

January 2022

# CCOVInews

A newsletter from  
the Cool Climate Oenology  
and Viticulture Institute



Cool  
Climate  
Oenology &  
Viticulture  
Institute

Brock University

## CCOVI research looks to specialized camera technology for early detection of grapevine viruses

Imagine being able to detect, and then manage, the presence of a grapevine virus before symptoms are even visible in the vineyard.

Sudarsana Poojari, Senior Staff Scientist at Brock University's Cool Climate Oenology and Viticulture Institute (CCOVI), is working to help the grape and wine industry do exactly that — without a hefty price tag or the need to work with complicated equipment and data.

Poojari is heading up a new research project that is investigating the use of a hand-held hyperspectral imaging system to detect Grapevine Red Blotch Virus and Grapevine leafroll-associated virus 3 in young and asymptomatic grapevines.

The goal is to identify unique spectral signatures that indicate the presence of these viruses in the early stages of infection. That data would then be shared with the industry, allowing grape growers to make more informed grapevine disease management decisions.

"It's very difficult to identify these virus infections based on visual observations alone, so we need something to detect what our eyes cannot see," Poojari explained. "A system for the detection and discrimination of grapevine viruses in young and asymptomatic phenotypes would provide a much-needed tool to the grape and wine sector."

The research team includes Poojari, CCOVI Researcher Jim Willwerth, post-doctoral fellow Balaji Devatha, and Wendy McFadden-Smith, Horticulture Integrated Pest Management Specialist at the Ontario Ministry of Agriculture Food and Rural Affairs. The Ontario Agri-Food Research Initiative

Commercialization Stream is supporting this work with a \$145,000 grant.

Mitigation and management of grapevine viral disease has been the priority for the grape and wine sector in Canada, and Poojari has seen a steady increase in the number of samples that are showing infection coming into CCOVI's Grapevine Virus Testing lab year after year.

Once a virus infects the plant, there is no cure, so tools for early detection are the best way for growers to protect the health of their vineyards.

High-end hyperspectral camera technology is used in agricultural settings to detect other diseases, as well as nutrient imbalances and water levels in the soil. It uses special optics to capture hundreds of spectral bands and has traditionally been used in conjunction with drones and specialized experts who assess the data.

Just like fingerprints, every object has a unique spectral signature, and Poojari said researchers will attempt to use these signatures to identify differences between healthy, asymptomatic and symptomatic grapevine leaves. They have begun baseline testing on plants in Brock's greenhouse and will collect field data at various intervals throughout the growing season starting next year.

To make this technology more accessible across the industry, Poojari and his team are using a more affordable hand-held camera and will work with Devatha to distill the complex data into practical information that can be easily applied in the vineyard.

"That's the whole hallmark of this project — to fine-tune the data so that everyone can understand it," Poojari said.



Post-doctoral fellow Balaji Devatha works with the hyperspectral camera technology in a Niagara vineyard.

Devatha, who has a background in Physics and Materials Science, specializes in the use of this type of technology.

"I have always wanted to contribute work towards sustainability. When the opportunity arose to make viticulture more sustainable with the help of a brilliant team led by Dr. Poojari, I just jumped into it," he said.

Partnering with Willwerth and McFadden-Smith will also ensure the data gets directly into the hands of growers, helping to further bolster the broader work CCOVI and its partners are doing to develop a national clean plant program for grapevines.

"If we could come up with a tool that could determine the health status of the young vineyards, I think that would provide grape growers the opportunity to make informed virus-management decisions," Poojari said.

## CCOVI research looks to specialized camera technology for early detection of grapevine viruses

Remember when those red, spotted beetles were seemingly everywhere earlier this year?

Due to warming temperatures, those pesky bugs are growing in numbers — and Brock University researchers have provided research-based strategies for managing their impact on grape and wine production in a special climate change edition of *Biomolecules*.

“This international collaboration between a leading viticulturalist, oenologist and industry extension specialist brought together three complementary skill sets to compile this comprehensive review and contextualize the research for winegrowers,” said leading author Gary Pickering, Professor of Biological Sciences and Psychology and Researcher at CCOVI. “It is aimed at better understanding the impact climate change will have on the grape and wine industry, including considerations such as the increased presence of this invasive pest.”

The publication, “Prevalence and Management of Alkyl-Methoxy-pyrazines in a Changing Climate: Viticultural and Oenological Considerations,” was co-authored by Jim Willwerth, CCOVI Researcher and Assistant Professor of Biological Sciences; Andreea Botezatu (PhD '14), of Texas A&M University; and Margaret Thibodeau, who successfully defended her PhD thesis in Biological Sciences at Brock earlier this year. The authors explored the impact that climate change will have on the presence of methoxy-pyrazines, a class of molecules that contribute ‘green’ characteristics to wine.

