

Alba Chavez, PhD

Professor and Researcher

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Research Interests

My research focuses on **microbial physiology, infectious diseases, host-microbe interactions, and biofilm biology**, with particular emphasis on clinically relevant and spaceflight-associated microorganisms. I am especially interested in understanding how **microgravity and extreme environments alter microbial gene expression, virulence, and resistance**, and how these changes impact human health in space and on Earth.

Academic Positions

- 2026 **TEXAS A&M UNIVERSITY** (San Antonio, TX)
Assistant Professor of Microbiology
- 2020–2025 **EMBRY-RIDDLE AERONAUTICAL UNIVERSITY** (Daytona Beach, FL)
Assistant Professor of Aerospace Physiology
Undergraduate Mentor
- 2019–2020 **NEW MEXICO STATE UNIVERSITY** (Las Cruces, NM)
Visiting Assistant Professor of Microbiology
- 2017–2019 **NEW MEXICO HIGHLANDS UNIVERSITY** (Las Cruces, NM)
Visiting Assistant Professor of Biology
Undergraduate Mentor
- 2016–2017 **NEW MEXICO STATE UNIVERSITY** (Las Cruces, NM)
Visiting Assistant Professor of Microbiology
Research Associate
- 2012–2016 **UNIVERSITY OF NEW MEXICO** (Albuquerque, NM)
Postdoctoral Research Associate
IRACDA Fellow

Education

- 2008–2012 **NEW MEXICO STATE UNIVERSITY**
Ph.D. Biology (Microbiology emphasis)
- 2006–2008 **NEW MEXICO STATE UNIVERSITY**
M.S. Biology
- 2000–2004 **UNIVERSIDAD AUTONOMA DE CHIHUAHUA**
B.S. Chemistry, Bacteriology and Parasitology
- 2009, 2017 **SORBONNE UNIVERSITY**
OBERVATOIRE OCE'ANOLOGIQUE
LABORATOIRE ARAGO
Visiting Fellow, Marine Microbiology
- 2010 **UNIVERSITY OF NEW SOUTH WALES**
Visiting Fellow, Marine Microbiology

