

### **Curriculum Vitae**

Johanna B. Holm, Ph.D.

Research Associate, Department of Microbiology and Immunology  
Institute for Genome Sciences  
University of Maryland Baltimore

**Date** October 12, 2021

### **Contact Information**

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Foreign Languages: None

### **Education**

2002 - 2006 B.S., Biology, Millersville University (Cum Laude and With Honors)  
Honors Thesis: "Chemical communication in Molluscs"

2010 - 2015 Ph.D., Marine Environmental Biology, University of Southern California,  
Thesis: "The microbiome of gorgonian octocorals, *Muricea*, with a description of  
a novel, photosynthetic protistan symbiont"

### **Post Graduate Education and Training**

2016 - 2020 Postdoctoral Fellowship, Institute for Genome Sciences, University of Maryland  
Baltimore

### **Employment History**

#### **Academic Appointments**

2016-present Member, Institute for Genome Sciences, University of Maryland School of  
Medicine

2021-present Research Associate, Microbiology & Immunology, University of Maryland  
School of Medicine

#### **Other Employment**

- 2007-2010 Technician III, Department of Clinical Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY
- 2006-2007 Cell Bank Associate II, Cell Banking Group, Manufacturing Department, AppTec LPS (now known as WuXi AppTec), Philadelphia, PA
- 2006 Marine Educator, Coastal Ecology, Chincoteague Bay Field Station, Wallops Island, VA
- 2003 Researcher, Summer Undergraduate Research Experience Program, University of Texas Medical Branch, Galveston, TX
- 2002-2006 Undergraduate Research Assistant, Department of Biological Sciences, Millersville University, Millersville, PA  
PI: Dr. Jean G. Boal, PhD

### **Professional Society Membership**

- 2018-Present General Member, American Society for Microbiology
- 2016-Present General Member, International Society for Microbial Ecology

### **Honors And Awards**

- 2016 Trainee Scholar, Infectious Disease Society for Obstetrics & Gynecology Annual Meeting, Annapolis, MD
- 2015 William E. Trusten Award, Most Accomplished Graduate Student in Biology, University Southern California, Los Angeles, CA
- 2014 Outstanding Teaching Assistant Award, Honors General Biology, University Southern California, University Southern California, Los Angeles, CA
- 2013 Summer Graduate Research Fellowship, Wrigley Institute for Environmental Studies (USC-WIES), University Southern California, Los Angeles, CA
- 2013 Outstanding Teaching Assistant Award, Introduction to Microbiology, University Southern California, Los Angeles, CA
- 2012 NSF Graduate Research Fellowship Honorable Mention
- 2011 Rose Hills Summer Graduate Fellowship, University Southern California, Los Angeles, CA
- 2010 Tyler Environmental Graduate Merit Fellowship Award, USC-WIES, University Southern California, Los Angeles, CA
- 2005 Student of Academic Distinction, 47<sup>th</sup> Annual Honors & Awards, Millersville University, Millersville, PA
- 2005 Best 3<sup>rd</sup>, Commonwealth of Pennsylvania University Biologists, Millersville University, Millersville, PA

2003 Best Poster Presentation, Society for Neuroscience, Summer Undergraduate Research Program, University of Texas Medical Branch, Galveston, TX

### **Administrative Service**

### **Institutional Service**

2018-present Bioinformatic Analyst, Microbiome Service Laboratory, University of Maryland Baltimore  
2013-2015 Faculty-Student Liaison at Department Faculty Meetings, University of Southern California  
2013-2014 Department Representative, Graduate Student Government, University of Southern California

### **Local and National Service**

#### National Service

2018-present *Ad Hoc* Reviewer, *Microbiome* (2x/yr), *PeerJ* (1x/yr), *PLOS One* (2x/yr), *f1000* (1x/yr), *Applied Microbiology* (3x/yr), *Environmental Microbiology* (1x/yr), *BMC Microbiology* (1x/yr)

