

## SCIENTIFIC CURRICULUM VITAE

*Dr. Gaii Petit*



### PERSONAL DETAILS

FIRST AND FAMILY NAME: Gaii Petit  
BIRTH: Venice (Italy), 8<sup>th</sup> June 1978  
ADDRESS: San Polo 1867, 30125 Venezia, Italy  
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### INSTITUTIONAL DETAILS

AFFILIATION: Dept. Land, Environment,  
Agriculture and Forestry, LEAF - University of  
Padova  
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### EDUCATION AND EMPLOYMENT EXPERIENCE

- 22<sup>nd</sup> December 2011 – present      **Assistant Professor** (Dept. Land, Environment, Agriculture and Forestry, LEAF - University of Padova)
- 1<sup>st</sup> May 2009 – 30<sup>th</sup> October 2011      Post-Doc fellow in Plant Ecology – University of Padova (Italy)  
Supervisor: Prof. Tommaso Anfodillo  
Topic: “Ontogenetic variation in xylem hydraulic architecture in trees”
- 1<sup>st</sup> June 2008 – 30<sup>th</sup> April 2009      Post-Doc fellow in Forest Ecology – University of Padova (Italy)  
Supervisor: Dr. Marco Carrer  
Topic: “Effects of temperature on tree growth at high altitude”
- 14<sup>th</sup> March 2008      **PhD** in Forest Ecology – University of Padova (Italy):  
Supervisor: Prof. Tommaso Anfodillo.  
Thesis title: “Analysis of the tapering of xylem conduits as a compensation mechanism for hydraulic limitations to tree growth”
- 24<sup>th</sup> September 2004      MS Degree in Forestry and Environmental Sciences – University of Padova (Italy)

### TEACHING EXPERIENCE

- 2012 – present      Tenured of course “Foreste e Cambiamenti Climatici” (Forests and Climate Change) in the MS degree in Forestry and Environmental Sciences (University of Padova)
- 2012      Invited teacher of wood anatomy in the European DendroEcological Field Week organized by Dr. Kerstin Treydte and Dr. Dave Frank (Swiss Federal Research Institute – WSL, Switzerland) at San Vito di Cadore (BL, Italy)
- 2008-2011      Lab Assistant of the course “Ecologia Forestale” (Forest Ecology.) in the BC degree in Forest and Environmental Technologies (University of Padova)

## **STUDENT ADVISING AND MENTORING**

### *PhD students*

- 2016 – present Natasa Kiorapostolou (Exploring growth responses of trees living in warm environments)
- 2015 – present Sudip Pandey (Assessment of climate-growth relationship in trees in cold environments by using an integrated approach to study dendro-anatomical features of tree rings)
- 2014 – 2017 Angela Luisa Prendin (Environmental effects and biophysical constraints on xylem physiology and tree growth in conifers in the Alps)

### *MS and BC students*

- 2014 – present Supervisor of 6 MS students and 2 BC students
- 2008 – 2014 Co-supervisor of around 15 MS/BC students

## **RESEARCH PROJECTS**

- 2016 University of Padova (DOR1611588/16): “Developmental constraints on xylem plastic responses to climate variability”
- 2015 University of Padova (60A08-2852/15): “Scaling of plant's functional traits under different environmental conditions”
- 2012-2015 Cost Action STReES (FP1106) – involved as leader member of the group studying the drought induced modifications to phloem/xylem anatomy and physiology.
- 2014 University of Padova (60A08-7773/14): “The hydraulic return of carbon investment in angiosperm trees”
- 2013 University of Padova (60A08-8333/13): “Relationship between the axial gradient of water potential and leaf gas exchanges in trees”
- 2012 University of Padova (60A08-0885/12): “Effects of axial conduit widening on xylem’s hydraulic properties and physiological responses to different soil water status in Scots pine”

