

Daniel (Danny) Tholen, Ph.D.

Institute of Botany, Department of Integrative Biology and Biodiversity
University of Natural Resources and Life Sciences (BOKU)
A-1180, Vienna, Austria
+43 1 47654 83112
daniel.tholen@boku.ac.at

Date of Birth: 21 May, 1976

Nationality: Netherlands

Languages: Dutch, English, German (fluent), Japanese and Chinese (basic)

Marital status: Married, two children

Publication profiles:

<https://scholar.google.com/citations?user=iQUjOxAAAAAJ>

<https://orcid.org/0000-0002-9517-0939>

SUMMARY

I am interested in the relationship between form and function of plants, in particular of leaves. I have broad experience with a wide range of plants physiological techniques such as building custom gas-exchange setups, using psychrometers, chlorophyll fluorescence, gas chromatography, chemical analysis, microscopy, mass spectrometry, etc. A strong background in mathematics and physics has allowed me to integrate modeling and computational approaches in plant physiology. This resulted in new insights and understanding of the photosynthetic process.

PROFESSIONAL EXPERIENCE

Senior Scientist (11.2019 – to date), Institute of Botany, University of Natural Resources and Life Sciences (BOKU), Vienna.

University Assistant (09.2013 – 10.2019), Institute of Botany, University of Natural Resources and Life Sciences (BOKU), Vienna.

Visiting Associate Professor (02.2017 – 03.2017), Plant Ecology, the University of Tokyo, Japan.

Research Associate (01.2012 – 08.2013), Group of Plant Systems Biology, Chinese Academy of Sciences - Max Planck Gesellschaft (CAS-MPG) Partner Institute for Computational Biology (PICB), Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai, China.

Visiting scientist (06.2011 – 09.2011), Université Laval, Centre de Recherche en Horticulture, Faculty of agricultural and agrifood sciences, Québec, Canada.

CAS visiting scientist (01.2010 – 12.2011), Group of Plant Systems Biology, CAS-MPG PICB, Shanghai, China. Main project: "Leaf anatomy and photosynthesis".

Postdoctoral fellow (11.2008 – 12.2009), Group of Plant Systems Biology, CAS-MPG PICB, Shanghai, China. Project: "CO₂ diffusion in plant leaves".

Postdoctoral fellow (11.2005 – 10.2008), Plant Ecology, the University of Tokyo / Osaka University, Japan. Project: "Investigating the effects of light quality on chloroplast movement and CO₂ diffusion in leaves of *Arabidopsis thaliana*".

EDUCATION

Ph.D. (2000 – 2005) in Plant Biology – Utrecht University, Utrecht, Netherlands.

Thesis: Growth and Photosynthesis in Ethylene-Insensitive Plants. (Advisers: Dr. H. Poorter and Prof. Dr. L.A.C.J. Voesenek)

Master (1995 – 1999) in Biology – Radboud University, Nijmegen, Netherlands.

Theses:

1. Regulation of flowering in Arabidopsis; gene expression of FWA (Prof. M. Koornneef, Wageningen University).
2. Submergence tolerance in Arabidopsis (Prof. C. Blom, Radboud University).
3. UV radiation and photosynthesis in Antarctic lichens (Dr. A. Huiskes, Netherlands Ecological Institute, Yerseke).

TEACHING EXPERIENCE

Courses taught

Physico-chemical plant physiology, master/graduate elective course, the University of Tokyo, lecture (ca. 1 SSt), in English, 2017

Methods of measuring stress resistance in plants, elective course Master program, BOKU, lecture/practical, 2 SSt, in English, since 2015.

Bau der Pflanze (anatomy and morphology of plants), compulsory course Bachelor program landscape architecture and landscape planning, BOKU, lecture/practical, 3x2 SSt, in German, since 2013.

Allgemeine Botanik (general botany), compulsory course bachelor program forestry, BOKU, Practical, in German, 2 SSt, since 2013.

Photosynthesis, elective graduate course, Partner Institute for Computational Biology (PICB), Shanghai, Lecture/Practical, in English, 2011.

Mentoring and supervision

Ms Miao Ye (visiting PhD student, 2018-ongoing). Project: Leaf functional anatomy in legumes. BOKU.

Ms Assiyeh Hamidipour (PhD student, 2018-ongoing). Project: How do dynamic changes in leaf anatomy affect photosynthesis under a water deficit? BOKU.

