



# Alaric D'Souza

## MD/PhD candidate

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## About me

Alaric is a final year MD/PhD student at Washington University in St. Louis. He completed his Computational and Systems Biology dissertation research on Microbial Ecology and antibiotic resistance genes in the Dantas Lab. In Fall 2021, Alaric will apply to Pediatrics residencies, with the intention of specializing in Infectious Diseases via a Physician Scientist Training Program. After finishing his training, Alaric hopes to lead his own research group studying microbial communities and host-pathogen interactions.

## Skills

Software Packages  
Adobe Illustrator, Adobe Photoshop, EndNote, LaTeX, Microsoft Office

Programming Languages  
Python, R, Bash, Wolfram Mathematica

Languages  
English (native)  
Hindi (beginner)

Misc.  
Computer Hardware, Machining and Fabrication, Welding

## research interests

Microbial ecology, bacterial genomics, and antibiotic resistance.

## education

- 2014-pres. MD candidate Washington University in St. Louis  
M4 with USMLE STEP exams complete
- 2016-20 PhD Dantas Lab, Washington University in St. Louis  
Computational and Systems Biology
- 2010-14 BS Yale University  
Ecology and Evolutionary Biology

## research and work experience

- 2016-20 Dantas Lab Washington University in St. Louis  
Doctoral Candidate | Ecology of hospital built environment bacteria and infant gut microbiota.
- 2015 Dantas Lab Washington University in St. Louis  
Rotation Student | Autologous Fecal Microbial Transplant Analysis
- 2012-14 Powell Lab Yale University  
Undergraduate Researcher | Foraging behavior of *Aedes aegypti* mosquitoes.
- 2013 Gagneux Lab Swiss Tropical and Public Health Institute  
Undergraduate Researcher | Antibiotic resistance and mutation rates in *Mycobacterium tuberculosis*.
- 2012 Schlesinger Lab The Ohio State University  
Undergraduate Researcher | Macrophage receptor signaling for *Mycobacterium tuberculosis* phagosome lysosome fusion escape.
- 2011 Seva Dhan Mumbai, India  
Summer Intern | Treatment of alcoholics and drug addicts.
- 2011 Course Consulting Canyon High School  
Consultant | Course design for AP Psychology and IB Theory of Knowledge.
- 2009 Mentee of Dr. P.S. Wijewarnasuriya Army Research Labs  
Summer Intern | Semiconductor photoresist optimization for infrared detectors.

## publications

\* authors contributed equally

- 2021 Destination shapes antibiotic resistance gene acquisitions, abundance increases, and diversity changes in Dutch travelers.  
D'Souza AW\*, Boolchandani M\*, Patel S, Galazzo G, Hattem J, Arcilla M, Melles D, Jong M, Schultsz C, Dantas G, Penders J  
*Genome Medicine* | 10.1186/s13073-021-00893-z
- 2021 Manure microbial communities and resistance profiles reconfigure after transition to manure pits and differ from fertilized field soil  
Sukhum K, Vargas R, D'Souza AW, Boolchandani M, Patel S, Kesaraju A, Walljasper G, Hedge H, Ye Z, Valenzuela R, Gunderson P, Bendixsen C, Dantas G, Shukla S  
*mBio* | 10.1128/mBio.00798-21
- 2020 Environmental remodeling of human gut microbiota and antibiotic resistance in livestock farms  
Sun J\*, Liao XP\*, D'Souza AW\*, Boolchandani M\*, Li SH\*, Cheng K, Martinez JL, Li L, Feng YJ, Fang LX, Huang T, Xia J, Yu Y, Zhou YF, Sun YX, Deng XB, Zeng ZL, Jiang HX, Fang BH, Tang YZ, Lian XL, Zhang RM, Fang ZW, Yan QL, Dantas G, Liu YH  
*Nature Communications* | 10.1038/s41467-020-15222-y