### **Teaching Service**

#### Undergraduate Student Teaching

2014 Instructor, Honors Organismal Biology and Evolution Laboratory (BISC 121)  
40 undergraduates, 15 contact hours/week, 6-week course  
2012 Mentor, Summer Research Training Program  
2 undergraduates, daily contact for the summer  
2012 Instructor, Introduction to Methods in Marine Biology & Oceanography (BISC 457L)  
20 undergraduates, 30 contact hours/week, 4-week Maymester course  
2011 Instructor, Introduction to Microbiology Laboratory (BISC 300)  
40 undergraduates, 15 contact hours/week  
2010 Instructor, Organismal Biology and Evolution Laboratory (BISC 120)  
40 undergraduates, 15 contact hours/week  
2004 Teaching Assistant, Animal Behavior (BISC 485)  
40 undergraduates, 5 prep hours/week  
2003 Teaching Assistant, Marine Biology (BISC 291)  
40 undergraduates, 5 prep hours/week

### **Post-Graduate Teaching**

2018-Present Instructor, Institute for Genome Sciences Microbiome Analysis Workshop  
30-50, 1 week annually, 24 contact hours/year

## Grant Support

### Active Grants:

06/01/2021-05/31/2026 PI: 75%  
National Institute of Allergy and Infectious Diseases, K01  
AI163413  
Annual Direct Costs: \$85,986  
Total Direct Costs: \$429,930  
“Integrating multi-omics data: Modeling biomarkers and  
mechanisms to reduce bacterial vaginosis recurrence”

### Completed Grants:

01/01/2018-1/15/2021 PI: 100%  
National Institute of Allergy and Infectious Diseases, F32  
AI136400  
Annual Direct Costs: \$65,606  
Total Direct Costs: \$183,246  
“Host-Microbe Interactions and Incident Infection”

## Publications

### Peer-reviewed journal articles

1. Hvorecny LM, Grudowski JL, Blakeslee CJ, Simmons TL, Roy PR, Brooks JA, Hanner RM, Beigel ME, Karson MA, Nichols RH, **Holm JB**, Boal JG. Octopuses (*Octopus bimaculoides*) and cuttlefishes (*Sepia pharaonis*, *S. officinalis*) can conditionally discriminate. *Anim Cogn*. 2007 Oct;10(4):449-59. doi: 10.1007/s10071-007-0085-4. Epub 2007 Apr 17. PMID: 17437139.
2. Boal JG, Prosser KN, **Holm JB**, Simmons TL, Haas RE, Nagle GT. Sexually mature cuttlefish are attracted to the eggs of conspecifics. *J Chem Ecol*. 2010 Aug;36(8):834-6. doi: 10.1007/s10886-010-9816-0. Epub 2010 Jul 1. PMID: 20593225.
3. Cummins SF, Boal JG, Buresch KC, Kuanpradit C, Sobhon P, **Holm JB**, Degnan BM, Nagle GT, Hanlon RT. Extreme aggression in male squid induced by a  $\beta$ -MSP-like pheromone. *Curr Biol*. 2011 Feb 22;21(4):322-7. doi: 10.1016/j.cub.2011.01.038. PMID: 21315594.
4. Xu X, Lee YJ, **Holm JB**, Terry MD, Oswald RE, Horne WA. The Ca<sup>2+</sup> channel beta4c subunit interacts with heterochromatin protein 1 via a PXVXL binding motif. *J Biol Chem*. 2011 Mar 18;286(11):9677-87. doi: 10.1074/jbc.M110.187864. Epub 2011 Jan 10. PMID: 21220418; PMID: 21220418.
5. Walderon MD, Nolt KJ, Haas RE, Prosser KN, **Holm JB**, Nagle GT, Boal JG. Distance chemoreception and the detection of conspecifics in *Octopus bimaculoides*. *The Journal of Molluscan Studies*. 2011 June; PMID: N/A
6. Heidelberg KB, Nelson WC, **Holm JB**, Eisenkolb N, Andrade K, Emerson JB. Characterization of eukaryotic microbial diversity in hypersaline Lake Tyrrell, Australia. *Front Microbiol*. 2013;4:115. doi: 10.3389/fmicb.2013.00115. eCollection 2013. PMID: 23717306; PMCID: PMC3651956.
7. **Holm JB**, Heidelberg KB. Microbiomes of *Muricea californica* and *M. fruticosa*: Comparative Analyses of Two Co-occurring Eastern Pacific Octocorals. *Front Microbiol*. 2016;7:917. doi: 10.3389/fmicb.2016.00917. eCollection 2016. PMID: 27445997; PMCID: PMC4914490.
8. Girard L, Birse K, **Holm JB**, Gajer P, Humphrys MS, Garber D, Guenther P, Noël-Romas L, Abou M, McCorrister S, Westmacott G, Wang L, Rohan LC, Matoba N, McNicholl J, Palmer KE, Ravel J, Burgener AD. Impact of the griffithsin anti-HIV

