LA-UR-23-20188

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Title: Virtual tour of LANL plant science capabilities

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Intended for: USDA Forest Service Southern Office researcher visit Jan 11, 2023

Issued: 2023-01-09

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Virtual tour of LANL plant science capabilities

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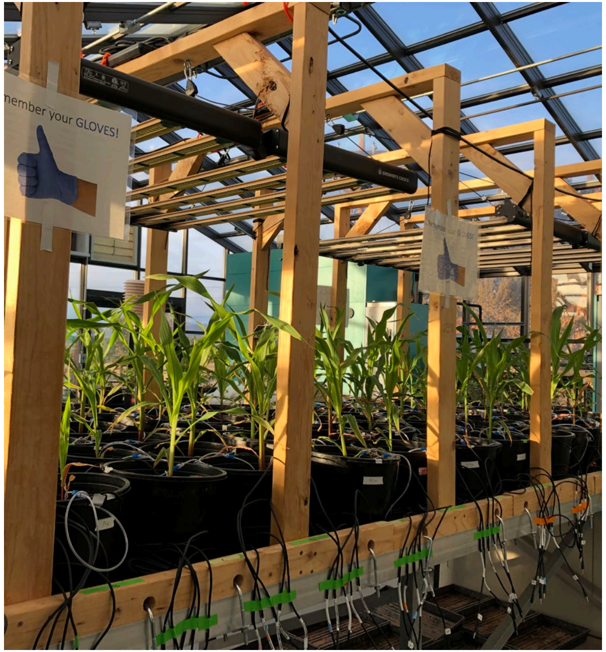
Earth and Environmental Sciences Division
Los Alamos National Laboratory

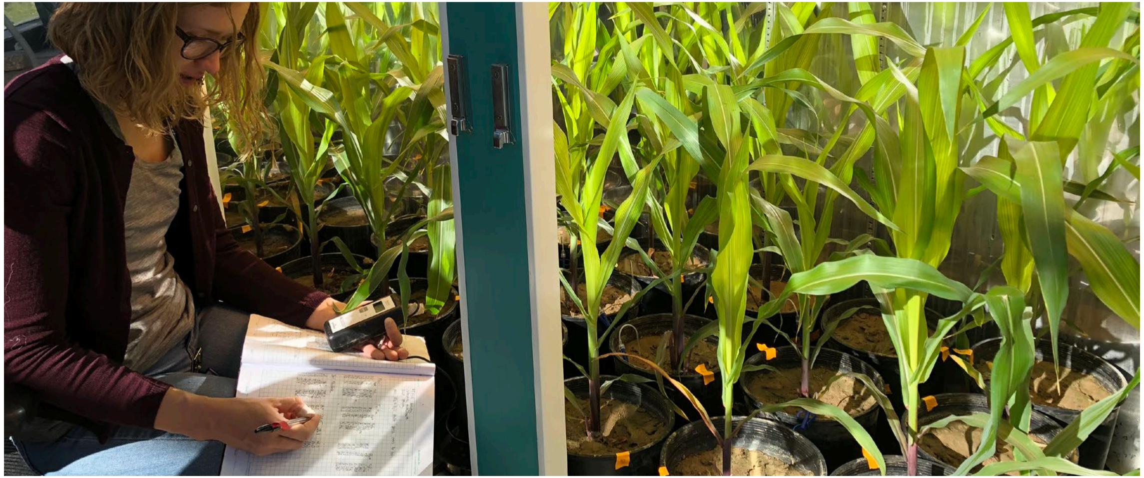
USDA Forest Service visit, January 11th, 2023

- Climate change effects and mitigation
- Climate action verification
- Food and biofuel security
- Plants as biosensors

LANL Greenhouse capability



Temperature and light control, ambient humidity



Two walk-in size climate-controlled growth chambers: Temperature, humidity, light, CO_2


61.0


LI-COR


Remember your GLOVES!