## **PEER-REVIEW EXPERIENCE**

### ISI JOURNALS

Acta Oecologica  
Annals of Botany  
Biotropica  
Frontiers in Plant Science  
Global and Planetary Change  
Plant Ecology and Diversity  
Nature - Scientific Reports  
Science of the Total Environment  
Tree Physiology  
Trees: Structure and Function

### PROJECT PROPOSALS

Austrian Science Fund (FWF)

## BIBLIOMETRY

From Scopus  
H-index: 11  
Sum of the times cited: 346  
Average citations per item: 16.47

## LIST OF PUBLICATIONS

### ISI JOURNALS

#### 2017

Nardini A, Savi T, Losso A, **Petit G**, Pacilè S, Tromba G, Mayr S, Trifilò P, Lo Gullo MA & Salleo S (2017) X-ray microtomography observations of xylem embolism in stems of *Laurus nobilis* are consistent with hydraulic measurements of percentage loss of conductance. *New Phytologist* 213: 1068-1075. DOI: 10.1111/nph.14245.

#### 2016

Anfodillo T, **Petit G**, Sterck F, Lechthaler S & Olson ME (2016) Allometric trajectories and “stress”: a quantitative approach. *Frontiers in Plant Science* 7: 1681. DOI: 10.3389/fpls.2016.01681.

Lintunen A, Paljakka T, Jyske T, Peltoniemi M, Sterck F, vonArx G, Cochard H, Copini P, Caldeira MC, Delzon S, Gebauer R, Grönlund L, Kiorapostolou N, Lechthaler S, Lobo-do-Vale R, Peters RL, **Petit G**, Prendin AL, Salmon Y, Steppe K, Urban J, Roig Juan S, Robert EMR & Hölttä T (2016) Osmolality and non-structural carbohydrate composition in the secondary phloem of trees across a latitudinal gradient in Europe. *Frontiers in Plant Science* 7: 726. DOI: 10.3389/fpls.2016.00726.

**Petit G**, Savi T, Consolini M, Anfodillo T & Nardini A (2016) Interplay of growth rate and xylem plasticity for optimal coordination of carbon and hydraulic economies in *Fraxinus ornus* trees. *Tree Physiology* 36: 1310-1319. DOI: 10.1093/treephys/tpw069.

#### 2015

Carrer M, von Arx G, Castagneri D & **Petit G** (2015) Distilling allometric and environmental information from time series of conduit size: the standardization issue and its relationship to tree hydraulic architecture. *Tree Physiology* 35: 27-33. DOI: 10.1093/treephys/tpu108.

Castagneri D, **Petit G** & Carrer M. (2015) Divergent climate response on hydraulic-related xylem anatomical traits of *Picea abies* along a 900-m altitudinal gradient. *Tree Physiology* 35: 1378-1387 DOI: 10.1093/treephys/tpv085.

#### 2014

Olson ME, Anfodillo T, Rosell JA, **Petit G**, Crivellaro A, Isnard S, León-Gómez C, Alvarado-Cárdenas LO & Castorena M (2014) Universal hydraulics of the flowering plants: vessel diameter scales with stem length across angiosperm lineages, habits and climates. *Ecology Letters* 17: 988-997. DOI: 10.1111/ele.12302.

**Petit G** & Crivellaro A (2014) Comparative axial widening of phloem and xylem conduits in small woody plants. *Trees, Structure and Function* 28: 915-921. DOI: 10.1007/s00468-014-1006-1.

**Petit G**, DeClerck FAJ, Carrer M & Anfodillo T (2014) Axial vessel widening in arborescent monocots. *Tree Physiology* 34: 137-145. DOI: 10.1093/treephys/tpt118.

#### 2013

Anfodillo T, **Petit G** & Crivellaro A (2013) Axial conduit widening in woody species: a still neglected anatomical pattern. *IAWA Journal* 34: 352-364. DOI: 10.1163/22941932-00000030.

