Alan E. Yocca, PhD

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SUMMARY

- ☐ Postdoctoral Researcher in comparative genomics and bioinformatics
- ☐ Author of 20 publications (5 first-author) centered on pangenomics and genome assembly
- ☐ Extensive experience with polyploid species; *Fragaria* x*ananassa* (8x), *Eragrostis tef* (8x), *Vaccinium* (4x)
- ☐ Experience with machine learning, long-read genome assembly and annotation, structural variation analyses, pangenomics, variant calling, high-performance computing environments, Nextflow, Python, bash scripting, R, and Perl

RESEARCH EXPERIENCE

United States Department of Agriculture, Research Associate (August 2023 - Present)

- ☐ Led the assembly and annotation of multiple long-read haplotype-phased genome assemblies for different apple cultivars
- ☐ Developed a research proposal to develop gene expression-based biomarkers to predict postharvest fruit physiology which was invited for a full proposal ($210k)
- ☐ Analyzed >500 RNA-seq datasets through nextflow to develop and apply machine learning models to predict postharvest fruit physiology

HudsonAlpha Institute for Biotechnology, Postdoctoral Researcher (May 2022 - Present)

- ☐ Aligned entire haplotype-phased genomes across Rosaceae to identify and characterize conserved noncoding sequences within and across pangenomes
- ☐ Assembled and annotated chromosome-scale haplotype phased genomes for multiple *Malus* (apple) and *Pyrus* (pear) individuals with PacBio HiFi and Dovetail Omni-C data
- ☐ Collaborated with USDA scientists to annotate the wild crabapple (*Malus fusca*) genome resulting in a publication currently in press
- ☐ Organized an effort to sequence and assemble a pear genome led by graduate students during a class through the American Campus Genomes Project

Michigan State University, Graduate Student (June 2017 - Apr 2022)

Dissertation title: "Leveraging Angiosperm Pangenomics to Understand Genome Evolution"

- ☐ Applied machine learning classification algorithms to identify core or variable genes in a pangenome with only a reference assembly resulting in a first-author publication
- ☐ Created a superpangenome for tetraploid *Vaccinium* across 32 individuals
- ☐ Discovered unexpected variation at the species level in conserved noncoding sequences in global *Arabidopsis thaliana* accessions resulting in a first-author publication

- ☐ Developed a high-throughput pipeline to calculate dN/dS values genome wide in <60 minutes https://github.com/Aeyocca/ka_ks_pipe

Pennsylvania State University, Undergraduate Research Assistant (June 2015 - Dec 2016)

- ☐ Increased *Arabidopsis thaliana* hairy-root transformation efficiency 10-fold (~1% - >10%)

EDUCATION

Michigan State University, East Lansing, MI

Ph.D. Plant Biology: Department of Plant Biology **June 2017**

Pennsylvania State University, University Park, PA

B.S. Biology: Department of Life Sciences **Dec 2016**

TECHNICAL SKILLS

Bioinformatics: Proficient in Python, Perl, R, bash, high performance computing, SLURM, LSF

Comparative Genomics: pangenomics, genome assembly/annotation, machine learning, phylogenetics, whole-genome alignment, polyploid genomics, RNA-sequencing

Programs: hifiasm, MAKER, BRAKER, Orthofinder2, MCSCanX, GENESPACE, RAxML, scikitlearn, YaHS, Cactus, mummer, phastCons, conda, pandas, Cactus, Interproscan, GATK, samtools, bedtools, pggb, vg-toolkit

SELECT PUBLICATIONS (8 of 20)

Yocca, Alan, Edger, Patrick. "Machine learning approaches to identify core and dispensable genes in pangenomes". *The Plant Genome* (2022).

Alan E. Yocca, Adrian Platts, Elizabeth Alger, Scott Teresi, Molla F. Mengist, Juliana Benevenuto, Luis Felipe V. Ferrão, MacKenzie Jacobs, Michal Babinski, Maria Magallanes-Lundback, Philipp Bayer, Agnieszka Golicz, Jodi L Humann, Dorrie Main, Richard V. Espley, David Chagné, Nick W. Albert, Sara Montanari, Nicholi Vorsa, James Polashock, Luis Díaz-Garcia, Juan Zalapa, Nahla V. Bassil, Patricio R. Munoz, Massimo Iorizzo and Patrick P. Edger. "Blueberry and cranberry pangenomes as a resource for future genetic studies and breeding efforts". *Horticulture Research* (2023).

Alan Yocca, Mary Akinyuwa, Nick Bailey, Brannan Cliver, Harrison Estes, Abigail Guillemette, Omar Hasannin, Jennifer Hutchison, Wren Jenkins, Ishveen Kaur, Risheek Rahul Khanna, Madelene Loftin, Lauren Lopes,Erika Moore-Pollard, Oluwakemisola Olofintila, Gideon Oluwaseye Oyebode, Jinesh Patel, Parbati Thapa, Martin Waldinger, Jie Zhang, Qiong Zhang, Leslie Goertzen, Sarah B. Carey, Heidi Hargarten, James Mattheis, Huiting Zhang, Teresa Jones, LoriBeth Boston, Jane Grimwood, Stephen Ficklin, Loren Honaas, Alex Harkess. "A chromosome-scale assembly for 'd'Anjou' pear". In Press (2023).