Dr Guillaume Theroux-Rancourt. (postdoc, 2018-ongoing). Project: Functional characterisation of plant leaf airspaces in 3D. BOKU.

Ms Adelheid Landsteiner (bachelor student, 2018-2019). Project: Effects of dehydration on leaf anatomy and photosynthesis in hybrid poplars. BOKU.

Mr Moritz Scheck (master student, 2018-2019). Thesis: New methods to estimate day respiration and the CO₂ compensation point of photosynthesis by comparing C₃ and C₂ plants. BOKU.

Ms Natascha Luijken (PhD student, 2017-2018). Project: How do dynamic changes in leaf anatomy affect photosynthesis under a water deficit? BOKU.

Mr Marco Hartmann (master student, 2016-ongoing). Project: Use of LEDs and light-guiding foils for improving light-use efficiency in plants.

Dr Shuyue Wang (Master: 2011-2013, PhD: 2013-2017). Thesis: Modeling photosynthesis and diffusion in C₄ plants. Partner Institute for Computational Biology (PICB), Shanghai.

Dr Yi Xiao (Master: 2010-2012, PhD: 2013-2016). Thesis: Three-dimensional models of C₃ leaf photosynthesis. PICB, Shanghai.

AWARDS AND FELLOWSHIPS

Young Talent Scholarship Award (2011), Sanofi-Aventis & Shanghai Institutes for Biological Sciences.

Young International Scientist Fellowship (2011) (extension), Chinese Academy of Sciences.

Young International Scientist Fellowship (2010), Chinese Academy of Sciences.

JSPS Postdoctoral Fellowship for Foreign Researchers (2005), Japan Society for the Promotion of Science.

Researcher trainee scholarship (OiO) (1999), Netherlands Science Organisation, ALW.

RESEARCH SUPPORT

Théroux-Rancourt G, **Tholen D**, Forrestel EJ (2019). Structure and function relationships in leaves across development in response to environmental change. Swiss Light Source Synchrotron, Paul-Scherrer Institute, Villigen, Switzerland. Grants access to microCT beamline.

Théroux-Rancourt G, **Tholen D** (2018). Genotypic, phenotypic, and environmental variation of volumetric leaf anatomical traits. Swiss Light Source Synchrotron, Paul-Scherrer Institute, Villigen, Switzerland. Access to microCT beamline.

Tholen D (2017). How do dynamic changes in leaf anatomy affect photosynthesis under a water deficit? Austrian Science Fund P30275. To: Danny Tholen. EUR 256K.

Théroux-Rancourt G, **Tholen D** (2017). Functional characterization of plant leaf airspaces in three dimensions. Austrian Science Fund M02245. EUR 162K

Tholen D, Hietz P (2016). Use of LEDs and light-guiding foils for improving light-use efficiency in plants. Austrian Research Promotion Agency (FFG)/ EcoCan GmbH, EUR 12.5K

Tholen D (2013). A model-based method for QTL analysis of canopy radiation-use. National Science Foundation China, Grant No. 31370272. CNY 800K (project transferred to colleague after leaving Shanghai)

Tholen D (2011). A structural model for rice leaf photosynthesis. National Science Foundation China, Grant No. C020401. CNY 200K

Tholen D, Terashima I (2005) Leaf Internal Conductance for CO₂ Diffusion: Studies with Tobacco and Arabidopsis Mutants. Japan Society for the Promotion of Science, Research Project Number: 05F05450. JPY 2,400K

INTERNATIONAL RECOGNITION

Invited speaker at the Plant Biology CS 2019 conference in Ceske Budejovice, Czech Republic (2019). *Leaf functional anatomy and photosynthesis.*

Visiting associate professorship (2 months) at the University of Tokyo, Japan (2017).

Invited expert instructor at the International Workshop on Crop Photosynthetic Ecophysiology in Wuhan, China, (2017).

Invited speaker at the Gordon Research Conference CO₂ assimilation in plants: Genome to Biome, Lucca, Italy (2017). *What can we learn from models of mesophyll conductance to CO₂?*

Invited speaker at the Plant Trait Workshop at the German-Japanese Symposium in Dresden, Germany (2016). *Reassimilation of photorespiratory carbon dioxide.*

Invited speaker at the Applied Biotechnology Colloquium at the Leibniz University Hannover (2014). *Form and Function of Plant Leaves: Light, CO₂ diffusion and refixation.*

Invited speaker at the 15th International Congress on Photosynthesis in Beijing, China (2010). *A 3D reaction-diffusion model reveals the mechanisms underlying a variable diffusion limitation of photosynthesis.*

Invited speaker at the European Science Foundation exploratory workshop on mesophyll conductance to CO₂: mechanisms, modeling and ecological implications in Sa Coma, Spain (2008). *The effect of chloroplast movements on mesophyll conductance in Arabidopsis thaliana.*

Member of the **Editorial Review Board** of Plant Cell & Environment (2013- ongoing).

