BIOGRAPHICAL SKETCH

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NAME: Whiteson, Katrine

eRA COMMONS USER NAME (credential, e.g., agency login): KWHITESON

POSITION TITLE: Professor

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of California, Berkeley, CA	B.A.	05/2000	Biochemistry
University of Chicago, Illinois, IL	Ph.D.	08/2007	Biochemistry
University of Geneva Hospitals, Switzerland	Postdoctoral Fellow	09/2011	Clinical Microbiology
San Diego State University, CA		08/2014	Metabolomics/Ecology

A. Personal Statement

Bacterial and viral colonization of the human body has profound implications for human health and medicine, and is the main focus of my laboratory at UC Irvine. **Long term, we envision a world where microbiome science can be an integrated component of solutions for health and environmental problems.** I am a Professor in the Molecular Biology and Biochemistry Department, and the co-Director of the UCI Microbiome Center with 15 years of microbiome research experience. I Co-Direct and founded UCI Microbiome (together with Prof. Jennifer Martiny), which brings together faculty from across seven schools at UCI. We led the first National Microbiome Centers' meeting in 2019, bringing 28 of 35 microbiome centers together, and launched the Microbiome Centers Consortia. I am also a member of the Steering Committee for the International Microbiome and Multi-Omics Standards Alliance (*IMMSA*) at NIST and a Senior Editor for the American Society for Microbiology journal *mBio*.

My role in this proposed work as Co-Investigator will be to oversee microbiome sequencing, bioinformatic analysis, and interpretation of the shotgun metagenomic and ex vivo fermentation data in Aim 2, and to advise on the fiber-degrading taxa and functional gene profiling supporting Aim 3's barrier-integrity endpoints. This collaboration builds on over five years of productive partnership with Dr. Fleischman, resulting in three joint publications characterizing dietary interventions and the gut microbiome in myeloproliferative neoplasm patients (see Products, below), including a study directly characterizing how a dietary intervention reshapes the gut microbiome in a hematologic malignancy population. This proposal extends that partnership to a new hematologic malignancy population and a defined fiber blend rather than a whole-food diet, leveraging the sequencing and bioinformatics infrastructure already established in our lab. My experience mentoring early-career investigators in clinical microbiome research and implementing dietary fiber interventions with sequencing and immune profiling will further support the project's translational goals.

In parallel, we are launching a new prospective cohort through the I-SPY network, with support from the Breast Cancer Research Foundation and BiomeSense, to study microbiome modulation during neoadjuvant chemotherapy. We also have a complementary, fully funded dietary fiber intervention supported by Nestlé Health Science, involving a 4-month protocol with matched fecal sample collection for sequencing, metabolomics, and additional assays. These combined projects will offer robust cross-cohort training and opportunities for translational insight.

Since starting at UCI in October 2014, I have continually led a vibrant research group of 3-7 students, 2-3 postdocs, and 3-15 undergraduate researchers. Six PhD students have defended, including Julio Avelar-Barragan (2023) and Alisha Monsibais (2025), who benefited everyone around her with her professional clinical micro lab experience. Currently, our group consists of three postdocs, three graduate students (one PhD, one medical student, and one Master's), a technician, a visiting sabbatical scholar, and about a dozen undergraduate researchers. Kayla Raygoza, a second-year PhD student supported by an NIH T32 in

