

Sean M. Gibbons

Institute for Systems Biology (ISB)
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Education

- University of Chicago** PhD, biophysical sciences 2011-2015
- advisers: Profs. Jack Gilbert and Maureen Coleman
 - dissertation title: *Multiscale microbial systems ecology and evolution.*
- Uppsala University** MSc, microbiology 2009-2010
- adviser: Prof. Peter Lindblad
 - thesis title: *Synthetic Biology for Renewable Energy.*
- The University of Montana** BA/BSc/BA, molecular biology/microbiology/French 2002-2008
- undergraduate research adviser: Prof. James Gannon
 - minor: chemistry
 - undergraduate honors thesis: Translation of "*Connemara Moonshine*" (collection of poems by Mark Gibbons) into French, supervised by Prof. Michel Valentin; published by *Propos2Editions* in 2009 as a bilingual edition under the title "*Mauvaises Herbes*"

Research Experience

- Institute for Systems Biology** 2018-present
Washington Research Foundation Distinguished Investigator & Assistant Professor
- Investigate eco-evolutionary processes in host-associated microbial communities
 - Characterize how the gut microbiota influences human health and disease
 - Develop novel computational and experimental tools for exploring host-microbe systems
 - Design targeted strategies for engineering the gut microbiome for improved human health
- University of Washington, Department of Bioengineering** 2019-present
Distinguished Affiliate Assistant Professor
- Mentor PhD, Master's, and undergraduate students
 - Serve on graduate student committees & participate in student recruitment
- eScience Institute** 2018-present
Data Science Fellow
- Drive scientific and educational efforts to advance and promote data science in the Seattle research community
- Center for Microbiome Informatics and Therapeutics** 2015-2018
MIT Dept. of Biological Engineering and The Broad Institute, Postdoctoral Research Associate
- **Adviser: Prof. Eric Alm**
 - Developed analytical/computational workflows for studying the dynamics of microbial populations in the gut.
 - Coordinated multidisciplinary team investigating high-resolution eco-evolutionary dynamics of diverse microbial populations in the human gastrointestinal tract
 - Designed a series of mouse experiments looking at how combined dietary and antibiotic perturbations influence the structure and stability of the gut microbiome
 - Developed a non-parametric approach for correcting batch effects in 'omics data
- University of Chicago** 2011-2015
Biophysical Sciences PhD Program, Graduate Research Fellow
- **Advisers: Prof. Jack Gilbert and Prof. Maureen Coleman**

- Led a study of marine microbial biogeography, investigating whether or not microbes are dispersal-limited across the globe
- Established and coordinated outside collaborations on the influence of invasive plants on soil microbial communities and on how human land use activities alter river sediment microbial community structure and function
- Developed and carried out a high-throughput bacterial microcosm experiment to test classic ecological theory on how environmental disturbances influence ecological diversity; collaborated with colleagues from the physics department to develop a mathematical formalism for modeling my empirical results
- Worked on several of the first investigations of how the human microbiome interacts with our built environment

Institute for Genomics and Systems Biology

2012-2015

Argonne National Laboratory, Biological Sciences Division, Research Associate

- Adviser: Prof. Jack Gilbert
- Senior data analyst for the [Earth Microbiome Project](#) - coordinated collection and analysis of microbial community data from a variety of environments across planet Earth
- Collaborated with researchers from the Knight and Caporaso labs to develop computational tools for processing very large sequencing data sets

Complex Systems Summer School

2014

Santa Fe Institute, Graduate Student

- Team leader on a project that investigated tradeoffs between efficiency and robustness of complex, adaptive systems (i.e. from economics to ecology); report: <http://goo.gl/9S4Rmy>

MPG Ranch

2010-2011

Molecular Ecology Laboratory, Research Scientist

- Ran the molecular ecology wet-lab at MPG Ranch; supervisors: Dr. Ylva Lekberg & Dr. Philip Ramsey
- Studied the impacts of invasive plant species on grasslands soil microbial communities
- Trained and managed research technicians in DNA extraction, PCR, next-generation sequencing library preparation, bioinformatics, and multivariate statistical analyses

