Mitchell J. Feldmann
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mjfeldmann.github.io

Research Interests

Plant Breeding & Biology
Theoretical & Applied Statistics
Quantitative & Population Genetics
Computer Vision & Machine Learning
Product Development & Outreach

Current Title(s)

University of California, Davis June 2021-Present
Postdoctoral Researcher
Strawberry breeding and research
Board Member the Plant Phenome Journal Jan 2022-Present
Social Media Editor @plantphenomej

Education

University of California, Davis Sept 2015-Sept 2020
Ph.D. in Horticulture and Agronomy
University of Arizona Aug 2012-May 2015
B.Sc. in Ecology and Evolutionary Biology
Minor in Mathematics

Industry Experience

HM Clause (Limagrain Group) July 2020-June 2021
Genetics Application Leader – Hot and Sweet Pepper

Publications

*Corresponding author

1. Jiménez, NP, **Feldmann MJ**, Famula RA, Pincot DDA, Bjornson M, Cole GS, Knapp SJ (2022) "Harnessing underutilized gene bank diversity and genomic prediction of cross usefulness to enhance resistance to *Phytophthora cactorum* in strawberry." *Submitted to The Plant Genome.*
2. **Feldmann MJ**, Covarrubias-Pazaran G, Piepho HP. (2022) "Complex Traits and Candidate Genes: Estimation of Genetic Variance Components Across Modes of Inheritance." Biorxiv. *Submitted to G3 Genes | Genomes | Genetics.* https://doi.org/10.1101/2022.07.04.498768 *
   Ubbens, J, **Feldmann MJ**, Stavness I, Sharpe AG. (2022) "Quantitative Evaluation of Nonlinear Methods for Population Structure Visualization & Inference." *G3 Genes | Genomes | Genetics*, jkac191, https://doi.org/10.1093/g3journal/jkac191
3. **Feldmann MJ**, Piepho H-P, Knapp SJ (2022) Average semivariance directly yields accurate estimates of the genomic variance in complex trait analyses. G3: Genes | Genomes | Genetics 12: jkac080. https://doi.org/10.1093/g3journal/jkac080 *
4. Pincot DDA, **Feldmann MJ,** Hardigan MA, Vachev MV, Henry PM, Gordon TR, Bjornson M, Rodriguez A, Cobo N, Cole GS, Coaker GL, Knapp SJ (2022) Novel Fusarium Wilt resistance genes uncovered in natural and cultivated strawberry populations are found on three non-homoeologous chromosomes. Theor. Appl. Genet. 135: 2121–2145. https://doi.org/10.1007/s00122-022-04102-2
5. **Feldmann MJ** and Tabb A. (2021) "Cost-effective, high-throughput phenotyping system for 3D reconstruction of fruit form." *The Plant Phenome Journal.* https://doi.org/10.1002/ppj2.20029. *
6. Hardigan MA, **Feldmann MJ**, Pincot DDA, Famula RA, Vachev MV, Madera MA, Zerbe P, Mars K, Peluso P, Rank D, Ou S, Saski CA, Acharya CB, Cole GS, Yocca AE, Platts AS, Edger PP, Knapp SJ. (2021). "Blueprint for Phasing and Assembling the Genomes of Heterozygous Polyploids: Application to the Octoploid Genome of Strawberry." *Biorxiv. https://doi.org/10.1101/2021.11.03.467115*
7. Petrasch S, Mesquida-Pesci SD, Pincot DDA, **Feldmann MJ,** López CM, Famula RA, Hardigan MA, Cole GS, Knapp SJ, Blanco-Ulate B. (2021) "Genomic Prediction of Strawberry Resistance to Postharvest Fruit Decay Caused by the Fungal Pathogen *Botrytis cinerea*." *G3.* https://doi.org/10.1093/g3journal/jkab378

