Message from the Director

As summer progresses, so too does the *Vitis*Gen3 project! Graduate students are starting projects, field days are being planned, crossing plans are being made, and our focus group research is underway. Now is a good time to start completing your reports, and to keep in mind our new VG3-branded slide decks and poster templates for upcoming meetings. I'm looking forward to seeing you all and reconnecting with our wonderful Advisory Board at the online End-of-Year meeting in September.

~Matt Clark

Save-the-Date for the VG3 End-of-Year Meeting: September 7th, 8am PST/10am CST/11am EST

This meeting will take place instead of 3rd quarter objective meetings and will include:

- **Project updates**
  - PIs should expect to submit updates to their Objective lead by August 1st.
- **Discussion sessions**
- **Opportunities for advisory board feedback**
- **Announcements and reminders**

Link to the Zoom meeting

Link to the preliminary itinerary

Questions about upcoming meetings? Email Kate at fessl023@umn.edu

Blog post roundup

Click on an image to open the post!

Updates from our Objective Leads

Objective 1: Dario Cantu

The Cantu and Cadle-Davidson labs are hard at work on chromosome-scale assemblies of resistant vines (new post-doc, Manon Paineau), validating rhAmpSeq markers for disease resistance, fruit quality, and flower sex (Cheng Zou), and ID-ing candidate genes and reconstructing REN6 and 7 (Melanie Massonnet). There was a robust discussion during the latest quarterly meeting about investing in knock-ins and moving forward with tissue culture. Updates on grape tissue culture and transformation were provided by Dario Cantu, Anand Dhekney, Gan-Yuan Zhong, and Chris Dardick.

Objective 2: Lance Cadle-Davidson

Objective 2 has been making steady progress on marker assisted selection (MAS) and vineyard computer vision. Unfortunately, supply chain delays have lasted through this year, but imaging equipment and tissue plates are on order and reaching researchers at participating institutions. For MAS, the first set of results were disseminated and a later-season data workshop will be held to help new breeders parse their data. Cheng has blown us away by developing all KASP markers of interest from the list presented at the annual meeting. For computer vision, labels are being printed and installed, and Yu and Leo are getting ready to travel to locations for imaging equipment orientation. The focus of the first season will be standardizing ground truth data and delivering high quality, usable data sets for each location.

Objective 3 (field trial): Katie Gold

The flagship field trial has been established! This trial should serve as a model for a future network of cultivar trials across the US. Funding sources for establishing this network are being explored, including using new vineyards at NASA Calibration Validation (CalVal) sites to help defray maintenance costs. Katie recently hosted a meeting with many of our Extension pathologists to start conceptualizing the mission of the experimental vineyard network and decide on dates for holding the Year 2 workshop. The workshop will be held in conjunction with the B.E.V. NY Conference in Syracuse, NY, and will feature 1-2 days of planning for the field trials ahead of seminars and panels featuring our VG3 Extension team members.

Objective 4: Chengyan Yue

After a thorough review of our budget and research priorities (and some great consultations with our advisory panel), the socioeconomic team has decided to run Garrett's focus group this summer and wait until the fall to purchase eye-tracking and brain-scanning equipment for Karina and Chengyan's work. The IRB amendments have been approved and participant incentives are being processed so that recruiting for the group can start. The results of the group, as well as an initial survey that Chengyan is developing, will inform the eye-tracking experiments that UMN and WSU researchers plan to conduct in the winter/spring of 2024.

Student Spotlight: Qingwei Qiao

PhD student in Applied Economics at Washington State University
Advisor: Karina Gallardo

My role within the VitisGen research team is to conduct a literature review on eye-tracking studies and subsequently perform data analysis. My favorite thing about my position is the ability to use eye-tracking devices to capture people's mental imagery and eye movements when viewing labels, analyze the data, and compare it with the actual behavior to draw meaningful insights.

