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# Guillaume Lobet

Assistant Professor - Plant Modelling

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## Informations

28-12-1984 [32]

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www.plantmodelling.xyz

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## Keywords

Computational modelling  
Image analysis  
Data analysis  
Web technologies  
Science communication  
Open Science

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## Languages

French ★★★★★  
English (C1/C2) ★★★★★☆  
Sign language ★☆☆☆☆

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### Note:

All my articles, presentations and projects can be viewed at [www.plantmodelling.xyz](http://www.plantmodelling.xyz)

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## Research statement

Plants are fascinating. They form complex and plastic networks (both above- and below-ground), ever integrating and adapting to endogenous and exogenous clues. Manipulation of these networks brings the promise to unlock plant productivity in limiting environments. My primary research interests lie in the understanding of these interconnected, multi-scale regulations pathways in crop plants.

The incredible complexity of plants calls for integrative research strategies such as combining innovative plant phenotyping pipelines with powerful modelling tools. My belief is that combining computational tools with the latest biological knowledge will open new horizons for plant research.

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## Current position

2016–now **Assistant Professor**  
Université catholique de Louvain | Forschungszentrum Juelich

We use modelling tools to understand how plants regulate their growth both internally (allometry) and externally (drought) through long distance signals (such as water and carbon flows).

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## Bibliometrics

Peer-review publications: **19**  
Total number of citations: **530**  
Google Scholar h-index: **11**

Reviews performed: **51**  
Invitations to conferences/workshops: **14**  
Organisation of conferences/workshops: **3**  
Academic editor: **Plant Direct**

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## Professional experiences

2016–now	<b>Assistant Professor</b>	UCL-ELI   FZJ-IBG3
2014–2016	<b>FNRS post-doctoral fellow</b>	Plant Physiology, PhytoSYSTEMS, ULg
2015–2016	<b>FNRS post-doctoral fellow</b>	Forschungszentrum Jülich IBG-3, Germany
2013–2014	<b>Post-doctoral fellow</b>	Plant Physiology, PhytoSYSTEMS, ULg
2008–2012	<b>PhD student</b>	Ecophysiology and Plant Breeding, UCL
2010-2012	<b>President of the ACELI</b>	Earth and Life Insititue, UCL

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## Professional experiences

- 2014–2016 **FNRS post-doctoral fellow** PhytoSYSTEMS, Univeristé de Liège, Belgium  
*Advisor:* Prof. Claire Périlleux  
*Fellowship:* Fonds de la Recherche Scientifique - FNRS  
 Understand allometric relationships in maize, both at the plant and root system level. The project combines phenotyping, modelling and transcrip-tomic approaches.
- 2015–2016 **FNRS post-doctoral fellow** Forschungszentrum Jülich IBG-3, Germany  
*Advisor:* Prof. Andrea Schnepf  
*Fellowship:* Fonds de la Recherche Scientifique - FNRS  
 Improve an existing plant model and couple it to a soil water movement model in order to explicitly simulate water and carbon fluxes in the plant.
- 2013–2014 **Post-doctoral fellow** PhytoSYSTEMS, Univeristé de Liège, Belgium  
*MARS project:* [www.iap-mars.be](http://www.iap-mars.be)  
*Advisor:* Prof. Claire Périlleux  
*Fellowship:* Belgian Science Policy, Inter-university Attraction Pole  
 Better understand how root and shoot influence each other and how this interaction contributes to the development of the plant.
- 2008–2012 **PhD student** Earth and Life Institute, UCL, Belgium  
*Regulation of water flow in the soil-root domain.*  
*Supervisor:* Prof. Xavier Draye  
*Fellowship:* FNRS-FRIA + DROPS (EU-FP7)  
 The objective of the thesis was to (1) analyse the water flows in the soil-root domain (2) quantify the contribution of plant regulatory processes.
- 2010-2012 **President of the ACELI** Earth and Life Institute, UCL, Belgium  
 The ACELI is the Earth and Life Institute Researchers' Association. It represents more than 300 researchers from multiple fields such as agronomy, microbiology, environmental sciences or climatology.
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## Computational skills

