

Cells, Genomes, and Life

Genomes: Variation, Adaptation,
Personalized Genomics Research

Environmental Biology Research

Dr. Allen G. Gibbs

Professor

School of Life Sciences

Phone: 702-895-3203

Email: allen.gibbs@unlv.edu

Expertise

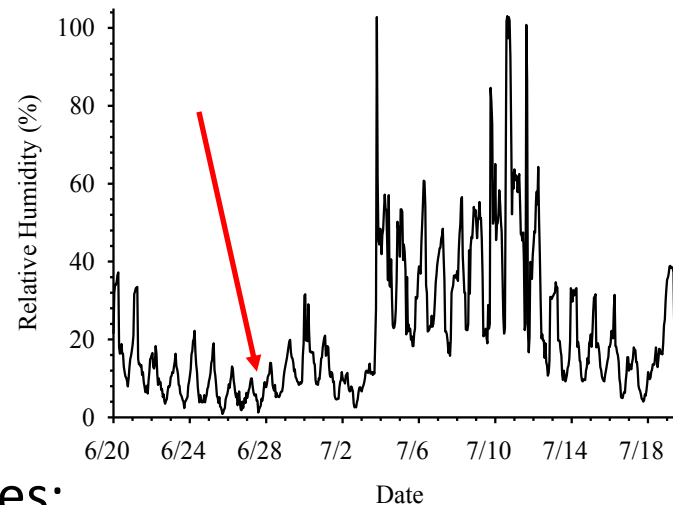
- Environmental physiology
- Insect physiology
- Experimental evolution

Environmental Physiology of Desert Invertebrates

Adaption to water stress:



Driest Day Ever Recorded (Anywhere)
Lake Mead, 2011

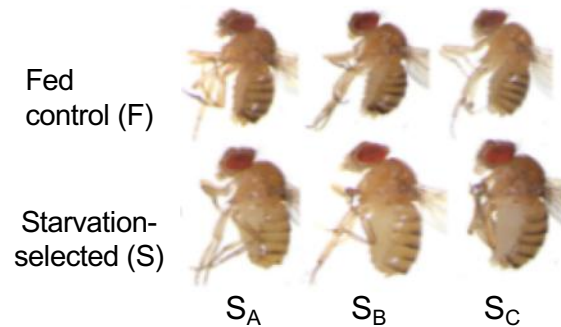


Adaptation to high temperatures:

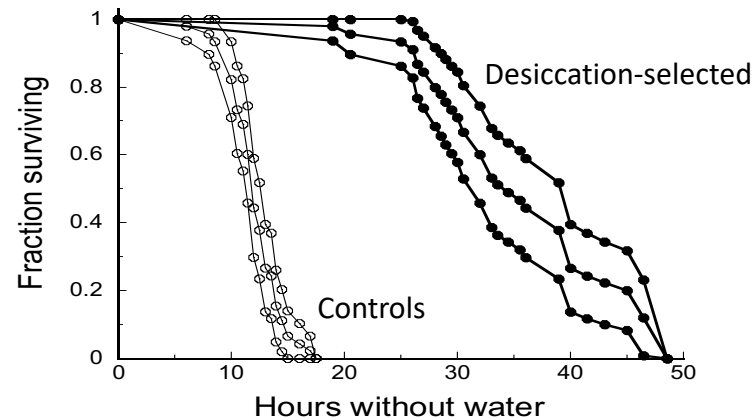


Experimental Evolution Research Using Fruit Flies

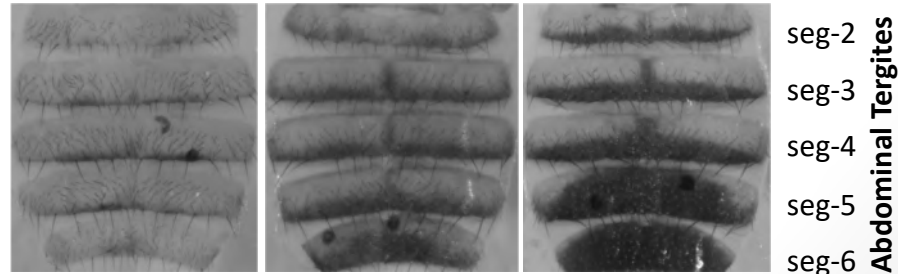
Starvation resistance:
- a fly model for obesity



