

Welcome to the XIV Annual International Controlled Atmosphere and Modified Atmosphere Research Conference!

- The Opening Ceremony, followed by the Welcome Reception, will begin at 3:00 pm Sunday, May 18th, 2025, at the Wenatchee Conference Center.
- All sessions will be held at the Wenatchee Conference Center in the Orchard Exhibit South room.
- The conference desk will be open at 1:00 pm on Sunday, May 18th, 2025, at the Wenatchee Conference Center (Red Lobby), and Monday through Thursday from 8:10 am to 6:00 pm.
- Poster setup is scheduled for Sunday, May 18th, 2025, in the Orchard Exhibit North room, from 1:00 pm to 2:50 pm. Poster removal will take place on Thursday, 22nd, 2025, from 1:00 pm to 2:00 pm.
- Wednesday, May 21st, 2025, at 5:30 pm, buses will transport attendees from the Wenatchee Conference Center to the Highlander Golf Course for the Conference Dinner with live entertainment from the Whiskey Trail Band!



Conference Program

Sunday 05/18/25	Monday 05/19/25	Tuesday 05/20/25	Wednesday 05/21/25	Thursday 05/22/25
Morning Sessions				
	Keynote II Dr. Pramor Mahajan 8:20 am - 9:15 am	Keynote III Dr. Randolph Beaudry 8:20 am - 9:15 am	Keynote IV Dr. Christopher Watkins 8:20 am - 9:15 am	Keynote V Dr. Bart Nicolai 8:00 am - 8:45 am
	O-I Dynamic Controlled Atmosphere 9:20 am - 10:35 am	O-V Controlled Atmosphere 9:20 am - 10:35 am	O-VII Dynamic Controlled Atmosphere 9:20 am - 10:35 am	Apple Discussion Panel 8:45 am - 9:45 am
	Coffee Break 10:35 am - 11:00 am	Coffee Break 10:35 am - 11:00 am	Coffee Break 10:35 am - 11:00 am	Coffee Break 9:45 am - 10:00 am
	O-II Controlled Atmosphere 11:05 am - 12:20 pm	O-VI Quarantine & Pathology 11:05 am - 11:50 pm	O-VIII Controlled Atmosphere 11:05 am - 12:20 pm	Pear Discussion Panel 10:00 am - 11:00 am
Afternoon Sessions				
Posters & Exhibitors Setup 1:00 pm - 2:50 pm	O-III Fruit Physiology in CA 1:30 pm - 2:45 pm	Technical Tours 1:30 pm - 6:00 pm	O-IX Fruit Physiology in CA 1:30 pm - 2:45 pm	Sponsors Talks 11:00 am - 11:50 am
Opening Ceremony 3:00 pm - 3:30 pm	Coffee & Poster Session 2:45 pm - 3:25 pm		Coffee & Poster Session 2:45 pm - 3:25 pm	Conference Closing Ceremony 12:00 pm - 1:00 pm
Keynote I Dr. Bart Nicolai 3:30 pm - 4:30 pm	O-IV Modified Atmosphere Packaging 3:30 pm - 5:00 pm		O-X Controlled & Modified Atmosphere 3:30 pm - 5:00 pm	Posters Removal 1:00 pm - 2:00 pm
Welcome Reception 4:30 pm - 6:00 pm	ISHS Business Meeting 5:00 pm - 6:00 pm		Conference Dinner 6:00 pm - 8:00 pm	

Sunday
05/18/2025

Opening Ceremony 3:00 pm – 3:30 pm

Carolina Torres, Washington State University, Wenatchee, WA, USA

Keynote Speaker 3:35 pm – 4:30 pm

Dr. Bart Nicolai

Bioscience Engineering Professor, KU Leuven, Belgium

“Holding their breath: how innovative controlled atmosphere storage technologies keep pome fruit
pristine (or not)”

