

**DARSHI BANAN, PhD**  
Postdoctoral Researcher  
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## Education

2019

**PhD** in Plant Biology, Advisor: Dr Andrew Leakey  
University of Illinois Urbana-Champaign – Urbana IL  
Dissertation: “*Phenotypic and genetic variation in the architectural responses of a C<sub>4</sub> grass to drought stress*”  
<http://hdl.handle.net/2142/106244>

2012

**BSc** in Plant Biology, Advisor: Dr Elizabeth VanVolkenburgh  
University of Washington Seattle – Seattle WA

## Research Interests

Climate change adaptation, Plant ecophysiology, Agricultural and forestry improvement

## Research Experience

2024 – present

Postdoctoral Researcher, Advisor: Scott Q Turn,  
School of Ocean and Earth Science and Technology, University of  
Hawai'i – Manoa HI

- “**Hawai'i Climate-Smart Commodities Program**: A portfolio approach to equitably scaling the agricultural sector.”
- Sustainable aviation fuel feedstocks: Evaluation of **tropical oilseed trees**.

2021 - 2024

Postdoctoral Scholar, Advisor: Dr Soo-Hyung Kim,  
School of Environmental and Forest Science, University of  
Washington – Seattle WA

- “**EndoPopulus**: Elucidation of the roles of diazotrophic endophyte communities in promoting productivity and resilience of *Populus* through systems biology approaches.”
- “**Climate Ready Landscape Plants**”: Irrigation deficit response of landscape plants in replicated trials across the Western US.

2012 – 2019

Graduate Research Assistant, Advisor: Dr Andrew Leakey,  
Department of Plant Biology, University of Illinois Urbana-  
Champaign – Urbana IL

- “A systems-level analysis of drought and density response in the model C<sub>4</sub> grass *Setaria viridis*.”

2010 – 2012

Independent Researcher, Advisor: Dr Elizabeth VanVolkenburgh,  
University of Washington – Seattle WA

- Leaf movement and pod harvest index as markers of drought tolerance in **Phaseolus vulgaris**.

2010

Research Assistant, Advisor: Dr Caroline Stromberg,  
Department of Biology, University of Washington – Seattle WA

- Response of **bamboo** epidermal cell morphology to light.

### Peer reviewed publications

\* Indicates undergraduate or MS first author.

1. **Banan D**, Sher AW, Doty SL, Kim SH. (2024) Endophyte mediated *Populus trichocarpa* water use efficiency is dependent on time of day and plant water status. *APS Phytobiomes*. <https://doi.org/10.1094/PBIOMES-11-22-0077-R>
2. Parasurama S\*, **Banan D**, Yun KD, Doty SL, Kim SH. (2023) Bridging time-series image phenotyping and functional-structural plant modeling to predict adventitious root system architecture. *Plant Phenomics*. <https://doi.org/10.34133/plantphenomics.0127>
3. Prakash PT, **Banan D**, Paul RE, Feldman MJ, Xie D, Freyfogle L, Baxter I, Leakey ADB. (2021) Correlation and co-localization of QTL for stomatal density, canopy temperature, and productivity with and without drought stress in *Setaria*. *J Exp Bot*. <https://doi.org/10.1093/jxb/erab166>
4. **Banan D**, Paul RE, Feldman MJ, et al. (2018) High-fidelity detection of crop biomass quantitative trait loci from low-cost imaging in the field. *Plant Direct*. 2:1-8. <https://doi.org/10.1002/pld3.41>
5. Feldman MJ, Paul RE, **Banan D**, Barrett JF, Sebastian J, Yee M-C, et al. (2017) Time dependent genetic analysis links field and controlled environment phenotypes in the model C<sub>4</sub> grass *Setaria*. *PLoS Genet*. 13(6): e1006841. <https://doi.org/10.1371/journal.pgen.1006841>

### Invited Presentations

1. Endophytes modify host carbon and water relations to improve *Populus trichocarpa* responses to drought stress. (2022) *Plant Biology, American Society of Plant Biologists*. Portland, OR, USA
2. Influence of leaf rolling on canopy light environment and biomass responses revealed by hemispherical imaging in *Setaria*. (2017) *International Setaria Genetics Conference*. St Louis MO, USA
3. Leaf Rolling: Grass movement for crop improvement. (2017) *Department of Crop Sciences*. Urbana, IL, USA
4. High fidelity detection of QTL for biomass production from rapid imaging of a C<sub>4</sub> grass crop in the field. (2015) *Institute for Genomic Biology*. Urbana, IL, USA

