Course:** Quantitative and ecological genetics, UNAM
- Course:** Genomic studies and its general applications, UNAM
- Course:** Adaptive molecular evolution, UNAM
- Course:** Selected topics of plant physiology: Anatomy, Nutrition, Photosynthesis and Transport, UNAM
- Course:** Introduction to bioinformatics using bacterial genomics, UNAM
- Course:** Population genetics, UNAM
- Course:** Ecological genomics, UNAM

**Workshop:** Bioinformatic and analysis of genomic data, UNAM  
**Workshop:** Introduction to the management and data analysis of massive DNA sequencing, UNAM  
**Workshop:** Introduction to Liquid Chromatography/Time-of-Flight/Mass Spectra (HPLC-TOF-MS). UNAM  
**Workshop:** Assembling and annotation of genomes, UNAM  
**Workshop:** Analysis of next generation sequencing data with Galaxy (RNA-seq and ChIP-seq), UNAM  
**Workshop:** JMP Applied to Multivariate statistical analysis, UAM  
**Workshop:** Practical workshop on large-scale genomic data analyses: GWAS in structured populations, The National Laboratory of Genomics for Biodiversity (LANGE BIO), Mexico  
**Workshop:** Next generation sequencing and population genomics, University of Copenhagen. Denmark  
**Workshop:** Unix and R applied to bioinformatics, UNAM

## RESEARCH GRANTS

**Genomics of plant defence.** CONACyT, Mexico (#1527). Co-author and project leader. Director: Dr. Juan Núñez Farfán (185,020.72 usd)  
**Genomic analysis of the adaptation of resistance against herbivores in *Datura stramonium*** (#IG200717). Support Program for Research Projects and Technological Innovation (PAPIIT), UNAM, Mexico. Co-author and project leader. Director: Dr. Juan Núñez Farfán (138,765.54 usd)

## CONFERENCES/PRESENTATIONS

### PhD studies

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|------|---|
| 2019 | Adaptive evolution of resistance against herbivores in <i>Datura stramonium</i><br>VII Mexican National Conference of Ecology, Mexico. <b>Speaker</b>                       |
| 2018 | Genome assembly and annotation of <i>Datura stramonium</i> (Solanaceae)<br>Student Seminar, Institute of Ecology, UNAM, México. <b>Speaker</b>                              |
| 2017 | Differentiation in chemical and physical defense in two native populations of <i>Datura stramonium</i><br>VI Mexican National Conference of Ecology. Mexico. <b>Speaker</b> |

### MSc studies

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| 2017 | Habitat heterogeneity promotes coexistence in the use of space of two <i>Peromyscus</i> (Cricetidae) in a template forest<br>VI Mexican National Conference of Ecology. <b>Poster</b>  |
| 2016 | Selection and use of the microhabitat by two <i>Peromyscus</i> in a conifer forest<br>XIII Mexican National Conference of Mastozoology. <b>Poster</b>  |
| 2016 | Ecological microdistribution in two <i>Peromyscus</i> of a temperate forest in central Mexico<br>XIII Mexican National Conference of Mastozoology. <b>Speaker</b>  |
| 2014 | Differential seasonal use of individual reproductive space of <i>Peromyscus difficilis felipensis</i> and <i>P. melanotis</i> (Rodentia: Cricetidae)<br>63rd Annual Meeting of Southwestern Association of Naturalist. <b>Poster</b> |
| 2013 | Microhabitat quality classification for small mammals in a temperate forest of conifers<br>XII Mexican National Conference of Mastozoology. <b>Poster</b>  |

## TEACHING EXPERIENCE

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| 01/02/2015 – 31/07/2015                            | Biology, Chemistry, Instituto Especializado en Estudios Intensivos S.C. (I.D.E.A.), Mexico City (high school) |
| 01/08/2015 – 17/12/2015                            | Biology and Sustainability, UAM (undergrad students)  |
| 15/01/2017 – 31/07/2017<br>15/01/2019 – 31/07/2019 | Quantitative and Ecological genetics, UNAM (bachelor and graduate students)                                   |

## MEMBERSHIPS/AFFILIATIONS

Society for the Study of Evolution (SSE)  
 Genetics Society of America (GSA)  
 Iberoamerican Society of Bioinformatics (SolBio)  
 Mexican Scientific Society of Ecology (SCME)

## REVIEWER

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*Mitochondrial DNA Part B: Resources* (1)  
*Journal of Plant Research* (1)  
*Ecology and Evolution* (1)

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#### WEBPAGES

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Twitter <https://twitter.com/muerteorcos>  
GitHub <https://github.com/icruz1989> (Here are deposited all workflows, scripts and bioinformatic pipelines that were used during my doctorate studies)  
ResearchGate [https://www.researchgate.net/profile/Ivan\\_De\\_La\\_Cruz\\_Arguello](https://www.researchgate.net/profile/Ivan_De_La_Cruz_Arguello)

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#### SKILLS

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Unix, Stats, HPLC, Insect/Plant care, R, JMP, Bioinformatics, Field work, Lab work

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### ACADEMIC CONTACTS

#### **Professor Juan Núñez Farfán,**

Department of Evolutionary Ecology  
Laboratory of Quantitative Genetics and Evolutionary Ecology  
Institute of Ecology, UNAM  
[farfan@unam.mx](mailto:farfan@unam.mx)

#### **Professor Daniel Piñero Dalmau**

Department of Ecological Biodiversity  
Laboratory of Plant Genetics and Evolution  
Institute of Ecology, UNAM  
[pinero@ecologia.unam.mx](mailto:pinero@ecologia.unam.mx)

#### **Professor Pedro L. Valverde Padilla**

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