*Curriculum Vitae*

**Christopher DeFraia**

Associate Professor

Department of Biological Sciences

Ferris State University

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**Education**

2010 **Ph.D.**, Microbiology and Cell Science (Molecular Biology), University of Florida.

Dissertation: Characterization of NPR1 suppressors and their role in plant immunity. Advisor: Dr. Zhonglin Mou.

2005 **B.S.**, Biotechnology, *cum laude*, Rutgers University.

Thesis: Molecular characterization of dissimilatory arsenate respiring prokaryotes using an arsenate respiratory reductase gene (*arrA*) as a biomarker. Advisor: Dr. Lily Young.

**ACADEMIC APPOINTMENTS**

2017- Present **Associate Professor of Biology**, Department of Biological Sciences,

Ferris State University, Big Rapids, MI.

2018-2019 **Faculty in Residence,** Office of E-learning, Ferris State University, Big Rapids, MI

2014-2017 **Assistant Professor of Biology**, Department of Biological Sciences,

Ferris State University, Big Rapids, MI.

Spring 2014 **Visiting Professor**, Department of Biology, Kenyon College, Gambier, OH.

Fall 2013 **Visiting Professor**, Department of Biology and Earth Science, Otterbein University, Westerville, OH.

2013-2014 **Postdoctoral Researcher**, Department of Molecular Genetics, Ohio State University, Columbus, OH.

2010-2013 **Postdoctoral Fellow**, Department of Molecular Genetics, Ohio State University, Columbus, OH.

**Fellowships and Awards**

Fall 2020 Sabbatical Award-Video Production: Understanding and Communicating Scientific Literature (~$36,000)

2019-2020 Teaching release-Video Production: Teaching Genetics (~$37,500)

2019 Ferris State Student Athlete Faculty Appreciation Recipient

2015-2016 Ferris Faculty Research Fellowship ($7500)

2011-2013 Pelotonia Postdoctoral Cancer Fellowship (~$113,000)

2010 IFAS/CALS Graduate Student Travel Grant. Amount: ($500)

2009 Davidson Graduate Student Travel Scholarship. Amount: ($350)

2005-2009 University of Florida Alumni Fellowship. Amount: (~$80,000)

2004 CEBIC Undergraduate Research Fellowship. Amount: ($3,000)

2003 Rutgers Undergraduate Research Fellows Award. Amount: ($1,500)

**TEACHING EXPERIENCE**

Fall 2014- **Ferris State University, Big Rapids, MI.**

Present Independent Study in Educational Video Production

General Biology I (three semesters)

Genetics, Human Aspects (six semesters)

Genetics, Human Aspects Laboratory (six semesters)

Principles of Genetics (eleven semesters)

Bioinformatics (four semesters)

Current Topics in Biology (five semesters)

Spring 2014 **Kenyon College, Gambier, OH.**

Applied Bioinformatics

Genetic Analysis

Fall 2013 **Otterbein University, Westerville, OH.**

Genetics

2005-2006 **University of Florida, Gainesville, FL.**

Bacterial Genome Sequencing Analysis

Basic Biology of Microorganisms Laboratory

**TEACHING WORKSHOPS AND COURSES COMPLETED**

2019 **Flipped Classroom Workshop.** The Lily Conference, Bethesda, MD.

2019 **Online Course Design Institute**, Ferris State University, Big Rapids, MI. Weeklong course teaching best practices for online education.

2019 **Growing With Canvas.** Online.Comprehensive 10-hour tutorial on all aspects of Canvas LMS.

2019 **Universal Design and Accessibility Workshop.** Ferris State University, Big Rapids, MI. One-day workshop on accessibility in website design.

2019 **YouTube Creator Academy**, Online. 5 hours course on YouTube video creation and channel management.

2018 **EdX 101**, Online. 20-hour course on how to create a Massively Open Online Course (MOOC).

2018 **VideoX**, Online. Five-hour course on educational video production.

2018 **BlendedX**, Online. Five-hour course on design of online and in-person courses.

2014 **Ferris Faculty Center for Teaching and Learning New Faculty Course Design Workshop.** Weeklong professional development program on syllabus creation, learning management systems, course design, diversity and inclusion, assessment, and reflective teaching.

**TEACHING PRESENTATIONS**

1. **DeFraia C.** Video Production for the University Course. Essentials of Online Teaching-Virtual Symposium. Ferris State University, Grand Valley University, Central Michigan University, Michigan Tech University, University of Michigan-Dearborn. 2019.

**LEARNING MANAGEMENT SYSTEMS**

Blackboard, Canvas, EdX Studio, Mastering Biology, YouTube Studio.

**RESEARCH EXPERIENCE**

2014-Present\* **Ferris State University, Big Rapids, MI.**

Principle Investigator

Research area: Plant Genetics

\*Suspended research program while Faculty-in-Residence at E-learning Office (Fall 2019), and continue suspension due to Covid-19.

