STEPHANIE P. KLEIN

USDA-NIFA Postdoctoral Fellow

I am an experienced root biologist with expertise in physiology, multi-trait interactions, and plant growth under a variety of environmental stresses. My work is multi-discplinary by integrating high throughput phenotyping, image analysis, intensive physiology studies, statistical analyses, and genetics. Now, I am seeking to bridge the gap between genotype and phenotype by incorporating genomics and transcriptomics with plant physiology to understand how root responses to variable nitrogen availability are controlled.

EDUCATION

2020 — **The Pennsylvania State University**
Ph.D. in Plant Biology — University Park, PA, USA

Thesis: Functional implications and association mapping of root hydraulic traits for improved drought tolerance in maize (Zea mays L.)

2013 — **University of Illinois at Urbana-Champaign**
B.S. in Integrative Biology — Urbana, IL, USA

RESEARCH EXPERIENCE

Present | 2021 — **Postdoctoral Researcher**
Iowa State University — Ames, IA, USA
- Building a model to predict root phenotypes and nitrogen stress responsiveness using transposable element-derived genotypic variation.
- Using RNAseq to identify differentially expressed genes and TEs and to infer changes at the network scale.

2020 | 2014 — **Graduate Research Assistant**
The Pennsylvnia State University — University Park, PA, USA
- Performed physiology and genetics studies underlying the responses of contrasting root anatomical phenotypes to drought conditions.
- Coordinated maize field projects for a multi-national team of researchers at two facilities.

2014 | 2013 — **Research Associate**
Chromatin, Inc. — Champaign, IL, USA
- Used tissue culture and molecular biology methods (DNA isolation, plasmid DNA assembly and sequencing, PCR, gel electrophoresis) for improvement of sorghum as a bioenergy crop.

2013 | 2011 — **Undergraduate Research Assistant**
Carl R. Woese Institute for Genomic Biology — Urbana, IL, USA
- Assisted with a variety of projects studying physiological responses to drought and elevated CO2 in field-grown soybean.
- Generated and analyzed a photo library collected from minirhizotrons tracking root growth over the field season.

GRANTS

2024 | 2022 — **USDA-AFRI Postdoctoral Fellowship**
Grant no. 2022-67012-37220 “The genomic basis of root phenotypes for improved nitrogen capture”, $225,000

2022 | 2017 — **USDA-AFRI**
Grant no. 2017-67013-26192 “Optimizing root metaxylem phenotypes to improve drought tolerance in maize”, $470,000
- Wrote with PhD advisor, Dr. Jonathan P. Lynch (PI on proposal).

CONTACT INFO

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Google Scholar Profile
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For more information, please contact me via email.

SKILLS

Full experience with field design, statistical analysis, and genome-wide association studies.

Budding skills with RNA-sequencing, gene networks, and genomics.

Highly skilled in data analysis and visualization with R.

*This resume was made with **pagedown**.*

Last updated on 2022-08-19.

2016 **Huck Graduate Research Innovation Award**
$5,000

2012 **American Society of Plant Biologists Summer Undergraduate Research Fellowship**
$4,000 + registration to annual ASPB meeting

AWARDS

2020 **American Society of Plant Biologists Early Career Service Award**

2020 **Huck Graduate Student Travel Award**

2019 **American Society of Plant Biologists Annual Meeting Travel Award**

2017 **Penn State University College of Agricultural Sciences Travel Award**

TEACHING EXPERIENCE

2022 **Exploring the Life Sciences**
Guest Lecturer of BIOL 113X at ISU — Ames, IA, USA

2021 **Translating Your IB Degree into Career Success**
Guest Panelist of IB 210 at UIUC (virtual)

2022 | 2021 **Analytical Genetics**
Guest Lecturer of GEN 410 at ISU — Ames, IA, USA

2020 | 2015 **Plant Nutrition**
Teaching assistant of HORT402w at PSU — University Park, PA, USA

PUBLICATIONS

2022 **The evolution and function of transposons in epigenetic regulation in response to the environment.**
Current Opinions in Plant Biology 69:102277. 2022. DOI: 10.1016/j.pbi.2022.102277
Klein SP, SN Anderson.

