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Education

1978	B.Sc.	Biochemistry & Microbiology, University of Adelaide, Australia.
1979	Honours (1st Class)	Biochemistry: <i>The Vertebrate Histone Gene Cluster</i> University of Adelaide, Australia.
1986	Ph.D.	Biochemistry: <i>Isolation of Human Collagen Genes</i> University of Adelaide, Australia.

Professional Experience

2002 – present	<i>Rothamsted International Fellow</i> , IACR-Rothamsted, Harpenden, UK
January, 2001	<i>Researcher-in-Residence</i> , The Santa Fe Institute, Santa Fe NM
2000 – present	<i>Advisory Board Member</i> , Bioinformatics Research Center, NCSU
2000 – present	<i>Associate-Director</i> , Center for the Biology of Nematode Parasitism, NCSU
1999 – present	<i>Science Advisory Board Member</i> , Divergence Inc. St. Louis, MO
1998 – present	<i>Science Advisory Board Member</i> , CALS Genome Research Lab, NCSU
1997 – present	<i>Associate Professor</i> , Department of Plant Pathology, NCSU
1995 – 1997	<i>Visiting Assistant Professor</i> , Department of Plant Pathology, NCSU
1987 – 1995	<i>Assistant Professor</i> , Dept. Nematology, University of California, Riverside
1984 – 1987	<i>Postdoctoral Fellow</i> , Div. Biol. Sciences, University of Missouri, Columbia

Brief Biography

David Bird was born in the “Riverland” wine-producing district of Australia in 1958, and grew up in Adelaide, South Australia. He received a BS in Biochemistry and Microbiology, and was awarded 1st Class Honours for a thesis employing RFLPs to establish a molecular phylogeny of vertebrates (*The Vertebrate Histone Gene Cluster*). In 1984 he completed a PhD in Biochemistry for sequencing human connective tissue disease genes (*Isolation of Human Collagen Genes*), and that same year accepted a Post-doctoral fellowship with Dr. Don Riddle at the University of Missouri-Columbia. At UM-C, Bird utilized genomic approaches of contig assembly and shotgun sequencing to localize genetically-characterized genes in the model nematode *C. elegans*, and was amongst the first investigators to establish a relationship between cuticle proteins and nematode morphology. Bird moved to the University of California-Riverside in 1987 as an Assistant Professor of Nematology, and in 1995 joined the Department of Plant Pathology at NCSU, where he is currently an Associate Professor. In 2002, he accepted an additional appointment at Rothamsted Experiment Station in England. Together with Dr. Charles Opperman, Bird conceived the Center for the Biology of Nematode Parasitism, which is scheduled to begin operations in mid-2002.

Bird has broad research interests, and his recent publications document research on free-living and parasitic nematodes and their hosts, and various other parasites, including a causative agent of malaria (*P. falciparum*). His interests span nematode biology and development; structure-function relationships; host-parasite interactions; evolution of parasitism; host responses and

resistance/susceptibility to pathogens; host-parasite signaling, and eco-genomics. Over the years, his research has gradually shifted from studies of vertebrates, to invertebrates, to plants, and increasingly to multi-trophic interactions. His current program emphasizes cellular and genomic approaches to understand the molecular basis of nematode-plant interaction, using root-knot nematode (*Meloidogyne* spp.) as a model. He has identified large suites of tomato genes that are nematode-responsive, and his group is establishing the regulatory networks that functionally link these genes in the context of the host-parasite interaction. He also is interested in basic questions of nematode biology, development, and the evolution of parasitism, and initiated a *Meloidogyne* EST sequencing project as a prelude to a complete genome sequence. This project brings together a multi-institutional group (NCSU, the Genome Sequencing Center at Washington University, UNC at Chapel Hill, and the Santa Fe Institute) for a functional genomic dissection of the nematode plant interaction, the evolution of parasitism, and the ecology of nematodes and their hosts.

