

# Stéphanie M. Bernard

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## **Education:**

PhD Rothamsted Research (UK) and School of Biological Sciences, Lancaster University (UK) 2002-2005  
Advisors: Dimah Z. Habash, Christine H. Foyer and Brian G. Forde

Maitrise (Master's degree by instruction; with honours), Université de Nantes (France), engineering school in Chemistry-Biology and Rothamsted Research (UK). 2000-2001

Licence (Bachelor's degree; with honours), Université de Nantes (France), engineering school in Chemistry-Biology 1999-2000

## **Professional experiences:**

**Postdoctoral fellow**, Earth Sciences Division, Lawrence Berkeley National Laboratory. September 2005-present

Project: An annual grassland mesocosm exploration of scaling from genomes to ecosystem function

This multidisciplinary project, funded by DOE, investigates the coordinated responses to climate change of plants and soil microorganisms from a California annual grassland ecosystem with the aim of linking the responses from gene to ecosystem. My studies have focused on the responses at the level of gene expression in *Avena barbata*, the dominant plant species in the studied grassland. Sequences of genes associated with plant carbon and nitrogen metabolism were cloned and transcript abundance was studied in both the roots and leaves of plants grown under differing climatic conditions. In collaboration with the Joint Genome Institute, four cDNA libraries of *Avena barbata* have been sequenced using Sanger sequencing as well as pyrosequencing and will provide further sequences data for transcripts profiling.

**Graduate Studies**, Crop Performance and Improvement division, Rothamsted Research (UK) and School of Biological sciences, Lancaster University. March 2002- September 2005

Project: Developing wheat with enhanced nitrogen use efficiency towards sustainable system of production

This large cross laboratory project was funded by the EU Framework V and focused on two main approaches; (1) the identification of quantitative traits loci for nitrogen use efficiency and (2) the genetic engineering of wheat. I used particle bombardment to manipulate the expression of cytosolic glutamine synthetase (GS) in wheat. As part of this project, I also characterized the transcript profile of wheat GS genes and this led to the identification of two cytosolic GS genes involved in nitrogen remobilisation in senescing wheat leaves. Additionally, I conducted phylogenetic analyses of the GS sequences from plants of the Poaceae family and identified three phylogenetically and functionally distinct GS sub-families.

**Research assistant**, Crop Performance and Improvement division, Rothamsted Research (UK). March 2001- February 2002

Research: Oxidative stress

While working with Christine H. Foyer at Rothamsted Research (UK), I was involved in two projects on oxidative stress. The first project involved the analysis of the transcripts of two antioxidant enzymes, ascorbate peroxidase and catalase, in drought-stressed wheat and *Arabidopsis thaliana* (wild type and the *Vtc-1* mutant deficient in ascorbate) and suggested a role for ascorbate as a signalling molecule in plants.

The second project was a EU funded project entitled ‘Senescence and Oxidative Stress’ and show that enhanced oxidative stress was not involved in the senescence of pea (*Pisum sativum*) nodules.

**Grant and Awards:**

2007- Divisional Program Development Grant: ‘Genomic Basis of Plant Response to Soil Heterogeneity’ (\$20k)

2006- Prize for best presentation awarded at the Rank Prize symposium ‘Can We Improve the Utilisation of Nitrogen in Cereals?’

**Published articles:**

1. **Bernard SM**, Blom Møller AL, Dionisio G, Jahn TP, Baudo M, Lopes MS, Tercé-Laforgue T, Foyer CH, Parry M, Forde BG, Araus JL, Hirel B, Schjoerring JK and Habash DZ (2008). Gene expression and function of glutamine synthetase isozymes in wheat (*Triticum aestivum* L.). *Plant Molecular Biology* 67(1-2):89-105.
2. Habash D, **Bernard S**, Schondelmaier J, Weyen J and Quarrie S. (2007) The genetics of nitrogen use in hexaploid wheat: N utilisation, development and yield. *Theoretical and applied genetics* 114(3): 403-419.
3. Groten K, Dutilleul C, van Heerden PDR, Vanacker H, **Bernard S**, Finkemeier I, Dietz K-J, Römer P and Foyer CH. (2006) Redox regulation of peroxiredoxin and proteinases by ascorbate and thiols during pea root nodule senescence. *FEBS Letters* 580(5): 1269-1276.
4. Groten K, Vanacker H, Dutilleul C, Bastian F, **Bernard S**, Carzaniga R, Foyer CH. (2005) The roles of redox processes in pea nodule development and senescence. *Plant Cell Environment*. 28 (10): 1293-1304.
5. Luna CM, Pastori GM, Driscoll S, Groten K, **Bernard S**, and Foyer CH. (2005) Drought controls on H<sub>2</sub>O<sub>2</sub> accumulation, catalase (CAT) activity and *CAT* gene expression in wheat. *J. Exp. Bot.* 56 (411): 417-423.
6. Pastori GM, Kiddle G, Antoniw J, **Bernard S**, Veljovic-Jovanovic S, Verrier PJ, Noctor G, Foyer CH. (2003) Leaf vitamin C contents modulate plant defense transcripts and regulate genes that control development through hormone signaling. *Plant Cell* 15 (4): 939-951.
7. Kiddle G, Pastori GM, **Bernard S**, Pignocchi C, Antoniw J, Verrier PJ, Foyer CH. (2003) Effects of leaf ascorbate content on defense and photosynthesis gene expression in *Arabidopsis thaliana*. *Antioxidants and Redox Signaling*. 5 (1): 23-32.

