



Jonathan Nesbit Fitz Gerald

Rhodes College
Department of Biology
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Education:

2002 **University of Chicago** Ph. D. Molecular Genetics and Cell Biology
1991 **University of California at Irvine** B. S. Biology

Present Position:

Associate Professor of Biology, Rhodes College, Memphis TN

Research Experience:

- 2003-2007 Post-Doctoral Fellow, Temasek Lifesciences Laboratory
began at the Ecole Normale Supérieure, Lyon France (2003-2004)
Department of Chromatin and Reproduction
Supervisor: Dr. Frédéric Berger
Project: Analysis of altered seed development in mutants of the Arabidopsis formin, AtFH5. Genetic analysis of interactions between AtFH5 and Polycomb group complexes. Isolation and analysis of the novel endosperm development regulator, titus andronicus.
- 2002-2003 Post-Doctoral Fellow, University of Chicago
Department of Molecular Genetics and Cell Biology
Supervisor: Dr. Jocelyn Malamy
Project: Quantitative genetic analysis of lateral root inhibition in response to low water stress. QTL mapping of major effect loci responsible for phenotypic differences in Columbia and Landsberg Arabidopsis thaliana ecotypes.
- 2002 Post-Doctoral Fellow, University of Chicago
Department of Molecular Genetics and Cell Biology
Supervisor: Dr. Stephen Kron
Project: Homology modeling of yeast and mammalian cyclin-dependent kinases and structure based design of CDC28 (yeast CDK) alleles that are restricted in cyclin binding.
- 1997-2002 Graduate Research Assistant, University of Chicago

Department of Molecular Genetics and Cell Biology

Supervisor: Dr. Stephen Kron

Doctoral Thesis: The G1 DNA damage checkpoint in *Saccharomyces cerevisiae*.

Project: Genetic characterization of G1 DNA damage checkpoint regulation in Saccharomyces cerevisiae. Designed and implemented G1 phase specific DNA damage checkpoint assays.

- 1995-1996 Graduate Research Assistant, University of Chicago
Department of Molecular Genetics and Cell Biology
Supervisor: Dr. Brian Keith
Project: Genetic and morphological characterization of Arabidopsis thaliana cvp mutants that display embryonic defects in vascular patterning.
- 1995 Summer Intern, Abbott Laboratories, North Chicago IL
Supervisor: Dr. Charles Hutchins
Project: Structural modeling and analysis of A. thaliana enzymes based on X-ray crystal structures from homologous proteins. Developed a database of potential small molecule inhibitors of chorismate mutase based on modeled active site.
- 1994 Laboratory Technician, University of Chicago
Department of Ecology and Evolution
Supervisor: Dr. Deborah Charlesworth
Project: Study of evolutionary mechanisms for development of sexual dimorphism using cytogenetic and molecular genetic analysis of Silene alba.
- 1990-1991 Undergraduate Research Assistant, University of California at Irvine
Laboratory of Phytochemistry and Toxicology
Supervisor: Dr. Eloy Rodriguez
Project: Characterization of a ring expansion reaction in a secondary metabolite from the Guyule Rubber Plant. Isolation and identification of toxic compounds from the Brazilian Pepper Tree.

Teaching Experience:

- 2007-Present Assistant Professor, Rhodes College
Courses: Biology I, Biology I lab, Mechanisms of Development, Animal Development, Genetics, Senior Seminar: Stem Cells and Regeneration, Senior Seminar: Seeds, Plant Genetics and Diversity, Senior Seminar: Metamorphosis, Senior Seminar: Evolution of Multicellularity
- 2003-2005 Guest Lecturer, Cold Spring Harbor Summer Courses
“Molecular Approaches in Plant Science”
As an assistant to Dr. Jocelyn Malay, ran a lab section in QTL mapping. Independently conducted a workshop in biostatistics and QTL analysis.
- 2001-2002 Guest Lecturer, Pritzker Medical School, University of Chicago
“Rational Drug Design”

- 2000-2001 Teaching Assistant, University of Chicago
 “Molecular Biology II”
Assisted Dr. Steve Kron in an innovative course for freshman biology majors incorporating weekly journal articles, interviews with the authors and oral presentations. Lab sections were coordinated with the authors and included experiments from the weekly paper.
- 1997 Teaching Assistant, University of Chicago
 “Development”
Assisted in a summer course for high school biology teachers. I gave three lectures on plant development.
- 1996 Teaching Assistant, University of Chicago
 “Introduction to Genetics”
A course for non-majors where I assisted Dr. Ed Garber, ran lab sessions and taught a mini-course in genetic analysis.
- 1992-1993 Assistant Head of Science Department
 Matshekge Hill Senior Secondary, Bobonong Botswana
Taught Cambridge O-level Biology and Combined Sciences in a school of 750 students. Assisted Dr. James Banda with running of department, organizing curriculum and preparation of exams.