Since 1987, Bird has been awarded more than nine million dollars in extramural grant funds, and he has published numerous papers and chapters. In 1996 Bird was named the Stoll-Stunkard Memorial Lecturer by the American Society of Parasitologists and also delivered the Keynote Address of the Keystone Symposium on Molecular Helminthology. Bird is a founder and Science Advisory Board member of the Genome Research Laboratory at NCSU, and serves as an Advisory Board Member for the Bioinformatics Research Center at NCSU. He is a founding and active participant in the Interdepartmental Genomic Sciences graduate program, and a Biotechnology Faculty member. Bird also serves on the Science Advisory Board of Divergence Inc.

Recognition and Awards

“Researchers Race Clock to Find Safer Nematode Solution” highlights efforts in the Bird and Opperman labs using genomics tools to understand tri-trophic interactions of nematodes in the rhizosphere. 2002. *Results II* (1):5 [*Results* is the NCSU publication on Research and Graduate Studies].

The meeting report “Notes from the Underground. Communication and Control in the Rhizosphere” by D.R. Strong and D.A. Phillips highlighted Bird’s root-knot nematode EST project, and his models of horizontal gene transfer. 2001. *Plant Physiology* 127:727-730.

Research Update “Ecologists and Molecular Biologists find common ground in the rhizosphere” by F. F. Denison highlighted Bird’s work on model systems to understand rhizosphere interactions. 2001. *Trends in Ecology and Evolution* 16:535-536.

The Bird group’s research on *in situ* localization of mRNAs in plant tissues was highlighted by the News and Reviews Editor as part of a report on “The new biology: Genomics fosters a systems approach and collaborations between academic, government and industry scientists.” 2001. *The Plant Cell* 13:725-732.

Bird’s research on genomics of plant-parasitic nematodes was highlighted in an article entitled “Parasite Paradise.” 2000. *The Scientist* 14:21.

Bird’s research on *in situ* localization of mRNAs in plant tissues, including nematode feeding sites, was highlighted by the Editor-in-Chief in a full-page announcement of this “Breakthrough Technology.” 2000. *Plant Physiology* 123(4):i.

Bird’s research on isolation of nematode-responsive genes was the subject of an article entitled “Genetic alterations may stop nematodes.” *Industrial Bioprocessing* is targeted to the biotechnology industry, and highlights new research advances with practical application. 1997. *Industrial Bioprocessing* 19:10.

Editorial article by D. Tagu and S.J. Barker “At the root of mycorrhizal symbiosis” reported on work from the Bird lab which showed overlapping patterns of host gene expression following root-knot nematode and VA mycorrhizal invasion. 1997. *Trends in Plant Sciences* 2:2-3.

Bird named the *Stoll-Stunkard Memorial Lecturer* by the American Society of Parasitologists, 1996. This award, in honor of the founders of the Society, is the highest award given for active research.

Bird awarded *University of California Regents Faculty Fellowship*, 1988.
Bird awarded *The George Murray Overseas Travel Scholarship*, 1984.
Bird awarded *Commonwealth Postgraduate Research Scholarship*, 1979–83.
Bird awarded *Commonwealth Secondary School Scholarship*, 1972–74.

Professional Society Memberships

American Society of Plant Biologists (nee Physiologists); International Society for Molecular Plant-Microbe Interactions; The Society of Nematologists; European Society of Nematologists; American Association for the Advancement of Science; American Phytopathological Society.

National Committees

Organizer and Session Chair, Symposium, *Nematology*. International Congress of Plant Pathology, Christchurch, NZ, Feb. 2003.

Senior Editor, *Phytopathology*. Responsible for all Biochemistry, Cell Biology and Nematology manuscripts, 1999–present.

Chair (2000), Society of Nematology Plant Resistance to Nematodes Committee 1997–2000; vice-chair: 1999.

Chair (2001), Society of Nematology Honors and Awards Committee 1998–2002; vice-chair: 2000.

Organizer and Session Chair, Symposium on *Parasite Genomics*, Joint Meeting of Society of Nematologists/American Society of Parasitologists, Monterey, CA, July 6–9, 1999.

Associate Editor, *Phytopathology*, 1998–1999.

Organizer and Session Chair, *Workshop on Parasitic Nematodes*, 12th International *C. elegans* Meeting, University of Wisconsin, Madison, WI, June 2–6, 1999.

Associate Editor, *Journal of Nematology*, 1995–1999.

