

# Carolina A. Martinez-Gutierrez, PhD

*Curriculum Vitae*

## Postdoctoral Researcher

Department of Biology, North Carolina State University  
Raleigh, NC  
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## EDUCATION

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- 2018-2022 PhD in Biological Sciences, Department of Biological Sciences, **Virginia Tech**, USA. Awarded in November 2022.
- 2015-2017 M.Sc. in Biotechnology, Environmental Planning Program, **Northwestern Center for Biological Research**, Mexico. Awarded in January 2018.
- 2010-2015 B.S. in Marine Biology, **Autonomous University of Baja California Sur**, Mexico. Awarded in August 2015.

## ACADEMIC POSITIONS AND RESEARCH EXPERIENCE

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- 2023 **Postdoctoral Researcher**. Advisor: Louis-Marie Bobay, Department of Biology, **North Carolina State University**, USA.
- 2018-2022 **PhD Candidate**. Advisor: Frank O. Aylward, Department of Biological Sciences, **Virginia Tech**, USA.
- 2015-2017 **Masters Researcher**. Advisor: Alejandro Lopez-Cortes, Environmental Planning Program, **Northwestern Center for Biological Research**, Mexico.
- 2014-2015 **Undergraduate Researcher**. Advisor: Alejandro Lopez-Cortes, Environmental Planning Program, **Northwestern Center for Biological Research**, Mexico.

## ACADEMIC HONORS, AWARDS, AND SCHOLARSHIPS

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- 2023 **Nomination Best PhD Dissertation Award**. Department of Biological Sciences, Virginia Tech.
- 2022 **Annie J. Liberati Memorial Scholarship**. Department of Biological Sciences, Virginia Tech (\$1000).

**International Society for Microbial Ecology Travel Grant** (Lausanne, Switzerland) (\$800).

**Travel Fund Program.** Graduate School, Virginia Tech (\$750).

2021 **International Women’s Day Award for Scientific Career.** Northwestern Center for Biological Research, Mexico.

**College of Science Virginia Tech Fellowship.** Virginia Tech. One semester stipend and tuition.

2018 **Biological Sciences Graduate Opportunity Fellowship.** Virginia Tech (\$4000).

2017 **Erasmus Mundus Exchange Program,** Fellowship to study one trimester abroad at the Institut Universitaire Européen de la Mer. One trimester stipend and tuition.

2015 **Masters Fellowship.** National Commission for Science and Technology, Mexico. Two years stipend and tuition.

## RESEARCH FELLOWSHIPS

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2023-2026 **Simons Postdoctoral Fellowship in Marine Microbial Ecology** (\$270,000, annual stipend and allowance).

## PUBLICATIONS

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### *Peer-reviewed original research articles and preprints*

*#Corresponding author*

1. **Martinez-Gutierrez, C.A. #**, Uyeda, J. and Aylward, F.O. (2023) A Timeline of Bacterial and Archaeal Diversification in the Ocean. *eLife*. 12:RP88268. [Manuscript access](#)
2. **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. *Plos Genetics*. 18(5), e1010220. [Manuscript access](#)
3. **Martinez-Gutierrez, C.A.** and Aylward, F.O. (2021) Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea. *Molecular Biology and Evolution*. 38(12), 5514–5527. [Manuscript access](#)
4. Moniruzzaman, M., Weinheimer, A.R., **Martinez-Gutierrez, C.A.**, Aylward, F.O. (2020) Widespread endogenization of giant viruses shapes genomes of green algae. *Nature* 588, 141–145. [Manuscript access](#)

5. Moniruzzaman, M., **Martinez-Gutierrez, C.A.**, Weinheimer, A.R., Aylward F.O. (2020) Dynamic genome evolution and complex virocell metabolism of globally-distributed giant viruses. *Nature Communications* 11(1710). [Manuscript access](#)
6. **Martinez-Gutierrez, 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. [Manuscript access](#)
7. Hernández-Núñez, E., **Martinez-Gutierrez, C.A.**, López-Cortés, A., Aguirre-Macedo, M.L., Tabasco-Novelo, C., González-Díaz, M. O., 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* 27, 1105–1111. [Manuscript access](#)
8. **Martinez-Gutierrez, 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. [Manuscript access](#)

### **Book Chapter**

1. **Martinez-Gutierrez, C.A.**# and Aylward, F.O. (2022) 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* 327-354. [Manuscript access](#)

### **Book Review Outreach**

1. **Martinez-Gutierrez, C.A.** and García-Carreño, F. (2017) The Vital Question: Energy, Evolution, and the Origins of Complex Life, Nick Lane. *Recursos Naturales y Sociedad* 3(1): 29-36. [Manuscript access](#)

### **SELECTED POSTERS, PRESENTATIONS, AND SEMINARS (\*invited)**

1. **Virginia Tech**, Virginia, USA. 2023. Host lecturer: Phylogenomics and the Early Evolution of Bacteria and Archaea. \*
2. **Purdue University**, Indiana, USA. 2023. Colloquium: Phylogenomics and the Nature of Early Life on Earth. \*
3. **University of California Santa Barbara**, California, USA. 2023. Colloquium: Phylogenomics and the Early Evolution of Bacteria and Archaea. \*

