

MELBA RUTH SALAZAR GUTIERREZ

Ph. 509-786-9201|Fax. 509-786-9370
m.salazar-gutierrez@wsu.edu
melbaruthsalazar@gmail.com

AgWeatherNet-IAREC
Washington State University
24106 N Bunn Rd.
Prosser, WA 99350

SUMMARY

Dr. Salazar is an Assistant Research Professor in the Biological Systems Engineering Department; currently she is the Interim Leader of the Research Program of the Agricultural Weather Network. She has over 15 years of experience in research, education, extension and outreach in biology, agricultural engineering, and statistics. She has published scientific papers in refereed journals as well as numerous proceedings. Her research focuses on cold hardiness, crop physiology and phenology of tree fruit and horticultural crops. Her varied experience in crop modeling and applied statistics brings a practical, real-world view of biology systems that she applies to her research.

AREA OF SPECIALTY

- Crop Physiology
- Phenology
- Cold hardiness
- Crop Modeling and Simulation
- Decision Support Systems
- Experimental Design
- Applied Statistics
- DSSAT
- SAS / SPSS

EDUCATION

Doctor of Philosophy Agronomy Sciences
Universidad Nacional de Colombia
Specialization in Statistics
Universidad Nacional de Colombia
Bachelor of Science – Education –Biology
Universidad del Cauca

Aug 2001 – Jun 2006
Bogotá, Colombia
Aug 1994 – Jun 1996
Bogotá, Colombia
Aug 1988 – Jun 1993
Popayán, Colombia

PROFESSIONAL EXPERIENCE

- Interim leader of the AgWeatherNet research program, WSU-IAREC, Prosser, WA. 2016 – Pres.
- Affiliate Assistant Professor, Department of Horticulture- WSU-IAREC, Prosser, WA. 2017 – Pres.
- Leader and representative for WSU, Land Grand Consortium – US Embassy- Colombia 2014 – Pres.
- Research Associate, AgWeatherNet Program. WSU-IAREC, Prosser, WA. 2012 - 2013
- Postdoctoral Research Associate. AgWeatherNet Program. WSU-IAREC, Prosser, WA. 2010 - 2012
- Postdoctoral Research Associate. The University of Georgia, Biological and Agricultural Engineering Department, Griffin, GA. 2010

- Postdoctoral Research Associate. The University of Georgia, Biological and Agricultural Engineering Department, Griffin, GA. (Sabbatical) 2008 - 2009
- Head of Mathematics and Applied Statistics and Associate Professor of Statistics. Engineering School, Universidad de la Sabana, Colombia. 2006 - 2010
- Visitor Scientist. Universidad de Almeria, Spain. 2006
- Visiting Research Scientist, Biological and Agricultural Engineering Department. University of Florida, Gainesville, FL. 2004 - 2005
- Statistics Coordinator - Lecturer Professor in Statistics. Planning Department, Universidad de Ciencias Aplicadas y Ambientales, Colombia 2001 - 2002
- Research Assistant, Plant Pathology and Biochemistry Department, IACR-Rothamsted Harpenden. England, UK. 1999 - 2000
- Lecturer Professor in Applied Statistics, Universidad de Caldas, Medicine and Biology School, Colombia. 1997 - 1999
- Statistics coordinator- Lecturer Professor in Applied Statistics, Universidad Católica de Manizales, Microbiology-Bacteriology Program, Colombia. 1997 - 1999
- Caldas Committee of Coffee Growers- Statistical Analysis of National Census for Coffee growers 1996
- Research Associate, The National Coffee Federation Research Center Cenicafé, Colombia 1991 - 1995

SKILLS

Languages: English, Spanish

Software/Programming: Microsoft Office Suite, Adobe Pro, SAS, SPSS, Basic R.

CURRENT RESPONSIBILITIES

As the *Interim Leader of the Research Program in AgWeatherNet (AWN)*, my role includes research, extension and outreach.

I am responsible for providing academic and research leadership, management and assessment for the AWN Research Program

- Responsible for crop modeling, simulation and decision support systems for the tree fruit and grape industry
- Co-lead research projects related with tree fruit, grapes, and other horticultural crops and perform evaluation with climate variables
- Grant proposals writing and application, writing and presentation of project progress and reports
- Lead the initiative in WSU for the Land Grant University Consortium in Colombia to leverage the land grant mission and expertise in applied agriculture and extension services in support of Colombia's peacebuilding efforts
- Attend, participate, and host industry meetings to assess business needs and plan projects.
- Responsible to plan, design and analyze experiments in the field and in the lab including experiments under different environments, use of plant growth chambers and lab experiments, collection of data in the field and data analysis
- Represent AWN in National and International meetings and working groups in relation to research
- Develop and implement protocols for field and laboratory research projects

- Lead and delegate research treatments, sample collection, field condition monitoring, and other related activities to assure quality data collection for research
- Support outreach and educational activities, oral and written presentation materials in English and Spanish
- Train and supervision of graduate students, and other visiting scientist
- Responsible for equipment operations and purchasing
- Lead the QA/QC for the AWN program

PREVIOUS RESPONSIBILITIES

Universidad de la Sabana

Bogotá, Colombia

*Associate Professor- Head of Mathematics and Statistics
School of Engineering*

As the Head of Mathematics and Statistics area my role was to provide leadership, motivation, and management toward the achievement of excellence in teaching, research, continuing education and service activities of the department as well as:

- Call and preside over all meetings of the department faculty and staff
- Coordinate the recruitment of new faculty members
- Develop syllabus and overall course structure, and administered all grades.
- Courses taught: Applied statistics, Methods I and II, Experimental design, Time series & forecasting tools at undergraduate and graduate level
- Conference presentation in several academic events

The University of Georgia

Griffin, GA

*Postdoctoral Research Associate
Biological and Agricultural Engineering Department*

My primary appointment was research in addition, I mentored students for the Youth Research Program. I was responsible for applying the crop simulation models to estimate irrigation requirements for maize, cotton, peanut, soybean, and fall and spring tomato in the Southeast of the U.S.A. as part of a project on Agricultural Irrigation Water Demand Forecast of the Major Crops in Georgia. This innovative application and results not only contributed to the advance of the use of models to estimate rural water use for growing crops but also as an instrument that can guide the farmers in doing appropriate use of water.