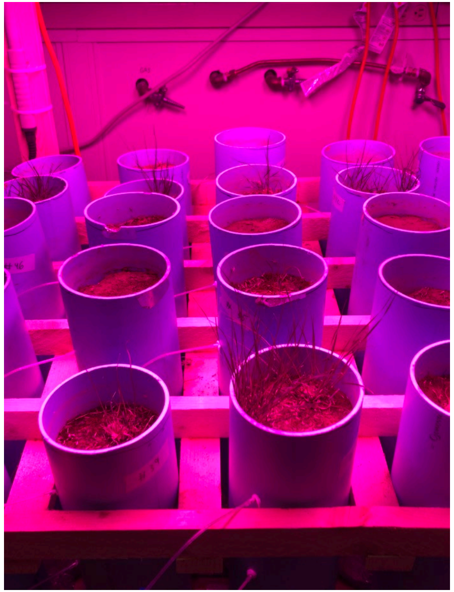
Experimental capabilities

Microbial inoculations

Isotopic labeling

Natural soil hydrology

Natural soil stratification



Climate change effects


PHEN
J108.1

Plant, Cell & Environment
Plant, Cell and Environment (2013) doi: 10.1111/pce.12141

How do trees die? A test of the hydraulic failure and carbon starvation hypotheses

SANNA SEVANTO[1], NATE G. MCDOWELL[1], L. TURIN DICKMAN[1], ROBERT PANGLE[2] & WILLIAM T. POCKMAN[2]

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[2]Department of Biology, University of New Mexico, 219 Yale Blvd., Albuquerque, NM 87131, USA

Plant, Cell & Environment
Plant, Cell and Environment (2017) 40, 1861–1873 doi: 10.1111/pce.12991

Original Article

Tree water dynamics in a drying and warming world

Charlotte Grossiord[1], Sanna Sevanto[1], Isaac Borrego[1], Allison M. Chan[1], Adam D. Collins[1], Lee T. Dickman[1], Patrick J. Hudson[2], Natalie McBranch[1], Sean T. Michaletz[1], William T. Pockman[2], Max Ryan[1], Alberto Vilagrosa[3] & Nate G. McDowell[4]

nature ecology & evolution ARTICLES
DOI: 10.1038/s41559-017-0248-x

A multi-species synthesis of physiological mechanisms in drought-induced tree mortality

Effects of Soil Microbes on Functional Traits of Loblolly Pine (*Pinus taeda*) Seedling Families From Contrasting Climates

Danielle E. M. Ulrich[1], Sanna Sevanto[2], Samantha Peterson[3], Max Ryan[2] and John Dunbar[4]*

ORIGINAL ARTICLE

WILEY Plant, Cell & Environment

Stem radial growth and water storage responses to heat and drought vary between conifers with differing hydraulic strategies

Àngela Manrique-Alba[1,2] | Sanna Sevanto[3] | Henry D. Adams[4] | Adam D. Collins[3] | Lee T. Dickman[3] | Esteban Chirino[5] | Juan Bellot[1,2] | Nate G. McDowell[6]

Ectomycorrhizal and Dark Septate Fungal Associations of Pinyon Pine Are Differentially Affected by Experimental Drought and Warming

Catherine Gehring[1], Sanna Sevanto[2], Adair Patterson[1], Danielle E. M. Ulrich[3] and Cheryl R. Kuske[4]*

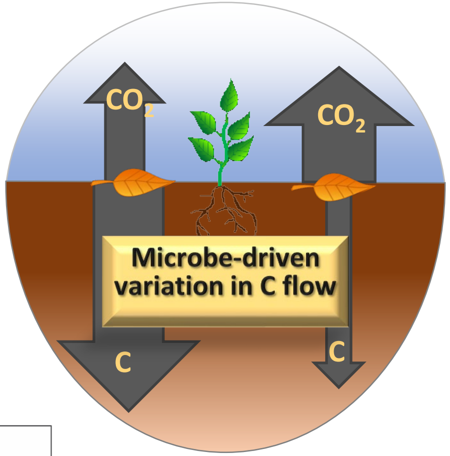
Root exudate composition reflects drought severity gradient in blue grama (*Bouteloua gracilis*)

