

# Jessica A. Grembi, PhD

POSTDOCTORAL RESEARCH FELLOW · DIVISION OF INFECTIOUS DISEASES AND GEOGRAPHIC MEDICINE

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## Research Interests

I am a microbiologist with strong computational skills broadly interested in the links between environmental health and public health. My current research focuses on host-microbe interactions in the human small intestine and the role of microbial ecology in diarrheal disease and childhood stunting. I am passionate about understanding the mechanisms underlying environmental enteropathy — a subclinical condition characterized by increased inflammation and permeability of the small intestine — which plays a role in persistent undernutrition and is estimated to impact between 50-90% of children in low- and middle-income countries. I work collaboratively with clinicians, epidemiologists, statisticians, microbiologists, immunologists, and other scientists both locally and globally to answer research questions related to these topics.

## Education

### Stanford University

Stanford, CA

#### PHD ENVIRONMENTAL ENGINEERING

September 2019

- Thesis Title: Enteric Pathogens: Measurement, Metrics, and Mitigation
- I developed a nano-liter qPCR chip to simultaneously detect 17 enteric pathogens, developed new analytical metrics that incorporate the quantity of individual pathogens into a composite total pathogen quantity score, and evaluated the efficacy of water, sanitation, handwashing, and nutrition interventions at reducing enteric pathogens in 14-month old children in rural Bangladesh.
- Advisors: Dr. Stephen Luby, MD and Dr. Alfred Spormann

### Pennsylvania State University

State College, PA

#### MS ENVIRONMENTAL ENGINEERING

May 2011

- Thesis Title: Remediation of high-strength mine impacted water with crab shell substrate mixtures: laboratory column and field pilot tests
- Advisor: Dr. Rachel Brennan

### United States Military Academy

West Point, NY

#### BS ENVIRONMENTAL ENGINEERING

June 2001

## Research and Work Experience

2019-present	<b>Postdoctoral Research Fellow</b> , Stanford University — <b>Primary Mentor: David Relman, MD</b>
2014-2019	<b>Graduate Research Assistant</b> , Civil and Environmental Engineering, Stanford University
2012-2013	<b>Global Health Researcher</b> , Innovations for Poverty Action, Dhaka, Bangladesh & Kakamega, Kenya
2011-2012	<b>Graduate Research Assistant</b> , Civil and Environmental Engineering, Stanford University
2009-2011	<b>Graduate Research Assistant</b> , Civil and Environmental Engineering, Penn State University
2008-2011	<b>Environmental Project Engineer</b> , Concurrent Technologies Corporation, Johnstown, Pennsylvania
2004-2007	<b>Medical Company Commander &amp; Env. Engr.</b> , U.S. Army 10 <sup>th</sup> Mountain Division, Ft. Drum, NY & Baghdad, Iraq
2001-2004	<b>Public Health Officer</b> , U.S. Army Center for Health Promotion and Preventive Medicine, Landstuhl, Germany

## Publications

### PEER-REVIEWED & PUBLISHED

*\*authors contributed equally to this work*

19. **Grembi, JA**, Nguyen, AT, Riviere, M, Heitmann, GB, Patil, A, Athni, TS, Djajadi, S, Ercumen, A, Lin, A, Crider, Y, Mertens, A, Karim, MA, Islam, MO, Miah, R, Famida, SL, Hossen, MS, Mutsuddi, P, Ali, S, Rahman, MZ, Hussain, Z, Shoab, AK, Haque, R, Rahman, M, Unicomb, L, Luby, SP, Arnold, BF, Bennett, A, Benjamin-Chung, J. (2024). Influence of hy-