Biostatistics and a Department of Education GAANN award, is focused on our Stenotrophomonas phage-antibiotic synergy project. Dr. Gina Faraci is developing her microbiome bioinformatics skills studying fecal microbiomes and metabolomes in an Alzheimer's disease collaboration. Dr. Sage Dunham, supported by a Cystic Fibrosis Foundation fellowship and a CFRI Nash Fellowship, is investigating phage-bacteria interactions for CF-relevant pathogens, and Dr. Sayali Mulay, who joined the lab in November 2025, is already a coauthor on our 2026 mSphere study of microbial dark matter. Recent PhD alumni have gone on to research careers at Agilent (Stephen Wandro), Natera (Tara Gallagher), USDA (Andrew Oliver), Sun Genomics (Joann Phan), Thermo Fisher (Julio Avelar-Barragan), and Applied BioCode (Alisha Monsibais), and former postdoctoral fellow Dr. Jason Rothman is now tenure-track faculty at UC Riverside. This constitutes an energetic, interactive group that is small enough for me to devote plenty of attention to everyone. I aim to maintain around 6 PhD students and post-docs, who then mentor Master's students and undergraduate students.Efficient administration of these grant and award funds has been essential for managing my lab's productivity and facilitating trainee career development. This productivity is evidenced by my track record: I have given ~100 seminars and overall, I have published 96 papers (40 from our group since 2020). Past trainees have furthered their careers at UCSD, the USDA and CDC, or are working in microbiome start-ups.

At UCI, we have a growing and vibrant microbiome research community with 8 new assistant professors and strong momentum in the School of Biological Sciences, where we have a weekly journal club and happy hour. I frequently serve on PhD committees, and work with post-docs on their faculty applications. Furthermore, I am committed to research training, including study design, data collection, analysis, and writing; we publish frequently and students present regularly in our lab group and journal clubs. Overall, UCI is a Minority Serving Institution (MSI) with both Asian American, Native American and Pacific Islander serving institution (AANAPISI) and also has been designated a Hispanic Serving Institution (HSI). Each student and post-doc completes an annual IDP in our lab, and I encourage participation in UCI's GPS-STEM professional development activities.

Several recent projects have prepared us for the proposed work, especially studies aiming to promoting healthy human microbiomes through high fiber diets and high quality microbiome focused sequencing and metabolomics. For example, I have sought training in clinical trial study design, and I was accepted into the NCATS Trial Innovation Network, which resulted in critical advice that has improved my expertise. (*Please see* Southern California, Clinical Translational Science Institute News, August 28, 2019: "How the Trial Innovation Network Helped this Investigator Redesign her Study Proposal to do More Science with Less Money").

Human Microbiomes and metabolomes in health and disease: I became deeply interested in the persistent polymicrobial infections of the Cystic Fibrosis (CF) airways as a postdoc in 2010, and since then I have maintained research focus on microbial communities, metabolites and phages in the context of CF. Although clinicians are increasingly aware of the polymicrobial nature of CF infections, clinical practice still focuses primarily on individual pathogens. In addition to sequencing microbial DNA, we use metabolomics to study the molecules present in longitudinal samples from CF patients. Looking at active metabolism has elucidated aspects of CF exacerbation and provided new tools for understanding it. For example, we have detected fermentation products such as 2,3-butanedione in the breath of CF patients and discovered that microbes typically discarded by clinical microbiology staff as "normal flora" are responsible for their production. In culturing and transcriptome experiments, we have found that fermentation products alter opportunistic pathogen physiology and are toxic to human cells. Using funding from a Gilead CF Research Scholar Award, an R01 from NHLBI (in collaboration with Prof. John LiPuma), and a research award from the CF Foundation we have characterized several thousand sputum metabolomes and microbiomes before and after antibiotic treatment to improve diagnosis of clinical status or treatment efficacy.

I led two dietary fiber interventions with fecal sample and microbiome cultivation and sequencing in 2024: in my undergraduate Winter 2024 class, and with a breast cancer survivor cohort in collaboration with UCSF at the teaching kitchen in the Samueli Center for Integrative health in Spring 2024. Starting in 2018, the UCI Microbiome Initiative that I co-direct supported a Course Based Undergraduate Research project where students in an upper division BioSci lab participated in a high fiber diet intervention and collected fecal samples for microbiome analysis before and after the intervention. Using whole foods such as beans as opposed to supplements was an important part of increased fiber consumption, which was found to affect microbiome composition. I present our high-fiber diet results regularly, and have worked with UCI chef Jess VanRoo to develop a high-fiber cooking curriculum as part of UCI's Culinary Medicine program. Since 2023, we initiated UCI Culinary Health with monthly lectures and an audience of the staff of the entire UC System.

