



Justin G. A. Whitehill, Ph.D.

Plant Molecular Biologist/Chemical Ecologist

Michael Smith Laboratories, University of British Columbia, 301-2185 East Mall, Vancouver, BC Canada V6T 1Z4

Lab: 604-822-9673 | Mobile: 604-442-5826 | Fax: 604-822-2114

Email: whiteh5@msl.ubc.ca | Website: <http://www.msl.ubc.ca/users/whitehil>

Google Scholar: <http://tinyurl.com/ScholarJGAWwhitehill>

h-index: 8 (updated January 10, 2017) | Total Citations: 257 (updated January 10, 2017)

PROFESSIONAL PROFILE

2016 - Present: Research Associate with Dr. Jörg Bohlmann, The University of British Columbia

My research explores the intricacies of **plant-pest (insect/pathogen) interactions** in the context of **forest health genomics**. The specialized interactions between plants and pests offer novel opportunities to explore defense mechanisms and identify unique traits (physical/chemical) such as underlying genes, biochemical pathways, proteins, and phytochemicals involved in plant defense. Ultimately, my research has led to new discoveries in **woody plant defense against major pests**. My PhD research identified the first endogenous resistance mechanism in ash against emerald ash borer (EAB). The work was featured on the cover of the journal *Oecologia*, a *New Phytologist* Tansley Review, and a science article in *The New York Times* by Carl Zimmer. Recently, I have expanded this research with Dr. Joy Ward at the University of Kansas as a collaborator. We secured **extramural funding from NSF (~\$200,000 USD)** to pursue natural variation in this resistance mechanism using a population of white ash trees comprised of individuals collected throughout North America.

Even more exciting outcomes are being generated from my current work as a **Research Associate** (previously a **Postdoctoral Fellow**) in the lab of Dr. Jörg Bohlmann at the University of British Columbia (UBC). My research at UBC has developed new knowledge around a previously unexplored resistance trait in Sitka spruce bark. The resistance trait is a specialized cell type called stone cells (or sclereids) that are found in the cortex of Sitka spruce bark. Stone cells show the strongest correlation with resistance against white pine weevil (WPW; *Pissoides strobi*) – even more effective than terpene-rich oleoresin. My research program comprehensively examines stone cells in Sitka spruce ranging from functional ecology to molecular biology. The first paper from my research with white pine weevil and stone cells (**Whitehill et al. 2016, *Plant, Cell and Environment*, 39:1646-1661**) was featured with an expert commentary highlighting the significance of the paper in advancing the “basic understanding of conifer defenses” (**Krokene 2016, *Plant, Cell and Environment*, 39:1643-1645**). My research is generating a foundational understanding of resistance mechanisms in ecologically and economically important conifer tree species to British Columbia. Recently I have identified the gene (a NAC transcription factor) responsible for controlling stone cell development. I am currently working to generate **transgenic and RNAi spruce** lines to functionally validate candidate gene function. Also, I work closely with government end-users to adapt methods and tools from my research program to generate novel management strategies for trees in natural and managed ecosystems. These strategies include the application of *genomic selection methods* to screen natural populations of trees and quickly advance breeding of resistant individuals for natural forest ecosystem restoration in high weevil impacted sites.

Ultimately, my long-term goals are to develop an internationally recognized, extramurally funded, *forest health genomics* research program to improve host resistance in important tree species against major pests. I plan to continue to apply **modern genomic technologies combined with conventional tree-breeding methods** to improve generation times and screening tools. My short-term goals are to *answer compelling questions in plant stress biology*. I have particular interest in exploring plant responses to biotic stresses such as pathogens and insects. My research will focus on **genomics of plant resilience** and **the use of gene editing to improve plant resilience**. I plan to accomplish this through an integration of extensive experimental understanding of natural tree resistance mechanisms combined with advanced genomic techniques including transgenic, RNAi, and CRISPR/Cas9 technologies to identify and utilize key resistances genes.

EDUCATION

- **2006-2011: Ph. D.** Plant Pathology with specialization in Plant Molecular Biology and Biotechnology, Department of Plant Pathology, The Ohio State University, Columbus, Ohio, USA. Advisor: Pierluigi 'Enrico' Bonello, Ph. D. Dissertation title: "*Investigations into Mechanisms of Ash Resistance to the Emerald Ash Borer.*"
- **2001-2006: B. S.** Life Science with Distinction (focus on Plant Science, Ecology, and Molecular Biology). Otterbein University, Westerville, Ohio, USA. Advisor: Jeffrey S. Lehman, Ph. D.
- **2001-2006: B. S.** Music with an emphasis on Piano Performance. Otterbein University, Westerville, Ohio, USA.