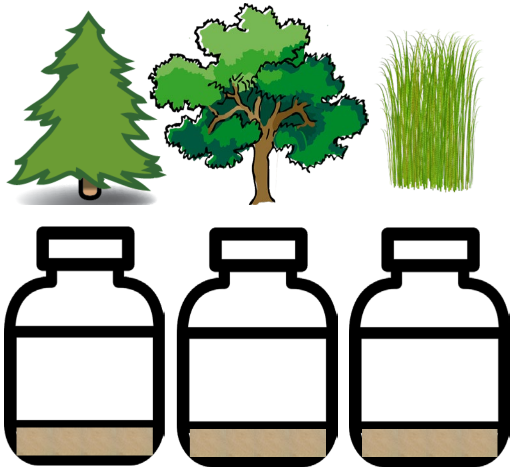
Danielle E. M. Ulrich[1✉], Chaevien S. Clendinen[2], Franklin Alongi[3], Rebecca C. Mueller[4], Rosalie K. Chu[2], Jason Toyoda[2], La Verne Gallegos-Graves[5], Hannah M. Goemann[6], Brent Peyton[7], Sanna Sevanto[8] & John Dunbar[5]

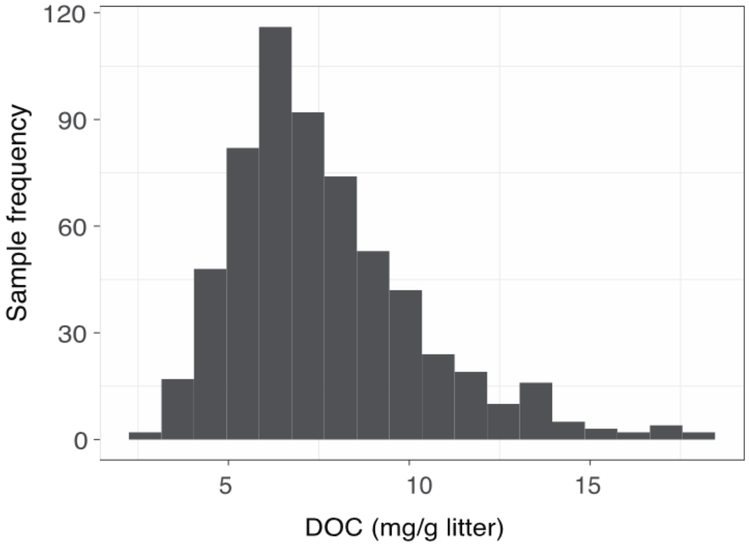
Microbial impacts on terrestrial carbon cycling:

-DOE BER BSSD SFA

-Litter decomposing microbiomes differ in DOC and CO_2 production







Microbial impacts on terrestrial carbon cycling:

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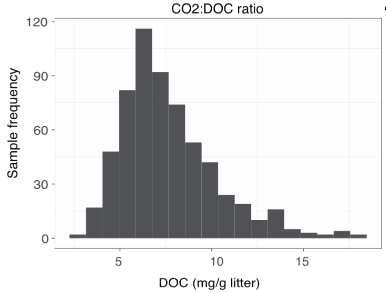
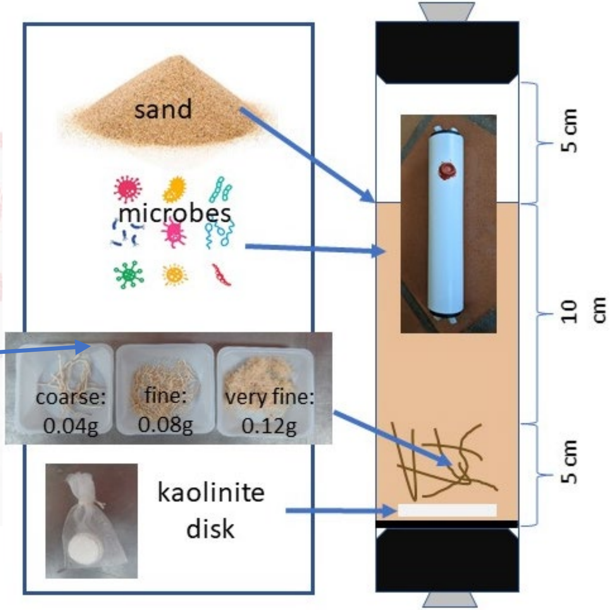
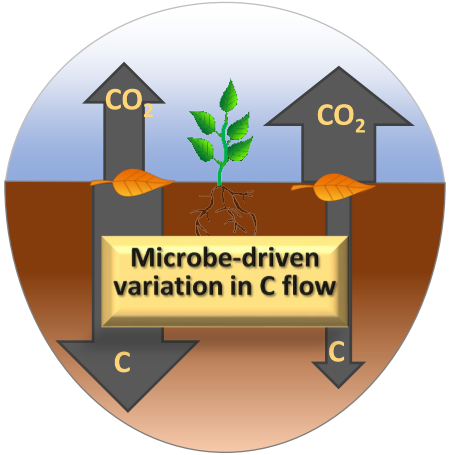
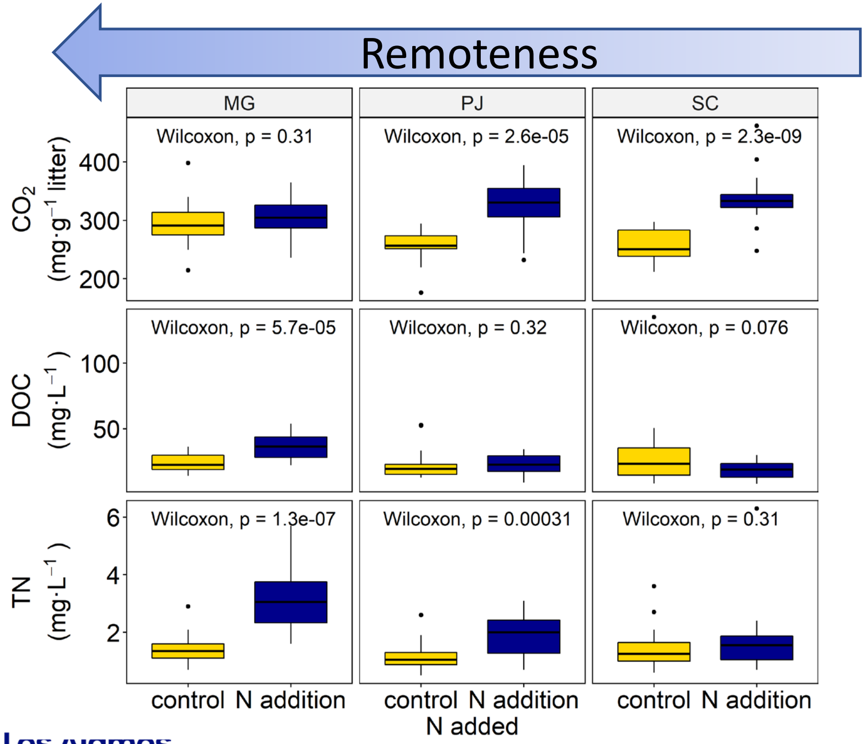
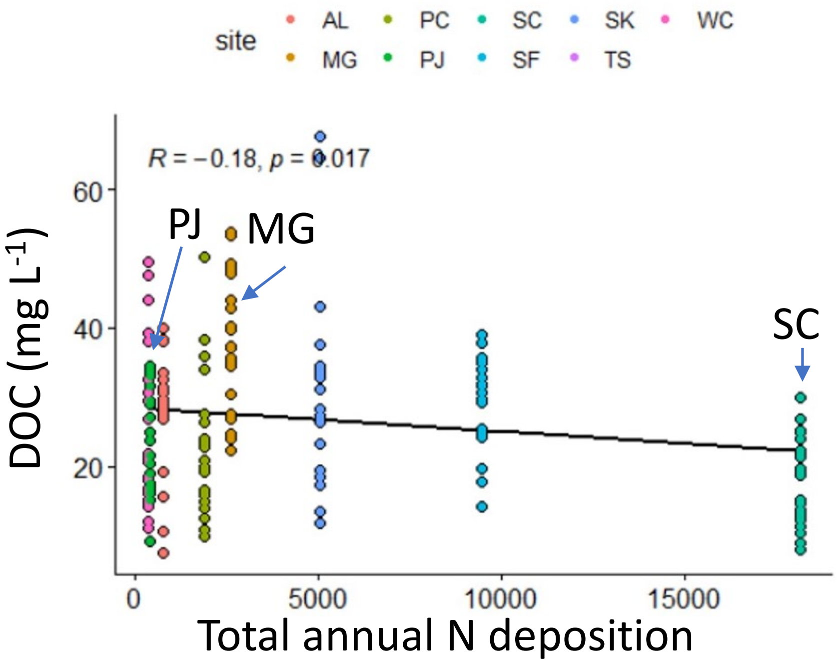






Proximity to human habitat increases microbial N use efficiency during subsurface litter decomposition and leads to increased CO_2 release

