# Curriculum Vitae

### Qualifications

* **PhD**, School of Botany and Zoology, The Australian National University (2011). Title of Thesis: “Extant and Fossil Myrtaceae pollen morphology and their significance to Systematics, Phylogenetics, Evolution, and Biogeography of the family”
* **Master of Science**, Monash University (2004). Title of Thesis: “The Development of digestive glands and enzymes of three carnivorous plants: *Sarracenia*, *Darlingtonia* and *Nepenthes*”
* **Bachelor of Science (Environmental)**, Monash University (1998)

### Memberships

* Secretary of Society of Australian Systematic Biologists (SASB) (2007-current)
* Member of Botanical Society of America (2015)
* Member of Australasian Systematic Botany Society (ASBS) (2006 - present)

### Professional Experience

February 2015 – current: **Postdoctoral Fellow**: University and Jepson Herbaria, University of California, Berkeley

*Duties have included:*

* Project manager for Californian Plant Phylodiversity Project
* Collecting herbarium and fresh leaf material for DNA sequencing
* Phylogenetic analysis of DNA sequences
* Curating digital spatial information linked to Californian plants

February 2013 – December 2014: **Postdoctoral Fellow**: Australian Tropical Herbarium (ATH), CSIRO and James Cook University,

*Duties included:*

* Developing an inventory and storage strategy for the molecular lab work done at ATH.
* Creating a phylogenetic tree of the plants of the Daintree Rainforest.
* Combining the morphological data from the Australian Tropical Rainforest Key with a phylogeny of the same plants.
* Co-supervision of a PhD student.
* Providing research support and advice to honours and visiting scholar of the herbarium.
* Presenting phylogenetic workshops to colleagues and second year botany students.
* Creating a world genus level phylogeny of plants using DNA alignments containing thousands of sequences.
* Co-speciation phylogenetic projects on the evolutionary similarity between Australian butterflies and plants and; the bug order Heteroptera and plants.

January 2013 – February 2013: **Senior Projects Officer**: CSIRO Ecosystem Sciences: Australian National Insect Collection

*Duties included:*

* Aligning Myrtaceae and *Fergusonina* sequences to be used for phylogenetic analysis.
* Dating Myrtaceae and *Fergusonina* fly phylogenies for a co-speciation project.
* Two papers arose from this work and a third is in preparation.

March 2011 – December 2012: **Senior Projects Officer/Postdoctoral Fellow**: CSIRO Plant Industry: Centre For Australian National Biodiversity Research

*Duties included:*

* *Acacia*, eucalypt, Orchid, Hornwort, Moss, Liverwort and Palm sequence aligning.
* The generation of hundreds of new eucalypt DNA sequences for phylogenetic analysis.
* Large-scale *Acacia*, Eucalypt, Orchid, Hornwort, Moss and Liverwort phylogenetic reconstructions.
* Character mapping of data extracted from the Euclid and Wattle Lucid keys.
* Cleaning *Acacia*, eucalypt, palm and orchid spatial data using records extracted from the Australian Virtual Herbarium (AVH).

October 2009 – March 2011: **Australasian Pollen and Spore Atlas (APSA) editor**: Archaeology and Natural History, Australian National University

*Duties included:*

* Editing digital images and sample information for addition to the APSA website (http://apsa.anu.edu.au/).
* Acquiring new digital images from existing slides for addition to the APSA website.
* Creating new pollen slides from existing pollen collections.
* Creating new pollen and slides from herbarium samples.

July 2007 – 2011: **Australian Plant Diversity Lab Demonstrator**: School of Botany and Zoology, Australian National University

*Duties included:*

* Teaching first and second year university students various aspects of the Australian flora and botanical methods including: the taxonomy and systematics of Australian plants, the various biomes of Australia, how to use interactive keys such as Euclid and how to collect and compile herbarium specimens.

April– May 2008: **Conservation Advice Profiler** (Casual): Centre For Plant Biodiversity Research, CSIRO Plant Industry

*Duties included:*

* Writing conservation advice profiles for use by government and the general public.
* Researching Australian plants that are deemed threatened and rewording scientific information so that it was more understandable for the general public.

April – October 2006: **Australasian Pollen and Spore Atlas Database Compiler** (Casual) – Australian Pollen and Spore Atlas, Archaeology and Natural History, Research School of Pacific and Asian Studies, The Australian National University

*Duties included:*

* Entering the information, such as species name, family name and locality of over 12000 pollen cards into a FileMaker Pro database which was then made available online at http://apsa.anu.edu.au/

August 2004 – January 2006**: Technical Officer** (Casual): Silviscan and Primary Wood Product Units (Clayton), CSIRO Forestry and Forest Products

*Duties included:*

* Running the Silviscan 1 and 2 systems testing wood samples for density and flexibility.
* Preparing wood samples for use in the Silviscan systems, including twin-blading, gluing, polishing and labeling.
* Acoustic testing of wood samples and entering results into *Excel* spreadsheets. Acquisition of digital images of wood samples.
* Correlating image analysis data for its use in final reports.