Desiccation resistance:
- understanding responses to desertification



Pigmentation:
- phenotypic correlations of melanization



Dr. Mira Han

- Associate Professor,
- School of Life Sciences
- Phone: 702-774-1503
- Email: mira.han@unlv.edu

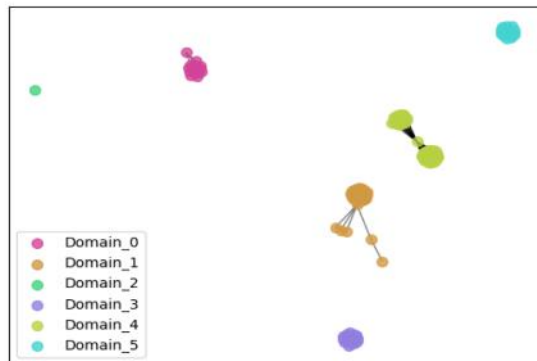
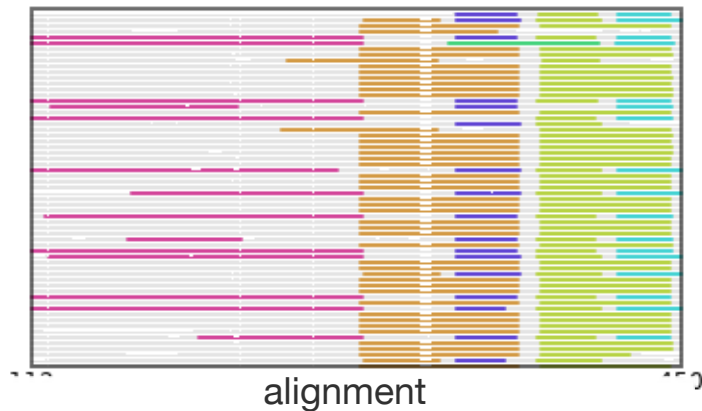
Expertise

- Molecular Evolution
- Genomics of transposons
- Next generation sequence analysis

Han Lab – Molecular Evolution

Evolution of domain architecture and interdomain linkers across 148 Amniote genomes

Kinesin Light Chain gene family



Domain homology across proteins

Database of homologous domains and linkers

mirahan.faculty.unlv.edu

Query Results "ENSGT00680000099553_8"

Found:

- ENSGT00680000099553_8

ENSGT00680000099553_8

ENSPYP00000003888 (view gene)