Monday
05/19/2025

Keynote Speaker 8:20 am – 9:15 am

Dr. Pramod Mahajan

Leibniz Institute for Agricultural Engineering and Bioeconomy, Potsdam, Germany

“Sensors and Modelling Applied to Fresh Produce Packaging and Storage”

O-I: Dynamic Controlled Atmosphere 9:20 – 10:35 am

Moderator: Rene Mogollon, Washington State University, Wenatchee, WA, USA

Title	Authors
Internal carbon dioxide injury in organic 'Honeycrisp' apples stored in controlled or dynamic controlled atmosphere storage with or without delay in relation to aroma volatiles and fruit quality	Yosef Al Shoffe; David Rudell; Christopher Watkins
DCA is a viable non-chemical strategy that preserves the quality of organic 'Gala' apples in long supply chains	Sadat Amankona; Hnin Phyu Lwin; Carolina Torres
Fruit quality and physiological disorder development in 'NYT' apples stored in air, controlled, or dynamic controlled atmosphere storage	Yosef Al Shoffe; Christopher Watkins
Dynamic Controlled Atmosphere (DCA) storage of Conference pear retains background color better than normal CA storage	Bert Verlinden; Hoang Minh Phan; Maarten Hertog; Pieter Verboven; Bart Nicolai
Enhancing Economic Viability of Organic Apple Storage through Dynamic Controlled Atmosphere Technology	Nickson Cabote; R. Karina Gallardo; Carolina Andrea Torres; Suzette Galinato

O-II: Controlled Atmosphere 11:05 am – 12:20 pm

Moderator: Sadat Amankona. Washington State University, WA, USA

Title	Authors
Metals in the CA room can degrade 1-MCP	Randolph M. Beaudry; Özge Horzum; Nobuko Sugimoto; Philip Engelgau
From recorded Controlled Atmosphere chain conditions to model predictions for remaining storage life	Leo Lukasse; Rob Schouten
Heat transfer dynamics during loading in industrial-scale controlled atmosphere storage of apples	Tuany Gabriela Hoffmann; Ulrike Praeger; Reiner Jedermann; Akshay D. Sonawane; Felix Büchele; Daniel A. Neuwald; Manfred Linke; Barbara Sturm; Pramod V. Mahajan
Investigating apple surface condensation and mass loss with IoT sensors and predictive modelling	Akshay D. Sonawane
Impact of Controlled Atmosphere Conditions on Shrinkage, Weight Loss, and Mass Settlement in Stored Pome Fruits	Laia Torregrosa; Josep Illa

O-III: Fruit Physiology in CA 1:30 pm – 2:45 pm

Moderator: Dave Rudell, USDA-ARS, Wenatchee, WA, USA

Title	Authors
Dynamic change in respiration rate of Conference pear in storage: experimental evidence and modelling	Pieter Verboven; Hoang Minh Phan; Maarten Hertog; Bert Verlinden; Bart Nicolai
Refrigeration system effects on apple fruit conservation, mass loss and in-situ metabolism activity during CA storage	Daniel Alexandre Neuwald; Felix Büchele; Tuany Gabriela Hoffmann; Pramod V. Mahajan
Progress towards understanding the link between preharvest factors and controlled atmosphere related storage disorders for apple fruit	Jason W. Johnston; Heike Schwendel; Leiza Turnbull; Ashleigh Julian; Anna Tattersall; Stanley Mair; Hannah Lloyd
Oxidative metabolism associated with superficial scald development in 'Granny Smith' apples	Mariana Jooste; Monja Gerber; Anél Botes; Daniël Viljoen; Ian Crouch; Elke Crouch
Cuticular wax content and fatty acid composition of 'Fräulein' apples under different storage methods	Daniel Alexandre Neuwald; Adriana Lugaesi; Manaswi Jenigar Hoovanna; Laura Rafaela Reckziegel Senem; Felix Büchele; Stephanie Dos Reis Ribeiro; Daiane Quadros de Oliveira Neuwa; Barbara Cecconi Deon; Kartik Khera; Kiran Hivare; Robert Keith Prange; Luiz Carlos Argenta; Fabio Rodrigo Thewes; Roger Wagner

