

BIOGRAPHICAL SKETCH

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NAME STAIGER, Christopher J.	POSITION TITLE Professor of Biological Sciences		
eRA COMMONS USER NAME			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Carleton College, Northfield MN	B.A.	1981-1985	Biology
University of California, Berkeley	Ph.D.	1985-1990	Botany
John Innes Centre, Norwich UK	post-doc	1990-1993	Cell Biology

A. Positions and Honors**Positions and Employment:**

1990-93 Senior Research Associate, John Innes Centre for Plant Science Research, England.
 1993-99 Assistant Professor, Department of Biological Sciences, Purdue University, West Lafayette, IN
 1999-03 Associate Professor, Department of Biological Sciences, Purdue University, West Lafayette, IN
 2000-2005 University Faculty Scholar, Purdue University, West Lafayette, IN
 2003— Professor, Department of Biological Sciences, Purdue University, West Lafayette, IN

Other Experience and Professional Memberships:

American Society for Cell Biology; American Society of Plant Biologists; Society for Experimental Biology, UK
 American Society for Biochemistry and Molecular Biology (ASBMB).

Honors and Awards

Teaching for Tomorrow Award, Purdue Univ. (1998)
 University Faculty Scholar, Purdue Univ. (2000-2005)
 Alexander von Humboldt Fellow, Bonn, Germany (2001)

Professional Activities

Reviewer of the following journals: Science, J. Cell Biol., Nature Cell Biol., Proc. Natl. Acad. Sci., J. Cell
 Science, Plant Cell, Plant Journal, Developmental Genetics, Planta, Protoplasma, Cell Motil. Cytosk., J.
 Biol. Chemistry, Plant Mol. Biol., Plant Physiology, Genetics, Mol. Biol. Cell, and J. Exp. Botany.
Ad hoc reviewer of grants for the following agencies: USDA-NRICGP, NSF, DOE, Samuel Roberts Noble
 Foundation, and BBSRC (UK).
 Panel member, Department of Energy-Energy Biosciences Division, 1995.
 Panel member, USDA-NRICGP, 1996, 1998, 2000, 2004
 Co-Editor, Protoplasma: An International Journal for Cell Biology, 1999–2003
 Faculty of 1000, Plant Cell Biology Section, 2000-2005
 Co-Editor, The Plant Cell, 2005—
 Editorial Board Member, Plant and Cell Physiology, 2007—

B. Selected publications, since 2000, of 69 total

Kovar, D.R., B.K. Drøbak, and C.J. Staiger. 2000. Maize profilin isoforms are functionally distinct. *Plant Cell* 12: 583-598
 Kovar, D.R., C.J. Staiger, E.A. Weaver, and D.W. McCurdy. 2000. AtFim1 is an actin filament cross-linking protein from *Arabidopsis thaliana*. *Plant Journal* 24: 625-636
 Hu, S., S.R. Brady, D.R. Kovar, C.J. Staiger, G.B. Clark, S.J. Roux, and G.K. Muday. 2000. Identification of plant actin-binding proteins by F-actin affinity chromatography. *Plant Journal* 24: 127-137

Principal Investigator/Program Director (Last, First, Middle): Staiger, Christopher J.