8. **Feldmann MJ,** Gage JL, Hissong-Turner SD, Ubbens JR. (2021) “Images Carried Before the Fire: The Power, Promise, and Responsibility of Latent Phenotyping.” The Plant Phenome. https://doi.org/10.1002/ppj2.20023 *
9. **Feldmann MJ,** Piepho H-P, Bridges WC, Knapp SJ. (2021). “Average semivariance yields accurate estimates of the fraction of marker-associated genetic variance and heritability in complex trait analyses,” *PLoS Genetics.* https://doi.org/10.1371/journal.pgen.1009762
10. **Feldmann MJ**, Hardigan MA, Famula RA, López CM, Tabb A, Cole GS, Knapp SJ. (2020). “Multi-dimensional machine learning approaches for fruit shape phenotyping in strawberry.” *GigaScience.* https://doi.org/10.1093/gigascience/giaa030
11. Hardigan MA, Lorant A, Pincot DDA, **Feldmann MJ**, Famula RA, Acharya CB, Lee S, Verma S, Whitaker VM, Bassil N, Zurn J, Cole GS, Bird K, Edger PP, Knapp SJ (2020). “Unraveling the Complex Hybrid Ancestry and Domestication History of Cultivated Strawberry.” Molecular Biology and Evolution. https://doi.org/10.1093/molbev/msab024
12. Pincot DDA, Ledda M, **Feldmann MJ**, Hardigan MA, Poorten TJ, Runcie DE, Heffelfinger C, Dellaporta SL, Cole GS, Knapp SJ (2020). “Social Network Analysis of the Genealogy of Strawberry: Retracing the Wild Roots of Heirloom and Modern Cultivars.” *G3.* https://doi.org/10.1093/g3journal/jkab015.
13. Hardigan MA, **Feldmann MJ**, Lorant A, Famula RA, Acharya CB, Cole GS, Edger PP, Knapp SJ. (2020). “Genome synteny has been conserved among the octoploid progenitors of cultivated strawberry over millions of years of evolution.” *Frontiers in Plant Science.* https://doi.org/10.3389/fpls.2019.01789
14. Tabb A, Medeiros H, **Feldmann MJ**, Santos TT. (2019) “Calibration of Asynchronous Camera Networks: CALICO.” *Arxiv.* https://arxiv.org/abs/1903.06811

Funded Grants

1. Knapp SJ, Cole GS, **Feldmann MJ**, Pincot DDA, Bjornon ML. (2021) “Accelerated Development and Commercialization of Strawberry Cultivars Resistant to Diseases Caused by Soil-Borne Pathogens.” California Strawberry Commission. Submitted. Estimated $599,476.
2. Knapp SJ, Coaker GI, Whitaker VM, Peres N, Henry PM, Zilberman D, Lee S, **Feldmann MJ**, Bjornson M, Debenardi J, Holmes G, Hewavitharana S, Daugovish O, Lloyd MG. (2022) “Delivering Breeding and Management Solutions to Prevent Losses to Emerging and Expanding Disease Threats in Strawberry.” USDA NIFA SCRI. Funded $6,255,366.
3. Knapp SJ, Cole GS, **Feldmann MJ**, Pincot DDA. (2021) “Enhancing Resistance to Soil-Borne Pathogens in Strawberry through Traditional and Genome-Informed Breeding Approaches.” California Strawberry Commission. Funded $357,000.

Data Releases

1. **Feldmann MJ,** Covarrubias-Pazaran G, Piepho H-P. (2022). “Data for ‘Complex Traits and Candidate Genes: Estimation of Genetic Variance Components Across Modes of Inheritance [Dataset].” Zenodo. https://doi.org/10.5281/zenodo.6981359
2. **Feldmann MJ** and Piepho H-P. (2021). “Data for "Genomic Heritability: A Ragged Diagonal Between Bias [Dataset].” Zenodo. https://doi.org/10.5281/zenodo.6981359
3. **Feldmann MJ,** Piepho H-P, Bridges WC, Knapp SJ. (2020). “Data for ‘Accurate Estimation of Marker-Associated Genetic Variance and Heritability in Complex Trait Analyses’ [Dataset].” Zenodo. http://doi.org/10.5281/zenodo.3742421
4. **Feldmann MJ,** Hardigan MA, Poorten TJ, Acharya CB, Colle M, Edger PP, VanBuren R, Knapp SJ. (2019). “Genotyping-By-Sequencing and Reference Genome Enabled Variant Discovery in Octoploid Strawberry [Data set].” Zenodo. http://doi.org/10.5281/zenodo.3576540
5. **Feldmann MJ**. (2019). “Classification and Quantification of Strawberry Fruit Shape [Data set].” Zenodo. http://doi.org/10.5281/zenodo.3528385
6. Tabb, A and **Feldmann, MJ**. (2019). Data and Code from: Calibration of Asynchronous Camera Networks: CALICO (Version 1.0) [Data set]. Zenodo. http://doi.org/10.5281/zenodo.3520866

Extended Abstracts

1. **Feldmann MJ**, Tabb A, Knapp SJ. (2019). “Cost-effective, high-throughput 3-D reconstruction method for fruit phenotyping.” CVPPP 2019: workshop on Computer Vision Problems in Plant Phenotyping. Peer reviewed. IPPN.