Several relevant publications from our group (out of 101):

a. Avelar-Barragan J, Mendez Luque LF, Nguyen J, Nguyen H, Odegaard AO, Fleischman AG, **Whiteson KL**. Characterizing the microbiome of patients with myeloproliferative neoplasms during a Mediterranean diet intervention. *mBio*. 2023 Oct 25:e0230823. PMID: 37877698.
b. Oliver A, Chase AB, Weihe C, Orchanian SB, Riedel SF, Hendrickson CL, Lay M, Sewall JM, Martiny JBH, **Whiteson K**. High-Fiber, Whole-Food Dietary Intervention Alters the Human Gut Microbiome but Not Fecal Short-Chain Fatty Acids. *mSystems*. 2021 Mar 16;6(2):e00115-21. PMID 33727392
c. Mendez Luque LF, Avelar-Barragan J, Nguyen H, Nguyen J, Soyfer EM, Liu J, Chen JH, Mehrotra N, Huang X, Kosiorek HE, Dueck A, Himstead A, Heide E, Lem M, El Alaoui K, Mas E, Scherber RM, Mesa RA, **Whiteson KL**, Odegaard A, Fleischman AG. The NUTRIENT Trial (NUTRitional Intervention among myEloproliferative Neoplasms): Results from a Randomized Phase I Pilot Study for Feasibility and Adherence. Cancer Res Commun. 2024 Mar 5;4(3):660-670. PMID: 38391189.
d. Oliver A, El Alaoui K, Haunschild C, Avelar-Barragan J, Mendez Luque LF, **Whiteson K**, Fleischman AG. Fecal Microbial Community Composition in Myeloproliferative Neoplasm Patients Is Associated with an Inflammatory State. Microbiol Spectr. 2022 Jun 29;10(3):e0003222. PMID: 35475626.

B. Positions and Honors

Positions and Employment

2025 – Professor, Dept of Mol Biology and Biochemistry, University of California, Irvine
2021 Guest Research Fellowship, University of Copenhagen, Denmark
2020 – 2025 Associate Professor, University of California, Irvine, CA
2020 – Co-Director, UCI Microbiome Center
2017 – 2020 Associate Director, UCI Microbiome Initiative
2014 – 2020 Assistant Professor, University of California, Irvine, CA
2013 – 2014 Adjunct Assistant Research Professor, San Diego State University, San Diego, CA
2011 – 2014 Postdoc, San Diego State University, San Diego, CA
2008 – 2011 Research Scientist, University of Geneva, Switzerland