SUMMARY OF POSTDOCTORAL RESEARCH ACTIVITIES

2011 – 2016: Postdoctoral Fellow with Dr. Jörg Bohlmann, The University of British Columbia

My postdoctoral research has dealt with exploring the ecological, biochemical, and molecular mechanisms underlying the interaction between a specialized cell type (stone cells or sclereids) found in the cortex of spruce bark and an endemic insect pest (the white pine weevil - WPW). Through a multifaceted approach I explore the composition of cortical stone cells in spruce and the critical mechanisms involved in their formation. Applied outcomes of this research include targeted functional genomics approaches as efficient screening tools for resistant plants that will help to accelerate and improve tree-breeding programs. Synergistic activities and impact of my current research include:

- **Comprehensive characterization of stone cells in spruce bark** through the application of novel biochemical, microscopic, and molecular approaches within the context of Sitka spruce defense against WPW. **** Published in *Plant, Cell and Environment* (39:1646-1661) with an expert commentary by Dr. Paal Krokene (39:1643-1645).****
- **New methods for testing tree-insect interactions** including development of a semi-artificial diet for WPW adults and larvae, techniques for quantifying damage to insect mouthparts and midgut tissues, and methods to identify novel host responses to insect feeding. ****Published at *Plant, Cell and Environment*. 39:2545-2556.****
- **Identification of stone cell biosynthetic genes using laser-microdissection and RNA-seq** combined with differential gene expression analyses of specific cell types. Functional validation of stone cell genes are being conducted with *transgenic, RNAi, and CRISPR/Cas9 Arabidopsis and spruce*.

SUMMARY OF Ph. D. RESEARCH ACTIVITIES

2006 – 2011: Graduate Research Associate with Dr. Pierluigi 'Enrico' Bonello, The Ohio State University

My Ph. D. research applied a multifaceted approach to dissect resistance mechanisms against the emerald ash borer in ash. Highlights and impacts of my past research include:

- **Proteomic expression and phenolic profiling of ash bark from species** resistant and susceptible to the emerald ash borer led to the identification of 4 proteins and 2 phenolic compounds associated with constitutive resistance against the pest.
- **Constitutive profiling experiments of bark from ash species** demonstrated the importance of phylogeny in understanding resistance in this system. The conceptual framework (i.e. phylogeny) and identification of putative resistance traits are now the foundation for current activities in the EAB resistance program.
- **Methyl jasmonate treatment of containerized and field-grown ash** identified lignin, trypsin inhibitors, and a phenolic glycoside (verbascoside) as being associated with increased resistance of susceptible North American ash to EAB. Bioassays using proxies for lignin and trypsin inhibitors had a negative impact on growth and development of emerald ash borer larvae *in vitro*. Verbascoside led to almost complete mortality of emerald ash borer larvae *in vitro* when tested at methyl jasmonate induced levels. The identification of verbascoside and the evidence supporting its negative impacts against larvae survival, growth, and development represent the first mechanism of resistance identified in ash against emerald ash borer.

TEACHING

- **Invited Lecture (November 2016)** titled *Chemical Ecology of Plant-Insect Interactions*, Biology 1112 at the Kwantlen Polytechnic University. Instructor: Dr. Mathias Schuetz, Surrey, British Columbia, Canada.
- **Invited Lecture (October 2016)** titled *Direct and Indirect Plant Defenses*, Biology 462 at the University of British Columbia. Instructor: Dr. Jörg Bohlmann, Vancouver, British Columbia, Canada.
- **Invited lecture (March 2014)** titled *Forest Chemical Ecology*, Biology 430 at the University of the Fraser Valley. Instructor: Sharon Gilles, Ph. D. Abbotsford, British Columbia, Canada.
- **Teaching assistant (2011)** for Forest Pathology, Plant Pathology 610 at The Ohio State University. Instructor: Pierluigi 'Enrico' Bonello, Ph. D. Columbus, Ohio, USA.
- **Invited lecture (May 2009)** titled *Introduction to Proteomics*, Entomology 694 at The Ohio State University. Instructor: Omprakash Mittapalli, Ph. D. Wooster, Ohio, USA.
- **Teaching assistant (2008)** for General Plant Pathology, Plant Pathology 401 at The Ohio State University. Instructor: Landon H. Rhodes, Ph. D. Columbus, Ohio, USA.
- **Laboratory preparation (2007)** for General Plant Pathology, Plant Pathology 401 at The Ohio State University. Instructor: Landon H. Rhodes, Ph. D. Columbus, Ohio, USA.
- **Teaching assistant and tutor (2003-2005)** for Introductory Biology series at Otterbein University. Instructor(s): Jeffrey S. Lehman, Ph. D. and Michael Hoggarth, Ph. D. Westerville, Ohio, USA.