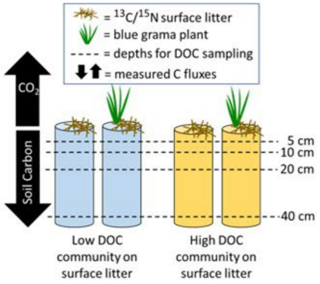




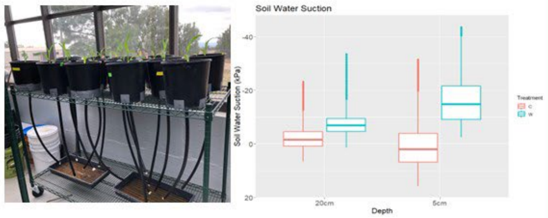
De Van et al. *in prep*

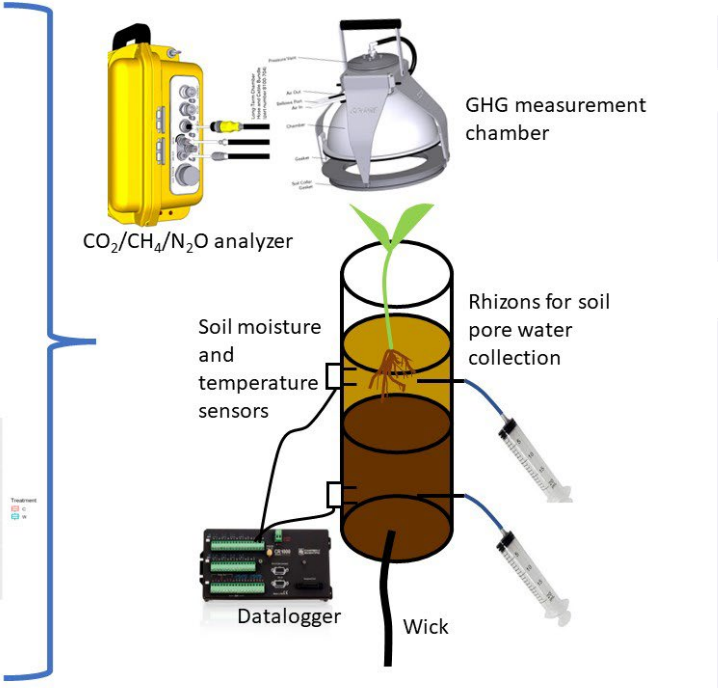
Climate action verification

SFA



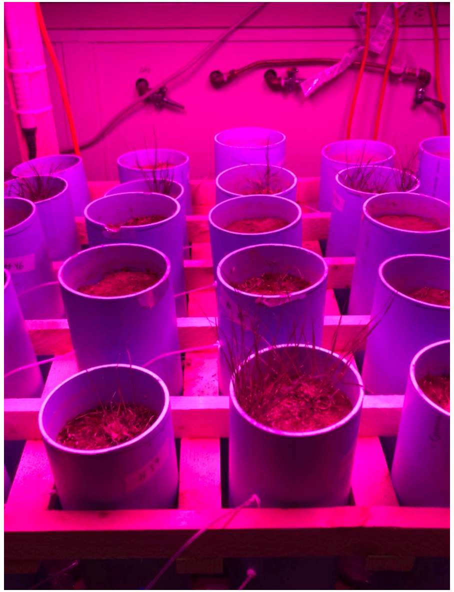
LDRD DR project

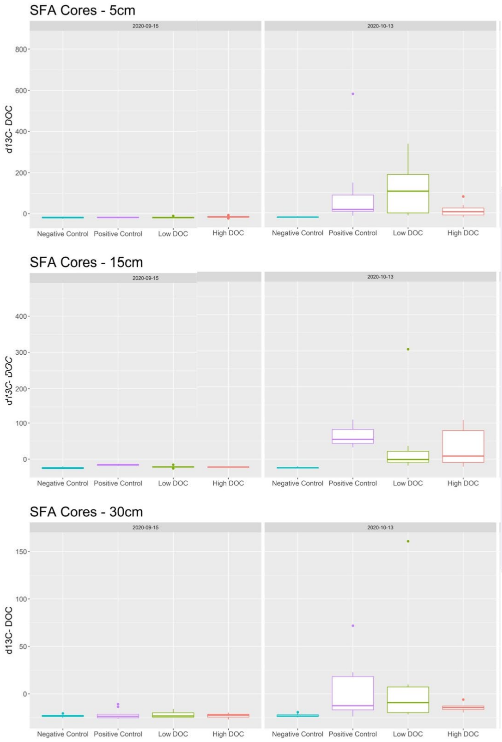


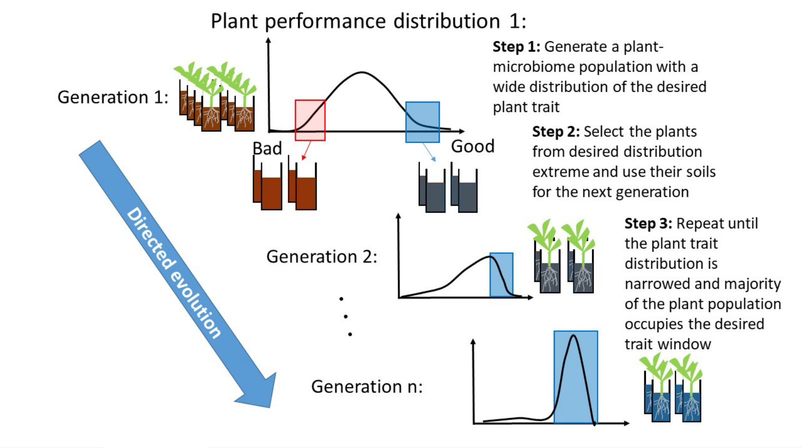


