

# 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)

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

**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

**Global Participation Program**. 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*

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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>
- Velazquéz-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](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 (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

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### 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. <b>Poster</b>

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 15/01/2019 – 31/07/2019	Quantitative and Ecological genetics, UNAM (bachelor and graduate students)
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)
REVIEWER	
	<i>Mitochondrial DNA Part B: Resources</i> (3) <i>Journal of Plant Research</i> (1) <i>Ecology and Evolution</i> (2)
WEBPAGES	
	Twitter <a href="https://twitter.com/muerteorcos">https://twitter.com/muerteorcos</a> GitHub <a href="https://github.com/icruz1989">https://github.com/icruz1989</a> (Here are deposited all workflows, scripts and bioinformatic pipelines that were used during my doctorate studies) ResearchGate <a href="https://www.researchgate.net/profile/Ivan_De_La_Cruz_Arguello">https://www.researchgate.net/profile/Ivan_De_La_Cruz_Arguello</a>
SKILLS	
	Unix, Stats, HPLC, Insect/Plant care, R, JMP, Bioinformatics, Field work, Lab work

## 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**

Institute for Research on Ecosystems and Sustainability  
Escuela Nacional de Estudios Superiores Campus Morelia  
[kenoyama@enesmorelia.unam.mx](mailto:kenoyama@enesmorelia.unam.mx)

### **Professor Daniel Piñero Dalmau**

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