University of Florida

Gainesville, FL

*Visiting Research Scientist
Biological and Agricultural Engineering Department*

- Agricultural Model Simulation course attendance
- Model development for Cape Gooseberry (*Physsalis peruviana* L.)
- Base temperature estimation for the phenological stages of Cape gooseberry
- Parametrization of the model for growth responses to climate variables
- Model development for GDD and thermal time accumulation

Universidad de Ciencias Aplicadas y Ambientales

Bogotá, Colombia

*Statistics Coordinator-Lecturer Professor in Statistics
Departamento de Planeación*

- My role was to provide statistical advice and support, including planning, experimental design, analysis and interpretation of results for research projects of professors and students.
- Teach basics of statistics to different programs including Agronomy, Medicine, Veterinary Medicine and Zootechnics. Developed syllabus and overall course structure, and administered all grades.

IACR-Rothamsted

Harpenden, England, UK

Research Assistant

Plant Pathology and Biochemistry Department

- My responsibility was to sampling plants from a winter linseed (*Linium usitatissimum*) field experiment and assessing the incidence of diseases on these plants in controlled environmental experiments on Pasm disease (*Mycosphaerella linicola*).
- Maintained a Burkard spore sampler for monitoring concentrations of air-borne pathogen spores, identified, and counted numbers of spores of different pathogenic species, after collected. Part time research in Borage (*Borago officinalis*) doing P.C.R. and other preparations in the lab.
- I attended two statistic courses (linear regression and multivariate analysis) at Hertfordshire University.

Universidad de Caldas

Manizales, Colombia

Lecturer Professor in Applied Statistics

Medicine and Biology School

Teaching and syllabus developing, overall course structure, and grades administration

Universidad Católica de Manizales

Manizales, Colombia

Research Coordinator, Statistics advisor, Lecturer Professor

Microbiology-Bacteriology Program

- Teaching and syllabus developing, overall course structure, and grades administration
- Statistical Advisor for Microbiology Research projects

Centro Nacional de Investigaciones de Café

Chinchiná, Colombia

Research Associate

Disciplina de Fisiología Vegetal

My role was to model the growth and development of the coffee berry fruit using thermal time, as well as a detailed anatomy and physiology study of the coffee fruit tissues for different stages of development, using electronic microscopy this study was the base of my BS thesis. In addition, I participated in other projects related with photosynthesis and physiology of the coffee tree.

OTHER RESEARCH EXPERIENCE

- Research and modeling exotic fruits and horticultural crops such as Uchuva, 2007
Cape gooseberry (*Physalis peruviana* L); Lulo (*Solanum quitoense* L.);
Lettuce (*Lactuca sativa*); Cabbage (*Brassica olearacea*); Celery (*Apium graveolens*); Broccoli (*Brasica sp.*)v ar. Coronado at the Sabana de Bogotá.

- Academic inter-change. Universidad de Almeria Spain. Project “Clean production of Rose (*Rosa sp.*) and Carnation (*Dianthus caryophyllus* L.) with two substrates in Bogotá Plateau. 2006
- Limnology and ichthyology study of the high Cauca river basin and Salvajina dams. Universidad del Cauca – Biology program. CVC Popayán-Colombia. 1990-1991

FUNDED RESEARCH

Project title	Agency	Date	Total	PI-CoPI's
Concord Grape Development and Climate Variability	WSCGRC	2016-2019	\$27,146	Salazar-Keller
A Multi-Level Approach to Heat-Related Illness Prevention in Ag Workers	HHS	2016-2020	\$94,277	Salazar-Spector UW
Building Capacity for Research and Extension- Colombia US Embassy Federal Award No: SCO-200-16-GR176	US Embassy-Colombia	2016	\$60,000	Byers -Salazar
Predicting Flower Bud Hardiness of Commercial Sweet Cherry Cultivars	WTRFC	2016-2019	\$264,914	Salazar-Grove Gibeaut
Influence of climate variability on grapevine phenology	WRAC	2017-2020	\$109,059	Salazar-Grove- Keller
Development of Apple Blossom Phenology and Fruit Growth Models	WTRFC	2012-2016	\$237,500	Salazar – Hoogenboom
Effect of early spring temperature on apple and sweet cherry blooms	WTRFC	2012-2015	\$255,000	Salazar – Hoogenboom
Predicting Key Phenological Stages for Grapevines	WRAC	2013-2016	\$169,269	Salazar – Hoogenboom
Weather Monitoring for Concord Grape Production	WSCGRC	2012-2015 2016-2019	\$ 17,562 \$ 27,146	Salazar – Hoogenboom Salazar –Keller
Measuring Weather Conditions at 30 feet for Inversion Modeling	WRAC	2013-2015	\$ 57,496	Hoogenboom – Salazar
Implementation and evaluation of apple pollen tube growth models. Tree Fruit Commission	WTFRC	2012-2015	\$92,034	Hoogenboom – Salazar
Assessment and Modeling of Wheat Falling Numbers	WGC	2013-2016	\$99,650	Hoogenboom – Salazar
Crop and Rangeland Forecasting Platform. Review and Design Guidance	CGIAR	2012	\$24,945	Hoogenboom – Salazar

Student Internship- Influence of Climate
on Vine Grape Production

CANHRS 2014

\$2,000 Hoogenboom –
Salazar

HONORS AWARDS

- 2017 Washington Association of Wine Grape Growers. Second place poster competition with Student: Corydon Funk. Kennewick, WA.
- 2016 International Society for Horticultural Science, First place poster competition with Student: Hector Camargo presented in Hortimodel 2016, Avignon, France.
- 2016 SURCA, Washington State University. Honorable Mention in the Organismal, Population, Ecological, and Evolutionary Biology category with Student: Corydon Funk.
- 2016 Washington Association of Wine Grape Growers. Third Place in poster competition with Student: Corydon Funk.
- 2014 American Society of Agronomy. Mentor Golden Opportunity Scholar. With Student: Nicholas Meier. Univ. of Missouri.
- 2012 Washington Association of Wine Grape Growers. Second place poster competition with Student: Diana Zapata.
- 2010 The University of Georgia, College of Agricultural and Environmental Science. Young Scholar Program. Certificate of Recognition for contributions as Mentor of the Apprenticeship Program.
- 2009 The University of Georgia, College of Agricultural and Environmental Science. Young Scholar Program. Certificate of Recognition for contributions as Mentor of the Apprenticeship Program.
- 2009 Sociedad Colombiana de Horticultura, Best presentation award at the III Horticultural Colombia Congress.
- 2004-2006 Doctoral Program Scholarship. The Administrative Department of Science, Technology and Innovation-Colciencias, Colombia.
- 1993-1995 Graduate Student, Scholarship. The Administrative Department of Science, Technology and Innovation-Colciencias, Colombia and the Scientific Research Program of the National Coffee Federation of Colombia – Cenicafé.
- 1991-1993 Undergraduate Student .The Administrative Department of Science, Technology and Innovation-Colciencias, Colombia and the Scientific Research Program of the National Coffee Federation of Colombia – Cenicafé.