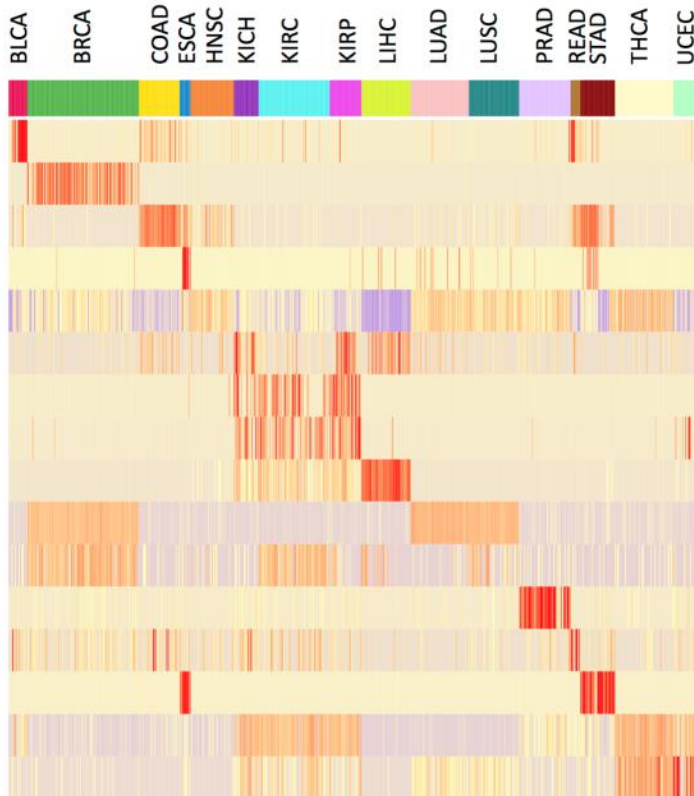
```
-----MQNSH-SGVNQLGGVFVNGRPLPDSTRQKIVELAHSGARP
CDISRILQTHADAKVQVLDNQNVSNGCSKILGRYYETGSIRPF00292 //
KIAQYKRECPSIFAWEIRDLLSEGVCTNDNIPSVSSINRVLSENSGT00680000099553_8_Domain_0
YDKLRML---NGQTGSWGTRPGWYPGTSVPGQPTQ--DGCQ(144, 283)
SDEAQMRLQLKRKLORNRTSFTQEQIEALEKEFERTHYPPDVFALERLAAKIDLPEA----
```

ENSMFAP00000012817 (view gene)

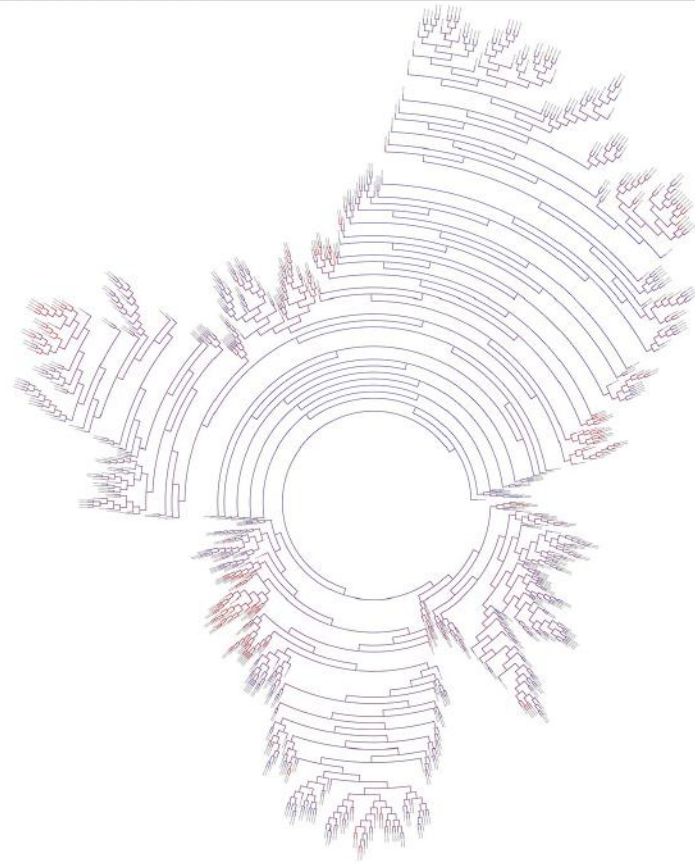
```
-----LSSGH-SGVNQLGGVFVNGRPLPDSTRQKIVELAHSGARP
CDISRILQ-----VSNGCVSKILGRYYETGSIRPRAIGGSKPRVATPEVVS
KIAQYKRECPSIFAWEIRDLLSEGVCTNDNIPSVSSINRVLRNL---ASEKQOMGADGM
YDKLRML---NGQTGSWGTRPGWYPGTSVPGQPTQ--DGCQQEGGGENTNSISSNGED
SDEAQMRLQLKRKLORNRTSFTQEQIEALEKEFERTHYPPDVFARERLAAKIDLPEARIQV
WFSNRRAKWRREEKLNRQRRQASNTPSHIPISSSFSTSVYQIPQPTTPVSSFTSGSMLG
RTDTALTNTYSALPPMPSFTMANNLPMQ-DSFPLVCQ-----FQFKFPEVNLICLNTG
QDYI-----SDYGDTTIELSEKKEKWLLEALQFYNCVLYCTIGE
GMDLKQGPLYTEGTISVGTNLHFGIQTFIHFGVLFVNGHLYVMKKKNVDWMDV-----
```

