

Nic Vega  
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### **EMPLOYMENT:**

2018-Present **Emory University**, Atlanta, GA. Assistant Professor, Department of Biology.

2013-2017 **Massachusetts Institute of Technology**, Cambridge, MA. Postdoctoral Associate, Physics of Living Systems, Department of Physics. Postdoctoral supervisor: Prof. Jeff Gore

### **EDUCATION:**

Ph.D. 2013 **Boston University**, Boston, MA. Molecular and Cellular Biology & Biochemistry (MCBB). Thesis supervisor: Prof. Jim Collins

M.S. 2007 **University of Washington**, Seattle, WA. Quantitative Ecology and Resource Management (QERM). Thesis supervisor: Prof. Vincent Gallucci

B.S. 2002 **Worcester Polytechnic Institute**, Worcester, MA. Mathematical Sciences; Biology and Biotechnology (Ecology and Evolutionary Biology concentration).

### **FUNDING:**

#### **Current Research Funding**

2020-2023: PI, National Science Foundation 2014173 \$419,999. Physics of Living Systems. "Modeling sources of variation in interaction networks using a *C. elegans* microbiome model." Co-PI Ilya Nemenman (Emory Physics).

2020-2023: Co-investigator, Emory MP3 Seed Grant Program. \$300,000. "Characterizing molecular regulation of *Acinetobacter baumannii* phenotypes to understand its spread dynamics in a host community." PIs Minsu Kim (Emory Physics) and Phil Rather (Emory SOM), co-investigator Daniel Weissman (Emory Physics).

2020-2022: Co-PI, Halle Institute Emory-Tel Aviv University Collaborative Research. \$20,000 (Emory sub-award \$10,000) "Monitoring worm gastrointestinal dynamics using fluorescent single-walled carbon nanotubes". Co-PI Gili Bisker (Tel Aviv University). In no-cost extension.

### Current Training Grant Participation

- 2018-2023 Training faculty, NSF Physics of Living Systems (iPoLS) 1806833 subcontract from Georgia Tech, “Collaborative Research: Formation of a High-Flux Student Research Network (HF-SRN) as a Laboratory for Enhancing Interaction in the PoLS SRN”, \$1.9M total, subcontract \$500k total
- 2019-2024 Training faculty, NIH Infectious Disease Across Scales Training Program (IDASP) T32 1T32AI138952.

### **PUBLICATIONS (h-index: 11)**

\* Trainees under my supervision.

§ These authors contributed equally to this work.

#### Submitted and in prep

Taylor, M.\*, Boddu, S.S.\*, & Vega, N.M. (in review) Using single-worm data to quantify heterogeneity in *Caenorhabditis elegans*-bacterial interactions. *JoVE* (Designed experiments and analyzed data; performed some experiments; performed modeling; wrote manuscript)

Villa, S., Chen, J.\*, Kwong, Z.\*, Acosta, A., Vega, N.M., & Gerardo, N.M. (in review) “Complex symbiont acquisition behaviors maintains a horizontally transmitted insect-microbial mutualism. *Current Biology* (Advised both trainees in experimental design and data analysis. Graduate trainee Chen is formally co-advised by the senior authors.)

Taylor, M.\* & Vega, N.M. (in prep) Effects of batch-based vs. individual measurements on between-group comparisons in microbial colonization. (Designed experiments and analyzed data; performed some experiments; performed modeling; wrote manuscript)

Taylor, M.\* & Vega, N.M. (in prep) Convergent and divergent evolution of an invading species in a microbiome community. (Designed experiments and analyzed data; wrote manuscript)

Taylor, M.\* & Vega, N.M. (in prep) Compositional convergence conceals intra-species divergence in evolving microbiome communities. (Designed experiments and analyzed data; wrote manuscript)

#### Research Publications as Principal Investigator

Taylor, M.\* & Vega, N.M. (2021) Host immunity alters community ecology and stability of the microbiome in a *C. elegans* model. *mSystems* 6. doi:10.1128/mSystems.00608-20 (Designed experiments and analyzed data; performed modeling; wrote manuscript)

