

# Martha A. Zepeda Rivera, PhD

mzepedar@fredhutch.org

## Education

- 2012-2018 Harvard University, Cambridge, MA  
PhD in Biochemistry (2014-2018)  
AM in Biology (2012-2014)  
Howard Hughes Medical Institute (HHMI) Gilliam Fellow  
Thesis Title: “Molecular Mechanism for Targeting a Self-Identity Protein to the Type VI System in *Proteus mirabilis*”
- 2008-2012 University of Washington, Seattle, WA  
Bachelor of Science in Biochemistry  
Bachelor of Science in Molecular, Cellular, Developmental Biology

## Additional Courses and Workshops

- 2015 Seattle Super Resolution Microscopy Workshop, Seattle, WA  
2014 Harvard Microbial Sciences Initiative Microscopy Workshop, Cambridge, MA  
2014 Analytical and Quantitative Light Microscopy Course, Woods Hole, MA

## Research Experience

- 2019- WRF Postdoctoral Fellow, Advisor: C.D. Johnston, PhD.  
Fred Hutchinson Cancer Research Center, Seattle, WA.  
**Overcoming genetic intractability of the cancer-associated bacterium *Fusobacterium nucleatum*.** Applying next generation sequencing, genomics and synthetic microbiology to generate genetically tractable clinical isolates of *F. nucleatum*, a bacterium associated with colorectal cancer tumors. Using these engineered systems in combination with eukaryotic tissue culture will explore the role and function of *F. nucleatum* in tumor initiation, progression and persistence.
- 2013-2018 HHMI Gilliam Fellow, Advisor: K.A. Gibbs, PhD  
Harvard University, Cambridge, MA  
**Constraining communication of a self-identity protein in the social bacterium *Proteus mirabilis*.** Applied biochemistry, microscopy, and genetics and found that the localization, stability and export of a protein encoding strain-specific information in the bacterium *Proteus mirabilis* is regulated by a conserved chaperone-like protein.
- 2011 HHMI Summer EXROP Student, Advisors: S. Ringgaard, PhD and M.K. Waldor MD, PhD  
Harvard Medical School, Boston, MA  
**Chemotaxis protein recruitment and localization in *Vibrio parahaemolyticus*.** Applied genetics and microscopy to assay the binding interactions of chemotaxis proteins to investigate how chemotaxis clusters are segregated to daughter cells upon cell division.
- 2009-2012 Undergraduate Researcher, Advisor: M.B. Hille, PhD  
University of Washington, Seattle, WA  
**RhoA GTPase activity effects during early gastrulation.** Using microinjections, *in situ* hybridizations and confocal microscopy of zebrafish embryos, investigated how phosphorylation of a particular catenin (p120) affects cell migration during early gastrulation.

## Publications

Stepanovica M, **Zepeda-Rivera MA**, McGlinchey AS, Baryiames AA, Jones DS, LaCourse KD, Bullman S, Johnston CD. Complete Genome Sequence of *Morganella morganii* CTX51T, Isolated from a Human Cecal Adenocarcinoma. *Microbiol Resour Announc*. 2022 Mar 7:e0006622. doi: 10.1128/mra.00066-22.

McGlinchey AS, **Zepeda-Rivera MA**, Stepanovica M, Baryiames AA, Jones DS, LaCourse KD, Bullman S, Johnston CD. Complete Genome Sequence of *Clostridium cadaveris* IFB3C5, Isolated from a Human Colonic Adenocarcinoma. *Microbiol Resour Announc*. 2022 Mar 17;11(3):e0113521. doi: 10.1128/mra.01135-21.

**Zepeda-Rivera MA**, Saak CC, Gibbs KA. A Proposed Chaperone of the Bacterial Type VI Secretion System Functions To Constrain a Self-Identity Protein. *J Bacteriol*. 2018 Jun 25;200(14). <<https://jb.asm.org/content/200/14/e00688-17.long>>

Saak CC, **Zepeda-Rivera M**, Gibbs KA. A single point mutation in a TssB/VipA homolog disrupts sheath formation in the type VI secretion system of *Proteus mirabilis*. *PLoS ONE*. 2017 Sept 26; 12(9):e0184797. <<https://doi.org/10.1371/journal.pone.0184797>>

Sysoeva TA, **Zepeda-Rivera MA**, Huppert LA, Burton BM. Dimer recognition and secretion by the ESX secretion system in *Bacillus subtilis*. *Proc Natl Acad Sci U S A*. 2014 May 27;111(21):7653-8. <<https://doi-org.ezp-prod1.hul.harvard.edu/10.1073/pnas.1322200111>>

Ringgaard S, **Zepeda-Rivera M**, Wu X, Schirner K, Davis BM, Waldor MK. ParP prevents dissociation of CheA from chemotactic signaling arrays and tethers them to a polar anchor. *Proc Natl Acad Sci U S A*. 2014 Jan 14;111(2):E255-64. <<https://doi-org.ezp-prod1.hul.harvard.edu/10.1073/pnas.1315722111>>

