



## Elizabeth Costello

Basic Life Research Scientist, Medicine - Med/Infectious Diseases

### SUPERVISORS

- David Relman

### Bio

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### HONORS AND AWARDS

- Walter V. and Idun Berry Postdoctoral Fellowship, Stanford University (2009-2013)
- K99 Pathway to Independence Award, NIH/NICHD (2013-2016)

### EDUCATION AND CERTIFICATIONS

- Postdoc, Stanford University (2013)
- Postdoc, University of Colorado Boulder (2009)
- PhD, University of Colorado Boulder (2007)
- BS, Cornell University (1999)

### LINKS

- Relman Lab: <https://med.stanford.edu/relmanlab.html>

### Publications

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### PUBLICATIONS

- **Sub-communities of the vaginal microbiota in pregnant and non-pregnant women.** *Proceedings. Biological sciences*  
Symul, L., Jeganathan, P., Costello, E. K., France, M., Bloom, S. M., Kwon, D. S., Ravel, J., Relman, D. A., Holmes, S.  
2023; 290 (2011): 20231461
- **Abrupt perturbation and delayed recovery of the vaginal ecosystem following childbirth.** *Nature communications*  
Costello, E. K., DiGiulio, D. B., Robaczewska, A., Symul, L., Wong, R. J., Shaw, G. M., Stevenson, D. K., Holmes, S. P., Kwon, D. S., Relman, D. A.  
2023; 14 (1): 4141
- **Rookery through rehabilitation: Microbial community assembly in newborn harbour seals after maternal separation.** *Environmental microbiology*  
Switzer, A. D., Callahan, B. J., Costello, E. K., Bik, E. M., Fontaine, C., Gulland, F. M., Relman, D. A.  
2023
- **Early prediction and longitudinal modeling of preeclampsia from multiomics.** *Patterns (New York, N.Y.)*  
Maric, I., Contrepolis, K., Moufarrej, M. N., Stelzer, I. A., Feyaerts, D., Han, X., Tang, A., Stanley, N., Wong, R. J., Traber, G. M., Ellenberger, M., Chang, A. L., Fallahzadeh, et al  
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- **Short-Term Dairy Product Elimination and Reintroduction Minimally Perturbs the Gut Microbiota in Self-Reported Lactose-Intolerant Adults.** *mBio*  
Smith, C. J., Dethlefsen, L., Gardner, C., Nguyen, L., Feldman, M., Costello, E. K., Kolodny, O., Relman, D. A.  
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- **Characterizing the oral and distal gut microbiota of the threatened southern sea otter (*Enhydra lutris nereis*) to enhance conservation practice.** *Conservation science and practice*  
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- **The human gut microbiome and health inequities.** *Proceedings of the National Academy of Sciences of the United States of America*  
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- **Microbiota assembly, structure, and dynamics among Tsimane horticulturalists of the Bolivian Amazon.** *Nature communications*  
Sprockett, D. D., Martin, M., Costello, E. K., Burns, A. R., Holmes, S. P., Gurven, M. D., Relman, D. A.  
2020; 11 (1): 3772
- **Complete Genome Sequences of Six *Lactobacillus iners* Strains Isolated from the Human Vagina.** *Microbiology resource announcements*  
France, M. T., Rutt, L. n., Narina, S. n., Arbaugh, S. n., McComb, E. n., Humphrys, M. S., Ma, B. n., Hayward, M. R., Costello, E. K., Relman, D. A., Kwon, D. S., Ravel, J. n.  
2020; 9 (20)
- **Replication and refinement of a vaginal microbial signature of preterm birth in two racially distinct cohorts of US women.** *Proceedings of the National Academy of Sciences of the United States of America*  
Callahan, B. J., DiGiulio, D. B., Goltsman, D. S., Sun, C. L., Costello, E. K., Jeganathan, P. n., Biggio, J. R., Wong, R. J., Druzin, M. L., Shaw, G. M., Stevenson, D. K., Holmes, S. P., Relman, et al  
2017
- **Candidatus *Mycoplasma girerdii* replicates, diversifies, and co-occurs with *Trichomonas vaginalis* in the oral cavity of a premature infant.** *Scientific reports*  
Costello, E. K., Sun, C. L., Carlisle, E. M., Morowitz, M. J., Banfield, J. F., Relman, D. A.  
2017; 7 (1): 3764
- **Marine mammals harbor unique microbiotas shaped by and yet distinct from the sea.** *Nature communications*  
Bik, E. M., Costello, E. K., Switzer, A. D., Callahan, B. J., Holmes, S. P., Wells, R. S., Carlin, K. P., Jensen, E. D., Venn-Watson, S., Relman, D. A.  
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- **Temporal and spatial variation of the human microbiota during pregnancy.** *Proceedings of the National Academy of Sciences of the United States of America*  
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2015
- **Population health: immaturity in the gut microbial community.** *Nature*  
Costello, E. K., Relman, D. A.  
2014; 510 (7505): 344-345
- **Genetically dictated change in host mucus carbohydrate landscape exerts a diet-dependent effect on the gut microbiota** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Kashyap, P. C., Marcobal, A., Ursell, L. K., Smits, S. A., Sonnenburg, E. D., Costello, E. K., Higginbottom, S. K., Domino, S. E., Holmes, S. P., Relman, D. A., Knight, R., Gordon, J. I., Sonnenburg, et al  
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- **Biphasic assembly of the murine intestinal microbiota during early development.** *ISME journal*  
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- **Distinct Distal Gut Microbiome Diversity and Composition in Healthy Children from Bangladesh and the United States** *PLOS ONE*  
Lin, A., Bik, E. M., Costello, E. K., Dethlefsen, L., Haque, R., Relman, D. A., Singh, U.