January – February 2004: **Student Botanical Internship Program:** Centre for Plant Biodiversity Research and Australian National Botanical Gardens

Duties included:

* Identifying plants in the field using plant identification keys.
* Incorporating herbarium specimens back into the herbarium.
* Re-labeling orchid spirit collections and re-incorporating them back into the spirit collection.
* Mounting new herbarium specimens to be included in the herbarium.
* Dismounting old specimens and identifying latitude and longitude co-ordinates from locality descriptions. Sampling plants for pressing in the herbarium.
* Scanning botanical line art drawings and then data basing them to be used as a prototype for their inclusion in the Australian Virtual Herbarium (AVH).
* Writing a web page detailing the botany and horticulture of the Wollemi Pine (http://www.anbg.gov.au/gnp/interns-2004/wollemia-nobilis.html).

***Refereed journal articles***

González-Orozco CE, Mishler BD, Miller JT, Laffan SW, Knerr N, Unmack P, Georges A, **Thornhill AH**, Rosauer DF, Gruber B (accepted in Ecology and Evolution) A phylogenetic framework for assessing biodiversity across multiple taxonomic groups: tools for conservation biogeography.

Quinn CJ, Crowden RK, Brown EA, Southam MJ, **Thornhill AH**, Crayn DM (2015) A reappraisal of the generic concepts of *Epacris*, *Rupicola* and *Budawangia* (Ericaceae, Epacridoideae, Epacrideae) based on phylogenetic analysis of morphological and molecular data. *Australian Systematic Botany* 28(1) 63-77

**Thornhill AH**, Ho SYW, Külheim C, Crisp MD (2015) Interpreting the modern distribution of Myrtaceae using a dated molecular phylogeny. *Molecular Phylogenetics and Evolution* 93, 29-43

Nagalingum, N, Mishler BD, Gonzalez-Orozco CE, Knerr N, **Thornhill AH**, Laffan S and Miller JT (2015) Patterns of endemism and diversity in Australia using a genus level Fern phylogeny. *Frontiers in Genetics* 6:132*.*

Pollock LJ, Rosauer DF, **Thornhill AH**, Kujala H, Crisp MD, Miller JT, and McCarthy MA (2015) Phylogenetic diversity meets conservation policy: small areas are key to preserving eucalypt lineages. *Philosophical Transactions B* 370, 20140007

Bui EN, **Thornhill AH**, Miller JT (2014) Salt-and alkaline-tolerance are linked in *Acacia.*

*Biology letters* 10 (7), 20140278

Gonzalez-Orozco CE , Ebach MC, Laffan S, **Thornhill AH**, Knerr N, Schmidt-Lebuhn AN, Cargill CC, Clements M, Nagalingum NS, Mishler BD, Miller JT (2014) Quantifying Phytogeographical Regions of Australia Using Geospatial Turnover in Species Composition. *PloS one*. 9 (3), e92558

González-Orozco CE , **Thornhill AH**, Knerr N, Laffan S, Miller JT (2014) Biogeographical regions and phytogeography of the eucalypts. Diversity and Distributions 20 (1), 46-58

Mishler BD, Knerr N, González-Orozco CE, **Thornhill AH**, Laffan S, and Miller JT (2014) Phylogenetic measures of biodiversity and neo-and paleo-endemism in Australian *Acacia*. *Nature Communications* 5

Nelson LA, Davies KA, Scheffer SJ, Taylor GS, Giblin-Davis RM, **Thornhill AH**, Yeates DK (2014) An emerging example of tritrophic coevolution between flies (Diptera: Fergusoninidae) and nematodes (Nematoda: Neotylenchidae) on Myrtaceae host plants. *Biological Journal of the Linnean Society.* 111 (4), 699-718

Purcell MF, Nelson LA, **Thornhill AH**, Yeates DK (2013) Two new species of Fergusonina Malloch gall fly (Diptera: Fergusoninidae) from leaf bud galls on black sallee (*Eucalyptus stellulata*) and manna gum (*Eucalyptus viminalis*) *Australian Journal of Entomology* 52 (4), 363-370

Yeoh SH, Ho SYW, **Thornhill AH**, Foley WJ (2013) Regional population expansion in *Eucalyptus globulus*. Molecular Phylogenetics and Evolution 68 (3), 498-501

**Thornhill AH**, Crisp MD (2012) Phylogenetic assessment of pollen characters in Myrtaceae. *Australian Systematic Botany*. **25**(3) 171-187.