- 2019 Genomic characterization of antibiotic resistant *Escherichia coli* isolated from domestic chickens in Pakistan  
Rafique M\*, Potter RF\*, Ferreiro A, Wallace MA, Rahim A, Malik AA, Siddique N, Abbas MA, D'Souza AW, Burnham CD, Ali N, Dantas G  
*Frontiers in Microbiology* | 10.3389/fmicb.2019.03052
- 2019 Cotrimoxazole prophylaxis increases resistance gene prevalence and  $\alpha$ -diversity but decreases  $\beta$ -diversity in the gut microbiome of HIV-exposed, uninfected infants.  
D'Souza AW\*, Moodley-Govender E\*, Berla B, Kelkar T, Wang B, Sun X, Daniels B, Coutsooudis A, Trehan I, Dantas G  
*Clinical Infectious Diseases* | 10.1093/cid/ciz1186
- 2019 Breakpoint beware: reliance on historical breakpoints for Enterobacteriaceae leads to discrepancies in interpretation of susceptibility testing for carbapenems and cephalosporins and gaps in detection of carbapenem-resistant organisms.  
Yarborough ML, Wallace MA, Potter RF, D'Souza AW, Dantas G, Burnham CD  
*European Journal of Clinical Microbiology & Infectious Diseases* | 10.1007/s10096-019-03711-y
- 2019 Spatiotemporal dynamics of multidrug resistant bacteria on intensive care unit surfaces.  
D'Souza AW\*, Potter RF\*, Wallace M, Shupe A, Patel S, Sun X, Gul D, Kwon JH, Andleeb S, Burnham CD, Dantas G  
*Nature Communications* | 10.1038/s41467-019-12563-1
- 2019 Phenotypic and genotypic characterization of linezolid resistant *Enterococcus faecium* from the USA and Pakistan.  
Wardenburg K\*, Potter R\*, D'Souza AW, Hussain T, Wallace M, Andleeb A, Burnham CA, Dantas G  
*Journal of Antimicrobial Chemotherapy* | 10.1093/jac/dkz367
- 2019 Sequencing-based methods and resources to study antimicrobial resistance.  
Boolchandani M\*, D'Souza AW\*, Dantas G  
*Nature Reviews Genetics* | 10.1038/s41576-019-0108-4
- 2018 Infant diet and maternal gestational weight gain predict early metabolic maturation of gut microbiomes.  
Baumann-Dudenhoeffer AM, D'Souza AW, Tarr PI, Warner BB, Dantas G  
*Nature Medicine* | 10.1038/s41591-018-0216-2
- 2018 *Superficieibacter electus* gen. nov., sp. nov., an Extended-Spectrum  $\beta$ -Lactamase Possessing Member of the Enterobacteriaceae Family, Isolated From Intensive Care Unit Surfaces.  
Potter RF\*, D'Souza AW\*, Wallace MA, Shupe A, Patel S, Gul D, Kwon JH, Beatty W, Andleeb S, Burnham CD, Dantas G  
*Frontiers in Microbiology* | 10.3389/fmicb.2018.01629
- 2017 Draft Genome Sequence of the *bla*OXA-436- and *bla*NDM-1-Harboring *Shewanella putrefaciens* SA70 Isolate.  
Potter RF\*, D'Souza AW\*, Wallace MA, Shupe A, Patel S, Gul D, Kwon JH, Andleeb S, Burnham CD, Dantas G  
*Genome Announcements* | 10.1128/genomeA.00644-17
- 2016 The rapid spread of carbapenem-resistant Enterobacteriaceae.  
Potter RF\*, D'Souza AW\*, Dantas G  
*Drug Resistance Updates* | 10.1016/j.drug.2016.09.002
- 2014 Malignant cancer and invasive placentation: A case for positive pleiotropy between endometrial and malignancy phenotypes.  
D'Souza AW and Wagner GP  
*Evolution, Medicine, and Public Health* | 10.1093/emph/eou022

