Sean M. Kearney

Contact Information	201 S. Hillsdale Dr. Bloomington, IN 47408	617 706 4588 s.m.kearn@gmail.com
Birthday	31 July 1991	
Nationality	United States of America	

Research Interests	systems biology, evolution, ecology, population genetics, -omics technologies, information theory, nonlinear dynamics, stochastic processes, probability theory, data mining, statistical learning, bayesian inference
Current Position	**Keio University - Dept of Microbiology & Immunology** Sept 2018 - Present Japanese Society for the Promotion of Science Postdoctoral Fellow Supervisor: Kenya Honda, M.D., Ph.D.

Education

Massachusetts Institute of Technology, Cambridge, MA — June 2018

Ph.D., Biological Engineering

Thesis Title: Towards Engineering the Gut Microbiota
Advisor: Eric J. Alm, Ph.D

Purdue University, West Lafayette, IN, — May 2013

B.S., Mathematics and Statistics, *with highest distinction*

B.S., Biological & Food Process Engineering, *with highest distinction*

Summary of Skills

Microbiology: Anaerobic microbial culture, bacterial isolation, phage isolation, microbial competition, microbial co-culture, conjugation, competition assays

Molecular Biology: High-throughput sequencing, DNA/RNA isolation, PCR, RT-qPCR, RNA-Seq, molecular cloning, *in situ* hybridization, fluorescence microscopy

Analysis: AWS, NGS data analysis, genome assembly, metabolomics, proteomics, transcriptomics, 16S rDNA data processing, statistical computing, machine learning

Languages:: R, Python, Matlab, LaTeX, HTML/CSS

Research Experience

MIT - Dept of Biological Engineering — Jan 2014 - Aug 2018
Supervisor: Eric J. Alm, Ph.D.

Thesis Topic: Defining Engineering Constraints in the Human Gut Microbiota

Identified tradeoffs in cross-person transmissibility and within-person persistence of lysis-resistant members of the human gut microbiota.

Developed strategy for reversibly introducing bacteria into the murine gastrointestinal tract with a pre-existing microbiota.

Conducted genomic analysis of an important mucus-associated human gut symbiont in healthy human adults over time.

Purdue University April 2010 to May 2013
Department of Agricultural and Biological Engineering,
Supervisors: Jenna L. Rickus, Ph.D and Kari L. Clase, Ph.D

Dow AgroSciences LLC May 2011 to Aug 2011
Research and Development, Undergraduate Science R&D Internship
Supervisors: Steve L. Evans, Ph.D and Janna M. Armstrong, B.S.

Selected Publications

1. **Kearney SM**, Gibbons SM, Poyet M, Soble R, Erdman SE, Alm EJ. "Orthogonal dietary niche enables reversible engraftment of a gut bacterial commensal." Cell Reports 24 (7), 1842-1851.
2. **Kearney SM**, Gibbons, SM, Poyet M, Gurry T, Bullock K, Allegretti JR, Clish CB, Alm EJ. "Endospore formers in the human gut trade off within-host persistence for cross-host transmission." *ISMEJ*, June 2018.
3. Wilck N, Matus MG, **Kearney SM**, et al. "Salt-responsive gut commensal modulates T_H17 axis and disease" *Nature*, (2017): nature24628.
4. Gibbons SM, **Kearney SM**, Smillie CS, Alm EJ. "Two dynamic regimes in the human gut microbiome." *PLoS Comput. Biol.*, 13(2): e1005364, 2017.
5. Allegretti JR, **Kearney SM**, Li N, Bogart E, Bullock K, Gerber GK, Bry L, Clish CB, Alm EJ, Korzenik JR. "Recurrent Clostridium difficile infection associates with distinct bile acid and microbiome profiles." *Aliment. Pharmacol. Ther.*, 43(11): 1142-1153, 2016.
6. Poutahidis T, **Kearney SM**, Levkovich T, Qi P, Varian BJ, Lakritz JR, Ibrahim YM, Chatzigiagkos A, Alm EJ, Erdman SE."Microbial symbionts accelerate wound healing via the neuropeptide hormone oxytocin." *PloS one*, 8(10): e78898, 2013.
7. Poutahidis T, Kleinewietfeld M, Smillie C, Levkovich T, Perrotta A, Bhela S, Ibrahim YM, Lakritz JR, **Kearney SM**, Chatzigiagkos A, Hafler DA, Alm EJ, and Erdman SE. "Microbial reprogramming inhibits Western diet-associated obesity." *PloS one*, 8(7): e68596, 2013.

Posters & Presentations

1. "Endospore formers in the human gut trade off within-host persistence for cross-host transmission." Poster, Boston Bacterial Meeting, June 2017.
2. "Endospore sequencing identifies dormant communities in the human gut microbiota". Poster, Microbial Stress Response GRC, July 2016 and ISME16 Montreal, August 2016.
3. "Marine polysaccharides provide orthogonal dietary niche for gut-associated microbes." Invited talk, Boston Bacterial Meeting. June 2015.

Awards

Japan Society for the Promotion of Science Postdoctoral Fellow	September 2018
Bn10 Round 3 Award, $50,000 Trainee Research Grant	June 2016
Robert E. Brown Graduate Fellowship, MIT BE Department	Fall 2013
NSF Graduate Research Fellowship	June 2013
Phi Beta Kappa	April 2012
Goldwater Scholar	March 2012
Distinguished Graduate, Rank 1 of 941, Carmel High School Class of 2009	May 2009
National Merit Scholar	April 2009