Hsu CL, Muerdter CP, Knickerbocker AD, Walsh RM, **Zepeda-Rivera MA**, Depner KH, Sangesland M, Cisneros TB, Kim JY, Sanchez-Vazquez P, Cherezova L, Regan RD, Bahrami NM, Gray EA, Chan AY, Chen T, Rao MY, Hille MB. Cdc42 GTPase and Rac1 GTPase act downstream of p120 catenin and require GTP exchange during gastrulation of zebrafish mesoderm. *Dev Dyn*. 2012 Oct;241(10):1545-61. <10.1002/dvdy.23847>

## Honors and Awards

- 2019 Washington Research Foundation Postdoctoral Fellowship
- 2019 Interdisciplinary Training in Cancer Research Postdoctoral Fellowship (awarded not accepted)
- 2012-2018 Howard Hughes Medical Institute Gilliam Fellowship  
*National award for five years of advanced studies; one of nine recipients*
- 2017 American Society for Microbiology Travel Award 2015 Simmons' Award  
*Internal Harvard University program for funded use of microscopy facility*
- 2013 Nomination for Peralta Prize awarded by Harvard University MCB department for best candidacy exam.
- 2010-2012 Ronald E. McNair Scholar, University of Washington  
*National program for preparing individuals of underrepresented groups with a strong interest in Ph.D. studies*
- 2011-2012 Ronald E. McNair Research Scholarship, University of Washington  
*Internal award for two quarters of research funding*
- 2011 American Society of Cell Biology Minority Affairs Committee Travel Award
- 2011 Accepted by HHMI Exceptional Research Opportunities Program (EXROP)  
*National summer internship program; one of eighty-one participants*
- 2010 Mary Gates Research Scholar, University of Washington

- 2010 *Internal award for two quarters of research funding*  
Nominated for HHMI EXROP  
*Sole nominee selected through internal UW-HHMI*
- 2009 Accepted by UW-HHMI Summer Internship Program  
*Internal program for funded summer research internship*

## Presentations

- 2017 “Regulation of the *Proteus mirabilis* self-identity protein IdsD before transport to a neighboring cell”. American Society for Microbiology Cell-Cell Communication Meeting. Athens, GA.
- 2016 “Coupling two essential functions for the communication of the self-identity protein IdsD in *Proteus mirabilis*”. Harvard University Cellular Dynamics Seminar Series. Cambridge, MA.
- 2016 “Targeting of a protein encoding self identity information in *Proteus mirabilis*”. 2016 HHMI Gilliams Fellow Meeting. Chevy Chase, MD.
- 2015 “Communicating identity: how a cluster of bacterial self-recognition proteins may form two distinct structures”. Harvard University Cellular Dynamics Seminar Series. Cambridge, MA.

## Presented Posters

- 2018 “Keeping identity in check: how the *Proteus mirabilis* self-identity protein IdsD is regulated before transport to a neighboring cell”. **Martha Zepeda Rivera** and Karine A. Gibbs. 2018 Boston Bacterial Meeting. Cambridge, MA
- 2017 “Regulation of the *Proteus mirabilis* self-identity protein IdsD before transport to a neighboring cell”. **Martha Zepeda Rivera** and Karine A. Gibbs. 2017 HHMI Gilliams Fellow Meeting. Chevy Chase, MD.
- 2016 “Targeting of a protein encoding self identity information in *Proteus mirabilis*”. **Martha Zepeda Rivera** and Karine A. Gibbs. 2016 HHMI Gilliams Fellow Meeting. Chevy Chase, MD.
- 2015 “Establishing a *Caenorhabditis elegans* model of *Proteus mirabilis* dynamics”. **Martha Zepeda Rivera** and Karine A. Gibbs. 2015 HHMI Gilliams Fellow Meeting Chevy Chase, MD.
- 2014 “Characterizing interactions among the Ids self-identity proteins in *Proteus mirabilis*”. **Martha Zepeda Rivera**, Lia Cardarelli and Karine A. Gibbs. 2014 HHMI Gilliams Fellow Meeting. Chevy Chase, MD. 2014 American Society for Microbiology. Boston, MA.
- 2013 “Characterizing the subcellular localization of components in a bacterial self-recognition system”. **Martha Zepeda Rivera** and Karine A. Gibbs. 2013 HHMI Gilliams Fellow Meeting. Chevy Chase, MD.
- 2012 “Interplay between p120 Catenin and RhoA GTPase during Early Zebrafish Gastrulation”. **Martha Zepeda Rivera**, Maya Sangesland, and Merrill B. Hille. 2012 Pacific Northwest McNair Regional Conference. Seattle, WA.
- 2011 “Effects of p120 Catenin and RhoA GTPase Interactions during Zebrafish Gastrulation”. **Martha Zepeda Rivera**, Cynthia Hsu, Kevin Depner, Abhay Knickerbocker, Trinidad Cisneros, Ryan M Walsh, and Merrill B. Hille. 2011 American Society of Cell Biology. Denver, CO.
- 2011 “Polar Localization of Chemotactic Proteins in *Vibrio parahaemolyticus*”. **Martha Zepeda Rivera**, Simon Ringgaard, and Matthew K. Waldor. 2012 HHMI EXROP Meeting. Chevy Chase, MD. 2011 American Society of Cell Biology. Denver, CO. 20<sup>th</sup> Annual McNair National Conference. Lake Geneva, WISACNAS National Conference. San Jose, CA. 2011 University of Washington Department of Biology Undergraduate Research Symposium. Seattle, WA. (Poster Award: 2<sup>nd</sup> Best Poster). 2011 Harvard University Summer Program Research Symposium. Boston, MA.
- 2010 “Importance of RhoA in the p120catenin Signaling Pathway”. **Martha Zepeda Rivera**, Cynthia