- drometeorological risk factors on child diarrhea and enteropathogens in rural Bangladesh. *PLoS Neglected Tropical Diseases*. 18(5): e0012157. doi: [10.1371/journal.pntd.0012157](https://doi.org/10.1371/journal.pntd.0012157)
18. Nguyen, AT, **Grembi, JA**, Riviere, M, Heitmann, GB, Hutson, WD, Athni, TS, Patil, A, Ercumen, A, Lin, A, Crider, Y, Mertens, A, Unicomb, L, Rahman, M, Luby, SP, Arnold, BF, Benjamin-Chung, J. (2024). Influence of temperature and precipitation on the effectiveness of water, sanitation, and handwashing interventions against childhood diarrheal disease in rural Bangladesh: a reanalysis of the WASH Benefits Bangladesh trial. *Environmental Health Perspectives*. 132(4):047006. doi: [10.1289/EHP1380](https://doi.org/10.1289/EHP1380). PMID: 38602833; PMCID: PMC11008709
  17. Mertens, A, Arnold, BF, Benjamin-Chung, J, Boehm, A, Brown, J, Capone, D, Clasen, T, Fuhrmeister, E, **Grembi, JA**, Holcomb, D, Knee, J, Kwong, LH, Lin, A, Luby, SP, Nala, R, Nelson, K, Njenga, S, Null, C, Pickering, AJ, Rahman, M, Reese, H, Steinbaum, L, Stewart, J, Thilakarathne, R, Cumming, O, Colford, JM, Ercumen, A. (2024). Is detection of enteropathogens and human or animal faecal markers in the environment associated with subsequent child enteric infections and growth: an individual participant data meta-analysis. *The Lancet Global Health*. 12(3):e433-e444. doi: [10.1016/S2214-109X\(23\)00563-6](https://doi.org/10.1016/S2214-109X(23)00563-6). PMID: 38365415; PMCID: PMC10882208.
  16. Jung, DK\*, Tan, S\*, Hemlock, C, Mertens, AN, Stewart, CP, Rahman, MZ, Ali, S, Raqib, R, **Grembi, JA**, Karim, MR, Shahriar, S, Roy, AK, Bakir, S, Shoab, AK, Famida, SL, Hossen, MS, Mutsuddi, P, Akther, S, Rahman, M, Unicomb, L, Hester, L, Granger, DA, Erhardt, J, Naved, RT, Al Mamun, MM, Parvin, K, Colford Jr., JM, Fernald, LCH, Luby, SP, Dhabhar, FS, Lin, A. (2023). Micronutrient status during pregnancy is associated with child immune status in rural Bangladesh. *Current Developments in Nutrition*. 7(8):101969 doi: [10.1016/j.cdnut.2023.101969](https://doi.org/10.1016/j.cdnut.2023.101969). PMID: 37560460; PMCID: PMC10407622.
  15. Shalon, D\*, Culver, RN\*, **Grembi, JA\***, Folz, J\*, Treit, P, Shi, H, Rosenberger, FA, Dethlefsen, L, Meng, X, Yaffe, E, Aranda-Diaz, A, Geyer, PE, Mueller-Reif, JB, Spencer, S, Patterson, AD, Triadafilopoulos, G, Holmes, SP, Mann, M, Fiehn, O, Relman, DA, Huang, KC. (2023). Profiling of the human intestinal microbiome and bile acids under physiologic conditions using an ingestible sampling device. *Nature*. 617:581–591. doi: [10.1038/s41586-023-05989-7](https://doi.org/10.1038/s41586-023-05989-7). PMID: 37165188; PMCID: PMC10191855.
  14. Folz, J, Culver, R, Morales, J, **Grembi, JA**, Triadafilopoulos, G, Relman, D, Huang, KC, Shalon, D, Fiehn, O. (2023). Human metabolome variation along the upper intestinal tract. *Nature Metabolism*. 5:777–788. doi: [10.1038/s42255-023-00777-z](https://doi.org/10.1038/s42255-023-00777-z). PMID: 37165176; PMCID: PMC10229427.
