

## **William Gerald Alexander, PhD**

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### **EMPLOYMENT**

2021-present Assistant R&D Staff Scientist  
Biosciences Division  
Oak Ridge National Laboratory, Oak Ridge, TN

2018-2021 Assistant Professor  
Department of Biology  
Truman State University, Kirksville, MO

2018 Postdoctoral Research Associate  
Department of Chemical & Biological Engineering  
University of Colorado-Boulder, Boulder, CO

2016-2018 Senior Scientist  
Inscripta, Inc.  
Boulder, CO

2011-2016 Postdoctoral Research Associate  
Laboratory of Genetics/DOE Great Lakes Bioenergy Research Center  
University of Wisconsin-Madison, Madison, WI

2008, 2011 Adjunct Instructor  
Columbia College  
Columbia, MO & Lake Ozark, MO

### **EDUCATION**

2005-2011 Doctor of Philosophy – Biological Sciences  
University of Missouri-Columbia, Columbia, MO

2001-2005 Bachelor of Science – Biology  
Truman State University, Kirksville, MO

### **EXTRAMURAL FUNDING**

10/22-09/27 DOE Office of Biological and Environmental Research Bioenergy Research Centers. "The Center for Bioenergy Innovation." Role: Co-PI, 20% effort. Total: \$1,200,000.

09/22-08/27 DOE Office of Biological and Environmental Research. "Microbial community engineering tools for enhancing polyolefin degradation and valorization." Role: Co-I, 20% effort. Total: \$3,600,000.

09/17-08/21 NSF: MCB-1716820. "Combinatorial Engineering of Essentiality." Role: co-PI, 50% effort. Total: \$660,000.

08/09-07/10 Graduate Assistantship in Areas of National Need Fellow. Total: \$30,000.

### **INTRAMURAL FUNDING**

07/22-09/23 ORNL Lab Directed Research & Development, Director's R&D Fund. "Towards mapping sequence-activity relationships of an entire microbial proteome." Role: co-PI, 20% effort. Total: \$700,000.

- 11/21-09/22 ORNL Lab Directed Research & Development, Standard Seed Money Fund. "Remediation of engineered redox imbalance by radiotrophy." Role: PI, 10% effort. Total: \$50,000.
- 09/20-01/21 Truman State University Office of Student Research Grant-in-Aid of Scholarship and Research Program. "Optimizing genome editing in *Chlamydomonas reinhardtii* using alternative nucleases." Role: PI, 10% effort. Total: \$750.

