

# Kevin J Forsberg

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## EDUCATION AND TRAINING

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- 2015-present     **Postdoctoral Fellow**  
Fred Hutchinson Cancer Research Center (Seattle, WA)  
Research Advisor: Harmit S. Malik, PhD  
*Topic: CRISPR-Cas inhibitors in phages and bacteria*
- 2009-2015       **Doctor of Philosophy** (Molecular Genetics and Genomics)  
Washington University in St. Louis (St. Louis, MO)  
Research Advisor: Gautam Dantas, PhD  
*Topic: Native ecology and clinical impacts of antibiotic resistance in soil*
- 2005-2009       **Bachelor of Science** (Molecular Biosciences and Biotechnology)  
Arizona State University, Barrett Honors College (Tempe, AZ)  
Research Advisors (2007-2009): David W. Craig, PhD and Dietrich A. Stephan, PhD  
Translational Genomics Research Institute (Phoenix, AZ)  
*Topic: Copy number variation associated with autism spectrum disorders*

## FELLOWSHIPS AND AWARDS

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- 2021-2026\*     DP2 New Innovators Award, NIH, NIAID  
\*Award contingent on obtaining faculty position by June 2021 (start date flexible)
- 2016-2019     Helen Hay Whitney Postdoctoral Research Fellow  
2018           Vijay and Sita Vashee Entrepreneur Awardee (Fred Hutchinson Cancer Research Center)  
2015           Spencer T. and Ann W. Olin Fellow (MSTP Washington Univ. in St Louis)
- 2014-2015     Genome Analysis Training Program (Washington Univ. in St Louis), NHGRI
- 2010-2013     National Science Foundation Graduate Research Fellow
- 2009-2010     Cell and Molecular Biology Training Grant (Washington Univ. in St Louis), NIGMS

## PUBLICATIONS

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[Google Scholar Link](#)

†corresponding author, \*direct mentee, ‡equal contributions

1. **Forsberg KJ**<sup>†</sup>, Schmidtke DT\*, Werther R, Hausman D\*, Stoddard BL, Kaiser BK, Malik HS. AcrIIA22 is a novel anti-CRISPR that impairs SpyCas9 activity by relieving DNA torsion of target plasmids. *BioRxiv*. 2020; DOI: 10.1101/2020.09.28.317578.
2. **Forsberg KJ**<sup>†</sup>, Bhatt IV\*<sup>‡</sup>, Schmidtke DT\*<sup>‡</sup>, Javanmardi K, Dillard KE, Stoddard BL, Finkelstein IJ, Kaiser BK, Malik HS. Functional metagenomics-guided discovery of potent Cas9 inhibitors in the human microbiome. *eLife*. 2019; Sep 10(8): e46540.
3. Crofts TS, Wang B, Spivak A, Gianoulis TA, **Forsberg KJ**, Gibson MK, Johnsky LA, Broomall SM, Rosenzweig CN, Skowronski EW, Gibbons HS, Sommer MO, Dantas G. Shared strategies for  $\beta$ -lactam catabolism in the soil microbiome. *Nature Chem Bio*. 2018, doi: 10.1038/s41589-018-0052-1.
4. Xu Z, Stogios PJ, Quaille AT, **Forsberg KJ**, Patel S, Skarina T, Houlston S, Arrowsmith C, Dantas G, Savchenko A. Structural and functional survey of environmental aminoglycoside acetyltransferases reveals functionality of resistance enzymes. *ACS Infectious Diseases*. 2017; 9(3), 653-665.
5. Crofts TS, Wang B, Spivak A, Gianoulis TA, **Forsberg KJ**, Gibson MK, Johnsky LA, Broomall SM, Rosenzweig CN, Skowronski EW, Gibbons HS, Sommer MO, Dantas G. Draft genome sequences of three  $\beta$ -lactam-catabolizing soil Proteobacteria. *Genome Announcements*. 2017; 32(5), e00653-17.
6. Yoneda A, Henson WR, Goldner NK, Park KJ, **Forsberg KJ**, Kim SJ, Pesesky MW, Foston M, Dantas G, Moon TS. Comparative transcriptomics elucidates adaptive phenol tolerance and utilization in lipid-accumulating *Rhodococcus opacus* PD630. *Nucleic Acids Research*. 2016; 44(5), 2240-54.
7. **Forsberg KJ**, Patel S, Witt E\*, Wang B, Ellison T\*, Dantas G. Identification of genes conferring tolerance to lignocellulose-derived inhibitors by functional selections in soil metagenomes. *Appl Environ Microbiol*. 2016; 82(2), 528-537.

