

## Dr Geoff Hyde

### Academic Address:

National Centre for Biological Sciences  
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### Date of Birth:

October 8 1954.

### Nationality:

Australian

### Academic Qualifications:

#### 1984-1987

B.Sc. Honours (First Class), University of Sydney.  
Thesis: Spatial Organisation and Orientation of *Mougeotia* Protoplasts.

#### 1988-1991

Ph.D., Plant Cell Biology Group, Research School of Biological Sciences,  
Australian National University, Canberra.  
Thesis: The Structural Basis of Zoospore Formation in *Phytophthora*.

### Academic Career History

#### 2005 (June) - Present

Convenor, Scientific Communication Module, NCBS, Bangalore.

#### 1996 (June) – 2006 (Feb)

Lecturer, School of Biological, Earth and Environmental Sciences,  
University of New South Wales, Sydney

#### 1995 - June 1996

Australian Research Council Post-Doctoral Fellow.  
School of Biological Sciences, UNSW.

#### 1994 (July) - 1994 (Dec)

Post-Doctoral Research Fellow, Biology Dept,  
York University, Ontario.

#### 1992 (June) - 1994 (June)

Natural Sciences and Engineering Research Council of Canada  
International Post-Doctoral Fellow, Biology Dept., York University,  
Ontario.

#### 1992 (Jan-Apr)

Research Assistant Plant Cell Biology Group, Australian National  
University.

## Prizes, Scholarships, Fellowships

**E.N. O'Reilly Prize** for Plant Physiology, 1986. Univ. Sydney.  
**Ilma Brewer Prize** for Botany, 1987. Univ. Sydney.  
**Commonwealth Postgraduate Research Award**, 1988-91, \$13,000 annually.  
**David Goodchild Award** (Australian Society for Electron Microscopy), 1992.  
**Young Scientist Award** (The Australian and New Zealand Society for Cell Biology), 1992.  
**Natural Sciences and Engineering Research Council International Fellowship** (Canada), 1992-94, \$32,000 annually.  
**Australian Research Council Post-Doctoral Fellowship** 1995-1996. \$50,000 annually  
**UNSW Vice-Chancellors Post-Doctoral Fellowship** 1995-declined

## Grants

Department of Industries, Trade and Commerce Cooperative Research Grant (Australia), 1990, \$3,700.  
UNSW Infrastructure Grant (with Anne Ashford), 1995, \$27,000.  
Small ARC Grant 1996-1997. \$10,000 per annum.  
Small ARC Grant 1998. \$17,000.  
Large ARC Grant (with Anne Ashford) 1999-2001 \$300,000.  
Small ARC Grant 1999. \$15,000.  
UNSW Research Support Grant 2001 \$20,000  
Large ARC Grant (with Anne Ashford) 2001-2003 \$276,000.  
UNSW Research Support Grant 2003 \$9,000.  
UNSW Faculty Research Support Grant 2004 \$15,918.

## Academic Focus

### Post-2005

At NCBS I have been running a Scientific Communications module for postgraduate students and academic staff. The main emphasis has been on improving students' skills in the writing of scientific manuscripts. I have been developing a new approach to scientific writing, based on my observation that the central weakness of most poor writers is their inability to construct a sound argument. Since both the Discussion and Introduction of a scientific paper are primarily argumentative (and present the greatest difficulties), students must be able to argue effectively if their papers are to be received well.

Using the argument mapping software, *Rationale*, students learn the basics of argument construction before they proceed to convert the argument into written text. By separating the two activities, i.e. argument construction and packaging of the argument, students are not overwhelmed by excessive demands on their

attention, and improve rapidly. Students are also encouraged to present their argument map to their research supervisor prior to starting on the more traditional drafting stage. Visual presentation makes it easier for the supervisor to assess the argument's soundness, and this results in a much more efficient revision process.

### **Pre-2005**

My scientific research mainly focussed on fungal cell structure, and its control by the cytoskeleton and other spatial regulators. It was distinguished both by the application of then-recent microscopical developments and by the number of conceptual advances thus made possible. At ANU, a large body of work pioneered the use of cryofixation and immunocytochemistry in the study of fungal cell division and concurrent organelle redistributions. The results led to a major revision of models of cytokinesis not only for spore-forming fungi, but also for many protists. In Canada, as an NSERC PDF, I developed protocols that allowed the most definitive study to that time of the hyphal  $\text{Ca}^{2+}$  gradient and its role in growth regulation. Back in Australia at UNSW, I adapted my live cell imaging skills to the study of vacuole motility in fungal hyphae, and together with Ashford and co-workers, my results made this a pre-eminent model system of fungal (and general) endomembrane biology. Recognition of the importance of this work is evidenced by the invitation to co-author a chapter for the definitive multi-volume treatise of fungal biology, *The Mycota*.