**Submitted for publication**

Leakey ADB, Ainsworth EA, **Bernard SM**, Markelz RJC, Ort DR, Placella SAP, Rogers A, Smith MD, Sudderth EA, Weston DJ, Wullschleger SD, Yuan S. Gene expression profiling – opening the black box of plant ecosystem responses to global change. Submitted to *Global Change Biology*-June 2008

**Bernard SM** & Habash DZ. The importance of cytosolic glutamine synthetase in plant growth and seed production. Submitted to *New Phytologist*- June 2008.

**Published abstracts:**

1. The long-term effects of drought and high temperature on N metabolism in a C<sub>3</sub> grass (2008). **Bernard SM**, StClair SB, Sudderth EA, Torn MS, Ackerly DD and Andersen GL. American Society of Plant Biologists. Annual Meeting Mérida, Mexico.
2. Linking the response of annual grasslands to warming and altered rainfall across scales of gene expression, species, and ecosystem. (2007) Torn MS, **Bernard SM**, St.Clair SB, Fischer ML, Hopkins FM, Placella SA, Castanha C, Sudderth E, Herman DJ, Salve R, Ackerly DD and Firestone MK. AGU, San Francisco, CA.
3. A molecular analysis of plant response to global climate change in an annual grassland (2007). **Bernard SM**, StClair S, Placella S, Firestone M, Salve R, Ackerly DD and Andersen GL. Ecological Society of America, annual meeting, San Jose, CA.
4. Connecting soil microbial N-transformations to plant N-processing (2007). Firestone MK, Placella SA, **Bernard SM**, Herman DJ, Brodie EL, Andersen GL, St Clair S and Ackerly DD. Ecological Society of America, annual meeting, San Jose, CA.
5. A molecular approach to understanding plant response to global climate change in a Californian grassland ecosystem (2007). **Bernard SM**, St. Clair S, Placella S, Firestone M, Torn MST, Ackerly DD and Andersen GL. *Plant biology and Botany*- Joint congress, Chicago, IL.

6. The genetics of nitrogen use in wheat- the role of leaf nitrogen metabolism. (2007) Habash D, **Bernard SM**, Schondelmaier J, Weyen J and Quarrie SA. Nitrogen symposium, Lancaster, UK.
7. A molecular approach to understanding plant response to global climate change in a Californian grassland. **Bernard S.M.**, Ball I., St.Clair S., Placella S., Firestone M., Torn M.S., Ackerly D. and Andersen G.L. Ecosystem. Gene in Ecology, Ecology in Genes. Kansas State University, Kansas City, Missouri. 2007.
8. Roles and regulation of glutamine synthetase in wheat. **Bernard S**, Dionisio G, Schjoerring JK, Foyer CH and Habash DZ. (2006) The Rank Prize fund, Mini-symposium on Can we improve the utilization of Nitrogen in cereals? Grasmere, UK.
9. Manipulating the expression of cytosolic glutamine synthetase in wheat of four genetic background. **Bernard S**, Weyen J, Foyer CH and Habash D (2004). 7th International Symposium on Inorganic Nitrogen Assimilation in Plants: From the Genome to the Agro-Ecosystem, Wageningen, The Netherlands.

***Invited presentations:***

2007- Statistical analysis and data integration in plant genomic ecology research Workshop, Urbana, IL, USA

2007- Ecological Society of America Annual Meeting, San Jose, CA, USA.

2006- Gene in Ecology, Ecology in Genes. Kansas State University, Kansas City, MO, USA.

2006- The Rank Prize fund mini-symposium, Can we improve the utilization of Nitrogen in cereals? Grasmere, UK.

***Current Membership in Professional Societies:***

2005- American Society of Plant Biologists

***Additional skills:***

Language: fluent in French (mother tongue) and English, conversational Spanish.

Students: I have supervised undergraduate students (5) hired to assist with laboratory and greenhouses experiments at LBNL.

Journal Reviewer: New Phytologist (2007)

***References:***

Dr. Gary L. Andersen, Earth Sciences Division, Lawrence Berkeley National Laboratory, 1, Cyclotron Road, Berkeley CA 94720.

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Dr. David D. Ackerly, Department of Integrative Biology, University of California, Berkeley, 3060 Valley Life Science Building, University of California, Berkeley CA 94720-3140.

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Dr. Dimah Z. Habash, Plant Science Department, Rothamsted Research, West Common, Harpenden, Hertfordshire, AL5 2JQ (UK).

Phone: (+44) 01582-763-133 ext. 2714 E-mail: dimah.habash@bbsrc.ac.uk

Prof. Christine H. Foyer, School of Agriculture, Food and Rural Development, Agriculture Building, The University of Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU (UK)

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