Chaudhry, W.\*, A. Worthy\*, N.M. Vega, and B. Levin. (2020) Mucoidy, a general mechanism for maintaining lytic phage in populations of bacteria. *FEMS Microbial Ecology* 96(10): fiae162. <https://doi.org/10.1093/femsec/fiae162> (Designed experiments; advised trainees in experimental design and performance and data analysis; performed microscopy experiments and image analysis; contributed to manuscript writing)

#### Other Research Publications

Ortiz-Lopez, A.\*, N.M. Vega, C. Ratzke, and J. Gore. (2021). Interspecies bacterial competition regulates community assembly in the *C. elegans* intestine. *The ISME Journal* 1–15. doi:10.1038/s41396-021-00910-4 (Designed experiments; advised trainee in experimental design and performance and data analysis; contributed to manuscript writing)

S. Qing§, Vega, N.M. §, B. Cervantes, C. Mancuso, J. Gore, and T. Lu. (2020) Colonization with heterologous bacteria reprograms a *Caenorhabditis elegans* nutritional phenotype. bioRxiv 2020.03.01.972349 (2020) doi:10.1101/2020.03.01.972349. (Designed and carried out experiments; analyzed data; contributed to manuscript writing)

Vega, N. M. and J. Gore. (2017). Stochastic assembly produces heterogeneous communities in the *C. elegans* intestine. *PLoS Biology* 15(3), e2000633 (Designed and carried out experiments; analyzed data; performed modeling; wrote manuscript)

Artemova, T., Y. Gerardin., C. Dudley, N. M. Vega, & J. Gore. (2015) Isolated cell behavior drives the evolution of antibiotic resistance. *Mol Syst Biol* 11(7):822. PMCID: PMC4547850 (Designed and carried out experiments; analyzed data; contributed to manuscript writing)

Vega, N. M., K. R. Allison, A. N. Samuels, M. Klempner, & J. J. Collins. (2013) *Salmonella typhimurium* intercepts *Escherichia coli* signaling to enhance antibiotic tolerance. *Proc Nat Acad Sci.* 110(35): 14420-14425. PMCID: PMC3761632 (Designed and carried out experiments; analyzed data; lead manuscript writing)

Vega, N. M., K. R. Allison, A. S. Khalil & J. J. Collins. (2012) Signaling-mediated bacterial persister formation. *Nat Chem Biol* 8(5): 431-433. PMCID: PMC3329571 (Designed and carried out experiments; analyzed data; lead manuscript writing)

Marbach, D., J. C. Costello, R. Kuffner, N. M. Vega, R. J. Prill, D. M. Camacho, K. R. Allison, M. Kellis, J. J. Collins & G. Stolovitzky. (2012) Wisdom of crowds for robust gene network inference. *Nat Meth* 9(8): 796-804. PMCID: PMC3512113 (Designed and carried out experiments; analyzed data)

Vega, N. M., V. F. Gallucci, L. Hauser & J. Franks. (2009). Differences in Growth in the Spiny Dogfish over a Latitudinal Gradient in the Northeast Pacific. Biology and Management of Dogfish Sharks. Gallucci, V. F., G. A. McFarlane & G. G. Bargmann.

Bethesda, Maryland, USA, American Fisheries Society: 169-180. (Designed and carried out data collection; analyzed data; lead manuscript writing)

Gallucci, V. F., R. J. Foy, S. M. O'Brien, A. Aires-da-Silva, H. Nesse, B. Langseth, N. M. Vega, I. Taylor and K. J. Goldman. (2008). Information from a pregnant salmon shark *Lamna ditropis* in the eastern North Pacific with observations on oophagous reproduction. *Journal of Fish Biology*, 73: 732–739. doi: 10.1111/j.1095-8649.2008.01951.x (Contributed to data collection and manuscript writing)

Hauser, L., J. H. Franks, N. M. Vega, V. F. Gallucci. (2007). Potential for sustainable expansion of the dogfish (*Squalus acanthias*) fishery in the northeast Pacific. *NOAA Report*. [http://www.fisheries.noaa.gov/mb/sk/pdf/Report\\_2.pdf](http://www.fisheries.noaa.gov/mb/sk/pdf/Report_2.pdf) (Contributed to data collection and manuscript writing)