Society of Nematology Representative, *Coalition for Research on Plant Systems (CROPS 99)* Symposium, St. Louis, MO, Nov. 9–11, 1997.

Israel-NC Ag. Biotechnology Workshop, Aug. 27–29, 1995. Representative speaker for *Crop Protection*.

Organizer, USDA regional meeting, *Molecular Genetics of Sedentary Endoparasitic Nematodes*, New Orleans, 12/95.

Chair, Society of Nematology ad hoc Committee: Oversight of plant-parasitic nematode genetic nomenclature, 1994–present.

Co-organizer, Fifth Biannual West Coast *C. elegans* Conference, UCLA, July 8–10, 1994.

Editor: *Advances in Molecular Plant Nematology*. NATO ARW Series, Vol. 268, 309 pp. Plenum Press, New York, NY.

Co-organizer, NATO Advanced Research Workshop, “Advances in Molecular Plant Nematology,” Martina Franca, Italy, Nov. 20–27, 1993.

Chair (1995) and founding member, NCR-172: Molecular Genetics of Host-Parasite Relations Involving Sedentary Endoparasitic Nematodes, 1991–1997.

Chair (1996) and founding member, Society of Nematology Biotechnology Committee; 1988–92, 1994–96, 1998–00.

Member, California Division of Natural/Agricultural Sciences planning group in pest management: Work group: Nematology, 1990.

Member, American Phytopathological Society ad hoc “Plant Pathogen Risk Assessment” Committee, 1987–88.

Recent Publications

- Bird, D. McK. and I. Kaloshian. 2002. Are roots special?: Nematodes have their say. *Physiological and Molecular Plant Pathology* in press.
- McCarter, J. P., Clifton, S. W., Bird, D. McK and R. Waterston. 2002. Nematode gene sequences; Update for March 2002. *Journal of Nematology* in press.
- Hirsch, A. M., Bauer, W. D., Bird, D. McK., Cullimore, J., Tyler, B. and J.I. Yoder. 2002. Molecular signals and receptors—controlling rhizosphere interactions between plants and other organisms: By chance or intent? *Ecology* in press.
- Koltai, H., Dhandaydham, M., Opperman, C., Thomas, J. and D. McK. Bird. 2001. Overlapping plant signal transduction pathways induced by a parasitic-nematode and a rhizobial endosymbiont. *Molecular Plant-Microbe Interactions* 14: 1168-1177.
- Bird, D. McK. and A. F. Bird. 2001. Plant parasitic nematodes. Chapter 8 in: *Parasitic Nematodes: Molecular Biology, Biochemistry and Immunology*, M. W. Kennedy and W. Harnett (Eds), pp139-166. CABI Publishing, Wallingford, UK.
- Opperman, C. H. and D. McK. Bird. 2001. Nematode genetics. *Encyclopedia of Plant Pathology* Maloy, O. C. and T. D. Murray (Eds), pp 696-698. Wiley and Sons, New York.
- McCarter, J., Bird, D., Clifton, S. and R. Waterston. 2000. Nematode gene sequences; Update for December 2000. *Journal of Nematology* 32: 331-333.
- McCarter, J. A., Abad, P., Jones, J and D. McK. Bird. 2000. Rapid gene discovery in plant parasitic nematodes via Expressed Sequence Tags. *Nematology* 2: 719-731.
- Bird, D. McK and H. Koltai. Plant parasitic nematodes: Habitats, hormones and horizontally-acquired genes. 2000. *Journal of Plant Growth Regulation* 19: 183-194.
- Koltai, H. and D. McK. Bird. 2000. High throughput cellular localization of specific plant mRNAs by liquid-phase *in situ* RT-PCR of tissue sections. *Plant Physiology* 123: 1203-1212.
- Koltai, H. and D. McK. Bird. 2000. Epistatic repression of *PHANTASTICA* and class 1 *KNOTTED* genes is uncoupled in tomato. *The Plant Journal* 22: 455-459.
- Bird, D. McK. 2000. Obituary: Alan Francis Bird. *Journal of Nematology* 32: 1-3.
- Bird, D. McK. and M.A. Wilson. 2000. *Nematode-induced genes in tomato*. US Patent #: 6,093,810.