#### 2012

Anfodillo T, Deslauriers A, Menardi R, Tedoldi L, **Petit G** & Rossi S. (2012) Widening of xylem conduits in a conifer tree depends on the longer time of cell expansion downwards along the stem. *Journal of Experimental Botany* 63: 837-845. DOI: 10.1093/jxb/err309.

Bettiati D, **Petit G** & Anfodillo T (2012) Testing the equi-resistance principle of the xylem transport system in a small ash tree: empirical support from anatomical analyses. *Tree Physiology* 32: 171-177. DOI: 10.1093/treephys/tpr137.

#### 2011

**Petit G** & Anfodillo T (2011) Comment on “The blind men and the elephant: the impact of context and scale in evaluating conflicts between plant hydraulic safety and efficiency” by Meinzer et al. (2010). *Oecologia* 165: 271-274. DOI: 10.1007/s00442-010-1871-2.

**Petit G**, Anfodillo T, Carraro V, Grani F & Carrer M (2011). Hydraulic constraints limit height growth in trees at high altitude. *New Phytologist* 189: 241-252. DOI: 10.1111/j.1469-8137.2010.03455.x.

#### 2010

**Petit G**, Pfautsch S, Anfodillo T & Adams MA (2010). The challenge of tree height in *Eucalyptus regnans*: when xylem tapering overcomes hydraulic resistance. *New Phytologist* 187: 1146-1153. DOI: 10.1111/j.1469-8137.2010.03304.x.

#### 2009

**Petit G** & Anfodillo T (2009) Plant physiology in theory and practice: An analysis of the WBE model for vascular plants. *Journal of Theoretical Biology* 259: 1-4. DOI: 10.1016/j.jtbi.2009.03.007.

**Petit G**, Anfodillo T & De Zan C (2009) Degree of tapering of xylem conduits in stems and roots of small *Pinus cembra* and *Larix decidua* trees. *Botany* 87: 501-508. DOI: 10.1139/B09-025.

#### 2008

**Petit G**, Anfodillo T & Mencuccini M (2008) Tapering of xylem conduits and hydraulic limitations in sycamore (*Acer pseudoplatanus*) trees. *New Phytologist* 177: 653-664. DOI: 10.1111/j.1469-8137.2007.02291.x.

#### 2007

Mencuccini M, Hölttä T, **Petit G** & Magnani F (2007) Sanio's law revisited. Size-dependent changes in the xylem architecture of trees. *Ecology letters* 10:1084-1093. DOI: 10.1111/j.1461-0248.2007.01104.x.

#### NON ISI JOURNALS:

Anfodillo T, **Petit G** & Carraro V (2013) The effect of axial conduit widening on sap flow sensors readings. *Acta Horticulturae* 991: 25-30.

**Petit G** & Anfodillo T (2013) Widening of xylem conduits and its effect on the diurnal course of water potential gradients along leaf venations. *Acta Horticulturae* 991: 239-244.

**Petit G**, Anfodillo T & Mencuccini M (2009) The distribution of resistances along the hydraulic pathway is controlled by the tapering of xylem conduits. *Acta Horticulturae* 846: 237-242.

#### PHD THESIS:

**Petit G** (2008) Analysis of the tapering of xylem conduits as a compensation mechanism for hydraulic limitations to tree growth. PhD Thesis. Università degli Studi di Padova, Padova.

## CONTRIBUTIONS AT CONFERENCES AND WORKSHOPS

### ORAL PRESENTATIONS:

2016

Prendin AL, Fonti P, von Arx G, Rixen C, Dawes MA & **Petit G**. Wood anatomical responses to long-term CO<sub>2</sub> enrichment and soil warming in *Larix decidua* treeline trees. AmeriDendro 2016 (28 March-1 April 2016, Mendoza, Argentina).

2015

**Petit G**. Plant plasticity and stable allometry of functional traits: towards a better mechanistic understanding of tree species acclimation to changing environmental conditions. X Congresso Nazionale SISEF (15-18 September 2015, Florence, Italy).