MEMBERSHIPS IN PROFESSIONAL OR HONOR SOCIETIES

- 2016-Pres. ASEE American Society for Engineering Association
- 2010-Pres. WAWGG Washington Wine Growers Association
- 2010-Pres. Washington State Grape Society
- 2001-Pres. SCCH Sociedad Colombiana de Ciencias Hortícolas -Colombian Horticultural Society
- 2010-Pres. INSAM International Society for Agricultural Meteorology
- 2010-2016 WAHORT Washington State Horticultural Association
- 2012-2017 ISHS International Society for Horticultural Sciences
- 2012-2016 ASPB American Society of Plant Biologist
- 2010-2016 ASA-CSSA-SSSA, American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America

PRESENTATIONS AT SCIENTIFIC OR TECHNICAL MEETINGS

- 2018 Grape Society Annual Meeting and Trade Show. Long Term Weather Trends and Phenology Stages.
- 2017 Ravenholt lecture Series. Panelist. Climate Extremes: Is the Pacific Northwest Wine Industry Ready? - What tools do we have what more do we need? WSU, Tri-cities. March 17.
- 2016 TRAC.Pasco (formerly Pasco Real Ag Show). Eastern WA Ag Expo. "Cuándo, Cómo, y Porqué usar las Ayudas de AgWeatherNet para Tomar Decisiones en la Huerta". January 6.
- 2016 Wilbur-Ellis Grower Meeting. How to Get the Best Use of AgWeatherNet: Tools for Better Decision Making. Yakima Convention Center. January 19 Spanish session.
- 2016 Washington State Department of Agriculture (WSDA), in partnership with Ste. Michelle Wine Estates and collaboration with the Washington State Department of Labor & Industries. Fisiología Vegetal. Conference for Pesticides Credits – Re – certification course. February 2. Columbia Crest Winery, Hwy 221 Columbia Crest Drive, (178810 Hwy 221), Paterson, WA.
- 2016 Precision Farming Expo. Why we should care about plant stress and climate variability. January 7-8, Three Rivers Convention Center & Toyota Center Kennewick, WA.

- 2016 Washington Farm Bureau. The best use of AgWeatherNet for better Agricultural Management. Washington. Leadership conference. April 15-17, Wenatchee, WA.
- 2016 APLU & NAFSA Latin American Partnerships Symposium. LGU Colombia Dialogue 2016. September 28, 29. UC Davis.
- 2016 Why we should care about plant stress and climate variability. Precision Farming Expo. January 7-8. Three Rivers Convention Center & Toyota Center Kennewick, WA.
- 2015 Panelist: Agricultural Education Extension Models in Practice. U.S Land Grant University Colombia Dialogue 2015: “Alianzas para la Agricultura” December 9-12 Bogotá, Colombia.
- 2015 Monitoreo de datos climáticos y modelación de cultivos en el Estado de Washington, USA. U.S Land Grant University Colombia Dialogue 2015: December 9-12 “Alianzas para la Agricultura” Bogotá, Colombia.
- 2015 Chair Spanish Session. Washington State Tree Fruit Association Annual Meeting, Dec, 7-9. Yakima, WA.
- 2015 Tree Fruit Thinning: Why, When and how / Raleo de frutos: Cómo, cuándo y porqué. 2015 111th Annual Meeting & NW Hort Expo. Washington State Tree Fruit Association, Dec, 7-9. Yakima, WA
- 2015 Monitoring Weather Data and Modeling Horticultural Crops in Washington State, Montpellier, Cirad Lavalette, bâtiment 3, salle 159, de 11h à 12h. France June 8- 2015.
- 2015 Modeling phenology of apple. X International Symposium on Modelling in Fruit Research and Orchard Management. June 2 - June 5, 2015 Agropolis international, Avenue Agropolis Montpellier, France
- 2015 Modeling Apple growing. X International Symposium on Modelling in Fruit Research and Orchard Management. June 2 - June 5, 2015 Agropolis international, Avenue Agropolis Montpellier, France

SCIENTIFIC SOCIETY OFFICE – COMMITTEE ASSIGNMENTS

Peer reviewer

- Scientia Horticulture
- HorTechnology
- Computers and Electronics in Agriculture. Elsevier.
- Precision and Agriculture Journal
- African Journal of Agricultural Research
- Agronomía Colombiana revista de la Universidad Nacional de Colombia

- 2017 Proposal evaluator for Biotechnology and Biological Sciences Research Council (BBSRC) U.K.

- 2017 Judge at the Clean Tech Competition (worldwide research and design challenge for pre-college youth)
- 2015 Chair Spanish Session - Washington State Tree Fruit Association Annual Meeting, Dec 7-9. Yakima, WA