2013-2014 **Ohio State University, Columbus, OH.**

*Postdoctoral Researcher*

Research topic: Architecture and movement of the nucleus

2010-2013 **Ohio State University, Columbus, OH.**

*Postdoctoral Fellow*

Research topic: Epigenetic silencing of transposable elements

2005-2010  **University of Florida, Gainesville, FL.**

*Graduate Research Fellow*

Research topic: Identification and characterization of disease resistance genes in plants.

2004-2005 **Rutgers University, New Brunswick, NJ.**

*Undergraduate Research Fellow*

Research topic: Identification and sequencing of an arsenic respiration gene from a novel bacterium.

2003 **Rutgers University, New Brunswick, NJ.**

*Undergraduate Researcher*

Research topic: Histidine Biosynthesis in *Arabidopsis thaliana*

**Undergraduate Mentoring**

Fall 2019 **Gregory Harmon**, Biology Education Major.

Independent Study: Production of an Online Learning Module and Videos for Photosynthesis in High School Biology

Fall 2019 **Archie Burbank**, Biology Education Major.

Independent Study: Production of an Online Learning Module and Videos for Organelle Structure and Function in High School Biology

2015-2017  **Jordan Lee,** Undergraduate Researcher, Ferris State University

Research topic: Characterization of flowering time genes.

Currently a PhD student at Baylor University

2014-2018 **Amanda Kruse**, Undergraduate Researcher, Ferris State University

Research topic: Isolation of plant development mutants.

Currently a student at the Michigan College of Optometry

2014-2018 **Paige Kramer**, Undergraduate Researcher, Ferris State University

Research topic: Isolation of plant development mutants.

Currently a medical student at Michigan State University

2013-2014 **Anisa Moussa**, Undergraduate Researcher, Ohio State University

Research topic: Isolation of nuclear membrane mutants.

2011-2013 **Erica Thomas**, Undergraduate Researcher, Ohio State University

Research topic: Production of mutant plants with active transposons

Received PhD in molecular biology at the University of Missouri

2010-2011 **Jennifer Bosse**, Undergraduate Researcher, Ohio State University

Research topic: Genotyping of plant transposon silencing mutants

Currently Lead Research Technician at OSU Wexner Medical

2008 **Mallory Bembry**, NSF REU Undergraduate Research Fellow, University of Florida

Research topic: Genetic analysis of an immunocompromised mutant

Obtained B.S. in Plant Biotechnology from Fort Valley University

2007-2010 **George Marek**, Undergraduate Researcher, University of Florida

Research topic: Isolation of immunocompromised mutant plants using a bacterial sensor

Obtained B.S. in Microbiology from the University of Florida

Obtained an MD-PhD from the University of Florida

**Research Publications**

1. Martinez G, Wolff P, Wang Z, Moreno-Romero J, Santos-González J, Conze LL,

**DeFraia C**, Slotkin RK, Köhler C. Paternal easiRNAs regulate parental genome

dosage in Arabidopsis. Nat Genet. Feb;50(2):193-198. (2018).

2. **DeFraia, C,** & Slotkin, R. K. (2014). Analysis of retrotransposon activity in plants. Methods in Molecular Biology (Clifton, NJ), **1112**, 195–210.

3. **DeFraia C\***, Wang Y\*, and Mou Z. (2013). The histone acetyltransferase activity of Elongator subunit 3 is essential for its role in plant immunity. BMC Plant Biology. **13**:102. (2013). \*Indicates equal contribution.

4. Nuthikattu S, McCue AD, Panda K, Fultz D, **DeFraia** **C**, Thomas EN, Slotkin RK. The initiation of epigenetic silencing of active transposable elements is triggered by RDR6 and 21-22 nucleotide small interfering RNAs. *Plant Physiol.* May;**162(1)**:116-31. (2013).

5. **DeFraia, C** and Mou, Z. The role of the Elongator complex in plants. *Plant Signal Behav* 6 (2). (2011).

6. **DeFraia C**, Zhang X, and Mou Z. Elongator subunit 2 is an accelerator of immune responses in *Arabidopsis thaliana*. *Plant J****.*** 64 (3):511–523. (2010).

7. Xiong Y, **DeFraia C**, Williams D, Zhang X, and Mou Z. Deficiency in a cytosolic ribose-5-phosphate isomerase causes chloroplast dysfunction, late flowering and premature cell death in Arabidopsis.*Physiol Plant* **137**: 249–263. (2009).

8. Xiong Y, **DeFraia C**, Williams D, Zhang X, Mou Z. Characterization of Arabidopsis 6-phosphogluconolactonase T-DNA insertion mutants reveals an essential role for the oxidative section of the plastidic pentose phosphate pathway in plant growth and development. *Plant Cell Physiol* **50** (7): 1277–1291. (2009).

9. **DeFraia C**, Schmelz E, and Mou Z.A rapid biosensor-based method for quantification of free and glucose-conjugated salicylic acid. *Plant Methods* **4**, 28. (2008).

10. Zhang X, Xiong Y, **DeFraia C**, Schmelz E, and Mou Z. The Arabidopsis MAP Kinase Kinase 7: A crosstalk point between auxin signaling and defense responses? *Plant Signal Behav* **3**, 272-274. (2008).