## PUBLICATIONS

### Refereed papers as joint author

1. White, RG, Hyde, GJ and Overall, RL. (1990). Microtubule arrays in regenerating *Mougeotia* protoplasts may be oriented by electric fields. *Protoplasma*, 158, 73-85.
2. Hyde, GJ, Gubler, F and Hardham, AR. (1991). Ultrastructure of zoosporogenesis in *Phytophthora cinnamomi*. *Mycological Research*, 95, 577-591.
3. Hyde, GJ, Hardham, AR, Lancelle, SA and Hepler, PK. (1991). Freeze substitution reveals a new model for sporangial cleavage in *Phytophthora*, a result with implications for cytokinesis in other eukaryotes. *Journal of Cell Science*, 100, 735-746.
4. Hyde, GJ, Hardham, AR, Lancelle, SA and Hepler, PK. (1991). Sporangial structure in *Phytophthora* is disrupted after high pressure freezing. *Protoplasma*, 165, 203-208.
5. Hyde, GJ and Hardham, AR (1992). Confocal microscopy of microtubule arrays in cryosectioned sporangia of *Phytophthora cinnamomi*. *Experimental Mycology*, 16, 207-218.
6. Hyde, GJ, Hepler, PK, Gubler, F, Lancelle, SA and Hardham, AR. (1993). Electron microscopic approaches to the study of zoospore formation in *Phytophthora*. *Journal of Computer-Assisted Microscopy*, 5, 37-41.
7. Hyde, GJ and Hardham, AR. (1993). Microtubules regulate the generation of polarity in zoospores of *Phytophthora cinnamomi*. *European Journal of Cell Biology*, 62, 75-85.
8. Galway, ME, Hyde, GJ and Hardham, AR. (1994). Capacity for microtubule reorganization and cell wall synthesis in cytoplasts of the green alga *Mougeotia*. *Protoplasma*, 178, 11-17.
9. Hardham AR, Cahill DM, Cope M, Gabor BK, Gubler F, Hyde GJ. (1994). Cell surface antigens of *Phytophthora* spores: biological and antigenic characterization. *Protoplasma* 181, 213-232.
10. Hyde GJ, Heath IB. (1995). Ca<sup>2+</sup> dependent polarization of axis establishment in the tip-growing fungus, *Saprolegnia ferax*, by gradients of the ionophore A23187. *European Journal of Cell Biology*, 67, 356-362.
11. Levina NN, Lew, R, Hyde GJ, Heath IB. (1995) Roles of Ca<sup>2+</sup> and plasma membrane Ca<sup>2+</sup> channels in hyphal tip growth of *Neurospora crassa*. *Journal of Cell Science* 108, 3405-3417.

12. Hyde GJ, Heath IB. (1997). Ca<sup>2+</sup> gradients in hyphae and branches of *Saprolegnia ferax*. *Fungal Genetics and Biology* 21, 238-251.
13. Hyde GJ, Cole LC, Ashford AE. (1997). Mycorrhiza movies. *Mycorrhiza* 7, 167-169.
14. Hyde GJ. (1998). Calcium Imaging: A primer for mycologists. *Fungal Genetics and Biology* 24, 14-23.
15. Ashford AE, Hyde GJ (1997). Accumulation and transfer of phosphorus compounds in vacuoles of the eucalypt mycorrhizal associate *Pisolithus tinctorius*. *Noticero de Biologia* 5, 87.
16. Hyde GJ, Davies D, Perasso L, Ashford AE. (1999). Anti-microtubule but not anti-actin drugs eliminate tubule formation by vacuoles of *Pisolithus tinctorius* hyphae. *Cell Motility and the Cytoskeleton* 42, 114-124.
17. Cole L, Davies D, Hyde G, Ashford AE (2000). ER-Tracker dye and BODIPY-brefeldin A differentiate the endoplasmic reticulum and Golgi bodies from the tubular-vacuole system in living hyphae of *Pisolithus tinctorius*. *Journal of Microscopy* 197, 239-248.
18. Cole L, Davies D, Hyde GJ, Ashford AE. (2000). Brefeldin A affects the endoplasmic reticulum, Golgi bodies, the tubular-vacuole system and the secretory pathway in *Pisolithus tinctorius* hyphae. *Fungal Genetics and Biology*, 29, 95-106.
19. Cole L, Davies D, Hyde GJ, and Ashford AE. (2000). Brefeldin A affects radial growth, the endoplasmic reticulum, Golgi Bodies, the tubular vacuole system and the secretory pathway of *Pisolithus tinctorius*. *Fungal Genetics and Biology*. 29, 95-106.
20. Hyde GJ, Davies D, Cole L, Ashford AE. (2002). Regulators of GTP-binding proteins cause morphological changes in the vacuole system of the filamentous fungus *Pisolithus tinctorius*. *Cell Motility and the Cytoskeleton*, 51, 133-146.
21. Hyde GJ, Davies D, Cole L, Ashford AE. (2003). Retention of fluorescent probes during aldehyde-free anhydrous freeze-substitution. *Journal of Microscopy*. 210. 125-130.
22. Okawa, C., Bonser, SP, Hyde, GJ.(2006) Measuring the structural efficiency of tree canopies. Submitted to *Tree Structure and Function*

## Chapters in Books

23. Galway, ME, Heckman, Jr, JW, Hyde, GJ and Fowke, LC. (1995). Advances in high pressure and freeze fixation. *Methods in Cell Biology*, Eds. DW Galbraith, DP Bouque and HJ Bohnert. Academic Press, N.Y.
24. Hardham AR, Hyde GJ. (1995). Zoosporogenesis in the Oomycetes. In *Advances in Botanical Research*. Eds. JH Andrews, IC Tommerup Vol 24. pp 353-398. Academic Press. San Diego
25. Ashford AE, Hyde GJ, Cole L. (2001) Motile Tubular Vacuole Systems (Invited Chapter, *The Mycota*, Eds: RJ Howard, R.J.; NAR Gow. Vol VIII, Springer Verlag).