  13. Mertens, A, Arnold, BF, Benjamin-Chung, J, Boehm, A, Brown, J, Capone, D, Clasen, T, Fuhrmeister, E, **Grembi, JA**, Holcomb, D, Knee, J, Kwong, LH, Lin, A, Luby, SP, Nala, R, Nelson, K, Njenga, S, Null, C, Pickering, AJ, Rahman, M, Reese, H, Steinbaum, L, Stewart, J, Thilakarathne, R, Cumming, O, Colford, JM, Ercumen, A. (2023). Effects of water, sanitation, and hygiene interventions on detection of enteropathogens and host-specific faecal markers in the environment: a systematic review and individual participant data meta-analysis. *The Lancet Planetary Health*. 7(3):e197-208. doi: [10.1016/S2542-5196\(23\)00028-1](https://doi.org/10.1016/S2542-5196(23)00028-1). PMID: 36889861; PMCID: PMC10009758.
  12. **Grembi, JA**, Rogawski McQuade, ET. (2022). Introducing riskCommunicator: An R package to obtain interpretable effect estimates for public health. *PLoS ONE*. 17(7):e0257708. doi: [10.1371/journal.pone.0265368](https://doi.org/10.1371/journal.pone.0265368). PMID: 35849588; PMCID: PMC9292119.
  11. Flaherty, KE, **Grembi, JA**, Ramachandran, VV, Haque, F, Khatun, S, Rahman, M, Maples, S Becker, TK, Spormann, AM, Schoolnik, GK, Hryckowian, AJ, Nelson, EJ. (2021). High-throughput low-cost nl-qPCR for enteropathogen detection: A proof-of-concept among hospitalized patients in Bangladesh. *PLoS ONE*. 16(10):e0257708. doi: [10.1371/journal.pone.0257708](https://doi.org/10.1371/journal.pone.0257708). PMID: 34597302; PMCID: PMC8486112.
  10. Lin, Y, **Grembi, JA**, Goots, SS, Sebastian, A, Albert, I, Brennan, RA. (2021). Advantageous microbial community development and improved performance of pilot-scale field systems treating high-risk acid mine drainage with crab shell. *Journal of Hazardous Materials*. 420:126665. doi: [10.1016/j.jhazmat.2021.126665](https://doi.org/10.1016/j.jhazmat.2021.126665). PMID: 34351284.
  9. Fuhrmeister, ER, Ercumen, A, **Grembi, JA**, Islam, M, Pickering, AJ, Nelson, KL. (2020). Shared bacterial communities between soil, stored drinking water, and hands in rural Bangladeshi households. *Water Research X*. 9:100056. doi: [10.1016/j.wroa.2020.100056](https://doi.org/10.1016/j.wroa.2020.100056). PMID: 32529181; PMCID: PMC7276488.
  8. **Grembi, JA**, Lin, A, Karim, Md. A, Islam, Md. O, Miah, R, Arnold, BF, Rogawski McQuade, ET, Ali, S, Rahman, Md. Z, Hussain, Z, Shoab, AK, Famida, SL, Hossen, Md. S, Mutsuddi, P, Rahman, M, Unicomb, L, Haque, R, Taniuchi, M, Liu, J, Platts-Mills, J, Holmes, SP, Stewart, CP, Benjamin-Chung, J, Colford, JM, Houpt, E, and Luby, SP. (2020). Effect of Water, Sanitation, Handwashing and Nutrition Interventions on Enteropathogens in Children 14 Months Old: A Cluster-Randomized Controlled Trial in Rural Bangladesh. *Journal of Infectious Diseases*. 227(3):434-447. doi: [10.1093/infdis/jiaa549](https://doi.org/10.1093/infdis/jiaa549). PMID: 32861214; PMCID: PMC9891429
  7. Nelson, EJ, **Grembi, JA**, Chao, DL, Andrews, JR, Alexandrova, L, Rodriguez, PH, Ramachandran, VV, Sayeed, MA, Wamala, JF, Debes, AK, Sack, DA, Hryckowian, AJ, Haque, F, Khatun, S, Rahman, M, Chien, A, Spormann, AM, Schoolnik,