Faculty Spotlight: Margaret Worthington

Associate Professor of Fruit Breeding and Genetics at the University of Arkansas System Division of Agriculture

I love that I get to be both an entrepreneur and a scientist in my role. I enjoy working with collaborators in the private sector and developing new cultivars that growers and consumers can enjoy. John Clark, my predecessor in the Arkansas Fruit Breeding Program, played a major role in making blackberries a global commodity during the course of his career. I hope to do the same thing for fresh market muscadine grapes. My dream is that we will see these unique fruits on supermarket shelves between the grapes and berries for 12 months a year by the time I retire!

Upcoming Conferences

Click on underlined text for more information about each event

GiESCO meeting **July 17-21 at Cornell University in Ithaca, NY**

Dirt to Glass Conference: Elevating MI Wine from the Ground Up, **August 24-25 in Traverse City, MI**

XVI EUCARPIA Symposium on Fruit Breeding and Genetics, **September 11-16 in Dresden, Germany**

VII Symposium of Mediterranean Malvasias **September 27-30 in Dubrovnik, Croatia**

National Association of Grape Breeders Conference **October 3-4th at the University of Arkansas in Fayetteville, AK**
Contact Dr. Margaret Worthington at mlworthi@uark.edu for more information

V International Symposium on Biotechnology and Molecular Breeding in Horticultural Species **October 18-21 in Nanjing, China**

II International Congress on Grapevine and Wine Sciences **November 8-10, 2023 in Logroño, La Rioja, Spain**

II International Symposium on Precision Management of Orchards and Vineyards **December 3-8 in Tatura, Victoria, Australia**

VitisGen3 Annual Meeting January 11-12, 2024 in San Diego, CA

Southeast Regional Fruit and Vegetable Conference, **January 11-14, 2024 in Savannah, GA**

2023 Field Days

Click on underlined text for more information about each event

NDSU Campus Field Day, July 25th 3-7pm CST, Horticulture Research and Demonstration Gardens

Michigan State University Viticulture Field Day, July 16th, Southwest Michigan Research and Extension Center

USDA-ARS Appalachian Fruit Research Station Summer Field Day, July 18th 12pm-5pm EST, Appalachian Fruit Research Station

Washington State Viticulture Field Day, August 10th 8am-10:30pm PST

University of Georgia Muscadine field day, August 16th 11am EST

University of Minnesota Enology Field Day, September 9th 10am-1pm CST

Recent papers from VG3 PIs and Collaborators

Castro C, **Massonnet M**, Her N, DiSalvo B, Jablonska B, Jeske DR, **Cantu D**, Roper MC. Priming grapevine with lipopolysaccharide confers systemic resistance to Pierce's disease and identifies a peroxidase linked to defense priming. New Phytol. 2023 May 7. doi: 10.1111/nph.18945. Epub ahead of print. PMID: 37149885.

Clark, J. R., & **Worthington, M.** (2023). Peach Tree Named 'Whitewater'. *Patents Granted.* Retrieved from https://scholarworks.uark.edu/pat/446

Gallardo, R. K., & Galinato, S. P. (2023). *2022 Cost Estimates of Producing and Packing Organic Honeycrisp Apples in Washington* (Cost Estimate WSU Peer Reviewed No. TB91E). Washington State Extension.

Hartman K, Alahakoon D, **Fennell A**. Impact of Water and Nutrient Supplementation on Yield of Prairie Plantings of Juneberry *Amelanchier alnifolia* Nutt., Cultivar and Windbreak Plantings. *Horticulturae*. 2023; 9(6):653. https://doi.org/10.3390/horticulturae9060653

Lim, H.J., **R.K. Gallardo**, and M.P. Brady (2023). "Interactions Between Organic and Conventional Markets from Pest and Disease Outbreaks: The Case of the U.S. Apple Industry." Journal of Agricultural and Applied Economics. https://doi.org/10.1017/aae.2023.11

Liu, E., Monica, J., Gold, K., Cadle-Davidson, L., Combs, D., & Jiang, Y. (2023). Vision-based Vineyard Navigation Solution with Automatic Annotation. *arXiv preprint arXiv:2303.14347.*

