Robert J. Ferl

Distinguished Professor
Assistant Vice President for Research
University of Florida

The Ferl Lab research program is centered on the environmental regulation of gene activity in plants. This central theme has guided activities that have reached out in the directions of fundamental mechanisms of gene expression in plants, plant chromatin, signal transduction and most recently the impacts of the novel environment of spaceflight on how these mechanisms provide adaptive strategies. Spaceflight is an environment completely outside of the evolutionary history of life on earth. Growing plants in space or on another planet to support human colonies requires an understanding of this novel physiological adaptation. Studying the effects of spaceflight allows us to explore limits to the adaptive process and to probe the potential mechanism that can allow life to expand adaptation to novel environmental challenges that will arise here on earth or when we move to other planets.

Academic History

Hiram College B.A.
1972-1976 major: Biology

Indiana University M.A., Ph.D.
1976-1980 major: Biology/Genetics

Appointments

1980-1986, Assistant Professor, Department of Botany, University of Florida
1986-1987, Associate Professor, Department of Botany, University of Florida
1987-1990, Associate Professor, Department of Vegetable Crops
1990-Present, Professor, Horticultural Sciences Department
1986-1987, Acting Chair, Department of Botany, University of Florida
1985-1987, Director, Biological Sciences Teaching Program, University of Florida
1990-1991, Administrative Council, ICBR
1988-1995, Chair, Institutional Biosafety Committee
1988-1996, Director / Advisor of UF ICBR DNA Sequencing Laboratory
1992-1995, Director of UF ICBR BEECS Genetics Laboratory
1994-2006, Assistant Director, ICBR
2001-2007, Director Center for Exploration Life Sciences KSC
2006-2019, Director Interdisciplinary Center for Biotechnology Research UF
2016-Present, Distinguished Professor, University of Florida
2019-Present, Assistant Vice President, UF Research

Selected Honors

Fellow of the American Society for Gravitational and Space Research. 2019
Fellow of the American Association for the Advancement of Science,2018
NASA Exceptional Scientific Achievement Medal, 2016
The American Institute of Aeronautics and Astronautics Jeffries Aerospace Medicine and Life Sciences Research Award, 2016
The American Society for Gravitational and Space Research Founders Award, 2016
Award for Compelling Science on the International Space Station, 2015
Faculty Research Achievement Award 1987, 1989, 1992
UFRF Professorship 1999, 2005
CREES Recognition Award 1997
Distinguished Teaching Award, 1984 College of Liberal Arts and Sciences, UF Teacher of the Year, 1984 Presented by Lambda Gamma Phi Honorary, UF

Narrative

Rob's experimental heritage is the study of gene expression in response to environmental change, and recently that environment has been spaceflight and extraterrestrial habitats. Rob Co-Chairs the Committee on Biological and Physical Sciences in Space for the National Academies of Science, has provided testimony to Congress on space biology and is a past president of the American Society for Gravitational and Space Research. Among his honors are the 2016 NASA Medal of Honor for Exceptional Scientific Achievement and the 2016 AIAA Jeffries Aerospace Medicine and Life Sciences Research Award. While a dedicated lab geek, he enjoys and advocates for the field experiential side of science – he and his lab have flown with their experiments on many parabolic flight and other research aircraft to study aspects of the microgravity environment and develop flight hardware for understanding biological effects of spaceflight. Rob also conducts ground based science on space-related environmental effects on terrestrial biology and works within planetary exploration analogs including the Haughton Mars Project in the Arctic and in Antarctic venues. His lab has had experiments on multiple Space Shuttle missions and International Space Station segments including recent launches and recoveries on with NASA and CASIS that emphasize cross and multi discipline approaches to space research. He has published extensively on the subject of spaceflight biology and extraterrestrial plant growth - and on the fundamentals of moving life off the surface of the earth.