## published abstracts

- 2021 Microbiome and immune disruption accompany mouse death in a gnotobiotic mouse model of neonatal sepsis  
Schwartz D, Wardenburg K, Shalon N, Ning J, Crofts T, D'Souza A, Robinson J, Henderson J, Warner B, Tarr P, Dantas G  
*Journal of the Pediatric Infectious Diseases Society* | 10.1093/jpids/piab031.010
- 2020 The Gut Microbiome and Resistome of Healthy Volunteers are Restructured After Short Courses of Antibiotics  
Anthony W, Sukhum K, Cass C, Reske K, Seiler S, Hink T, Coon C, D'Souza A, Wang B, Sun S, Dubberke E, Burnham C-A, Dantas G, Kwon JH  
*Infection Control & Hospital Epidemiology* | 10.1017/ice.2020.476
- 2017 Longitudinal Analysis of ICU Surface Multidrug-resistant Organism Contamination in the US and Pakistan  
Kwon JH, D'Souza A, Potter R, Wallace M, Shupe A, Patel S, Gul D, Andleeb S, Burnham C-A, Dantas G  
*Open Forum Infectious Diseases* | 10.1093/ofid/ofx163.245

2015 Autologous Fecal Microbiota Transplantation as a Strategy to Prevent Colonization With Multidrug-Resistant Organisms Following Antimicrobial Therapy  
Bulow C, D'Souza A, Hink T, Wallace M, Reske K, Sun X, Kwon JH, Burnham C-A, Dantas G, Dubberke E  
*Open Forum Infectious Diseases* | 10.1093/ofid/ofv133.479

## invited talks

2021 An exploration of Emergency Department turnaround time data  
WUSTL Clinical Informatics Seminar

2021 Total thyroidectomy in a 15 yo F with familial adenomatous polyposis  
WUSTL GI Seminar

2021 Angiomyolipoma in a 9 yo F with tuberous sclerosis  
WUSTL Pathology Seminar

2020 16S rRNA gene sequencing in bacterial endocarditis  
WUSTL Lab Medicine Seminar

2019 Effects of antibiotic prophylaxis on the HIV-exposed uninfected infant gut microbiome  
WUSTL MSTP Work in Progress Seminar

2018 Bacterial contamination on hospital ICU surfaces in the United States and Pakistan  
WUSTL Microbiology Department Seminar

2018 Bacterial contamination on hospital ICU surfaces in the United States and Pakistan  
WUSTL Center for Genome Sciences

2018 Bacterial contamination on hospital ICU surfaces in the United States and Pakistan  
American Society of Microbiology Micro

2017 Bacterial contamination on hospital ICU surfaces in the United States and Pakistan  
CSB-MMMP-PMB Interdepartmental Retreat

2017 Multidrug resistant organisms on hospital surfaces in the United States and Pakistan  
Computational and Systems Biology Retreat

2017 Longitudinal analysis of ICU surface microbial contamination in the United States and Pakistan  
American Society of Microbiology Micro

2017 Effects of trimethoprim-sulfamethoxazole on the microbiomes of HIV- infants born to HIV+ mothers  
WUSTL Center for Genome Sciences

2017 Antibiotic Resistance: a growing public health crisis  
WUSTL Institute of Public Health

2013 Drop Team and Rayleigh-Taylor instability  
Canyon High School AP biology class

2012 Mannose Receptor Signaling  
SUCCESS

## patents

2018 Store-Easy Automotive wheelchair storage device.  
Patent US9937088B2  
Guertler C, D'Souza AW, Milgrom R, Hong T, Xiao Y, Nadell S

## posters

2019 Spatiotemporal dynamics of multidrug resistant bacteria on intensive care unit surfaces.  
IMM/MICRO Mini WIP

2019 Cotrimoxazole prophylaxis increases resistance gene prevalence and  $\alpha$ -diversity but decreases  $\beta$ -diversity in the gut microbiome of HIV-exposed, uninfected infants.  
American Society of Microbiology (ASM) Microbe