Han Lab – Transposon Genomics

Transposons in host regulation and disease



Tissue specific transposon expression



Predicted NANOG binding based on ancestral reconstruction of RLTR13D6 transposons

Dr. Allyson Hindle

Assistant Professor

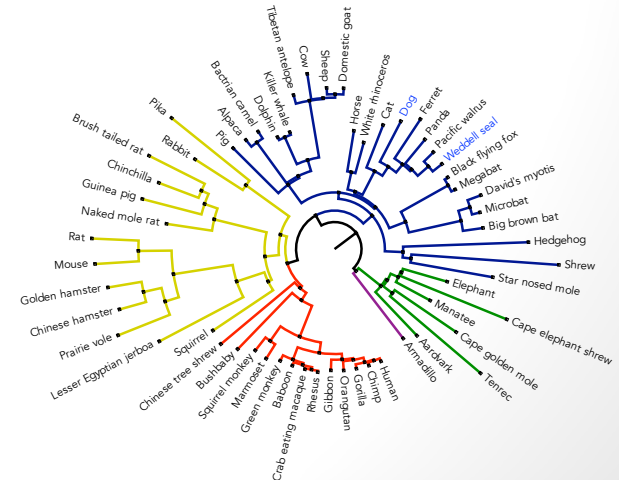
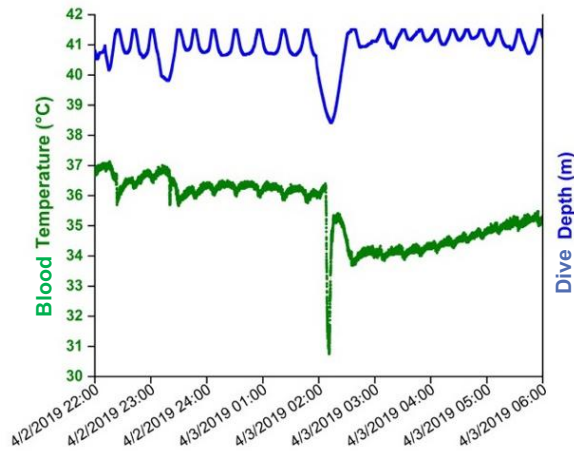
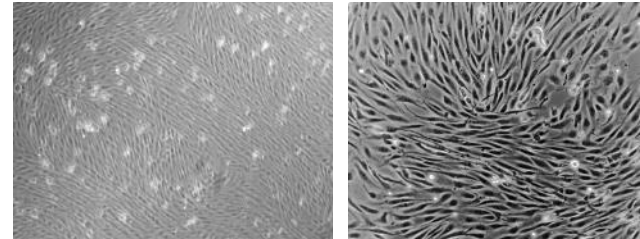
School of Life Sciences