### Abstracts and Conference Proceedings

1. **Banan D**, Dale R, Baxter I, Leakey AL. (2023) How do grass internode patterns emerge? *Plant Signaling and Behavior*. Seattle, WA, USA
2. **Banan D**, Chung SW, Jeon JJ, Hendrickson M, Parasurama S, Sher A, Tournay R, Aufrecht J, Ahkami A, Doty SL, Kim SH. (2023) EndoPopulus: Endophyte inoculation enhances *Populus* physiological responses to abiotic stress. *DOE BSSDPI Meeting*. Bethesda, MD, USA
3. Doty S, Sher A, Tournay R, **Banan D**, et al. (2023) Elucidation of the Roles of Diazotrophic Endophyte Communities in Promoting Productivity and Resilience of *Populus* through Systems Biology Approaches. *DOE BSSDPI Meeting*. Bethesda, MD, USA
4. Dale R, **Banan D**, Shankar Mukherji, et al. (2023) Competition for resources during semi-sequential growth of developmental units drive allometric patterns in the grass *Setaria*. *NAPPN Annual Conference*. St. Louis, MO, USA
5. Dale R, **Banan D**. (2022) Understanding factors affecting internode length variability in *Setaria* using mathematical modeling. *Plant Biology, American Society of Plant Biologists*. Portland, OR, USA
6. Hendrickson M, **Banan D**, Tournay R, Doty SL, Kolodner Z, Valentine L, Kim SH. (2022) Impact of *Salicaceae* endophytes on the epidermal patterning, stomatal dynamics, and mesophyll conductance of *Populus trichocarpa* in response to water stress. *Plant Biology, American Society of Plant Biologists*. Portland, OR, USA
7. Parasurama S, **Banan D**, Tournay R, Doty SL, Valentine L, Kolodner Z, Kim SH. (2022) *Salicaceae* endophytes influences on *Populus* root architecture. *Plant Biology, American Society of Plant Biologists*. Portland, OR, USA
8. Barrett J, **Banan D**, Hubbard A, et al. (2021) Phenotyping for water use efficiency and related traits in C<sub>4</sub> grasses *Setaria* and *Sorghum*. *DOE BSSDPI meeting*. Bethesda, MD, USA
9. **Banan D**, Paul REP, Holmes M, Schlake H, Feldman MJ, Baxter I, Leakey ADB. (2016) High fidelity detection of QTL for biomass production from rapid imaging of a C<sub>4</sub> grass crop in the field. *Phenotypic Prediction: Image Acquisition and Analysis*. Ames, IA, USA
10. **Banan D**, Paul REP, Feldman MJ, Baxter I, Leakey ADB, Brutnell TP. (2016) High fidelity detection of QTL for biomass production from rapid imaging of a C<sub>4</sub> grass crop in the field. *DOE Genomic Science PI Meeting*. Bethesda, MD, USA

11. **Banan D**, Paul RE, Feldman MJ, Baxter I, Leakey ADB. (2015) Rapid hemispherical photographic phenotyping of productivity and canopy dynamics in a *Setaria* RIL population. *Maize Genetics Conference*. St Charles, IL, USA
12. **Banan D**, Holmes M, Paul RE, Schlake H, Baxter I, Leakey ADB. (2015) Rapid hemispherical photographic phenotyping of productivity and canopy dynamics in a *Setaria* RIL population. *Plant and Animal Genome Conference*. San Diego, CA, USA
13. **Banan D**, Neuhaus MJ, Leakey ADB. (2013) Screening of a *Setaria viridis* x *italica* RIL population for stomatal patterning variation in responses to density and drought treatment. *University of Illinois Plant Biology Department Fall Welcome*. Urbana, IL, USA
14. **Banan D**, VanVolkenburgh E. (2012) Growth response of common bean (*Phaseolus vulgaris* L.) lines to water deficit. *Bean Improvement Cooperative*. Mayaguez, P.R.