- GK. (2020). Gold Standard Cholera Diagnostics Are Tarnished by Lytic Bacteriophage and Antibiotics. *Journal of Clinical Microbiology*. 58(9):e00412-20. doi: 10.1128/JCM.00412-20. PMID: 32611794; PMCID: PMC7448619.
6. **Grembi, JA**, Mayer-Blackwell, K, Luby, SP, Spormann, AM. (2020). High-Throughput Multiparallel Enteropathogen Detection via Nano-Liter qPCR. *Frontiers in Cellular and Infection Microbiology*. 10:351. doi: 10.3389/fcimb.2020.00351. PMID: 32766166; PMCID: PMC7381150.
  5. **Grembi, JA\***, Nguyen, LH\*, Haggerty, TD, Gardner, CD, Holmes, SP, Parsonnet, J. (2020). Gut microbiota plasticity is correlated with sustained weight loss on a low-carb or low-fat dietary intervention. *Scientific Reports*. 10:1405. doi: 10.1038/s41598-020-58000-y. PMID: 31996717; PMCID: PMC6989501.
  4. Lin, A, Ali, S, Arnold, BF, Rahman, MZ, Alauddin, M, **Grembi, JA**, Mertens, AN, Famida, SL, Akther, S, Hossen, MS, Mutsuddi, P, Shoab, AK, Hussain, Z, Rahman, M, Unicomb, L, Ashraf, S, Naser, AM, Parvez, SM, Ercumen, A, Benjamin-Chung, J, Haque, R, Ahmed, T, Hossain, MI, Choudhury, N, Jannat, K, Alauddin, ST, Minchala, SG, Cekovic, R, Hubbard, AE, Stewart, CP, Dewey, KG, Colford, JM, Luby, SP. (2020). Effects of Water, Sanitation, Handwashing, and Nutritional Interventions on Environmental Enteric Dysfunction in Young Children: A Cluster-randomized, Controlled Trial in Rural Bangladesh. *Clinical Infectious Diseases*. 70(5):738-747. doi: 10.1093/cid/ciz291. PMID: 30963177.
  3. Alexandrova, L, Haque, F, Rodriguez, P, Marrazzo, AC, **Grembi, JA**, Ramachandran, V, Hryckowian, AJ, Adams, CM, Siddique, MSA, Khan, AI, Qadri, F, Andrews, JR, Rahman, M, Spormann, AM, Schoolnik, GK, Chien, A, Nelson, EJ. (2019). Identification of Widespread Antibiotic Exposure in Patients With Cholera Correlates With Clinically Relevant Microbiota Changes. *Journal of Infectious Diseases*. 220(10):1655-1666. doi: 10.1093/infdis/jiz299. PMID: 31192364; PMCID: PMC6782107.
  2. Stewart, CP, Dewey, KG, Lin, A, Pickering, AJ, Byrd, KA, Jannat, K, Ali, S, Rao, G, Dentz, HN, Kiprotich, M, Arnold, CD, Arnold, BF, Allen, LH, Shahab-Ferdows, S, Ercumen, A, **Grembi, JA**, Naser, AM, Rahman, M, Unicomb, L, Colford, JM, Luby, SP, Null, C. (2019). Effects of lipid-based nutrient supplements and infant and young child feeding counseling with or without improved water, sanitation, and hygiene (WASH) on anemia and micronutrient status: Results from 2 cluster-randomized trials in Kenya and Bangladesh. *American Journal of Clinical Nutrition*. 109:148-164. doi: 10.1093/ajcn/nqy239. PMID: 30624600; PMCID: PMC6358037.
  1. **Grembi, JA**, Sick, BA, Brennan, RA. (2016). Remediation of High-Strength Mine-Impacted Water with Mixed Organic Substrates Containing Crab Shell and Spent Mushroom Compost. *Journal of Environmental Engineering*. 142:04015075. doi: 10.1061/(ASCE)EE.1943-7870.0001023

