Houston Saxe

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Summary

Bioinformatics scientist/analyst in the Dandekar lab with four years of coding experience and six years of experience in molecular biology research. Experience analyzing gene expression data from the command line to R, developing shiny web apps to analyze data, and creating machine learning models to predict disease outcomes from SNPs. Published author in molecular biology research and excited to apply this knowledge in a bioinformatics context. Estimated completion of degree in early 2024.

Research/Relevant Experience

- **Dissertation**
  - **Department of Plant Sciences, UC Davis UC Davis 2016-present, Dandekar lab**
    - Study root diseases using RNAseq, QTLs, and chemical genomics
      - Shell scripting to preprocess , align, and quantify expression of RNA-seq reads
      - R coding to analyze high-feature data
        - Manipulation: dplyr, tidyr, tibble, etc.
        - Visualization: base R and ggplot2 for descriptive statistics (PCA, boxplots, etc.)
        - Differential expression analysis: limma, Modeling of genes against traits of interest
        - Developed package 'Omics-Analyst' to filter and visualize high feature data with PCA
      - Omics validation experiments
        - Use Isoxaben to Inhibit the function of a differentially expressed gene from the RNA-seq study in micro-propagated shoots and subject to pathogen challenge
      - Create machine learning models
        - Validate current QTLs
        - Discover new QTLs
        - Test QTL predictive ability
    - Consult lab members with experimental design and data analysis
    - Consult lab members and collaborators with analysis of extensive data using Shiny web applications

- **Masters Research 2016-2019**
  - Study plant metabolism along shikimic acid pathway (GalloylGlucosylTransferases, GGTs)
    - *In silico* identification and *in vivo* isolation of the genes of interest
    - *In silico* expression analysis of genes of interest
    - Creation of transgenic lines of SR1 tobacco and J1 somatic embryos expressing the gene
    - Isolation of the recombinant enzyme using immobilized metal affinity chromatography
    - *In vitro* enzymatic analysis of recombinant enzyme for substrates and products
    - *In vivo* metabolomic analysis of transgenic SR1 lines using GC-TOF-MS
  - Published thesis in *Frontiers in Plant Science*
  - Obtain funding for my project in the form of research awards

- **Research Associate**
  - **Scientific Methods Inc. March 2015-Dec 2018, Cris Wilk**
    - Almond field trial evaluating the efficacy of pheromone lures in capturing *Amyelois transitella*
      - Designed experiment
      - Setup experiment in field
      - Collect data and maintain moth traps
      - Wrote report interpreting analyzed data and submit to client

Education

University of California, Davis Ph.D. Candidate Dec 2019-present

- Doctor of Philosophy in Horticulture and Agronomy, Designated Emphasis in Biotechnology
- Dissertation: Molecular Basis of Resistance to Root Diseases in California Walnuts

- Cumulative GPA 3.62/4.00
- ***Workshop***: UC Davis Bioinformatics Core RNA-Seq Analysis Workshop, UC Davis Bioinformatics Core Intro to Python

University of California, Davis Graduate Dec 2019

- Master of Science in Horticulture and Agronomy
- Thesis: Two UGT84A Family Glycosyltransferases Regulate Phenol, Flavonoid, and Tannin Metabolism in Juglans regia (English Walnut). See publication section
- Cumulative GPA 3.54/4.00

California State University of Chico Graduate Dec 2015

- Bachelor of Science in Crops/Horticulture
- Cumulative GPA 3.41/4.00

Skills

- ***Bioinformatics***:
  - Familiar with Command Line Interface (Linux) and Bash scripting on a shared server to process and analyze RNA-seq reads
  - Familiar/Novice Python user
  - Example repo: https://github.com/hsaxe/SCRI_ROOT_bash
- ***Data Science:***
  - Intermediate/Advanced R (competent in data manipulation, analysis, and visualization of RNA-seq, proteomic, and metabolomic data)
  - Machine learning to predict disease from SNPs
  - Solid statistical foundation
  - Creating reports of results in R markdown/Quarto
  - Example repos:
    - https://github.com/hsaxe/SCRI_ROOT_R/blob/master/SCRI_ROOT_RNAs.qmd
    - https://github.com/hsaxe/Machine_Learning_QTL
- ***Programming:*** Creating Shiny apps for self and others for data analysis or visualization of complex experiments:
  - R: intermediate/advanced data analysis, visualization and manipulation
  - Python: beginner file/directory manipulation, nucleotide sequence analysis, loop writing
  - Git: Use mostly within Rstudio but some command line experience
  - R package https://github.com/hsaxe/Omics-Analyst
  - Shiny Apps:
    - Dandekar_Lab_Data_Visualization_App
    - In_Vitro_Blight_Assay_Analysis_App
    - SCRI_Phenotype_Analysis_App

- ***Extensive experience in experimental design***
- ***Published author in molecular biology***
- ***Scientific/Professional Communication***: Technical editing/manuscript preparation, presentation at professional conferences and meetings, routine lab meetings to update on research progress
- ***Soft Skills***: Good team player, effective communicator, critical thinker, positive attitude, active listener
- ***Plant Model*:** SR1 tobacco, walnut
- ***Molecular Biology*:** Western blot, SDS-PAGE, PCR, gel clean-up, in-fusion cloning, bacterial transformation, colony screening/selection, plant transformation, plant cell culture, protein extraction, protein quantitation, Immobilized Metal Affinity Chromatography, DNA/RNA extraction/quantitation, cDNA synthesis, metabolite extraction
- ***Microsoft suite:*** (Word, Excel, PowerPoint)
- ***Language***: Conversational Spanish