Other Professional Experience and Service

2025 – Senior Editor, *mBio*, American Society for Microbiology
2025 Organizer, Microbial Dark Matter Symposium, Laguna Beach, CA
2025 Organizer, 3rd National Microbiome Centers Consortia Meeting, Irvine, CA
2024 Keynote Speaker, Viral Ecogenomics Meeting, Berkeley, CA
2024 NIH Study sections, ad hoc (2)
2023-24 Established UCI Culinary Health *Understanding the Microbiome* Lecture Series
2023 Center for Innovative Phage Applications and Therapeutics (IPATH) seminar series organizer
2023 Melanoma and the Microbiome Workshop, Washington DC, March 2023
2023 Ad Hoc NIH Study Sections, 2 special emphasis panels
2022 Diverse Educational Community and Doctoral Experience (DECADE) representative, UCI
2022 – DEI Committee for Mathematical Computational Systems Biology PhD program
2022 Organizer, 2022 National Microbiome Centers Consortia Meeting (Chicago)
2022 Center for Innovative Phage Applications and Therapeutics (IPATH) seminar series organizer
2022 Ad-hoc Reviewer, NIH Study Section DHMI
2021 – International Microbiome & Multi-Omics Standards Alliance (IMMSA) Steering Committee
2020 – 2025 Senior Editor, *mSystems*, American Society for Microbiology
2020 Inclusive Excellence Task Force, School of Bio Sci, UC Irvine
2020 Microbiome Centers Consortium COVID task force subcommittee
2020 NSF Review Panel
2019 – External Advisory Board for Prime-TR, (MD Anderson Microbiome Center)
2019 Organizer, First National Microbiome Centers Meeting
2019 NIH/NIC Innovation Lab: Systems Biology for the Cancer Microbiome
2018 North American Cystic Fibrosis Conference session organizer
2018 American Society for Microbiology Undergraduate Research Fellowship Committee
2018 Ad-hoc Reviewer, NIH Study Section GMPB
2018 UCI Task Force for Precision Medicine
2017 California Child Health Research Coalition Meeting
2017 – Associate Director, UCI Microbiome Initiative
2017 Early Career Reviewer, NIH Study Section GMPB

2016 Strategic planning committee, University of California Irvine School of Medicine
2016 – Associate Editor, *mSystems*
2016 – Associate Editor, *PeerJ*
2015 – Meeting Organizer for annual SoCal Microbiome Symposium, Calit2 UC Irvine
2014 – Seminar series organizer for Molecular Biology and Biochemistry
2014 Guest Associate Editor, special topic on viral metagenomics, *Frontiers in Microbiology*
2013 – 2023 Meeting Organizer for "Cystic Fibrosis: Ecology, Evolution, Eradication" Telluride, CO

Honors

2022 –2026 Samueli Scholar (awarded by the Susan Samueli Integrative Health Institute)
2022 – 2025 UCI Chancellor's Fellow
2022 Faculty Mentor Award, UC Irvine School of Biological Sciences
2021 Guest Research Fellowship, University of Copenhagen, Denmark
2018 Best Lab, Lake Arrowhead Microbial Genomics
2015 Gilead Sciences Research Scholars in Cystic Fibrosis Award
2012 Lake Arrowhead Microbial Genomics Poster Award
2001 – 2007 Molecular Cell Biology Training Grant, University of Chicago, IL
1996 – 2000 Regents and Chancellors Scholar, University of California, Berkeley, CA
1996 – 2000 Alumni Scholarship, University of California, Berkeley, CA

C. Contributions to Science

1. High fiber dietary interventions to engineer healthy microbiomes:
Long term, the Whiteson group envisions a world where microbiome science can be an integrated component of solutions for health and environmental problems. Our work with cancer microbiome and the microbiomes of people eating high fiber diets in Ecuador have highlighted the importance of fiber in promoting healthy gut microbiomes. Filling the fiber gap to promote microbiome health is a natural step, and we have carried out high fiber diet interventions with undergraduate students at UC Irvine. Starting in 2024, the high fiber diet interventions will be carried out in both undergraduate students at UCI, as well as in cancer patients and survivors at both UCI and UCSF, with support from the Susan Samueli Integrative Health Institute.