Uppsala University

2009-2010

Fulbright Graduate Research Fellow, Ångström Laboratory, Graduate Student

- Advisers: Prof. Peter Lindblad & Dr. Thorsten Heidorn
- Conducted synthetic biology research geared toward engineering biohydrogen production pathways in cyanobacteria

Environmental and Industrial Microbiology Laboratory

The University of Montana, Laboratory Manager

2008-2009

- Advisers: Prof. James Gannon and Dr. Philip Ramsey
- Managed the Environmental and Industrial Microbiology Laboratory at the University of Montana.
- Trained graduate students and postdocs in wet lab techniques
- Developed wet-lab protocols and conducted independent research on the effects of heavy metals on microbial metabolism and community assembly

The University of Montana, Laboratory Technician

2005-2008

- Adviser: Prof. James Gannon
- Cultured and characterized novel bacterial strains from the Nyack Microbial Observatory in Glacier National Park, cleaned glassware, prepared media, and maintained/repared equipment

Teaching Experience (*prior to joining ISB – see package for post-ISB accomplishments*)

Computational Analysis Strategies for the Microbiome Workshop, University of Costa Rica

Fall, 2017

Instructor

- Co-taught a week-long graduate workshop on metagenomic and metatranscriptomic data analysis at the University of Costa Rica

ACERA School of Science, Creativity and Leadership, Cambridge, MA

Fall, 2016

Visiting Instructor

- Developed microscope-based curriculum for middle school students to learn about mycorrhizal fungi
- Visited the classroom three times: first visit, gave an introductory lecture and then took class outside to collect roots from plants in the playground; second visit, processed, cleared, and stained the roots; third visit, looked at the roots under the microscope and then gave a wrap-up lecture

Chief Dull Knife College, Lama Deer, MT

2010-2014

Adjunct Faculty/Visiting Instructor

- Taught a molecular ecology course to undergraduate students over two semesters; designed curriculum for the classroom and the wet-lab; held office hours
- Coordinated a 2-year student research program to characterize the microbial ecology of Tongue River sediments over a 100 km transect, which resulted in a peer-reviewed publication (i.e. [Gibbons et al. 2014](#)).
- Ran seminars and faculty trainings in wet lab techniques and data analysis

Marine Metagenomics Graduate Workshop, Basque Country, Spain

Spring, 2014

Erasmus Fellow and Instructor

- Gave a series of lectures on statistical methods for analyzing ecological data

Bioinformatics in Ecology Workshop, Nanjing, China

Winter, 2013

Instructor

- Gave a 2-day tutorial on analyzing 16S amplicon data using QIIME

University of Chicago, Chicago, IL

Spring 2013

Bioinformatics and Microbial Ecology Graduate Course, Teaching Assistant

- Served as a teaching assistant for a graduate course taught by Prof. Jack Gilbert
- Prepared lecture materials, ran data-analysis mini-workshops, held office hours, graded coursework
- Mentored students who wanted to submit their class projects as publications to peer-reviewed scientific journals

Argonne Soil Metagenomics Conference, Lemont, IL

Fall 2012

Teaching Assistant

- Co-taught a bioinformatics workshop geared towards analyzing amplicon sequencing data

University of Chicago, Chicago, IL

Spring 2012

Teaching Assistant Training Course

- Took semester-long course designed to train teaching assistants in pedagogy and public speaking
- Designed lesson plans, gave lectures that were recorded and critiqued by faculty and students

The University of Montana, Missoula, MT

Fall 2009

Guest Lecturer

- Guest lectured for an upper division undergraduate course on microbial physiology, taught by Prof. James Gannon

The French Ministry of Education, Voiron, France

2004-2005

Instructor

- Taught an English discussion and grammar course at Lycée Ferdinand Buisson
- Designed curriculum and taught classes 5 days a week for 1 year

Publications

Please see my Google Scholar page: <https://scholar.google.com/citations?user=jRChVdYAAAAJ&hl=en>

Selected Presentations (prior to joining ISB - see package for post-ISB accomplishments)