COMMUNITY SERVICE

I regularly review manuscripts for many quality journals in my field, including: Plant Cell & Environment, Nature Plants, Plant Physiology, New Phytologist, Plant Science, Journal of Experimental Botany, PLoS One and Plant Biology.

Acting as reviewer for projects of the C.T. de Wit Graduate School for Production Ecology & Resource Conservation, Wageningen, Netherlands

PhD thesis Examiner, Macquarie University, Australia (2012)

PUBLICATIONS

I have published 20 peer reviewed papers and 4 book chapters. These have been cited 1463/1015 times achieving a H-index of 15/13 (Google Scholar/Web of Science). Average citation rate per year as reported by Web of Science was 73. Many of my papers have been published in the top 20 journals of my field:

Trends in Plant Science, IF 12.149: 1 paper

Plant Physiology, IF 5.949: 5 papers

Plant, Cell and Environment, IF 5.415: 6 papers

Journal of Experimental Botany, IF 5.354: 1 paper

4 of my papers have been cited more than 100 times, and 2 were awarded as “highly cited” in 2017 by the Web of Science.

1. Oguchi, R, Onoda, Y, Terashima, I & **Tholen, D** 2018, ‘Leaf anatomy and function’ in Adams III, WW & Terashima, I (ed.), The leaf: a platform for performing photosynthesis, Springer International Publishing, Cham, pp. 97–139, doi:10.1007/978-3-319-93594-2_5
2. Flexas, J, Cano, FJ, Carriquí, M, Coopman, RE, Mizokami, Y, **Tholen, D** & Xiong, D 2018, ‘CO₂ diffusion inside photosynthetic organs’ in Adams III, WW & Terashima, I (ed.), The leaf: a platform for performing photosynthesis, Springer International Publishing, Cham, pp. 163–208, doi:10.1007/978-3-319-93594-2_7
3. Xiao, Y, Chang, T, Song, Q, Wang, S, **Tholen, D**, Wang, Y, Xin, C, Zheng, G, Zhao, H & Zhu, XG 2017, ‘ePlant for quantitative and predictive plant science research in the big data era? Lay the foundation for the future model guided crop breeding, engineering and agronomy’, Quantitative Biology, vol. 5, no. 3, pp. 260-271
4. Wang, S, **Tholen, D** & Zhu, XG 2017, ‘C₄ photosynthesis in C₃ rice: a theoretical analysis of biochemical and anatomical factors’, Plant Cell and Environment, vol. 40, no. 1, pp. 80-94
5. Xiao, Y, **Tholen, D** & Zhu, XG 2016, ‘The influence of leaf anatomy on the internal light environment and photosynthetic electron transport rate: Exploration with a new leaf ray tracing model’, Journal of Experimental Botany, vol. 67, no. 21, pp. 6021-6035
6. Xin, CP, **Tholen, D**, Devloo, V & Zhu, XG 2015, ‘The benefits of photorespiratory bypasses: How can they work?’, Plant Physiology, vol. 167, no. 2, pp. 574-585
7. **Tholen, D**, Ethier, G & Genty, B 2014, ‘Mesophyll conductance with a twist’, Plant Cell and Environment, vol. 37, no. 11, pp. 2456-2458
8. Jiang, C, **Tholen, D**, Xu, JM, Xin, C, Zhang, H, Zhu, X & Zhao, Y 2014, ‘Increased expression of mitochondria-localized carbonic anhydrase activity resulted in an increased biomass accumulation in *Arabidopsis thaliana*’, Journal of Plant Biology, vol. 57, no. 6, pp. 366-374
9. **Tholen, D**, Ethier, G, Genty, B, Pepin, S & Zhu, XG 2012, ‘Variable mesophyll conductance revisited: Theoretical background and experimental implications’, Plant, Cell and Environment, vol. 35, no. 12, pp. 2087-2103
10. **Tholen D**, Boom C, & Zhu XG 2012, ‘Opinion: Prospects for improving photosynthesis by altering leaf anatomy’ Plant Science vol. 197, pp 92–101