### **PEER-REVIEWED ARTICLES** (\*,† denote equal contribution)

- 1) Tidwell AK, Faust E, Eckert CA, Guss AM, and **Alexander WG**. (2025) Discovering methylated DNA motifs in bacterial nanopore sequencing data with MIJAMP. *Bioinformatics*, in revision.
- 2) Allemann MN, Kato R, **Alexander WG**, et al. (2025) Laboratory evolution in *Novosphingobium aromaticivorans* enables rapid catabolism of a model lignin-derived aromatic dimer. *Appl. Environ. Microbiol.* e02081-24.
- 3) Podar M, Hochanadel LH, **Alexander WG**, Schadt CW, and Pelletier DA. (2024) Complete genome sequence of *Promicromonospora* sp. strain Populi, an actinobacterium isolated from *Populus trichocarpa* rhizosphere. *Microbiol. Resour. Announce.* **13**(12): e00851-24.
- 4) Imai S, Allen B, Hochanadel LH, **Alexander WG**, et al. (2024) Complete genome sequence of *Luteolibacter* sp. strain Populi, a member of phylum Verrucomicrobiota isolated from the *Populus trichocarpa* rhizosphere. *Microbiol. Resour. Announce.* **13**(11): e00801-24.
- 5) Bleem AC, Kuatsjah E, Johnsen J, Mohamed ET, **Alexander WG**, et al. (2024) Evolution and engineering of pathways for aromatic O-demethylation in *Pseudomonas putida* KT2440. *Metab. Eng.* **84**: 145-157.
- 6) Pelletier DA, **Alexander WG**, Burdick LH, Rush TA, Tannous J, Webb AB, and Morrell-Falvey JL. (2024) Complete genome of *Pseudomonas putida* strain WBB028 isolated from leaf litter. *Microbiol. Resour. Announce.* **13**(7): e00234-24.
- 7) Noshay JM, Walker T, Alexander WG, et al. (2023) Quantum biological insights into CRISPR-Cas9 sgRNA efficiency from explainable-AI driven feature engineering. (2023) *Nucleic Acids Res.* **51**(19): 10147-10161.
- 8) Mulay SA, **Alexander WG**, Hahn CR, Klingeman DM, Elshahed MS, Youssef NH, and Podar M. (2023) Complete genome sequence of *Desulfomicrobium* sp. strain ZS1 from Zodletone Spring in Oklahoma, USA. *Microbiol. Resour. Announce.* **12**(5): e00145-23.
- 9) Peris D, **Alexander WG**, Fisher KJ, Moriarty RV, Basuino MG, Ubbelohde EJ, Wrobel RL, and Hittinger CT. (2020) Synthetic hybrids of six yeast species. *Nat. Commun.* **11**(1): 2085.
- 10) Kuang MC, Kominek J, **Alexander WG**, Cheng J-F, Wrobel RL, and Hittinger CT. (2018) Repeated cis-regulatory tuning of a metabolic bottleneck gene during evolution. *Mol. Biol. Evol.* **35**(8): 1968-1981.
- 11) Peris D, Moriarty RV, **Alexander WG**, et al. (2017) Hybridization and directed evolution of *Saccharomyces* species for cellulosic biofuel production. *Biotech. Biofuels.* **10**(1): 78-97.
- 12) Garst A, Bassalo MC, Pines G, Lynch SA, Halweg-Edwards AL, Liu R, Liang L, Wang ZW, Zeitoun R, **Alexander WG**, and Gill RT. (2017) Genome scale sequence-to-activity relationship mapping at single nucleotide resolution. *Nat. Biotech.* **35**(1): 48-55.
- 13) Wisecaver JH, **Alexander WG**, King SB, Hittinger CT, and Rokas A. (2016) Dynamic evolution of nitric oxide detoxifying flavohemoglobins, a family of single-protein metabolic modules in bacteria and eukaryotes. *Mol. Biol. Evol.* **33**(8): 1979-1987.
- 14) **Alexander WG**, Wisecaver JH, Rokas A, and Hittinger CT. (2016) Horizontally acquired genes in early-diverging pathogenic fungi enable the use of host nucleosides and nucleotides. *Proc. Natl. Acad. Sci. U. S. A.* **113**(15): 4116-4121.

- 15) **Alexander WG**, Peris D, Pfannenstiel B, Opulente D, Kuang MC, and Hittinger CT. (2016) Efficient engineering of marker-free synthetic allotetraploids of *Saccharomyces*. *Fungal Genet. Biol.* **89**(1): 10-17 (*Nota Bene*: this was an invited contribution for a special issue on Fungal Synthetic Biology).
- 16) **Alexander WG**, Doering DT, and Hittinger CT. (2014) High-efficiency genome editing and allele replacement in prototrophic and wild strains of *Saccharomyces*. *Genetics* **198**(3): 859-866.
- 17) Peris D, Sylvester K, Libkind D, Gonçalves P, Sampaio JP, **Alexander WG**, and Hittinger CT. (2014) Population structure and reticulate evolution of *Saccharomyces eubayanus* and its lager-brewing hybrids. *Mol. Ecol.* **23**(8): 2031-2045.
- 18) Xiao H<sup>†</sup>, **Alexander WG**<sup>†</sup>, Hammond TM<sup>†</sup>, Boone EC, Perdue TC, Pukkila PJ, and Shiu PKT. (2010) QIP, a protein that converts duplex siRNA into single strands, is required for Meiotic Silencing by Unpaired DNA. *Genetics* **186**(1): 119-126.
- 19) **Alexander WG**<sup>\*</sup>, Raju NB<sup>\*</sup>, Xiao H<sup>\*</sup>, Hammond TM, Perdue TD, Metzenberg RL, Pukkila PJ, and Shiu PKT. (2008) DCL-1 colocalizes with other components of the MSUD machinery and is required for silencing. *Fungal Genet. Biol.* **45**(5): 719-727.
- 20) Bardiya N, **Alexander WG**, Perdue TD, Barry EG, Metzenberg RL, Pukkila PJ, and Shiu PKT. (2008) Characterization of interactions between and among components of MSUD machinery in *Neurospora crassa* using Bimolecular Fluorescence Complementation. *Genetics* **178**(1): 593-596.