PUBLICATIONS

Peer Reviewed

1. Peña Q., A.J., Hoogenboom G., Salazar, M.R., Stöckle, C., and Keller M., 2018. Comparison of Air Temperature Measured in a Vineyard Canopy and at a Standard Weather Station. Submitted to Australian Journal of Grape and Wine Research.
2. Peña Q., A.J., Chaves, B., Salazar, M.R., Keller M., and Hoogenboom G. 2018. Radius of influence of air temperature from automated weather stations installed in complex terrain. Submitted to Theoretical and Applied Climatology.
3. Camargo Alvarez, H., Salazar Gutiérrez, M., Zapata, D., Keller, M and Hoogenboom, G. 2018. Time-to-event analysis to evaluate dormancy status of single-bud cuttings: An example for grapevines. Plant Methods October 14:98. Available online: <https://plantmethods.biomedcentral.com/track/pdf/10.1186/s13007-018-0361-0>
<https://doi.org/10.1186/s13007-018-0361-0>
4. Valencia, A., J.A., Soto, G.A., Castaño, V, G.J., Villa, Vallejo E., L.F., Salazar-Gutierrez, M.R. 2018. Morphometric Identification of Stem Borers *Diatraea Saccharalis* and *Diatraea Busckella* (Lepidoptera: Crambidae) in Sugarcane Crops (*Saccharum Officinarum*) in Caldas Department, Colombia. PlosOne. Available online: <https://doi.org/10.1101/385955>
5. Camargo, H., Salazar-Gutierrez, M.R., Chaves, B. and Hoogenboom G. Modeling pollen tube growth of apple. 2018. Scientia Horticulturae 240. 125-132
6. Chaves, B., Salazar, M.R., Schmidt, T., Dasgupta, J and Hoogenboom, G. 2017. Modeling apple bloom phenology. Acta Hort. 1160. 201-206.
7. Chaves, B., Salazar, M.R., Schmidt, T., Dasgupta, J and Hoogenboom, G. 2017. Modeling fruit growth of apple. ISHS Acta Horticulturae 1160. 335-340.
8. Zapata D.M., Salazar M., Chaves B., Keller M., and Hoogenboom G. 2017. Predicting Key Phenological Stages for 17 Grapevine Cultivars (*Vitis vinifera* L.). Am. J. Enol. Vitic. 68 (1): 60-68.
9. Salazar, M.R., Chaves, B., Hoogenboom, G. 2016. The freezing tolerance of apples flower buds. Scientia Hort. 198 :344-351.
10. Whiting, M.D., Salazar, M.R., Hoogenboom, G. 2015. Development of Bloom Phenology Models for Tree Fruits. Acta Hort. 1068: 107-112.
11. Zapata D.M., *Salazar M., Chaves B., Keller M., and Hoogenboom G. 2015. Estimation of the base temperature and growth phase duration in terms of thermal time for four grapevine cultivars. Int. Jour. Biometeorol. 59: 1771. *Corresponding author.

12. Salazar-Gutierrez, M.R., Chaves, B., Anothai, J., Whiting, M., Hoogenboom, G., 2014. Variation in cold hardiness of sweet cherry flower buds through different phenological stages. *Scientia Hort.* 172: 161-167.
13. Salazar-Gutierrez, M.R., Johnson, J., Chaves, B., Hoogenboom, G. 2013. Relationship of Base Temperature to Development of Winter Wheat in the Southeastern US. *The Int. Jour. of Plant Product.* 7 (4): 741-762.
14. Salazar, M.R., Hook, J. E., Garcia y Garcia, A., Paz, J.O., Chaves, B., Hoogenboom, G. 2012. Estimating Irrigation Water Use for Maize in the Southeastern USA: A Modeling Approach" *Agr. Water Manage.* 107:104-111.
15. López, M.A., Chaves, B., Flórez, R. V. J. Salazar, M. R. 2010. Modelo de aparición de nudos en clavel (*Dianthus caryophyllus* L.) cv. Delphi cultivado en sustratos. Node appearance model for substrate grown carnation (*Dianthus caryophyllus* L.) cv. Delphi. *Agronomía Colombiana.* 28(1): 47-54.
16. Salazar, M.R., Jones, J.W., Chaves, B., Cooman, A., Fisher, G. 2008. Base temperature and simulation model for nodes appearance in Cape gooseberry (*Physalis peruviana* L.), *Revista Brasil. de Frutic.* 30 (4): 862-867.
17. Pulido, S., Bojaca, C., Salazar, M.R., Chaves, B. 2008. Node appearance model for Lulo (*Solanum quitoense* Lam.) in the high altitude tropics. *Biosyst. Engineering.* 101(4): 383-387.
18. Carranza, C., Lancho, O., Miranda, D., Salazar, M.R., Chaves, B. 2008. A simple simulation model of dry matter distribution in broccoli (*Brassica* sp.) variety Coronado and cabbage (*Brassica oleracea*) hibrid Delus cultivated in Bogotá plateau. *Agronomía Colombiana* 26, (1): 23-31.
19. Salazar, M.R., Jones, J.W., Chaves, B., Cooman, A. 2006. A model for the potential production and dry matter distribution of Cape gooseberry (*Physalis peruviana* L.). *Scientia Hort.* 115 (2): 142-148.
20. Salazar, M.R., Jones, J.W., Chaves-Cordoba, B., Cooman, A. 2006. A Simple Phenological and Potencial Production Model for Cape gooseberry (*Physalis peruviana* L). *Acta Hort.* 718: 105-112.
21. Salazar, G.M.R., Lopez F. Y., Mosquera S. L. P., Riaño, H.N.M., Arcila, P.J. 1997. Characterization of photosynthetic activity of coffee (*Coffea* sp) fruits. *Supplement of plant physiology.* 14 (3):1109.
22. Salazar, G.M.R., Chaves C.B., Riaño, H.N.M., Arcila, P.J., Jaramillo, R.A. 1994. Crecimiento del fruto de café C arabica L. Cenicafé (Chinchiná). *Revista Cenicafe.* 45 (2): 41-50.
23. Salazar, G.M.R., Riaño, H.N.M., Arcila, P.J., Ponce, D.C.A. 1994. Estudio morfológico, anatómico y ultraestructural del fruto de café C arabica L. Cenicafé (Chinchiná). *Revista Cenicafe.* 45 (3):93-104.

24. Salazar, G.M.R., Arcila, P.J., Riaño, H.N.M., Bustillo, P.A.E. 1993. Crecimiento y desarrollo del fruto de café y su relación con la broca. Cenicafé (Chinchiná). Avance Técnico. N° 194 Septiembre.
25. Salazar, G.M.R., Arcila, P.J., Riaño, H.N.M., Bustillo, P.A.E. 1994. Crecimiento y desarrollo del fruto de café y su relación con la broca. Revista Asocia. 2 (3).