Other Publications of General Interest

- Bird, D. McK., Opperman, C. H., Jones, S. J. M. and D. L. Baillie. 1999. The *Caenorhabditis elegans* genome: A guide in the post genomics age. *Annual Review of Phytopathology* 37: 247-265.
- Bird, D. McK. and C. H. Opperman. 1998. *Caenorhabditis elegans*: A Genetic Guide to Parasitic Nematode Biology. *Journal of Nematology* 30: 299-308.
- Opperman, C. H. and D. McK. Bird. 1998. The soybean cyst nematode, *Heterodera glycines*: a genetic model system for the study of plant-parasitic nematodes. *Current Opinion in Plant Biology* 1: 342-346.
- Blaxter, M. and D. McK. Bird. Parasitic nematodes. 1997. In: *C. elegans* II, D. L. Riddle, T. Blumenthal, B. Meyer and J. Priess (Eds). pp 851-878. Cold Spring Harbor Press, Cold Spring Harbor, NY.
- Bird, D. McK. and M.A. Wilson. 1997. *Nematode-induced genes in tomato*. US Patent #: 5,612,471.
- Bird, D. McK. 1996. Manipulation of host gene expression by root-knot nematodes. *Journal of Parasitology* 82: 881-888.

- Guthrie, N., Bird, D. McK., Crandall, I. and I. W. Sherman. 1995. The adherence of erythrocytes infected with *Plasmodium falciparum* (human malaria) can be mimicked using pfalhesin-coated microspheres. *Cell Adhesion and Communication* 3: 407-417.
- Bird, D. McK. and D. L. Riddle. 1994. A genetic nomenclature for parasitic nematodes. *Journal of Nematology* 26: 138-143.
- Bird, D. McK. and M. A. Wilson. 1994. Plant molecular and cellular responses to nematode infection. In: NATO ARW: Advances in Molecular Plant Nematology, F. Lamberti, C. De Georgi and D. McK. Bird (Eds), pp 181-195. Plenum Press, New York, NY.
- Wilson, M. A., Bird, D. McK. and E. van der Knaap. 1994. A comprehensive subtractive cDNA cloning approach to identify nematode-induced transcript in tomato. *Phytopathology* 84: 299-303.
- Bird, D. McK. 1992. Mechanisms of the *Meloidogyne*-host interaction. In: Nematology: From Molecule to Ecosystem, F. J. Gommers and P. W. Th. Maas (Eds), pp 51-59. ESN Inc., Dundee, Scotland.
- Bird, D. McK. And D. L. Riddle. 1989. Molecular cloning and sequencing of *ama-1*, the gene encoding the largest subunit of *Caenorhabditis elegans* RNA polymerase II. *Molecular and Cellular Biology* 9: 4119-4130.
- von Mende, N., Bird, D. McK., Albert, P. S. and D. L. Riddle. 1988. *dpy-13*: A nematode collagen gene that affects body shape. *Cell* 55: 567-576.

Recent Invited Talks

- Model systems to dissect nematode parasitism: Genomics and cell biology of symbiosis in the rhizosphere.* 8th International Congress of Plant Pathology, Christchurch, New Zealand, February 3-7, 2003.
- Model systems to control nematode parasites: Genomics and cell biology of symbiosis in the root ecosystem.* The Perth Medicago Workshop, Rottnest Island, Australia, November 10-13, 2002.
- Model systems to dissect nematode parasitism: Genomics and cell biology of symbiosis in the rhizosphere.* International conference on Molecular and Cellular Biology of Helminth Parasites, Hydra, Greece, September 15-19, 2002.
- What does a worm want with 20,000 genes? The evolution of parasitism, and the essential-gene conundrum.* American Phytopathological Society, Milwaukee, WI, July 27-31, 2002.
- Model systems to dissect nematode parasitism: Genomics and cell biology of symbiosis in the rhizosphere.* CSIRO Division of Plant Industries, Canberra, Australia. April 30, 2002.
- A model systems approach to nematode parasitism: Genomics and cell biology of symbiosis in the root ecosystem.* The Danforth Center, St. Louis MO, April 16, 2002.
- Root-knot nematodes and rhizobia: Genomics and cell biology of symbiosis in the root ecosystem.* BASF Corp., RTP, NC, March 6, 2002.
- Conversazioni Biochimiche: Genomics and cell biology of symbiosis in the root ecosystem.* Department of Biochemistry and Molecular Biology, University of Bari, Italy, December 10, 2001.
- Root-knot nematodes and rhizobia: Genomics and cell biology of symbiosis in the root ecosystem.* John Innes Centre/Sainsbury Laboratory, Norwich, UK, December 7, 2001.
- Root-knot nematodes and rhizobia: Genomics and cell biology of symbiosis in the root ecosystem.* Department of Biology, NCA&T University, Greensboro, NC, December 3, 2001.
- From Genome to Cells: High throughput localization of gene transcripts in tissue sections.* National Society for Histotechnology Annual Meeting, Charlotte, NC September 25, 2001.
- Model systems to dissect nematode parasitism: Genomics and cell biology of symbiosis in the root ecosystem.* Department of Genetics, NCSU, September 10, 2001.