Refereed Publications

1. Zeidler C, Zabel P, Vrakking V, Dorn M, Bamsey M, Schubert D, Ceriello A, Fortezza R, De Simone D, Stanghellini C, Kempkes F, Meinen E, Mencarelli A, Swinkels GJ, Paul A-L, Ferl RJ (2019) *The Plant Health Monitoring System of the EDEN ISS Space Greenhouse in Antarctica During the 2018 Experiment Phase.* Front Plant Sci 10: 1457
2. Zhou M, Sng NJ, LeFrois CE, Paul A-L, Ferl RJ. (2019). *Epigenomics in an extraterrestrial environment: organ-specific alteration of DNA methylation and gene expression elicited by spaceflight in Arabidopsis thaliana.* BMC genomics, 20: 205.
3. Zupanska AK, LeFrois C, Ferl RJ, Paul A-L. (2019). *HSFA2 Functions in the Physiological Adaptation of Undifferentiated Plant Cells to Spaceflight*. International Journal of Molecular Sciences, 20
4. Beisel NS, Noble J, Barbazuk WB, Paul A-L, Ferl RJ. (2019). *Spaceflight-induced alternative splicing during seedling development in Arabidopsis thaliana.* Npj Microgravity, 5: 9.
5. Sng N, Kolaczkowski B, Ferl RJ, Paul A-L (2019) *A New Member of the CONSTANS-Like Protein Family is a Regulator of ROS Homeostasis and Spaceflight Physiological Adaptation.* AoB Plants, 11: ply075.
6. Krishnamurthy A, Ferl RJ, Paul A-L, (2018) *Comparing RNA-Seq and microarray gene expression data in two zones of the Arabidopsis root apex relevant to spaceflight.* Applications in Plant Sciences Applications in Plant Sciences, 6: e01197
7. Califar BM, Tucker R, Cromie J, Sng N, Schmitz RA, Callaham JA, Barbazuk B, Paul A-L, Ferl RJ. 2018. *Approaches for Surveying Cosmic Radiation Damage in Large Populations of Arabidopsis thaliana Seeds – an Antarctic Example.* Gravitational and Space Research, 6: 54-73
8. Beisel N, Callaham J, Sng N, Taylor DJ, Paul A-L, Ferl RJ (2018) *Utilization of Single-Image Normalized Differential Vegetation Index (SI-NDVI) for Early Plant Stress Detection*. Applications in Plant Sciences 6: e01186
9. Sng, N., A.-L. Paul, and R. J. Ferl. (2018). *Phenotypic characterization of an Arabidopsis T-DNA insertion line SALK*_063500. Data in Brief 18: 913-919.
10. Schultz ER, Zupanska AK, Sng NJ, Paul A-L, Ferl RJ (2017) *Skewing in Arabidopsis roots involves disparate environmental signaling pathways*. BMC Plant Biol 17: 31
11. Paul A-L, Sng NJ, Zupanska AK, Krishnamurthy A, Schultz ER, Ferl RJ (2017) *Genetic dissection of the Arabidopsis spaceflight transcriptome: Are some responses dispensable for the physiological adaptation of plants to spaceflight?* PLoS One 12: e0180186
12. Zhou M, Callaham JB, Reyes M, Stasiak M, Riva A, Zupanska AK, Dixon MA, Paul A-L, Ferl RJ (2017) *Dissecting Low Atmospheric Pressure Stress: Transcriptome Responses to the Components of Hypobaria in Arabidopsis*. Front Plant Sci 8: 528
13. Paul A-L, Zhou M, Callaham JB, Reyes M, Stasiak M, Riva A, Zupanska AK, Dixon MA, Ferl RJ (2017) *Patterns of Arabidopsis gene expression in the face of hypobaric stress*. AoB Plants 9: plx030-plx030