WHITE PAPERS

Agricultural Irrigation Water Demand. Georgia's Major and Minor Crops 2011 through 2050
<http://www.nespal.org/sirp/waterinfo/state/awd/agwaterdemand.htm>

Partnership for Education, Equity and Capacity Building in Colombian Agriculture: A Concept Note from the US Land-Grant University Dialogue with Colombian Agriculture. Report presented to the US Embassy in Colombia October, 2017.
<https://lgucolombia.org/wp-content/uploads/2018/03/RRR-IFS-Colombia-Final-Report-WSU-ilovepdf-compressed.pdf>

MEDIA

2017 Pamphlet – Extension and Rural Education Subgroup - Land Grant University Colombia Consortium <https://drive.google.com/file/d/OB-hlD1QZiY2BbkxCLVRBdVVWUkNKWDQwVENZSHF2U1RqaGtJ/view>

2017 New model forecasts grapevine bud break, bloom and veraison
<http://www.goodfruit.com/new-model-forecasts-grapevine-bud-break-bloom-and-veraison/>

2017 Interview Wave Minute Program- May 11, 2017
<http://washingtonagnetnetwork.com/2017/05/11/wave-minute-agweathernet-grape-growers/>

2017 Viticulture and Enology Extension News (VEEN)-Predicting Phenology: A New Tool from AgWeatherNet. By Melba Salazar-Gutiérrez, WSU-AgWeatherNet
<http://wine.wsu.edu/wp-content/uploads/sites/66/2017/04/2017-VEEN-Spring.pdf>

2016 AWN Video Series <https://www.youtube.com/watch?v=uUCd9JanRGI>

2016 <https://www.youtube.com/watch?v=vc-q-R9qIA>

2016 <http://www.goodfruit.com/es/presentaciones-sofisticadas-en-espanol/>

2016 <https://bsyse.wsu.edu/2016/09/22/student-wins-first-place/>

CONFERENCE ATTENDANCE, POSTER AND PROCEEDINGS

1. Ying-Tsui Wang, Melba Salazar and Gerrit Hoogenboom 2017. Modeling branch pattern and shoot length for predicting apple tree response to pruning. Oral presentation at ASABE annual meeting 2017, July 16-19. Spokane Convention Center, Spokane, WA.

2. Ying-Tsui Wang, Melba Salazar and Gerrit Hoogenboom 2017. Pruning effect on the shoot structure of Fuji apple trees grafted on two different rootstocks. Poster presented at WSU showcase 2017, March 31. M.G. Carey Senior Ballroom, Compton Union Building in WSU, Pullman, WA.
3. Camargo, H., M. Salazar, and G. Hoogenboom. 2016. Predicting the dormancy and bud break dates for grapevines. Hortimodel 2016 . International Society for Horticultural Science, Brussels, Belgium.
4. Camargo, H., M. Salazar, B. Chaves, and G. Hoogenboom. 2016. Modeling pollen tube growth for Gala and Fuji apples. Poster session presented at the Hortimodel 2016 conference of the International Society for Horticultural Science, Avignon, France.
5. Pena-Q, A.J. Salazar-G, M., Hoogenboom, G. Differences in air temperature, bark and xylem temperature in a Chardonnay vineyard. Session Machine vision, sensing and control for specialty crops. Paper# 162460989. ASABE 2016 Annual International meeting July 17th-20th, 2016. Orlando, FL
6. Gramann, J. Salazar-G, M., Hill, S., Ghidey, T., Hoogenboom, G. Temperature Inversions, Freezing Temperatures, and Prediction. Session Advanced computational approaches for solving agricultural and biological engineering problems. Paper# 162459942. ASABE 2016 Annual International meeting July 17th-20th , 2016. Orlando, FL
7. Salazar, M. R. The best use of AgWeatherNet for better Agricultural Management. Washington Farm Bureau, 2016 leadership conference. April 15-17, 2016. Wenatchee, WA
8. Salazar, M.R, Paternina, M.J and Hamman, R. 2016. Cold or Warm Season for Grapes in the Pacific Northwest, Can We Really Tell? Agriculture in a Changing Climate: Implications for Educators, Industry, and Producers. Red Lion Hotel Kennewick, WA. March 9th- 11th 2016.
9. Pena, A.J., Camargo, H.A., Salazar, M.R, and Hoogenboom, G. Surface Air Temperature Variability in South Central Washington: An Agricultural Approach. Agriculture in a Changing Climate: Implications for Educators, Industry, and Producers. Red Lion Hotel Kennewick, WA. March 9th- 11th 2016.
10. Funk, C., Salazar, M.R., Chaves, B., Hamman, R., Riley, B., and Hoogenboom, G. Climate and Relation to Quality. Agriculture in a Changing Climate: Implications for Educators, Industry, and Producers. Red Lion Hotel Kennewick, WA. March 9th- 11th 2016.
11. Salazar, M.R. 2016. BC Tree Fruit Hort Symposium, Attendance, participation. Kelowna, BC- February 24, 2016.
12. Corydon Funk, Melba Salazar-Gutierrez, Bernardo Chaves, Rick Hamman, Bill Riley, Gerrit Hoogenboom. 2016. Climate and Relation to Quality. Poster Presented at WAWGG Conference 2016, Feb 9-11. Three Rivers Convention Center.
13. Camargo, A, Héctor A, Salazar, G., Melba R., Hoogenboom, Gerrit. 2016. Predicting Key Phenological Stages for Grapevines. A Simple but Scientific Approach for Management and Site Selection. Poster Presented at WAWGG Conference 2016, Feb 9-11. Three Rivers Convention Center.
14. Maria Jose Paternina, Melba R. Salazar, Rick Hamman. 2016, Is Cold Really Cold? and Warm, Really Warm? Poster Presented at WAWGG Conference 2016, Feb 9-11. Three Rivers Convention Center.