2022 **Integrated root phenotypes for improved low nitrogen tolerance in rainfed direct-seeded rice.**
Plant, Cell & Environment, 1-18. 2022. DOI: 10.1111/pce.14284
Ajmera I, A Henry, AM Radanielson, **SP Klein,** A Ianevski, MJ Bennett, LR Band, JP Lynch.

2021 **Root anatomy and soil resource capture.**
Plant and Soil 446:21-63. 2021. DOI: 10.1007/s11104-021-05010-y
Lynch JP, CF Strock, HM Schneider, JS Sidhu, I Ajmera, T Galindo-Castañeda, **SP Klein,** MT Hanlon.

2020 **Multiple integrated root phenotypes are associated with improved drought tolerance.**
Plant Physiology 183(3):1011-1025. 2020. DOI: 10.1104/pp.20.00211
Klein SP, HM Schneider, A Perkins, K Brown, J Lynch.

2020 **Genetic control of root anatomical plasticity in maize.**
The Plant Genome. 2020. DOI: 10.1002/tpg2.20003
Schneider HM, **S Klein,** MT Hanlon, S Kaeppler, KM Brown, JP Lynch.

2020 **Genetic control of root architectural plasticity in maize.**
Journal of Experimental Botany 71(10):3185-3197. 2020. DOI: 10.1093/jxb/eraa084
Schneider HM, **S Klein,** MT Hanlon, EA Nord, S Kaeppler, KM Brown, A Warry, R Bhosale, JP Lynch.

2018 **The xerobranching response represses lateral root formation when roots are not in contact with water.**
Current Biology 28(19):3165-3173. 2018. DOI: 10.1016/j.cub.2018.07.074
Orman-Ligeza B, EC Morris, B Parizot, T Lavigne, A Babé, A Ligeza, **S Klein,** C Sturrock, W Xuan, O Novák, K Ljung, MA Fernandez, PL Rodriguez, IC Dodd, I De Smet, F Chaumont, H Batoko, C Périlleux, JP Lynch, MJ Bennett, T Beeckman, X Draye.

2016 **Intensifying drought eliminates the expected benefits of elevated carbon dioxide in soybean.**
Nature Plants 2:16132. 2016. DOI: 10.1038/nplants.2016.132
Gray SB, O Dermody, **SP Klein,** AM Locke, JM McGrath, RE Paul, DM Rosenthal, UM Ruiz-Vera, MH Siebers, R Strellner, EA Ainsworth, CJ Bernacchi, SP Long, DR Ort, ADB Leakey.

PRE-PRINTS

2020 **Shared genetic architecture underlying root metaxylem phenotypes under drought stress in cereals.**
bioRxiv. 2020. DOI: 10.1101/2020.11.02.365247
Klein SP, JE Reeger, S Kaeppler, K Brown, J Lynch.

PRESENTATIONS

ORAL

2022 **Gordon Research Conference on Salt and Water Stress in Plants**
Multiple integrated root phenotypes are associated with drought tolerance in maize.
Les Diablerets, CH

2021 **Zeavolution Virtual Seminars**
Unearthing relationships between transposable elements and root abiotic stress responses.

2020 **Penn State University Plant Biology Seminar**
Integrated root phenotypes associated with improved drought tolerance in maize.
University Park, PA, USA

2020 **Iowa State University - Department of Agronomy Seminar**
Integrated root phenotypes associated with improved drought tolerance in maize.
Ames, IA, USA

2019 **Maize Genetics Meeting**
Root metaxylem as a novel target for improved drought tolerance in maize.
St. Louis, MO, USA

2018 **Gordon Research Seminar in Salt and Water Stress in Plants**
Do smaller root metaxylem vessels improve drought tolerance in maize?
Waterville Valley, NH, USA

2017 **Join International Sweet Corn Development Association and the Corn Breeding Research Annual Meeting**
Identifying root phenes for improved maize performance in nitrogen- and water-limited environments.
Chicago, IL, USA

POSTERS

2022 **Maize Genetics Meeting**
Transposable element-mediated genotypic variation likely mediates root responses to nitrogen stress.
St. Louis, MO, USA
SP Klein, SN Anderson.