### **Supervision and Mentorship of Student Research**

- 2023 Allison Fron, University of Washington Seattle, *M.S. student*: “Climate Ready Landscape Plants: Aesthetic qualities and physiology of landscape plants in water deficit conditions across the Western U.S.”
- 2023 Matthew Hendrickson, University of Washington, *M.S. student*: “Endophyte inoculation alters the stomatal patterning and improves the intrinsic water-use efficiency of black cottonwood.”
- 2023 Zohar Kolodner, University of Washington Seattle, *Mary Gates Undergraduate Research Scholar*: “How inoculation method effects endophyte colonization and plant health in poplar.”
- 2023 Leah Marie Valentine, University of Washington Seattle, *Mary Gates Undergraduate Research Scholar*: “Cost-benefit analysis of Populus-endophyte symbiosis across varying inoculation methods.”
- 2022 Sriram Parasurama, University of Washington Seattle, *Mary Gates Undergraduate Research Scholar*: “RhizoPop: a novel phenotyping and modeling platform for Poplar roots and their stress responses.”
- 2016 Finey Ruan, University of Illinois Urbana Champaign, *Undergraduate Integrative Biology Honors Thesis*: “Quantitative Trait Loci (QTL) analysis of seed head traits under wet and dry conditions in the model C4 grass, *Setaria*.”
- 2014 Mark Holmes, University of Urbana Champaign, *Undergraduate Crop Sciences Honors Thesis*: “Quantitative genetic analysis of tiller angle as a target for improved radiation use efficiency in C4 crops.”

### **Teaching Experience**

- 2014 – 2018 Graduate Teaching Assistant, Introductory Biology (2 semesters), Environmental Biology (2 semesters), University of Illinois Urbana-Champaign – Urbana IL
- 2012 Teaching Intern, Plant Ecophysiology, University of Washington – Seattle WA
- 2010 Peer Teaching Assistant, Plant Identification and Systematics, University of Washington – Seattle WA

### **Service, Outreach, and Membership**

- 2016 – 2017 Outreach Coordinator, Plant Biology Association of Graduate Students, University of Illinois Urbana Champaign – Urbana IL
- 2014 – 2015 Colloquium Coordinator, Plant Biology Association of Graduate Students, University of Illinois Urbana Champaign – Urbana IL
- 2013 – 2014 Outreach Coordinator, Plant Biology Association of Graduate Students, University of Illinois Urbana Champaign – Urbana IL

Ad hoc reviewer: Plant Direct, Plant Cell and Environment, Nature Scientific Reports

Member: American Society of Plant Biologists (ASPB), Environmental and Ecological Plant Physiology (EPP) Section

### **Awards and Fellowships**

- 2016 Poster Contest 2<sup>nd</sup> Place, Phenotypic Prediction: Image Acquisition and Analysis Workshop
- 2015 Govindjee and Rajni Govindjee Award for Excellence in Plant Biology
- 2015 Scherago International Student Travel Grant, Plant and Animal Genome Conference
- 2014 University of Illinois List of Teachers Ranked as Excellent by their Students
- 2011 Howard Hughes Medical Institute Research Fellowship

### **Other Professional and Volunteer Work**

- 2022 - 2023 Volunteer STEM Mentor, World Relief Western Washington – Kent WA
- 2020 Community Garden Specialist, World Relief Seattle, AmeriCorps – Kent WA

- 2012 – 2017 Volunteer Horticulturist, University of Illinois Plant Biology Greenhouse – Urbana IL
- 2012 – 2017 Volunteer Docent, University of Illinois Plant Biology Greenhouse – Urbana IL
- 2012 – 2017 Volunteer Citizen Science Partner, Osher Lifelong Learning Institute – Urbana IL
- 2010 – 2012 Volunteer Student Gardener, University of Washington Center for Urban Horticulture, UW Farm – Seattle WA

**Professional Training**

LI-COR LI-6800 Training Course (2021) LI-COR, University of Washington Seattle, Seattle WA

Tucson Plant Breeding Institute (2018) Bio5 Institute, University of Arizona, Tucson AZ

LI-COR LI-6400 Training Course (2013) LI-COR, University of Illinois Urbana Champaign, Urbana IL