1. Gibbons, S.M. 2018. Individual-specific eco-evolutionary dynamics in the human gut. *Invited Talk, Biophysics Seminar Series, University of Chicago, Chicago, IL*
2. Gibbons, S.M. 2017. Determinants of resilience in microbial communities. *Invited Talk, Institute for Systems Biology, Seattle, WA*
3. Gibbons, S.M. 2017. Individual-specific eco-evolutionary dynamics in the human gut. *Invited Talk, Center for the Study of Inflammatory Bowel Disease Annual Symposium, Massachusetts General Hospital, Boston, MA*
4. Gibbons, S.M., Kearney, S.M., Smillie, C.S., Alm, E.J. 2017. Two dynamic regimes in the human gut microbiome? *Invited Talk, Ecological Society of America Conference, Portland, OR*
5. Gibbons, S.M. 2017. How do we model microbial dynamics in the gut? *Invited Talk, Channing Network Division Seminar, Harvard Medical School, Cambridge, MA*
6. Gibbons, S.M. 2017. Microbial systems as quantitative models for understanding ecological resilience. *Invited Talk, UCLA Ecology and Evolution Dept. Seminar, Los Angeles, CA*
7. Gibbons, S.M. 2016. The ecology of the human gut microbiome in health and disease. *Invited Talk, Whitehead Institute Teacher Program Seminar, Cambridge, MA*
8. Gibbons, S.M. 2015. Protein expression levels constrain evolutionary trajectories during genome streamlining. *Invited Talk, Microbial Systems Seminar, MIT, Cambridge, MA*
9. Gibbons, S.M. 2015. The search for microbes. *Invited Talk, Biological Sciences Division Graduate Student Seminar, University of Chicago*
10. Gibbons, S.M. 2014. The Intermediate Disturbance Hypothesis: why should diversity peak at intermediate disturbance? *Invited Talk, Natural History Seminar, University of Chicago, Dept. of Ecology and Evolution, Chicago, IL*
11. Gibbons, S.M. 2013. The Earth Microbiome Project: Planetary-scale systems ecology. *Invited talk, TDWG Biodiversity and Informatics Standards Conference, Florence, Italy*
12. Gibbons, S.M. 2013. The Earth Microbiome Project: Planetary-scale systems ecology. *Invited lecture, Genome Science Symposium. Tokyo, Japan*

Awards, Scholarships, and Fellowships

- 2018 Washington Research Foundation Distinguished Investigator**
2016 Department of Energy ENIGMA Discovery Grant
- 2014 Erasmus Mundus Scholarship for Visiting Scholars (University of the Basque Country, Spain)**
2014 University of Chicago Graduate Student Council Travel Award
- 2013 University of Chicago Biological Sciences Division Student Travel Grant
2013 Travel Grant for the International Thünen Symposium on Soil Metagenomics
- 2012 EPA STAR Graduate Fellowship (3 years; tuition, stipend, and research expenses)**
2012 Amazon Web Services Education Grant
- 2010 Fulbright Graduate Fellowship (1 year of support to study abroad)**
- 2008 University of Montana Top Graduating Senior in Microbiology and French Departments**
2008 University of Montana Student Service Award for Distinguished Service & Achievement
- 2007 HHMI MILES Honors Research Fellow**
2007 Julius and Anna Wiegenstein Scholarship for Microbiology
2007 Jestrab-Chaffee Scholarship for Academic Excellence
2007 Top Life Science Poster Presentation at the UM Undergraduate Research Conference
2007 National SMART Grant
- 2006 Davidson Honors College Undergraduate Research Award**
2006 Adrian and Sally Walker Scholarship for Financial Need, Community Service, and Academics
2006 Leslie Sheridan Alumni Scholarship for Deserving Science Majors
2005 McGee, Rose Southworth Scholarship for Deserving Students Majoring in a Foreign Language
2005 Robert M. Burgess Memorial Scholarship for Promising Undergraduates Majoring in the Humanities
2005 Montana Baker Grant for Low-Income Montanans
2003 Bonhomme Scholarship for Academic Excellence
2002 Fox Foundation Scholarship for Promising High School Graduates