14. Zhou M, Paul A-L, Ferl RJ (2017) *Data for characterization of SALK_084889, a T-DNA insertion line of Arabidopsis thaliana.* Data Brief 13: 253-258
15. Zupanska AK, Schultz ER, Yao J, Sng NJ, Zhou M, Callaham JB, Ferl RJ, Paul A-L (2017) *ARG1 Functions in the Physiological Adaptation of Undifferentiated Plant Cells to Spaceflight*. Astrobiology 17: 1077-1111.LeFrois C. E., Zhou M., Amador D. M., Sng N., Paul A.-L., and Ferl R. J. (2016) *Enabling the Spaceflight Methylome: DNA Isolated from Plant Tissues Preserved in RNAlater™ Is Suitable for Bisulfite PCR Assay of Genome Methylation.* Gravitational and Space Research 4: 28-37
16. Schultz E. R., Paul A.-L., and Ferl R. J. (2016*) Root Growth Patterns and Morphometric Change Based on the Growth Media.* Microgravity Sci Tec: 1-11.
17. Ferl R.J., Paul A-L. (2016) *The effect of spaceflight on the gravity-sensing auxin gradient of roots: GFP reporter gene microscopy on orbit.* Npj Microgravity 2: 15023
18. Paul A-L., Ferl R.J. (2015) *Spaceflight exploration in plant gravitational biology. Methods in molecular biology* 1309: 285-305
19. Ferl R.J., Koh J., Denison F., Paul A-L. (2015) *Spaceflight Induces Specific Alterations in the Proteomes of Arabidopsis.* Astrobiology 15: 32-56 (and cover article)
20. Gokirmak T., Denison F.C., Laughner B.J., Paul A-L., Ferl R.J. (2015) *Phosphomimetic mutation of a conserved serine residue in Arabidopsis thaliana 14-3-3omega suggests a regulatory role of phosphorylation in dimerization and target interactions*. Plant physiology and biochemistry : PPB / Societe francaise de physiologie vegetale 97: 296-303
21. Bamsey M.T., Paul A-L., Graham T., Ferl R.J. (2014) *Flexible imaging payload for real-time fluorescent biological imaging in parabolic, suborbital and space analog environments.* Life Sciences in Space Research 3: 32-44
22. Ferl R.J. (2014) *Suborbital Vehicles to Study Transition Adaptation to Spaceflight – Why Biologists Should Care About the New Suborbital Flight Opportunities.* Gravitational and Space Research 2: 58-65
23. Parsons-Wingerter P, Vickerman MB, Paul A-L, Ferl R.J. (2014) *Mapping by VESGEN of Leaf Venation Patterning in Arabidopsis with Bioinformatic Dimensions of Gene Expression.* Gravitational and Space Research 2: 68-81
24. Sng N., Callaham J., Ferl R.J., Paul A-L. (2014) *Arabidopsis thaliana for spaceflight applications - preparing dormant biology for passive stowage and on orbit activation*. Gravitational and Space Research 2: 81-89
25. Denison, F.C., T. Gokirmak, and R.J. Ferl, *Phosphorylation-related modification at the dimer interface of 14-3-3omega dramatically alters monomer interaction dynamics.* Archives of Biochemistry and Biophysics, 2014. 541: p. 1-12.
26. Zupanska, A.K., F.C. Denison, R.J. Ferl, and A-L. Paul, *Spaceflight engages heat shock protein and other molecular chaperone genes in tissue culture cells of Arabidopsis thaliana.* Am J Bot, 2013. 100(1): p. 235-48.
27. Schultz, E.R., K.L. Kelley, A-L. Paul, and R.J. Ferl, *A Method for Preparing Spaceflight RNAlater- Fixed Arabidopsis thaliana(Brassicaceae) Tissue for Scanning Electron Microscopy.* Applications in Plant Sciences, 2013. 1(8): p. 1300034.
28. Paul, A-L., A.K. Zupanska, E.R. Schultz, and R.J. Ferl, *Organ-specific remodeling of the Arabidopsis transcriptome in response to spaceflight.* BMC plant biology, 2013. 13: p. 112.
29. Paul, A-L., R.M. Wheeler, H.G. Levine, and R.J. Ferl, *Fundamental plant biology enabled by the space shuttle.* Am J Bot, 2013. 100(1): p. 226-34.