Phone: 702-895-4521

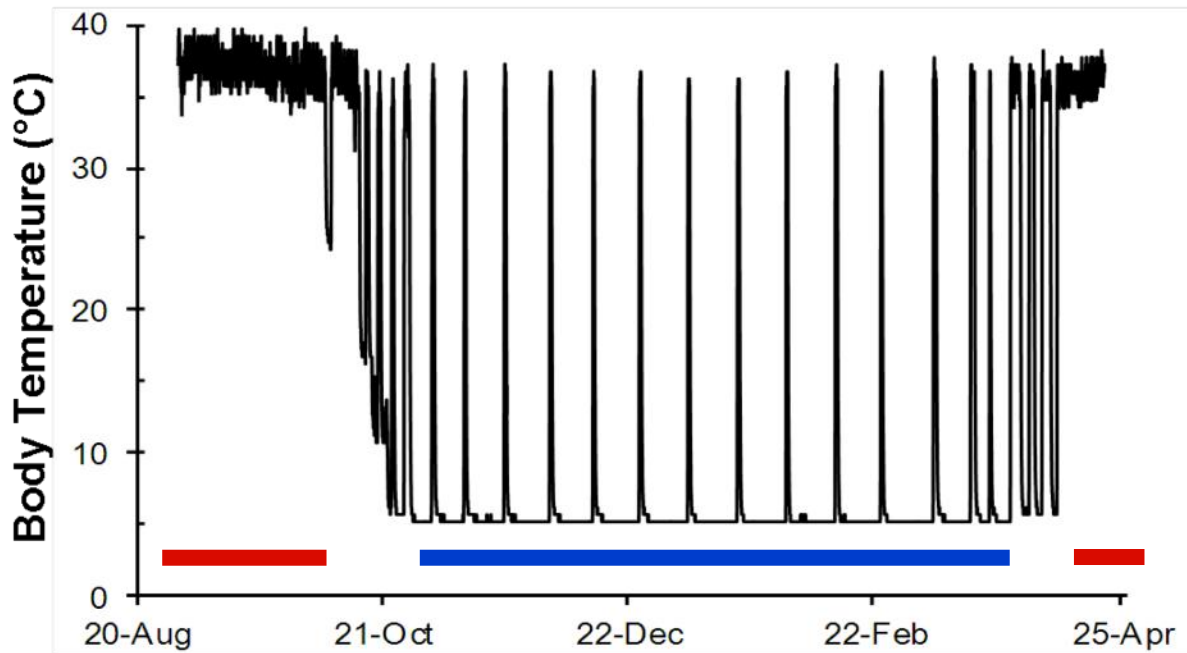
Email: allyson.hindle@unlv.edu

Expertise

- Molecular mechanisms of hypoxia tolerance in hibernating and diving mammals
- Cardiovascular and blood pressure regulation
- Comparative genomics, biomarker discovery and bioinformatics
- Cell line resource development for non-model systems



