

# Carolina A. Martínez-Gutiérrez, MS

*Curriculum Vitae*

## Graduate Research Assistant and Ph.D. Candidate

Department of Biological Sciences

Virginia Tech

Blacksburg, VA, 24061

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## EDUCATION AND RESEARCH EXPERIENCE

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2018-23 PhD student in Biological Sciences, Department of Biological Sciences, **Virginia Polytechnic Institute and State University**, Blacksburg, VA.

Advisor: Frank O. Aylward.

2015-18 **Master in Biotechnology**, Use, Manage and Conservation of Natural Resources Program, Northwestern Center of Biological Research, Baja California Sur, Mexico.

**Thesis: Isolation and Culture-Independent Analysis of Polyhydroxyalkanoates-Producing and *n*-Hexadecane-Degrading Communities in Microbial Mats from Guerrero Negro, Mexico.**

Advisor: Alejandro López-Cortés and José Q. García-Maldonado.

2010-15 **Bachelor in Marine Biology**, Autonomous University of Baja California Sur, Mexico.

Undergraduate Research in Microbiology, **Thesis: Affect of Glucose Concentration on Production of Biomass and Polyhydroxyalkanoates by *Paracoccus seriniphilus* E71 strain.**

Advisor: Alejandro López-Cortés.

## PUBLICATIONS

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### Peer-reviewed articles/preprints

1. **Martinez-Gutierrez, C.A.** and Aylward F.O. (2022). Genome size distributions in bacteria and archaea are strongly linked to evolutionary history at broad phylogenetic scales. *bioRxiv*
2. **Martinez-Gutierrez, C.A.** and Aylward F.O. (2021). Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea. *Molecular Biology and Evolution*.
3. Moniruzzaman, M., Weinheimer, A.R., **Martinez-Gutierrez, C.A.** et al. (2020) Widespread endogenization of giant viruses shapes genomes of green algae. *Nature* 588, 141–145
4. Moniruzzaman, M., **Martinez-Gutierrez, C.A.**, Weinheimer, A.R. et al. (2020) Dynamic genome evolution and complex virocell metabolism of globally-distributed giant viruses. *Nature Communications* 11(1710)

5. **Martínez-Gutiérrez, C.A.** and Aylward F. O. (2019) Strong Purifying Selection Is Associated with Genome Streamlining in Epipelagic *Marinimicrobia*. *Genome Biology and Evolution*. 11(10): 2887-2894
6. Hernández-Núñez, E., **Martínez-Gutiérrez, C. A.**, López-Cortés, A., Aguirre-Macedo, M. L., Tabasco-Novelo, C., González-Díaz, M. O., and García-Maldonado, J. Q. (2019) Physico-chemical Characterization of Poly (3-Hydroxybutyrate) Produced by *Halomonas salina*, Isolated from a Hypersaline Microbial Mat. *Journal of Polymers and the Environment*. 1-7
7. **Martínez-Gutiérrez, C.A.**, Latisnere-Barragán, H., García-Maldonado, J.Q., López-Cortés A. (2018) Screening of polyhydroxyalkanoate-producing bacteria and PhaC-encoding genes in two hypersaline microbial mats from Guerrero Negro, Baja California Sur, Mexico. *PeerJ* 6:e4780

#### **Book Chapter (Author's proof submitted)**

1. **Martínez-Gutiérrez, C.A.** and Aylward F. O. Evolutionary Genomics of Marine Bacteria and Archaea. In Stal J.L. and Cretoiu MS (eds) *The Marine Microbiome: An Untapped Source of Biodiversity and Biotechnological Potential*, second edition. Springer

#### **Book Review**

1. **Martínez-Gutiérrez, C. A.** and García-Carreño, F. (2017) Review The Vital Question: Energy, Evolution, and the Origins of Complex Life, Nick Lane. *Recursos Naturales y Sociedad*. 3(1): 29-36

#### **Symposium memories**

1. Pérez-Medina, M., **Martínez-Gutiérrez, C. A.**, Padilla-Hernández, R.E., Valerdi-Negreros, J.C., Cuevas-Rodríguez, G., Brito-Souza, E. M. (2014) Application of Microculture for Bacterial Isolation from Industrial Residue Contaminated by Hexavalent Chromium. *II International Symposium of Environmental Bioengineering*. University of Guanajuato. 158-162

#### **FELLOWSHIPS/AWARDS**

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| 2021 | <b>International Women's day Award for Scientific Career</b> , Northwestern Center for Biological Research, Mexico |
|      | <b>College of Science Virginia Tech Fellowship</b> , Fall Semester, 2021   |
| 2018 | <b>Biological Sciences Graduate Opportunity Fellowship Virginia Tech</b> , Fall Semester 2018                      |

- 2017 **Erasmus Mundus Exchange Program**, Fellowship to study one trimester at the Institut Universitaire Européen de la Mer, and receive training from the Laboratory of Microbiology of the Extreme Environments at the Institut Français de Recherche pour l'Exploitation de la Mer, Brest, France
- 2015-17 **Master's Fellowship, National Commission of Science and Technology (CONACyT)**, fellowship for Master's Research