a. Oliver A, Chase AB, Weihe C, Orchanian SB, Riedel SF, Hendrickson CL, Lay M, Sewall JM, Martiny JBH, **Whiteson K**. High-Fiber, Whole-Food Dietary Intervention Alters the Human Gut Microbiome but Not Fecal Short-Chain Fatty Acids. *mSystems*. 2021 Mar 16;6(2):e00115-21. PMID 33727392
b. Sewall JM, Oliver A, Denaro K, Chase AB, Weihe C, Lay M, Martiny JBH, **Whiteson K.** Fiber Force: A Fiber Diet Intervention in an Advanced Course-Based Undergraduate Research Experience (CURE) Course. *J Microbiol Biol Educ.* 2020 Apr 30;21(1):21.1.40. doi: 10.1128/jmbe.v21i1.1991. eCollection 2020. PMID: 32431776
c. Avelar-Barragan J, Mendez Luque LF, Nguyen J, Nguyen H, Odegaard AO, Fleischman AG, **Whiteson KL**. Characterizing the microbiome of patients with myeloproliferative neoplasms during a Mediterranean diet intervention. *mBio*. 2023 Oct 25:e0230823. PMID: 37877698.
d. Adams, E., Gille, A., Alaniz N., Jamie, C., Patton, J., **Whiteson, K.** (2020) Comparing Fecal, Saliva, and Chicha Microbiomes Between Mothers and Children in an Indigenous Ecuadorian Cohort bioRxiv 2020.10.02.323097; doi: https://doi.org/10.1101/2020.10.02.323097

2. Human microbial community composition in health and disease:
As a research scientist in the infectious disease department of the public hospital in Geneva, Switzerland, I spearheaded a new research effort to use high-throughput sequencing to study the human oral microbiome. My group was the first to use Illumina sequencing to study microbial community composition, and I examined microbial communities in healthy and diseased human oral samples. In this exciting early era of microbiome research, even before the human Microbiome project, we found that oral microbial communities are stable in the same person through time and within cohabiting family members, and that people with a devastating facial gangrene associated with malnourishment known as noma have distinct oral microbial communities. More recently, we are characterizing oral microbial communities in 800 mothers and their 1st grade children from an NIH ECHO cohort. We are working toward understanding healthy human microbial colonization and just published a study focused on integrative 'omics in preterm infants. I am working toward larger cohorts with the UC Center for Pediatric Microbiome Research that I established with pilot funding from UC BRAID.

a. Rothman JA, Riis JL, Hamilton KR, Blair C, Granger DA, **Whiteson KL**. Oral microbial communities in children, caregivers, and associations with salivary biomeasures and environmental tobacco smoke

exposure. *mSystems*. 2023 Jun 20:e0003623. doi: 10.1128/msystems.00036-23. Online ahead of print. PMID: 37338237.

b. Wandro, S., Osborne, S., Enriquez, C., Bixby, C., Arrieta, A., and **Whiteson, K.** (2018) The microbiome and metabolome of pre-term infant stool is personalized, and not driven by health outcomes including necrotizing enterocolitis and late-onset sepsis. *mSphere* 3:e00151-18. PMC5917424.

c. Nusbaum, D., Sun, F., Ren, J., Zhu, Z., Ramsy, N., Pervolarakis, N., Kunde, S., England, W., Gao, B., Fiehn, O., Michail, S., **Whiteson, K.** (2018) Gut microbial and metabolomic profiles after fecal microbiota transplantation in pediatric ulcerative colitis patients, *FEMS Microbiology Ecology*, 94:9, fiy133

d. **Whiteson K.L.**, Lazarevic V., Tangomo M., Girard M., Maughan, H., Pittet, D., Francois P., Schrenzel J. and the GESNOMA study group (2014). NOMA affected children from Niger have distinct oral microbial communities based on high-throughput sequencing of 16S rRNA gene fragments. *Plos Neglected Tropical Disease* 8(12): e3240. PMCID: PMC4256271

3. Phage in the human microbiome and as potential therapeutics:

Our lab is deeply interested in the role of phage in shaping microbial community physiology and composition. Phage sequences are underexplored in comparison to bacteria; 70-90% of phage sequences have no known homologs. I have analyzed phage sequences from gut and airway samples with the aim of characterizing their distribution and function. We have also been conducting phage-host co-evolution experiments with *Enterococcus*, *Pseudomonas*, and most recently *Stenotrophomonas* – all prevalent, antibiotic resistant human-associated bacteria. We have funding from the NIH, the Cystic Fibrosis Foundation, and the Cystic Fibrosis Research Institute supporting these projects, along with internal UCI funding for undergraduate research to support the significant number of undergraduate students contributing to our phage work.