4. **18<sup>th</sup> International Symposium on Microbial Ecology**, Lausanne, Switzerland. 2002. Poster: A Phylogenomic Timeline of Bacterial and Archaeal Diversification in the Ocean.
5. **Workshop Feasible but Undiscovered Metabolisms: Thermodynamics, Evolution, and the Origin of Life**, Santa Fe Institute, New Mexico, USA. 2022. Presentation: Phylogenomic Methods Applied to the Study of Early Microbial Evolutionary Events. \*
6. **American Society for Microbiology**. ASM Microbe Conference, Washington, DC, USA. 2022. Poster: Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea.
7. **American Society for Microbiology**. Flash Talks online mini conference. Blacksburg, USA. 2021. Presentation: Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea.
8. **Metagenomics Event at Virginia Tech**. Blacksburg, USA. 2021. Presentation: Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea.
9. **Virginia Tech Research Day**. Blacksburg, USA. 2021. Presentation: Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea.
10. **Northwestern Center for Biological Research**. Mexico. 2021. Presentation: Phylogenetic Signal, Congruence, and Uncertainty across Bacteria and Archaea. \*
11. **Northwestern Center for Biological Research**. Mexico. 2021. Presentation: Strong Purifying Selection is Associated with Genome Streamlining in Epipelagic Marinimicrobia. \*
12. **Virginia Tech Research Day**. Blacksburg, USA. 2020. Presentation: Strong Purifying Selection is Associated with Genome Streamlining in Epipelagic Marinimicrobia.
13. **Microbiology of Food, Energy, Water, and Health Systems Mini-Symposium**. Blacksburg, USA. 2019. Poster: Convergent DNA repair gene loss across diverse streamlined marine bacterial genomes.
14. **Virginia Tech Research Day**. Blacksburg, USA. 2019. Poster: Convergent DNA repair gene loss across diverse streamlined marine bacterial genomes.
15. **American Society for Microbiology**. Virginia Branch Annual Meeting, Radford, USA. 2018. Poster: Convergent DNA repair gene loss across diverse streamlined marine bacterial genomes.

16. **Institut Universitaire Européen de la Mer.** Brest, France. 2017. Presentation: Polyhydroxyalkanoates Bioplastics Produced by Hypersaline Microorganisms. \*
17. **III National Congress of Biochemistry and Molecular Biology of Bacteria.** Mexico. 2015. Poster: Effect of Glucose Concentration on Production of Biomass and Polyhydroxyalkanoates by *Paracoccus seriniphilus* E71 strain.
18. **Autonomous University of Baja California Sur.** Mexico. 2015. Production of Biodegradable Bioplastics by Marine Microorganisms\*

## TEACHING EXPERIENCE

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1. **Teaching Assistant. Fall 2022. Virginia Tech.**  
**Course: Principles of Biology Lab**  
I taught a laboratory section to three groups of undergraduate students. My activities consisted in presenting lectures about experiments, assisting students during experiments, helping students during office hours, grading quizzes and worksheets, and designing quizzes.
2. **Highschool Teacher. Spring 2018. Saint John's Highschool, Mexico.**  
**Courses: General Biology and Marine Biology**  
For these courses, my activities consisted in presenting lectures, grading, and helping students to develop science projects.
3. **Teaching Certificate Program - Virginia Tech**  
I received training to develop effective teaching strategies.

## MENTORING EXPERIENCE

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1. **Undergraduate Student Nick Anderson (now master's student in Hopkins University)**  
I provided guidance to develop a bioinformatics-based project to study the evolution of a marine microbial clade. Senior project required by the Systems Biology program at Virginia Tech.
2. **Graduate Students Paula Erazo and Sangita Karki.**  
I trained graduate students in the use of computational tools with phylogenetic applications.

## FIELD EXPERIENCE

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1. **Ecology and Molecular Biology of Hypersaline Microbial Mats from Baja California Sur.** Mexico. 2016. National Aeronautics and Space Administration (NASA).

## **SERVICE**

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### ***Academic Reviewing***

1. iScience.
2. ISME Communications.
3. Frontiers in Microbiology.
4. Genome Biology and Evolution.

### ***Selected Outreach and Science Communication Activities***

1. Exactamente Mujeres. 2022 and 2023. I joined a group of female scientists from different academic backgrounds to talk about scientific careers to high school students in Latin American countries.
2. Research Day at Virginia Tech. Science presentations for the general community in Blacksburg. Annual participation from 2018-2021.
3. Kid's Tech University. 2020. I taught kids about evolution through interactive activities.
4. The DNA of You and Me. 2020. Kindergarten visit. Development of activities to teach kids concepts of genetics.
5. Gilbert Linkous Elementary School Science Affair. 2019. I judged science projects of kids.
6. Reviewer of Graduate Students Research Projects at Virginia Tech. 2019.

### ***Community Service***

1. Call Center COVID vaccine appointments for Spanish-speaking communities. 2021.
2. Organization of Research Day for graduate Students at Virginia Tech. 2021-2022.
3. Development of scientific materials in Spanish COVID pandemic. 2020.
4. Cleaning Day of the New River, Virginia. 2019.
5. The Big Planting Day at Virginia Tech. Reforestation of Blacksburg Streams. 2019.