- Image analysis** Java, ImageJ  
 Implementation of several plant image analysis tools.
- Plant modelling** Java, R  
 Implementation of a functional-structural plant model, PlaNet-Maize.  
 Creation of a model of tomato inflorescence development.
- Data analysis and management** R, Perl, MySQL  
 Laboratory database creation and management.  
 Quantitative analysis of large datasets.
- Public database creation and management** SQL, HTML5, PHP, Javascript  
[www.plant-image-analysis.org](http://www.plant-image-analysis.org)  
[www.flor-id.be](http://www.flor-id.be)

## Awards, distinctions and grants

2015	<b>Teaching Tools in Plant Biology Competition - Plant Cell</b> Root System Architecture quantification. Why and How?	Winner
2015	<b>Roundtable organisation competition</b> Rhizosphere 4 Meeting	Winner
2014	<b>FNRS Post-doctoral fellowship</b> Fonds de la Recherche Scientifique - FNRS, Belgium	~ 160 000 € (3 years salary)
2012	<b>Honorary fellowship</b> Belgian American Educational Foundation	
2012	<b>Best oral communication</b> 17 <sup>th</sup> symposium on Applied Biological Sciences, Leuven, Belgium	Second prize
2010	<b>Best poster</b> Plant Science Doctoral School, Liège, Belgium	First prize
2010	<b>FRIA fellowship</b> Fonds de la Recherche Scientifique - FNRS, Belgium	~ 96 000 € (4 years salary)

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## Education

2008–2012	<b>PhD</b> in agronomical sciences	Ecophysiology and Plant Breeding, UCL
2012	<b>Teaching formation</b> for higher education	IPM, UCL
2003–2008	<b>Master</b> in bio-engineering	Université catholique de Louvain
2007	<b>Erasmus</b> Exchange program	University of Manchester, UK

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## Other informations

### Teaching experience

Root modelling, Scientific figures, LaTeX and ImageJ course

### Thesis supervision

Supervision of 1 PhD (ongoing) and 6 master theses

### Boy-scout leader

Organisation of projects abroad (Ireland, Czech Republic, Morocco)

### Personal interests

Sign languages and deaf culture, reading, technology, running, hiking, environment

## Publications

Journal names were intentionally left blank.

updated: 2016-09-26

### Articles in peer-reviewed journals

Image analysis in plant sciences: Publish then Perish

Guillaume Lobet

2017

Using a structural root system model for an in-depth assessment of root image analysis pipeline

Guillaume Lobet\*, T. Koevoets I, M. Noll, P. Meyer, P. Tocquin, L. Pagès, and C. Périlleux

2017

Integrating roots into a whole plant network of flowering time genes in *Arabidopsis thaliana*

Bouché, F., M. D'Alia, P. Tocquin, Guillaume Lobet, N. Detry, and C. Périlleux

2016

Environmental control of root system biology

Rellán-Álvarez\*, R., Guillaume Lobet\*, and J. Dinneny

2016

FLOR-ID, an interactive database of flowering-time gene networks in *Arabidopsis thaliana*

Bouché\*, F., Guillaume Lobet\*, P. Tocquin, and C. Périlleux

2015

archiDART: an R package for the automated 2D computation of plant root architectural traits

Delory, B. M., C. Baudson, Y. Brostaux, Guillaume Lobet, P. duJardin, L. Pagès, and P. Delaplace

2015

Root System Markup Language: toward an unified root architecture description language

Guillaume Lobet, M. Pound, J. Diener, C. Pradal, X. Draye, C. Godin, M. Javaux, D. Leitner, F. Meunier, P. Nacry, T. Pridmore, and A. Schnepf

2015

Rhizoponics, a novel hydroponic rhizotron for root system analyses on mature *Arabidopsis thaliana* plants

Mathieu\*, L., Guillaume Lobet\*, P. Tocquin, and C. Périlleux

2015

GLO-Roots: an imaging platform enabling multidimensional characterization of soil-grown roots systems