2008, 2009 **COLORADO COLLEGE**
Visiting Fellow, Microbiology

Journal Publications

- Morales-Morales H, Rivas-Lucero B, Segovia-Lerma A, **Chavez A** and Smith G. 2007. Biocide effect of *Jetropia dioica* and *Lippia graveolens*. *Agricol Practices*. 3(5):70-71.
- Chavez A** and Nishiguchi MK. 2011. Effect of environmental factors on Biofilm formation by *Vibrio fischeri* isolates. *Journal of Basic Microbiology*. 51: 452-458.
- Chavez A**, Hogan D, Gorman C, Quintanal-Villalonga A and Nishiguchi MK. 2012. Multiple *Vibrio fischeri* genes are involved in biofilm formation and host colonization. *FEMS Microbial Ecology*. 81(3): 562-573.
- Chavez A**, Gorman C, Erken M, Steinberg P, McDougald D and Nishiguchi MK. 2012. Predation response of *Vibrio fischeri* biofilms to bacterivorous protists/phagotrophic protozoa. *Applied and Environmental Microbiology*. 79 (2): 553-558.
- Guerrero-Ferreira R, Gorman C, **Chavez A** and Nishiguchi MK. 2012. Characterization of the Bacterial Diversity in Indo-West Pacific Loliginid and Sepiolid Squid Light Organs. *Microbial Ecology* 65 (1): 214-226.
- Chavez A**, Jahng M, Rane HS, Asare K, Kulkarny VV, Bernardo SM and Lee SA. 2014. In vitro analyses of Flufenamic Acid activity against *Candida albicans* biofilms. *International Journal of Antimicrobial Agents*. 43 (1):86-91.
- Chavez A**, Gorman C, Lostroh P and Nishiguchi MK. 2014. Gene-Swapping mediates host specificity among symbiotic bacteria in a beneficial symbiosis. *PLoS One* 11;9(7):e101691.
- Bernardo SM, Rane HS, **Chavez A** and Lee SA. 2014. Secretion and filamentation are differentially mediated by the *Candida albicans* t-SNAREs SSO2 and SEC9. *FEMS Yeast Research*. 14(5):762-75.
- Chavez A**, Lown L, Jahng M, Walraven CJ and Lee SA. 2014. An *in vitro* analysis of finasteride activity against *Candida albicans* urinary biofilm formation and filamentation. *Antimicrobial Agents and Chemotherapy*. 58 (10): 5855-5862.
- Kulkarni VV, **Chavez A**, Rane HS, Jahng M, Bernardo SM, Parra KJ and Lee SA. 2014. Quinacrine inhibits *Candida albicans* growth and filamentation at neutral pH. *Antimicrobial Agents and Chemotherapy*. 58(12): 7501-7509.
- Chavez A**, Morales-Morales H and Smith G. 2014. Antibacterial activity of Mexican Oregano essential oil (*Lippia berlandieri*) on phytopathogenic *Xanthomonas vesicatoria*. *Tecnociencia*. 3(2):109-121.
- Chavez A**, Gorman C and Nishiguchi MK. 2015. Proteomic and metabolomic profiles demonstrate variation among free-living and symbiotic *Vibrio fischeri* biofilms. *BMC Microbiology*. 15:226.
- Chavez A**, Nourabadi N, Erken M, McDougald D and Nishiguchi MK. 2016. Evaluation of a metabolic-based assay for Vibrionaceae biofilms and comparative analysis of biofilm quantitation methodologies. *Folia Microbiologica*. 61:449-453.
- Chavez A**, Soto W and Nishiguchi MK. 2021. Identification of a Transcriptomic network underlying the wrinkly and smooth phenotypes of *Vibrio fischeri*. *Journal of Bacteriology*. 203(3):1-13.
- Topolski C, Divo E, Li X, Hicks J, **Chavez A**, Castillo H. 2023. Phenotypic and transcriptional changes in *Escherichia coli* K12 in response to simulated microgravity on the EagleStat, a new 2D microgravity analog for bacterial studies. *Life Sciences in Space Res*. 34:1-8.
- Chavez A**, Topolski C, Hicks J, Baez N, Burke M, Castillo H. 2023. Phenotypical changes in *Escherichia coli* K12 after prolonged exposure to simulated microgravity. *Frontiers in Space Technol*. 4:1282850.
- Wilson L., Nielsen K., Caspasso-Villanueva S., O'Brien T., Hefner L., Slick P., Petty L., Dienna H., Castillo H., **Chavez A**. 2025. Characterization of virulence-related phenotypes of *Candida parapsilosis* and *Rhodotorula mucilaginosa* isolated from the International Space Station. *Life Sciences in Space Res*. 45:16-24.
- Slick P, Tobarra M, **Chavez A**, Castillo H. 2025. Detection of Quorum-Sensing Molecules in the Mutualistic Bacteria *Vibrio fischeri* Exposed to Simulated Microgravity Using Cell-Based Biosensors. *Beyond Undergraduate Research Journal* 8:6.
- Taylor R, Capasso-Villanueva S, Jeon A, Daugherty K, Sandell D, Robinson L, Castillo H, **Chavez A**. 2025. Repurposing Finasteride and Serotonin Reuptake Inhibitors as Novel Antimicrobials: A Dual-Action Approach Against Bacterial and Fungal Pathogens. *Frontiers in Bioscience-Elite*. Accepted, in press.

Conference Presentations

Selected (45 total)

May 2010. American Society for Microbiology. San Diego, CA. "Structural and regulatory genes influence Biofilm formation in *Vibrio fischeri*."

Oct 2010. Society for Advancement of Chicanos and Native Americans in Science (SACNAS). Anaheim, CA. "Genetic basis of biofilm formation in *Vibrio fischeri*".

August 2010. Gordon International Symposium of Microbial Ecology. Seattle, WA. "Variability in Biofilm formation among environmental and symbiotic isolates of *Vibrio fischeri*".

October 2012. South Central Medical Mycology Meeting. New Orleans, LA. "Role of the exocyst subunit Sec15 in *Candida albicans* virulence".

January 2013. Society for Integrative and Comparative Biology, San Francisco, CA. "Biofilm formation as a refuge against protozoan bacteriovores" and "Symbiotic loci is responsible of host specificity in the *Vibrio fischeri*-*Euprymna* symbiosis".

May 2013. American Society for Microbiology. Denver, CO. "Effect of flufenamic acid in *Candida albicans* biofilm formation".

June 2013. IRACDA national meeting. Atlanta, GA. "The *C. albicans* exocyst subunit Sec6 is involved in secretion, filamentation and biofilm formation".

June 2014. IRACDA national meeting. San Diego, CA. "The *C. albicans* exocyst subunit Sec15 is involved in secretion and filamentation".

October 2015. Society for Advancement of Chicanos and Native Americans in Science (SACNAS). Washington DC. "Genetic basis of *Candida* biofilms".