30. Denison, F.C., T. Gokirmak, and R.J. Ferl, *Phosphorylation-related modification at the dimer interface of 14-3-3omega dramatically alters monomer interaction dynamics.* Archives of Biochemistry and Biophysics, 2013. 541C: p. 1-12.
31. Abboud, T., A. Berinstain, M. Bamsey, R.J. Ferl, A-L. Paul, T. Graham, M.A. Dixon, D. Leonardos, Stasiak, and R. Noumeir, *Multispectral Plant Health Imaging System for Space Biology and Hypobaric Plant Growth Studies.* Insciences Journal, 2013. 03(03): p. 24-44.
32. Abboud, T., M. Bamsey, A-L. Paul, T. Graham, S. Braham, R. Noumeir, A. Berinstain, and R.J. Ferl, *Deployment of a fully-automated green fluorescent protein imaging system in a high arctic autonomous greenhouse.* Sensors (Basel), 2013. 13(3): p. 3530-48.
33. Schultz, E.R., A. Zupanska, S. Manning-Roach, J. Camacho, A-L. Paul, and R.J. Ferl, *Testing the Bio-compatibility of Aluminum PDFU BRIC Hardware.* Gravitational and Space Biology, 2012. 26(2): p. 48-63.
34. Paul, A-L., A.K. Zupanska, D.T. Ostrow, Y. Zhang, Y. Sun, J.L. Li, S. Shanker, W.G. Farmerie, C.E. Amalfitano, and R.J. Ferl, *Spaceflight transcriptomes: unique responses to a novel environment.* Astrobiology, 2012. 12(1): p. 40-56.
35. Paul, A-L., F.C. Denison, E.R. Schultz, A.K. Zupanska, and R.J. Ferl, *14-3-3 phosphoprotein interaction networks - does isoform diversity present functional interaction specification?* Front Plant Sci, 2012. 3: p. 190.
36. Paul, A-L., C.E. Amalfitano, and R.J. Ferl, *Plant growth strategies are remodeled by spaceflight.* BMC Plant Biol, 2012. 12(1): p. 232.
37. Mayfield, J.D., A-L. Paul, and R.J. Ferl, *The 14-3-3 proteins of Arabidopsis regulate root growth and chloroplast development as components of the photosensory system.* J Exp Bot, 2012. 63(8): p. 3061-70.
38. Paul, A-L., M.S. Manak, J.D. Mayfield, M.F. Reyes, W.B. Gurley, and R.J. Ferl, *Parabolic flight induces changes in gene expression patterns in Arabidopsis thaliana.* Astrobiology, 2011. 11(8): p. 743-58.
39. Paul, A-L. and R.J. Ferl, *Using Green Fluorescent Protein (GFP) Reporter Genes in RNAlater™ Fixed Tissue.* Gravitational and Space Biology, 2011. 25(1): p. 40-43.
40. Ferl, R.J., A. Zupanska, A. Spinale, D. Reed, S. Manning-Roach, G. Guerra, D.R. Cox, and A-L. Paul, *The performance of KSC Fixation Tubes with RNALater for orbital experiments: A case study in ISS operations for molecular biology.* Advances in Space Research, 2011. 48(1): p. 199-206.
41. Denison, F.C., A-L. Paul, A.K. Zupanska, and R.J. Ferl, *14-3-3 proteins in plant physiology.* Semin Cell Dev Biol, 2011. 22(7): p. 720-7.
42. Visscher, A., A-L. Paul, M. Kirst, C. Guy, A. Schuerger, and R.J. Ferl, *Growth performance and root transcriptome remodeling of Arabidopsis in response to Mars-like levels of magnesium sulfate.* PLoS One, 2010. 5(8): p. e12348.
43. Visscher A., A-L Paul, M Kirst, CL Guy, AC Schuerger, and R.J. Ferl (2010) *Responses of wildtype arabidopsis and ion transporter mutants to high levels of magnesium sulfate; consequences for (extra)terrestrial plant growth.* PLoS One 5(8): e12348
44. Gökirmak, T., A-L. Paul, and R.J. Ferl, *Plant phosphopeptide-binding proteins as signaling mediators.* Curr Opin Plant Biol, 2010. 13(5): p. 527-32.
45. Ferl, R.J. and A-L. Paul, *Lunar plant biology--a review of the Apollo era.* Astrobiology, 2010. 10(3): p. 261-74.
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S. Xiao, *Arabidopsis 14-3-3 lambda is a positive regulator of RPW8-mediated disease resistance.* Plant J, 2009. 60(3): p. 539-50.