Rellán-Álvarez, R., Guillaume Lobet, H. Lindner, P.-L. Pradier, M.-C. Yee, J. Sebastian, Y. Geng, C. Trontin, T. LaRue, A. Schrager, C. Haney, R. Nieu, J. Maloof, J. P. Vogel, and J. R. Dinneny

2015

Plant water uptake in drying soils

Guillaume Lobet, V. Couvreur, F. Meunier, M. Javaux, and X. Draye

2014

A modeling approach to determine the importance of dynamic regulation of plant hydraulic conductivities on the water uptake dynamics in the soil-plant-atmosphere system

Guillaume Lobet, L. Pagès, and X. Draye

2014

Inflorescence development in tomato: gene functions within a zigzag model

Périlleux\*, C., Guillaume Lobet\*, and P. Tocquin

2014

Root Systems Biology: bridging regulatory networks to rhizosphere-scale processes

Hill, K., S. Porco, Guillaume Lobet, S. Zappala, S. Mooney, X. Draye, and M. J. Bennett

2013

Comparative analysis of Cd and Zn impacts on root distribution and morphology of *Lolium perenne* and *Trifolium repens*: implications for phytostabilization

Lambrechts, T., G. Lequeue, Guillaume Lobet, B. Godin, C. L. Biolders, and S. Lutts

2013

Novel scanning procedure enabling the vectorization of entire rhizotron-grown root systems

Guillaume Lobet and X. Draye

2013

An online database for plant image analysis software tools

Guillaume Lobet, X. Draye, and C. Périlleux

2013

A novel image analysis toolbox enabling quantitative analysis of root system architecture

Guillaume Lobet, L. Pagès, and X. Draye

2011

Model-assisted integration of physiological and environmental constraints affecting the dynamic and spatial patterns of root water uptake from soils

Draye, X., Y. Kim, Guillaume Lobet, and M. Javaux

2010

## Pre-print articles

Combining semi-automated image analysis techniques with machine learning algorithms to accelerate large scale genetic studies

Atkinson, J., Guillaume Lobet\*, M. Noll, P. Meyer, and D. Wells

2017

Novel multiscale insights into the composite nature of water transport in roots

Couvreur, V., M. Faget, Guillaume Lobet, M. Javaux, F. Chaumont, and X. Draye

2017

CRootBox: A Structural-Functional Modelling Framework For Root Systems

Schnepf, A., D. Leitner, M. Landl, Guillaume Lobet, T. Hieu Mai, S. Morandage, C. Sheng, M. Zoerner, J. Vanderborght, and H. Vereecken

2017

## Book chapters

Root water uptake and water flow in the soil-root domain

Guillaume Lobet, C. Hachez, F. Chaumont, M. Javaux, and X. Draye

*Plant Roots: The Hidden Half*, CRC Press, 2013, New York

## PhD thesis

Regulation of water flow in the soil-root domain. New tools and methods

Guillaume Lobet

Earth and Life Institute, Université catholique de Louvain, 2012

## Articles in conference proceedings

First steps towards an explicit modelling of aba production and translocation in relation with the water uptake dynamics

Guillaume Lobet, L. Pagès, and X. Draye

*Acta Horticulturae*, pp. 373–381, 2013

New insights on the role of root radial hydraulic conductivity in the overall water uptake dynamics

Guillaume Lobet and X. Draye

*Communication in Agricultural and Applied Biological Sciences*, pp. 117–121, 2012

A modeling approach to determine the contribution of plant hydraulic conductivities on the water uptake dynamics in the soil-plant-atmosphere system

Guillaume Lobet, L. Pagès, and X. Draye

*IEEE Plant Growth Modeling and Applications*, pp. 1–5, 2012

## Invited presentations in international conferences

Alternative plants, why we need models to understand the complexity of plants

Guillaume Lobet

*IPG Symposium*, Columbia, Missouri, 2017

Open Science, a view from the bench.

Guillaume Lobet

*OpenBelgium Conference*, Antwerpen, 2016

Open Science: Yes we can (and should!)

