

**Terence S. Crofts, Ph.D.**

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 Chemistry of Life Processes Institute, Room 3737, Evanston, IL 60208

**EDUCATION AND EMPLOYMENT**

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2018 – present	<b>Research Assistant Professor, Northwestern University</b> Department of Molecular Biosciences
2014 – 2018	<b>Postdoctoral Scholar, Washington University in St. Louis</b> Department of Pathology and Immunology Advisor: Gautam Dantas Project: Mechanisms of chemotherapeutic bioconversion by environmental and human commensal bacteria
2008 - 2013	<b>PhD, University of California Berkeley</b> Department of Plant and Microbial Biology Microbiology Program Advisor: Michiko E. Taga Committee: M.E. Taga, K. Niyogi, M. Chang, P.C. Zambryski Thesis: Genetic and Biochemical Origins of Diversity in Cobamides: Nature's Most Beautiful Cofactors.
2004 - 2008	<b>BS, University of Illinois at Urbana-Champaign</b> Molecular and Cellular Biology; High Distinction Advisor: David M. Kranz Thesis: Characterization of specificity and activity of mutated T cell receptor – pepMHC interactions Chemistry

**AWARDS & HONORS**

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## FELLOWSHIPS

NIH/NIDDK T32 Postdoctoral Training Grant	2017-2018
NIH/NCIHD T32 Postdoctoral Training Grant	2014-2016
William T. & Helen S. Halstead Scholarship	2009-2010
NSF Graduate Research Fellowship Honorable Mention	2009

## AWARDS

Lake Arrowhead Microbial Genomics Conference 2 <sup>nd</sup> place poster	2016
American Society for Microbiology Student Travel Grant	2010
Annual Microbiology Student Symposium 1 <sup>st</sup> place poster	2010
Plant and Microbial Biology Dept. Retreat 2 <sup>nd</sup> place poster	2009
Dept. of Molecular and Cellular Biology Best Senior Thesis	2008
Graduation with High Distinction (Molecular and Cellular Biology)	2008
Graduation with James Scholar Honors	2008
Dept. of Molecular and Cellular Biology Open House 1 <sup>st</sup> place poster	2007
James Scholar Research Scholarship	2007
Edmund James Scholar	2004-2008
Dean's List	2005-2008
Merit Recognition Scholarship Program	2004

**PUBLICATIONS**

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1. Crofts TS<sup>†</sup>, McFarland AG, Hartmann EM (*under review*) Mosaic Ends Tagmentation (METa) assembly for extremely efficient construction of functional metagenomic libraries. (preprint available at <https://doi.org/10.1101/2021.02.01.429292>)
2. Crofts TS<sup>†</sup>, Mullooney MW, Maltseva NI, Kim Y, Endres M, Joachimiak A (*under review*) Functional characterization of chloramphenicol reductases from human pathogens.
3. Crofts TS<sup>†</sup>, Sontha P, King AO, Wang B, Bidy B, Zanolli N, Gaumnitz J, Dantas G<sup>†</sup> (2019) Discovery and characterization of a nitroreductase capable of conferring bacterial resistance to chloramphenicol. **Cell Chemical Biology**, 26 (4): 559-70.
4. Crofts TS, Wang B, Spivak A, Gianoulis TA, Forsberg KJ, Gibson MK, Johnsky LA, Broomall SM, Rosenzweig CN, Skowronski EW, Gibbons HS, Sommer MOA, Dantas G (2018) Shared strategies for  $\beta$ -lactam catabolism in the soil microbiome. **Nature Chemical Biology**, 14 (6). 556-64.
  - a. Crofts, Terence S. "Bacteria may be powerful weapon against antibiotic resistance." The Conversation, May 2<sup>nd</sup>, 2018, [theconversation.com/bacteria-may-be-powerful-weapon-against-antibiotic-resistance-95750](http://theconversation.com/bacteria-may-be-powerful-weapon-against-antibiotic-resistance-95750).
5. Keen EC\*, Crofts TS\*, Dantas G (2018) Checkpoint checkmate: Microbiota modulation of cancer immunotherapy. **Clinical Chemistry**, 64 (9). 1280-3.
6. Crofts TS, Wang B, Spivak A, Gianoulis TA, Forsberg KJ, Gibson MK, Johnsky LA, Broomall SM, Rosenzweig CN, Skowronski EW, Gibbons HS, Sommer MOA, Dantas G (2017) Draft genome sequences of three  $\beta$ -lactam-catabolizing soil Proteobacteria. **Genome Announcements**, 5 (32). 8-10.
7. Crofts TS\*, Gasparrini AJ\*, Dantas G (2017) Next-generation approaches to understand and combat the antibiotic resistome. **Nature Reviews Microbiology**, 15 (7), 422-34.
8. Gasparrini AJ\*, Crofts TS\*, Gibson MK, Tarr PI, Warner BB, Dantas G (2016) Antibiotic perturbation of the preterm infant gut microbiome and resistome. **Gut Microbes**, 7 (5), 443-9.
9. Gibson MK\*, Crofts TS\*, Dantas G (2015) Antibiotics and the developing infant gut microbiota and resistome. **Current Opinion in Microbiology**, 27, 51-6.
10. Crofts TS\*, Hazra AB\*, Tran JLA, Sokolovskaya O, Osadchiy V, Ad O, Pelton J, Bauer S, Taga ME (2014) Regiospecific formation of cobamide isomers is directed by CobT. **Biochemistry**, 53 (49), 7805-15.
11. Crofts TS, Men Y, Alvarez-Cohen L, Taga ME (2014) A bioassay for the detection of benzimidazoles reveals their presence in a range of environmental samples. **Frontiers in Microbiology**. 5:592.
12. Men Y, Seth EC, Yi S, Crofts TS, Allen RH, Taga ME, Alvarez-Cohen L (2014) Identification of specific corrinoids reveals corrinoid modifications in dechlorinating microbial communities. **Environmental Microbiology**, 17 (12), 4873-84.
13. Crofts TS, Seth EC, Hazra AB, Taga ME (2013) Cobamide structure depends on both lower ligand availability and CobT substrate specificity. **Chemistry and Biology**, 20 (10), 1265-74.
14. Hazra AB, Tran JLA, Crofts TS, Taga ME (2013) Analysis of substrate specificity in CobT homologs reveals widespread preference for 5,6-dimethylbenzimidazole, the lower axial ligand of vitamin B12. **Chemistry and Biology**, 20 (10), 1275-85.