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48. Paul, A-L., L. Liu, S. McClung, B. Laughner, S. Chen, and R.J. Ferl, *Comparative interactomics: analysis of arabidopsis 14-3-3 complexes reveals highly conserved 14-3-3 interactions between humans and plants.* J Proteome Res, 2009. 8(4): p. 1913-24.
49. Bamsey, M., A. Berinstain, T. Graham , P. Neron, B. S., R. Giroux, R.J. Ferl, A-L. Paul, and M.A. Dixon, *Developing strategies for automated remote plant production systems: Environmental control and monitoring of the Arthur Clarke Mars Greenhouse in the Canadian High Arctic.* Advances in Space Research, 2009. 44: p. 1367-1381.
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51. Folta, K.M., A-L. Paul, J.D. Mayfield, and R.J. Ferl, *14-3-3 isoforms participate in red light signaling and photoperiodic flowering.* Plant Signaling and Behavior, 2008. 3: p. 304-306.
52. Paul A-L, K.M. Folta, R.J. Ferl, *14-3-3 Proteins, red light, and photoperiodic flowering: A point of connection?* Plant Signaling and Behavior, 2008. 3(8) ISSN: 1559-2324
53. Sabina, R.L., A-L. Paul, R.J. Ferl, B. Laber, and S.D. Lindell, *Adenine nucleotide pool perturbation is a metabolic trigger for AMP deaminase inhibitor-based herbicide toxicity.* Plant Physiol, 2007. 143(4): p. 1752-60.
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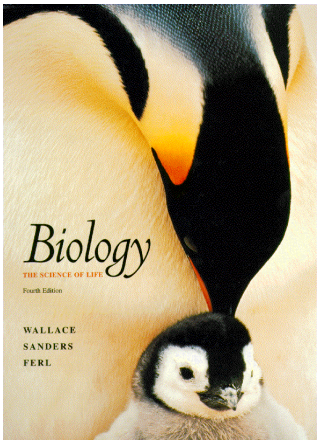
Books

1. Paul, A-L. and R.J. Ferl. 2000. Genome Organization and Expression. In: Biochemistry and Molecular Biology of Plants. Buchanan, Gruissem and Jones eds. American Association of Plant Physiologists 1,316 pages total, 46 pages in chapter.

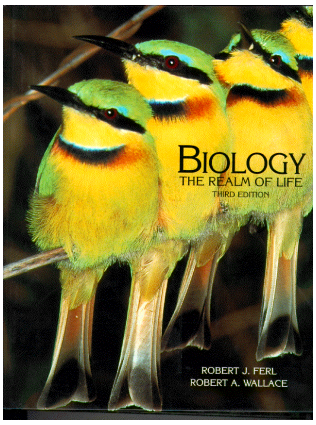
    - This textbook was regarded as the premiere advanced textbook in the field and the reference is listed here among books, rather than as a book chapter below, to reflect the effort and effect that this contribution has had in the textbook community.

2. Wallace, R., J. Sanders and R.J. Ferl. 1996. BIOLOGY: The Science of Life, 4th Edition. Harper Collins Publishers. 1,047 pages.



- This book is the biology majors text resulting from the collaboration with Bob Wallace and Jerry Sanders. While this and the non-majors text Biology: The Realm of Life did very well, the untimely death of co-author Bob Wallace basically signaled the end of the series.

3. Ferl, R.J. and R. Wallace. 1995. BIOLOGY: The Realm of Life, 3rd Edition. Harper Collins Publishers. 876 pages.



- I was the primary author on this book, ultimately responsible for every word and every illustration. This text was aimed at non-majors biology students and is my personal favorite.

4. Wallace, R., J. Sanders and R.J. Ferl. 1991. BIOLOGY: The Science of Life, 3rd Edition. Harper Collins Publishers. 1,341 pages.