**Petit G**, Savi T & Nardini A. Plastic response of xylem anatomy to growth constraints and its effects on the vulnerability to embolism formation in *Fraxinus ornus*. Xylem International Meeting (7-9 September 2015, Bordeaux, France).

**Petit G**, von Arx G, Castagneri D & Carrer M. Time series of conduit size reflect hydraulic adaptation to increasing tree height during ontogeny. Conference on Tree Rings In Archaeology, Climatology And Ecology (TRACE 2015) (20-23 May 2015, Sevilla, Spain).

Prendin AL, Fonti P, von Arx G, Rixen C, Dawes MA & **Petit G**. Anatomical responses to long-term CO<sub>2</sub> enrichment and soil warming in *Larix decidua* trees at the alpine treeline. Conference on Tree Rings In Archaeology, Climatology And Ecology (TRACE 2015) (20-23 May 2015, Sevilla, Spain).

2014

Castagneri D, **Petit G** & Carrer M. Quantitative wood anatomy in multi-century Norway spruce chronologies. New methods and promising results. 9th International Conference in Dendrochronology (13-17 January 2014, Melbourne, Australia).

2013

**Petit G**, Castagneri D & Carrer M. A dendro-anatomical approach for the study of past, present and future dynamics of high altitude forests. IX Congresso Nazionale SiseF (16-19 September 2013, Bozen, Italy).

Anfodillo T, **Petit G** & Carraro V. The effect of axial conduit widening on sap flow sensors readings. 9<sup>th</sup> International Workshop on Sapflow (4-7 June 2013, Ghent, Belgium).

Fonti P, Carraro V, Carrer M, Frank D, **Petit G** & Anfodillo T. An insight in tree water relation responses to climate from 13 years of sap flow and dendrometers daily cycles. 9<sup>th</sup> International Workshop on Sapflow (4-7 June 2013, Ghent, Belgium).

**Petit G** & Anfodillo T. Widening of xylem conduits and its effect on the diurnal course of water potential gradients along leaf venations. 9<sup>th</sup> International Workshop on Sapflow (4-7 June 2013, Ghent, Belgium).

Castagneri D, **Petit G** & Carrer M. Relationships between ring width, tracheid size and climate in Norway spruce along a 1000 m elevational gradient. Tree Rings in Archaeology, Climatology and Ecology 2013 (8-11 May 2013, Viterbo, Italy).

Anfodillo T, **Petit G** & Crivellaro A. Wood anatomy in trees can be predicted within the framework of a tapered pipe model. International Symposium on Wood Structure in Plant Biology and Ecology (17-20 April 2013, Naples, Italy).

Crivellaro A, **Petit G** & Anfodillo T. Sanio's laws explained by conduit tapering. International Symposium on Wood Structure in Plant Biology and Ecology (17-20 April 2013, Naples, Italy).

**Petit G** & Anfodillo T. Analysis of the axial gradient of water potential in the main leaf venation of *Fraxinus excelsior* and *Sorbus aucuparia*. International Symposium on Wood Structure in Plant Biology and Ecology (17-20 April 2013, Naples, Italy).

2011

- Anfodillo T, **Petit G**, Carraro V & Carrer M. Height growth at the treeline: do hydraulic limitations matter? AGU Fall Meeting 2011 (5-9 December 2011, San Francisco, CA, USA).
- Anfodillo T, Carrer M, Simini F, Banavar J, **Petit G** & Maritan A. Nuove prospettive per la definizione della struttura ottimale delle foreste. VIII Congresso Nazionale Sisef (4-11 October 2011, Rende, CS, Italy).
- Petit G**, Bettiati D & Anfodillo T. Come un individuo di frassino maggiore realizza l'equi-resistenza idraulica in tutti i percorsi radici-foglie. VIII Congresso Nazionale Sisef (4-11 October 2011, Rende, CS, Italy).
- Anfodillo T, Grani F, Bettiati D, Fiorin L & **Petit G**. Sap flow, tapering of xylem conduits and optimized distribution networks in trees: the need for an overall perspective. 8<sup>th</sup> International Workshop on Sapflow (8-12 May 2011, Volterra, Italy).