## PRE-PRINTS IN REVIEW

1. Butzin-Dozier, Z, Ji, Y, Coyle, J, Malencia, I, Rogawski McQuade, ET, **Grembi, JA**, Platts-Mills, JA, Houpt, ER, Graham, JP, Ali, S, Rahman, Md Z, Alauddin, M, Famida, SL, Akther, S, Hossen, Md S, Mutsuddi, P, Shoab, AK, Rahman, M, Islam, Md O, Miah, R, Taniuchi, M, Liu, J, Alauddin, S, Stewart, CP, Luby, SP, Colford, JM, Hubbard, AE, Mertens, AN, Lin, A. Treatment Heterogeneity of Water, Sanitation, Hygiene, and Nutrition Interventions on Child Growth by Environmental Enteric Dysfunction and Pathogen Status for Young Children in Bangladesh. <https://www.medrxiv.org/content/10.1101/2024.03.21.24304684v1>

## SOFTWARE

1. **riskCommunicator** is an R/CRAN package to estimate interpretable epidemiological effects using parametric g-computation with bootstrap resampling to obtain confidence intervals. [Available on CRAN, >12,900 downloads]

## Awards, Fellowships, & Grants \_\_\_\_\_

2022-2024	<b>NRSA Postdoctoral Fellowship (1F32DK130574)</b> , NIH, NIDDK	<i>3 years of salary</i>
2022-2024	<b>Grant INV-037857 (Lead Author)</b> , Bill and Melinda Gates Foundation	<i>\$ 2,134,000</i>
2021-2023	<b>Dr. George Rosenkranz Prize</b> , Stanford Health Policy	<i>\$ 100,000</i>
2021-2022	<b>Dean's Postdoctoral Fellowship</b> , Stanford University School of Medicine	<i>½ year salary</i>
2018	<b>Seed Grant Award</b> , Stanford Center for Innovations in Global Health	<i>\$ 50,000</i>
2016-2018	<b>Jim and Gaye Pigott Interdisciplinary Graduate Fellowship</b> , Stanford University	<i>3 years of salary</i>
2016-2017	<b>Grant OPP1161946 (Lead Author)</b> , Bill and Melinda Gates Foundation	<i>\$ 650,000</i>
2015	<b>Microbiome Seed Grant</b> , Stanford Microbiome Consortium	<i>\$ 20,000</i>
2014	<b>Seed Grant</b> , Stanford Center for Innovations in Global Health	<i>\$ 25,000</i>
2011-2016	<b>Graduate Research Fellowship</b> , National Science Foundation	<i>3 years of salary</i>
2011	<b>David A. Long Scholarship</b> , Pennsylvania American Waterworks Association	<i>½ year salary</i>
2010	<b>Scholarship</b> , American Society of Mining and Reclamation	
2010	<b>Poster Presentation Award</b> , Pennsylvania Water Environment Association	
2010	<b>George W. Johnstone Graduate Fellowship</b> , Pennsylvania State University	<i>½ year salary</i>
2009	<b>College of Engineering Recruitment Fellowship</b> , Pennsylvania State University	<i>1 year of salary</i>
2004, 2006	<b>Meritorious Service Medal</b> , U.S. Army	
2003, 2007	<b>Commendation Medal</b> , U.S. Army	
2003	<b>Parachutist Badge - Distinguished Honor Graduate</b> , U.S. Army	
2002	<b>Expert Field Medical Badge</b> , U.S. Army	
2000	<b>Air Assault Badge</b> , U.S. Army	
1998-2001	<b>Superintendent's Award</b> , United States Military Academy	

