**HEATHER M. MEYER**

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**RESEARCH INTERESTS**

My goal as a research leader is to leverage advanced live-cell imaging, molecular genetics, biochemistry, and multi-omics to understand how intrinsically disordered proteins drive environmentally-induced cellular and developmental decisions in plants.

**CURRENT POSITION**

**Syracuse University, NY** January 2025-Current

Assistant Professor of Biology

**Carnegie Institution for Science, CA** May 2024- December 2024

Department of Plant Biology

Research Scientist

**Mozza Foods, CA**

Senior Scientist January 2022- April 2024

**Carnegie Institution for Science, CA** December 2016- 2021

Department of Plant Biology

Postdoctoral fellow

Principal investigator: David Ehrhardt

**EDUCATION**

**Cornell University, NY** 2011-2016

Ph.D., Genetics, Genomics, and Development

Dissertation: The role of variability in generating giant cell patterning in the *Arabidopsis* sepal

**Sarah Lawrence College, NY**  2007-2011

Bachelor of Arts, Premedical Sciences

Senior Thesis: A phylogenetic and morphological analysis of *Nitella flexilis* species complex

**School of International Training, Botswana, Africa** 2010

Independent Study: The ecological importance of the *Characeae* in the Okavango Delta

**FELLOWSHIPS AND GRANTS**

**Finalist. NSF Science Technology Center Grant** (Hired grant consultant and editor) 2023

Award amount**:** $30,000,000 for 5 years of support and potential for a 5-year continuation

National Science Foundation, USA.

**Carnegie Science Venture Grant** (transformative science grant, activated 2024)2021

Award amount: $150,000 for two years of support

Carnegie Institution for Science, USA

**Company of Biologists Scientific Meeting Grant** 2020

Award amount: $1,500 for organizing a 1-day intrinsically disordered protein symposium

Company of Biologists, UK

**Simons Fellow. Life Science Research Postdoctoral Fellowship** (2.5% success rate) 2018-2021

Award amount: $180,000 for 3 years support

Life Science Research Foundation, USA

**NIH F32 NRSA Postdoctoral Fellowship** (Impact Score: 17, 5th percentile, deferred) 2018

Award amount: $150,000 for three years support

National Institute of Health, USA

**Arabidopsis Research Early Career Scientist Travel Grant** 2012

Award amount: $1000 for international travel support

North American Arabidopsis Steering Committee, USA

**Honorary Mention. Graduate Research Fellowship Program** 2011

National Science Foundation, USA

**AWARDS AND HONORS**

**FASEB Mechanism in Plant Development Short Talk Award** 2019

FASEB Science Research Conference (SRC), USA

**Postdoctoral Innovation and Excellence Award** 2019

Carnegie Institution for Science, USA

**LPS Award Best Paper Award** 2018

Cornell University, USA

**Undergraduate Student Research Award** 2010 Botanical Society of America, USA

**PUBLICATIONS**

**Meyer, H.M**.\*, Hotta T., Malkovsky, A., Zheng Y., & Ehrhardt, D.W.\* (2023). Manipulating condensation of thermo-sensitive SUF4 protein tunes flowering time in *Arabidopsis thaliana*. Second round of review at Dev Cell, *Biorxiv:* [*https://www.biorxiv.org/content/10.1101/2023.11.01.565081v4*](https://www.biorxiv.org/content/10.1101/2023.11.01.565081v4) \* Co-corresponding authors

**Meyer, H.M**.\*, & Ehrhardt, D.W.\* (2021). What is the spectrum of cellular functions for membraneless organelles and intrinsically disordered proteins? (Article within “Fifteen of the Most Compelling Open Questions in Plant Cell Biology” issue) Plant Cell Rep., 2022:34 <https://doi.org/10.1093/plcell/koab225>. \* Co-corresponding authors.