2009

- Petit G**, Carraro V, Menardi R, Fontanella F & Anfodillo T. Limitazioni termiche al limite superiore del bosco nelle dolomiti: risposte fisiologiche di individui di abete rosso sottoposti a riscaldamento artificiale. VII Congresso Nazionale Sisef (29 September - 2 October 2009, Pesche, Isernia, Italy).

2008

- Petit G**, Anfodillo T & Mencuccini M. The distribution of resistances along the hydraulic pathway is controlled by the tapering of xylem conduits. 7<sup>th</sup> International Workshop on Sapflow (21-24 October 2008, Seville, Spain).

2006

- Anfodillo T, Carraro V, Carrer M, Rossi S, **Petit G** & Fior C. Tapering of xylem conduits in woody plants and optimization of water transport. 6<sup>th</sup> International Workshop on Sapflow (27-30 November 2006, Perth, Australia).

POSTERS:

2016

- Prendin AL, Buttò V, Castagneri D, Carrer M, Fonti P, von Arx G & **Petit G**. Conduit-size based comparison of present and past tree height growth rates at two treeline sites in the Alps. AmeriDendro 2016 (28 March-1 April 2016, Mendoza, Argentina).

2015

- Prendin AL, Fonti P, von Arx G, Rixen C, Dawes MA & **Petit G**. Wood anatomical responses to long-term CO<sub>2</sub> enrichment and soil warming in *Larix decidua* treeline trees. X Congresso Nazionale SISEF (15-18 September 2015, Florence, Italy).
- Savi T, Nardini A, Losso A, Pacilè S, Tromba G, **Petit G**, Mayr S, Trifilò P, Lo Gullo MA & Salleo S. Drought stress and xylem embolism: validating hydraulic techniques by direct observations of the functional status of xylem conduits. Joint Congress SIBV-SIGA (8-11 September 2015, Milan, Italy)

2013

- Castagneri D, **Petit G** & Carrer M. Nuove metodologie per lo studio delle relazioni clima-accrescimento nelle specie arboree. IX Congresso Nazionale Sisef (16-19 September 2013, Bozen, Italy).
- Petit G** & Crivellaro A. Basipetal widening of xylem and phloem conduits along the stem in different woody species. 9<sup>th</sup> International Workshop on Sapflow (4-7 June 2013, Ghent, Belgium).

2005

- De Zan C, **Petit G** & Anfodillo T. Variazione del lume delle cellule xilematiche in piccoli esemplari di *Larix decidua* Mill. e *Pinus cembra* L. a diverse altitudini. V Congresso Nazionale Sisef (27-29 September 2005, Grugliasco, Turin, Italy).

**Petit G**, Anfodillo T & Mencuccini M. La riduzione dell'accrescimento in altezza come conseguenza di un cambiamento delle proprietà idrauliche e anatomiche dello xilema. V Congresso Nazionale Sisef (27-29 September 2005, Grugliasco, Turin, Italy).

#### SEMINARS ON INVITATION

2014

**Petit G**. Xylem/phloem functional allometry in wet vs. dry environments in *Pinus sylvestris*. Meeting of Cost Action STReESS - FP1106 (Hyytiälä, Finland, 5-8 March 2014)

2010

**Petit G**. Hydraulic limitations at the treeline. Forest Research Institute - WSL (Birmensdorf, Switzerland, 1 December 2010)

2008

**Petit G**. Optimization of water transport in big-sized trees. Scuola Superiore Sant'Anna (Pisa, Italy, 11 December 2008)