### **AVAILABLE PREPRINTS**

- 1) Oda Y, Nelson WC, Alexander WG, Nguyen S, Egbert RG, and Harwood CS. (2024) A Rhodospseudomonas strain with a substantially smaller genome retains the core metabolic versatility of its genus. *bioRxiv* 2024.10.21.619483; doi: <https://doi.org/10.1101/2024.10.21.619483>.
- 2) Hren AP *et al.* (2024) High-efficiency transformation and gene expression in Picosynechococcus sp. PCC 7002. *bioRxiv* 2024.09.17.613521; doi: <https://doi.org/10.1101/2024.09.17.613521>.
- 3) Oda Y *et al.* (2023) Sorgoleone degradation by sorghum-associated bacteria; an opportunity for enforcing plant growth promotion. *bioRxiv* 2023.05.26.542311; doi: <https://doi.org/10.1101/2023.05.26.542311>.

### **REVIEWS & COMMENTARY**

- 1) **Alexander WG**. (2019) Marionette strains aim to make refining metabolic pathways faster and easier. *Synth. Biol* **4**(1): ysz007.
- 2) **Alexander WG**. (2018) A history of genome editing in *Saccharomyces cerevisiae*. *Yeast* **35**(5): 355-360. (*Nota Bene*: this was an invited review for the Budding Topics series)
- 3) Momany M, Di Pietro A, **Alexander WG**, *et al.* (2015) Meeting Report: Fungal Genomics Meets Social Media: Highlights of the 28th Fungal Genetics Conference at Asilomar. *G3* **5**(12): 2523-2525. (*Nota Bene*: this was an invited contribution from Dr. Michelle Momany and *Genes|Genomes|Genetics*)

### **PUBLIC SOFTWARE REPOSITORIES**

- 1) MIJAMP: methylome discovery in ONT datasets. (2024) [code.ornl.gov/alexander-public/mijamp/](https://code.ornl.gov/alexander-public/mijamp/)

### **PATENTS**

- 1) **Alexander WG**, Navarro DP, and Hittinger CT. "Synthetic yeast cells and the methods and uses of the same." US Patent No. 11,913,016; issued February 27, 2024.
- 2) Hittinger CT and **Alexander WG**. "Constructs and methods for genome editing and genetic engineering of fungi." US Patent No. 10,870,858; issued December 22, 2020.

## **PROFESSIONAL MEMBERSHIP & SERVICE** (\*indicates an elected position; *ad hoc* committees omitted)

Member:	Society for Industrial Microbiology and Biotechnology, Genetics Society of America
Reviewer:	<i>Genome Research, Yeast, Fungal Genetics and Biology, Molecular Biology &amp; Evolution, Biotechnology &amp; Bioengineering, Antonie van Leeuwenhoek, Mycologia, BMC Biology, Computational &amp; Structural Biotechnology</i>
2025	Co-Chair, Systems and Computational Biology section, SIMB National Meeting
2023	Co-Chair, Commodity Chem. & Fuels I, SIMB National Meeting
2023	Co-Chair, Student Poster & Rapid Fire sessions, SIMB SBFC
2022	Instructor, Nanopore Sequencing session, Biotechnology for TN Teachers Workshop
2022	Co-Chair, High-Throughput Technologies Session, SIMB SFBC
2020-2021	Truman AAUP Chapter Executive Committee Member-At-Large*
2020-2021	High Impact Experiences Committee Member
2019-2021	Biology Departmental Seminar Committee Member & Chair*
2019-2020	Science Olympiad Exam Writer and Proctor, Designer Genes event
2018-2020	Tau Kappa Epsilon International Fraternity Faculty Adviser
2018-2019	STEM Perspective of The Dialogues Committee Committee Member
2014-2015	Representative of Conversion Area for GLBRC Retreat 2015
2011	Laboratory of Genetics Annual Retreat Poster Judge
2005-2011	Mizzou Biology Graduate Student Association Member (Treasurer* '07-'08)

## **HONORS & AWARDS** (\*designates a competitive award, †designates a student-nominated award)

2021	Instructor of the Year, National Residence Hall Honorary, Bess Truman Chapter*†
2021	COPLAC Dunn Award Nominee*†
2021	Research Mentor of the Year Nominee, Truman Student Government*†
2020	William O'Donnell Lee Advising Award Nominee*†
2020	Educator of the Year Nominee and Finalist, Truman Student Government*†
2020	Instructor of Year Winner, National Residence Hall Honorary, Bess Truman Chapter*†
2013	Cold Spring Harbor Laboratory scholarship to attend the inaugural Synthetic Biology course*
2011	Missouri Graduate Student Association Outstanding Graduate Student Nominee*
2009	David Perkins Fund Award*
2005	Graduated Truman State University <i>cum laude</i>
2004	Truman State University President's Recognition Award
2003	NSF Research Experience for Undergraduates Fellow*