MENTORSHIP

I am actively involved with the training and mentoring of high school, undergraduate, Masters, Ph. D. students and visiting scientists over a range of projects. Students mentored include:

- **Kristina Kshatriya** (January 2016-present), BSc. Student, University of British Columbia.
- **First Nations, Métis and Inuit students** (May 2016), Verna J. Kirkness Science and Engineering Education Program, University of British Columbia.
- **Maureen Lai, Rosalyn Desa, Osama Qubain and Rikul Thapar** (December 2015), Growing the Future Economy. Communicating Science. SCIE 300. <http://tinyurl.com/StoneCellsandEconomy>.
- **Erica Li-Leger** (Summer 2014), NSERC award recipient. Current Status: Graduate Research Associate, Simon Fraser University.
- **Elizabeth Steves** (2013-2014), lab technician. Current Status: Graduate Research Associate, Simon Fraser University.
- **Callum Kingwell** (Summer 2013), NSERC award recipient. Current Status: Ph.D. Student, Dept. of Neurobiology and Behavior, Cornell University (Advisor: Thomas D. Seeley, Ph.D.).
- **Cyrus Chan** (April 2013), job-shadowing program, Terry Fox Secondary School. Current Status: Undergraduate at Simon Fraser University.
- **Ahmed Najar** (2011), visiting scientist. Current Status: Postdoctoral Fellow, Dept. of Renewable Resources, University of Alberta (Advisors: Nadir Erbilgin, Ph.D. and Simon Landhausser, Ph.D.).
- **Ronald Batallas** (2010), visiting scientist. Current Status: M.S. student, Dept. of Biological Sciences, University of Alberta (Advisor: Maya L. Evenden, Ph.D.).
- **Gerardo Suazo** (2009), visiting scientist. M.S. completed, University of Hohenheim.
- **Robbie Snyder** (2009), summer intern. Current Status: Ph.D. Candidate, Division of Epidemiology, University of California, Berkeley.
- **Scott Williams** (2008), summer intern. Current Status: Postdoctoral Fellow, Dept. of Entomology, Purdue University.

PUBLICATIONS (15 in total)