- microbicide and placebo gels on the rectal mucosal proteome and microbiome in non-human primates. *Sci Rep*. 2018 May 23;8(1):8059. doi: 10.1038/s41598-018-26313-8. PMID: 29795295; PMCID: PMC5966460.
9. McComb E, **Holm J**, Ma B, Ravel J. Complete Genome Sequence of *Lactobacillus crispatus* CO3MRSI1. *Microbiol Resour Announc*. 2019 Jan;8(5). doi: 10.1128/MRA.01538-18. eCollection 2019 Jan. PMID: 30714033; PMCID: PMC6357639.
  10. **Holm JB**, Humphrys MS, Robinson CK, Settles ML, Ott S, Fu L, Yang H, Gajer P, He X, McComb E, Gravitt PE, Ghanem KG, Brotman RM, Ravel J. Ultrahigh-Throughput Multiplexing and Sequencing of >500-Base-Pair Amplicon Regions on the Illumina HiSeq 2500 Platform. *mSystems*. 2019 Jan-Feb;4(1). doi: 10.1128/mSystems.00029-19. eCollection 2019 Jan-Feb. PMID: 30801027; PMCID: PMC6381223.
  11. Elovitz MA, Gajer P, Riis V, Brown AG, Humphrys MS, **Holm JB**, Ravel J. Cervicovaginal microbiota and local immune response modulate the risk of spontaneous preterm delivery. *Nat Commun*. 2019 Mar 21;10(1):1305. doi: 10.1038/s41467-019-09285-9. PMID: 30899005. PMCID: PMC6428888.
  12. France M, Ma B, Gajer P, Brown S, Humphrys MS, **Holm JB**, Brotman RB, Ravel J. VALENCIA: A nearest centroid classification method for vaginal communities based on composition. 2020. Preprint. <https://doi.org/10.21203/rs.2.24139/v1>.
  13. Ma B, France MT, Crabtree J, **Holm JB**, Humphrys MS, Brotman RB, Ravel JR. A comprehensive non-redundant gene catalog reveals extensive within-community intraspecies diversity in the human vagina. *Nat Commun* 11, 940 (2020). <https://doi.org/10.1038/s41467-020-14677-3>. PMID: 32103005
  14. **Holm JB**, France MT, Ma B, et al. Comparative Metagenome-Assembled Genome Analysis of “*Candidatus Lachnocurva vaginae*”, Formerly Known as Bacterial Vaginosis-Associated Bacterium–1 (BVAB1). *Frontiers in Cellular and Infection Microbiology* 2020;10. PMID: 32296647.
  15. Moreno-Sabater A, Autaa G, Sterlin D, Jerbi A, Villette R, **Holm JB**, Parizot C, Selim S, Senghor Y, Ghillani-Dalbin P, Bachmeyer C, Hennequin C, Gorochov G, Larsen M. Systemic anti-commensal response to fungi analyzed by flow cytometry is related to gut microbiome ecology. *Microbiome*. 2020 Nov 15;8(1):159. doi: 10.1186/s40168-020-00924-8. PubMed PMID: 33190643; PubMed Central PMCID: PMC7667786.