Awards and Fellowships:

- 2019 “Integrating Meaningful Practices with Access to Computational Thinking: Towards Increasing the Academic and Career Success of STEM Students” Betsy Sanders, Jonathan Fitz Gerald, Mauricio Cafiero, Katherine White NSF Division Of Undergraduate Education (DUE-1930377) \$650,000
- 2019 “Urban Teacher Partnership for Culturally Relevant STEM Education” Zachary A. Casey, Dana A. Horgen, Christopher W. Seaton, Jonathan N. Fitz Gerald NSF Robert Noyce Teacher Scholarship Program, Division of Undergraduate Education (DUE-1852661) \$1,168,344
- 2013 “RUI-Identification of Genes and Cellular Processes Targeted by Imprinted Pathways in Natural Variants of Arabidopsis thaliana” Jonathan Fitz Gerald (PI) NSF Molecular and Cellular Biosciences Program, Genetic Mechanisms Division (MCB-1244101) \$412,000
- 2010 CAP Mellon Study Leave Program
- 2008, 2009, 2011, 2012, 2019,2020 Faculty Development Endowment, Rhodes College
- 2008, 2010, 2013 Hill Fund Recipient, Rhodes College
- 2003 “Genetic Analysis of Arabidopsis Seed Endosperm Development” Jonathan Fitz Gerald (PI) NSF International Research Fellowship (IRFP-0301886) \$98,173.00
- University of Chicago Dean's Merit Scholar
- Molecular and Cellular Biology NIH Training Grant

Peer-Reviewed Publications: († denotes undergraduate authors)

A.G. Gardner, J.N. Fitz Gerald, J. Menz†, K.A. Shepard, D.G. Howarth and R.S. Jabaily, "Characterizing floral symmetry in the core Goodeniaceae with geometric morphometrics." **PLoS One**. 11(5): e0154736 doi:10.1371/journal.pone.0154736 (2016)

J.N. Fitz Gerald, A.L. Carlson, E. Smith, J. Maloof, D. Weigel, J. Chory, J.O. Borevitz and R.J. Swanson, "New Arabidopsis advanced intercross recombinant inbred lines (Van-0 X Col-0) reveal female control of nonrandom mating." **Plant Physiol**. 165(1): 175-185 (2014)

A.W. Truman, A.A. Kitazono, J.N. Fitz Gerald and S.J. Kron, "Cell Cycle: Regulation by Cyclins." In: **Encyclopedia of Life Sciences**, John Wiley & Sons, Ltd: Chichester (2012)

A.L. Carlson, J.N. Fitz Gerald, M. Telligman†, M. Roshanmanesh and R.J. Swanson, "Defining the genetic architecture underlying female- and male-mediated nonrandom mating and seed yield traits in Arabidopsis." **Plant Physiol**. 157(4):1956-64. (2011)

J.N. Fitz Gerald, S.H. Poh† and F. Berger, "Polycomb group dependent imprinting of the actin regulator *AtFH5* in *Arabidopsis thaliana* regulates morphogenesis." **Development**, 136 (20):3399-3404 (2009)

J.N. Fitz Gerald, M. Luo, A. Chaudhury and F. Berger, "DNA methylation causes predominant maternal controls of plant embryo growth." **PLoS ONE** 3(5):e2298. doi:10.1371/journal.pone.0002298 (2008)

F. Berger, J.N. Fitz Gerald and M. Ingouff, "*Arabidopsis* as a model for understanding basics of endosperm development." Book chapter in **Endosperm: Developmental and Molecular biology**, edited by O. A. Olsen. Springer-Verlag Berlin Heidelberg 91-110(2007)

J.N. Fitz Gerald, M.D. Lehti-Shiu, P.A Ingram, K.I. Deak, T. Biesiada and J.E. Malamy, "Identification of quantitative trait loci that regulate Arabidopsis root system size and plasticity." **Genetics** 172(1): 485-498 (2006)