2013; 8 (1)

- **Time series community genomics analysis reveals rapid shifts in bacterial species, strains, and phage during infant gut colonization** *GENOME RESEARCH*  
Sharon, I., Morowitz, M. J., Thomas, B. C., Costello, E. K., Relman, D. A., Banfield, J. F.  
2013; 23 (1): 111-120
- **Microbiome assembly across multiple body sites in low-birthweight infants.** *mBio*  
Costello, E. K., Carlisle, E. M., Bik, E. M., Morowitz, M. J., Relman, D. A.  
2013; 4 (6): e00782-13
- **Cohabiting family members share microbiota with one another and with their dogs.** *eLife*  
Song, S. J., Lauber, C., Costello, E. K., Lozupone, C. A., Humphrey, G., Berg-Lyons, D., Caporaso, J. G., Knights, D., Clemente, J. C., Nakielny, S., Gordon, J. I., Fierer, N., Knight, et al  
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- **Distinct cutaneous bacterial assemblages in a sampling of South American Amerindians and US residents** *ISME JOURNAL*  
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- **The Application of Ecological Theory Toward an Understanding of the Human Microbiome** *SCIENCE*  
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- **Sources of Bacteria in Outdoor Air across Cities in the Midwestern United States** *APPLIED AND ENVIRONMENTAL MICROBIOLOGY*  
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- **Minimum information about a marker gene sequence (MIMARKS) and minimum information about any (x) sequence (MIxS) specifications** *NATURE BIOTECHNOLOGY*  
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- **Supervised classification of human microbiota** *FEMS MICROBIOLOGY REVIEWS*  
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- **Strain-resolved community genomic analysis of gut microbial colonization in a premature infant** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
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- **Global patterns in the biogeography of bacterial taxa** *ENVIRONMENTAL MICROBIOLOGY*  
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- **Postprandial remodeling of the gut microbiota in Burmese pythons** *ISME JOURNAL*  
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- **Delivery mode shapes the acquisition and structure of the initial microbiota across multiple body habitats in newborns** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Dominguez-Bello, M. G., Costello, E. K., Contreras, M., Magris, M., Hidalgo, G., Fierer, N., Knight, R.  
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- **QIIME allows analysis of high-throughput community sequencing data** *NATURE METHODS*  
Caporaso, J. G., Kuczynski, J., Stombaugh, J., Bittinger, K., Bushman, F. D., Costello, E. K., Fierer, N., Pena, A. G., Goodrich, J. K., Gordon, J. I., Huttley, G. A., Kelley, S. T., Knights, et al  
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- **Forensic identification using skin bacterial communities** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Fierer, N., Lauber, C. L., Zhou, N., McDonald, D., Costello, E. K., Knight, R.  
2010; 107 (14): 6477-6481
- **Direct sequencing of the human microbiome readily reveals community differences** *GENOME BIOLOGY*  
Kuczynski, J., Costello, E. K., Nemergut, D. R., Zaneveld, J., Lauber, C. L., Knights, D., Koren, O., Fierer, N., Kelley, S. T., Ley, R. E., Gordon, J. I., Knight, R.  
2010; 11 (5)
- **Bacterial Community Variation in Human Body Habitats Across Space and Time** *SCIENCE*  
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- **Regulation of myocardial ketone body metabolism by the gut microbiota during nutrient deprivation** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Crawford, P. A., Crowley, J. R., Sambandam, N., Muegge, B. D., Costello, E. K., Hamady, M., Knight, R., Gordon, J. I.  
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- **Soil CO<sub>2</sub> flux and photoautotrophic community composition in high-elevation, 'barren' soil** *ENVIRONMENTAL MICROBIOLOGY*  
Freeman, K. R., Pescador, M. Y., Reed, S. C., Costello, E. K., Robeson, M. S., Schmidt, S. K.  
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- **Fumarole-Supported Islands of Biodiversity within a Hyperarid, High-Elevation Landscape on Socompa Volcano, Puna de Atacama, Andes** *APPLIED AND ENVIRONMENTAL MICROBIOLOGY*  
Costello, E. K., Halloy, S. R., Reed, S. C., Sowell, P., Schmidt, S. K.  
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- **The earliest stages of ecosystem succession in high-elevation (5000 metres above sea level), recently deglaciated soils** *PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES*  
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2008; 275 (1653): 2793-2802
- **Biogeochemical consequences of rapid microbial turnover and seasonal succession in soil** *ECOLOGY*  
Schmidt, S. K., Costello, E. K., Nemergut, D. R., Cleveland, C. C., Reed, S. C., Weintraub, M. N., Meyer, A. F., Martin, A. M.  
2007; 88 (6): 1379-1385
- **Microbial diversity in alpine tundra wet meadow soil: novel Chloroflexi from a cold, water-saturated environment** *ENVIRONMENTAL MICROBIOLOGY*  
Costello, E. K., Schmidt, S. K.  
2006; 8 (8): 1471-1486
- **Structure and function of alpine and arctic soil microbial communities** *RESEARCH IN MICROBIOLOGY*  
Nemergut, D. R., Costello, E. K., Meyer, A. F., Pescador, M. Y., Weintraub, M. N., Schmidt, S. K.  
2005; 156 (7): 775-784

- **The rate and pattern of cladogenesis in microbes** *EVOLUTION*  
Martin, A. P., Costello, E. K., Meyer, A. F., Nemergut, D. R., Schmidt, S. K.  
2004; 58 (5): 946-955