O-IV: Modified Atmosphere Packaging 3:30 pm – 5:00 pm

Moderator: Christopher Watkins, Cornell University, Ithaca, NY, USA

Title	Authors
Is it possible to substitute low temperature MAP with or without ethylene scrubbing for CA marine transport of tree-ripe mango?	Jeffrey K. Brecht; Faisal Shahzad; Moshe Doron; Steven A. Sargent
Effect of Packaging Materials and Micro-perforation on the VOCs equilibrium of Packaged Broccoli raab (<i>Brassica rapa</i> L.)	Giancarlo Colelli; Aysha Saleem; Pramod V. Mahajan; Maria L. Amodio; Sandra Pati
The biological and economic viability of implementing controlled atmosphere storage for the Michigan asparagus industry	Philip Engelgau; John Bakker; Ben Werling; Simone Valle de Souza; Randy Beaudry

Ozone-Enriched MAP: An Effective Approach for Microbial Control in Table Grapes	Giuseppe Rosiello; Colelli; Raffaele Simonelli; Maria Luisa Amodio
Miniature Electronic System for O ₂ and CO ₂ Control in Modified Atmosphere Storage and Transport Boxes	Yogesh Bhaskar Kalnar; Pramod V Mahajan; Cornelia Weltzien
Ripening behaviour of avocado fruits under the influence of different ripening enhancer in Modified Atmosphere Condition	Chhungpuii Khawhtring; Lisa Lathruaizeli; Olivia Lalremsangi

ISHS Business Meeting 5:00 pm – 6:00 pm

Moderator: Giancarlo Colelli, University of Foggia, Foggia FG, Italy

**Tuesday
05/20/2025**

Keynote Speaker 8:20 am – 9:15 am

Dr. Randolph Beaudry

Postharvest Biology and Technology Professor, Michigan State University, Lansing, Michigan, USA

“Target atmospheres for the storage of blueberry fruit: what should we expect in terms of decay control and physiological impacts”

O-V: Controlled Atmosphere 9:20 am – 10:35 am

Moderator: Yosef Al Shoffe, Cornell University, Ithaca, NY, USA

Title	Authors
Effects of low oxygen on storage disorders in ‘Honeycrisp’ apples	Jennifer DeEll; Geoffrey Lum
Superficial scald inhibition treatments and their ethylene-dependence in symptom expression on ‘Granny Smith’ apples	Elke Crouch; Monja Gerber; Mariana Jooste; Anel Botes; Daniel Viljoen; Ian Crouch
Commercial scale experiments with 1-MCP and CA in apple cv. Red Aroma	Jorunn Børve; Theresa Weigl; Emily Follett
Impacts of a short growing season for controlled atmosphere storage of apples	Emily Follett; Jorunn Børve; Theresa Weigl; Siv F. Remberg
The effect of delayed cooling and delayed CA establishment on internal browning and fruit quality of ‘Fuji’ apples	Anel Botes; Mariana Jooste; Elke Crouch; Anmari Kriegler

O-VI: Quarantine & Pathology 11:05 am – 11:50 pm

Moderator: Isabel Ortega-Salazar, Washington State University, Wenatchee, WA

Title	Authors
Potential of CA storage for postharvest disinfestation of codling moth (Cydia pomonella) in pear: determination of most tolerant life stage	Ann Schenk; Tim Beliën
Fungal growth and aflatoxin contamination on sweet potato stored under controlled atmosphere conditions	Maria Del Carmen Alamar Gavidia; Lembe Magwaza; Leon A Terry; Angel Medina; Roberta Tosetti; Sulaiman Sowe

Biocontrol coating and controlled atmosphere as innovative postharvest solutions to manage potato black dot during cold storage	Marta Sanzo Miró; Christian Ghidelli; Belinda Pérez Bibbins; M. Carmen Alamar
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<p>Wednesday 05/21/2025</p>

