

## Biographical sketch: Steven Harris

### (a) Professional preparation

#### Undergraduate

University of Windsor, Windsor, ON, Canada      Biology B.Sc.(Hons.)      1983

#### Graduate

University of Windsor, Windsor, ON, Canada      Biology M. Sc.      1986

University of Michigan, Ann Arbor, MI      Biology Ph.D.      1992

#### Post-doctoral

Purdue University, West Lafayette, IN      Fungal genetics      1991-1994

### (b) Appointments

Department of Plant Pathology and Microbiology, and Department of Entomology, Iowa State University

Professor and Chair 2021-current

Department of Biological Sciences, University of Manitoba

Adjunct Professor 2021-current

Professor and Head 2017-2021

Center for Plant Science Innovation and Department of Plant Pathology, University of Nebraska.

Adjunct Professor 2017-current.

Professor 2012-2017.

Associate Professor 2006-2012.

Assistant Professor 2001-2006.

Institute of Microbiology, Chinese Academy of Sciences, Beijing

Visiting Professorship for Senior International Scientists 2013-2014; 2016

Department of Microbiology, University of Connecticut Health Center

Assistant Professor, 1994-2001

### (c) Activities

**Administration:** Chair, Department of Plant Pathology and Microbiology, and Department of Entomology, Iowa State University; Head, Department of Biological Sciences, University of Manitoba

**Teaching:** Design and implementation of freshman biology lab course LIFE120L (~1400 students/academic year) at University of Nebraska; Instructor of freshman biology courses at University of Nebraska (LIFE120, ~270 students/semester) and University of Manitoba (BIOL 1030, ~250 students/term); HHMI/National Academies Summer Institute Teaching Fellow (2012) and Facilitator (2018).

**Panel Review:** NSF Plant, Fungal and Microbial Development (2008, 2009, 2010). NSF Systems and Synthetic Biology (2016). NSF Fungal and Microbial Developmental Mechanisms (2017). NASA Exobiology (Feb. 2018; Aug. 2018 [panel chair]).

**Editorial Boards:** Molecular Microbiology (editor), Applied and Environmental Microbiology, Mycologia, Microbiology, Eukaryotic Cell, PLoS One, Fungal Biology.

**Entrepreneurial activity:** Co-founder and Chief Scientific Officer of MycoInnovation, LLC.

**(d) Publications**

*Refereed papers*

82. Carr, E. C., Harris, S. D., Herr, J. R., and Riekhof, W. R. 2021. Lichens and biofilms: common collective growth imparts similar developmental strategies. *Algal Res.* 54: in press

81. Horianopolous, L.C., Gluck-Thaler, E., Benoit Gelber, I., Cowen, L.E., Geddes-McAlister, J., Landry, C.R., Schwartz, I.S., Scott, J.A., Sellam, A., Sheppard, D.C., Spribille, T., Subramanian, R., Walker, A.K., Harris, S.D., Shapiro, R.S., and Gerstein, A. 2020. The Canadian Fungal Research Network: current challenges and future opportunities. *Can. J. Microbiol.* 27: 1-10.

80. Chelius, C., Huso, W., Reese, S., Doan, A., Lincoln, S., Lawson, K., Tran, B., Purohit, R., Glaros, T., Srivastava, R., Harris, S.D., and Marten, M. 2020. Dynamic transcriptomic and phosphoproteomic analysis during cell wall stress in *Aspergillus nidulans*. *Mol. Cell. Proteomics.* 19: 1310-1329.

79. Zhou, X., Zheng, L., Ye, J., Virag, A., Harris, S.D., and Lu, L. 2020. The scaffold proteins paxillin B and  $\alpha$ -actinin regulate septation in *Aspergillus nidulans* via control of actin ring contraction. *Genetics.* 215: 449-461.

