**STEVEN J. CLOUGH** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**RESEARCH INTERESTS**

My research focus is on the molecular interactions that take place when plants are parasitized by microbes using genomic approaches that allow one to ascertain global changes in gene expression during these interactions. These gene expression profiles provide a deeper understanding of biological responses and may be use to develop mapping markers associated with specific defense responses.

**EDUCATION**

**POSTDOC** Microarray development for the NSF Soybean Functional Genomics

*3/1999-10/2001* Program. **Advisor: Lila Vodkin**.

**POSTDOC** Plant transformation using Agrobacterium**. Advisor: Andrew Bent**

*6/1996-2/1999* Positional cloning of an Arabidopsis gene involved in pathogen defense.

**Ph.D.** *1996* Plant pathology. University of Georgia. **Major advisor: Timothy Denny**

The biphasic nature of *Pseudomonas solanacearum* and its regulation.

**M.S.** *1991* Plant pathology. University of Georgia. **Major advisor: Timothy Denny**

Regulation of virulence in *Pseudomonas solanacearum* by an endogenous

volatile compound.

**B.A.** *1986* Biochemistry. University of California, Berkeley

**APPOINTMENTS**

*2001-present* **Research Geneticist:** USDA-ARS, Urbana, Illinois

**Assistant Professor:** Dept of Crop Science, University of Illinois, Urbana

* 1. **Postdoctoral Research Associate:** Dept of Crop Science, U of Illinois, Urbana

**PUBLICATIONS - Last five years**

Calla, B., Blahut-Beatty, L., Koziol, L., Zhang, Y., Neece, D.J., Carbajulca, D., Garcia, A., Simmonds, D.H., and Clough, S.J. (2014a) Genomic evaluation of oxalate-degrading transgenic soybean in response to *Sclerotinia sclerotiorum* infection. *Mol. Plant Pathol*., *Accepted Dec 6, 2103.*

Calla, B., Blahut-Beatty, L., Koziol, L., Simmonds, D., Clough, S.J. (2014b) Transcriptome analyses suggest a disturbance of iron homeostasis in soybean leaves during white mold disease establishment. *Mol. Plant Pathol*. *Accepted Dec 6, 2013.*

Radwan, O., Wu, X., Govindarajulu, M., Libault, M., Neece, D.J., Oh, M.-H, Berg, R.H., Stacey, G., Taylor, C.G., Huber, S.C., and Clough, S.J. (2012)14-3-3 proteins SGF14c and SGF14l play critical roles during soybean nodulation. Plant Physiol.160:2125-2136.

Radwan, O., Li, M., Calla, B., Li, S., Hartman, G.L. and S.J. Clough, S.J. (2012) Effect of *Fusarium virguliforme* phytotoxin on soybean gene expression suggests a multi-dimensional defense approach. *Mol. Plant Pathol.* 14:293-307.

Zabala, G., Campos. E.,Varala, K.K., Bloomfield. S., Jones, S.I., Win, H., Tuteja, J.H., Calla, B., Clough, S.J., Hudson, M. and Vodkin, L.O. (2012) Divergent Patterns of Endogenous Small RNA Populations from Seed and Vegetative Tissues of *Glycine max*. *BMC Plant Biol*. 12:177.

Wang, D., M. Qi, B. Calla, S.S. Korban, S.J. Clough, G.W. Sundin, I. Toth, P.J.A. Cock, and Y. Zhao (2011). Genome-wide identification of genes regulated by the Rcs phosphorelay system in *Erwinia amylovora*. *Mol. Plant-Microbe Interact*. 25:6-17. 2012.

Wang, D., B. Calla, S. Vimolmangkang, X. Wu, S.S. Korban, S.C. Huber, S.J. Clough, and Y. Zhao (2011). The orphan gene *ybjN* conveys pleiotropic effects on multicellular behavior and survival of *Escherichia coli*. *PLoS ONE* 6(9): e25293. doi:10.1371/journal.pone.0025293.

Radwan, O., Y. Liu, and S.J. Clough (2011).Transcriptional analysis of soybean roots response to *Fusarium virguliforme*, the causal agent of sudden death syndrome. *Mol. Plant-Microbe Interact*. 24:958-972.

Bilgin, D.D., J.A. Zavala, J. Zhu, S.J. Clough, D.R. Ort, and E.H. DeLucia (2010). Biotic stress globally down-regulates photosynthesis genes. *Plant Cell Environ*. 33:1597-1613.

