



UVic Forest Biology Update

Spring 2022

Meet our Associate Member: Dr. Marie Vance



As a research scientist with the BC Ministry of Forests, I am focused on developing two new tree-breeding programs for Interior western redcedar (*Thuja plicata*) & ponderosa pine (*Pinus ponderosa*). Both species have climate niches that are projected to undergo dramatic northward expansions in the coming decades. To get started, I need a large group of genetically diverse parents. In ponderosa pine, this is straight-forward: open-pollinated cones can be collected from good-looking maternal “plus” trees (i.e., disease-free trees with good form). Last summer I travelled throughout southern BC to identify plus trees & then returned in August with tree climbers, who collected the cones. In western redcedar, the situation is more complicated because this species has a naturally high selfing rate, meaning open-pollinated cones will contain an unknown mixture of outcrossed and selfed seeds. Because a reliable pedigree is needed to calculate genetic parameters, I am breeding trees in a previously established clone bank at the Cowichan Lake Research Station on Vancouver Island. After collecting & extracting pollen, reproduction is stimulated in maternal trees by the application of gibberellic acid, female cones are protected by isolation bags, and the selected pollen is applied. My main goal is to establish progeny tests (i.e. common garden experiments), where the best families can be identified & used to establish seed production orchards and breeding populations.

Ehltig Lab

Sarah Lane in the Ehltig lab is searching for new medicines to treat human diseases by looking to trees & plant physiology. Plants produce a host of secondary metabolites with unique chemical characteristics to deal with stresses, including nutrient deficiencies like iron. Taking advantage of this, she is growing poplar & other woody plants without iron to encourage them to make iron-chelators, compounds that bind iron & make it accessible for uptake. She then collects these chelators by extracting them from plant tissues. The extracts are used to treat human cell culture models of iron overload diseases as a test for bioactivity. Iron chelators are particularly exciting as a possible treatment for some types of neurodegenerative diseases like Parkinson’s Disease, where too much iron in some parts of the brain causes cell death in neurons related to movement. So far, Sarah has found that poplar trees increase secondary metabolites that are iron chelating as they become iron deficient, & select metabolites can reduce iron-overload in some mammalian cell types. She is currently testing her extracts on neurons from patients that have a genetic form of Parkinson’s Disease.



Meet our Associate Member:

Dr. Greg Owens



Dr. Gregory Owens leads an evolutionary genomics research group at the University of Victoria in the Department of Biology. Dr. Owens’ research seeks to elucidate the genomic underpinnings of natural phenomena, like local adaptation, hybridization, and the maintenance of genetic diversity, spanning theoretical foundations and applied solutions. Currently, members of the Owens lab are working on understanding genome structure variation in sunflowers, identifying the sex-determining genes in Pacific rockfish, assembling a new genome for the lingonberry plant, understanding the impacts of landslides on Pacific salmon genomics, and developing genomic resources to assist in the conservation of keystone kelp species. The group uses molecular tools and bioinformatic analyses to address these topics, while working with a number of community and government partners across a diverse range of disciplines to tackle challenges in evolutionary biology. Dr. Owens’ expertise and ongoing work in plant genomics connect his group to many diverse ongoing projects in the Centre for Forest Biology.

Constabel Lab

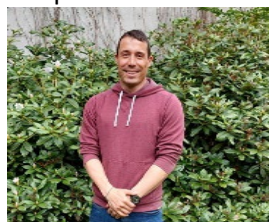


Megan and Harley celebrate transplanting the first successful CRISPR rescue plants in the Greenhouse." (Complementing the mutated and phenotype demonstrates that this mutation alone is responsible for the phenotype.)

Congratulations

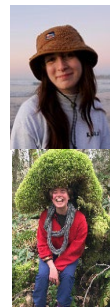
Harley!

Congratulations to Harley Gordon for winning Best Presentation by a PhD student at this year's UVic Biology Graduate Student Symposium. A well deserved price in a competitive field. A big Thank You to all FORB students, who all gave great presentations.



New FORB Members

Emma Hayward	Dr. Ehltling	MSc
Emma Creasy	Dr. von Aderkas	Research Assistant
Erik Murphy	Dr. Will Hintz/Dr. Paul de la Bastide	Research Assistant
Sarah Sleeman	Dr. Will Hintz/Dr. Paul de la Bastide	Research Assistant
Keelie Taylor	Dr. von Aderkas/Dr. Hind	Research Assistant
Alastair Baird	Dr. von Aderkas/Dr. Punzalan	Research Assistant



Garry Oak Ecosystems Study:

Hintz Lab

Coop student Rachel Witt studies ectomycorrhizal fungi of Garry oak ecosystems, sampling sporophores and soil for metagenomic analysis. This project includes Drs. Hintz, de la Bastide, Berch and MacKinnon, with Mitacs partners Habitat Acquisition Trust and Metchosin Foundation.



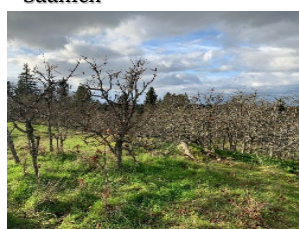
Dr. Shannon Berch (left) and Rachel Witt (right) at Metchosin



Rachel Witt (left) and Dr. Paul de la Bastide (right) at Oak Haven Park, Central Saanich



Dr. Paul de la Bastide (left) and Rachel Witt (right) at Oak Haven Park, Central Saanich



Mount Tolmie in Saanich, December 2021

Rainforest Biodiversity Study:

Hintz Lab

Coop students Hannah Bentsen and Celeste Ramsey document fungal biodiversity in Vancouver Island rainforests, collecting 455 macrofungi. This ambitious project explores novel fungal metabolites and includes Drs. Hintz, de la Bastide and Mitacs partner Kapoose Creek Wellness.



Hannah Bentsen and Celeste Ramsey



Aureoboletus mirabilis
(Admirable Bolete)



Ramaria sp. (Coral fungus)



Mycena sp