11. Zhu, XG, Zhang, GL, **Tholen, D**, Wang, Y, Xin, CP & Song, QF 2011, 'The next generation models for crops and agro-ecosystems', *Science China Information Sciences*, vol. 54, no. 3, pp. 589-597
12. **Tholen, D** & Zhu, XG 2011, 'The mechanistic basis of internal conductance: A theoretical analysis of mesophyll cell photosynthesis and CO₂ diffusion', *Plant Physiology*, vol. 156, no. 1, pp. 90-105
13. Hachiya, T, Mizokami, Y, Miyata, K, **Tholen, D**, Watanabe, CK & Noguchi, K 2011, 'Evidence for a nitrate-independent function of the nitrate sensor NRT1.1 in *Arabidopsis thaliana*', *Journal of Plant Research*, vol. 124, no. 3, pp. 425-430
14. Yoshida, K, Watanabe, CK, Hachiya, T, **Tholen, D**, Shibata, M, Terashima, I & Noguchi, K 2011, 'Distinct responses of the mitochondrial respiratory chain to long- and short-term high-light environments in *Arabidopsis thaliana*', *Plant, Cell and Environment*, vol. 34, no. 4, pp. 618-628
15. Terashima, I, Hanba, YT, **Tholen, D** & Niinemets, U 2011, 'Leaf functional anatomy in relation to photosynthesis', *Plant Physiology*, vol. 155, no. 1, pp. 108-116
16. Hachiya, T, Watanabe, CK, Boom, C, **Tholen, D**, Takahara, K, Kawai-Yamada, M, Uchimiya, H, Uesono, Y, Terashima, I & Noguchi, K 2010, 'Ammonium-dependent respiratory increase is dependent on the cytochrome pathway in *Arabidopsis thaliana* shoots', *Plant, Cell and Environment*, vol. 33, no. 11, pp. 1888-1897
17. **Tholen, D**, Boom, C, Noguchi, K, Ueda, S, Katase, T & Terashima, I 2008, 'The chloroplast avoidance response decreases internal conductance to CO₂ diffusion in *Arabidopsis thaliana* leaves', *Plant, Cell and Environment*, vol. 31, no. 11, pp. 1688-1700
18. **Tholen, D**, Pons, TL, Voeselek, LACJ & Poorter, H 2008, 'The role of ethylene perception in the control of photosynthesis', *Plant Signaling and Behavior*, vol. 3, no. 2, pp. 108-109
19. **Tholen, D**, Boom, C, Noguchi, K & Terashima, I 2007, 'The effects of chloroplast movement on CO₂ transfer conductance in *Arabidopsis thaliana*', *Plant and Cell Physiology*, vol. 48, pp. S95-S95
20. **Tholen, D**, Pons, TL, Voeselek, LACJ & Poorter, H 2007, 'Ethylene insensitivity results in down-regulation of Rubisco expression and photosynthetic capacity in tobacco', *Plant Physiology*, vol. 144, no. 3, pp. 1305-1315
21. **Tholen, D**, Poorter, H & Voeselek, LACJ 2006, 'Ethylene and plant growth' in Khan, NA (ed.), *Ethylene Action in Plants*, Springer-Verlag, Berlin, 35-49
22. Pierik, R, **Tholen, D**, Poorter, H, Visser, EJW & Voeselek, LACJ 2006, 'The Janus face of ethylene: growth inhibition and stimulation', *Trends in Plant Science*, vol. 11, no. 4, pp. 176-183
23. **Tholen, D**, Voeselek, LACJ & Poorter, H 2004, 'Ethylene insensitivity does not increase leaf area or relative growth rate in *Arabidopsis*, *Nicotiana tabacum*, and *Petunia x hybrida*', *Plant Physiology*, vol. 134, no. 4, pp. 1803-1812
24. **Tholen, D**, Poorter, H & Voeselek, L 2003, 'Ethylene insensitivity does not stimulate growth in *Arabidopsis thaliana*', *NATO science series sub series I Life and behavioural sciences*, vol. 349, IOS PRESS, pp. 250-252

Research outputs other than publications:

Tholen, D & Hietz, P (2017) Use of LEDs and light-guiding foils for improving light-use efficiency in plants. Research contract report prepared for EcoCAN GmbH.

EXTRACURRICULAR ACTIVITIES

Vice-Chair on the board of the BOKU-Kindergarten (2015-2017).