Book Chapters

1. Brown, C., et al., *Plants for space exploration*, in *Plant Tropisms*, S. Gilroy and P. Masson, Editors. 2008, Blackwell Publishing: Ames, IA. p. 183-195.

2. Paul, A-L., et al., *Strong magnetic field induced changes of gene expression in Arabidopsis*, in *Materials Processing in Magnetic Fields*, H.J. Schneider-Muntau and H. Wada, Editors. 2005, World-Scientific: Singapore. p. 238-242.
3. Paul, A-L. and R.J. Ferl, *Gene expression in space biology experiments*, in *Plant Biotechnology 2002 and Beyond.*, I.K. Vasil, Editor. 2003, Kluwer Academic Press. p. 342-347.
4. Paul, A-L. and R.J. Ferl, *Molecular aspects of stress-gene regulation during spaceflight*. 2002, NASA Technical Reports Server.
5. Ferl, R.J., et al., *Plant adaptation to low atmospheric pressures potential molecular responses*. 2002, NASA Technical Reports Server.
6. Sehnke, P.C. and R.J. Ferl, *14-3-3 proteins: Effectors of enzyme function*, in *Protein:Protein Interactions in Plant Biology.*, McManus, Laing, and Allan, Editors. 2001.
7. Ferl, R.J. and A-L. Paul, *Genome organization and expression*, in *Biochemistry and Molecular Biology of Plants*, W.G. B. Buchanan, R. Jones, Editor. 2000, American Society of Plant Physiologists: Rockville, MD. p. Chapter 7.
8. Paul, A-L. and R.J. Ferl, *In vivo footprinting in Arabidopsis*, in *Methods in Molecular Biology*. 1997. p. 417-429.
9. Vega-Palas, M.A., A-L. Paul, and R.J. Ferl, *Chromatin*, in *Methods in Plant Molecular Biology.*,J.A. Bryant, Editor. 1996, Academic Press. p. 13-38.
10. Paul, A-L. and R.J. Ferl, *Genomic Sequencing in Maize*, in *The Maize Handbook*, M. Freeling and V. Walbot, Editors. 1994, Springer-Verlag. p. 579-585.
11. Daugherty, C.J., et al., *Environmental stress and gene regulation*, in *Arabidopsis*, C. Somerville and E. Meyerowitz, Editors. 1994, Cold Spring Harbor. p. 769-806.
12. Ferl, R.J., et al., *The application of automated DNA sequence analysis to phylogenetic studies*, in *Phylogenetic Analysis of DNA Sequences*, M. Miyamoto and J. Cracraft, Editors. 1991, Oxford Press.
13. Paul, A-L. and R.J. Ferl, *Assays for studying chromatin structure*, R.A.S.a.D.P.S.V. S.B. Gelvin, Editor. 1989, Kluwer Academic Publications.
14. Paul, A-L. and R.J. Ferl, *Chromatin structure of plant genes*, in *Chromosomes: Eukaryotic, Prokaryotic and Viral*. 1989, CRC Press.
15. Paul, A-L. and R.J. Ferl, *Chromatin structure and gene regulation.*, in *Cell culture and Somatic Cell Genetics of Plants Vol. 6 Molecular Biology of Nuclear Genes.*, J. Schell and I.K. Vasil, Editors. 1989, Academic Press.
16. Ferl, R.J., *In vivo detection of protein DNA interactions*, in *Methods in Plant Molecular Biology*, S. Gelvin, Editor. 1989, Martin Nijhoff Press.
17. Paul, A-L., et al., *Architecture of the 5' flanking regions of the maize Adh genes.*, in *Architecture of Eukaryotic genes.*, G. Kahl, Editor. 1988, VCH Press.
18. Ferl, R.J. and A-L. Paul, *Chromatin structure of Plant genes*, in *Chromosomes: Eukaryotic, Prokaryotic and Viral.*, K.W. Adolf, Editor. 1988, CRC Press.
19. Ferl, R.J. and A-L. Paul, *Methods of Chromatin structure analysis*, in *Methods in Plant Molecular Biology.*, S. Gelvin, Editor. 1988, Martinus Nijhoff Press.
20. Ferl, R.J., *Characterization of nuclear factors that regulate alcohol dehydrogenase gene expression*, in *Biochemical and Physiological Mechanisms Associated with Environmental Stress Tolerance in Plants.*, J. Cherry, Editor. 1988, NATO ASI Series.
21. Ferl, R.J., et al., *Analysis of chromatin structure and gene regulation*, in *Tailoring Genes for Crop Improvement: An agricultural perspective.*, G. Bruenig, et al., Editors. 1987. p. 47-58.
22. Ferl, R.J., *Architecture of the maize Adh1 promoter and its chromatin*, in *Plant Genetics*