#### Reviews as Principal Investigator

Vega, N. M. & W. Ludington. (2021) From a parts list to assembly instructions and an operating manual: how small host models can re-write microbiome theory. *Current Opinion in Microbiology* 64: 146-151

Vega, N. M. (2019) Experimental evolution reveals microbial traits for association with the host gut. *PLOS Biology* 17, e3000129

#### Other Reviews

Vega, N. M. & J. Gore. (2018) Simple organizing principles in microbial communities. *Current Opinion in Microbiology* 45:195-202

Vega, N. M. & J. Gore. (2015) Biofilms: How Structure Emerges from Conflict. *Curr. Biol.* 25, R800–802 (2015). doi: 10.1016/j.cub.2015.07.007. PMID: 26394102

Vega, N. M. and J. Gore. (2014) Collective antibiotic resistance: mechanisms and implications. *Current Opinion in Microbiology* 21:28-34. doi: 10.1016/j.mib.2014.09.003

#### Other

Vega, N. M., K. R. Allison, A. N. Samuels, M. S. Klempner, and J.J. Collins. (2013) Reply to Blair et Al.: Dose-Dependent Effects and Oxidative Stress Responses in Antibiotic Tolerance in Salmonella Typhimurium. *Proceedings of the National Academy of Sciences* 110, no. 48: E4570–E4570. doi:10.1073/pnas.1318744110. PMCID: PMC3845158

### **PROFESSIONAL SERVICE/OUTREACH:**

<u>Professional</u>		
	2022-	Associate Editor, PLOS Computational Biology
	2022-	Conference hub organizer, Microbial Ecology and Evolution conference MEE*2023
<u>Emory Service</u>		
	2022	Chair, Graduate Biology Academic Award Task Force
	2020-2021	Faculty Search Committees, Biology and Physics
	2020-	Diversity, Equity, and Inclusion Committee, Emory Biology
	2020-	Diversity, Equity, and Inclusion Committee, Emory PBEE
	2019-	Mentor, Initiative for Maximizing Student Development
	2019-	Departmental Assessment Committee, Emory Biology
	2019	Internal fellowship review committee, Halle Institute for Global Research
	2018-	Inclusive Teaching Task Force, Emory University
	2018-	Member, Women in Science and Engineering (WISE), Emory University
	2018-	Member, Atlanta Society of Mentors
<u>Before Emory</u>		
	2015-2016	Recording Secretary, MIT Postdoctoral Association
	2014-2016	Community Building Committee, MIT Postdoctoral Association

### **TALKS AND PRESENTATIONS:**

#### Upcoming:

2022 University of Pittsburg Department of Biology seminar, October 17.

#### Past:

2021 South Dakota State University, Biology department seminar, October 1.

"Understanding microbial ecology using *C. elegans*" (Invited talk)

2021 Aspen Center for Physics Heinz R. Pagels Public Lecture, June 17. "SARS-CoV-2 and mRNA Vaccines By the (Bio)Numbers". (Invited talk)

2021 ETH Zurich Evolutionary Systems Biology seminar, May 13. (Invited talk)

2021 Emory Physics colloquium, April 20. “SARS-CoV-2 and mRNA Vaccines By the (Bio)Numbers”. (Invited talk)

2021 University of Nebraska Lincoln Biology Department seminar, March 11. “Assembly, stability, and heterogeneity in the gut microbiome: a worm’s story.” (Invited talk)

2021 Carnegie Institute Department of Embryology seminar, January 25. “Assembly, stability, and heterogeneity in the gut microbiome: a worm’s story.” (Invited talk)

2020 QUBES High-throughput Discovery Science and Inquiry-based Case Studies for Today’s Students (HITS) workshop, June 24-25. “Experimental big data as a case study tool.” (Invited talk)

2020 Boston University Systems Biology seminar, January 30. “Microbiome ecology in a *C. elegans* model”. (Invited talk)

2019 Boston College Biology seminar, December 3. “Microbiome ecology in a *C. elegans* model.” (Invited talk)

2019 NIH Microbiome workshop, December 10. “Deciphering the Microbiome: Empowering theory, cross-system analyses, and innovative analytics to propel advances in microbiome science”. Alexandria, Virginia. (Invited talk)