Keynote Speaker 8:20 am – 9:15 am

Dr. Christopher Watkins

Postharvest Science Professor, Cornell University, Ithaca, NY, USA

“Dynamic Controlled Atmosphere Storage – A USA Perspective on Challenges and Opportunities”

O-VII: Dynamic Controlled Atmosphere 9:20 am – 10:35 am

Moderator: Victor Escalona, Universidad de Chile, Chile

Title	Authors
Synergy of dynamic controlled atmosphere and 1-MCP application in preserving apple fruit quality at elevated storage temperatures in response to rising energy costs	Daniel Alexandre Neuwald; Felix Büchele; Adriana Lugaresi; Daiane Quadros de Oliveira Neuwa; Fabio Rodrigo Thewes; Siamak Kalantari; Jurandi Gonçalves De Oliveira; Maria Emma García-Pastor
Dynamic controlled atmosphere – chlorophyll fluorescence (DCA-CF) and controlled atmosphere (CA) in long-term storage of ‘Cripps’ Pink’ apples with special reference to internal browning	Daniela Ramos; Ineke de Jong; Mariana Jooste; Ian Crouch; Elke Crouch
Chlorophyll fluorescence imaging as a tool for identifying low-oxygen in apples (Malus x domestica, BORKH.)	Tim-Pascal Schlie; Werner Dierend; Dirk Köpcke; Thomas Rath
From storage to flavor: VOCs dynamics in apples before and after DCA-CF and 1-MCP	Angelo Zanella; Alessia Panarese; Ines Ebner; Oswald Rossi; Nadja Sadar; Stefan Stürz
Recovery of ester production following simulated DCA storage with and without 1-MCP treatment	Randolph M. Beaudry; Özge Horzum; Jiarui Xu; Nobuko Sugimoto; Philip Engelgau

O-VIII: Controlled Atmosphere 11:05 am – 12:20 pm

Moderator: Angelo Zanella, Laimburg Research Centre, Südtirol, Italy

Title	Authors
Controlled atmospheres improve postharvest quality of Regina cherries depending on maturity stages	Victor Escalona; Rodrigo Neira; Violeta Muñoz; Matías Piña; Joaquín Villegas; Fernanda Hernández; Daniel Guerrero
Ethylene concentrations during Controlled Atmosphere transport of fruit and flowers	Leo Lukasse; Marcel Staal; Rob Schouten; Fátima Perreira da Silva; Taylor Person
Exploring Postharvest Storage Efficacy of Horticultural Crops Under Low Pressure Conditions	Brendon Anthony; Yong-Ki Kim; Jakob Pott
Evaluating Cold Chain Scenarios, Including Controlled Atmosphere Storage, to Optimize Sweet Cherry Quality	Gabriela Bolanos; Rene Mogollon; Carolina Torres

Exploring the Effects of Low Pressure to Extend the Storage Life of Various Kiwifruit Varieties	Jakob Pott; Brendon Anthony
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O-IX: Fruit Physiology in CA 1:30 pm – 2:45 pm

Moderator: Carolina Torres. Washington State University, Wenatchee, WA

Title	Authors
Humidity in RA and CA storage of apples and pears	Robert K. Prange; A. Harrison Wright; Barbara Daniels-Lake; Daniel Neuwald; Luis C. Argenta; Dirk Koepcke
Long-term storage of 'Fuji' apples and characterization of different internal browning types using X-ray computed tomography	Kenias Chigwaya; Jaco Moelich; Daniel Viljoen; Ian Crouch; Elke Crouch
Towards a non-invasive methodology for assessing apple ripening state in real time during refrigeration storage	Alan Keraudren
Disentanglement of low oxygen stress and ripening in pome fruit	Loren Honaas; Huiting Zhang; Heidi Hergarten; Stephen Ficklin; Alex Harkess
Reducing Chilling Injuries in Nectarines: The Role of Controlled Atmosphere and Its Molecular Mechanisms	Eduardo Javier Ordoñez Trejo; Federica Consiglio; Pasquale Termolino; Emanuela Palomba; Marina Iovene; Riccardo Aiese Cigliano; Marco Dimarsico; Serena Varotto; Claudio Bonghi