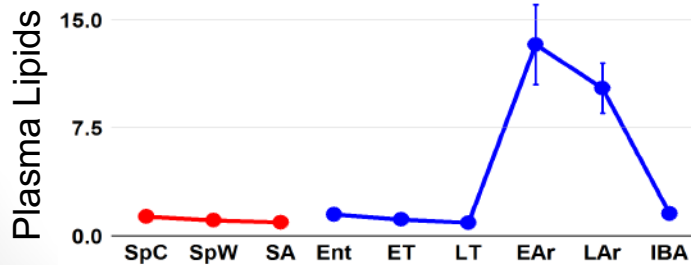
Metabolic control of small hibernators



SUMMER



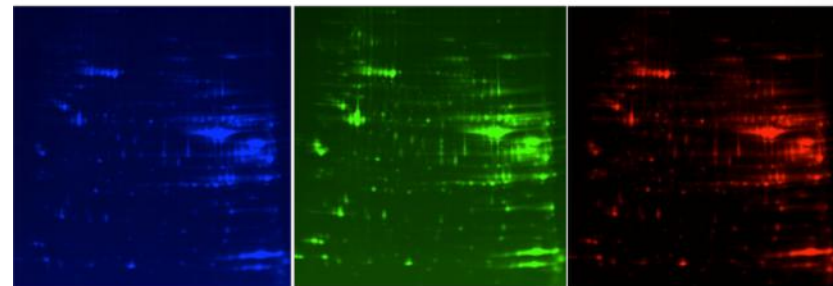
WINTER



REFERENCE

SQUIRREL 1

SQUIRREL 2



Cy2

Cy3

Cy5

Behavioral & Evolutionary Genetics

Dr. Donald K. Price

Professor of Biology

School of Life Sciences

702.895.5077

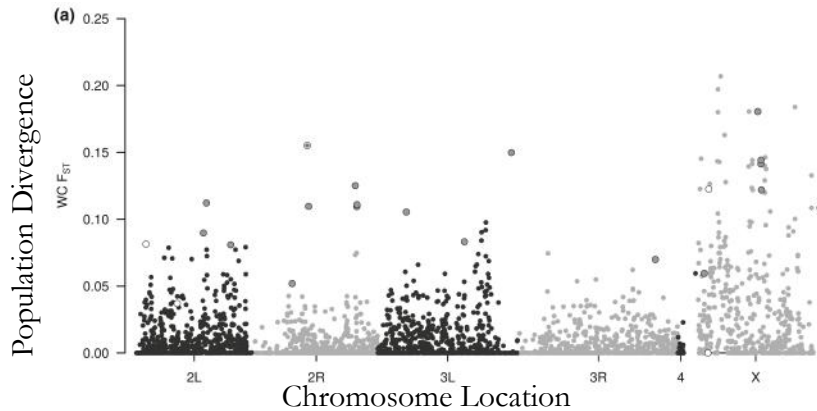
donald.price@unlv.edu

Expertise

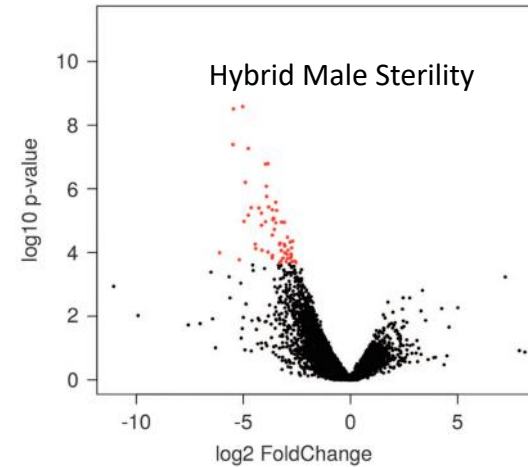
- Behavioral Genetic Analysis
- Quantitative Genetics
- Genome-wide Gene Expression Analysis
- Adaptative Comparative Genomic Analysis
- Hawaiian Evolutionary Biology
- Biodiversity and Speciation

Evolutionary Genetics

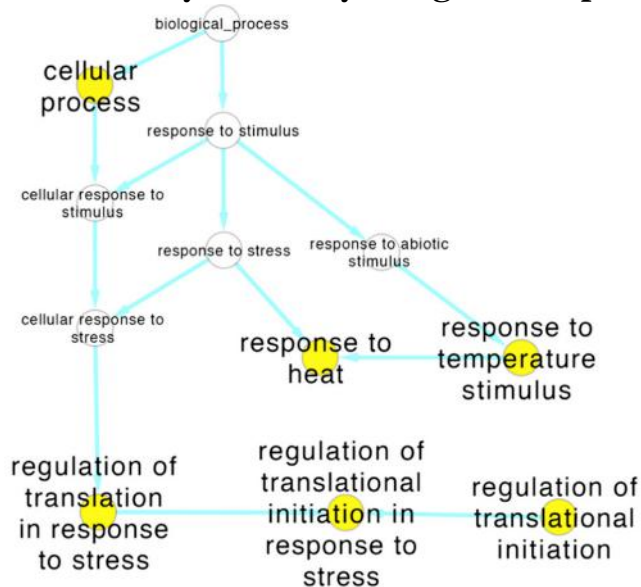
Population Genomic Analysis of Adaptation