**Meyer, H.M.** (2020). In search of function: Nuclear bodies and their possible roles as plant environmental sensors. COPB, 2020:58:33-40 <https://doi.org/10.1016/j.pbi.2020.10.002>

Rice, S., Fryer, E., Jha, S.G., Malkovskiy, A., **Meyer, H.M.**, Thomas, J., Weisbauer, R., Zhao, K., Birnbaum, K., Ehrhardt, D., and Rhee, S. (2020). First plant cell atlas workshop report. Plant Direct, 2020:00:1-10 <https://doi.org/10.1002/pld3.271>

**Meyer, H.M.\***, Teles, J.\*, Formosa-Jordan, P.\*, Refahi, Y., San-Bento, R., Ingram, G.C., Jönsson, H.,

Lock J.C.W., Roeder, A.H.K. (2017). Fluctuations of the transcription factor ATML1 generate the pattern

of giant cells in the *Arabidopsis* sepal. eLife. 2017;6:e19131. <http://doi.org/10.7554/elife.19131>

\*equal contribution

Tauriello, G.\*, **Meyer, H.M.\***, Smith, R.S., Koumoustsakos, P., Roeder, A.H.K. Variability and constancy

in cellular growth of *Arabidopsis* sepals. Plant. Physiology, 169(4), 2342-2358. \* equal contribution

<http://doi.org/10.1104/pp.15.00839>

**Meyer, H. M.**, & Roeder, A.H.K. (2014). Stochasticity in plant cellular growth and patterning. Frontiers in

Plant Science: Plant Evolution and Development. 5:420. <http://doi.org/10.3389/fpls.2014.00420>

**RESEARCH EXPERIENCE**

**Carnegie Institution for Science- Plant Biology**, CA May 2024-December 2024

Research Scientist

Prion-like proteins as carriers and facilitators of molecular memory in plants

* Engineered a chimeric version of the prion-like protein LD (LD-mTFP), along with two LD variants (LDv1-mTFP and LDv2-mTFP) to be used for functional characterization in plants
* Cloned epitope-tagged versions of LD and LD variants that are codon optimized for e.coli expression

**Mozza Foods**, CA January 2022-April 2024

Senior Scientist; CSO: Cory Tobin

Bioengineering soy and *Arabidopsis* plants to produce dairy-identical casein micelles for cheese making.

* Leading two teams (microscopy, and gene expression) that have successfully examined the localization, stability, degredation, and micellular behavior of casein proteins in plant embryonic cells and plant cell lines
* Co-leading the scientific direction for increasing casein protein production in stable soy plants
* Developed dual-reporter/FACS system for evaluating the contributions of promoters, UTRs, and enhancers on casein expression
* Developing protocols and analyses for quantifying the production and phosphorylation states of different caseins in both soy and *Arabidopsis* plants, and plant cell lines
* Employing confocal and immunogold transmission electron microscopy for visualizing casein micelles in live and fixed plant cells and cell lines

**Carnegie Institution for Science- Plant Biology**, CA 2017-Present

Postdoctoral Fellow; PI: David W. Ehrhardt

Investigation of intrinsically disordered proteins as possible thermos-sensors to time flowering in *Arabidopsis thaliana*

* Tested temperature-dependent phase separation of the flowering time protein SUF4 *in vitro* using a suite of biochemical techniques
* Engineered a functional chimeric SUF4 protein (SUF4-mEGFP) that is expressed and visualized in mitotically dividing tissues
* Engineered plants with tunable flowering time responses
* Employed quantitative fluorescence-based experiments (e.g. FRAP, 3D FLIP, and live cell imaging) to investigate SUF4 phase separation *in vivo* under different temperature conditions
* Used site-directed mutagenesis to test the functionality of SUF4 phase separation on flowering time
* Developed an image processing pipeline through imageJ to quantify the number of SUF4 puncta in confocal 3D stacked images
* Employed Imaris image analysis software for condensate co-localization analysis
* Tested the functional relationship between phase separated SUF4 and known interacting proteins under different temperature conditions

**Cornell University**, NY 2011-2016

Doctoral candidate; PI: Adrienne H.K. Roeder

The role of variability in generating giant cell patterning in the *Arabidopsis* sepal