UCLA Symposia on Molecular and Cellular Biology, M. Freeling, Editor. 1985.
23. Sachs, M.M., et al., *Molecular genetic analysis of the maize anaerobic response*, in *Maize for Biological Research*, W. Sheridan, Editor. 1982.

Patents

United States Patent: Ferl, et al. 6,867,350 March 15, 2005

Plants with enhanced ability to produce starch and methods for obtaining them

Inventors: **Ferl, Robert J.** (Gainesville, FL); **Sehnke, Paul C.** (Gainesville, FL); **Chung, Hwa Jee** (Seoul, KR); **Wu, Ke** (Gainesville, FL); **Hannah, L. Curtis** (Gainesville, FL)
Assignee: University of Florida Research Foundation, Inc. (Gainesville, FL)

United States Patent: Vasil, et al. 5,955,330 September 21, 1999

Means for enhancing expression

Inventors: **Vasil, Vimla** (Gainesville, FL); **Clancy, Maureen A.** (Gainesville, FL); **Ferl, Robert J.** (Gainesville, FL); **Vasil, Indra K.** (Gainesville, FL); **Hannah, L. Curtis** (Gainesville, FL)
Assignee: Research Corporation Technologies (Tucson, AZ)

Selected Professional Activities

National:

Co-Chair Standing Committee on Biological and Physical Sciences in Space, National Academies of Science and Engineering 2014-Present
Co-Chair Committee on Mid Term Assessment of the Decadal Study on Biological and Physical Sciences in Space, National Academies of Science and Engineering 2016-2017
Testimony before the Subcommittee on Space, Committee on Science, Space, and Technology, United States House of Representatives: to The International Space Station after 2024: Options and Impacts March 22, 2017
President, American Society for Gravitational and Space Research, 2014-2015
Symposium Committee American Society for Gravitational and Space Research 2015
Chair of the Universities Space Research Association (USRA) Science Council for the Division of Space Life Sciences 2011-2013
University of Florida Designated Representative to the Universities Space Research Association (USRA) 2006 – present
Member National Research Council of the National Academy of Science Decadal Survey on Biological and Physical Sciences in Space 2009-2011
Member GeneLab Steering Committee for NASA 2014-2017

Board of Governors, American Society for Gravitation and Space Research 2012-2013
Science Council for the Division of Space Life Sciences 2005-2013

Professional Membership

Lifetime Member Maize Genetics Cooperation
Lifetime Member American Society for Gravitational and Space Research Member
American Society for Plant Biology
American Association for the Advancement of Science

Educational and Public Outreach (selected recent)

Community open house presentation at Florida Museum of Natural History annual Starry Night event. 2013
"Space Biology-UF Science on the International Space Station."An interactive presentation that connects with local school children as well as interested adults in the community. 2017
Science Café for the Florida Museum of Natural History. An interactive presentation sponsored by the FMNLH and held at a local restaurant and open to the public: Going Boldly: Astrobiology, Space Biology and Seeking the Meaning of Life off Earth.
The Ferl space biology program also hosts an interactive website (http://ufspaceplants.org/) and contributes to public web-based discussion of space biology (e.g. https://theconversation.com/taking- plants-off-planet-how-do-they-grow-in-zero-gravity-45032)

Major Science Operations (selected recent)