Publications

- **Saxe, H. J.**, Horibe, T., Balan, B., Butterfield, T. S., Feinberg, N. G., Zabaneh, C. M., Jacobson, A. E., & Dandekar, A. M. (2021). Two UGT84A Family Glycosyltransferases Regulate Phenol, Flavonoid, and Tannin Metabolism in Juglans regia (English Walnut). *Frontiers in Plant Science*, *12*(February), 1–16. https://doi.org/10.3389/fpls.2021.626483

Teaching Experience

- **Teaching Assistant BIT 1Y, Introduction to Biotechnology**
    - **Department of Plant Sciences, UC Davis, Spring 2019/2020/2021**
    - **Professor Abhaya Dandekar**
        - Run two 50-minute discussions each week
        - Proctor exams
        - Hold office hours
        - Grade all homework and group assignments through Canvas
        - Contribute ideas to class curriculum
    - **Very good to Excellent student evaluation scores and comments**

- **Teaching Assistant BIT 160, Principles of Plant Biotechnology**
    - **Department of Plant Sciences, UC Davis, Winter 2018**
    - **Professor Abhaya Dandekar**
        - Hold regular weekly office hours for undergraduate and graduate students
        - Grade assignments and exams
        - Contribute ideas to class curriculum
            - Work with Dr. Dandekar to improve exam questions and format
            - Facilitate class discussion

Awards and Grants, Funding, Honor

- **Graduate Student Researcher Award, Fellowships, and Stipends (From Horticulture and Agronomy Graduate Group)**
    - **Spring 2017 - $7,500**
    - **Winter, Spring, and Fall 2018 - $30,000**
    - **Winter, Spring, and Fall 2019 - $28,500**
- **Jastro Research Award**
    - **2018-2019, 2019-2020 (UC Davis) - $5,140.00**
- **Dean's list four semesters (CSU, Chico) 2011, 2012, and 2013**
- **Army National Scholar Academic Athlete of the Year (Senior Year of High School)**
- **Olga C. Griffin Memorial Scholarship (Senior Year of High School) - $1,000**
- **LPHS PTSA Scholarship (Senior Year of High School) - $750**
- **Dollars for Scholars (Senior Year of High School) - $250**

Professional Affiliations

- **Member, American Society for Microbiology**

Conferences Attended

- 31st Annual Biotechnology Training Retreat, 2022. Presented a poster titled: "Walnut Transcriptome Provides Evidence for Cell Wall Biogenesis as a Susceptibility Factor in Multiple Root Diseases."
- 30th Annual Biotechnology Training Retreat, 2021. Gave a TED talk titled: "Identifying Gene Candidates for Engineering Disease Resistance in Walnut Roots."
- Walnut Research Conference 2021. Gave a talk titled: "Investigation of Innate Immunity by RNA-seq."
- 29th Annual Biotechnology Training Retreat, 2020. Presented a poster titled: "Defining Potential Mechanisms of Pellicle Darkening in Juglans regia (English Walnut)." Authors: Houston Saxe*, Timothy Butterfield, Bipin Balan, and Abhaya M. Dandekar. Department of Plant Sciences, University of California, Davis, CA, 95616
- Walnut Research Conference, 2020
- 26th Annual Biotechnology Training Retreat, 2017

Work Experience

Pest Control Advisor and Certified Crop Advisor 2014-2018

Scientific Methods Inc. - Chico, CA

- Led weekly meetings with farmers on reported data & interpretation

- Wrote recommendations based on data collected
- Monitored for presence and severity of pests and Phytopathogens
- Filled out detailed scouting report sheets
- Completed work in a timely manner
- Uses good observational skills
- Collected plant and soil samples

Farm Intern Summer 2013
Deseret Farms of California - Chico, CA
- Pressure-bombed thousands of acres of walnuts and prunes
- Used excel spreadsheets and graphs to enter pressure bomb and well data
- Reported data to foreman
- Evaluated young tree health
- Developed new well testing procedure
- Monitored safflower harvest

Farm Laborer (Summers 2010 & 2011)
Carrico Farms - Oroville, CA
- Performed maintenance on rice farming equipment
- Helped convert walnut orchard to rice
- Hard labor in hot climate, worked 8 hrs. a day for two months clearing sticks and large debris

Grounds Crew Member (1 year 2012-2013)
California State University, Chico - Chico, CA
- Landscape work
- Used wide variety of equipment/tools
- Learned how to fix irrigation systems
- Some Janitorial work

Tree Maintenance Crew Member (summers 2008 & 2009)
Camarillo Tree and Landscape - Camarillo, CA
- Removed tree debris from worksite
- Loaded and split wood
- Ran chainsaws, stump grinders, leaf-blowers, commercial size chipper
- Performed maintenance on all equipment

Hobbies and Interests
- Spending time with family and friends
- Outdoor recreation. Usually hiking or cross country/enduro dirt bike riding
- Traveling with wife and daughter
- General interest in all things science and philosophy