78. Schroeder, W.L., Harris, S.D., and Saha, R. 2020. Computation-driven analysis of model polyextremotolerant fungus *Exophiala dermatitidis*: defensive pigment metabolic costs and human applications. *iScience.* 23 (4): 100980.

77. Coudert, Y., Harris, S., and Charrier, B. 2019. Design principles of branching morphogenesis in filamentous organisms. *Curr Biol.* 29: R1149-R1162.

76. Ribeiro, L.F.C, Chelius, C., Boppidi, K.R., Naik, N.S., Hossain, S., Ramsey, J.J.L.A., Kumar, J., Ribeiro, L.F., Ostermeier, M., Tran, B., Ah Goo, Y., de Assis, L.J., Ulas, M., Bayram, O., Goldman, G.H., Lincoln, S., Srivastava, R., Harris, S.D., and Marten, M.R. 2019. Comprehensive analysis of *Aspergillus nidulans* protein kinase A phosphorylome identifies a novel mode of CreA regulation. *mBio.* 10: pii: e02825-18.

75. Harris, S.D. 2019. Hyphal branching in filamentous fungi. *Dev. Biol.* 451: 35-39.

74. Chelius, C., L. F. C. Ribeiro, J. Kumar, S. Lincoln, B. Tran, Y. Ah Goo, R. Srivastava, S. D. Harris, and M. R. Marten. 2018. Phosphoproteomic and transcriptomic analyses reveal multiple functions for *Aspergillus nidulans* MpkA independent of cell wall stress. *Fungal Genet. Biol.* 125: 1-12.

73. Boppidi, K., L. F. C. Ribeiro, S. Iambamrung, S. Nelson, Y. Wang, M. Momany, E. Richardson, S. Lincoln, R. Srivastava, S. D. Harris, and M. R. Marten. 2018. Altered secretion patterns and cell wall organization caused by loss of PodB function in the filamentous fungus *Aspergillus nidulans*. *Sci. Rep.* 8: 11433 (doi: 10.1038/s41598-018-29615-z).

72. Ribeiro, L.F.C., C. Chelius, S. D. Harris, and M. R. Marten. 2017. Insights regarding fungal

phosphoproteomic analysis. *Fungal Genet. Biol.* 104: 38-44.

71. dos Reis, T.F., B. M. Nitsche, P. B. de Lima, L. J., de Assis, L. Mellado, S. D. Harris, V. Meyer, R. A., dos Santos, D. M. Riano-Pachon, L. N. Ries, and G. H. Goldman. 2017. The low affinity glucose transporter HxtB is also involved in glucose signaling and metabolism in *Aspergillus nidulans*. *Sci. Rep.* 7: 45073

70. Steinberg, G., M. A., Penalva, M. Riquelme, H. A. Wosten, and S. D. Harris. 2017. Cell biology of hyphal growth. *Microbiol. Spectr.* 5: doi: 10.1128/microbiolspec.FUNK-0034-2016

69. Si, H., W. R. Rittenour, and S. D. Harris. 2016. Roles of *Aspergillus nidulans* Cdc42/Rho GTPase regulators in hyphal morphogenesis and development. *Mycologia.* 108: 543-555.

68. Gremillion, S., S. D. Harris, L. Jackson-Hayes, S. Kaminskyj, D. Loprete, A. Gauthier, S. Mercer, A. Rivita, and T. Hill. 2014. Proteins of the conserved oligomeric Golgi complex are required for polarity, cell wall integrity, and glycosylation in the filamentous fungus *Aspergillus nidulans*. *Fungal Genet Biol.* 73: 69-82.

67. Ramsubramaniam, N., S. D. Harris, and M. Marten. 2014. The phosphoproteome of *Aspergillus nidulans* reveals functional association with processes involved in morphology and secretion. *Proteomics.* 21-22: 2454-2459.