November 2015. South Central Medical Mycology Meeting. New Orleans, LA. "Role of the exocyst in *Candida albicans* virulence".

August 2024. International Symposium for Chemistry and Microbiology. Chihuahua, MX. "Out of this world: Phenotypic characterization of yeast strains isolated from the International Space Station".

November 2024. Congreso Espacial Centroamericano (CEC). Guatemala, GT. "Phenotypic characteristics of *Candida albicans* isolated from the International Space Station".

Teaching Experience

January 2004 – May 2004. **Calculus and General Immunology**. Autonomous University of Chihuahua, Mexico. Chemistry Department. Role: *Lecturer*.

January 2007 – May 2007. General Biology (BIOL 211). New Mexico State University. Biology Department. Role: *Teaching Assistant*.

August 2007 – December 2007. **General Microbiology laboratory** (BIOL 311). New Mexico State University. Biology Department. Role: *Laboratory Instructor*.

January 2007 – May 2008. **Medical Microbiology laboratory** (BIOL 479). New Mexico State University. Biology Department. Role: *Laboratory Instructor*.

Jan 2009 – May 2009. 3100 **ABI sequencer**. New Mexico State University. Biology Department. Role: *Teaching Assistant*.

May 2010 – July 2010. **Medicinal Plants of the Southwest (Workshop)**. New Mexico State University. Biology Department. Role: *Lecturer and Laboratory Instructor*.

May 2011. **American Association of University Women (AAUW)**. "Girls Can! Stem Education" (Workshop). New Mexico State University. Biology Department. Role: *Lab Instructor*.

September 2011 – December 2011. **Molecular Genetics of Microorganisms** (BIOL 478). New Mexico State University. Biology Department. Role: *Lecturer and Teaching Assistant*.

September 2011 – December 2011. **Invertebrate Zoology** (BIOL 465). New Mexico State University. Biology Department. Role: *Lecturer and Teaching Assistant*.

August 2013-December 2013. **Molecular Genetics of Microorganisms** (BIOL 478). New Mexico State University. Biology Department. Role: *Lecturer*.

April 2014. **Generaciones Program for Underrepresented High School Students**. "Squids and Bacteria" (Workshop). New Mexico State University. Biology Department. Role: *Lecturer and Lab Instructor*.

August 2014-December 2014. **Molecular Genetics of Microorganisms** (BIOL 478). New Mexico State University. Biology Department. Role: *Lecturer*.

January 2015. **Generaciones Program for Underrepresented High School Students**. "Discover the diversity in Microbes" (Workshop). New Mexico State University. Biology Department. Role: *Lecturer and Lab Instructor*.

August 2016-December 2016. **Immunology** (BIOL 478). New Mexico State University. Biology Department. Role: *Lecturer*.

August 2016-December 2016. **Molecular Genetics of Microorganisms** (BIOL 478). New Mexico State University. Biology Department. Role: *Lecturer*.

August 2016-December 2016. **Microbiology Seminar** (BIOL 412). New Mexico State University. Biology Department. Role: *Lecturer*.

January 2017-May 2017. **Human Biology** (BIOL 101). New Mexico State University. Biology Department. Role: *Lecturer*.

January 2017-May 2017. **Public Health Microbiology** (BIOL 219). New Mexico State University. Biology Department. Role: *Lecturer*.

August 2017-December 2017. **General Biology** (BIOL 211). New Mexico State University. Biology Department. Role: *Lecturer*.

August 2017-December 2017. **General Microbiology** (BIOL 311). New Mexico State University. Biology Department. Role: *Lecturer*.

August 2017-December 2017. **Molecular Genetics of Microorganisms** (BIOL 478). New Mexico State University. Biology Department. Role: *Lecturer*.

January 2017-December 2017. **Microbiology club**. Role: *Faculty advisor*.

August 2018-December 2018. **General Microbiology** (BIOL 301). New Mexico Highlands University. Biology Department. Role: *Lecturer*.

August 2018-December 2018. **Advanced Microbiology**. New Mexico Highlands University. Biology Department. Role: *Lecturer*.

August 2018-December 2018. **Research Methods in Life Sciences and Graduate Seminar**. New Mexico Highlands University. Biology Department. Role: *Lecturer*.

January 2019-May 2019. **Bacterial Physiology**. New Mexico Highlands University. Biology department. Role: *Lecturer*.

January 2019-May 2019. **Advanced Cell Biology**. New Mexico Highlands University. Biology department. Role: *Lecturer*.