- Model systems to dissect nematode parasitism: Genomics and cell biology of symbiosis in the root ecosystem.* Department of Biology, Wake Forest University, Winston-Salem, NC, September 5, 2001.
- Model systems to dissect nematode parasitism: Genomics and cell biology of symbiosis in the root ecosystem.* The Plant Science Centre, University of Adelaide, Adelaide, Australia, July 25, 2001.
- Caenorhabditis elegans, a model rhizosphere organism.* Symposium on Rhizosphere control points: Molecules to Food Webs, UC-Davis, Davis CA, June 1–3, 2001.
- Genomics to solve agricultural problems: Nematodes.* Pickle Packers International Conference on 21st Century Technologies for the Pickled Vegetable Industry, Raleigh NC, April 10, 2001.
- Signal transduction in the nematode–plant interaction: genomics meets cell biology.* UC-Riverside seminar series on Genomics/Bioinformatics/Proteomics, Riverside CA, Feb. 12, 2001.
- Genetics, genomics and cell biology of host responses to parasitic nematodes: The power of plants as tractable models.* Keystone Symposium on Molecular Heminthology: An Integrated Approach, Taos NM, Jan. 20–25, 2001.
- Genetic, genomic and cellular approaches to understanding soybean cyst nematode.* Annual joint conference, NC Small Grain, Soybean and Corn Producers Associations, RTP, NC, Jan 16, 2001.
- Signal transduction in the nematode–plant interaction: genomics meets cell biology.* Association of Applied Biologists, Royal Linnean Society, London, England, Dec. 12, 2000.
- Signal transduction in the nematode–plant interaction and the role of horizontal gene transfer: genomics meets cell biology.* The Sanger Center: Wellcome Trust Genome Campus, Cambridge, England, Dec. 11, 2000.
- The biology of nematode parasitism; habitats, hormones and horizontally-acquired genes.* Department of Biology, UNC-Chapel Hill, Nov. 27, 2000.
- The biology of nematode parasitism.* National Science Foundation, Washington DC, Nov. 14, 2000.
- Overlapping plant signal transduction pathways in parasitic-nematode and rhizobial endosymbioses.* Department of Biology, NCA&T University, Greensboro NC Oct. 30, 2000.
- Signal transduction in the nematode–plant interaction: genomics meets cell biology.* Department of Plant Pathology, NCSU, Sept. 25, 2000.
- Genomic analysis of a nematode-plant interaction: A tool to study plant biology.* NSF-Plant Genome Conference, Washington DC, Sept. 21, 2000.
- Are mechanisms of parasitism catholic?* Department of Zoology, NCSU, Sept. 7, 2000.
- Gene expression in nematode feeding sites; parallel development of nodules and knots.* INRA, Toulouse, France, July 31, 2000.
- Phantastically knotted feeding sites: the link between transcription factors and phytohormones in giant cell formation.* Society of Nematologists Meeting, Quebec, Canada, June 26, 2000.
- Functional analysis of gene expression in giant cells.* European Society of Nematologists Meeting, Israel, April 3, 2000.