## **Major Invited Speeches**

### National

1. **Holm, JB**, “**Shining Light on an Elusive Bug: A comparative metagenome-assembled genome analysis of “*Candidatus Lachnocurva vaginae*”, formerly known as Bacterial Vaginosis Associated bacterium – 1 (BVAB1), Pacific BioSciences, Center for Disease Control, The Biotechnology Core Facility Branch. *Oral Presentation*, September 29, 2020.**

### International

2. **Holm, JB**, “**Shining Light on an Elusive Bug: A comparative metagenome-assembled genome analysis of “*Candidatus Lachnocurva vaginae*”, formerly known as Bacterial Vaginosis Associated bacterium – 1 (BVAB1), Pacific BioSciences, PacBio Virtual Global Summit. *Oral Presentation*, November 17, 2020.**

## **Proffered Communications**

### Local

1. **Holm, JB**, Nichols, AE, Nagle, GT, Effects of the IEECKTS region on mating behaviors of *Aplysia brasiliana*, University of Texas Medical Branch Summer Undergraduate Research Program, University of Texas Medical Branch, 2003
2. **Holm, JB**, Nichols, AE, Nagle, GT, Effects of the IEECKTS region on mating behaviors of *Aplysia brasiliana*, Northeast Ecology and Evolution Conference, Penn State University, 2005
3. **Holm, JB**, Nichols, AE, Nagle, GT, Effects of the IEECKTS region on mating behaviors of *Aplysia brasiliana*, Commonwealth of Pennsylvania University Biologists, Millersville University, 2005
4. **Holm, JB**, Boal JG, Chemical communication in Molluscs, Undergraduate Thesis Defense, Millersville University, Millersville, PA, **Oral Presentation**, 2006
5. **Holm, JB**, Heidelberg, KB., Gorgonians and Ocean Acidification, Rose Hills Summer Fellowship Symposium, University of Southern California, 2011
6. **Holm, JB**, Heidelberg, KB., Initial findings of the bacterial and eukaryotic microbial communities associated with the CA Golden Gorgonian, USC Marine & Environmental Biology Department Retreat, University of Southern California, 2011
7. **Holm, JB**, Heidelberg, KB., Initial findings of the bacterial and eukaryotic microbial communities associated with the California Golden Gorgonians, USC Graduate Student Government, University of Southern California, 2012
8. **Holm, JB**, Heidelberg, KB., Microbial consortia of temperate gorgonians, Marine & Environmental Biology Weekly Seminar, University of Southern California, **Oral Presentation**, 2012
9. **Holm, JB**, Ziebis, W., Heidelberg, KB., Oxygen production in the octocorals: an attribute of their photosynthetic protistan endosymbionts, USC-WIES Summer Graduate Fellowship Symposium, University of Southern California, **Oral Presentation**, 2013
10. **Holm, JB**, Heidelberg, KB., Photosynthetic capabilities of local octocorals, Marine & Environmental Biology Graduate Retreat, University of Southern California, **Oral Presentation**, 2013
11. **Holm, JB** Gajer, P, Ravel, JR, PECAN: A fast, novel 16S rRNA gene sequence non-clustering based taxonomic assignment tool, Mid-Atlantic Microbiome Meetup, 2016

#### National

12. **Holm, JB**, Caron, DA, Ziebis, W, Webster, P, Heidelberg, KB., A description of the bacteria and a polyp endophyte associated with southern California species of *Muricea*, Yosemite Symbiosis Workshop, **Oral Presentation**, May 3-4, 2014.
13. **Holm, JB**, Caron, DA, Ziebis, W, Webster, P, Heidelberg, KB., A multidisciplinary description of microbial diversity of two species of octocoral from southern California, Joint Aquatic Sciences Meeting, **Oral Presentation**, May 18-23, 2014.
14. **Holm, JB**, Brotman RB, Ravel, JR, Detection & Implications of *Lactobacillus iners* sub-strain diversity, Infectious Disease Society for Obstetrics & Gynecology, **Oral Presentation**, August 11-13, 2016.
15. **Holm, JB**, Norris-Turner, A., Brotman RB, Infectious Disease Society for Obstetrics & Gynecology, **Oral Presentation**, August 10-13, 2017.