15. **WHITEHILL, J. G. A.**, H. Henderson, W. Strong, B. Jaquish, and J. Bohlmann. **2016**. Function of Sitka spruce stone cells as a physical defense against white pine weevil. *Plant, Cell and Environment*. 39:2545-2556.
14. ***WHITEHILL, J. G. A.**, H. Henderson, M. Schuetz, O. Skyba, M. M. S. Yuen, J. King, A. L. Samuels, S. D. Mansfield, and J. Bohlmann. **2016**. Histology and cell wall biochemistry of stone cells in the physical defense of conifers against insects. *Plant, Cell and Environment*. 39:1646-1661.
*Featured with an expert commentary by Paal Krokene. **Carbon castles and insect invaders: dissecting physical defenses in conifer stems** - Commentary on Whitehill et al. 'Histology and cell wall biochemistry of stone cells in the physical defense of conifers against insects'. *Plant, Cell and Environment*. 39:1643-1645.
13. Villari, C., D. A. Herms, **J.G.A. WHITEHILL**, D. Cipollini, and P. Bonello. **2015**. Progress and gaps in understanding mechanisms of ash resistance to emerald ash borer, a model for wood boring insects that kill angiosperm trees. *New Phytologist – Tansley Review*. 209:63-79.
12. **WHITEHILL, J.G.A.**, C. Rigsby, D. Cipollini, D. A. Herms, and P. Bonello. **2014**. Decreased Emergence of Emerald Ash Borer from Ash Treated with Methyl Jasmonate is Associated with Induction of General Defense Traits and the Toxic Phenolic Compound Verbascoside. **Featured Journal Cover Article in the December 2014 edition of Oecologia**. 176:1047-1059.
11. Chakraborty, S., **J.G.A. WHITEHILL**, A.L. Hill, S. O. Opiyo, D. Cipollini, D.A. Herms, and P. Bonello. **2014**. Effects of water availability on emerald ash borer larval performance and phloem phenolics of Manchurian and black ash. *Plant, Cell & Environment*. 37:1009-1021.
10. Najar, A., S. M. Landhäusser, **J.G.A. WHITEHILL**, P. Bonello, and N. Erbilgin. **2014**. Reserves Accumulated in Non-Photosynthetic Organs during the Previous Growing Season Drive Plant Defenses and Growth in Aspen in the Subsequent Growing Season. *Journal of Chemical Ecology*. 40:21-30.
9. Gangadharan, A., M. V. Sreerekha, **J.G.A. WHITEHILL**, J. H. Ham, and D. Mackey. **2013**. The *Pseudomonas syringae* pv. *tomato* Type III Effector HopM1 Suppresses Arabidopsis Defenses Independent of Suppressing Salicylic Acid Signaling and of Targeting AtMIN7. *PLoS ONE*. 8(12), e82032.
8. Hill, A., **J.G.A. WHITEHILL**, S. Opiyo, P. L. Phelan, and P. Bonello. **2012**. Nutritional attributes of ash (*Fraxinus* spp.) outer bark and phloem and their relationships to resistance against the emerald ash borer. *Tree Physiology*. 32:1522-1532.
7. **WHITEHILL, J.G.A.**, S. Opiyo, D. Cipollini, J. L. Koch, D.A. Herms, and P. Bonello. **2012**. Interspecific Comparison of Constitutive Ash Phloem Phenolic Chemistry Reveals Compounds Unique to Manchurian Ash, a Species Resistant to Emerald Ash Borer. *Journal of Chemical Ecology*. 38:499-511.
6. W. Li, I. P. Ahn, Y. Ning, C. H. Park, L. Zeng, **J.G.A. WHITEHILL**, H. Lu, Q. Zhao, B. Ding, Q. Xie, J. M. Zhou, L. Dai, and G. L. Wang. **2012**. The U-box/ARM E3 ligase PUB13 regulates cell death, defense and flowering time in *Arabidopsis*. *Plant Physiology*. 159:239-250.
5. **WHITEHILL, J.G.A.**, A. Popova-Butler, K. B. Green-Church, J.L. Koch, D.A. Herms, and P. Bonello. **2011**. Interspecific Proteomic Comparisons Reveal Ash Phloem Genes Potentially Involved in Constitutive Resistance to the Emerald Ash Borer. *PLoS ONE*. 6(9):e24863.
4. Chen Y., **J.G.A. WHITEHILL**, P. Bonello, and T. M. Poland. **2011**. Wood-boring emerald ash borer larval feeding changes black ash foliar phytochemistry. *Phytochemistry*. 72:1990-1998.
3. Cipollini D., Q. Wang, **J.G.A. WHITEHILL**, J. Powell, P. Bonello, and D. A. Herms. **2011**. Distinguishing Defensive Characteristics in the Phloem of Ash Species Resistant and Susceptible to Emerald Ash Borer. *Journal of Chemical Ecology*. 37:450-459.
2. Chen Y., **J.G.A. WHITEHILL**, P. Bonello, T. Poland. **2011**. Differential Response in Foliar Chemistry of Three Ash Species to Emerald Ash Borer Adult Feeding. *Journal of Chemical Ecology*. 37:29-39.

1. **WHITEHILL, J.G.A.**, J. S. Lehman, and P. Bonello. **2007**. *Ips pini* (Curculionidae: Scolytinae) is a vector of the fungal pathogen, *Sphaeropsis sapinea* (Coelomycetes), to Austrian pines, *Pinus nigra* (Pinaceae). *Environmental Entomology*. 36:114-120.

PROFESSIONAL AFFILIATIONS

- Entomological Society of America (2008-Present)
- International Society of Chemical Ecology (2009, 2011, 2014)

GRANT FUNDING

- **\$188,774. National Science Foundation**. Collaborator with Joy Ward (Lead PI) and Laurel Haavik (Post-doc) at the University of Kansas. Decline and resilience of white ash populations during an emerald ash borer invasion. **(2016-2017)**
- **\$6000. The OARDC Research Enhancement Competitive Grant Program**. The Ohio State University, Columbus, Ohio, USA. **(2008)**
- **\$300. Otterbein Student Research Grant**. Otterbein College, Westerville, Ohio, USA. **(2004)**

COMPETITIVE TRAVEL AWARDS

- **\$1800**, The University of British Columbia Postdoctoral Fellow Travel Award, Vancouver, British Columbia, Canada (2014)
- **\$350**, OARDC Professional Growth Scholarship, The Ohio State University, Columbus, Ohio, USA (2009)
- **\$600**, Plant Pathology Graduate Student Association Travel Grant, The Ohio State University, Columbus, Ohio, USA (2009)