January 2019-May 2019. **Human Biology**. New Mexico Highlands University. Biology department. Role: *Lecturer*.

January 2019-May 2019. **Chemistry**. New Mexico Highlands University. Biology department. Role: *Lecturer*.

August 2019-May 2020. **Microbiology and Advanced Microbiology lab coordinator**. New Mexico State University.

January 2020-May 2020. **General Microbiology** (BIOL 311). New Mexico State University. Biology Department. Role: *Lecturer*.

January 2020-May 2020. **Medical Microbiology** (BIOL 479). New Mexico State University. Biology Department. Role: *Lecturer*.

August 2020-July 2025. **General Biology** (BIOL 120). Embry-Riddle Aeronautical University. Human Factors Department. Role: *Lecturer and Lab Manager*.

August 2020-July 2025. **Research Techniques** (BIO 110). Embry-Riddle Aeronautical University. Human Factors Department. Role: *Lecturer and Research Mentor*.

Spring 2021-December 2024. **Research Symposium** (BIO 111). Embry-Riddle Aeronautical University. Human Factors Department. Role: *Lecturer and Research Mentor/Advisor*.

May 2024-June 2024. **Introduction to Molecular and Forensic Techniques** (Workshop). Autonomous University of Chihuahua, Mexico. Chemistry Department. Role: *Lecturer and Lab Instructor*.

August 2021-July 2025. **Advanced Biology. Ecology and Evolution** (BIOL 121). Embry-Riddle Aeronautical University. Human Factors Department. Role: *Lecturer and Lab Manager*.

August 2021-July 2025. **Genetics Laboratory** (BIO 125L) Embry-Riddle Aeronautical University. Human Factors Department. Role: *Lab Coordinator*.

August-July 2025. **Introduction to Chemistry** (BIO 110). Embry-Riddle Aeronautical University. Human Factors Department. Role: *Lecturer*.

August 2021-July 2025. **Aerospace Physiology club**. Role: *Advisor*

January 2026-May 2026. **Introduction to Microbiology** (BIOL 2421). Texas A&M University-San Antonio. Department of Natural Sciences. Role: *Lecturer*

January 2026-May 2026. **Introduction to Microbiology Laboratory** (BIOL 2421). Texas A&M University-San Antonio. Department of Natural Sciences. Role: *Lecturer*

May 2026-July 2026. **Introduction to Microbiology** (BIOL 2421). Texas A&M University-San Antonio. Department of Natural Sciences. Role: *Asynchronous online Lecturer*

Chapters in Edited Books

Chavez A and Nishiguchi MK. 2017. Impact of metabolomics in symbiosis research. In Tech, Open access.

Patents

Organic and Environmentally "Green" Pesticide Compositions. US Provisional Patent No. 61/910,720. Filing date: December 2, 2013.

Honors and Awards

2025 Embry Riddle University Office of Undergraduate Research Award for Excellence in Mentoring

2025 Embry Riddle University College of Arts and Sciences Deans Award for Excellence in Mentoring

2015 National Institutes of Health (NIH) T32 Infectious Diseases Postdoctoral Fellowship

2012 Outstanding Graduate Student Award at New Mexico State University

2012 IRACDA/ASERT (Institutional Research and Academic Career Development Award along with Academic Science Education and Research Training) Award

2010 New Mexico Space Grant Consortium Fellowship

2009 New Mexico Space Grant Consortium Fellowship

2004 Suma Cum Laude/Best Undergraduate Student Award

Professional Associations

American Society for Gravitational and Space Research (ASGSR) – **Member**

Congreso Espacial Centroamericano (CEC) – **Member**

American Society for Microbiology (ASM) – **Member**

Society for Integrative and Comparative Biology (SICB) – **Member**

Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) – **Mentor and Member**

Alpha Epsilon Delta (AED) National Health Preprofessional Honor Society – **Faculty Mentor, Kappa Chapter**