O-X: Controlled & Modified Atmosphere 3:30 pm – 5:00 pm

Moderator: Isabel Ortega-Salazar, Washington State University, Wenatchee, WA

Title	Authors
From pollination to postharvest conditions: towards understanding the development of CA-related disorders in CH201/FRED® pears	Séverine Gabioud Rebeaud; Samuel Köchli; Pierre-Yves Cotter; Danilo Christen
Controlled atmosphere, temperature management, and harvest timing to mitigate 'Gem' pear internal breakdown development	Rachel Leisso; Janet Turner; Shawn McMurtrey; Christopher Imler; Kristal Dowell; David Rudell; Emmi Klarer; Yu Dong
Effects of Temperature and Dynamic Controlled Atmosphere Storage on Fruit Quality and Disorder Incidence in 'Gala' Apples	Hnin Phyu Lwin; Sadat Amankona; David Rudell; Carolina Torres
Metabolic and molecular responses of Red Delicious apple to dynamic and static controlled atmosphere storage	Elige Salamé; Benedetto Rupert; Pietro Tonutti; Stefano Brizzolara
Mechanistic insights into husk scald development in pomegranates: The role of oxidative stress, hormones, and storage conditions	Luis Cisneros-Zevallos; Luis Cisneros-Zevallos; Mahshad Maghousi; Maria Luisa Amodio; Danial Fatchurrahman Giancarlo Coelli
Sulfur dioxide gasification and generators combined with controlled atmosphere on postharvest quality of Blue Ribbon blueberries	Victor Escalona; Rodrigo Neira; Violeta Muñoz; Matías Piña; Joaquín Villegas; Fernanda Hernández; Julia Pinto

Thursday
05/22/2025

Keynote Speaker 8:00 am – 8:45 am

Dr. Bart Nicolai

Bioscience Engineering Professor, KU Leuven, Belgium
“Reduction of energy use during pome fruit storage”

**Apple Discussion Panel: New Apple Cultivars: What Do We Need to Know to Optimize Storage?,
8:45 am – 9:45 am**

Moderator: Ines Hanrahan, Washington Tree Fruit Research Commission, Wenatchee, WA

Panelists: Rob Blakey, Stemilt Growers; Carolina Torres, Washington State University; Dave Rudell,
USDA-ARS Wenatchee; and Chris Watkins, Cornell University.

Pear Discussion Panel: Pear Disorders and Storage Challenges, 10:00 am – 11:00 am

Moderator: Carolina Torres. Washington State University, Wenatchee, WA

Panelists: Séverine Gabioud Rebeaud, Agroscope ; Dirk Köpcke, Lower Saxony Fruit Research Station
Jork (OVA); and Ann Schenk, Flanders Centre of Postharvest Technology.

Sponsor Talks 11:00 am – 11:50 am

Moderator: Rene Mogollon. Washington State University, Wenatchee, WA

Presenters: Isocell-Gas At Site, Storage Control Systems, Paclife, AgroFresh, Optiflux

