

# IVAN MIJAIL DE LA CRUZ ARGUELLO

*Ciudad de México, México*

*Fecha de Nacimiento: 03-Agosto-1989 (31 años)*

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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

June 2021 - present

**Postdoctoral researcher**, Department of Plant Protection Biology, Integrative Plant Protection Unit, Swedish University of Agricultural Sciences (SLU)  
Supervisor: Dr. Johan A. Stenberg

October 2020 – May 2021

**Postdoctoral Fellow**, Laboratory of Molecular Ecology, Institute for Research on Ecosystems and Sustainability, National Autonomous University of Mexico (UNAM)  
*Project: Ecology and Molecular evolution of Quercus in Mexico*  
Supervisor Dr. Ken Oyama Nakagawa

October 2020

**PhD in Philosophy (Honorable Mention)**, Department of Evolutionary Ecology, Institute of Ecology, National Autonomous University of Mexico (UNAM)  
*Thesis: Adaptive evolution of resistance against herbivores in Datura stramonium*  
Supervisor Dr. Juan Núñez Fárfan

March 2015

**M.Sc. in Biology with Excellence Merits**, Department of Biology, Metropolitan Autonomous University (UAM), Mexico  
*Thesis: Microdistribution and microhabitat selection of small mammals in a forest of Central Mexico*  
Supervisor Dr. Alondra Castro Campillo

July 2011

**B.S. in Biology**, Department of Biology, Metropolitan Autonomous University (UAM), Mexico

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## APPOINTMENTS/OVERSEA RESEARCH EXPERIENCE

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01/09/2019 - 08/06/2020

**Visiting Scientist**, Ecological Genetics Research Unit, University of Helsinki, Finland  
Genomics of *Datura stramonium*, Supervisor Dr. Juha Merilä

26/03/2018 - 30/06/2018

**Visiting Graduate Student**, 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

**Research assistant**, 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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2021-present

**Postdoctoral fellowship**, Department of Plant Protection Biology, Swedish University of Agricultural Sciences (SLU)

2021

**Free registration to the Society for Experimental Botany** annual Conference 2021. Attendee Category Low- and Middle-Income Countries

2021	<b>Global Participation Program.</b> Free registration for my participation in the annual meeting 2021 of the Society for Study of Evolution
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 at 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)

**De-la-Cruz**, I. M., Castro-Campillo, A., Salame-Méndez, A. 2021. Habitat heterogeneity facilitates coexistence of two syntopic species of *Peromyscus* in a temperate forest of Central Mexico. *Therya*. <https://doi.org/10.12933/therya-21-1113>

**Velázquez-Márquez**, S., De-la-Cruz, I. M., Tapia-López, R., Núñez-Farfán, J. Tropane alkaloids and terpene synthase genes of *Datura stramonium* (Solanaceae). *PeerJ*. <https://doi.org/10.7717/peerj.11466>

**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>

**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

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

**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 (LANGEBIO), Mexico  
**Workshop:** Next generation sequencing and population genomics, University of Copenhagen. Denmark  
**Workshop:** Unix and R applied to bioinformatics, UNAM  
**Workshop:** RepeatExplorer; discovering repeats in NGS data. Virtual.

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## RESEARCH GRANTS

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**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)

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## CONFERENCES/PRESENTATIONS

### PhD studies

2021	Genomic and chemical evidence for local adaptation in resistance to different herbivores in <i>Datura stramonium</i> Virtual Evolution 2021. Society for the study of Evolution <b>Speaker</b>
2019	Adaptive evolution of resistance against herbivores in <i>Datura stramonium</i> VII Mexican National Conference of Ecology, Mexico. <b>Speaker</b>
2019	Natural history and infestation dynamic of three herbivores specialist of <i>Datura stramonium</i> VII Mexican National Conference of Ecology, Mexico. <b>Speaker</b>
2018	Genome assembly and annotation of <i>Datura stramonium</i> (Solanaceae) 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> VI Mexican National Conference of Ecology. Mexico. <b>Speaker</b>

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### MSc studies

2017	Habitat heterogeneity promotes coexistence in the use of space of two <i>Peromyscus</i> (Cricetidae) in a template forest 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 XIII Mexican National Conference of Mastozoology. <b>Poster</b>
2016	Ecological microdistribution in two <i>Peromyscus</i> of a temperate forest in central Mexico 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) 63rd Annual Meeting of Southwestern Association of Naturalist. <b>Poster</b>

2013

Microhabitat quality classification for small mammals in a temperate forest of conifers  
XII Mexican National Conference of Mastozoology. **Poster**

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**TEACHING EXPERIENCE**

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	Quantitative and Ecological genetics, UNAM (bachelor and graduate students)
15/01/2019 – 31/07/2019	

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**MEMBERSHIPS/AFFILIATIONS**

Society for the Study of Evolution (SSE)  
Society for Molecular Biology and Evolution (SMBE)  
Genetics Society of America (GSA)  
Iberoamerican Society of Bioinformatics (SolBio)  
Sociedad Científica Mexicana de Ecología (SCME)

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**REVIEWER**

*Mitochondrial DNA Part B: Resources* (3)  
*Journal of Plant Research* (1)  
*Ecology and Evolution* (2)

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**WEBPAGES**

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**

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 Johan A. Stenberg**

Department of plant protection biology  
Integrated plant protection group  
Swedish University of Agricultural Sciences  
[Johan.Stenberg@slu.se](mailto:Johan.Stenberg@slu.se)

**Professor Ken Oyama Nakawaga**

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