

Matthew M. Carter, Ph.D.

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Education

Stanford University, Stanford, CA **2018 - 2024**
Department of Microbiology and Immunology (GPA: 3.96/4.00)

Cornell University, Ithaca, NY **2010 - 2014**
B.S. in Biological Engineering, *cum laude* (GPA: 3.69/4.00)

Employment and Research Experience

Post-doctoral Associate **September 2024 - Present**
Department of Microbiology and Immunology, Stanford University, Stanford, CA
Advisor: Professor Justin Sonnenburg

Graduate Student **September 2018 - September 2024**
Department of Microbiology and Immunology, Stanford University, Stanford, CA
Thesis advisor: Professor Justin Sonnenburg
Thesis committee: Professors Michael Fischbach, David Relman and Susan Holmes

Research Associate **August 2014 - April 2018**
Technology Development Group, Caribou Biosciences, Berkeley, CA

Fellowships and Awards

Stanford Graduate Fellowship Program, Smith Fellowship (2018-2021)
Kessler Fellowship (2013)
Carol Winter and Charles Mund Scholar (2013)

Manuscripts in preparation

*authors contributed equally

1. Carter MM, Zeng X, Hennings T, Ward C, Landry M, Perelman D, Nguyen T, Robinson JL, Higginbottom S, Maecker H, Fischbach M, Sonnenburg ED, Gardner CD, Sonnenburg JL
A gut pathobiont impairs metabolic homeostasis by altering host circulating glycine
In preparation
2. Carter MM*, Liu Z*, Olm MR*, Sprockett D, Martin M, Gurven M, Trumble B, Kaplan H, Sonnenburg ED, Relman D, Good BH, Sonnenburg JL
Global migration of vanishing gut microbes with humans prior to industrialization
In preparation

Pre-Print Publications

1. Carter MM, Demis D, Perelman D, St Onge M, Petlura C, Cunanan K, Mathi K, Maecker HT, Chow JM, Robinson JL, Sonnenburg ED, Buck RH, Gardner CD, Sonnenburg JL
A human milk oligosaccharide alters the microbiome, circulating hormones, cytokines and metabolites in a randomized controlled trial of older individuals
MedRxiv (2023)

Peer-Reviewed Publications

*authors contributed equally (co-first), †authors contributed equally (co-second)

1. Dwaraka VB, Aronica L, Carerras-Gallo N, Robinson JL, Hennings T, Lin A, Turner L, Smith R, Mendez TL, Went H, Ebel ER, Carter MM, Sonnenburg ED, Sonnenburg JL, Gardner CD
Unveiling the Epigenetic Impact of Vegan vs. Omnivorous Diets on Aging: Insights from the Twins Nutrition Study (TwINS)
BMC medicine (2024)
2. Gerrick ER, Zlitni S†, West PT†, Carter MM†, Mechler CM, Olm MR, Caffrey EB, Li JA, Higginbottom SK, Severyn CJ, Kracke F, Spormann AM, Sonnenburg JL, Bhatt AS, Howitt MR
Metabolic diversity in commensal protists regulates intestinal immunity and trans-kingdom competition
Cell (2024)
3. Carter MM*, Olm MR*, Merrill BM*, Dahan D, Tripathi S, Spencer SP, Yu FB, Jain S, Neff N, Jha AR, Sonnenburg ED, Sonnenburg JL
Ultra-deep Sequencing of Hadza Hunter-Gatherers Recovers Vanishing Gut Microbes
Cell (2023)
4. Pensinger DA, Fisher AT, Dobrila HA, Van Treuren W, Gardner JO, Higginbottom SK, Carter MM, Schumann B, Bertozzi CR, Anikst V, Martin C, Robilotti EV, Chow JM, Buck RH, Tompkins LS, Sonnenburg JL, Hryckowian AJ
Butyrate differentiates permissiveness to *Clostridioides difficile* infection and influences growth of diverse *C. difficile* isolates
Infection and Immunity (2023)
5. Frias JP, Lee ML, Carter MM, Ebel ER, Lai RH, Rikse L, Washington ME, Sonnenburg JL, Damman CJ
A microbiome-targeting fibre-enriched nutritional formula is well tolerated and improves quality of life and haemoglobin A1c in type 2 diabetes: A double-blind, randomized, placebo-controlled trial
Diabetes, Obesity and Metabolism (2023)
6. Olm MR*, Dahan D*, Carter MM, Merrill BM, Yu FB, Jain S, Meng XD, Tripathi S, Wastyk H, Neff N, Holmes S, Sonnenburg ED, Jha AR, Sonnenburg JL
Robust Variation in Infant Gut Microbiome Assembly Across a Spectrum of Lifestyles
Science (2023)
7. Tabula Sapiens Consortium, Quake SR
The Tabula Sapiens: a multiple organ single cell transcriptomic atlas of humans
Science (2022)