15. Salazar, M.R. 2016. Fisiología Vegetal. Conference for Pesticides Credits – Re – certification course. Washington State Department of Agriculture (WSDA), in partnership with Ste. Michelle Wine Estates and collaboration with the Washington State Department of Labor & Industries. February 2, 2016.
16. Columbia Crest Winery, Hwy 221 Columbia Crest Drive, (178810 Hwy 221), Paterson, WA 99345
17. Salazar, M.R. 2016. How to Get the Best Use of AgWeatherNet Tools for Better Decision Making. Wilbur- Ellis Grower Meeting, Yakima Convention Center. January 19 Spanish session.
18. Salazar, M.R. 2016 Cuándo, Cómo, y Porqué usar las Ayudas de AgWeatherNet para Tomar Decisiones en la Huerta”. January 6. 2016 Eastern WA Ag Expo (formerly Pasco Real Ag Show) TRAC.Pasco.
19. Salazar, M.R. 2016. Why we should care about plant stress and climate variability. Precision Farming Expo. January 7-8. Three Rivers Convention Center & Toyota Center Kennewick, WA
20. Salazar, MR, 2015. Panelist: Agricultural Education Extension Models in Practice. U.S Land Grant University Colombia Dialogue 2015: “Alianzas para la Agricultura” Holiday Inn Express - Bogota, Colombia, December 9-12.
21. Salazar, MR, 2015. Monitoreo de datos climáticos y modelación de cultivos en el Estado de Washington, USA. U.S Land Grant University Colombia Dialogue 2015: “Alianzas para la Agricultura” Holiday Inn Express - Bogota, Colombia, December 9-12
22. Salazar, M.R. Chair Spanish Session. 2015 Washington State Tree Fruit Association Annual Meeting, Dec, 7-9. Yakima, WA
23. Salazar, M.R. Tree Fruit Thinning: Why, When and How / Raleo de frutos: Cómo, cuándo y porqué. , 2015. 111th Annual Meeting & NW Hort Expo. Washington State Tree Fruit Association, Dec, 7-9. Yakima, WA
24. Wasko DeVetter L., Hoheisel G., Salazar, M.R. Determining Cold Hardiness in Washington Blueberry. Small Fruit Conference. December 2-4, 2015. Lynden, WA.
25. Salazar, M.R. 2015. Monitoring Weather Data and Modeling Horticultural Crops in Washington State, Montpellier, Cirad Lavalette, bâtiment 3, salle 159, de 11h à 12h. France June 8- 2015.
26. Salazar, MR. et al., 2015. Modeling phenology of apple. X International Symposium on Modelling in Fruit Research and Orchard Management. June 2 - June 5, 2015 Agropolis international, Avenue Agropolis Montpellier, France
27. Salazar, MR. et al., 2015. Modeling Apple growing. X International Symposium on Modelling in Fruit Research and Orchard Management. June 2 - June 5, 2015 Agropolis international, Avenue Agropolis Montpellier, France
28. Funk, C., Salazar, M., Chaves, B., Hoogenboom, G., Hamman, R., Riley, B. 2015. Climatic trends, bioclimatic indices and the relation to wine-grape harvest qualities. Past, Present, & Future Challenges to Natural & Managed Ecosystems Sagebrush, Salmon, & Syrah in a Non-stationary Environment. 86th Annual Meeting Northwest Scientific Association April 1-4, 2015 Columbia Basin College, Pasco, WA

29. Peña, Q. A.J., Salazar, G. M.R., Hoogenboom, G. 2015. A Methodological Approach to Determine Flower Bud Vulnerability to Low Temperature during Early Spring. Past, Present, & Future Challenges to Natural
30. & Managed Ecosystems Sagebrush, Salmon, & Syrah in a Non-stationary Environment. 86th Annual Meeting Northwest Scientific Association April 1-4, 2015 Columbia Basin College, Pasco, WA
31. Castillo, O., Hoogenboom, G., Salazar, M., Chaves, B., Loyd, N., Hill, S. 2015. Spatial Interpolation Approach Of Temperature Observations For The State Of Washington. Past, Present, & Future Challenges to Natural & Managed Ecosystems Sagebrush, Salmon, & Syrah in a Non-stationary Environment. 86th Annual Meeting Northwest Scientific Association April 1-4, 2015 Columbia Basin College, Pasco, WA.
32. Salazar, M.R. Participant/attendant. Women in Agriculture Conference, Union Gap March 2015.
33. Salazar, G., M.R. 2015. Tools to Help with Management and Control Strategies – AgWeatherNet Models Washington Association of Wine Grape Growers Session: Focus on Viticulture – Presented in Spanish. 2015 Washington Association of Wine Grape Growers Annual Meeting, Convention, and Trade Show. February 10-13, 2015 Three Rivers Convention Center & Toyota Center Kennewick, WA
34. Salazar, G., M.R. 2014. The Use of AgWeatherNet (AWN) for Practical Applications in Agriculture / El uso de "AgWeatherNet" (AWN) Para Aplicaciones Prácticas en Agricultura – Spanish Session. Hort Convention & Annual Meeting. December, 2014. Three Rivers Convention Center.
35. Cold hardiness of tree fruits. Melba R. Salazar, Bernardo Chaves, Matthew Whiting and Gerrit Hoogenboom. Plant Biology 2014. Portland, OR. July 12-16, 2014.
36. Phenology and Development of Apple. Melba R. Salazar, Bernardo Chaves, Tory Schmidt, Karen Lewis, Nairanjana Dasgupta, Ines Hanrahan, Felipe Castillo and Gerrit Hoogenboom. Washington State Horticultural Association Annual Meeting Poster Session. Wenatchee, Dec 1-5, 2013
37. AgWeatherNet Apple Pollen Tube Growth Model Web Based Decision Support Tool. S. Hill, M. Salazar, L. Combs, T. Schmidt, G Hoogenboom. Washington State Horticultural Association Annual Meeting Poster Session. Wenatchee, Dec 1-5, 2013
38. Cold Hardiness of Cherries and Apples. Melba R. Salazar, Bernardo Chaves, Jakarat Anothai, John Ferguson, Matthew Whiting and Gerrit Hoogenboom. Washington State Horticultural Association Annual Meeting Poster Session. Wenatchee, Dec 1-5, 2013
39. Performance Evaluation of CSM-CERES-Maize and CSM-IXIM-Maize Models for Maize Responses to High Temperature and Drought Stress under Field Conditions. Jakarat Anothai, Michael Ottman, Melba Salazar, Al Green, Bruce Kimball and Gerrit Hoogenboom. Accepted for poster presentation at the ASA, CSSA and SSSA Annual Meetings in Tampa, FL on November 3-6, 2013.
40. Use of Principal Component Analysis for the Phenological Classification of Winter Wheat. Melba Ruth Salazar-Gutierrez, Jerry W. Johnson, Bernardo Chaves, Jakarat Anothai and Gerrit Hoogenboom. Accepted for poster presentation at the ASA, CSSA and SSSA Annual Meetings in Tampa, FL on November 3-6, 2013.