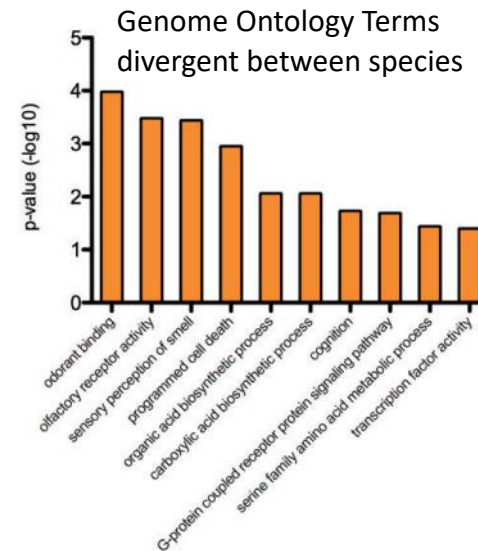
Genome-wide Gene Expression Analysis



Genomic Analysis of Physiological Adaptation



Comparative Genomic Analysis



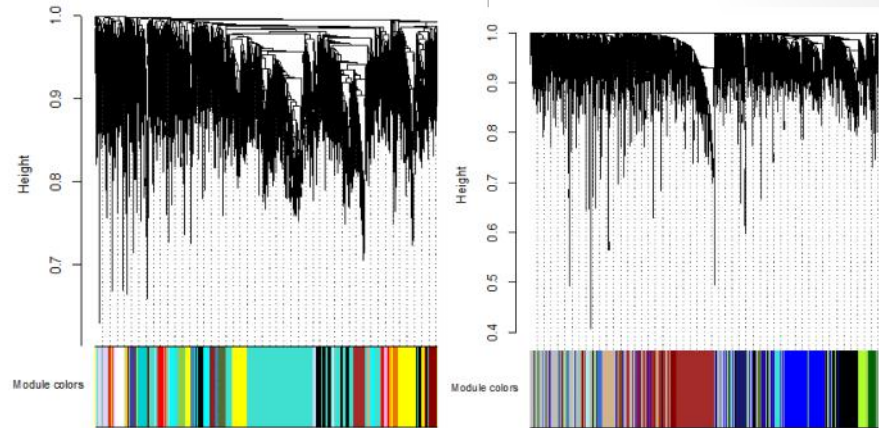
Behavioral Genetics

Hawaiian picture wing *Drosophila*

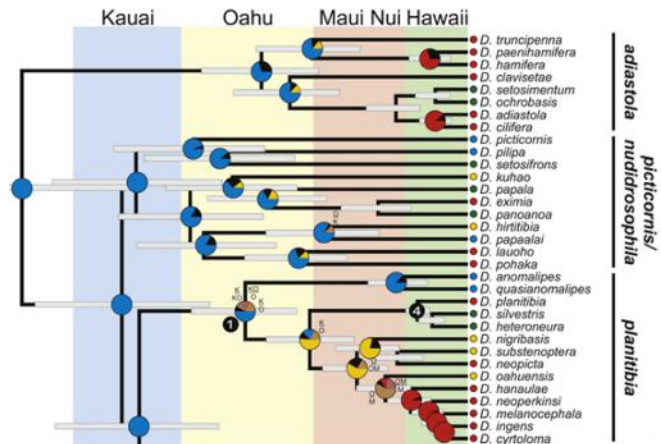


Hawaiian Islands

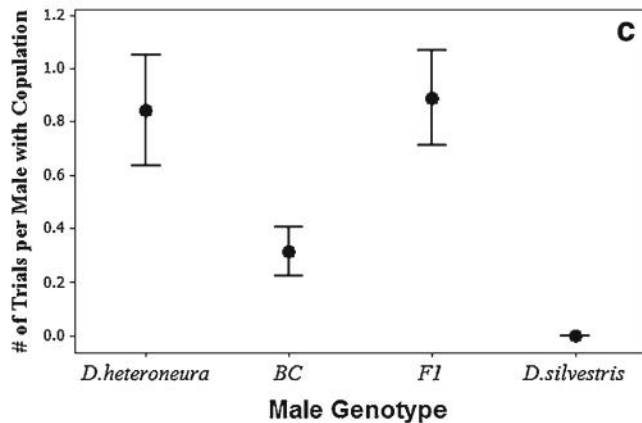
Behavioral Gene Expression Correlation Networks