16. **Holm, JB**, Humphrys, M, France, M, McComb, E, Ma, Bing, Mehta, Aditya, Tallon, Luke, Brotman, Rebecca, Ravel, Jacques. Comparative metagenomic-assembled genome analysis of “*Candidatus Lachnocurva vaginae*”, formerly known as BVAB1. *Advances in Genome Biology and Technology*, February 23-26, 2020.

#### International

17. **Holm, JB**, Boal, JG, Contact with freshly-laid eggs induces dominance in male squid, *Loligo pealeii*, 31st Int. Ethological Conference, Rennes, FR, August 19-24, 2009.
18. **Holm, JB**, Heidelberg, KB., Microbial consortia of temperate gorgonians, 12<sup>th</sup> International Coral Reef Society Conference, Cairns, AUS, **Oral Presentation**, July 9-13, 2012.
19. **Holm, JB** Gajer, P, Ravel, JR, PECAN: A fast, novel 16S rRNA gene sequence non-clustering based taxonomic assignment tool, 24<sup>th</sup> International Society for Microbial Ecology, Montreal, August 21-26, 2016.
20. Holm JB, He X, **Brotman RM**, Turner AN. Vitamin D and the vaginal microbiome: Results from a blinded, randomized controlled trial. The Infectious Diseases Society for Obstetrics and Gynecology 2017 Annual Meeting, Park City, Utah, August 10-12, 2017.
21. Holm JB, He X, **Brotman RM**, Turner AN. Vitamin D and the vaginal microbiome: Results from a blinded, randomized controlled trial. The International Society for Sexually Transmitted Disease Research, 22nd Biennial Congress, Rio de Janeiro Brazil, July 12-13, 2017.
22. Brotman RM, Gajer P, **Holm JB**, Robinson CR, Jones D, Chatterjee A, Humphrys M, Forney LJ, Ravel J, Ghanem KG. Comparison of shipped versus freshly frozen self-collected vaginal samples for microbiota assessment. The International Society for Sexually Transmitted Disease Research, 22nd Biennial Congress, Rio de Janeiro Brazil, July 12-13, 2017.
23. Robinson CK, Holm J, Gajer P, Chatterjee A, Humphrys M, Ravel J, Brotman RM. Concordance between random catch urine and mid-vaginal microbiota. The International Society for Sexually Transmitted Disease Research, 22nd Biennial Congress, Rio de Janeiro Brazil, **Oral Presentation**, July 12-13, 2017.
24. **Holm JB**, Ma B, Robinson CK, Klebanoff MA, **Brotman RM**, Ravel J. Genomic diversity in the vaginal microbiome influences variable risk of incident sexually transmitted infection. 17<sup>th</sup> International Symposium on Microbial Ecology (ISME17), August 12-17, 2018, Leipzig, Germany.
25. **Holm, JB**, France, MB, Ma, B, Brotman RB, Ravel, JR, Six nearly-complete genomes of BVAB1 derived from vaginal metagenomes, Keystone Symposium: Role of the Genital Tract Microbiome in Sexual and Reproductive Health, Capetown, ZA, December 11-15, 2018.
26. Balkus J, Proll S, **Holm JB**, et al. A multi-site comparative study to understand sources of variability in studies of the vaginal microbiota Sexually Transmitted Infections. STI & HIV 2019 Congress Joint Meeting of the 23<sup>rd</sup> the International Society for Sexually Transmitted Diseases Research. Vancouver, CAN, July 14-17, 2019.
27. Brotman RM, **Holm JB**, Borgogna JL, Robinson CK, Klebanoff MA, Ghanem KG, Yeoman CJ, Ravel J, Shardell MD. The vaginal microenvironment prior to incident STI. STI & HIV 2019 Congress Joint Meeting of the 23<sup>rd</sup> the International Society for Sexually Transmitted Diseases Research. Vancouver, CAN, **Oral Presentation**, July 14-17, 2019.
28. Robinson CK, **Holm JB**, Brown S, Ravel J, Ghanem KG, **Brotman RM**. Concordance between mid-vaginal swabs and both clean- and random-catch urine samples. STI & HIV

2019 Congress Joint Meeting of the 23<sup>rd</sup> the International Society for Sexually Transmitted Diseases Research. Vancouver, CAN, July 14-17, 2019.