HONORS AND RECOGNITION

- **2010 President's Prize (1st Place)**. Student Competition 10-minute Paper Oral Presentation for the President's Prize: Section Forest Entomology and Invasive Species. 58th Annual meeting of the Entomological Society of America, San Diego, California, USA.
- **2009 Runner-up**. Student Competition 10-minute Paper Oral Presentation for the President's Prize: Section Transgenics. 57th Annual meeting of the Entomological Society of America, Indianapolis, Indiana, USA.
- **2006 Outstanding Overall Senior Research Project in the Department of Life and Earth Sciences**. Department of Life and Earth Sciences, Otterbein University, Westerville, Ohio, USA.
- **2006 Outstanding Overall Senior Research Project in Microbiology and Plant Science**. Department of Life and Earth Sciences, Otterbein University, Westerville, Ohio, USA.
- **2003 The E. Jeanne Willis Award for Significant contribution to the Department of Life and Earth Sciences**. Department of Life Sciences, Otterbein University, Westerville, Ohio, USA.

NEWSPAPER EDITORIALS

- **Entomology Today**. *Ash and Emerald ash borer: How do trees defense themselves from a deadly beetle?* September 15th, 2016. <https://entomologytoday.org/2016/09/13/ash-and-emerald-ash-borer-how-do-trees-defend-themselves-from-a-deadly-beetle>.
- **The New York Times**. *The Slow Process of Countering the Emerald Ash Borer*. August 27th, 2015. <http://www.nytimes.com/2015/09/01/science/the-slow-process-of-countering-the-emerald-ash-borer.html>.
- **The Columbus Dispatch**. *Better Ash*. January 15th, 2012. <http://www.dispatch.com/content/stories/science/2012/01/15/better-ash.html>.
- **The Columbus Dispatch**. *Scientists hope parasites, hybrid tree will stop emerald ash borer*. August 9th, 2010. <http://www.dispatch.com/content/stories/science/2010/08/08/taking-on-a-killer.html>.

RESEARCH PRESENTATIONS (41 in total)

- **Invited talk, Whitehill, J.G.A.** Improving tree resistance against insect pests: ecology to forest health genomics. Host: Dr. George Hamilton, Rutgers University, Dept. of Entomology EAB Outreach Interview. New Brunswick, New Jersey, USA (November 2016).
- **Contributed talk, Herms, D.A, D. Cipollini, C.M. Rigsby, J.G.A. Whitehill, and P. Bonello.** 2016. Mechanisms of ash resistance to emerald ash borer: a review of 12 years of research. Emerald Ash Borer National Research and Technology Development Meeting (October 2016).
- **Invited talk, Whitehill, J.G.A.** and J. Bohlmann. Carbon castles and the physical defense of conifers against insect invaders. Host: Dr. Richard Karban, UC Davis, Dept. of Entomology and Nematology Seminar Series. Davis, California, USA (October 2016).
- **Invited talk, Whitehill, J.G.A.,** M.M.S. Yuen, H. Henderson, M. Schuetz, O. Skyba, J. King, J. Bryan, A. L. Samuels, S.D. Mansfield and J. Bohlmann. Stone cells and the conifer defense syndrome. XXV International Congress of Entomology. Session - *Deciphering Complex Signaling Mechanisms in Insect-Plant Interactions*. Orlando, Florida, USA (September 2016).
- **Invited talk, Herms, D.A., D. Cipollini, K. Knight, J. Koch, T. Poland, C. Rigsby, J. Whitehill, and P Bonello.** A quest for ash resistance to emerald ash borer guided by a coevolutionary perspective. International Union of Forest Research Organizations Workshop on Biological Invasions in Forests. Shepherdstown, West Virginia, USA (July 2016).
- **Invited talk, Whitehill, J.G.A.** Carbon castles and the physical defense of conifers against insect invaders. Host: Dr. Campbell Nairn, University of Georgia, Warnell School of Forestry Faculty Interview. Athens, Georgia, USA (March 2016).
- **Selected poster, Whitehill, J.G.A.,** H. Henderson, M. Schuetz, A. L. Samuels, A. D. Yanchuk, and J. Bohlmann. Resistance of Sitka Spruce against White Pine Weevil: An Ecological, Histological and Genomic approach to decipher Stone Cell Function and Development. MSL/CHiBi Merger Symposium. Michael Smith Laboratories, University of British Columbia. Vancouver, British Columbia, Canada (October 2015).
- **Invited talk, Whitehill, J.G.A.** Forest Health Research Scientist Interview. Host: Ontario Ministry of Forests and Natural Resources. Sault Ste. Marie, Ontario, Canada (September 2015).
- **Contributed poster, Whitehill, J.G.A.,** H. Henderson, M. Schuetz, A. L. Samuels, A. D. Yanchuk, and J. Bohlmann. Laser-microdissection and transcriptomics of developing stone cells in the physical defense of conifers against insects. Canadian Plant Genomics Workshop. The Inn at Laurel Point. Victoria, British Columbia, Canada (August 2015).
- **Invited talk, Herms, D.A., D. Cipollini, K. Knight, J. Koch, O. Mittapalli, T. Poland, C. Rigsby, J. G. A. Whitehill, and P Bonello.** 2015. The quest for ash resistance to EAB: towards a mechanistic understanding. 26th USDA Interagency Research Forum on Invasive Species, Annapolis, MD (January 2015).
- **Invited talk, Whitehill, J.G.A.,** H. Henderson, M. Yuen, M. Schuetz, A. Skyba, J. Bryan, A. L. Samuels, S. Mansfield, B. Jacquish, A. D. Yanchuk, and J. Bohlmann. The stone cell defense of Sitka spruce against white pine weevil: Transcriptome and functional analyses. Coastal Tree Breeder's Symposium. Victoria, British Columbia, Canada (December 2014).
- **Selected talk, Whitehill, J.G.A.,** H. Henderson, M. Yuen, M. Schuetz, A. Skyba, J. Bryan, A. L. Samuels, S. Mansfield, B. Jacquish, A. D. Yanchuk, and J. Bohlmann. The stone cell defense of Sitka spruce against white pine weevil: Transcriptome and functional analyses. 62nd Annual Meeting of the Entomological Society of America. Section Symposium: Forest Entomology: Beyond Saving Trees. Portland, OR, USA (November 2014).