* Engineered a functional chimeric ATML1 protein (ATML1-mCitrine) that is expressed in living plant epidermal cells
* Utilized advanced live-imaging techniques to quantitatively investigate the dynamics of ATML1 during epidermal patterning
* Co-developed an image processing pipeline, which blended MorphographX, Constanza, and imageJ to quantify and track nuclear fluorescent intensity of ATML1 over time in developing tissues
* Beta-tested and refined new MorphographX plugins, which were permanently incorporated into the final image-processing platform
* Identified growth trends that permit plant cells of varying size to coordinate their growth in order to form a tissue using advanced live-cell image and the image processing program MorphoGraphX

**New York Botanical Garden**, NY 2007-2011

Cullman Fellow; PI: Kenneth G. Karol

A systematic investigation of the *Nitella flexilis* species complex

* sequenced two chloroplast-encoded genes (rbcL and atpB) from 121 herbarium specimens, many being type specimens
* generated and interpreted a molecular phylogeny using maximum parsimony
* used Scanning Electron Microscopy (SEM) to examine cell wall architecture of the female reproductive organ (oospore)
* Conducted field research to survey and collect *Characeae* specimens throughout the USA, Canada, Panama, and Botswana. Specimen are housed in the Garden’s herbarium

**SCIENTIFIC WRITING AND EDITING EXPERIENCE**

**Scientific Consultant for NSF Science and Technology Center Grant** 2022

New York University, NY

**Co-guest topic editor for Frontiers of Plant Science’s Rising Stars: Plant Cell Biology 2022 special edition** 2022

Frontiers of Plant Science, UK

**TEACHING EXPERIENCE**

**Phase Separation in Biology Guest Lecturer** 2024

Stanford University, CA

**Droplets and Gels in Healthy and Diseased Cells Guest Lecturer** 2022 and 2023

Syracuse University, NY

**Undergraduate Independent Research Mentor**  2019 Carnegie Institution for Science, CA

**Co-organizer and Instructor of 10-week Carnegie Writing Workshop Series** 2018 and 2019

Carnegie Institution for Science, CA

**REU Summer Intern Mentor**  2014

Cornell University NY

**Undergraduate Independent Research Mentor**  2014 Cornell University, NY

**Teaching assistant of BIOMG2800: Genetics and Genomic** 2012

Cornell University, NY

**GROUPS AND ORGANIZATIONS**

**Carnegie Institution Postdoctoral Association: Faculty application panel** 2024

Career panelist

Carnegie Institution for Science, USA

**“Near Peers: Pathway to New Position” Webinar** 2023

Career panelist

North American Arabidopsis Steering Committee, USA

**International Conference for Arabidopsis Research Community Session** 2021

Co-organizer for “Intrinsically Disordered Protein” session

North American Arabidopsis Steering Committee, USA

**Carnegie Science Climate Survey** 2019-2021

Working group member (one of two postdocs selected to represent the entire Institute)

Carnegie Institution for Science, CA

**Intrinsically Disordered Protein Scientific Interest Group**  2017-Present

Co-founder and co-organizer

Carnegie Institution for Science and Stanford University, CA

**Carnegie Institution Postdoctoral Association**  2017-2020

Council member and Treasurer

Carnegie Institution for Science, CA

**MEETING PRESENTATIONS**

**Meyer, HM.**, Hotta, T. Zheng, Y., & Ehrhardt, D.W., 2024. Intrinsically disordered proteins as possible thermosensors in Arabidopsis thaliana. ASBMB: Signal transduction: an emergent behavior of biomolecular condensates interest group, San Antonio, TX, USA (Invited talk).

**Meyer, HM.**, Hotta, T. Zheng, Y., & Ehrhardt, D.W., 2022. Intrinsically disordered proteins as possible thermosensors in Arabidopsis thaliana. Syracuse University, USA (Invited talk and class guest speaker).

**Meyer, HM.**, Hotta, T. Zheng, Y., & Ehrhardt, D.W., 2020. Intrinsically disordered proteins as possible thermosensors in Arabidopsis thaliana. FASEB: Mechanisms in Plant Development, USA (Invited talk and Poster).

**Meyer, HM.**, Hotta, T. Zheng, Y., & Ehrhardt, D.W., 2020. Intrinsically disordered proteins as possible thermosensors in Arabidopsis thaliana. IDPSIG and Friends virtual seminar series (talk).

