

# Claire Duvallet

---

cduvallet@gmail.com  
cduvallet.github.io

9 Seattle St  
Allston, MA 02134

I am a PhD in computational biology interested in using data science to impact society.

**SKILLS**      **Technical:** Python (pandas, seaborn, matplotlib, scikit-learn, etc); git and GitHub; AWS (S3, EC2, Glacier, IAM); bash; LaTeX; R (proficient); data wrangling and exploration; machine learning; NGS analysis (16S, metagenomics); untargeted metabolomics analysis.  
**Non-technical:** conflict management; student advocacy; project management; oral and written communication; diversity, equity, and inclusion.  
**Languages:** English (native), French (fluent), Spanish (conversational), Khmer (beginner)

**EDUCATION**      **Massachusetts Institute of Technology, Cambridge, MA**      2014 – 2019  
Ph.D., Biological Engineering, January 2019  
  
**Columbia University, New York, NY**      2009 – 2013  
B.S., Biomedical Engineering

**RESEARCH**      **Massachusetts Institute of Technology**      2015 – 2019  
Supervisor: Eric J. Alm, Ph.D.  
Ph.D., *Department of Biological Engineering* (2015 – Jan. 2019)  
Postdoc (Feb. 2019 – Apr. 2019)

I studied the relationship between the microbiome and health and disease, mining large clinical and biological datasets to extract scientific insight.

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

As an undergraduate researcher, I worked on developing a point-of-care microfluidic device to diagnose multi-drug resistant tuberculosis in resource-limited settings.

- PUBLICATIONS**
1. Chengzhen Dai, **Claire Duvallet**, An Ni Zhang, Mariana Matus, Newsha Ghaeli, Shinkyu Park, Noriko Endo, Siavash Isazadeh, Tong Zhang, 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.”  
*submitted (bioRxiv preprint).*
  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.”  
*submitted (medRxiv preprint).*
  3. Mariana Matus, **Claire Duvallet**, Newsha Ghaeli, Melissa Kido Soule, Krista Longnecker, Ilana Brito, Carlo Ratti, Elizabeth B. Kujawinski, and 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.” (2019)  
*PLoS ONE*, doi: [10.1371/journal.pone.0216453](https://doi.org/10.1371/journal.pone.0216453).

5. Keegan Korthauer\*, Patrick Kimes\*, **Claire Duvallet**<sup>†</sup>, Alejandro Reyes<sup>†</sup>, Ayshwarya Subramanian<sup>†</sup>, Mingxiang Teng, Chinmay Shukla, Eric Alm, and Stephanie Hicks.  
“A practical guide to methods controlling false discoveries in computational biology.”  
*Genome Biology*, doi: [10.1186/s13059-019-1716-1](https://doi.org/10.1186/s13059-019-1716-1).
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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1038/s41467-017-01973-8).
  - Received PSB Award for Rigorous Secondary Data Analysis
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](https://doi.org/10.1371/journal.pone.0176335).
10. [Non-peer reviewed blog post] **Claire Duvallet**. (2019)  
“Scientific discovery from a clinical study: surprises from the lung and stomach microbiomes.” *Nature Microbiology Community Forum*. ([go.nature.com/30rx4VZ](https://go.nature.com/30rx4VZ)).
11. [Non-peer reviewed blog post] **Claire Duvallet**. (2017)  
“Beyond dysbiosis: disease-specific and shared microbiome responses to disease.”  
*Nature Microbiology Community Forum*. ([go.nature.com/2As9meL](https://go.nature.com/2As9meL)).
12. [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](https://doi.org/10.5281/zenodo.1146764)

## SOFTWARE

### Percentile normalization

Correcting batch effects in case-control microbiome studies.

Python implementation: [github.com/seangibbons/percentile\\_normalization](https://github.com/seangibbons/percentile_normalization) (*contributor*)  
QIIME 2 plugin: [github.com/cduvallet/q2-perc-norm](https://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](https://github.com/swo/dbotu3) (*contributor*)  
QIIME 2 plugin: [github.com/cduvallet/q2-dbotu](https://github.com/cduvallet/q2-dbotu) (*developer*)

### Amplicon sequencing pipeline

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

Python: [github.com/thomasgurry/amplicon\\_sequencing\\_pipeline](https://github.com/thomasgurry/amplicon_sequencing_pipeline) (*co-developer*)

FELLOWSHIPS & AWARDS	<b>Fellowships</b>	
	Siebel Scholars Foundation <i>Siebel Scholar Class of 2019</i>	2018
	National Defense Science and Engineering Graduate Fellowship <i>NDSEG Recipient</i>	2015 – 2018
	National Science Foundation Graduate Research Fellowship <i>Honorable Mention</i>	2015
	Henry Luce Foundation <i>Luce Scholar, Engineering World Health Cambodia</i>	2013 – 2014
	<b>Awards</b>	
	PSB Award for Rigorous Secondary Data Analysis <i>Junior Research Parasite</i>	2019
	MIT Graduate Women of Excellence	2017
	Salutatorian <i>Columbia University Fu Foundation School of Engineering and Applied Science</i>	2013
	King’s Crown Bronze Leadership Award <i>Columbia University</i>	2012
TEACHING EXPERIENCE	<b>Teaching Assistant</b>	Fall 2015
	20.106 Systems Microbiology, <i>Massachusetts Institute of Technology</i>	
	I was a TA for seven advanced undergraduate students in a new course on the human microbiome, emerging disease, phylogenetics, and host-microbe interactions.	
	<b>Lecturer</b>	2013 – 2014
	Biomedical Equipment Technology Department, <i>University of Puthisastra</i> Engineering World Health, <i>Phnom Penh, Cambodia</i>	
	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	<b>Academic and professional</b>	
	MIT Microbiome Club <i>Co-Founder, President, Executive board member</i> <i>MIT-Harvard Microbiome Symposium, co-founder and organizing committee</i>	2015 – 2018
	MIT Biotech Group <i>Beyond the Bench Initiative board member</i>	2017 – 2018
	<b>Departmental and MIT</b>	
	Graduate Student Advisory Group for Engineering (GradSAGE) Advisory group to the Dean of the School of Engineering	2017 – 2018
	MIT Graduate Student Council Diversity and Inclusion Subcommittee <i>Vice Chair, Department and Classroom Inclusion co-coordinator</i>	2017 – 2019

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*

ESL Program for MIT Service Employees 2015 – 2018  
*Math GED tutor*