M. Ingouff, J.N. Fitz Gerald*, C. Guerin, H. Robert, M.B. Sorensen, D. Van Damme, D. Geelen, L. Blanchoin and F. Berger, "Plant formin *AtFH5* is an evolutionary conserved actin nucleator involved in cytokinesis." **Nature Cell Biology** 7(4): 374-380 (2005) (*co-first author)

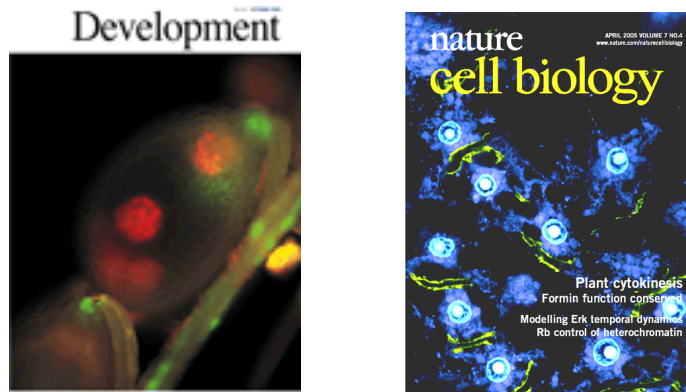
D. Garcia, J.N. Fitz Gerald and F. Berger, "Maternal control of integument cell elongation and zygotic control of endosperm growth are coordinated to determine seed size in Arabidopsis." **Plant Cell** 17(1): 52-60 (2005)

J.N. Fitz Gerald, J.A. Benjamin† and S.J. Kron, "Robust G1 checkpoint arrest in budding yeast: Dependence on DNA damage signaling and repair," **Journal of Cell Science**, 115: 1749-1757 (2002)

S.H. Ahn, B.R. Tobe, J.N. Fitz Gerald, S.R. Anderson[†], A. Acurio and S.J. Kron, "Enhanced cell polarity in mutants of the budding yeast cyclin-dependent kinase Cdc28p," **Molecular Biology of the Cell**, 12: 3589-3600 (2001)

F.M. Carland, B.L. Berg, J.N. FitzGerald, S. Jinamornphongs[†], T. Nelson and B. Keith "Genetic regulation of vascular tissue patterning in Arabidopsis." **Plant Cell** 11(11): 2123-37 (1999)

Journal Covers:



Invited Talks and Presentations:

"Genetic and cellular architecture of parentally biased seed size determinants." Oral Presentation at the Population, Evolution and Quantitative Genetics Meeting of the Allied Genetics Conference, Orlando FL (2016)

"Natural variation in Arabidopsis *AtFH5* expression indicates an adaptive role for Polycomb regulation of the seed endosperm." Small talk at the International Conference on Arabidopsis Research, Vancouver, BC, Canada (2014)

"Applying inquiry-based strategies to reinforce integration of disciplines in an evo-devo course" Oral Presentation at the Society of Developmental Biologist Regional Meeting, Nashville TN (2013)

"Examining parental conflict as a mechanism for the epigenetic regulation of seed development in Arabidopsis." Invited speaker, University of Miami (2012)

"Characterization of parentally-biased events during the development of the Arabidopsis seed endosperm using native autofluorescence" Oral Presentation at the International Conference on Arabidopsis Research, Vienna, Austria (2012)

"Characterization of parentally-biased events during the development of the *Arabidopsis thaliana* seed endosperm using native autofluorescence." Oral presentation and the Society of Developmental Biology regional meeting, St. Jude's Research Hospital, Memphis (2012)

"The Polycomb target *AtFH5*, an Arabidopsis formin homolog, as a potential realizator of seed size variation through parental genomic imprinting." Invited speaker, University of Chicago (2011)

“Polycomb-dependent parental imprinting of the Arabidopsis formin homolog, *AtFH5*.” Invited speaker, University of Memphis (2010)

“Polycomb regulates endosperm structure through parental and regional silencing of the Arabidopsis formin *AtFH5*: developmental and evolutionary perspectives.” Invited speaker at ENS RDP, Lyon France (2009)

“Direct regulation of an actin nucleating formin by Polycomb: a link between pattern and morphogenesis”. Oral presentation at the EMBO Conference on Chromatin and Epigenetics, EMBL Heidelberg, Germany (2007)

“Root system diversity links drought sensing with developmental plasticity”. Oral presentation at 14th International Conference on Arabidopsis Research, Madison WI, (2003)

“Essential roles for *S. cerevisiae* cyclin-dependent kinase in DNA damage checkpoint arrest”. Oral presentation at ASM DNA damage and repair, Hilton Head SC, (1999)