**Meyer, HM.**, Hotta, T. Zheng, Y., & Ehrhardt, D.W., 2019. Investigation of intrinsically disordered domain proteins as possible thermosensors to time flowering in Arabidopsis thaliana. FASEB: Mechanisms in Plant Development, Olean, NY, USA (Lightning talk and Poster)

**Meyer, HM.**, Hotta, T. Zheng, Y., & Ehrhardt, D.W., 2018. Investigation of intrinsically disordered domain

proteins as possible thermosensors to time flowering in Arabidopsis thaliana. EMBO|EMBL, Heidelberg, Germany (Poster)

**Meyer, HM.**, Hotta, T. Zheng, Y., & Ehrhardt, D.W., 2018. Investigation of intrinsically disordered domain proteins as possible thermosensors to time flowering in Arabidopsis thaliana. Carnegie Institution for Science Trustees meeting. Washington D.C., USA (Invited talk)

**Meyer, HM.**, Hotta, T. Zheng, Y., & Ehrhardt, D.W., 2018. Investigation of intrinsically disordered domain proteins as possible thermosensors to time flowering in Arabidopsis thaliana. Plant Development and Drought Stress meeting. Asilomar, CA, USA (Poster)

**Meyer, H.M.**, Teles, J. Formosa-Jordann, P. Jonnson, H., Locke, J. & Roeder, A.H. 2017. Stochastic fluctuations of the transcription factor ATML1 patterns giant cell in the Arabidopsis thaliana sepal. Carnegie Institution for Science Department of Plant Biology Seminar Series. Stanford, CA, USA (Invited talk)

**Meyer, H.M.** & Roeder A.H. 2016. Stochastic fluctuations of the transcription factor ATML1 patterns giant cell in the Arabidopsis thaliana sepal. FASEB: Mechanisms in plant development, Saxton River, VT, USA (Poster)

**Meyer, H.M.** & Roeder, A.H. 2014. Dosage of the transcription factor ATML1 patterns giant cells on the Arabidopsis thaliana sepal. The John Innes Centre, Norwich, UK (Invited talk)

**Meyer, H.M.** & Roeder, A.H. 2014. Dosage of the transcription factor ATML1 patterns giant cells on the

Arabidopsis thaliana sepal. EMBO Interdisciplinary Plant development, Cambridge, UK (Flash talk and

poster)

**Meyer, H.M.** & Roeder, A.H. 2014. The transcription factor ATML1 drives giant cell formation

in Arabidopsis thaliana. Membrane Signaling Group. Cornell University, Ithaca, USA (Invited talk)

**Meyer, H.M.** & Roeder, A.H. 2013. The transcription factor ATML1 drives giant cell formation in Arabidopsis thaliana. FASEB: Mechanisms in plant development, Saxton River, VT, USA (Poster)

**Meyer, H.M.** & Roeder, A.H. 2012. CDK and Cyclin both necessary for interaction with CDK inhibitor, LGO. International Conference for Arabidopsis Research, Vienna, Austria (Poster)

**Meyer, H.M.** & Karol, K.G. 2011. A phylogenetic and morphological analysis of Nitella flexilis species

complex. Sarah Lawrence College, Bronxville, NY, USA (Thesis Seminar)

**Meyer, H.M.** & Karol, K.G. 2011. A phylogenetic and morphological analysis of Nitella flexilis species

complex. Northeast Algal Symposium, Woods Hole, MA, USA (Invited talk)

**Meyer, H.M.** & Karol, K.G. 2010. A systematic investigation of the Nitella flexilis species complex.

Phycological Society of America Annual Symposium, East Lansing, MI, USA (Invited talk)

**Meyer, H.M.** & Karol, K.G. 2010. A systematic investigation of the Nitella flexilis species complex.

Northeast Algal Symposium, Bristol, RI, USA (Invited talk)

**Meyer, H.M.** & Karol, K.G. 2009. Are you the real Nitella flexilis? Northeast Algal Symposium, Amherst,

MA, USA (Poster)

**REFERENCES**

**Dr. David Ehrhardt Dr. Adrienne Roeder Dr. Dominique Bergmann**

Postdoctoral mentor Ph.D. advisor Unofficial Postdoctoral Mentor

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260 Panama Street Cornell University Stanford University

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