- Staiger, C.J., F. Baluska, D. Volkmann, and P. Barlow (editors). 2000. Actin: A dynamic framework for multiple plant cell functions. Kluwer Academic Publishers, Dordrecht, The Netherlands, 659 pp.
- Staiger, C.J. 2000. Signaling to the actin cytoskeleton in plants. *Annu. Rev. Plant Physiol. Plant Mol. Biol.* 51: 257-288.
- Kovar, D.R., B.C. Gibbon, D.W. McCurdy, and C.J. Staiger. 2001. Fluorescently-labeled fimbrin decorates a dynamic actin filament network in live plant cells. *Planta* 213: 390-395
- Kovar, D.R., B.K. Drøbak, D.A. Collings, and C.J. Staiger. 2001. The characterization of ligand-specific maize (*Zea mays*) profilin mutants. *Biochemical J.* 358: 49-57
- Bruno, K.S., J.L. Morrell, J.E. Hamer, and C.J. Staiger. 2001. SEPH, a Cdc7p orthologue from *Aspergillus nidulans*, functions upstream of actin ring formation during cytokinesis. *Mol. Microbiol.* 42: 3-12
- Kovar, D.R., P. Yang, W. S. Sale, B.K. Drøbak, and C.J. Staiger. 2001. *Chlamydomonas reinhardtii* produces a profilin with unusual biochemical properties. *J. Cell Sci.* 114: 4293-4305
- Snowman, B.N., D.R. Kovar, G. Shevchenko, V.E. Franklin-Tong, and C.J. Staiger. 2002. Signal-mediated depolymerization of actin in pollen during the self-incompatibility response. *Plant Cell*, 14: 2613-2626
- McGough, A., C.J. Staiger, J.K. Min, and K. Simonetti 2003. The gelsolin family of actin regulatory proteins: Modular structures, versatile functions. *FEBS Lett.* 552: 75-81
- Staiger, C.J. and V.E. Franklin-Tong 2003. The actin cytoskeleton is a target of the self-incompatibility response in *Papaver rhoeas*. *J. Exp. Bot.* 54: 103-113
- Huang, S., D.R. Kovar, L. Blanchoin, and C.J. Staiger. 2003. *Arabidopsis* capping protein (AtCP) is a heterodimer that regulates assembly at the barbed ends of actin filaments. *J. Biol. Chem.*, 278: 44832-44842
- Huang, S., L. Blanchoin, F. Chaudhry, V.E. Franklin-Tong, and C.J. Staiger. 2004. A gelsolin-like protein from *Papaver rhoeas* pollen (PrABP80) stimulates calcium-regulated severing and depolymerization of actin filaments. *J. Biol. Chem.*, 279: 23364-23375
- Klein, M.G., W. Shi, U. Ramagopal, Y. Tseng, D. Wirtz, D.R. Kovar, C.J. Staiger, and S.C. Almo. 2004. Structure of the actin crosslinking core of fimbrin. *Structure*, 12: 999-1013
- Drøbak, B.K., V.E. Franklin-Tong, and C.J. Staiger. 2004. Tansley Review: The role of the actin cytoskeleton in plant cell signaling. *New Phytol.* 163: 13-30
- Staiger, C.J., and P.J. Hussey. 2004. Actin and actin-modulating proteins. In P.J. Hussey (ed.) *The Plant Cytoskeleton in Cell Differentiation and Development*. Blackwell Publishing, Sheffield, UK., 32-80.
- Park, G., K.S. Bruno, C.J. Staiger, N.J. Talbot, and J.-R. Xu 2004. Independent genetic mechanisms mediate turgor generation and penetration peg formation during plant infection in the rice blast fungus. *Mol. Microbiol.* 53: 1695-1707
- Fan, X., J. Hou, X. Chen, F. Chaudhry, C.J. Staiger, and H. Ren. 2004. Identification and characterization of a Ca²⁺-dependent actin-filament severing protein from lily pollen. *Plant Physiol.* 136: 3979-3989.
- Sheahan, M.B., C.J. Staiger, R.J. Rose, and D.W. McCurdy 2004. A green fluorescent protein fusion to actin-binding domain 2 of *Arabidopsis* fimbrin highlights new features of a dynamic actin cytoskeleton in live plant cells. *Plant Physiol.* 136: 3968-3978.
- Preuss, M.L., D.R. Kovar, Y.-R. J. Lee, C.J. Staiger, D.P. Delmer, and B. Liu. 2004. A plant-specific kinesin binds to actin microfilaments and interacts with cortical microtubules in cotton fibers. *Plant Physiol.* 136: 3945-3955.
- Basu, D., J. Le, S. E-D. El-Assal, S. Huang, C. Zhang, E.M. Mallery, G. Koliantz, C.J. Staiger, and D.B. Szymanski. 2005. DISTORTED3/SCAR2 is a putative *Arabidopsis* WAVE complex subunit that activates actin-related protein 2/3 and is required for epidermal morphogenesis. *Plant Cell* 17: 502-524
- Huang, S., R.C. Robinson, L.Y. Gao, T. Matsumoto, A. Brunet, L. Blanchoin, and C.J. Staiger. 2005. *Arabidopsis* VILLIN1 generates actin filament cables that are resistant to depolymerization. *Plant Cell* 17: 486-501
- Michelot, A., C. Guérin, S. Huang, M. Ingouff, S. Richard, N. Rodiuc, C.J. Staiger, and L. Blanchoin. 2005. The formin homology 1 domain modulates the actin nucleation and bundling activity of *Arabidopsis* FORMIN1. *Plant Cell* 17: 2296-2313
- Yokota, E., M. Tominaga, I. Mabuchi, Y. Tsuji, C.J. Staiger, K. Oiwa, T. Shimmen. 2005. Plant villin, P-135-ABP, possesses G-actin binding activity and accelerates the polymerization and depolymerization of actin in a Ca²⁺-sensitive manner. *Plant Cell Physiol.* 46: 1690-1703
- Thomas, S.G., S. Huang, C.J. Staiger, and V.E. Franklin-Tong. 2005. Signals and targets triggered by self-incompatibility in plants: recognition of "self" can be deadly. In "Communication in plants—neuronal aspects of plant life", F. Baluska, S. Mancuso, D. Volkmann eds. Heidelberg, Springer.