41. A sequential model for predicting budbreak, blooming, and veraison of wine grape cultivars. Zapata, R. D, M. Salazar, M. Keller, L. Mills and G. Hoogenboom. Accepted for oral presentation at 2013 SACNAS National Conference in Meeting in San Antonio, TX (USA). October 3 – 6, 2013.
42. Cold hardiness of apples and cherry buds. Melba Salazar-Gutierrez, Bernardo Chaves, Jakarat Anothai, Matthew Whiting and Gerrit Hoogenboom. Poster presented at the American Society of Plant Biologists. Providence, R.I. Jul 20-24, 2013
43. The effect of extreme high temperatures on maize growth and development. Jakarat Anothai, Melba Salazar-Gutierrez, Stan Thain, Ian Flitcroft, and Gerrit Hoogenboom. Poster presented at the Plant Biology international annual meeting of the American Society of Plant Biologists. Providence, R.I. Jul 20-24, 2013
44. Mega-Environment and Multivariate Statistical Analysis of Hard Winter Wheat Grown in Washington State. Melba Salazar-Gutierrez, Jakarat Anothai, Bernardo Chaves, and Gerrit Hoogenboom. Poster presented at the Annual Meeting of for the Western Society of Crop Science. Pendleton, OR. Jun 11-12, 2013.
45. How it works: starting date and base temperature for the prediction of developmental stages for grape. Zapata, R. D, M. Salazar, M. Keller, L. Mills and G. Hoogenboom. Poster presentation at WAWGG (Washington Association of Wine Grape Growers) 2013 Annual Meeting, Kennewick, WA (USA). February 5 – 8, 2013.
46. Salazar M., Chaves, B., Keller, M., Mills, L., Zapata, D., and Hoogenboom, G. Changes in winegrape phenology and the relationship with local climate in Washington. Poster presentation at WAWGG (Washington Association of Wine Grape Growers) 2013 Annual Meeting, Kennewick, WA (USA). February 5 – 8, 2013.
47. Evaluation of the CSM-CERES-Wheat Model Using Variety Trial Data. Melba Salazar-Gutierrez, Jerry Johnson, Bernardo Chaves, Jakarat Anothai and Gerrit Hoogenboom. Poster presented at the Annual Meeting of the American Society of Agronomy at the Climatology & Modeling Section. Cincinnati, OH. Oct 21 to Oct 24, 2012
48. Prediction of key phenological stages for grapevine. Zapata, R. D, M. Salazar, M. Keller, L. Mills and G. Hoogenboom. 2012. Award Second Place Poster presentation at WAWGG (Washington Association of Wine Grape Growers) 2012 Annual Meeting, Kennewick, WA (USA). February 7 – 10, 2012.
49. Relationship of Base Temperature to Development of Winter Wheat in the Southeast. M.R. Salazar, J. Johnson, B. Chaves, and G. Hoogenboom. Poster presented at the Annual Meeting of the American Society of Agronomy at the Climatology & Modeling Section, San Antonio, TX. Oct 16 to Oct 19, 2011.
50. Development of bloom phenology models for tree fruit. Whiting, M.; Salazar, M.R.; Hoogenboom, G. Paper presented by Gerrit Hoogenboom at the “IXth International Symposium on Modelling in Fruit Research and Orchard Management” in Saint- Jean-sur-Richelieu (QC), Canada, June 19 to June 23, 2011.
51. Reproductive Development Model for Winter Wheat in the Southeast. M.R. Salazar, J. Johnson, B.Chaves, and G. Hoogenboom. Conference presentation at the 4st Biological Systems Simulation Conference in Austin, TX, on March 19 to March 21, 2011. Participation/attendance to the American Society of Agronomy, Crop Science Society of America and Soil Science Society of America Annual Meeting in L Long Beach, CA. October 31 to Nov 4, 2010.

52. Dry Matter Accumulation Model for Rose CV. Charlotte. Manuel R. Agámez R, Bernardo Chaves, Melba R. Salazar-Gutiérrez y Víctor J. Flórez R. Participation/attendance/conference presentation at the Congreso Iberoamericano de Horticultura: Innovación Tecnológica y Mercados Competitivos, Bogotá, Colombia. Sept 30 to Oct 2, 2010.
53. Phenological Model of Bud Appearance in Rose. CV Charlotte. Manuel R. Agámez R., Bernardo Chaves C., Melba R. Salazar-Gutiérrez y Víctor J. Flórez R. Participation/attendance/conference presentation at the Congreso Iberoamericano de Horticultura: Innovación Tecnológica y Mercados Competitivos, Bogotá, Colombia. Sept 30 to Oct 2, 2010.
54. Potential growth mathematical modeling of standard Carnation CV, Delphi grown in substrates. M.A. Lopez-Murcia, B.Chaves-Cordoba, V.J.Florez-Roncancio, M.R. Salazar-Gutierrez. Poster presented at the 28th International Horticultural Congress. Section: Modeling Horticultural Systems Lisbon, Portugal. Aug 22 to Aug 27, 2010.
55. Desarrollo de un modelo fenológico de lulo (*Solanum quitoense* var. *quitoense* LAM). Sandra Pulido, Melba Salazar, Bernardo Chaves y Carlos Bojacá. Conference presentation at the Encuentro Nacional de Investigación en Postgrados. ENIP. Bogota, Colombia. Dec 2 to Dec 4, 2009.
56. Estimating Agricultural water Use for the Major Crops in the Southeastern USA: A Simulation Approach. Melba R. Salazar, Axel Garcia y Garcia, Joel O. Paz, James E. Hook, Gerrit Hoogenboom. Poster presented at the ASA-. CSSA-SSSA, International Annual Meeting, Pittsburg on Nov 1 to Nov 5, 2009.
57. Phenological model of node appearance in carnation cv. Delphi. Modelo fenológico de Clavel cv. Delphi. Miguel Ángel Lopez Murcia, Bernardo Chaves Cordoba, Victor Julio Florez Roncancio y Melba Ruth Salazar. Conference presentation at III Congreso Colombiano de Horticultura. Simposio Internacional de cebolla y ajo en el trópico. Libro de resúmenes. Pg. 45. Paipa, Colombia Sept 8 to Sep 12, 2009.
58. Agricultural water use in Georgia. Melba Salazar, Axel Garcia y Garcia, Joel Paz, Jim Hook. & Gerrit Hoogenboom. Conference presentation at the South East Climate Consortium Conference SECC Spring Meeting. Griffin, GA. May 5 to May 7, 2009.
59. Water requirements of the major's crops in Georgia. Melba Salazar, Axel Garcia y Garcia, Joel Paz, Jim Hook. & Gerrit Hoogenboom. Poster presented at the South East Climate Consortium Conference SECC Spring Meeting. Griffin, GA. Conference presentation at the South East Climate Consortium Conference SECC Spring Meeting. Griffin, GA. May 5 to May 7, 2009.
60. Simulating water use of the major crops in Georgia.M.R. Salazar, A. Garcia y Garcia, J.O. Paz, J.E. Hook, and G. Hoogenboom. Conference presentation at the 39th Biological Systems Simulation Conference. Simulation of Food, Feed, Fiber and Fuel Production Systems in the 21st Century. University of Georgia in Proceedings of Pg-33-34. Griffin, GA. May 11 to May 13, 2009.
61. Estimating irrigation water amounts for pecans in Georgia. A. Garcia y Garcia, M. R. Salazar, J. O. Paz, J. E. Hook, and Gerrit Hoogenboom Participation/attendance/conference presentation at the 39th Biological Systems Simulation Conference. Simulation of Food, Feed, Fiber and Fuel Production Systems in the 21st Century. In Proceedings of 39th Biological Systems Simulation