66. Lin, X., J. A. Alspaugh, H. Liu, and S. Harris. 2014. Fungal morphogenesis. *Cold Spring Harb Perspect Med.* In press (doi: 10.1101/cshperspect.a019679)

65. Majumdar, A., S. D. Scott, J. S. Deogun, and S. Harris. 2014. Yeast pheromone pathway modeling using Petri nets. *BMC Bioinformatics.* 15: Suppl 7:S13.

64. Lan, N., H. Zhang, C. Hu, W. Wang, A. M. Calvo, S. D. Harris, S. Chen, and S. Li., 2014. Coordinated and distinct functions of velvet proteins in *Fusarium verticillioides*. *Eukaryot Cell.* 13: 909-918

63. Min, K., H. Son, J. Y., Lim, G. J., Choi, J. C. Kim, S. D. Harris, and Y.W. Lee, 2014. Transcription factor RFX1 is crucial for maintenance of genome integrity in *Fusarium graminearum*. *Eukaryot Cell.* 13: 427-436.

62. Rittenour, W. E., and S. D. Harris, 2013. Glycosylphosphatidylinositol-anchored proteins in *Fusarium graminearum*: Inventory, variability, and virulence. *PLoS One* 8:e81603.

61. Harris, S. D., 2013. Golgi organization and the apical extension of fungal hyphae: an essential relationship. *Mol. Microbiol.* 89: 212-215.

60. Harris, S. D., 2012. Evolution of modular conidiophore development in the Aspergilli. *Annals of the N. Y. Acad. Sci.* 1273: 1-6.

59. Si, H., W. R. Rittenour, K. Xu, M. Nicksarlian, A. M. Calvo, and S. D. Harris, 2012. Morphogenetic and developmental functions of the *Aspergillus nidulans* homologues of the yeast bud site selection proteins Bud4 and Axl2. *Mol. Microbiol.* 85: 252-270.

58. Rittenour, W. R., and S. D. Harris. 2011. In vitro induction of infection-related hyphal structures in plant pathogenic fungi. *Methods Mol. Biol.* 835: 377-383.
57. Strobe, P. K., K. W. Nickerson, S. D. Harris, and E. Moriyama. 2011. Molecular evolution of urea amidolyase and urea carboxylase in fungi. *BMC Evol. Biol.* 11: 80.
56. Rittenour, W. R., M. Chen, E. Cahoon, and S. D. Harris, 2011. Control of glucosylceramide production and morphogenesis by the Bar1 ceramide synthase in *Fusarium graminearum*. *PLoS One.* 6: e19385.
55. Harris, S. D., 2011. Hyphal morphogenesis: an evolutionary perspective. *Fungal Biol.* 115: 475-484.
54. Harris, S. D., 2011. Cdc42/Rho GTPases in fungi: variations on a common theme. *Mol. Microbiol.* 79: 1123-1127.
53. Rittenour, W. R., and S. D. Harris, 2010. An *in vitro* method for the analysis of infection-related morphogenesis in *Fusarium graminearum*. *Mol. Plant Pathol.* 11: 361-369.
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51. Si, H., D. Justa-Schuch, S. Seiler, and S. D. Harris, 2010. Regulation of septum formation by the Bud3-Rho4 GTPase module in *Aspergillus nidulans*. *Genetics.* 185: 165-176.
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49. Rittenour, W. R., H. Si, and S. D. Harris. 2009. Hyphal morphogenesis in *Aspergillus nidulans*. *Fungal Biol. Rev.* 23: 20-29.
48. Harris, S. D. 2009. The Spitzenkorper: a signaling hub for the control of fungal development? *Mol. Microbiol.* 73: 733-736.
47. Harris, S. D., G. Turner, V. Meyer, E. A. Espeso, T. Specht, et al. 2009. Morphology and development in *Aspergillus nidulans*: a complex puzzle. *Fungal Genet. Biol.* 46: S82-S92.
46. Harris, S. D. 2009 Branching of fungal hyphae: regulation, mechanisms and comparison with other branching systems. *Mycologia.* 100: 823-832.
45. Pollack, J. K., S. D. Harris, and M. R. Marten. 2009. Autophagy in fungal hyphae. *Fungal Genet. Biol.* 45: 1-8.