a. Green SI, Clark JR, Santos HH, Weesner KE, Salazar KC, Aslam S, Campbell WJ, Doernberg SB, Blodget E, Morris MI, Suh GA, Obeid K, Silveira FP, Filippov AA, **Whiteson KL**, Trautner BW, Terwilliger AL, Maresso A. A retrospective, observational study of 12 cases of expanded access customized phage therapy: production, characteristics, and clinical outcomes. *Clin Infect Dis*. 2023 Jun 3:ciad335. doi: 10.1093/cid/ciad335. PMID: 37279523.

b. Monsibais, A. N., Tea, O., Ghatbale, P., Phan, J., Lam, K., Paulson, M., Tran, N., Suder, D. S., Blanc, A., Samillano, C., Suh, J., Dunham, S. J. B., Gonen, S., Pride, D. T., **Whiteson, K**. "Enhanced Suppression of *Stenotrophomonas maltophilia* by a Three-Phage Cocktail: Genomic Insights and Kinetic Profiling." AAC (2024) Under Review. bioRxiv doi: 10.1101/2024.08.14.607921

c. Wandro, S., Oliver, A., Gallagher, T., Weihe, C., England, W., Martiny, J., and **Whiteson, K**. (2019) Predictable molecular adaptation of coevolving *Enterococcus faecium* and lytic phage EfV12-phi1. *Front. Microbiol*. doi: 10.3389/fmicb.2018.03192

d. Barr, J. J., Auro, R., Furlan, M., **Whiteson, K. L**., Erb, M. L., Pogliano, J., Stotland, A., Wolkowicz, R., Cutting, A. S., Doran, K. S., Salamon, P., Youle, M., and Rohwer, F. 2013. Bacteriophage adhering to mucus provide a non–host-derived immunity. PNAS *110*, 10771–10776. PMCID: PMC3696810

4. Leadership for microbiome standards and centers in the US:

I established a microbiome research center at UCI in 2017 together with my ecology colleague Dr. Jen Martiny. We quickly realized that many universities were creating microbiome centers and then joined forces to form a network of the microbiome centers, the Microbiome Centers Consortia. We have formed several committees and worked together to share strategies for promoting well-designed studies and standards. I also work on improving microbiome standards as part of the National Institute of Standards and Technology (NIST) steering committee for the International Microbiome and Multi-Omics Standards Alliance (*IMMSA*).

a. Martiny JBH, **Whiteson KL**, Bohannan BJM, David LA, Hynson NA, McFall-Ngai M, Rawls JF, Schmidt TM, Abdo Z, Blaser MJ, Bordenstein S, Bréchot C, Bull CT, Dorrestein P, Eisen JA, Garcia-Pichel F, Gilbert J, Hofmockel KS, Holtz ML, Knight R, Mark Welch DB, McDonald D, Methé B, Mouncey NJ, Mueller NT, Pfister CA, Proctor L, Sachs JL. The emergence of microbiome centres. *Nat Microbiol.* 2020 Jan;5(1):2-3. doi: 10.1038/s41564-019-0644-x. PMID: 31857734 No abstract available.

b. Microbiome Centers Consortium COVID Committee. Coordinating and Assisting Research at the SARS-CoV-2/Microbiome Nexus. *mSystems*. 2020 Dec 1;5(6):e00999-20. doi: 10.1128/mSystems.00999-20. PMID: 33262241

c. Wandro S, Carmody L, Gallagher T, LiPuma JJ, **Whiteson K**. (2017) Making it last: storage time and temperature have differential impacts on metabolite profiles of airway samples from cystic fibrosis patients. *mSystems* 2:e00100-17.

d. **Whiteson KL**. (2018) Vive la persistence: engineering human microbiomes in the 21st century. *mSystems* 3:e00166-17.