- **Invited talk**, Herms, D.A., **J.G.A. Whitehill**, C.M. Rigsby, D. Cipollini, and P. Bonello. Variation in ash resistance to emerald ash borer: lack of coevolutionary history facilitates a mega-invasion in defense free space. 62nd Annual Meeting of the Entomological Society of America. Portland, OR, USA (November 2014).
- **Invited talk**, **Whitehill, J.G.A.**, H. Henderson, M. Schuetz, A. L. Samuels, A. D. Yanchuk, and J. Bohlmann. Resistance of Sitka Spruce against White Pine Weevil: An Ecological, Histological and Genomic approach to decipher Stone Cell Function and Development. Forest Genetics Council Interior Technical Advisory Committee Meeting. Vernon, British Columbia, Canada (January 2014).
- **Contributed poster**, **Whitehill, J.G.A.**, H. Henderson, M. Schuetz, A. L. Samuels, A. D. Yanchuk, and J. Bohlmann. Resistance of Sitka Spruce against White Pine Weevil: An Ecological, Histological and Genomic approach to decipher Stone Cell Function and Development. SMarTForests Scientific Advisory Board Annual Meeting. Michael Smith Laboratories, University of British Columbia. Vancouver, British Columbia, Canada (December 2013).
- **Invited talk**, **Whitehill, J.G.A.**, H. Henderson, M. Schuetz, A. L. Samuels, A. D. Yanchuk, and J. Bohlmann. Stone cells and weevil resistance in Sitka spruce. Dept. of Forest and Conservation Science Seminar Series. University of British Columbia. Vancouver, British Columbia, Canada (October 2013).
- **Invited talk**, **Whitehill, J.G.A.**, H. Henderson, M. Schuetz, A. L. Samuels, A. D. Yanchuk, and J. Bohlmann. Resistance of Sitka Spruce against White Pine Weevil: An Ecological, Histological and Genomic approach to decipher Stone Cell Function and Development. Botany Department Seminar Series. University of British Columbia. Vancouver, British Columbia, Canada (September 2013).
- **Selected talk**, **Whitehill, J.G.A.**, H. Henderson, M. Schuetz, A. L. Samuels, A. D. Yanchuk, and J. Bohlmann. Resistance of Sitka Spruce against White Pine Weevil: An Ecological, Histological and Genomic approach to decipher Stone Cell Function and Development. Forest Genetics 2013. Whistler, British Columbia, Canada (July 2013).
- **Contributed poster**, C. M. Rigsby, V. Muilenberg, **J. G. A. Whitehill**, E. M. Amstutz, T. Tarpey, J. A. Yoder, P. Bonello, D. A. Herms, and D. Cipollini. Determinates of successful dispersal and establishment of the emerald ash borer. Gordon Research Conference in Plant-Herbivore Interactions. Ventura, California, USA (February/March 2013).
- **Contributed poster**, S. Chakraborty, **J. G. A. Whitehill**, S. Opiyo, A. L. Hill, D. F. Cipollini, D. A. Herms and P. Bonello. Are phloem phenolics involved in Induced Ash Resistance? Gordon Research Conference in Plant-Herbivore Interactions. Ventura, California, USA (February/March 2013).
- **Contributed talk**, **Whitehill, J.G.A.**, T. R. Sexton, A. D. Yanchuk, and J. Bohlmann. Resistance of Sitka spruce against white pine weevil: A genomic and histological approach to decipher stone cell development. 60th Annual Meeting of the Entomological Society of America. Knoxville, Tennessee, USA (November 2012).
- **Contributed talk**, **Whitehill, J.G.A.**, D. A. Herms, and P. Bonello. MeJA as a Tool to Investigate Induced Responses of Ash to the Emerald Ash Borer. 58th Annual meeting of the Entomological Society of America. San Diego, California, USA (December 2010).
- **Contributed talk**, **Whitehill, J.G.A.**, D. A. Herms, and P. Bonello. A Perspective on Ash Resistance to the Emerald Ash Borer. EAB-Mini Symposium. Delaware, Ohio, USA (November 2010).
- **Selected talk**, **Whitehill, J.G.A.**, K. Green-Church, S. Popova-Butler, J. Koch, D. A. Herms, and P. Bonello. In Search of a Mechanism of Resistance Against the Emerald Ash Borer. 24th Annual Edward F. Hayes Graduate Research Forum. Columbus, Ohio, USA (May 2010).
- **Contributed poster**, **Whitehill, J.G.A.**, K. Green-Church, S. Popova-Butler, J. Koch, D. A. Herms, and P. Bonello. Comparative proteomics of ash species resistant and susceptible to the emerald ash borer. OARDC Annual Research Conference. Wooster, Ohio, USA (April 2010).