2019 Longitudinal analysis of ICU surface microbial contamination in the US and Pakistan  
NIAID/IDSA Infectious Diseases Research Careers Meeting

2018 Longitudinal Analysis of ICU Surface Microbial Contamination in the US and Pakistan  
American Physician Scientist Association (APSA) Midwest meeting

2018 Longitudinal Analysis of ICU Surface Microbial Contamination in the US and Pakistan  
Lake Arrowhead Microbial Genomics Conference

2018	Longitudinal Analysis of ICU Surface Microbial Contamination in the US and Pakistan American Society of Microbiology (ASM) Microbe
2017	Longitudinal Analysis of ICU Surface Microbial Contamination in the US and Pakistan American Society of Microbiology (ASM) Microbe
2017	Longitudinal Analysis of ICU Surface Microbial Contamination in the US and Pakistan 5th annual Global Health & Infectious Disease Conference
2014	Invasive populations of <i>Aedes aegypti</i> in Central California Yale Ecology and Evolutionary Biology Poster Session
2013	The genetics of foraging behavior in <i>Aedes aegypti</i> Cell Symposia: Genes, Circuits, and Behavior
2012	Mannose receptor signaling linking spleen tyrosine kinase and MAP kinase p38 in human macrophages The Ohio State University SUCCESS program
2009	Relationship of spinning time and speed to photoresist thickness on semiconductor wafers Army Research Labs: Science and Engineering Apprentice Program

## awards

2021	Gold Humanism Honor Society Inductee
2020	Spencer T. and Ann W. Olin Fellow
2017-18	Burroughs Wellcome Fund, Institutional Program Unifying Population and Laboratory-Based Sciences
2016	BioEntrepreneurship Core Bench to Business Competition
2015	IDEA Labs Demo Day Finalist
2013	Alan S. Tetelman Fellowship for International Research in the Sciences
2013	Paul K. and Evelyn Elizabeth Cook Richter Fellowship
2012	CBC Spouses Cheerios Brand Health Initiative Scholarship
2011	CBC Louis Stokes Health Scholarship
2010	CBC Louis Stokes Health Scholarship

## activities and leadership

2019-pres.	Volunteer Seeing patients as a medical student volunteer for the free clinic	Saturday Neighborhood Health Clinic
2014-pres.	Yale Admissions Interviewer Interviewer for Yale College admissions of prospective undergraduate students	Yale Alumni Schools Committee
2015-17	Physicians for Human Rights Co-President of club focusing on human rights and political issues that relate to medicine, including health-care for prisoner, refugees, and underserved communities	Washington University in St. Louis
2014-17	Store-Easy Company seeking to improve manual wheelchair storage in automobiles	Washington University in St. Louis - Sling Health
2012-14	Drop Team Undergraduate research team selected by NASA to conduct fluid mechanics research in zero-gravity	Yale University
2012-14	Splash at Yale Undergraduate group teaching short courses to middle and high school students	Yale University
2011-14	Big Sib Mentor to freshman students at Yale University	Yale University - Pierson College

## teaching

2017-20	Computational Teaching Assistant   Fundamentals of Biostatistics   Washington University in St. Louis
2017-20	Graduate Mentor   Visiting scholars, rotation students, and undergraduates   Dantas Lab
2017	Teaching Assistant   Microbes and Pathogenesis   Washington University in St. Louis
2017	Graduate Mentor   IPH Summer Program   Washington University in St. Louis
2016	Graduate Mentor   Eureka Program   Washington University in St. Louis
2013-14	Lecturer   Origins of Life   Yale Splash
2011-14	Lecturer   The Science of Ice Cream   Yale Splash

## professional memberships

2020-pres.	Gold Humanism Honor Society
2019-pres.	Infectious Diseases Society of America
2016-pres.	American Society for Microbiology