César A. Lizárraga

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Work Experience

- **December 2014 - Present: Donald Danforth Plant Science Center (St. Louis, MO)**
  Laboratory Technician (Bioinformatics/Statistics) in Mockler Lab
  - Develop and document pipelines for analyzing high throughput sequencing and imaging data
  - Analytics and Data Management for the Brachypodium ENCODE Project
  - Analytics and Data Management for the EPSCoR Project
  - Assist with data analysis whenever requested
- **July 2014 - Present: Nanaya (St. Louis, MO)**
  Statistician/Back-end developer
  - Develop, design, and test algorithm(s) from prototype
  - Verify that proper statistical procedures are being used within prototype algorithm(s)
  - Facilitate communication between developers and R&D Team members
  - Manage and update server depending on needs of team
- **December 2014 - September 2015: Benson Hill Biosystems (St. Louis, MO)**
  Independent Contractor (Bioinformatics/Statistics)
  - Developed high throughput imaging analysis pipeline for a custom in-house imaging system
  - Developed an RNA-seq pipeline to discover novel transcripts
  - Provided statistical consultation when necessary

Education

B.A. Mathematics, 2008
Probability and Statistics
Department of Mathematics, Washington University in St. Louis

Project Experience

- **General Lab Projects**
  - Develop, maintain, and test an RNA-seq pipeline for NGS data from Illumina sequencing platform
  - Develop, maintain, and test a SNP calling pipeline for NGS paired-end read data from Illumina sequencing platform
    - Developed in Python and Bash wrapper script: PyPipe
  - Develop, maintain, and test a ChIP-seq pipeline for NGS data from Illumina sequencing platform
    - Developed in Python: PyChIP
  - Developed high throughput phenotyping pipeline using PlantCV and R for imaging analysis for internal use with LemnaTec high-throughput facility

- **Brachypodium ENCODE Project**
  - Mapped forward previous structural *Brachypodium distachyon* annotations to new genome assembly using MAKER
  - Mapped functional domains with InterProScan to the annotations and converted locations to genomic coordinates
  - Structural and functional annotations were placed as tracks in a genome browser
- **PheNode: Field canopy sensor system**
  - Develop code for Arduino to interface with sensors
  - Develop code to control Arduino from Raspberry Pi, read, and save results
  - Assess power requirements and setup batteries, relays, etc.
- **PhenoPiSight: Fixed Camera Greenhouse-based Phenotyping Platform**
  - Automate image capture and transfer of images from 180 Raspberry Pis on a gantry above the greenhouse
  - Develop pipeline to take captured images and make dense 3d reconstructions
  - Manually find phenotypes in 3d reconstructions and compare to ground-based greenhouse measurements
  - Developed in Python and Bash: PhenoPiSight
- **Benson Hill Biosystems**
  - Developed high throughput phenotyping pipeline using HTPheno, R, and Python for a custom in-house imaging system
  - Developed an RNA-seq pipeline to discover novel transcripts using structural annotations, a new genome assembly, and set intersections.

Bioinformatics Skills

- NGS data analysis: *RNA-seq, ATAC-seq, ChIP-seq, variant calling*
- Biostatistics: *Regression, multiple test correction, modelling, heritability (broad-sense)*
- Clustering/Dimensionality reduction: *UPGMA, K-means, Agglomerative, hierarchical clustering, PCA*

Computer Skills

- Languages: *Python, R, Bash, Perl, Java, MATLAB*
- Operating systems and GNU/Linux: *AWK, sed, grep, Emacs, UNIX*

Languages

- Spanish: *Fluent*
- Italian: *Intermediate*

Publications

- Laura Rayhel, B.A., Copper Aitken-Palmer, D.V.M., Ph.D., Priscilla Joyner, B.Sc., B.V.M.S., Carolyn Cray, Ph.D., **César Andrés Lizárraga, B.A.**, Betty Ackerman, M.T. (A.S.C.P.), and Chris Crowe, B.S. Hematology and biochemistry in captive white-naped cranes (*Grus VIPIO*). *Journal of Zoo and Wildlife Medicine 46(4):747-754. http://dx.doi.org/10.1638/2015-0027.1 (2015)*

Professional Presentations (Posters)

- Skyler Mitchell, Stuart Marshall, Stephanie Turnipseed, Luke Burnham, **César Lizárraga**, Jared Streich, Rob Alba, and Todd C. Mockler (2015) "Effect of drought treatments on transpiration rate and stomatal density in *Brachypodium distachyon*." Donald Danforth Plant Science Center and Missouri Botanical Gardens Joint Fall Symposium, St. Louis, MO, October 2015
- **César A. Lizárraga**, Henry D. Priest, Noah Fahlgren, Rob Alba, and Todd C. Mockler. Bioinformatics Pipelines for Purple False Brome (Brachypodium distachyon) Donald Danforth Plant Science Center, St. Louis, MO. (2015)
- **Cesar Lizarraga**, Stuart Marshall, Bradley Flynn, Nadia Shakoor1 and Todd C. Mockler. PhenoPiSight: Fixed Camera Greenhouse-based Phenotyping Platform. (2016)