- **Invited talk, Whitehill, J.G.A.**, D. A. Herms, and P. Bonello. Exploring the molecular and biochemical basis of ash resistance to the emerald ash borer. The Symposium on Ash in North America. West Lafayette, Indiana, USA (March 2010).
- **Contributed talk**, Herms, D.A., **J. G. A. Whitehill**, D. Smitley, D. Cipollini, J. Koch, O. Mittapalli, and P. Bonello. Characterization of Variation and Mechanisms of Resistance of Ash to Emerald Ash Borer. Gordon Research Conference on Plant-Herbivore Interactions. Galveston, Texas, USA (February 2010).
- **Contributed talk, Whitehill, J.G.A.**, K. Green-Church, S. Popova-Butler, D. A. Herms, and P. Bonello. Proteomic differences between ash species resistant and susceptible to the emerald ash borer. 57th Annual Meeting of the Entomological Society of America. Indianapolis, Indiana, USA (December 2009).
- **Contributed talk, Whitehill, J.G.A.**, D. A. Herms, and P. Bonello. Developing an effective bioassay to test the effects of ash compounds on EAB. EAB Mini-Symposia Meeting. Delaware, Ohio, USA (December 2009).
- **Contributed talk**, Medina-Ortega, K. J., **J.G.A. Whitehill**, P. Bonello, and L. A. Cañas. The role of phenolics and other mechanisms of resistance to the silverleaf whitefly in poinsettias. 57th Annual Meeting of the Entomological Society of America. Indianapolis, Indiana, USA (December 2009).
- **Contributed talk, Whitehill, J.G.A.**, K. Green-Church, S. Popova-Butler, D. A. Herms, and P. Bonello. Potential roles in EAB resistance of Manchurian ash proteins revealed by DIGE. EAB-Mini Symposium. Delaware, Ohio, USA (December 2009).
- **Contributed talk, Whitehill, J.G.A.**, D. A. Herms, and P. Bonello. Phytochemical responses of constitutive and induced phloem tissues from *Fraxinus* spp. susceptible and resistant to EAB. Emerald Ash Borer Research and Development Meeting. Pittsburgh, Pennsylvania, USA (October 2009).
- **Contributed talk, Whitehill, J.G.A.**, K. Green-Church, S. Popova-Butler, D. A. Herms, and P. Bonello. Proteomic differences between ash species resistant and susceptible to the emerald ash borer. Emerald Ash Borer Research and Development Meeting. Pittsburgh, Pennsylvania, USA (October 2009).
- **Contributed talk, Whitehill, J.G.A.**, K. Green-Church, S. Popova-Butler, D. A. Herms, and P. Bonello. Proteomic differences between ash species resistant and susceptible to the emerald ash borer (*Agrilus planipennis*). Meeting of the International Union of Forest Research Organizations (IUFRO), Unit 7.03.11: Tree Resistance to Insects. San Vito di Cadore - Cortina d'Ampezzo, Italy (September 2009).
- **Selected talk**, Green-Church, K. B., A. Popova-Butler, C. James, N. Kleinholz, **J. G. A. Whitehill**, D. A. Herms, and P. Bonello. Differential Gel Electrophoresis Examination of Asian Ash Tree Resistance to Emerald Ash Borer Attack Verses North American Ash Tree Susceptibility. American Society for Mass Spectrometry 57th ASMS Conference. Philadelphia, Pennsylvania, USA (June 2009).
- **Selected talk, Whitehill, J.G.A.**, D. A. Herms, P. Bonello. Effects of Methyl Jasmonate on Induced Responses of Manchurian and White Ash to Emerald Ash Borer Elicitors. Plant-Molecular Biology and Biotechnology Annual Symposia. Columbus, Ohio, USA (April 2009).
- **Contributed poster, Whitehill, J.G.A.**, S. Williams, D. A. Herms, and P. Bonello. Effects of methyl jasmonate on induced responses of Manchurian and white ash to emerald ash borer elicitors. OARDC Annual Research Conference. Columbus, Ohio, USA (April 2009).
- **Contributed talk**, Bonello, P., **J. G. A. Whitehill**, and D. A. Herms. Chemical and Proteomic Approaches to Dissecting Ash Resistance to the Emerald Ash Borer. 20th USDA Interagency Research Forum on Invasive Species. Annapolis, Maryland, USA (January 2009).
- **Contributed talk, Whitehill, J.G.A.**, D. A. Herms, P. Bonello. Phloem defense traits of ash species susceptible and resistant to EAB. EAB-Mini Symposium. Columbus, Ohio, USA (December 2008).
- **Contributed talk, Whitehill, J.G.A.**, D. A. Herms, P. Bonello. Constitutive phloem proteins, phenolics, and lignin in ash species resistant and susceptible to the emerald ash borer (*Agrilus planipennis*). 56th Annual Meeting of the Entomological Society of America. Reno, Nevada, USA (November 2008).