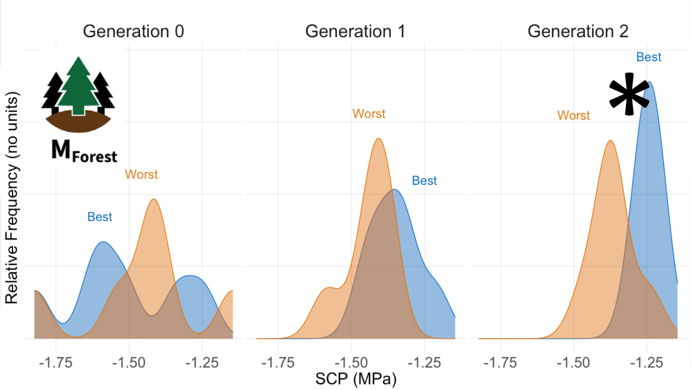
Climate change mitigation and food security:

Microbial systems to control carbon cycling and plant drought tolerance









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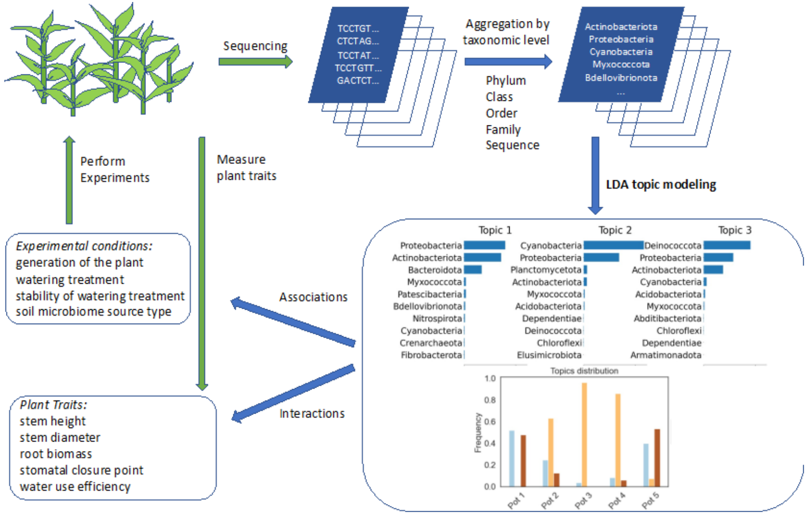
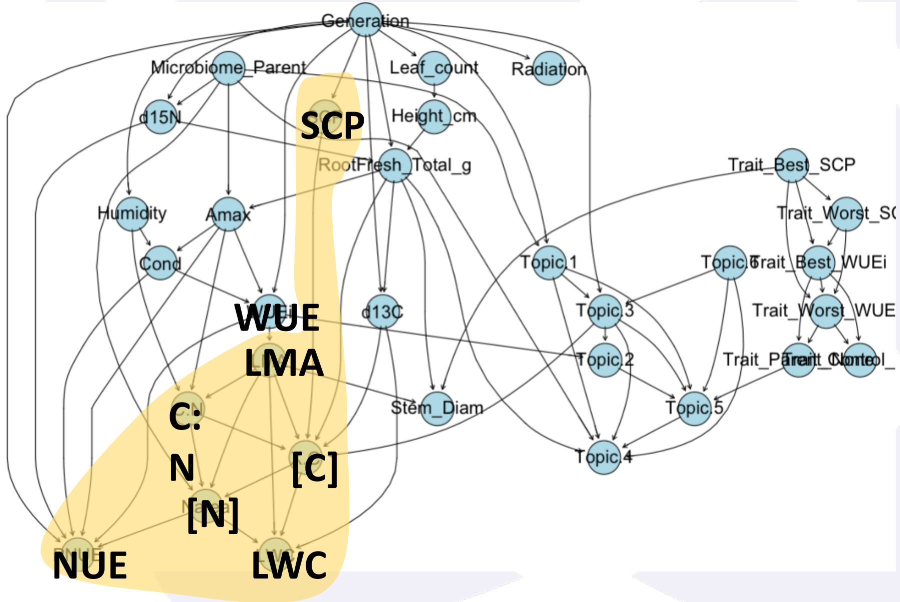
Machine learning to understand complex systems