2019 **ASPB Plant Biology 2019**
Root metaxylem as a novel target for improved drought tolerance in maize.
San Jose, CA, USA
SP Klein, S Kaeppler, K Brown, J Lynch.

2019 **Plant Vascular Biology**
Root metaxylem as a novel target for improved drought tolerance in maize.
Monterey, CA, USA
SP Klein, S Kaeppler, K Brown, J Lynch.

2018 **ASPB Plant Biology 2018**
Smaller root metaxylem vessels for improved drought tolerance in maize.
Montreal, QC, CA
SP Klein, S Kaeppler, K Brown, J Lynch.

2017 **Xylem International Meeting**
Identifying genes underlying maize root metaxylem plasticity in response to drought.
Bordeaux, FR
SP Klein, S Kaeppler, K Brown, J Lynch.

2017 **University of Missouri Interdiscplinary Plant Group Symposium**
Root metaxylem: Discovering new phenes for drought tolerance in maize.
Columbia, MO, USA
SP Klein, S Kaeppler, K Brown, J Lynch.

2016 **ASPB Plant Biology 2016**
Root metaxylem: Discovering new phenes for drought tolerance in maize.
Austin, TX, USA
SP Klein, S Kaeppler, K Brown, J Lynch.

2013 **ASPB Plant Biology 2013**
Minirhizotron imaging shows strong interaction effects of drought and elevated CO2 on soybean nodulation in a Free-Air CO2 Enrichment field experiment.
Providence, RI, USA
SP Klein, R Paul, SB Gray, ADB Leakey.

SERVICE

PROFESSIONAL SERVICE

Present | 2021 **Postdoc Representative**
Iowa State Department of Genetics, Cell, and Developmental Biology Graduate Student and Postdoc Association

2022 | 2021 **Graduate Council Representative**
Iowa State Postdoc Association

2022 | 2018 **Chair**
Gordon Research Seminar on Salt and Water Stress in Plants

2022 **Iowa State Science Fair Judge**
Junior and senior levels

2021 | 2018
Advisory Council
American Society of Plant Biologists, Environmental ecology and plant physiology section

2020 | 2018
Ambassador Alliance Chair
American Society of Plant Biologists

2020 | 2015
Ambassador
American Society of Plant Biologists

2019 | 2015
Graduate Student Representative
American Society of Plant Biologists, Membership Committee
• Oversaw the redesign of ASPB's ambassador program

2017 | 2015
Plant Biology Program Representative
Huck Graduate Student Advisory Committee

2017 | 2015
Student-invited speaker liaison
Penn State Plant Biology Program

OUTREACH

Present | 2021
Alumni Mentor
University of Illinois, School of Integrative Biology
• Serve as a resource for current or recently graduated students as they develop their career paths.
• Participated in various panels and virtual mentoring events.

Present | 2017
Scientist Mentor
PlantingScience
• Assist students virtually with experiments they conduct as part of a plant biology-based learning module.

2022
Mentor
Iowa State Research Experiences for Teachers — Ames, IA, USA
• Mentored a public school teacher for 6 weeks to provide hands-on training to supplement the teacher's development of new lesson plans.

2020
Nutrients In a Nutshell
Co-host with Christopher Strock
• YouTube Series that quickly summarizes the role of key nutrients for plant growth that's gotten over 20K views.
• Example: Nitrogen Deficiency in Plants

2016
White House Easter Egg Roll
American Society of Plant Biologists Booth Attendant — Washington, D.C., USA
• Interacted with attendees and communicated basic needs for optimal plant growth.

REVIEWER

New Phytologist, BMC Genomics, BMC Plant Biology, Plant Genome, Plant and Soil, Theoretical Applied Genetics.

PROFESSIONAL MEMBERSHIPS

- **American Society of Plant Biologists, Maize Genetics Cooperation, International Society of Root Research, North American Plant Phenotyping Network**