Hawaiian picture wing Phylogenetic Analysis



Behavioral Reproductive Isolation



Dr. Jeffery Shen
Professor,
School of Life Sciences
Phone: 702-895-4704
Email: jeffery.shen@unlv.edu

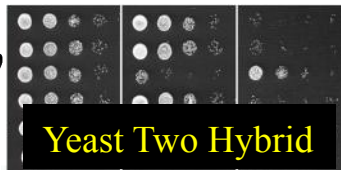
Expertise

- Big Data Analysis to Study Biology, Agriculture and Medicine
- Molecular Mechanisms Controlling Plant Responses to Drought Heat, and Salinity
- Seed Germination, Tissue Culture and Plant Transformation
- Molecular Basis of Leukemia (in collaboration with Dr. J. Cheng at the University of Chicago Medical School)
- Nutrition of Cereal Crops (in collaboration with Dr. Christine Bergman, Ph.D. and R.D. at UNLV)

Molecular Basis of Drought Stress Responses and Seed Germination



Gene Gun



Yeast Two Hybrid



Confocal

BMC Genomics, 2016, 17:102

Plant Science, 2015, 236:214-222

Front. Plant Science, 2015; 6: 1145

Trends in Plant Sci, 2010, 15: 247



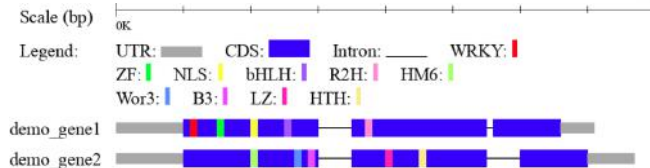
Short Read Assembly Algorithm

for Genome and Transcriptome Analysis

http://shenlab.sols.unlv.edu/shenlab/software/Tiling_Assembly/tiling_assembly.html

DNA Research, 2015, 22: 319-329

Genomics, 2014, 103:122-134

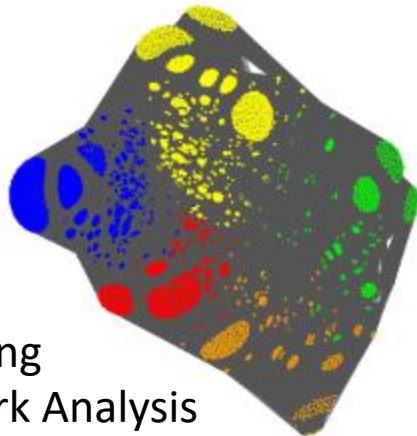


Promoter and Coding Region Structures

http://shenlab.sols.unlv.edu/shenlab/software/TSD/transcript_display.html

Bioinformatics, 2016, 32:2024-2025

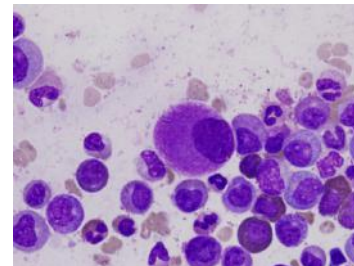
Plant Cell Environ. 2017, 40:2004-2016



Signaling network Analysis

Molecular Basis of Leukemia

(in collaboration with Medical School, University of Chicago)



Cytogenetically normal refractory cytopenemia with multilineage dysplasia (CN-RCMD)

Nature Communications, 2018, 9:1163

Leukemia, 2013, 27: 1291-1300