## Conference Organisation

- Organiser and chair** of Symposium, "Ions - regulators of fungal cells?", Fifth International Mycology Congress, Vancouver, Canada, 1994.
- Organiser and chair** of Symposium, "Determinants of spatial organisation in plant and fungal cells", Thirty-ninth Annual Meeting of The Australian Society of Plant Physiologists, Sydney, Australia. 1995.
- Organiser** : 10<sup>th</sup> Annual Meeting of the Australian Plant and Fungal Cell and Developmental Biology Group, Kioloa. Australia, 2004.

## Invited Talks:

1. The structural basis of zoosporogenesis in *Phytophthora*. Institute of Plant Biology, University of Zurich, Zurich, Switzerland (1992).
2. Cytokinesis in *Phytophthora* studied by chemical fixation, plunge-freezing and high-pressure freezing. Institute for Cell Biology, ETH, Zurich, Switzerland (1992).
3. The structural basis of zoosporogenesis in *Phytophthora*. Institute for Plant Physiology, University of Salzburg, Salzburg, Austria(1992).
4. Fungal zoosporogenesis. Biology Department, York University, Toronto. Canada(1992).
5. A place for everything : spatial organisation in fungal cells. Department of Biology, University of Guelph, Canada (1993).
6. Killer fungi from Down Under. Toronto Mycological Society, (1994).
7. A23187 polarizes axis establishment in *Saprolegnia ferax*. Fifth International Mycology Congress, Vancouver, Canada. (1994)
8. Living in a polarised world: how cells cope. University of New South Wales (1995).
9. Scientific writing: meeting reader's expectations. Univ.of Western Sydney (1996).
10. Scientific writing: meeting reader's expectations. University of Sydney (1997).
11. Vacuoles of filamentous fungi. University of Sydney (2004).
12. Vacuoles of filamentous fungi. University of NSW (2004).

## TEACHING

### Course Convenor

**Scientific Communications Module:** for Postgraduate students  
NCBS, Bangalore.

### Course Co-ordinator

**Plant Ecosystem Processes** (3<sup>rd</sup> Year UG) 1997-2004. UNSW, Sydney.  
**Australian Wildlife Biology** (General Education) 1999-2005. UNSW, Sydney.  
**Botany for Landscape Architects**, (1st Year UG) 1996-1999. UNSW, Sydney.

### Significant Teaching Contributions (as a Lecturer)

**Ecology for Environmental Managers** (Masters Degree) 2000-2003.  
**Plant Ecosystem Processes** (3<sup>rd</sup> Year UG) 1996-2004. UNSW, Sydney.  
**Environmental Microbiology** (3<sup>rd</sup> Year UG) 2000-2004. UNSW, Sydney.  
**Cell and Developmental Biology** (3<sup>rd</sup> Year UG) 1995. UNSW, Sydney.  
**Professional Skills** (4<sup>th</sup> Year UG, and PG) 1996-2004. UNSW, Sydney.  
**Scientific Writing** (4<sup>th</sup> Year UG, and PG) 1996-1999. Univ. of Western Sydney.  
**Evolutionary and Functional Biology** (1st Year UG) 1996-2004. UNSW, Sydney.  
**Australian Wildlife Biology** (General Education) 1996-2005. UNSW, Sydney.  
**Botany for Landscape Architects** (1st Year UG) 1996-2000. UNSW, Sydney.  
**Horticulture** (1st Year UG) 2000-2003. UNSW, Sydney.  
**Molecules, Cells and Genes** (1st Year UG) 2004. UNSW, Sydney.  
**Advanced Science** (1st Year UG) 1999-2002. UNSW, Sydney.  
**Australian Ecosystems** (Vacation Course, OS Students). 1996-1998. UNSW.

### ADMINISTRATIVE DUTIES:

Library Liaison Officer, BEES, UNSW, 1998-2004.  
Student Grievance Officer, BEES, UNSW, 2003-2004.

### MEMBERSHIP OF SOCIETIES AND DUTIES

The Australian and New Zealand Society for Cell Biology  
Australian Society for Plant Biology  
Cell Biology Discipline Representative for ASPP (2003-04).

**Journal Duties:**

Protoplasma (Editor)

Canadian Journal of Botany (Reviewing)

Physiologia Plantarum (Reviewing)

Fungal Genetics and Biology (Reviewing)