CCOVI has been a world leader on research in this area.

These chemicals are naturally occurring in some grape cultivars, and can, in low levels, contribute favourably to the overall flavour profile of certain wines (like Sauvignon Blanc, for example).

In higher quantities, however, they produce an undesirable flavour that is likened to green pepper or peanut butter.

The compounds can also be introduced



CCOVI has developed leading strategies to mitigate the impact of the multi-coloured Asian ladybeetle (Photo courtesy of Brock Master of Biological Sciences student Kasia Zgurzynski)

when *Harmonia axyridis*, or multi-coloured Asian ladybeetles, are inadvertently crushed and incorporated in with the grapes at harvest.

While these invasive pests have been present in wine-growing regions around the world for the last decade or so, warmer temperatures in Canada are allowing them to live longer and reproduce in higher numbers.

“They usually die off because our winters are so cold, but they are now surviving longer, and since they are able to proliferate early in the season — and can actually get two or three generations in one season — there’s now more around on a regular basis,” Pickering explained.

The article outlines that there are insecticides and repellents that have shown promise for managing the presence of these ladybeetles in the vineyard, as well as remediation practices that can take place in the winery. The authors also note that viticultural practices, such as implementing a vine training system to increase temperature and light exposure, also have potential to manage concentrations of the chemical in its naturally occurring form in the grape.

“How the grapes respond to climate change is going to be dependent on the part of the world, and even the appellation, that we’re talking about,” Pickering added. “For instance, we have a really interesting story here in Canada this vintage, with our two major grape growing regions — Ontario and B.C. — experiencing polar opposites in terms of weather and related vineyard stressors, yet both scenarios are predicted from the climate change models.”

That’s why the collaborative work that CCOVI and its partners do to support the grape and wine industry is more important than ever.

“Increased frequency of extreme weather events happening during the growing season are going to have different impacts, so it’s important for us to continue doing research on flavour compounds such as methoxy-pyrazines to better understand how to mitigate the impacts of climate change and maintain the high quality of our wines here in Canada,” Pickering said.

# WHAT'S HAPPENING AT CCOVI

## CCOVI Lecture Series returns for 15th edition

The CCOVI Lecture Series returns to the virtual stage on January 31, celebrating its 15th year and reflecting on the Institute's 25th anniversary. The free lectures are open to the public and will take place remotely via livestream every week until April 4. Due to current health and safety protocols, there will be no in-person attendance. Visit: [brocku.ca/ccovi/outreach/lecture](https://brocku.ca/ccovi/outreach/lecture) for details on how to watch the lectures.

### SCHEDULE

#### Monday, January 31

Donald Cyr, Professor of Finance, Goodman School of Business, Brock University — Potential use of Weather Derivatives in Hedging Aggregate Viticulture Yields: A Case Study of the Niagara Region of Canada

#### Monday, February 7

Michael Ripmeester and Russell Johnston, Chair and Professor of Geography, Faculty of Social Sciences, Brock University and Associate Professor, Communications, Popular Culture and Film, Brock University — Grapes, Wine and Public Memory

#### Monday, February 14

Debbie Inglis, CCOVI Director, Brock University — TanninAlert: the launch of a new program for Ontario red winemakers to assess skin and seed tannin at harvest to assist in winemaking decisions

#### Monday, February 28

Sudarsana Poojari, CCOVI Senior Virologist, Brock University — Emerging virus diseases of grapevine: Advances in diagnosis and management

#### Monday, March 7

Joachim Scholz and Jacob Anthony Gigliotti, Assistant Professor, Goodman School of Business, Brock University; Oenology and Viticulture student, Brock University — Brand Storytelling on Instagram: How Wine Brands Create Epic Stories One Image at a Time

#### Monday, March 14

Liette Vasseur, UNESCO Chair on Community Sustainability: from Local to Global, Brock University — Exploring different cover crops to adapt to climate changes

#### Monday, March 21

Vanda Provato and Abhay Garg, Chief Marketing and Digital Officer, LCBO; Vice President of Merchandising, LCBO

#### \*Special day\* Friday, March 25

José Ramón Urbez Torres, Research Scientist, Agriculture and Agri-Food Canada Summerland Research and Development Centre

#### Monday, March 28

Belinda Kemp, CCOVI Senior Oenologist, Brock University — Magic of mushrooms: the potential use of mushroom-derived materials in the winery

#### Monday, April 4

Ronald Jackson, Wine Writer, Author — Wine and Food: Perfect Marriage or Myth



## CCOVI launches new Continuing Education courses

### Wine Faults and Sensory Practices (Online):

This three-day intensive course provides a general overview of sensory science and how it can be applied to the wine industry. Topics such as sensory thresholds, psychological biases, and the biology of human perception will be explored to better understand the range and diversity of how the general population experiences wine. Students will gain experience with common sensory tests including preference testing, difference testing, and flash profiling with an emphasis on the implications for product development and consumer insight. The sensory aspects of common faults will be explored in detail.