Principal Investigator/Program Director (Last, First, Middle): Staiger, Christopher J.

Yong, W., B. Link, R. O'Malley, J. Tewari, C.T. Hunter, C.-A. Lu, X. Li, A.B. Bleecker, K.E. Koch, M.C. McCann, D.R. McCarty, S.E. Patterson, W.-D. Reiter, C. Staiger, S. R. Thomas, W. Vermerris, and N.C. Carpita 2005. Genomics of plant cell wall biogenesis. *Planta* 221: 747-751

Huang, S., L. Gao, L. Blanchoin, and C.J. Staiger. 2006. Heterodimeric capping protein from Arabidopsis is regulated by phosphatidic acid. *Molecular Biology of the Cell* 17: 1946-1958

Thomas, S.G., S. Huang, S. Li, C.J. Staiger, and V.E. Franklin-Tong. 2006. Actin depolymerization is sufficient to induce programmed cell death in self-incompatible pollen. *Journal of Cell Biology* 174: 221-229

Abu-Abied, M., L. Golomb, E. Belausov, S. Huang, B. Geiger, Z. Kam, C.J. Staiger, and E. Sadot. 2006. Identification of plant cytoskeleton-interacting proteins by screening for actin stress fiber association in mammalian fibroblasts. *Plant J.* 48: 367-379

Michelot, A., E. Derivery, R. Paterski-Boujema, C. Guérin, S. Huang, F. Parcy, C.J. Staiger and L. Blanchoin. 2006. A novel mechanism for the formation of actin-filament bundles by a non-processive formin. *Current Biology* 16: 1924-1930

Staiger, C.J. and L. Blanchoin. 2006. Actin dynamics: old friends with new stories. *Current Opinion in Plant Biology*, 9: 554-562

Michelot, A., J. Berro, C. Guérin, R. Boujemaa-Patersky, C.J. Staiger, J.-L. Martiel, and L. Blanchoin. 2007. Stochastic dynamics of individual actin filaments mediated by ADF/cofilin. *Current Biology* 17: 825-833

Chaudhry, F., C. Guérin, M. von Witsch, L. Blanchoin, and C.J. Staiger. 2007. Identification of *Arabidopsis* cyclase-associated protein 1 as the first nucleotide-exchange factor for plant actin. *Mol. Biol. Cell* 18: 3002-3014

C. Research Support

Ongoing Research Support

Staiger (PI) 5/2004-5/2007

DOE-Energy Biosciences (DE-FG02-04-ER15526)

Regulation of actin dynamics at filament ends: the role of actin-binding proteins.

This study characterizes the properties of Arabidopsis capping protein and pollen gelsolin from poppy.

Carpita (PI) 9/2002-8/2007

NSF, Plant Genome (0217552-DBI)

Identification and characterization of cell wall mutants in maize and arabidopsis using novel spectroscopies.

Role: Co-PI

Staiger's role in this project is to perform cytological analysis on various cell wall mutants.

Gelvin (PI) 9/2004-8/2007

NSF-Arabidopsis 2010 Project

Bimolecular fluorescence complementation (BMFC) to investigate protein-protein interactions in planta.

Role: Co-PI

Staiger's role in this project is to assist with fluorescence microscopy and to generate half-YFP cDNA libraries.

Staiger (PI) 5/2007-5/2010

DOE-Energy Biosciences (DE-FG02-04-ER15526)

Regulation of actin dynamics at filament ends: the role of capping protein in plant growth and lipid signaling.