**MENTORING & MANAGEMENT**

Year	Name	Status During Contact	Current Status
2010-2011	Abby Rehard	Undergraduate Laboratory Tech, Shiu Lab	Musician, University of Missouri-Columbia School of Music
2011	Ashlan Musante	Rotating Graduate Student, Hittinger Lab	Associate Director, Alnylam Pharmaceuticals
2011	Meihua "Christina" Kuang	Rotating Graduate Student, Hittinger Lab	Postdoc, University of California-San Diego
2011	Elaine Welch	Rotating Graduate Student, Hittinger Lab	Associate Research Scientist, PPD
2012	EmilyClaire Baker	Rotating Graduate Student, Hittinger Lab	Postdoc, University of Oregon
2012	Mary O'Neill	Rotating Graduate Student, Hittinger Lab	Postdoc, Institut Pasteur
2012	Seth Keel	Rotating Graduate Student, Hittinger Lab	Solutions Architect, Wisconsin Institutes for Discovery
2012	Maria Sardi	Rotating Graduate Student, Hittinger Lab	Senior Bioinformatician, Cargill
2013	Drew Doering	Rotating Graduate Student, Hittinger Lab	Scientist, Joint Genome Institute
2014	Brandon Pfannenstiel	Rotating Graduate Student, Hittinger Lab	Scientist I, Zymergen
2016	Russell Wrobel, PhD	Scientist, Hittinger Lab	Scientist, Hittinger Lab
2016-2018	Clint Davis	Research Associate, Inscripta	Research Associate, Inscripta
2016-2018	Charles Johnson	Research Associate, Inscripta	Scientist I, Inscripta
2017-2018	Brett Dunn	Research Associate, Inscripta	Lab Technician III, Biodesix
2017-2018	Miles Gander, PhD	Scientist I, Inscripta	Scientist II, AbSci
2018-2020	Carolynn Gonzalez	Undergraduate Research Asst, Alexander Lab	Undergraduate Student, St. Louis University
2019-2020	Allison Houghton	Undergraduate Research Asst, Alexander Lab	Graduate Student, IU Bloomington
2019-2020	Mira Basuino	Undergraduate Research Asst, Alexander Lab	Medical Student, Kansas City University
2019-2021	Emily Ubbelohde	Undergraduate Research Asst, Alexander Lab	Graduate Student, UW-Madison
2019-2021	Hannah Kimbrough	Undergraduate Research Asst, Alexander Lab	Laboratory Intern, Stowers Institute
2020-2021	RJ Flinn	Undergraduate Research Asst, Alexander Lab	Slated to graduate Truman Spring 2022

## **INSTRUCTOR OF RECORD EXPERIENCE**

### **Columbia College**

Genetics with lab (Su08)

Principles of Biology I with lab (Su11)

### **Truman State University**

Cells, Molecules, & Genes with lab (Fa18, Fa19)

Genetics with lab (Sp19, Sp20, Fa20, Sp21)

Mycology with lab (Sp20)

Introduction to Writing About Biology (Fa20)

Senior Seminar (Sp21)

## **INVITED PRESENTATIONS**

2022	American Society of Microbiology TN/KY Regional Meeting, Johnson City, TN
2021	Oak Ridge National Laboratory, Oak Ridge, TN
2019	A.T. Still University, Kirksville, MO
2019	Truman State University, Kirksville, MO
2018	A.T. Still University, Kirksville, MO
2018	Truman State University, Kirksville, MO
2016	Swansea University, Swansea, Wales, United Kingdom
2016	Muse Biotechnology, Boulder, CO
2016	GLBRC Annual Science Meeting, Lake Geneva, WI
2016	University of Southern Mississippi, Hattiesburg, MS
2016	Clark University, Worcester, MA
2015	Oak Ridge National Laboratory, Oak Ridge, TN
2015	Ginkgo Bioworks, Boston, MA
2015	Washington University in St. Louis, St. Louis, MO
2015	10th Annual DoE JGI User Meeting, Walnut Creek, CA
2015	28th Fungal Genetics at Asilomar, Pacific Grove, CA
2015	Evolution Seminar Series, University of Wisconsin, Madison, WI
2014	7 <sup>th</sup> Annual Midwest Yeast Meeting, Northwestern University, Evanston, IL
2014	GLBRC Annual Retreat, South Bend, IN
2014	Missouri University of Science and Technology, Rolla, MO
2013	GLBRC Annual Retreat, South Bend, IN
2010	Gordon Conference on Cellular and Molecular Fungal Biology, Holderness, NH
2010	Truman State University, Kirksville, MO
2009	25th Fungal Genetics at Asilomar, Pacific Grove, CA