

Biographical Sketches

Dr. Robert J. Ferl

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Education and training

Hiram College, Hiram OH B.A. 1976 Biology and Computer Science

Indiana University, Bloomington, IN M.A. 1978 Biology and Genetics

Indiana University, Bloomington, IN Ph.D. 1980 Biology and Genetics

Research and Professional Experience

Dr. Robert Ferl is a Distinguished Professor in the department of Horticultural Sciences and is an Assistant Vice President for Research the University of Florida. Ferl is a Fellow of the American Association for the Advancement of Science, a Fellow of the American Society for Plant Biology, and of the American Society for Gravitational and Space Research, and also served as President for ASGSR. Ferl's experimental heritage is the study of gene expression in response to environmental change, and recently that environment has been spaceflight and extraterrestrial habitats. He 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. 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, and the ASGSR Founders Award. Ferl also advocates field experience; 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. Ferl also conducts ground-based science and works within planetary exploration analogs including the Houghton Mars Project in the Arctic and in Antarctic venues. He 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. Ferl 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.

Selected Publications (from >175 Refereed)

Ferl RJ, Zhou M., Strickland HF, Haveman NJ, Callaham JB, Bandla S, Ambriz D, Paul, A-L
(2023) Transcriptomic dynamics in the transition from ground to space are revealed by

Virgin Galactic human-tended suborbital spaceflight. *NPJ Microgravity*. Dec 20;9(1):95

Olanrewaju GO, Haveman NJ, Naldrett MJ, Paul AL, Ferl RJ, Wyatt SE. (2023) Integrative transcriptomics and proteomics profiling of *Arabidopsis thaliana* elucidates novel mechanisms underlying spaceflight adaptation. *Front Plant Sci*. Nov 27;14:1260429

Paul A-L, Elardo SM, Ferl RJ (2022) Plants grown in Apollo lunar regolith present stress-associated transcriptomes that inform prospects for lunar exploration. *Commun Biol* 5: 382

Haveman N, Paul A-L, Ferl RJ (2022) Plant Biology and a New Approach to Space Farming. *Space Manufacturing and Resources Earth and Planetary Exploration Applications* 67-87

Paul, A-L, Haveman, N, Califar, B, and Ferl, RJ (2021). Epigenomic Regulators Elongator Complex Subunit 2 and Methyltransferase 1 differentially condition the spaceflight response in *Arabidopsis*. *Frontiers in Plant Science* 12.

Tucker R, Callaham J, Zeidler C, Paul A-L, Ferl RJ (2020) NDVI imaging within exploration growth modules –study from EDEN ISS Antarctica. *Life Sci Space Res* 26: 1-9.

- Califar B, Sng NJ, Zupanska A, Paul A-L, Ferl RJ (2020) Root Skewing-Associated Genes Impact the Spaceflight Response of *Arabidopsis thaliana*. *Front Plant Sci* 11: 239.
- Zeidler C, Zabel P, Vrakking V, Dorn M, Bamsey M, Schubert D, et al. ... 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
- 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 Genetics* 20: 205
- Califar B, Tucker R, Cromie J, Sng N, Schmitz RA, Callaham J, 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
- Sng N, Kolaczowski B, Ferl RJ, Paul A-L (2018) A Member of the CONSTANS-Like Protein Family is Regulator of ROS Homeostasis and Spaceflight Adaptation. *AOB Plants* ply075
- Beisel N, Callaham J, Sng N, Taylor DJ, Paul A-L, Ferl RJ (2018) Utilization of SI-NDVI for Early Plant Stress Detection. *Appls in Plant Sci* 6: e01186
- Paul A-L, Zhou M, Callaham J, Reyes M, Stasiak M, Zupanska AK, Dixon MA, Ferl RJ (2017) Patterns of *Arabidopsis* gene expression in the face of hypobaric stress. *AoB Plants* 9: plx030
- Ferl RJ, 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
- Ferl RJ, Koh J., Denison F., Paul A-L. (2015) Spaceflight Induces Specific Alterations in the Proteomes of *Arabidopsis*. *Astrobiology* 15: 32-56 (and cover article)
- Bamsey M.T., Paul A-L., Graham T., Ferl RJ (2014) Flexible imaging payload for fluorescent biological imaging in parabolic, suborbital and space analog environments. *LSSR* 3: 32-44
- Paul A-L, Zupanska AK, Schultz ER, Ferl RJ (2013) Organ-specific remodeling of the *Arabidopsis* transcriptome in response to spaceflight. *BMC Plant Biology*. 13:112
- Paul A-L, Wheeler R, Levine H, Ferl RJ. (2013) Fundamental plant biology enabled by the space shuttle *American Journal of Botany*. 100(1):226-234.
- Abboud T, Bamsey M, Paul A-L, Graham T, Braham S, Noumeir R, Berinstain A, and Ferl R. (2013) Deployment of a fully-automated green fluorescent protein imaging system in a high arctic autonomous greenhouse. *Sensors*. 13:3530-3548.
- Paul A-L, Amalfitano CE, Ferl RJ. (2012) Plant growth strategies are remodeled by spaceflight. *BMC Plant Biology* 12:232 doi:10.1186/1471-2229-12-232.

Selected Synergistic Activities

- Farming on the Moon with Neil deGrasse Tyson, Anna-Lisa Paul & Robert Ferl https://www.youtube.com/watch?v=g3Jz2_KBUzs&ab_channel=StarTalk
- University of Florida Institute of Food and Agricultural Sciences blog - A first: Scientists grow plants in soil from the Moon: <https://blogs.ifas.ufl.edu/news/2022/05/12/a-first-scientists-grow-plants-in-soil-from-the-moon/>
- Presentation Scientists on a mission to feed Mars – University of Florida News 2/2017. A public outreach description and video set surrounding our most recent space biology launch to the ISS <https://social.shorthand.com/UFNews/uytChfNBEE/space-plants>
- UF Space Plants (<http://ufspaceplants.org/>). Our laboratory outreach web page, which contains links to our plant space biology research program.
- NPR Science Friday. For premier of “The Martian”; how space plant biology is getting us closer to the goal of other planets <https://www.sciencefriday.com/videos/plants-in-space/>