8. **Forsberg KJ**, Patel S, Wencewicz TA, Dantas G. The tetracycline destructases: a novel family of tetracycline-inactivating enzymes. *Chemistry & Biology*. 2015; 22(7), 888-897.
9. Gibson MK, **Forsberg KJ**, Dantas G. Improved annotation of antibiotic resistance determinants reveals microbial resistomes cluster by ecology. *The ISME Journal*. 2015; 9:207
10. **Forsberg KJ**<sup>‡</sup>, Patel S<sup>‡</sup>, Gibson MK, Lauber CL, Knight R, Fierer, N, Dantas G. Bacterial phylogeny structures soil resistomes across habitats. *Nature*. 2014; 509(7502): 612.
11. Moore AM, Patel S, **Forsberg KJ**, Wang B, Bentley G, Razia Y, Qin X, Tarr PI, Dantas G. Pediatric fecal microbiota harbor diverse and novel antibiotic resistance genes. *PLOS ONE*. 2013; 8 (11): e78822.
12. **Forsberg KJ**<sup>‡</sup>, Reyes A<sup>‡</sup>, Wang B, Selleck EM, Sommer MO, Dantas G. The shared antibiotic resistome of soil bacteria and human pathogens. *Science*. 2012; 337(6098):1107-11.
13. Harris RA, Wang T, Coarfa C, Nagarajan RP, Hong C, Downey SL, Johnson BE, Fouse SD, Delaney A, Zhao Y, Olshen A, Ballinger T, Zhou X, **Forsberg KJ**, Gu J, Echipare L, O'Geen H, Lister R, Pelizzola M, Xi Y, Epstein CB, Bernstein BE, Hawkins RD, Ren B, Chung WY, Gu H, Bock C, Gnirke A, Zhang MQ, Haussler D, Ecker JR, Li W, Farnham PJ, Waterland RA, Meissner A, Marra MA, Hirst M, Milosavljevic A, Costello JF. Comparison of sequencing-based methods to profile DNA methylation and identification of monoallelic epigenetic modifications. *Nat Biotechnol*. 2010; 28(10):1097-105.

## REVIEWS AND INVITED PUBLICATIONS

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14. **Forsberg KJ**, Malik HS. Microbial Genomics: The expanding universe of bacterial defense systems. *Current Biology*. 2018; 28(8):R361-364.
15. Pehrsson EC, **Forsberg KJ**, Gibson MK, Ahmadi S, Dantas G. Novel resistance functions uncovered using functional metagenomic investigations of resistance reservoirs. *Frontiers in Microbiology*. 2013; 4(145).

## PATENTS

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1. Tolia N, Dantas G, Wencewicz TA, Park J, Gasparini A, **Forsberg KJ**, Vogel J, Reck MR, Symister CT, Markley JL. Inhibition and diagnostics of emerging tetracycline resistance enzymes. US Patent No. US10273468B2.
2. Dantas G, Gonzales PR, **Forsberg KJ**, Pesesky MW, Chang M, Mobashery S. Compositions and methods of use of antibacterial drug combinations. US Patent No. US10500191B2.