11. Zhang X, Dai Y, Xiong Y, **DeFraia** **C**, Li J, Dong X, and MouZ. Overexpression of Arabidopsis *MAP Kinase Kinase 7* leads to activation of plant basal and systemic acquired resistance. *Plant Journal* **52**, 1066-1079. (2007).

12. Perez-Jimenez J, **DeFraia C**, Young L.Arsenate respiratory reductase gene (*arrA*) for *Desulfosporosinus* sp. strain Y5. *Biochem Biophys Res Commun* Dec **16**:(2):825-9 **(**2005).

**RESEARCH ABSTRACTS**

1. Amanda Kruse and **Christopher DeFraia**. “Characterization of Leaf Development Genes in *Arabidopsis thaliana*” Ferris State University Student Research Fellowship Symposium. Big Rapids, MI. (2015)

2. Paige Kramer, Amanda Kruse, and **Christopher DeFraia**. “An Arabidopsis Mutant with Drought Hypersensitivity” Ferris State University Student Research Fellowship Symposium. Big Rapids, MI. (2016)

3. Paige Kramer, Amanda Kruse, and **Christopher DeFraia**. “An Arabidopsis Mutant with Drought Hypersensitivity” West Michigan Regional Undergraduate Science Research Conference. Grand Rapids, MI. (2017)

4. **DeFraia C**. and Slotkin RK. “Transgenerational Epigenetic Silencing of Transposable Elements in Arabidopsis Pollen.” Ohio State University Comprehensive Cancer Center Symposium. Columbus, OH. (2013).

5. **DeFraia C**. and Slotkin RK. “Epigenetic Silencing of Transposons by sRNAs in Arabidopsis*.*” Ohio State University Comprehensive Cancer Center Symposium. Columbus, OH. (2013).

6. **DeFraia C**., McCue A., and Slotkin, RK. “Transgenerational activation of transposable elements in Arabiodopsis.” Cell Symposia: Epigenetics and the Inheritance of Acquired States. Boston, MA. (2011).

7. **DeFraia C**., Zhang X., Mou., Z."A genetic screen for suppressors of *npr1*-mediated SA toxicity identifies a novel positive regulator of salicylic acid-mediated immunity.” 21st International Conference on Arabidopsis Research. Yokohama, JP. (2010).

8. **DeFraia C**. and Mou Z. "A rapid and biosensor-based method for quantification of free and glucose-conjugated salicylic acid." 19th International Conference on Arabidopsis Research. Montreal, CA. (2008).

9. **DeFraia C**. and Mou Z. "Suppressor mutants of *npr1* restore salicylic acid tolerance and pathogen resistance in Arabidopsis thaliana." Florida Genetics. Gainesville, FL. (2007).

**Professional memberships and service**

2018-Present Member-Genetics Society of America

2006-Present Member, American Association for the Advancement of Science

2013 Manuscript Reviewer, Public Library of Science (PLOS) Genetics

2012 Manuscript Reviewer, The Plant Cell

**UNIVERSITY SERVICE**

2020-2021 **Member**, Institutional Biosafety Committee

2018-2020 **Member**, Promotion and Merit Committee

2018-Present **Lead Advisor**, Biology: Pre-Medicine Major

2015-2018 **Advisor**, Biology: Pre-Medicine Major

2017-Present **Faculty Advisor,** Ferris State University Pre-Med/Pre-PA Club

2016-2018 **Member,** Ferris Distinguished Teacher Award Committee

2016-2018 **Member,** Ferris University Radiation Safety Committee

2015-2016 **Member**, Ferris University Research Committee

2015-2018 **Member**, Biology Department Curriculum Committee.

2010 **Poster Judge**, University of Florida Undergraduate Research Symposium.

2006-2007 **Graduate Representative**, University of Florida Career Fair. Discussed graduate school and career opportunities with undergraduates.

2005-2006 **Chair**, Invited Speaker Committee for Microbiology and Cell Sciences, University of Florida.

**Scientific Literacy and Outreach**

2012-2013 **Co-Instructor,**Young Scholars Program, 7th grade biology. Taught 7th grade students the scientific method through plant biology experiments

2008 **Panel Member**, Café Scientifique. Discussed transgenic plants and genetically modified organisms in a public forum.

2007 **Presenter**, Sunbelt Agricultural Expo. Discussed the state of plant disease resistance research with farmers and the public.

**LABORATORY SKILLS**

Real time PCR, confocal and fluorescence microscopy, microarray analysis, northern blot, fluorescence-activated cell sorting, genetic screening, map-based cloning, construction of transgenic plants, Arabidopsis husbandry, pollen isolation and assays, next-generation sequencing, western blot, yeast two-hybrid, recombinant protein expression and purification, bisulfite sequencing, chromatin immunoprecipitation, enzyme activity assays, subcellular fractionation, HPLC, DNA and protein sequence analysis, microarray data analysis, Graphpad Prism, ImageJ, Galaxy/Bowtie (analysis of genomic deep sequencing data).