### Advanced Winemaking (Online):

This 10-week course is open to students who have successfully completed the Foundations in Winemaking course. Both the scientific and the practical aspects of winemaking will be explored in greater depth than in the introductory course with an increased emphasis on small-scale commercial production. Topics will include wine regulations, winery design and equipment selection, production planning, managing inoculated and wild fermentations, barrels and oak alternatives, finishing, and packaging.

### WSET Level 3 (Online):

This course provides an in-depth exploration of a wide range of wines and the wine regions in which they are grown. This internationally recognized level of certification is ideal for trade employees, advising management, customer service and those making informed selections of wines in a wide variety of situations, or the wine enthusiast wishing to build on WSET Level 2 certification. Duration: Nine weeks. Final exam to be taken in-person at Brock University.

For more information and to register, visit [brocku.ca/ccovi/continuing-education](https://brocku.ca/ccovi/continuing-education) or contact Barb Tatarnic at [ccovi@brocku.ca](mailto:ccovi@brocku.ca)



# Continuing Education courses

## WSET Level 3 Award in Wines

**\*NEW ONLINE\***

February 21 - April 24

## Certification in Ontario Wines

March 4 - April 8

## Foundations in Winemaking

March 7 - May 9

## Cider and Perry Production - A Foundation (online)

April 14 - June 30

September 1 - November 17

## WSET Level 1 Award in Wine

February 7 - March 6

February 21 - March 20

March 7 - April 3

March 21 - April 17

## WSET Level 2 Award in Wine

February 7 - March 13

February 21 - March 27

March 7 - April 10

March 21 - April 24

## WSET Level 1 Award in Spirits

March 7 - April 3

## WSET Level 2 Award in Spirits

March 21 - April 24



## CCOVI welcomes New Fellows, Professional Affiliates

CCOVI is pleased to welcome four new Fellows and Professional Affiliates to the Institute:

**Charles Despres:** Associate Professor, Brock University

**Justin Renkema:** Agriculture and Agri-Food Canada, London Research and Development Centre – Vineland Campus

**Amy LeMay:** Post-Doctoral Fellow, Niagara Community Observatory, Brock University

**Liette Vasseur:** UNESCO Chair on Community Sustainability: From Local to Global, Brock University



## Thesis defences

Congratulations to Charlene Marcotte who successfully defended her MSc thesis on January 18, 2022. Her thesis was titled: "Techniques to manage tannins of Cabernet sauvignon and Pinot noir wines made in Ontario, Canada" and she is co-supervised by Debbie Inglis and Belinda Kemp.

### PUBLICATIONS AND BRIEFS

- Belinda Kemp, Hannah Charnock, and Gary J. Pickering. (2022). What does 'buying local' mean to wine consumers? Journal of Wine Research. (In publication).

### UPCOMING PRESENTATIONS

- McFadden-Smith, Wendy. (2022). New IPM Products/Product Re-evaluation Update. Ontario Fruit and Vegetable Convention. February 23, 2022.
- Willwerth, Jim. (2022). Vineyards. The Use of Abscisic Analogs to Mitigate the Effects of Climate Change and Red Blotch Infection. Ontario Fruit and Vegetable Convention. February 23, 2022.
- McFadden-Smith, Wendy. (2022). Spotted Lanternfly - What's being done to Prepare for its Arrival. Ontario Fruit and Vegetable Convention. February 24, 2022.
- Vasseur, Liette, Carter, Kathryn, Verhallen, Anne and Heather VanVolkenburg (2022). Cover crop options for Vineyards. Ontario Fruit and Vegetable Convention. February 24, 2022.
- McFadden-Smith, Wendy and Willwerth, Jim. (2022). The Challenging 2021 Vintage. Ontario Fruit and Vegetable Convention. February 24, 2022.
- Renkema, Justin. (2022). Update on Identifying Insect Vectors of GRBV in Ontario. Ontario Fruit and Vegetable Convention. February 24, 2022.