- Hsu, and Merrill B. Hille. 2010 University of Washington Department of Biology Undergraduate Research Symposium. Seattle, WA. (Poster Award: 3<sup>rd</sup> Best Poster).
- 2010 “p120 Catenin: Gastrulation Effects and Its Signaling Pathway”. **Martha Zepeda Rivera**, Cynthia Hsu, and Merrill B. Hille. 2010 Mary Gates Hall Undergraduate Research Symposium. Seattle, WA.
- 2010 “p120 Catenin Phosphorylation and Signaling to Rho GTPases are Necessary for Cell Motility”. Cynthia Hsu\*, **Martha Zepeda Rivera**, and Merrill B. Hille. Northwest Developmental Biology Conference. Friday Harbor, WA.

### Special Responsibilities

- 2022 Ad hoc reviewer: *ASM Microbiology Spectrum*
- 2021 Ad hoc reviewer: *Nature*, *Nature Microbiology*

### Teaching Experience

- 2018-2019 Teaching consultant for Amgen Foundation’s Amgen Biotech Experience Program (Coordinators: Tara Bristow and Kristen Bjork). Developed lab curriculum and teacher resources to implement molecular biology techniques in high school classrooms.
- 2016-2018 Teaching fellow for Life Sciences Outreach Program (Coordinator: Alia Qatarneh). Instructed high school students on molecular biology techniques. Harvard University, Cambridge, MA.
- 2016, 2017 Teaching fellow for Summer Explorations Programs. Modified LSO materials and instructed middle school students. Harvard Ed Portal, Allston, MA.
- 2016, 2017 Course Instructor, Clubes de Ciencia, Bolivia. Designed a 40-hour molecular biology course with active learning and laboratory components. Prepared and taught lectures, labs, and activities and supervised a team of co-instructors. Santa Cruz, Bolivia.
- 2014 Teaching fellow for Microbes in Disease and the Environment (Instructor: K.A. Gibbs, PhD). Led weekly laboratory sections, one of which I developed, and graded student assignments and exams. Harvard University, Cambridge, MA.
- 2013 Teaching fellow for Life and Physical Sciences A (Instructors: T. Brenner, PhD and G. Tucci, PhD). Led weekly discussion sections and graded student assignments and exams. Harvard University, Cambridge, MA.

### Mentees

- 2021 Postdoctoral Fellow Mentor, Johnston Laboratory, Fred Hutchinson Cancer Research Center
- 2021 M. Stepanovica (undergraduate student from Trinity College Dublin)
- 2021 A. McGlinchey (undergraduate student from Trinity College Dublin)
- 2013-2018 Graduate Student Mentor, Gibbs Laboratory, Harvard University
- 2017-2018 A. Pinnock (undergraduate thesis student)
- 2016, 2017 A. Donovan (summer high school student)
- 2014 J. Cheng (rotation student)
- 2014 M. Rangel (Summer Research Opportunities at Harvard)
- 2013 Peer Mentor, Summer Research Opportunities Program at Harvard University
- 2013 M. Creer (Summer Research Opportunities at Harvard participant)

## **Community Outreach Service**

- 2021 Volunteered with Skype a Scientist, and Girls in Engineering Math and Sciences
- 2020 Volunteered with Skype a Scientist, and Girls in Engineering Math and Sciences
- 2020 Served on ‘Research Careers Panel’ for FHCRC Summer Interns
- 2019 Volunteered with Skype a Scientist
- 2019 Served as panelist for “Kennedy High School’s Career Exploration event at FHCRC
- 2012-2017 Volunteered with Harvard University’s Life Sciences Outreach Program, with the Harvard Ed Portal, and with Clubes de Ciencias Bolivia

## **Board Service**

- 2020- SoundBio Lab Board Member  
SoundBio Lab is a DIY Bio/Makerspace with a mission to advance science equity in the Greater Seattle area.
- 2020- SoundBio Lab Committee Member  
Education & Outreach Committee- help develop educational materials and workshops  
Strategic Planning Committee- assisting in developing of SBL 5-year strategic
- 2021- SoundBio Lab Community Engagement Community Chair
- 2020-2022 Hutch United Community Co-Chair  
Internal employee organization with a mission to “foster a supportive and inclusive community to promote the success of underrepresented scientists”. I help organize and lead community events and our monthly book club.