**Thornhill AH**, Hope G, Craven LA, Crisp MD (2012) Pollen morphology of the Myrtaceae Part 1: Tribes Eucalypteae, Lophostemoneae, Syncarpieae, Xanthostemoneae and subfamily Psiloxyloideae. *Australian Journal of Botany* **60**, 165-199.

**Thornhill AH**, Hope G, Craven LA, Crisp MD (2012) Pollen Morphology of the Myrtaceae Part 2: Tribes Backhousieae, Melaleuceae, Metrosidereae, Osbornieae and Syzygieae. *Australian Journal of Botany* **60**, 200-224.

**Thornhill AH**, Hope G, Craven LA, Crisp MD (2012) Pollen Morphology of the Myrtaceae Part 4: Tribes Kanieae, Myrteae and Tristanieae. *Australian Journal of Botany* **60**, 260-289.

**Thornhill AH**, Macphail M (2012) Fossil myrtaceous pollen as evidence for the evolutionary history of the Myrtaceae: A review of fossil *Myrtaceidites* species. *Review of Palaeobotany and Palynology* **176–177**, 1–23.

**Thornhill AH**, Popple LW, Carter RJ, Ho SYW, Crisp MD (2012) Are pollen fossils useful for calibrating relaxed molecular clock dating of phylogenies? A comparative study using Myrtaceae. *Molecular Phylogenetics and Evolution* 63, 15-27.

**Thornhill AH**, Wilson PG, Drudge J, Hope G, Craven LA, Crisp MD (2012) Pollen Morphology of the Myrtaceae Part 3: Tribes Chamelaucieae, Leptospermeae and Lindsayomyrteae. *Australian Journal of Botany* **60**, 225-259.

Crisp MD, Burrows GE, Cook LG, **Thornhill AH**, Bowman DMJS (2011) Flammable biomes dominated by eucalypts originated at the Cretaceous-Palaeogene boundary. *Nature Communications* 2, 1-8.

**Thornhill** AH (2010) Can Myrtaceae pollen of the Holocene from Bega Swamp (New South Wales, Australia) be compared with extant taxa? *Terra Australis* 32, 405-427.

**Thornhill AH**, Harper IS, Hallam ND (2008) The Development of the Digestive Glands and Enzymes in the Pitchers of Three *Nepenthes* Species: *N. alata*, *N. tobaica*, and *N. ventricosa* (Nepenthaceae). *International Journal of Plant Sciences* 169, 615-624.

***Journal articles in review:***

**Thornhill AH**, Mishler BD, Knerr N, Gonzalez-Orozco CE, CostionCM, Crayn DM, Laffan S and Miller JT (in review at Journal of Biogeography) Combined statistical interpretation of phylogenetic metrics reveals more about ecological and evolutionary processes than observed patterns alone.

Bui EM, **Thornhill AH**, Knerr N, and Miller JT Climate and geochemistry as drivers of eucalypt diversification in Australia (in review at Global Ecology and Biogeography)

González-Orozco CE, Pollock LJ, **Thornhill AH**, Mishler BD, Knerr N , Miller JT, Laffan SW, Rosauer DF, Faith D, Nipperess D, Kujala H, Linke S, Gruber B (in review at Nature Climate Change) Eucalypts will lose evolutionary biodiversity in extreme climate change.

González-Orozco CE, Miller JT, Laffan SW, Knerr N, **Thornhill AH**, Mishler BD and Gruber B (in review at Conservation Biology) Centres of palaeo and neo-endemism for *Acacia* and eucalypts in the Murray-Darling Basin, south-eastern Australia: are they protected?

Laffan SW, Rosauer DF, Di Virgilio G, Miller JT, González-Orozco CE, Knerr N, **Thornhill AH**, Mishler BD (in review at Methods in Ecology and Evolution) Range-weighted metrics of species and phylogenetic turnover can better resolve biogeographic breaks and boundaries.

***Journal articles in preparation:***

**Thornhill AH**, Crisp MD, Cook LG, Nelson LA, Yeates DK, Lam KE, Külheim C and Miller JT (in prep) Lineages through time: A comparison of Australian *Acacia* (Fabaceae) and eucalypts (Myrtaceae).

**Thornhill AH**, Gonzalez-Orozco CE, Knerr N, Mishler BD, Laffan S and Miller JT (in prep) Do the same patterns of endemism and diversity repeat at different phylogenetic levels in the eucalypts?

**Thornhill AH**, Crisp MD, Smissen RD, and de Lange PJ (in prep) Disjunct groups of *Kunzea* (Myrtaceae) have been formed by both vicariance and long distance dispersal.