Lopez-Moreno, H.; Phillips, M.; **Diaz-Garcia, L.**; Torres-Meraz, M.A.; de La Torre, F.; Berro, I.; Loarca, J.; Mura, J.; Ikeda, S.; Atucha, A.; et al. A Survey of Key Methods, Traits, Parameters, and Conditions for Measuring Texture in Cranberry (Vaccinium macrocarpon Ait.). Horticulturae 2023, 9, 479. https://doi.org/10.3390/horticulturae9040479

Lu, Lizhen, Yingzhen Yang, **Gan-Yuan Zhong**, Zhenchang Liang, and Lailiang Cheng. 2023. "Phytochemical Composition and Content of Red-Fleshed Grape Accessions" *Horticulturae* 9, no. 5: 579. https://doi.org/10.3390/horticulturae9050579

Minio A, **Figueroa-Balderas R**, Cohen SP, Ali SS, Carriel D, Britto D, Stack C, Baruah IK, Marelli JP, **Cantu D**, Bailey BA. Clonal reproduction of Moniliophthora roreri and the emergence of unique lineages with distinct genomes during range expansion. G3 (Bethesda). 2023 Jun 20:jkad125. doi: 10.1093/g3journal/jkad125. Epub ahead of print. PMID: 37337677.

Romero Galvan F, Pavlick R, Trolley GR, Aggarwal S, Sousa D, Starr C, Forrestel EJ, Bolton S, Alsina MDM, Dokoozlian N, **Gold KM**. Scalable early detection of grapevine virus infection with airborne imaging spectroscopy. Phytopathology. 2023 Apr 25. doi: 10.1094/PHYTO-01-23-0030-R. Epub ahead of print. PMID: 37097472.

Nathan J. Scinto-Madonich, Shivranjani Baruah, Sameya Young, Katherine Vignona, Andrew C. Read, Sara C.D. Carpenter, Li Wang, Xinying Shi, Geoffrey Chang, Miguel A. Piñeros, **Adam J. Bogdanove**. Initial characterization of a bacterial leaf streak susceptibility gene suggests it encodes a membrane transporter that influences seed nutrition and germination. Physiological and Molecular Plant Pathology. 2023. https://doi.org/10.1016/j.pmpp.2023.102031.

Surya Sapkota, Cheng Zou, Craig Ledbetter, Anna Underhill, Qi Sun, David Gadoury, Lance Cadle-Davidson, Discovery and genome-guided mapping of *REN12* from *Vitis amurensis*, conferring strong, rapid resistance to grapevine powdery mildew, *Horticulture Research*, 2023;, uhad052, https://doi.org/10.1093/hr/uhad052

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Tuggle, C. K., Clarke, J., Murdoch, B. M., Lyons, E., Scott, N. M., Benes, B., … **Sheehan, M.J.**, ...Schnable, P. (2023, March 22). Current Challenges and Future of Agricultural Genomes to Phenomes in the U.S. https://doi.org/10.31219/osf.io/m346e

Wannemuehler, S. D., Luby, J. J., & **Yue, C.** (2023). Consumer Preferences for Kiwiberries: Implications of Experimental Auctions, *HortScience*, *58*(7), 739-746. Retrieved Jun 13, 2023, from https://doi.org/10.21273/HORTSCI17133-23

Wuddineh, W.A., Xu, X. & **Zhong, Gan-Yuan**. Amino acid substitutions in grapevine (*Vitis vinifera*) acetolactate synthase conferring herbicide resistance. *Plant Cell Tiss Organ Cult* (2023). https://doi.org/10.1007/s11240-023-02512-8

Announcements

Contact Kate Fessler at fessl023@umn.edu to add announcements to this newsletter

Dr. Soon Li Teh has accepted a position as the new grape breeder & enologist at the University of Minnesota. He begins on 30 September, 2023. Welcome to the VG3 team, Soon Li!

VG3 postcards have been printed! Send your mailing address to fessl023@umn.edu to receive a set.

New to VG3? Click here to submit a profile for the website

Call for website contributions!

Do you have a research update to share? Some cool photos to show off? A student looking to add a byline to their CV? Email Kate Fessler at VitisGen3@umn.edu or fessl023@umn.edu

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