- **Contributed poster, Whitehill, J.G.A.**, D. A. Herms, and P. Bonello. Constitutive phloem phenolics and lignin in ash species resistant and susceptible to the emerald ash borer (*Agrilus planipennis*). Plant Molecular Biology and Biotechnology Research Symposium. Columbus, Ohio, USA (April 2008).

OUTREACH AND SERVICE

- **Michael Smith Laboratories Science Communication Team Member**, Science Communication Committee, University of British Columbia. Vancouver, British Columbia, Canada (September 2016 – February 2017).
- **Adjudication committee member**, Postdoctoral Fellow Travel Awards Committee, University of British Columbia. Vancouver, British Columbia, Canada (July 2015).
- **Invited Session Moderator**, Joint Forestry Genome Symposium/Workshop. Vancouver, British Columbia, Canada (June 2014).
- **President**, OSU Plant Pathology Graduate Student Association (2010-2011)
- **Seminar Speaker Organizer** (Gregg Howe, Ph.D., Professor, Michigan State University) OSU Plant Pathology Graduate Student Association (2011)
- **Social Committee member**, OSU Plant Pathology Graduate Student Association (2010-2011)
- **Review Panel member**, OARDC SEEDS Grant competition for Masters and Ph.D. Graduate students, College of Agriculture, The Ohio State University (2009-2010)
- **Vice-President**, OSU Plant Pathology Graduate Student Association (2009-2010)
- **Treasurer**, OSU Plant Pathology Graduate Student Association (2008-2009)
- **Travel Grant Committee member**, OSU Plant Pathology Graduate Student Association (2008-2010)
- **Plant Sale Chair**, Sale total ~ \$5,000 USD, OSU Plant Pathology Graduate Student Association (2007-2008)
- **Plant Sale Committee member**, OSU Plant Pathology Graduate Student Association (2006-2009)

Ad hoc peer review for **20** scientific journals: *Acta Physiologiae Plantarum* | *BMC Genomics* | *Cogent Food and Agriculture* | *Current Metabolomics* | *Environmental Entomology* | *Environmental Science & Technology* | *Evolutionary Bioinformatics* | *Forest Ecology and Management* | *International Journal of Biological Sciences* | *International Journal of Forestry* | *Journal of Bioresource Management* | *Journal of Chemical Ecology* | *New Forests* | *Oecologia* | *PeerJ* | *Plant and Cell Physiology* | *Plant, Cell & Environment* | *The Plant Journal* | *Plant Physiology* | *PLoS One*