APEX04 spaceflight experiment on the ISS 2017
Initial Drop Tower microgravity experiment conducted at Glenn Research Center (GRC), 2017-2019
Bremen Germany for first multiple logistical meetings of the EDEN-ISS experiment to be deployed in Antarctica, 2016-2018
University of Guelph for "tomatosphere" educational outreach spaceflight experimental design 2017-2018
HASP (High Altitude Student Payload) preparations and integration operations, Palestine TX 2016.
HASP launch operations, Ft. Sumner, NM 2016
Antarctic High Altitude Balloon Payload 2016-2017
Antarctic deployment to the German Neumayer III station Jan and Feb 2018, 2019
Suborbital space launches with Blue Origin (2) and Virgin Galactic (1) 2018-2019

Extramural Funding (recent)

Role	Agency	Grant Title & Dates	Total Award
PI	NASA	NRA NNH18ZTT001N-FG: Appendix B – Suborbital Biology The role of Ca2+ signaling during the early events of plant adaptation to spaceflight 10/20/2019 -	$298,000
PI	NASA-FO	SpaceTech-REDDI-2019 - 80HQTR19NOA01-19FO-F1 – Biological Imaging in support of Suborbital and Exploration Science 10/20/2019-10/19/2021	$461,949
Co-PI	NASA	Epigenetic Adaptation to the Spaceflight Environment - Genomic Change Induced by Generations in Space. 9/2018 – 8/2021	$511,983
PI	NASA-FO	Human tended space biology: Enabling suborbital genomics and gene expression. 7/2018 – 6/2021.	$299,838
PI	NASA	Spectral imaging within the EDEN ISS project – an Antarctic analog for enhancing exploration life support. 2017-2019.	$286,690
Co-PI	NASA	Epigenetic change in *Arabidopsis thaliana* in response to spaceflight 2014-2018	$449,176
PI	FSGC	UF in the Antarctic EDEN module in collaboration with the DLR 2016-2018	$25,000
Co-PI	CASIS	Molecular Biology of Plant Development in the Spaceflight Environment II. 2015-2018.	$182,929
Co-PI	NASA	Early stage plant adaptation to spaceflight - molecular responses of Arabidopsis to the transition from terrestrial environment to space. 2014-2017	$149,619
Co-PI	NASA	Epigenetic change in Arabidopsis thaliana in response to spaceflight. 2014-2017	$448,238
Co-PI	CASIS	Molecular Biology of Plant Development in the Spaceflight Environment II. 2015-2016	$121,000
PI	NASA	Early stage plant adaptation to spaceflight - molecular responses of Arabidopsis to the transition from terrestrial environment to space. 11/01/2014 – 6/30/2017	$149,619
Co-PI	NASA	Epigenetic change in Arabidopsis thaliana in response to spaceflight – the differential cytosine methylation of plants and derived cell lines. 9/01/2014 – 9/30/2017	$448,238

PI	NASA	Molecular Responses of Arabidopsis to the Low Atmospheric Pressures of Spaceflight Vehicles and Planetary Habitats. 2014-2017	$522,611
Co-PI	CASIS	Molecular Biology of Plant Development in the Spaceflight Environment. 2013-2015	$49,405
Co-I	FSGC	Crew-Assisted and Crew-Autonomous Biological Imaging in Parabolic and Suborbital Vehicles. 2012	$10,000
Co-PI	NASA	Cell Signaling in Undifferentiated Cells - Perceiving the Spaceflight Environment without Specialized Tissues. 2012	$245,453
PI	NASA	Molecular Biology of Growth and Cell Remodeling within the Spaceflight Environment. 2012-2014	$482,207
Co-PI	NASA	The impact of spaceflight on Arabidopsis: Deep sequencing and DNA arrays as collaborative readouts of the transcriptome of Arabidopsis seedlings and undifferentiated cells in space. 2010-2012	$145,910
Co-PI	NASA	Gene Expression and Molecular Signaling in Spaceflight Environments. 2009-2013	$283,608
PI	NASA	Leveraging Shuttle/ISS science, hardware and operations to enable in situ biology analyses in planetary analog environments. 2009-2011	$62,553
PI	NASA	Transgenic plant biomonitors of spaceflight exposure – telemetric data collection. 2007-2012	$712,025