8. Crimarco A, Landry MJ, Carter MM, Gardner CD
Assessing the effects of alternative plant-based meats v. animal meats on biomarkers of inflammation: a secondary analysis of the SWAP-MEAT randomized crossover trial
The Journal of Nutrition Science (2022)
9. Crimarco A, Springfield S, Petlura C, Streaty T, Cunanan K, Lee J, Fielding-Singh P, Carter MM, Topf MA, Wastyk HC, Sonnenburg ED, Sonnenburg JL, Gardner CD
A randomized crossover trial on the effect of plant-based compared with animal-based meat on trimethylamine-N-oxide and cardiovascular disease risk factors in generally healthy adults: Study With Appetizing PlantfoodMeat Eating Alternative Trial (SWAP-MEAT)
The American Journal of Clinical Nutrition (2020)
10. Cameron PS*, Fuller CK*, Donohoue PD, Jones BN, Thompson MS, Carter MM, Gradia S, Vidal B, Garner E, Slorach EM, Lau E, Banh LM, Lied AM, Edwards LS, Settle AH, Capurso D, Llaca V, Deschamps S, Cigan M, Young JK, May AP
Mapping the genomic landscape of CRISPR-Cas9 cleavage
Nature Methods (2017)
11. van Overbeek M*, Capurso D*, Carter MM, Thompson MS, Frias E, Russ C, Reece-Hoyes JS, Nye C, Gradia S, Vidal B, Zheng J, Hoffman GR, Fuller CK, May AP
DNA Repair Profiling Reveals Nonrandom Outcomes at Cas9-Mediated Breaks
Molecular Cell (2016)

Other Publications

1. Carter MM, Spencer SP
Resisting weight gain with prebiotic fibre
Nature Metabolism, News & Views (2024)
2. Carter MM, Olm MR, Sonnenburg ED
Microbiome assembly in The Gambia
Nature Microbiology, News & Views (2022)

Issued Patents and Patents Pending

Matthew M. Carter, Paul D. Donohoue. Novel CRISPR-associated (Cas) protein. **US10876101**, Dec 2020; **US10889808**, Jan 2021; **US11028381**, June 2021; **US11293011**, April 2022; **US11932883**, March 2024; **US11939606**, March 2024.

Andrew P. May, Rachel E. Haurwitz, Jennifer A. Doudna, James M. Berger, Matthew M. Carter, Paul Donohoue. Compositions and methods of nucleic acid-targeting nucleic acids. **US9260752**, Feb 2016; **US9410198**, Aug 2016; **US9725714**, Aug 2017; **US9803194**, Oct 2017; **US9809814**, Nov 2017; **US9909122**, Mar 2018; **US10125361**, Nov 2018; **US11312953**, April 2022.

Matthew M. Carter, Megan van Overbeek, Andrew P. May. Directed nucleic acid repair. **US20170058272**, Mar 2017.

Invited Talks, Lectures and Public Presentations

Carter, MM. “Using deep metagenomic sequencing to identify vanishing gut microbes”. Scientific Advisory Board Meeting of the Stanford Center for Human Systems Immunology; August 12, 2024; Palo Alto, CA.

Carter, MM. “Vegan diets modulate serum glycine via the gut microbiota”. Stanford Microbiology and Immunology Seminar; February 28, 2024; Stanford, CA.

Carter, MM. “Modulation of the gut microbiota with a human milk oligosaccharide alters circulating hormones, cytokines and metabolites.” Gut Microbiota For Health World Summit; March 12, 2023; Prague, Czech Republic.

Carter, MM, Olm MR, Fessler J, Spencer SP. “Methods and approaches for understanding microbiome composition and function.” Guest lecture for MI215: Principles of Biological Techniques; January 19, 2023; Stanford, CA.

Carter, MM. “The RAMP Study: Rejuvenation of the Aging Microbiota With Prebiotics.” Stanford Microbiology and Immunology Scientific Conference; November 3, 2022; Asilomar, CA.

Carter, MM. “Ultra-deep Sequencing of Hadza Hunter-Gatherers Recovers Vanishing Microbes.” Lab meeting of Professor David Relman (Stanford); June 9, 2022; Stanford, CA.

Carter MM, Olm MR. “DNA Sequencing and Bioinformatics in the Human Microbiome.” Guest lecture for MI221: The Gut Microbiota in Health and Disease; October 4, 2022; Stanford, CA.

Carter MM, Olm MR. “DNA Sequencing and Bioinformatics in the Human Microbiome.” Guest lecture for MI221: The Gut Microbiota in Health and Disease; September 28, 2021; Stanford, CA.

Merrill BM, Carter MM, Dahan D. “Recovering bacterial genomes from the Hadza hunter-gatherer gut microbiome.” Lab meeting of Professor Katie Pollard (UCSF); December 3, 2019; San Francisco, CA.

Extra-curricular coursework

CE1465 Adobe Illustrator I (2023; Rhode Island School of Design)

MUSIC101: Introduction to Electronic Sounds (2022)

PHIL60: Philosophy of Science (2021)

BIO282: Modelling Cultural Evolution (2019)

Service

Stanford Microbiology and Immunology Scientific Conference Committee (2022)

Stanford Microbiology and Immunology Admissions Committee (2022)

Stanford Microbiology and Immunology Faculty Seminar Committee (2019-2020)

Assisted with peer-review for manuscripts submitted to *Nature*, *Nature Microbiology*, *Nature Metabolism*, *Cell*, and *Genome Research*.

Teaching

Teaching Assistant, *BIOS 223: Development and reporting of robust and reproducible LC-MS/MS assays*. Led by Dr. Emma Guiberson; Winter 2024.

Teaching Assistant, *MI221: The Gut Microbiota in Health and Disease*. Led by Professors Ami Bhatt and Justin Sonnenburg; Fall 2021.

References

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Michael Fischbach, Ph.D.
Liu (Liao) Family Professor
Department of Bioengineering
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Thomas C. and Joan M. Merigan Professor
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