## ACADEMIC ACTIVITIES

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- 2021 American Society for Microbiology, Flash Talks online mini-conference. **Presentation: Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea.**
- Metagenomics Event at Virginia Tech. **Presentation: Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea.**
- Virginia Tech Research Day, Blacksburg, USA. **Presentation: Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea.**
- 2019 Microbiology of Food, Energy, Water, and Health Systems Mini-Symposium, Blacksburg, USA. **Poster: Convergent DNA repair gene loss across diverse streamlined marine bacterial genomes.**
- 2019 Virginia Tech Research Day, Blacksburg, USA. **Poster: Convergent DNA repair gene loss across diverse streamlined marine bacterial genomes.**
- 2018 American Society for Microbiology, Virginia Branch Annual Meeting, Radford, USA. **Poster: Convergent DNA repair gene loss across diverse streamlined marine bacterial genomes.**
- 2017 Internship at the Laboratory of Microbiology of the Extreme Environments, Institut Français de Recherche pour l'Exploitation de la Mer, Brest, France. **Project: Production of Polyhydroxyalkanoates by Bacterial Strains Isolated from Hydrothermal Vents.**
- Internship at the Laboratory of Marine Pathology and Microbiology, Center of Investigation and Advanced Research, Merida, Mexico. **Project: Experiments of Graduate Research.**
- 2015 III National Congress of Biochemistry and Molecular Biology of Bacteria, Puebla, Mexico. **Poster: Affect of Glucose Concentration on Production of Biomass and Polyhydroxyalkanoates by *Paracoccus seriniphilus* E71 strain.**

2014 XIX Congress of Scientific and Technological Investigation from the Pacific, Nayarit, Mexico. **Presentation: Isolation of Bacterial Strains from Industrial Sediments Contaminated with Chromo (VI).**

Internship at the Laboratory of Environmental Engineering, University of Guanajuato, Guanajuato, Mexico. **Project: Bioprospection of Extremophilic Microorganisms.**

## TRAINING COURSES

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2018-19 **Biological Sciences GTA Teaching Certificate**, Center for Excellence in Teaching and Learning at Virginia Tech, Blacksburg, USA.

2018 **Proteomics: Principles and Analytical Tools**, Northwestern Center of Biological Research, La Paz, Mexico.

2017 **II Summer School in Bioinformatics**, National Autonomous University of Mexico, Queretaro, Mexico.

**Bioinformatics Abilities: Introduction to UNIX, R, Python and Versions Control with Git**, Center of Genomic Sciences, National Autonomous University of Mexico, Cuernavaca, Mexico.

**Phyloinformatics: Homology, Alignments and Phylogenetic Inference**, Center of Genomic Sciences, National Autonomous University of Mexico, Cuernavaca, Mexico. 2017.

2016 **Next-Generation Sequencing and Computational Epigenetic**, Northwestern Center of Biological Research, La Paz, Mexico.

**Metagenomics: Applications and Study Cases in Marine Organisms**, Northwestern Center of Biological Research, La Paz, Mexico.

2015 **Production and Purification of Recombinant Proteins from Submerged Cultures of *Escherichia coli***. Interdisciplinary Center of Marine Sciences, La Paz, Mexico.

## CONFERENCES AND SEMINARS (\*invited)

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**December 2<sup>nd</sup>, 2021** Northwestern Center for Biological Research, Mexico.\*

**April 28<sup>th</sup>, 2021** Northwestern Center for Biological Research, Mexico.\*

**December 12<sup>th</sup>, 2017** Institut Universitaire Européen de la Mer, France. \*

**July 13<sup>th</sup>, 2017** Northwestern Center of Biological Research, La Paz, Mexico.

**April 14<sup>th</sup>, 2016** Northwestern Center of Biological Research, La Paz, Mexico.

**June 05<sup>th</sup>, 2015**

Autonomous University of Baja California Sur, La Paz, Mexico. \*

**November 22<sup>th</sup>, 2013**

Autonomous University of Baja California Sur, La Paz, Mexico.

## **TECHNICAL ABILITIES**

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### **1. Equipment skills**

Phase-Contrast Microscopy, Laminar-Flow Station, Extraction Station, PCR Station, Incubators for Bacterial Cultures, UV-Vis Spectrophotometer, Centrifuge, Photodocumentation System, Thermocycler, Electrophoresis Chamber, Analytic Balance, Micropipets, Potentiometer, Autoclaving Equipment, Nanodrop, Qubit 30, Rotor Gene (qPCR), Molecular Cloning.

### **2. Computational skills**

Highly proficient in Windows and Linux, as well as Python and R as programming languages.

## **FIELD WORK**

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2016 Ecological and Molecular Research of Hypersaline Microbial Mats from Baja California Sur. **National Aeronautics and Space Administration (NASA), sampling of microbial mats for further experiments, Guerrero Negro, Mexico.**