44. Semighini, C. P., and S. D. Harris. 2008. Regulation of apical dominance in *Aspergillus nidulans* hyphae by reactive oxygen species. *Genetics*. 179: 1919-1932.
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41. Virag, A., M. P. Lee, H. Si, and S. D. Harris. 2007. Regulation of hyphal morphogenesis by Cdc42 and Rac1 homologues in *Aspergillus nidulans*. *Mol. Microbiol.* 66: 1579-1596.
40. Li, S., D. Bao, G. Yuen, S. D. Harris, and A. Calvo. 2007. *basA* regulates cell organization and asexual/sexual sporulation ratio in *Aspergillus nidulans*. *Genetics* 176: 243-253.
39. Yu, F., K. Zaleta-Rivera, X. Zhu, J. Huffman, J. C. Millet, S. D. Harris, G. Yuen, X. C. Li, and L. Du. 2007. Structure and biosynthesis of heat-stable antifungal factor (HSAF), a broad-spectrum antimycotic with a novel mode of action. *Antimicrob. Agents Chemother.* 51: 64-72.
38. Ferreira, M. E., T. Heinekamp, A. Hartl, A. A. Brakhage, C. P. Semighini, S. D. Harris, M. Savoldi, P. F. de Gouvea, M. H. Goldman, and G. H. Goldman. 2006. Functional characterization of the *Aspergillus fumigatus* calcineurin. *Fungal Genet. Biol.* 43: 219-230.
37. Malavazi, I., M. Savoldi, S. M. Z. Di Mauro, C. F. M. Menck, S. D. Harris, M. H. Goldman, and G. H. Goldman. 2006. Transcriptome analysis of *Aspergillus nidulans* exposed to camptothecin-induced DNA damage. *Eukaryot. Cell* 5: 1688-1704.
36. Fogue, P., S. Halouska, M. Werth, K. Xu, S. Harris, and R. Powers, 2006. NMR metabolic profiling of *Aspergillus nidulans* to monitor drug and protein activity. *J. Proteome Res.* 5: 1916-1923.
35. Harris, S. D., 2006. Cell polarity in filamentous fungi: shaping the mold. *Intl. Rev. Cytol.* 251: 41-77.
34. Virag, A., and S. D. Harris, 2006. Functional characterization of the *Aspergillus nidulans* homologues of yeast Spa2 and Bud6. *Eukaryot. Cell.* 5: 881-895.
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32. Malavazi, I., C. P. Semighini, M. R. Z. Kress, S. D. Harris, and G. H. Goldman, 2006. Regulation of hyphal morphogenesis and the DNA damage response by the *Aspergillus nidulans* ATM homologue, AtmA. *Genetics.* 173: 99-109.

31. Li, S., L. Du, G. Yuen, and S. D. Harris, 2006. Distinct ceramide synthases regulate polarized growth in the filamentous fungus *Aspergillus nidulans*. *Mol. Biol. Cell.* 17: 1218-1227.
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29. Virag, A., and S. D. Harris, 2006. The Spitzenkorper: a molecular perspective. *Mycological Res.* 110: 4-13.
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26. Fagundes, M. R. K., C. P. Semighini, I. Malavazi, M. Savoldi, J. F. Lima, M. H. Goldman, S. D. Harris, and G. H. Goldman, 2005. The *Aspergillus nidulans* *uvsB<sup>ATR</sup>* and *scaA<sup>NBS1</sup>* genes show genetic interactions during recovery from replication stress and DNA damage. *Euk. Cell.* 4: 1239-1252.
25. Harris, S. D., N. D. Read, R. W. Roberson, B. Shaw, S. Seiler, M. Plamann, and M. Momany, 2005. Spitzenkorper meets polarisome: microscopy, genetics, and genomics converge. *Euk. Cell.* 4: 225-229.
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23. Pearson, C. P., K. Xu, K. Sharpless, and S. D. Harris, 2004. MesA, a novel fungal protein required for the stabilization of polarity axes in *Aspergillus nidulans*. *Mol. Biol. Cell.* 15: 3658-3672.
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21. Fagundes, M. R. Z., L. Fernandes, M. Savoldi, S. D. Harris, M. H. S. Goldman, and G. H. Goldman, 2003. Identification of a topoisomerase I mutant, *scsA1*, as an extragenic suppressor