15. Bowerman NA, Crofts TS, Chlewicki L, Do P, Baker BM, Garcia KC, Kranz DM (2009). Engineering the binding properties of the T cell receptor:peptide:MHC ternary complex that governs T cell activity. **Molecular Immunology**, 46 (15), 3000-8.

\*Authors contributed equally to these works

†Shared corresponding author position

## PRESENTATIONS

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### INVITED SEMINARS

Crofts, TS “Outside the box antimicrobial-bacteria interactions.” **Florida State University College of Medicine**, Tallahassee, FL [remote]. February, 2021.

Crofts, TS “Microbiomes and emerging contaminants.” **Carnegie Mellon University**, Pittsburgh, PA. February, 2020.

Crofts, TS “Microbiomes and emerging contaminants.” **University of Illinois at Champaign-Urbana**, Urbana, IL. February, 2020.

Crofts, TS “Microbiomes and emerging contaminants.” **Arizona State University**, Tempe, AZ. February, 2020.

Crofts, TS “Microbiomes and emerging contaminants.” **Loyola University Stritch School of Medicine**, Maywood, IL. November, 2019.

Crofts, TS “Mechanisms of bacterial penicillin catabolism.” **Rocky Mountain Laboratories**, Hamilton, MT. June, 2019.

Crofts, TS “Small molecule degradation, modification, and synthesis in microbiomes.” **University of Illinois at Chicago**, Chicago, IL. December, 2018.

Crofts, TS “Mechanisms of antimicrobial bioconversion by environmental and host-associated bacteria.” **Lake Arrowhead Microbial Genomics 2018**. Lake Arrowhead, CA. September, 2018.

Crofts, TS “Mechanisms of antimicrobial bioconversion by environmental and host-associated bacteria.” **Microbiology and Immunology 2018**. LabRoots. September, 2018. URL: <https://bit.ly/3unK527>

Crofts, TS “Functional metagenomic discovery and characterization of novel antimicrobial resistance mechanisms.” **Gordon Research Conference on Multi-Drug Efflux Systems**, Galveston, TX. March, 2017.

Crofts, TS “The double-edged sword of microbiome diversity: Small molecule synthesis and degradation.” **University of Oregon**, Eugene, OR. February, 2017.

Crofts, TS “Development of a murine gut microbiota model for early and repeated antibiotic exposure in early infancy.” Women’s Health Research Seminar Series, **Barnes Jewish Hospital Institute of Health**, St. Louis, MO. October, 2015.

### ORAL PRESENTATIONS

Crofts, TS “Outside the box antimicrobial-bacteria interactions.” **MicroSeminar Series**. February, 2021. URL: <https://bit.ly/3s7XVDE>.

Crofts TS, Wang B, Spivak A, TA Gianoulis, Gibbons HS, Gibson MK, Forsberg KJ, Dantas G “Soil amidases allow catabolism of  $\beta$ -lactam antibiotics by environmental bacteria.” **Gordon Research Conference on Drug Resistance**, University of New England, Biddeford, ME. June, 2016.

Crofts, TS “Genetic and Biochemical Origins of Diversity in Cobamides: Nature's Most Beautiful Cofactor” **University of California, Berkeley**, Department of Plant and Microbial Biology, Berkeley, CA. March, 2014.

Crofts TS "Bacterial perfectionists - How corrinoid producers specify the lower ligand." **West Coast Bacterial Physiologists Annual Conference**, Asilomar, CA. December, 2011.

#### POSTER PRESENTATIONS

Crofts TS “New Functionally Validated Chloramphenicol Reductases from *Haemophilus* and *Neisseria* spp.” **ASM Microbe 2020**. *Conference cancelled*.