Gonzalez-Orozco CE, Mishler BD, Knerr N, Cargill C, **Thornhill AH** and Miller JT (in prep) Phylogenetic Niche Modeling: a case study with Australian hornworts.

Nagalingum N, Lee, A, Gonzalez-Orozco CE, Knerr N, **Thornhill AH**, Laffan S, Miller JT and Mishler BD (in prep) Patterns of phylogenetic endemism and diversity in Australia conifers.

Scheffer SJ, Nelson LA, Davies KA, Taylor GS, Giblin-Davis RM, **Thornhill AH**, Yeates DK (in prep) Into the dry – the *Fergusonina* phylogeny suggests flies radiated into drier adapted host plant environments.

***Presented Workshops***

**2015**

Californian Plant Phylodiversity Project: Californian Native Plant Society – Rare Plant Treasure Hunt weekend at McLaughlin Reserve.

**2014**

Phylogenetics: 2nd year Botany workshop, James Cook University, Cairns.

Phylogenetics: Molecular workshop, Australian Government Department of Agriculture, Cairns.

**2013**

Phylogenetics: Molecular workshop, James Cook University, Cairns.

Taming the BEAST: Molecular dating workshop**,** James Cook University, Cairns.

***Conference presentations***

**2015**

***American Botany Meeting 2015*:** Edmonton, Canada. Title: Interpreting the biogeographic history of Myrtaceae using a fossil-calibrated dated molecular phylogeny

Title: Patterns of diversity and endemism at different phylogenetic scales using examples from the Australian flora

**2014**

***Association for Tropical Biologists Conference***: Cairns, Australia. Title: Phylogenetically comparing tropical and savanna floras: Northern Australia, Papua New Guinea and New Caledonia.

***Centre For Biodiversity Analysis Conference***: Understanding biodiversity dynamics using diverse data sources, Canberra, Australia. Title: Identifying the floral phylogenetic hotspots of Australia.

**2013**

***Systematics without Borders, joint Australian Systematic Botany Society and Society of Australian Systematic Biologists Conference***: Sydney, Australia. Title: Detecting the age of biomes using dated phylogenies of the eucalypts and *Acacia*

**2012**

***Australian Systematic Botany Society Conference***: Perth, Australia. Title: Eucalypts and orchids: a phylogenetic and spatial analysis of two of Australia’s largest plant groups.

**2011**

***18th International Botanical Congress****:* Melbourne, Australia. Title: Extant and fossil Myrtaceae pollen morphology and its use in family Systematics, Phylogenetics and Evolution.

**2010**

***Australian Systematic Botany Society Conference***: Lincoln, New Zealand. Title: Interpretation of Myrtaceae evolution and biogeography using molecular dating.

**2009**

***Society of Australian Systematic Biologists Conference***: Darwin 200– Evolution and Biodiversity: Darwin, Northern Territory, Australia. Title: Let’s make a date – Matching *Myrtaceidites* and other fossil pollen with extant Myrtaceae pollen groups to calibrate molecular trees.

**2008**

***Australian Systematic Botany Society Conference***: Adelaide, Australia. Title: Using pollen morphology of extant and fossil taxa for Myrtaceae family systematics.

***The 8th International Organisation of Palaeobotany Conference/12th International Palynological Congress***: Bonn, Germany. Title: Using pollen morphology of extant and fossil taxa for Myrtaceae family systematics.

**2007**

**8th Invertebrate Biodiversity and Conservation / Society of Australian Systematic Biologists Conference**: Brisbane, Australia. Title: Phylogenetic study of Myrtaceae pollen.

**2006**

**New South Wales Group of Histology Conference**: Canberra, Australia. Title: Botanical Histology: Investigating the development of the digestive glands and enzymes of various carnivorous pitcher plants.

**Grants awarded**
2010 - Australian Systematic Botany Society student travel grant to attend the Lincoln, New Zealand ASBS Conference - $200

2009 - Society of Australian Systematic Biologists student conference bursary to attend the Darwin SASB conferences - $220

2008 - Australian Biological Resources Study travel bursary to attend the Bonn International Palynological Conference - $1500

2008 – ANU Vice-Chancellor student travel grant to attend the Bonn International Palynological Conference - $1500

2008 - Paleontological Association student travel grant to attend the Bonn International Palynological Conference- €800

2008 - Australian Systematic Botany Society student travel grant to attend the Adelaide ASBS Conference - $200

2008 - Centre for Archaeological Research analysis grant - $1800

2007 - Centre for Archaeological Research analysis grant - $1800

2007 - Society of Australian Systematic Biologists student conference bursary to attend the Brisbane SASB conferences - $220

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### Primary referees

Prof Mike Crisp

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***Alternate referees***

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