## INVITED TALKS

10. **Grembi, JA.** Measuring immune markers in small intestine samples collected with the CapScan device. Bill and Melinda Gates Foundation, Microbiome Quarterly Research Symposium. Online. 2024 Sept 03.
9. **Grembi, JA.** Bifidobacterium: friend or foe? Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Division of Population Health Research Seminar. Online. 2023 December 14.
8. **Grembi, JA.** Profiling of the human intestinal microbiome and bile acids under physiologic conditions using an ingestible sampling device. Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Division of Intramural Research Tenure-Track Investigator Virtual Symposia: Disentangling host-microbe interactions through the analysis of high dimensional multi-omics data. Online. 2023 April 13.
7. **Grembi, JA.** Effects of water, sanitation, handwashing (WSH) and nutritional interventions on enteropathogen burden in young children: a cluster-randomized controlled trial in rural Bangladesh. Infectious Diseases Grand Rounds, Stanford, CA. 2019 Feb 21.
6. **Grembi, JA,** Mayer-Blackwell, K, Luby, SP, Spormann, AM. High-throughput multi-parallel nL-qPCR SmartChip for the detection of 17 enteric pathogens. American Society of Tropical Medicine and Hygiene Annual Meeting, New Orleans, LA. 2018 Oct 29-31.
5. **Grembi, JA,** Mayer-Blackwell, K, Hoy-Schulz, YE, Parsonnet, J, Luby, SP, Spormann, AM. nL-qPCR pathogen chip: A tool for stool. Bay Area WASH Symposium, Berkeley, CA. 2017 Apr 5.
4. **Grembi, JA.** Gut microbiota of obese adults: predicting diet success. Division of Infectious Diseases and Geographic Medicine & Division of Pediatric Infectious Diseases Annual Retreat, Stanford, CA. 2016 May 3.
3. **Grembi, JA,** Sick, BA, Goots, SS, Lin, S, Brennan, RA. Remediation of high-strength mine impacted water with crab shell substrate mixtures: laboratory column and field pilot tests. National Meeting of the American Society of Mining and Reclamation, Bismarck, ND. 2011 June 1.
2. **Grembi, JA,** Sick, BA, Brennan, RA. Utilization of a sustainable resource to remediate high- strength mine-impacted water from a local abandoned mine: Crab-shell column study. American Chemical Society National Meeting, Boston, MA. 2010 Aug 22-26.
1. **Grembi, JA.** Evaluation of Alternative Particle Filtration Designs to Reduce RDX Losses in Dewatering Operations. Environment, Energy, and Sustainability Symposium (E2S2), Denver, CO. 2009 May 4-7.

## Teaching Experience \_\_\_\_\_

June 2019	<b>Microbial Ecology using R and Bioconductor</b> , Course Moderator & Teaching Assistant	<i>San Francisco, CA</i>
Fall 2014	<b>Environmental Microbiology</b> , Graduate Teaching Assistant	<i>Stanford, CA</i>
Spring 2014	<b>Design for a Sustainable World</b> , Teaching Associate	<i>Stanford, CA</i>
Winter 2014	<b>Current Topics in Sustainable Engineering</b> , Teaching Associate	<i>Stanford, CA</i>
Fall 2009	<b>Field Methods for Remediation Design</b> , Graduate Teaching Assistant	<i>State College, PA</i>

## Mentoring \_\_\_\_\_

Summer 2024	<b>Eliza Daigle</b> , Undergraduate, Whitman College	<i>Remote</i>
Summer 2021	<b>Mira Ramachandran</b> , Undergraduate, University of California, Davis	<i>Stanford, CA</i>
2019-2022	<b>Rebecca Christensen</b> , Undergraduate, Stanford University	<i>Stanford, CA</i>
Summer 2018	<b>Areta Buness</b> , Undergraduate, Stanford University	<i>Stanford, CA</i>
Summer 2013	<b>Maneet Kaur</b> , Undergraduate, University of California, Berkeley	<i>Bangladesh</i>
2010-2011	<b>Sara Goots</b> , Undergraduate, Penn State University	<i>State College, PA</i>
2010-2011	<b>Shanxing Lin</b> , Undergraduate, Penn State University	<i>State College, PA</i>
2009-2010	<b>Bradley Sick</b> , Undergraduate, Penn State University	<i>State College, PA</i>
Fall 2009	<b>Amanda Brown</b> , Undergraduate, Penn State University	<i>State College, PA</i>

## Service & Professional Development \_\_\_\_\_

### MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

2022-present **Stanford Center for Innovations in Global Health**, Postdoctoral Affiliate  
2021-present **Stanford Maternal and Child Health Research Institute**, Member  
2016-present **American Society for Tropical Medicine and Hygiene**, Member  
2009-present **American Society for Microbiology**, Member

### PEER REVIEW OF MANUSCRIPTS

Clinical Infectious Diseases  
American Journal of Tropical Medicine and Hygiene  
Environmental Microbiology  
mSystems

### SERVICE AND OUTREACH

2018-2023	<b>Stanford Military-Affiliated Advisory Committee</b> , Member	<i>Stanford, CA</i>
2016-2023	<b>Synopsys Science Fair</b> , Volunteer Judge	<i>San Jose, CA</i>