Posters

1. **Feldmann MJ**, Hardigan MA, Lopez-Ramirez CM, Famula RA, Cole GS, Knapp SJ. (2020). "GenomicPrediction of Hybrid Performance in Strawberry." Plant and Animal Genome XXVIII. San Diego, CA.
2. **Feldmann MJ**, Hardigan MA, Lopez-Ramirez CM, Famula RA, Cole GS, Knapp SJ. (2019). "Heterosis and genome-scale diversity among high-yielding hybrids of strawberry." American Society of Horticultural Science. Las Vegas, NV.
3. **Feldmann MJ**, Tabb A, Knapp SJ. (2019). "Cost-effective, high-throughput 3-D reconstruction method for fruit phenotyping." Computer Vision and Pattern Recognition. Long Beach, CA. Poster.
4. **Feldmann MJ**. (2019). "Ordination, quantification, and quantization of strawberry fruit shape". UC Davis Plant Science Symposium. Davis, CA.
5. **Feldmann MJ**, Pincot DD, Poorten TJ, Heffelfinger C, Cole GS, Hardigan MA, Acharya CB, Dellaporta S, Knapp SJ. (2019). "Highly accurate forensic approaches for authenticating pedigrees and protecting intellectual property in octoploid strawberry using high-density SNP genotyping arrays." Gainesville, FL. North American Strawberry Growers Association.
6. **Feldmann MJ** and Knapp SJ. (2019). "Semi-unsupervised quantization of strawberry shape diversity in elite germplasm." Phenome. Tucson, AZ.
7. **Feldmann MJ**, Bhartia YV, Newell SA, Harshman JM, Knapp SJ. (2018). "Quantitative methods for studying fruit morphology in strawberry." Phenome. Tucson, AZ.
8. **Feldmann MJ**, Hardigan MA, Poorten TJ, Acharya CB, Colle M, Edger PP, VanBuren R, Knapp SJ. (2018). "Genotyping-by-sequencing and reference genome enabled variant discovery in octoploid strawberry." Plant and Animal Genome XXVI. San Diego, CA.
9. **Feldmann MJ,** Bridges WC, Knapp SJ. (2017). "Heritability of a quantitative trait locus." National Association of Plant Breeders Annual Meeting. Davis, CA.

Invited Talks

1. **Feldmann MJ**. (2022) "Molecular Genetic Applications Enabled by Platinum Quality Reference Genome Assemblies in Octoploid Strawberry". Pacific Biosciences session Plant and Animal Genome XXIX. San Diego, CA
2. **Feldmann MJ**. (2021) "Targeted genotyping for genomic evaluation in cultivated strawberry" LGC Biosearch (Lucigen Corp). Webinar.
3. **Feldmann MJ**. (2021). "Complex traits and candidate genes: assumption-free estimation of genetic variance components." UC Davis Plant Science Seminar. Davis, CA.
4. **Feldmann MJ**. (2020). "Molecular Genetic Applications in Octoploid Strawberry." HM Clause, Davis, CA
5. **Feldmann MJ**. (2020). "Multi-Dimension Fruit Shape Phenotyping in Strawberry." Flavor, Nutrition, and Post-Harvest Genomics. Plant and Animal Genome XXVIII. San Diego, CA.
6. **Feldmann MJ**. (2020). "Genomic Prediction of Hybrid Performance in Strawberry." Strawberry Genomics. Plant and Animal Genome XXVIII. San Diego, CA.
7. **Feldmann MJ.** (2019). "Tractable Quantitative Genetic Approaches for High-Dimensional Phenotypes." University of Chicago, Chicago, IL.
8. **Feldmann MJ.** (2019). "Genetics and Breeding of Garden Strawberry (*Fragaria* × *ananassa*)." UC Davis SCOPE. Davis, CA.
9. **Feldmann MJ. (**2019). "Ordination, quantification, and quantization of strawberry fruit shape." UC Davis Plant Science Symposium. Davis, CA.
10. **Feldmann MJ** and Knapp SJ. (2019). "Semi-unsupervised quantization of strawberry shape diversity in elite germplasm." Phenome. Tucson, AZ.
11. **Feldmann MJ**. (2018). "Forensic approaches for authenticating pedigrees and protecting intellectual property in breeding programs." Plant Breeding Annual Retreat. Monterey, CA.