## TEACHING AND MENTORSHIP

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Mentees:	Deanna Hausman (Fred Hutch, Postbac researcher, NIH PREP; <u>now</u> : Yale Univ. PhD student) Danica Schmidtke (Fred Hutch, Research technician; <u>now</u> : Stanford Univ. PhD student) Ishan Bhatt (Fred Hutch, Research technician; <u>now</u> : Ahmedabad Univ. technician) Eli Wisdom (Fred Hutch, Summer undergraduate; <u>now</u> : Yale Univ. postbac researcher) Evan Witt (WashU, Undergraduate researcher; <u>now</u> : Rockefeller Univ. PhD student) Kumar Thurimella (WashU, Summer undergraduate; <u>now</u> : Univ. of Colorado MD student) Tyler Ellison (WashU, Summer undergraduate; <u>now</u> : Univ. of Washington PhD student) Vidhan Srivastava (WashU, High school student; <u>now</u> : Univ. of Chicago Medical Center resident)
2012-2014	Lecturer, <i>Freshman Seminar: Phage Hunters</i> (BIO 192, Washington Univ. in St Louis)
2013	Lecturer, <i>Molecular Biology at the Cutting Edge</i> (BIO 4933, Washington Univ. in St Louis)
2012	Teaching Assistant, <i>Genomics</i> (BIO 5488, Washington Univ. in St Louis)

## CONFERENCE PRESENTATIONS

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2020	Presenter, Microbiome Symposium (virtual conference, hosted by Fred Hutch, Seattle, WA)
2020	Presenter, The Global Virome in Health and Disease (Tahoe City, CA)
2019	Presenter, Molecular Genetics of Bacteria and Phages (Madison, WI)
2019	Presenter, CRISPR 2019 (Québec City, Canada)
2018	Poster, Molecular Genetics of Bacteria and Phages (Madison, WI)
2015	Presenter, Gordon Research Conference, Ecological & Evolutionary Genomics (Biddeford, ME)
2014	Poster, Gordon Research Conference, New Antibacterial Discovery & Development (Ventura, CA)
2011	Presenter, I-CARES Research Symposium (St Louis, MO)
2011	Poster, Center for Genome Sciences & Systems Biology Research Symposium (St Louis, MO)

## **LEADERSHIP, PROFESSIONAL DEVELOPMENT, AND OUTREACH**

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2018 Reviewer, Mock K99 Review Committee, Fred Hutchinson Cancer Research Center  
2012-2014 Member, Finance Committee, Young Scientist Program (secure funding for outreach efforts)  
2010-2014 Volunteer, Young Scientist Program (science outreach targeting disadvantaged St. Louis youth)  
2014 Finalist, International FameLab St. Louis Regional (science communication competition)  
2012-2013 Organizer, NAKFI Expert Workshop on Microbial Ecosystem Services (Annapolis, MD)  
2011-2012 Member, Strategic Planning Committee, Young Scientist Program  
2012 Moderator, Expert Panel Discussion on Energy and Environmental Policy (St. Louis, MO)  
2010-2011 Director, Molecular Genetics and Genomics Student Run Seminar

Reviewer for: Nature Reviews Genetics, Nucleic Acids Research, Environmental Science & Technology, mSphere, Diversity, ISME, and Frontiers in Microbiology

## **REFERENCES**

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### **Harmit Malik, Ph.D.**

HHMI Investigator and Member, Division of Basic Sciences, Fred Hutchinson Cancer Research Center  
(206) 667-5204, hsmalik@fredhutch.org

### **Gautam Dantas, Ph.D.**

Professor, Department of Pathology and Immunology, Washington University in St. Louis  
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### **Barry Stoddard, Ph.D.**

Member, Division of Basic Sciences, Fred Hutchinson Cancer Research Center  
(206) 667-4066, bstoddar@fredhutch.org

### **Timothy Wenczewicz, Ph.D.**

Associate Professor, Department of Chemistry, Washington University in St. Louis  
(314) 935-7247, wenczewicz@wustl.edu

### **Brett Kaiser, Ph.D. (Teaching Reference)**

Associate Professor, Department of Biology, Seattle University  
(206) 220-8266, kaiserb@seattleu.edu