Conference. University of Georgia in Proceedings of Pg-35-36. Griffin, GA. May 11 to May 13, 2009.

62. Crop modelling advances Melba Ruth Salazar. Conference presentation at the workshop Analysis for applied Mathematics. Instituto de Física y Matemáticas de la Universidad Michoacana de San Nicolás de Hidalgo. Morelia, Mich. México Sep 18 to Sep 20, 2008.
63. Development of a phenological model of lulo *Solanum quitoense*. Sandra Patricia Pulido., Carlos Ricardo Bojaca Aldana., Bernardo Chaves., Melba Ruth Salazar. Conference presentation in Spanish titled "Desarrollo de un modelo fenológico de lulo *Solanum quitoense*". II Simposio Internacional de Fruticultura Trópic y Subtrópic. Instituto de Investigaciones en Fruticultura Trópic. La Habana-Cuba. Sep 17 to Sep 21, 2007.
64. Phenological model and dry matter distribution of Cape gooseberry (*Physalis peruviana* L.). Melba Ruth Salazar., James W. Jones., Bernardo Chaves-Cordoba, Alexander Cooman
65. Conference presentation in Spanish titled Modelación de la fenología y distribución de masa seca en uchuva (*Physalis peruviana* L.). II Simposio Internacional de Fruticultura Trópic y Subtrópic. Instituto de Investigaciones en Fruticultura Trópic. La Habana-Cuba. Sep 17 to Sep 21, 2007.
66. Estimation of base temperature for development of a phenological model of lulo (*Solanum quitoense* Lam). Pulido, S., Chaves, B., Bojaca, C., Salazar, M.R. Conference presentation in Spanish titled Estimación de la temperatura base para el desarrollo de un modelo fenológico de Lulo (*Solanum quitoense* Lam). Sociedad Colombiana de Ciencias Hortícolas. Colombia. Sep 12 to Sep 14, 2007.
67. Potential production model proposal of lettuce Batavia (*Lactuca sativa*). Carranza, C., Lancho, O., Miranda, D., Salazar, M.R., Chaves, C. Conference presentation in Spanish Propuesta de un modelo de producción potencial de masa seca de lechuga Batavia (*Lactuca sativa*) Sociedad Colombiana de Ciencias Hortícolas. Colombia. Sep 12 to Sep 14, 2007.
68. Development of a dry mass production model for cabbage (*Brassica oleracea*) hybrid Delus. Carranza, C., Lancho, O., Miranda, D., Salazar, M.R., Chaves, C. Conference presentation in Spanish. Avance de un modelo de producción potencial de masa seca de repollo (*Brassica oleracea*) híbrido Delus. Sociedad Colombiana de Ciencias Hortícolas. Memorias. II Congreso Colombiano de Horticultura, Colombia. Sep 12 to Sep 14, 2007.
69. Development of a mathematical model of the potential growth in celery (*Apium graveolens*) variety Tall Utha Carranza, C., Lancho, O., Miranda, D., Salazar, M.R., Chaves, C. Conference presentation in Spanish. Desarrollo de un modelo matemático del potencial de crecimiento de apio (*Apium graveolens*) variedad Tall Utha. Sociedad Colombiana de Ciencias Hortícolas. Memorias. II Congreso Colombiano de Horticultura, Colombia. Sep 12 to Sep 14, 2007.
70. Development of a simulation model of the dry mass distribution in broccoli Carranza, C., Lancho, O., Miranda, D., Salazar, M.R., Chaves, C. (*Brassica* sp.) var. Coronado. Planteamiento de un modelo de simulación de distribución de masa seca en brócoli (*Brassica* sp.) var. Coronado Sociedad Colombiana de Ciencias Hortícolas. Memorias II Congreso Colombiano de Horticultura, Colombia. Sep 12 to Sep 14, 2007.
71. A Simple Phenological and Potential production Model for Cape gooseberry (*Physalis peruviana* L.). M.R. Salazar, J.W. Jones, B. Chaves-Cordoba, A. Cooman.

72. Poster presented at the Hortimodel . Wageningen, The Netherlands, Oct 29 to Nov 2, 2006.
73. Modelo de producción potencial de uchuva (*Physalis peruviana* L). Melba Ruth Salazar., James W. Jones., Bernardo Chaves., Alexander Cooman. Conference presentation at Sociedad Colombiana de Ciencias Hortícolas. I Congreso Colombiano de Horticultura. Colombia, Oct 17 to Oct 20, 2006.
74. Estudio Anatómico y Fisiológico del fruto de café. Salazar, G.M.R., Riaño, H.N.M., Arcila, P.J., Ponce, D.C.A. Conference presentation at XXVII Congreso Nacional Asociación Colombiana de Ciencias Biológicas ACCB. Colombia, Oct 7 to Oct 10, 2001.
75. Crecimiento y desarrollo del fruto de café. Salazar, G.M.R., Riaño, H.N.M., Arcila, P.J., Ponce, D.C.A. Conference presentation at XXIII. Congreso Anual y Primer Seminario Problemática de las Malezas en Colombia: Un Diagnóstico Regional. Santa fe de Bogotá, Feb 24 to Feb 26, 1993.
76. Estudio Anatómico del fruto de café. Salazar, G.M.R., Chaves, C.B., Riaño, H.N.M., Arcila, P.J., Ponce, D.C.A. Conference presentation at XXVII XXIII Congreso Anual y Primer Seminario Problemática de las Malezas en Colombia: Un Diagnóstico Regional. Santa fe de Bogotá, Feb 24 to Feb 26, 1993.