Teaching Assistant and Lecturer Experience

Guest Lecturer Feb 11, 2021
Quantitative Genetics and Selection Theory (PLS 225)
University of California, Davis

Guest Lecturer Jan 30, 2020
Quantitative Genetics and Selection Theory (PLS 290)
University of California, Davis

Guest Lecturer Jan 8, 2020
Quantitative Genetics and Selection Theory (PLS 290)
University of California, Davis

Teaching Assistant Jan-Apr 2019
Quantitative Genetics and Selection Theory (PLS 290)
University of California, Davis

Guest Lecturer June 6, 2018
Strawberry Field Day to Demonstrate Pest Management Research
University of California, Davis

Guest Lecturer Apr 4, 2018
Fruit and Nut Cropping Systems (PLS 170B)
University of California, Davis

Guest Lecturer Jan 25, 2018
Quantitative Genetics and Selection Theory (PLS 290)
University of California, Davis

Guest Lecturer Nov 17, 2017
Fruit and Nut Cropping Systems (PLS 170A)
University of California, Davis

Teaching Assistant Jan-Apr 2017
Experimental Design and Analysis (PLS205)
University of California, Davis

Teaching Assistant Jan-Apr 2018
Experimental Design and Analysis (PLS205)
University of California, Davis

Departmental and Professional Service

Board Member the Plant Genome Journal Jan 2020-Sept 2021
Social Media Editor @plantgenome

2022 North American Plant Phenotyping Network 2022 Committee Jan 2021-Present

Admissions Committee Member of the Horticulture Grad Group Jan 2019-May 2019
University of California, Davis

Admissions Committee Member of the Horticulture Grad Group Jan 2018-May 2018
University of California, Davis

Admissions Committee Member of the Horticulture Grad Group Jan 2017-May 2017
University of California, Davis

Plant Sciences Seminar Leader Sept 2016-Sept 2018
University of California, Davis

2017-2018 Horticulture and Agronomy Graduate Officer Sept 2017-Sept 2018
University of California, Davis

2016-2017 Horticulture and Agronomy Graduate Officer Sept 2016-Sept 2017
University of California, Davis

2018 UC Davis Plant Science Symposium Committee President Sept 2016-Apr 2017
University of California, Davis

2017 UC Davis Plant Science Symposium Committee Member Sept 2016-Apr 2017
University of California, Davis

Professional Development

Board Member at the Plant Genome Journal June 2020-Sept 2021
Social Media Editor @plantgenome

Maricopa NSF Field-Based High Throughput Phenotyping Workshop Oct 2017
University of Arizona Maricopa Agricultural Center, Maricopa, AZ

RNA-seq Library Preparation and Data Analysis Workshop Feb 2017
UC Davis DNA Tech Core, Davis, CA

Genome Assembly and Analysis Workshop Dec 2016
UC Davis Bioinformatics Core, Davis, CA

Writing a Dissertation or Thesis Nov 2016

University Writing Program, Davis, CA
Tucson Winter Plant Breeding Institute Jan 2015
University of Arizona

Fellowships, Awards, and Features

2019 UC Davis Henry A. Jastro Graduate Research Fellowship ($3,000)
2019 UC Davis Horticulture & Agronomy Graduate Fellowship ($1,000)
2018 UC Davis Henry A. Jastro Graduate Research Fellowship ($3,000)
2018 UC Davis Horticulture & Agronomy Graduate Fellowship ($1,000)
2018 UC Davis January Plant Breeding Center Featured Student
2017 UC Davis Henry A. Jastro Graduate Research Fellowship ($2,580)
2017 UC Davis Horticulture & Agronomy Graduate Fellowship ($1,000)
2017 NSF Field-Based High Throughput Phenotyping Travel Award

Journals Reviewed

Emerging Technologies in Life Science
G3: Genes | Genomes | Genetics
The Plant Phenome Journal
The Plant Genome Journal
Horticulture Research
Plant Methods
Heredity
Genome Biology