of a mutation in *scaA*<sup>NBS1</sup>, the apparent homolog of human nibrin in *Aspergillus nidulans*. *Genetics*. 164: 935-945.

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12. Harris, S. D., A. F. Hofmann, H. W. Tedford, and M. P. Lee, 1999. Identification and characterization of genes required for hyphal morphogenesis in the filamentous fungus *Aspergillus nidulans*. *Genetics*. 151: 1015-1025.

11. Harris, S. D., and P. R. Kraus, 1998. Regulation of septum formation in *Aspergillus nidulans* by a DNA damage checkpoint pathway. *Genetics*. 148: 1055-1067.

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4. Harris, S. D., and J. R. Pringle, 1991. Genetic analysis of *Saccharomyces cerevisiae* chromosome I: On the role of mutagen specificity in delimiting the set of genes identifiable using temperature-sensitive-lethal mutations. *Genetics*. 127: 279-285.
3. Harris, S. D., and D. A. Cotter, 1988. Transport of yeast vacuolar trehalase to the vacuole. *Can. J. Microbiol.* 34: 835-838.
2. Gupta, J., S. D. Harris, and D. A. Cotter, 1987. Evidence for nonregulatory trehalase activity in *Dictyostelium discoideum*. *Curr. Microbiol.* 16: 101-104.
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#### *Book Chapters*

7. Harris, S. D. 2012. Molecular basis of morphogenesis in fungi, pp. 1-20 in *Morphogenesis and Pathogenicity in Fungi*, edited by J. Perez-Martin and A. DiPietro. Springer.
6. Harris, S. D. 2010. Hyphal growth and polarity, pp. 238-259 in *The Cellular and Molecular Biology of Filamentous Fungi*, edited by K. A. Borkovich and D. J. Ebbole, ASM Press.
5. Harris, S. D. 2007. Hyphal morphogenesis in *Aspergillus nidulans*, pp. 211-222 in *The Aspergilli: Genomics, Medical Aspects, Biotechnology, and Research Methods*, edited by G. H. Goldman and S. A. Osmani, Taylor and Francis.
4. Semighini, C. P., Goldman, G., and Harris, S. D., 2005. The DNA damage response of filamentous fungi: novel features associated with a multicellular lifestyle, pp. 117-139 in *Applied Mycology and Biotechnology, vol. 5; Genes, Genomics, and Bioinformatics*, edited by D. K. Arora. Elsevier Science, Amsterdam.
3. Harris, S. D., 2005. Mitosis in filamentous fungi, pp. 37-51 in *The Mycota, vol. 1 2<sup>nd</sup> ed.*; *Growth, Differentiation and Sexuality*, edited by U. Kues and R. Fischer. Springer-Verlag, Berlin.
2. Harris, S. D., 2001. Genetic analysis of ascomycetous fungi, pp. 47-58 in *Molecular and Cell Biology of Filamentous Fungi*, edited by N. J. Talbot. Oxford University Press, UK.



1. Turner, G., and S. D. Harris, 1998. Genetic control of polarized growth and branching in filamentous fungi, pp. 230-261 in *The Fungal Colony*, edited by N. A. R. Gow, G. M. Gadd, and G. Robson. Cambridge Press, UK.