Crofts TS, Wang B, Spivak A, Gianoulis TA, Forsberg KJ, Gibson MK, Johnsky LA, Broomall SM, Rosenzweig CN, Skowronski EW, Gibbons HS, Sommer MOA, Dantas G “Antibiotic eaters: Functional characterization of a penicillin catabolic pathway in soil bacteria.” **Gordon Research Conference on Enzymes, Coenzymes, and Metabolic Pathways**. Waterville Valley, NH. July, 2018.

Schwartz DJ, Crofts TS, Robinson J, Henderson JP, Warner BB, Tarr PI, Dantas G “Gnotobiotic mouse model of infection susceptibility in the neonatal intensive care unit.” **American Society for Microbiology**, San Francisco, CA. June, 2019.

Crofts TS, Sontha P, King AO, Wang B, Dantas G “Chloramphenicol reductase: A novel resistance mechanism linking aplastic anemia and chloramphenicol.” **Global Health and Infectious disease conference**, St. Louis, MO. April 2018.

Crofts TS, Wang B, Spivak A, TA Gianoulis, Gibbons HS, Gibson MK, Forsberg KJ, Dantas G “Soil amidases allow catabolism of  $\beta$ -lactam antibiotics by environmental bacteria.” **Lake Arrowhead Microbial Genomics**, Lake Arrowhead, CA. August, 2016.

Crofts TS, Hazra AB, Tran JLA, Seth EC, Taga ME “The molecular basis of specificity in the biosynthesis of Vitamin B<sub>12</sub> and its analogs.” **Gordon Research Conference on Enzymes, Coenzymes, and Metabolic Pathways**, Waterville Valley, NH. July, 2013.

Hazra AB, Crofts TS, Tran JLA, Taga ME “A tale of two isomers: Exploring the molecular basis of lower ligand attachment in cobamides.” **Gordon Research Conference on Enzymes, Coenzymes, and Metabolic Pathways**, Waterville Valley, NH. July, 2013.

Crofts TS, Hazra AB, Tran JLA, Seth EC, Taga ME “The molecular basis of specificity in the biosynthesis of Vitamin B<sub>12</sub> and its analogs.” **American Society for Microbiology 112th General Meeting**, San Francisco, CA. June, 2012.

Crofts TS, Taga ME “Corrinoid lower ligand specificity in the legume symbiont *Sinorhizobium meliloti*.” **American Society for Microbiology Conference on Beneficial Microbes**, Miami, FL. October, 2010.

#### TEACHING EXPERIENCE

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**Discussion Leader**, June 2014

Washington University in St. Louis, Summer Undergraduate Research Fellowship Program  
Ethical and Responsible Conduct in Science and Scholarship Seminar

**Graduate Student Instructor**, spring 2011

University of California, Berkeley, Department of Plant and Microbial Biology  
PMB 13: Genetic Revolutions

**Graduate Student Instructor**, spring 2010

University of California, Berkeley, Department of Plant and Microbial Biology  
PMB C112L: Microbiology Laboratory

**GRANTS, FUNDING, AND PATENTS**

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NIH NIGMS R01 PAR-19-254 *Submitted*

Mosaic Ends Tagmentation Assembly: A high efficiency method for functional metagenomic library preparation  
R01GM141080

NIH NHLBI R01 PA-18-784 *Submitted*

Characterization of gut microbiome chloramphenicol redox enzymes, their linkage to aplastic anemia, and their inhibition  
R01HL153868

Major authorship contributions to 12 full-research grants submitted to:

- National Institutes of Health (total funded, \$2.3 million)
- Center for Disease Control and Prevention (total funded, \$988,000)
- National Science Foundation
- Department of Defense
- March of Dimes Foundation
- Bill and Melinda Gates Foundation

NIH/NIDDK T32 Postdoctoral Training Grant

2017-2018

NIH/NCIHD T32 Postdoctoral Training Grant

2014-2016

#### PATENTS

Provisional application 63/062,639: Mosaic ends tagmentation assembly

#### MENTORSHIP

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##### Mentor for Undergraduate Students

UC Berkeley

Vadim Osadchiy	2013 - 2014	Marielle Bolano	2010
Jasmine Aimua	2012 - 2013	Judi Abegania	2010
Shelley Shi	2012 - 2013		
Andrea R. Oneto	2011 - 2012		

Washington University

Pratyush Sontha	2017 - 2018	Amber O. King	2015 - 2017
Nicole Zanolli	2016 - 2017	Jae Lee	2014
John Gaumnitz	2016		

##### Mentor for Graduate Students

UC Berkeley

Omer Ad Chemical Biology Graduate Program, fall 2012

Washington University

Brent A. Biddy Molecular Genetics and Genomics Program, spring 2015

Drew J. Gasparrini Molecular Genetics and Genomics Program, fall 2014

#### REFERENCES

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**Prof. Gautam Dantas, PhD**

## Curriculum Vitae

Terence S. Crofts

### *Postdoctoral Supervisor*

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### **Prof. Neil L. Kelleher, PhD**

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### **Prof. Michiko E. Taga, PhD**

#### *PhD Supervisor*

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Berkeley, CA 94720

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### **Prof. Phillip I. Tarr, MD**

#### *Postdoctoral Co-mentor*

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