This study characterizes CP-interacting proteins, lipid interactions, and analyzes the phenotypes of homozygous mutant plants.

Staiger (co-PI) 8/2007-7/2010

BARD

Studies of novel cytoskeletal regulatory proteins that are involved in abiotic stress signaling.

Staiger's role is to set up *in vitro* motility assays to examine the regulation of myosin motor activity by novel regulatory light chains, and to perform biochemical & biophysical measurements on plant actin-binding proteins.

Completed Research Support (in the past 3 years)

Staiger (PI) 4/2002-3/2006

NSF (0130576-MCB)

Molecular Genetic and Biochemical Characterization of the Fimbrin Gene Family from Arabidopsis thaliana

This study examines the function of multigene family for an actin-bundling protein.

Staiger (PI) 9/2002-9/2006

USDA-NRICGP (02-35304-12412)

Analysis of profilin-interacting proteins from plants.

This study uses biochemical approaches to identify ligands and binding partners of the G-actin binding protein profilin.

Sadot (PI) Volcani Institute, Israel 11/2003-4/2005

BARD (IS-3460-03)

Pilot Study: A functional genomic screen for new cytoskeletal proteins and the determination of their role in actin-mediated functions and guard cells regulation.

Role: Co-PI

Staiger's role in this project is to characterize the biochemical properties of putative actin-binding proteins.

Carpita (PI) 2004-2005

NSF-REU

Identification and characterization of cell wall mutants by FTIR and NIR spectroscopies.

Role: Co-PI

D. Training of Junior Scientists

1. Graduate Students; 7 Previous, 1 Current

Sharon L. Ashworth, Ph.D. awarded 5/98 (currently Research Scientist, IU Med. School)

Thesis title: *Characterization of the actin depolymerizing factor, AtADF1, from Arabidopsis thaliana*

Bryan C. Gibbon, Ph.D. awarded 12/99 (currently Post-doc at Univ. Arizona, Larkins lab)

Thesis title: *The role of profilin in maize pollen growth and development*

David R. Kovar, Ph.D. awarded 5/01 (currently Asst. Professor, University of Chicago)

Thesis title: *The characterization of plant actin-binding proteins*

Ken Bruno, Ph.D. awarded 5/03 (currently Res. Scientist, Pacific National Labs)

Thesis title:

Lisa Y. Gao, M.Sc. awarded 12/04 (currently employed at Genentech)

Thesis title: *Biochemical analysis of the Arabidopsis fimbrin gene family*

Faisal A. Chaudhry, M.Sc. awarded 8/05 (currently Ph.D. student in BIOL SCI, McCann Lab)

Thesis title: *Biochemical analysis of Arabidopsis thaliana cyclase-associated protein (AtCAP)*

Preethi Chander, Ph.D. awarded 12/06 (student of Janet Smith)

Thesis title: *Structural analysis of the regulatory protein of pyrimidine biosynthesis, PyrR*

Parul Khurana, Ph.D. candidate, Biol. Sci.

2. Post-doctoral Research Scientists: 11 Previous, 1 Current

Dr. Ming Yuan '94-'95 (currently Professor, China Agriculture University)

Dr. Haiyun Ren '95-'97 (currently Assoc. Professor, Beijing Normal University)

Dr. Laura Zonia '95-'97 (currently Research Associate, University of Amsterdam)

Dr. David C. Collings '99-'01 (currently Research Associate, Australian Natl. Univ.)

Principal Investigator/Program Director (Last, First, Middle): **Staiger, Christopher J.**

Dr. Matthias von Witsch '00-'01 (currently Scientific Advisor, German Ministry of Research & Education)

Dr. Tracie Matsumoto '01-'02 (currently Research Horticulturist USDA-ARS Pacific Basin Agricultural Research Center Hilo, Hawaii)

Dr. Kristen Lennon '02-'04

Dr. Sathish Kasina '05 (currently Post-doc Michigan State University)

Dr. Baruch Zimmerman '05 (currently employed in corporate setting, Israel)

Dr. Shanjin Huang '01-'06 (currently group leader, CAS-Beijing, Institute of Botany)

Dr. Songya Lu '05-'06 (currently Asst. Professor, Wuhan Univ. China)

Dr. Xia Wang '07—