Closing Ceremony 12:00 pm – 1:00 pm

ISHS Young Mind Award

Poster Sessions

05/19/2025 – 05/21/2025

Poster	Title	Authors
P-1	Digital twin for prediction of cold storage conditions of fruit by real-time sensor monitoring	Akshay D. Sonawane; Tuany G. Hoffmann; Pramod V. Mahajan; Reiner Jederman
P-2	Effects of packaging conditions and genotypes on the quality of mung bean sprouts	Piyada Alisha Tantasawat; Tanandorn Woramit; Chadapon Chaiyapan; Pakhawat Pookhamsak; Akkawat Tharapreuksapong; Piyapond Puekphong; Theerawat Chantakot; Patompong Thinkham; Sukanya Aiamlar; Wissanee Pola
P-3	Combination of CA storage and refrigerated retail shelves on blueberry loss, organoleptic and nutritional quality	Chloé Leclerc; Philippe Bony; Christophe Aubert; Guillaume Chalot; Valentine Cottet; Myriam Capron; Melina Augereau
P-4	Preventing fruit spoilage and extend cherry shelf-life in Trentino region (northern Italy)	Dario Angeli; Fabio Zeni; Lorenzo Turrini; Sarah Girardi; Alessandro Pederghana; Milena Valentini; Simone Dalpiaz
P-5	Sensitivity of 'Fresco' (Wellant®) and SQ159' (Magic Star®) apples to dynamic elevated CO ₂ concentrations in CA/ULO storage	Dirk Köpcke; Tim-Pascal Schlie
P-6	Evaluating of Harvista treatment and two storage regimes on the quality 'Gala' apple	Pavol Suran
P-7	New insight into the storage potential of red-fleshed apple	Dario Angeli; Fabio Zeni; Lorenzo Turrini; Bruno Galli; Isabella Endrizzi; Jasmine Chini; Luca Lovatti
P-8	Quality outcomes of using MAP in Russet Burbank potatoes	Gustavo Henrique de Teixeira; Samuel Paytosh; Jessica Smith; Pankaj Yadav; Hailey Hampton; Rabecka Hendricks; Nora Olsen
P-9	Heat transfer dynamics in the cool-down phase for efficient CA-storage of apples	Tuany Gabriela Hoffmann; Ulrike Praeger; Felix Büchele; Daniel A. Neuwald; Pramod V. Mahajan
P-10	Skin greasiness development in WA 38 apples under different storage regimes	Rene Mogollon; Carolina Torres
P-11	Effects of micro-nanobubble pretreatment and passive modified atmosphere packaging on microbiological quality and shelf life of fresh Swiss chard	Nandi Elana Nyamende; Ayanda Masilela; Morris Fanadzo; Zinash Belay; Oluwafemi Caleb
P-12	Combining cold plasma treatment with sodium alginate coating to preserve nectarine quality and control Botrytis cinerea	Zinash Belay; Simphiwe Khumalo; Neliswa A Matrose; Oluwafemi James Caleb
P-13	The Impact of Short-term High-Carbon dioxide Controlled Atmosphere Treatment on Insect Disinfestation and Quality	Ammara Asghar; Giancarlo Colelli; yAoub Fathi Najafabadi; Ilaria Dlsita; Giacinto S. Germinara; Danial Fatchurrahman; Maria Luisa Amodio
P-14	Ethylene signaling interference in apple during storage suggests Neofunctionalization of Hypoxia response pathways	Heidi Hargarten; Huiting Zhang; John Hadish; Stephen Ficklin; Alex Harkess; Loren Honaas
P-15	Ethylene concentration in commercial apple storage rooms	Daniel Neuwald; Luiz Argenta; Rachael Wood; Felipe Terra
P-16	Dynamic Controlled Atmosphere (DCA Swinglos®) for the Improvement of postharvest quality of yellow-flesh kiwifruit (cv. SunGold™)	Luca Buglia; Vitantonio Tateo; Marina Buccheri; Maristella Vanoli; Rosita Caramanico; Fabio Lovati
P-17	Post-production performance and stress tolerance evaluation of Bulbine frutescens during transportation and retail phases	Elige Salamé; Elige Salamé; Annalisa Meucci; Alice Trivellini; Anna Mensuali; Antonio Ferrante

P-18	The Impact of DCA Storage on Fruit Quality: A comparison between 'Gala' and 'Honeycrisp'	Sadat Amankona; Hnin Phyu Lwin; Carolina Torres
P-19	The Effect of Stepdown Cooling on Internal Browning and Fruit Quality of 'Fuji' Apples	Anel Botes, Mariana Jooste, Elke Crouch, Anmari Kriegler