Yocca, Alan, Lu, Zefu, Schmitz, Bob, Freeling, Michael, and Edger, Patrick. "Evolution of conserved noncoding sequences in *Arabidopsis thaliana*". *Molecular Biology and Evolution* (July 2021).

Patrick P. Edger, Massimo Iorizzo, Nahla V. Bassil, Juliana Benevenuto, Luis Felipe V. Ferrão, Lara Giongo, Kim Hummer, Lovely Mae F. Lawas, Courtney P. Leisner, Changying Li,Patricio R. Munoz, Hamid Ashrafi, Amaya Atucha, Ebrahiem M. Babiker, Elizabeth Canales, David Chagné, Lisa DeVetter, Mark Ehlenfeldt, Richard V. Espley, Karina Gallardo, Catrin S. Günther, Michael Hardigan, Amanda M. Hulse-Kemp, MacKenzie L. Jacobs, Mary Ann Lila, Claire Luby, Dorrie Main, Molla F. Mengist, Gregory L. Owens, Penelope Perkins-Veazie, James Polashock, Marti Pottorff, Lisa J. Rowland, Charles A. Sims, Guo-qing Song, Jessica Spencer, Nicholi Vorsa, **Alan E. Yocca**, Juan Zalapa. "There and back again; historical perspective and future directions for *Vaccinium* breeding and research studies". *Horticulture Research* (2022).

Qiao, Qin, Edger, Patrick P., Xue, Li, Qiong, La, Lu, Jie, Zhang, Yichen, Cao, Qiang, **Yocca, Alan E.**, Platts, Adrian E., Knapp, Steven J., Van Montagu, Marc, Van de Peer, Yves, Lei, Jiajun, Zhang, Ticao. "Evolutionary history and pan-genome dynamics of strawberry (*Fragaria* spp.)" *PNAS*. (2021).

Abigail E Bryson, Emily Lanier, Kin H Lau, Davis Mathieu, **Alan E. Yocca**, Garret P Miller, Brieanne Vaillancourt, Patrick P. Edger, C Robin Buell, Bjoern Hamberger. "Dynamic evolution of a miltiradiene biosynthetic gene cluster in Lamiaceae". *Nature Communications* (2023).

Barbey, Christopher, Lee, Seonghee, Verma, Sujeet, Whitaker, Vance M., Bird, Kevin A., **Yocca, Alan E.**, Edger, Patrick P., Knapp, Steve J., and Folta, Kevin M. "Genomic Characterization of Disease Resistance Genes in Strawberry" *G3: Genes, Genomes, Genetics* (Oct 1, 2019).

SELECT PRESENTATIONS

Yocca, Alan. "Conserved noncoding sequences across Rosaceae". Oral Presentation, Plant and Animal Genome Conference (2024).

Yocca, Alan. "Plant Pangenomics". Invited Lecture for Plant Biotechnology (HORT7070). Auburn University, 2023.

Yocca, Alan, Bassil, Nahla, Chagné, David, Espley, Richard, Finn, Chad, Iorizzo, Massimo, Main, Dorrie, Muñoz, Patricio, Polashock, Jim, Vorsa, Nick, Zalapa, Juan, Teresi, Scott, Alger, Elizabeth, Platts, Adrian, Edger, Patrick. "Pangenomic Variation across Autotetraploid *Vaccinium corymbosum* (blueberry) and *Vaccinium macrocarpon* (cranberry)". Oral Presentation, Plant and Animal Genome Conference (2023).

Yocca, Alan, Barash, Andrew, Bukhari, Daaren, Karthikeyan, Akshitha , Mitchell, Allison,] Niemiec, Ashlin, Radgens, Gabe, Schneider, Jared, Sharpe, Sydney, Srinivasan, Vidhula,

Xenos, Christina, Missy Fix, Hummer, Kim, Bassil, Nahla, McKain, Michael R., Edger, Patrick. "Analysis of Global *Vaccinium* Species during an Undergraduate Course in Phylogenetics". Oral Presentation, Botany Conference. (2021).

Yocca, Alan, Lu, Zefu, Schmitz, Bob, Freeling, Michael, and Edger, Patrick. "Evolution of conserved noncoding sequences in *Arabidopsis thaliana*". Oral Presentation, International Conference for Arabidopsis Research. (2021).

Yocca, Alan, Edger, Patrick. "Machine learning approaches to identify core and dispensable genes in pangenomes". Oral Presentation, Plant Science Graduate Student Research Symposium. First place oral presentation award (2021).

AWARDS & HONORS

Apr. 2022 Michigan State University

- Bessy Award for best publication by a graduate student

Apr. 2021 Michigan State University

- Plant Science Graduate Student Research Symposium, first place oral presentation

Aug. 2017 – Aug. 2018, Michigan State University

- College of Natural Science Recruiting Fellowship

Jun. 2017 – Aug. 2017, Michigan State University

- Early Start Fellowship