Dimensional reduction using Latent Dirichlet Allocation

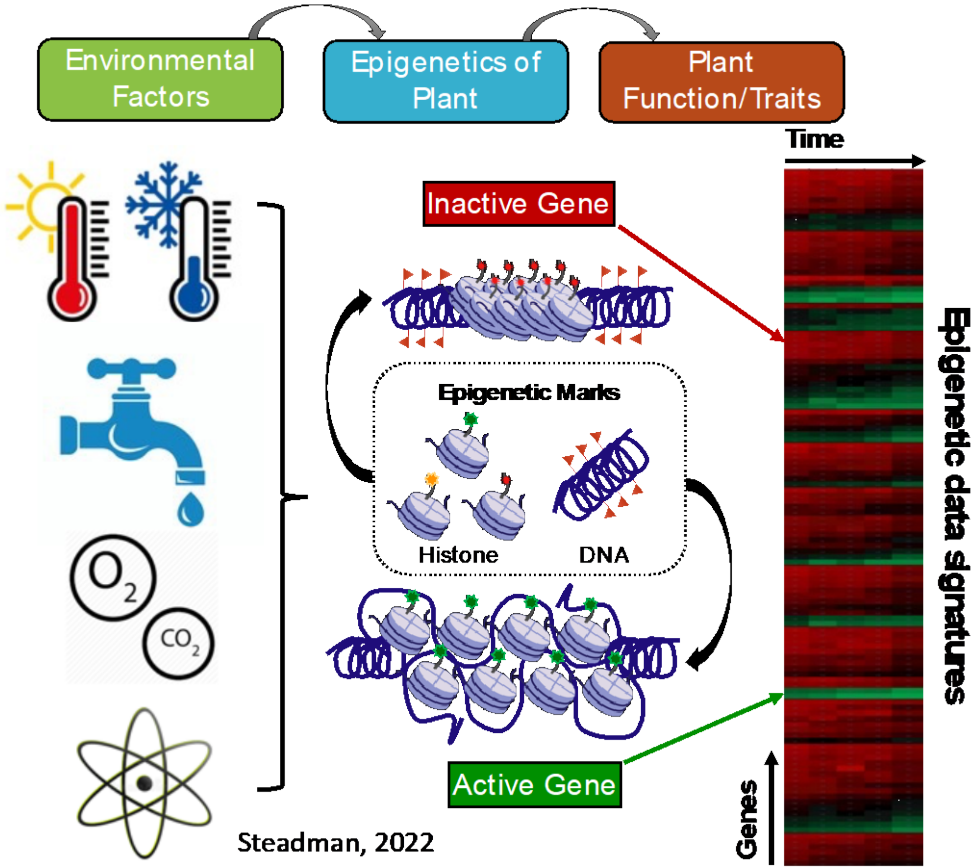


Non-linear interactions with Probabilistic Graphical Modeling



Epigenetics for plants

Christina Steadman EES-14



Steadman, 2022

Plants as biosensors
Radiological Control Area