2019 Houston Area Worm Meeting, October 10, Baylor College of Medicine, Houston, TX. “Microbiome ecology in a *C. elegans* model”. (Invited talk)

2019 Gordon Conference in Microbial Population Biology, July 7-12, Andover, NH. “Common ground in microbiome assembly: Host factors in microbial ecology”. (Invited talk)

2019 1<sup>st</sup> Annual Emory Microbiome Symposium, August 19. Atlanta, GA. “Common ground in microbiome assembly: Host factors in microbial ecology” (Invited talk)

2019 ASM Microbe, June 20-24, San Francisco, CA. “Common ground in microbiome assembly: Host factors in microbial ecology”. (Invited talk)

2018 WGC Scientific Conference, July 5-7, Wellcome Genome Campus, Hinxton, UK. Ecology, Evolution, and Genomics of *Caenorhabditis* and Other Nematodes. “A *C. elegans* model for microbiome ecology.” (Talk)

2018 ASM Microbe, June 7-11, Atlanta GA. “A *C. elegans* model for microbiome ecology.” (Talk)

2017 GSA *C. elegans* International Meeting, June 21-25, UCLA, Los Angeles, CA. “Ecology of bacterial community assembly in a *C. elegans* model.” (Talk)

2017 Boston Bacterial Meeting, June 15-16, Cambridge, MA. “Ecology of bacterial community assembly in a *C. elegans* model.” (Talk)

2016 Emerging Leaders in Systems Biology Symposium. September 12-13, Cincinnati Childrens' Hospital Medical Center, Cincinnati, OH. "Bacterial community assembly in a *C. elegans* model." (Talk)

2016 ASM Microbe. June 16-20, Boston, MA. "Stochastic and deterministic bacterial community assembly in a *C. elegans* model." (Talk)

2016 Boston Bacterial Meeting. June 14-15, Cambridge, MA. "Bacterial community assembly in a *C. elegans* model." (Poster)

2015 Boston Bacterial Meeting. June 18-19, Cambridge, MA. "Microbial Community Ecology in a *C. elegans* Model." (Poster)

2015 American Society for Microbiology General Meeting. May 30-June 2, New Orleans, LA. "Microbial Community Ecology in a *C. elegans* Model." (Poster)

2014 qBio Conference. August 13-16, Santa Fe, NM. "Community ecology in a *C. elegans* model." (Talk)

2014 Boston Bacterial Meeting. June 12-13, Cambridge, MA. "Cooperative antibiotic resistance in a *C. elegans* model." (Poster)

2013 Boston Bacterial Meeting. June 14-15, Cambridge, MA. "*Salmonella typhimurium* intercepts *E. coli* signaling to enhance antibiotic tolerance." (Poster)

2011 Boston Bacterial Meeting, Cambridge, MA. "Signaling-mediated bacterial inoculation and persister formation" (Talk)

## **TEACHING:**

### Emory University

Summer & Fall 2021: STEM Inclusive Teaching Project Learning Group Facilitator (co-facilitators Eladio Abreu and Miguel Reyes, Emory Biology).

Fall 2020, Spring 2021: BIOL 370. Introduction to Microbiology (80 students)

Spring 2021-2022: BIOL 470W/IBS 539. Microbiome Community Ecology (12 students)

Spring 2020: BIOL 470W. Microbiome Community Ecology (8 students)

Fall 2019-2022: Contributed four class lectures to IBS 590 (Becoming a Successful Scientist) graduate class for the MMG program

Spring 2019: BIOL 385W. The Universe Within: Population Biology and Community Ecology of the Microbiome (20 students)

### Boston University

Spring 2010: Teaching Fellow for laboratory sections of BE 209 (Principles of Molecular Cell Biology and Biotechnology) undergraduate class

Fall 2009: Teaching Fellow for laboratory sections of BI 107 (Biology I) undergraduate class

University of Washington

Autumn 2006: TA for QSCI482 (Statistical Inference in Applied Research) graduate/upper-level undergraduate class

Summer 2006: Instructor for QSCI292 (Calculus for Biologists II) undergraduate class

Spring 2006: TA for QSCI 292 (Calculus for Biologists II) undergraduate class

Autumn 2005: TA for QSCI381 (Introduction to Probability and Statistics) undergraduate class