Guillaume Lobet

*Pecha Kucha Night - Open Con*, Liège, 2016

plant-image-analysis.org: A platform referencing plant image analysis tools

Guillaume Lobet

*Neubias Taggathon*, Barcelona (videoconference), 2016

Social media in research: a beginner's guide

Guillaume Lobet

*Biocomplexity Engineering group seminar*, Florida (video conference), 2016

Introducing Root System Markup Language, a new toolbox to link experimental data with simulation

Guillaume Lobet

*Modeling plant development from the organ to the whole plant scale*, Montpellier, 2015

Scientific valorisation: getting the most out of your research.

Guillaume Lobet

*Communiquer sa recherche*, ULB, Bruxelles, 2015

Scientific valorisation: getting the most out of your research.

Guillaume Lobet

*Let's Talk Science*, Leuven, 2015

Plant Image Analysis tools. Current trends and limitations

Guillaume Lobet, X. Draye, and C. Périlleux

*Plant Image Analysis Problems and Solutions - A Workshop*, Madison, 2015

Water relations in the soil-plant system: what can we learn from functional-structural plant models

Guillaume Lobet and X. Draye

*BASF Symposium 2014 on Unlocking Yield Potential in Soil*, Limburgerhof, 2014

Water relations in the soil-plant system: what can we learn from functional-structural plant models

Guillaume Lobet and X. Draye

*Society for Experimental Botany Annual Main Meeting*, Manchester, 2014

Water relations in the soil-plant system: what can we learn from functional-structural plant models

Guillaume Lobet, F. Meunier, M. Javaux, and X. Draye

*Soil Science Society Belgium: Soil-plant interactions in a changing world*, Bruxelles, 2014

SmartRoot : A novel image analysis toolbox enabling quantitative analysis of root system architecture

Guillaume Lobet, L. Pagès, and X. Draye

*International Workshop on Image Analysis Methods for the Plant Sciences*, Nottingham, 2013

New insights on the role of root radial conductivity on the overall uptake dynamics

Guillaume Lobet, V. Couvreur, M. Javaux, and X. Draye

*Roots for improving resource acquisition in crops, Rank Price Fund*, Grasmere, 2011

## **Presentations in international conferences**

Using structural models to validate and improve root image analysis pipelines

Guillaume Lobet

*International Plant Phenotyping Symposium*, Mexico, 2016

FLOR-ID: an interactive database of flowering gene network in Arabidopsis

Bouché, F., Guillaume Lobet, P. Tocquin, and C. Périlleux

*Workshop on Mechanisms controlling Flower Development*, Aiguablave, 2015

Introducing Root System Markup Language, a new toolbox to link experimental data with simulation

Guillaume Lobet

*International workshop on Image analysis methods for the plant sciences*, Louvain-la-Neuve, 2015

Plant Image Analysis tools: current trends and limitations

Guillaume Lobet, X. Draye, and C. Périlleux

*International workshop on Image analysis methods for the plant sciences*, Aberystwyth, 2014

Inflorescence development in tomato: gene functions within a zigzag model

Guillaume Lobet<sup>\*</sup>, C. Périlleux<sup>\*</sup>, and P. Tocquin

*Genetic Variation of Flowering Time Genes and Applications for Crop Improvement*, Bielefeld, 2014

First steps towards an explicit modelling of ABA production and translocation in relation with the water uptake dynamics

Guillaume Lobet, L. Pagès, and X. Draye

*9th International Workshop on Sap Flow*, Leuven, 2013

A modeling approach to determine the contribution of plant hydraulic conductivities on the water uptake dynamics in the soil-plant-atmosphere system

Guillaume Lobet, L. Pagès, and X. Draye

*4th International Symposium on Plant Growth Modeling, Simulation, Visualization and Applications*, Shanghai, 2012

Integrating soil and plant knowledge at different scales to better understand the dynamics of water in SPAC

Guillaume Lobet, L. Pagès, F. Chaumont, M. Javaux, and X. Draye

*Ressources captures by plant crops*, Nottingham, 2008