Abstracts from Undergraduate Researchers (presenter underlined):

“Dissecting the regulation of imprinted gene targets using natural ascensions of *Arabidopsis thaliana*.” Lauren Hamm, Matthew Smith and Jonathan Fitz Gerald. Poster presentation at the International Conference on Plant Science in Valencia, Spain (2019)

“The *Arabidopsis* chromatin remodeling proteins demonstrates a novel parental effect on seed size and genomic imprinting.” Meghan Hansen, Madeleine Mabante and Jonathan Fitz Gerald. Poster presentation at the International Conference on Plant Science in Valencia, Spain (2019)

“Using natural variation in *Arabidopsis thaliana* to describe the role of Parental Conflict in seed size and robustness.” Nuanqiu Hou, Ashley Bruneau and Jonathan Fitz Gerald. Poster presentation at the International Conference on Plant Science in Valencia, Spain (2019)

“Using natural variation to uncover potentially adaptive transcriptional networks in *Arabidopsis thaliana* seed size regulation.” Dexter Griffin and J.N. Fitz Gerald. Poster presented at GARNet’s Natural Variation Conference. Cambridge, UK (2016)

“Dissecting the regulation of imprinted gene targets using natural ascensions of *Arabidopsis thaliana*.” Matthew Smith and J.N. Fitz Gerald. Poster presented at GARNet’s Natural Variation Conference. Cambridge, UK (2016)

“Genetic architecture of parentally-biased seed size determinants.” Jamara Haymore and J.N. Fitz Gerald. Poster presented at 25th Annual International Conference of Arabidopsis Research, Vancouver BC (2014)

“A putative maternal polarity complex for posterior (chalazal) endosperm development in *Arabidopsis*.” Phuong Le, B. Durbin and J.N. Fitz Gerald. Poster presented at 25th Annual International Conference of Arabidopsis Research, Vancouver BC (2014)

“Natural variation in *Arabidopsis AtFH5* expression indicates an adaptive role for Polycomb regulation in the seed endosperm.” Ellen Dahl, D. Altamirano and J.N. Fitz Gerald. Oral presentation at the regional Society of Developmental Biologists meeting, Nashville TN (2013). Best Speaker Award.

“Imprinted expression of polarizing genes in the seed endosperm is subject to natural variation.” Brittany Pope, J. Chan, R. Ishii and J.N. Fitz Gerald. Poster presented at the

22nd Annual International Conference of Arabidopsis Research Madison, Wisconsin (2011)

“Paternal regulation of maternal gene expression may provide an adaptive mechanism in *Arabidopsis thaliana*.” Maria E. Cartagena and J. N. Fitz Gerald. Poster presented at the 20th Annual International Conference of Arabidopsis Research Edinburgh, Scotland (2009)

Synergistic Activities:

Faculty Committees

Committee on Committees, Chair(2019-2020)

Departmental Education Program Assessment Committee, Chair (2016-17)

Institutional Research Board

Academic Advising Committee

FEATS First year Faculty Mentoring committee (2016-2020)

Teaching mentor (2014-2016)

Chaired or participated in multiple job search committees

Additional College Service

Participant in Grant Proposal Writing:

2018,2019 NSF S-STEM proposal

2018 NSF Noyce proposal

2017 HHMI proposal

Department Services

2008, 2011,2018 Director of First term core lab

2012 Co-director of first term core lab

2008-2019 Director of Biology Imaging Center

2011-2019 Supervisor, Advanced Inquiries in Development Fellowship program

Research mentor to 2 students during academic year who showed mastery of developmental biology in Mechanisms of Development and who wished to pursue research in the field.

2009-2019 RSAP Supervisor, Digital Imaging Analysis Technician

Research mentor to student responsible for maintaining Imaging Center and online tutorials. RSAP also acts as TA for courses requiring microscopy. Each RSAP develops their own research.

2015-2019 RSAP Supervisor, Computational Biology

Research mentor to student who produces online computational resources to aid in teaching of biology.

And general activities such as student advising, work on SLOs and chairing an SLO committee, teaching and scholarship mentor to Biology junior faculty

Other Services

2016-19 Shelby County Schools (SCS), In Service training for middle and high school biology teachers

2016 Review Panel, NSF MCB Genetic Mechanisms

2013-2017 SCS, Various elementary school plant science projects at Snowden and Idlewild Elementary schools

Various Grant and Publication reviews