Astrobiology club (TAMUSA) – **Faculty Advisor**

Student Mentorship

RECENT STUDENT POSTER PRESENTATIONS

- Mitchell Villafania, Alba Chavez, and Hugo Castillo. *Effects of Microgravity on Mutualistic Bacteria.*
- Paulina Slick, Brandi Small, Alba Chavez, and Hugo Castillo. *Effects of Long-term Exposure to Microgravity Conditions on Bacterial Communities.*
- Marissa Burke, Nicole Tucker, Linda Delgado, Alba Chavez, and Hugo Castillo. *Phenotypical Effects of Chronic Exposure of Escherichia coli to Simulated Microgravity.*
- Janelle Hicks, Collin Topolski, Alba Chavez, and Hugo Castillo. *Differential Gene Expression in Escherichia coli Chronically Exposed to Simulated Microgravity.* Alyssa McMandon, Birgitta Sophia Munthe, Alba Chavez, and Karen Gaines. *Comparison of Salivary Cortisol Levels in Various Academic Majors Using Enzyme-Linked Immunosorbent Assay.*
- Alexander Teigen, Pablo Robles, and Alba Chavez. *Association of Salivary Cortisol Levels with Introversive and Extroversive Personalities.*
- Olivia Siu, Mitchel Villafania, Lauryn Taylor, Alyssa McMandon, Alba Chavez, and Hugo Castillo. *Effects of Microgravity on Mutualistic Bacteria.*
- Kaitlyn Nielsen, Takara O'Brien, and Alba Chavez. *Effects of Simulated Atmospheres on the Growth and Persistence of Microbial Space Isolates.*
- Brianna Magdaleno and Alba Chavez. *Measurement of the Salivary Hormones Cortisol and Melatonin in Embry-Riddle Students.*
- Paulina Slick, Hugo Castillo, and Alba Chavez. *Impact of Simulated Microgravity Conditions on Bacterial Cell-Cell Communication Utilizing Vibrio fischeri.*
- Riley Dienna, Logan Petty, and Alba A. Chavez. *Antifungal Resistance Patterns of Two Human Yeast Strains Isolated from the International Space Station (ISS).*
- Paulina Slick, Maria C. Tobarra, Alba Chavez, and Hugo Castillo. *Assessing Bacterial Quorum Sensing Through Measuring Bioluminescence with Vibrio fischeri Exposed to Simulated Microgravity.*
- Takara O'Brien, Kaitlyn Nielsen, and Alba Chavez. *Observing Pathogenic Affinity of Candida and Rhodotorula under Simulated Moon and Martian Atmospheres.*
- Ja'Hann Hannor and Alba Chavez. *Regenerating Planaria: Effects of Environmental Factors on Cell Regeneration.*

- Maria Tobarra and Alba Chavez. *Stress Salivary Biomarkers Variation During Flight Exercises in Pilots from the Spanish Air Force*.
- Stefani Caspasso-Villanueva, Reilly S. Taylor, Ana I. Cruz, Sebastian T. Tucker, and Alba A. Chavez. *Drug Repurposing in Mycology: Identification of Compounds as Potential Antifungals Against Yeast Strains Isolated From the International Space Station*.
- Jaden McBride, Ashley Lunt, and Alba Chavez. *Antimicrobial Profile of Oral Biofilms: Insights and Implications*.
- Wesley Flewelling, Anderson Yeon, Giovanini Benjamin, and Alba Chavez. *Leveraging Drug Repurposing: A Strategic Approach to Combat Bacterial Infections*.
- Ja'Hann Hannor and Alba Chavez. *Effects of Environmental Factors and Finasteride on Planaria Regeneration*.
- Ryan Rednick, Mariposa McGee, Marina Veden and Alba Chavez. *Comparison of Marine and Fungal Biofilms*.

LIST OF INTERNAL FELLOWSHIPS FUNDED BY ERAU/NSF grant DMS-1345499

a) SURF (Summer Undergraduate Research Fellowship)

- Lauren Wilson - *Impact of Spaceflight on Fungal Antibiotic Susceptibility and Virulence* (Summer 2023)
- Kaitlyn Nielsen - *Observing Pathogenic Affinity of Candida and Rhodotorula under Simulated Moon and Martian Atmospheres* (Summer 2023)
- Stefani Caspasso-Villanueva - *Out of This World: Comprehensive Analysis of Space Conditions on Skin Mycobiome*(Summer 2024)
- Reilly Taylor - *Unraveling the Effects in Cell Regeneration and Antimicrobial Efficacy of Selected Antidepressant* (Summer 2024)
- Heather Mari Hall Alcala – *Silencing the Space Invaders: Disrupting Quorum Sensing to Halt Microbial Virulence in Space* (Summer 2025)

b) RIA (Research Incentive Grant)

- Mariposa Magee - *Analysis of Biofilm or Bacterial Communities Formed by Marine Bacteria* (Fall 2024)
- Carol Mitchell and Zachary Young - *Assessing Gene Expression Markers for Different Strains of Yeast Fermentation under Simulated Microgravity Conditions* (Fall 2024).