Spring 2005: Teaching Assistant for QSCI 292 (Calculus for Biologists II) undergraduate class

## **MENTORSHIP**

### **Graduate Trainees**

<b>First</b>	<b>Last</b>	<b>Program</b>	<b>Joined</b>
Megan	Taylor	Technician/MPH	Spring 2018
Jason	Chen	PBEE	Spring 2019
Satya	Spandana Boddu	Physics	Spring 2019
Carmen	Alvarez	PBEE	Spring 2021
Brandon	Berryhill	MMG	Spring 2022

### **Undergraduate Trainees**

<b>First</b>	<b>Last</b>	<b>Program</b>	<b>Start</b>	<b>Graduation</b>
Jimmy	Nguyen	499R (Biology)	Fall 2018	Spring 2020
Mihir	Patil	499R (Biology)	Fall 2018	Spring 2020
Carissa	Hutchinson	Honors	Fall 2018	Spring 2019
Andrew	Worthy	FWS/Honors	Spring 2019	Spring 2020
Lili	Janasky	FWS/SIRE	Fall 2019	Spring 2021
Alex	Choy	499R (Physics)	Spring 2020	Spring 2020
Teresa	Zheng	499R (Biology)	Fall 2019	Spring 2020
Delvonae	Beckles	SURE (Spelman)	Summer 2021	
Zee	Kwong	Formally supervised by Prof. Gerardo	Summer 2021	

### **Thesis Committees**

<b>First</b>	<b>Last</b>	<b>Program</b>	<b>Start</b>	<b>Graduation</b>
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Samiksha	Kaul	GATech	Spring 2019	
Tim	O'Sullivan	GATech	Spring 2018	Summer 2021
Amanda	Smith (Shurzinske)	GMB	Fall 2018	Spring 2021
Adithi	Govindan	Honors	Fall 2019	Spring 2020
Joy	Qiu	Honors	Fall 2019	Spring 2020
Nick	Berg	Honors	Fall 2020	Spring 2021
Carter	Abbott	Honors	Fall 2020	Spring 2021
Josh	Manuel	Honors	Fall 2021	Spring 2022
Jake	Fontaine	Honors	Fall 2021	Spring 2022
Anthony	Ortiz-Lopez	Microbiology MIT		Summer 2021
Jessica	Coates	MMG	Spring 2020	
Kayla	Stoy	PBEE	Fall 2019	
Loy	Xingwen	PBEE	Fall 2018	Spring 2021
Lynda	Bradley	PBEE	Spring 2020	
Linnea	Blavnik	Physics	Spring 2020	
Emma	Dawson	Physics	Fall 2021	

### Qualifying Exam Committees

<b>First</b>	<b>Last</b>	<b>Program</b>	<b>Term</b>
Kayla	Stoy	PBEE	Spring 2020
Michelle	McCauley	PBEE	Spring 2021
Marissa	Duckett	PBEE	Spring 2022

### Rotation Students

<b>Year</b>	<b>Term</b>	<b>Name</b>	<b>Program</b>
2018	Spring	Kayla Stoy	PBEE
2018	Summer	Megan Woods	MMG
2018	Fall	Emilio Rodriguez	MMG
2019	Spring 1	Jason Chen	PBEE
2019	Spring 2	Daniel Wilkins	PBEE
2019	Spring	Satya Boddu	Physics
2021	Spring	Carmen Alvarez	PBEE
2021	Fall	Marissa Duckett	PBEE
2022	Spring	Jarreth Caldwell	MMG
2022	Spring	Brandon Berryhill	MMG

### PROFESSIONAL DEVELOPMENT

2021. STEM Inclusive Teaching Project Facilitator Training. April 28 & 30 (remote)

2019. Healthy Working Environments for Graduate Students: A Program for Faculty. Presented by the Center for Faculty Development and Excellence, Emory University. October 21.

2018. Atlanta Society of Mentors Faculty Mentor Series, Emory University, Atlanta GA.

2016. Research Mentor and Facilitator Training for Microbiologists: Parts I & II. Workshop Participant, 3.5 hour seminars. ASM Microbe, Boston MA (June 2016)

2015. Kaufman Teaching Certificate Program. MIT (Spring 2015)