Claire Duvallet

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My long-term career goal is to become a key player in shaping the integration of precision medicine into public health. Currently, my ideal job is one in which I help shape the vision of a company which uses computational biology to impact society.

Education

Massachusetts Institute of Technology, *Cambridge, MA* 2014 – 2019
Ph.D., Biological Engineering

Columbia University, *New York, NY* 2009 – 2013
B.S., Biomedical Engineering

Research

Massachusetts Institute of Technology 2015 – present
Supervisor: Eric J. Alm, Ph.D.
Department of Biological Engineering

I study the relationship between the microbiome and health and disease, and am generally interested in personalized medicine approaches for public health applications.

Columbia University 2011 – 2013
Supervisor: Samuel L. Sia, Ph.D.
Molecular and Microscale Bioengineering Laboratory

As an undergraduate research assistant, I worked on developing a point-of-care microfluidic device to diagnose multi-drug resistant tuberculosis.

Publications

1. Chengzhen Dai, **Claire Duvallet**, An Ni Zhang, Mariana Matus, Newsha Ghaeli, Shinkyu Park, Noriko Endo, Siavash Isazadeh, Kazi Jamil, Carlo Ratti, and Eric Alm.
   "Multi-site sampling and risk prioritization reveals the public health relevance of antibiotic resistance genes found in sewage environments."
   in preparation.

2. **Claire Duvallet**, Caroline Zellmer, Pratik Panchal, Shrish Budree, Madji Osman, and Eric Alm.
   "Framework for rational donor selection in fecal microbiota transplant clinical trials."
   in preparation.

3. Mariana Matus, **Claire Duvallet**, Newsha Ghaeli, Melissa Kido Soule, Krista Longnecker, Ilana Brito, Carlo Ratti, Elizabeth B. Kujawinski, Eric Alm.
   "Untargeted detection of human health and activity markers in residential wastewater through microbiome sequencing and metabolomics."
   in preparation.

4. **Claire Duvallet**, Kara Larson, Scott Snapper, Sonia Iosim, Ann Lee, Katherine Freer, Kara May, Eric Alm, and Rachel Rosen.
   "Aerodigestive sampling reveals altered microbial exchange between lung, oropharyngeal, and gastric microbiomes in children with impaired swallow function."
   PLoS ONE, *in review* (preprint).

5. Keegan Korthauer*, Patrick Kimes*, **Claire Duvallet**†, Alejandro Reyes†, Ayshwarya Subramanian†, Mingxiang Teng, Chinmay Shukla, Eric Alm, Stephanie Hicks.
   "A practical guide to methods controlling false discoveries in computational biology."
   Genome Biology, *in review* (preprint).

6. Sean Gibbons, **Claire Duvallet**, and Eric Alm. (2018)
"Correcting for batch effects in case-control microbiome studies."
PLoS Computational Biology. doi: 10.1371/journal.pone.0176335.

7. **Claire Duvallet**. (2018)
"Meta-analysis generates and prioritizes hypotheses for translational microbiome research."
Microbial Biotechnology. doi: 10.1111/1751-7915.13047.

8. **Claire Duvallet**, Sean Gibbons, Thomas Gurry, Rafael Irizarry, and Eric Alm. (2017)
"Meta-analysis of gut microbiome studies identifies disease-specific and shared responses."
Nature Communications. doi: 10.1038/s41467-017-01973-8.

9. Scott Olesen, **Claire Duvallet**, and Eric Alm. (2017)
"dbOTU3: A new implementation of distribution-based OTU calling."
PloS ONE. doi: 10.1371/journal.pone.0176335.

10. *[Non-peer reviewed blog post]* **Claire Duvallet**. (2017)
"Beyond dysbiosis: disease-specific and shared microbiome responses to disease."
Nature Microbiology Community Forum. (link).

11. *[Dataset]* **Claire Duvallet**, Sean Gibbons, Thomas Gurry, Rafael Irizarry, and Eric Alm. (2017)
"MicrobiomeHD: the human gut microbiome in health and disease."
Zenodo. doi: 10.5281/zenodo.1146764

Software

Percentile normalization
Correcting batch effects in case-control microbiome studies.

Python implementation: github.com/seangibbons/percentile_normalization *(contributor)*
QIIME 2 plugin: github.com/cduvallet/q2-perc-norm *(developer)*

Distribution-based OTU calling
New implementation of Preheim *et al.*'s distribution-based OTU clustering algorithm.

Python implementation: github.com/swo/dbotu3 *(contributor)*
QIIME 2 plugin: github.com/cduvallet/q2-dbotu *(developer)*

Amplicon sequencing pipeline
End-to-end pipeline to process 16S data.

Python: github.com/thomasgurry/amplicon_sequencing_pipeline *(co-developer)*

Fellowships & Awards

Fellowships

Siebel Scholars Foundation — 2018
Siebel Scholar Class of 2019

National Defense Science and Engineering Graduate Fellowship — 2015 – 2018
NDSEG Recipient

National Science Foundation Graduate Research Fellowship — 2015
Honorable Mention

Henry Luce Foundation 2013 – 2014
Luce Scholar

Awards

PSB Award for Rigorous Secondary Data Analysis 2019
Junior Research Parasite

MIT Graduate Women of Excellence 2017

Salutatorian 2013
Columbia University Fu Foundation School of Engineering and Applied Science

King's Crown Bronze Leadership Award 2012
Columbia University

Teaching Experience

Teaching Assistant Fall 2015
20.106 Systems Microbiology, *Massachusetts Institute of Technology*

I was a TA for seven advanced undergraduate students in a new course on the human microbiome, emerging disease, phylogenetics, and host-microbe interactions.

Lecturer 2013 – 2014
Biomedical Equipment Technology Department, *University of Puthisastra*
Engineering World Health, *Phnom Penh, Cambodia*

As a Luce Scholar, I was one of the first lecturers for Engineering World Health's new Associate Bachelors program in Biomedical Equipment Technology at the University of Puthisastra, a private university in Phnom Penh.

Leadership & Service

Academic and professional

MIT Biotech Group 2017 – 2018
Beyond the Bench Initiative board member

MIT Microbiome Club 2015 – 2018
Co-Founder, President, Executive board member
MIT-Harvard Microbiome Symposium, co-founder and organizing committee

Departmental and MIT

Graduate Student Advisory Group for Engineering (GradSAGE) 2017 – 2018
Advisory group to the Dean of the School of Engineering

MIT Graduate Student Council 2017 – 2019
Diversity and Inclusion Subcommittee
Vice Chair, Department and Classroom Inclusion co-coordinator

BE Resources for Easing Friction and Stress (BE REFS) 2016 – 2019
Confidential conflict management coach and graduate student advocate

BE Graduate Student Board 2015 – 2018
Diversity Chair; *co-Founder*, BE Application Assistance Program

Outreach & Mentorship

Science Club for Girls, Young Leaders in STEM 2016 and 2017
Volunteer, developed and taught three-day course on microbiology and the human microbiome