Libault, M., A. Farmer, L. Brechenmacher, J. Drnevich, R.J. Langley, D.D. Bilgin, O. Radwan, D. Neece, S.J. Clough, G.D. May, and G. Stacey (2010). Complete transcriptome of the soybean root hair cell, a single cell model, and its alteration in response to *Bradyrhizobium japonicum* infection. *Plant Physiol.* 152:541-552.

Zhu, J., W.L. Patzoldt, O. Radwan, P.J. Tranel, and S.J. Clough (2009). Effects of photosystem II interfering herbicides atrazone and bentazon on the soybean transcriptome. *The Plant Genome* 2:191-205.

Calla, B., T. Vuong, O. Radwan, G.L. Hartman, and S.J. Clough (2009). Gene expression profiling soybean stem tissue early response to *Sclerotinia sclerotiorum* and in silico mapping in relation to resistance markers. *The Plant Genome* 2:149-166.

Bilgin, D.D., E.H. DeLucia, and S.J. Clough (2009). A robust plant RNA isolation method suitable for Affymetrix Genechip analysis and quantitative real-time RT-PCR. *Nature Protocols* 4:333-340.

**HONORS AND AWARDS**

Clough and Bent 1998 Plant Journal publication (16:735-743) on the floral dip transformation of Arabidopsis was rated as the #1 citation in the biological sciences (plants and animal journals) for the 10-year period of 1996-2005 and has been cited over 6,843 times as of January 21, 2014 (ISI Web of Knowledge, Thomson Reuters).

**OTHER**

Adjunct assistant professor with the Department Crop Science, U of Illinois

Affiliate: Institute for Genomic Biology, U of Illinois

Committee member: Biological Safety Committee, University of Illinois

Committee member: Computer Resources Committee, Dept. Crop Sci., University of Illinois

NSF Soybean Functional Genomics Workshop, May 2000: lecturer and organizer, U. of Illinois

NSF Genomics Annual Workshop for High-school Teachers, 2007-2009: lecturer and organizer, Danforth Center, St. Louis, MO.

Lecturer: University of Illinois graduate course development on plant-microbe molecular interactions

Reviewer: NIFA-AFRI grant proposal review panelist 2013

**RECENT COLLABORATORS AND OTHER AFFILIATIONS**

University of Illinois: Brian Diers, Glen Hartman, Randall Nelson, Lila Vodkin

University of Missouri: Gary Stacey

Danforth Center: Christopher Taylor

AgCanada: Daina Simmonds

The Ohio State University: Anne Dorrance and John Finer

ESALQ (University of São Paulo): Jose Baldin

**POSTDOCTORAL, VISING SCIENTISTS and GRADUATE STUDENT ADVISING**

Lucimara Koga (Postdoc 2013, now postdoc with EMBRAPA Soja, Londrina, Brazil)

Osman Radwan (Postdoc 2007-2012, now postdoc with another professor on campus)

Jijun Zou (Postdoc 2002-2004, now employed in permanent position as Regulatory Operations Coordinator and Global Regulatory Product Manager - China and Asia-Pacific at DuPont/Pioneer, Des Moines, IA)

Damla Bilgin (Postdoc 2004-2006, now employed in permanent position as a Senior Scientist and Group Leader at Sapphire Energy, San Diego)

MeiPhing Lee (Postdoc 2005, deceased)

Bao Li (2011, visiting professor from China Agricultural University)

Michelle da Fonseca Santos (visiting Ph.D. student 2011, now employed in permanent position as a Breeder with Monsanto, Brazil)

Alexandre Garcia (visiting Ph.D. student 2010, now employed in permanent position as Research Supervisor in Molecular Breeding at Tropical Melhoramento e Genética Ltda, Londrina, Brazil)

Doris Carbajulca (2008-2013, visiting Scholar, Peru)

Min Li (Ph.D. 10/07, employed in permanent position as Data Mining Scientist / BioInformaticist at Syngenta, Charlotte, NC)

Jin Zhu (Ph.D. 5/09, now employed in permanent position as Molecular Biologist at Monsanto, St. Louis, MO)

Bernarda Calla (MS 05/07; Ph.D. 5/12; postdoc at USDA-ARS, Hilo)

Yanyu (Zoey) He (MS 12/12, now employed in permanent job as Research Associate at Monsanto, St. Louis, MO)

Maria Malvino (MS, current)