

DAVID R. BENSON, PhD, FAAM

Professor *Emeritus* of Microbiology

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Education and Professional Appointments

2020 – present - Professor *Emeritus* of Microbiology
2017-present - Elected AAAS Fellow
2012-17 - Jefferson Science Fellow, US Dept. State ISN/BPS
2007-2012 - Head, Dept. Molecular & Cell Biology
2005-present - Elected Fellow - American Academy Microbiology
1994 - Visiting Professor, University of Waikato, New Zealand
1991-present - Professor of Microbiology, Univ. Connecticut
1985-1991 - Associate Professor of Biology, Univ. Connecticut
1980-1985 - Assistant Professor of Biology, Univ. Connecticut
1978-1980 - Postdoctoral Research Associate, Biochemistry, Univ. Wisconsin, Madison
1973-1978 - Ph.D., Research Assistant, Microbiology and Biochemistry, Rutgers University
1968-1972 - B.A., Moravian College, Bethlehem, PA, English/Biology

Research Areas

Microbial genomics, microbial biogeography and ecology, physiology and molecular biology of bacteria, symbiosis, psychrophile evolution, food microbiology, bio-security

Teaching

Applied Micro. (Undergrad.), Intro. Micro. (Undergrad.), Advanced Micro. (Undergrad.), Industrial Microbiology (Grad.), Physiological Genetics of Bacteria (Grad.), Microbial Physiology (Grad.), Special Topics Seminars (Grad. and Undergrad.), Coastal Ecology (Undergrad.), Microbes that Changed History (Undergrad. W), Plagues and Pandemics (Undergrad. Honors)

Professional Societies

American Society for Microbiology (ASM)
American Academy of Microbiology (AAM)
Connecticut Academy of Arts and Sciences (CAAS)
AAAS

Honors

Elected American Association for the Advancement of Science Fellow – 2017-present
Jefferson Science Fellow (National Academy of Sciences) to the U.S. Dept. of State (2012-2017)
Elected Connecticut Academy of Arts and Sciences (2008)
Elected Fellow of the American Academy Microbiology (2005)
Editorial Board, Applied and Environmental Microbiology (ASM)
Chair-elect, Chair General Microbiology Division I, ASM (2004-2005);
Chair-elect, Chair and Councilor General Microbiology Division I, ASM (1989-1991)

Positions

National and International: Editorial Board, Applied and Environmental Microbiology (1986-1996); Chair-Elect, General Microbiology Division (I) American Society for Microbiology (1989-1990); Chairman, General Microbiology Division (I) ASM (1990-1991); Chairman, Organizing Committee for the 7th International Meeting on *Frankia* and Actinorhizal Plants, (1988); USDA-

CRGO Grants review panel (1990, 1988, 1986); Chair, Organizing Committee, Conn. Valley Branch ASM Annual Meeting (1990); Faculty Opponent, Univ. Umeå, Sweden (1990), Visiting Scientist, Univ. Chile, Santiago (1999-2001), Chair-Elect, General Microbiology Division I ASM (2003-2004), Chair, General Microbiology Division I, American Society for Microbiology (2004-2005), panel member NSF-GENEN Program (2004); Division I Councilor, American Society for Microbiology (2005-2006); Nominating Committee, Proctor & Gamble Award, American Academy of Microbiology (2006-present); Presidential Policy Directive-2 (PPD-2) coordinator for the U.S. Dept. State, 2012-2013; Member of Delegation, Meeting of Experts, Biological Weapons Convention, 2013; Jefferson Science Advisor, U.S. Dept. State (2012-2017).

Intramural: Head, Department of Molecular & Cell Biology (2007-2012); Microbiology Graduate Program Chair (1985, 1986, 1990, 1991-1993, 1997-1999); MCB PTR Committee (1985-1989, 1991-1993, 1995, 1996 (Chair), 1998, 1999 (Chair), 2000, 2002-2005, 2006 (Chair), 2007, 2013, 2014); Provost's Faculty Review Board (2013-2016); Member, Faculty Senate (2014-2017); Graduate Awards Committee (1984); Graduate Admissions Committee (1984, 1985 Chairman, 1986 Chairman, 1987 Chairman, 2015-present); Training Grant Committee (1987); Honors Committee (1988-1990); Biotechnology Steering Committee (1984, 1985); Radiation Safety Committee (1987-1990); Executive Committee, Institute of Water Resources (1987-1989); UCRF Grants Review Panel - 1988, 1989, 1991, Chairman, '89; Building Committee Liaison, 1992-1997; Microbial Physiologist Search Committee (1996-1997; Chair), Microbiology Search Committee (2006-2007), Food Microbiology Search Committee (1998), Chancellor's Research Excellence Advisory (1998), Microbiology Section PTR Committee (1981); Pathogenic microbiologist search committee (1998-2001), Phase II Biology Building (1996-1999), Storrs Research Advisory Council (1997-2001), Self-study Steering Committee (2000-2001), Conflict of Interest Committee (2000-2004), Animal Science Department External Review Committee (2001), Departmental Advisory Committee (2002-2007), Graduate Education (Interim Chair) (2003-2004); MRIRC Review Committee for University Center review (2008-2011); Confidential Committee on Scientific Misconduct (Chair; 2010). Provost's Faculty Review Board for PTR (2013-2015; Chair, 2014-15); University Senate (2013-2016); Graduate Faculty Representative MCB (2015-2018).

Peer-reviewed publications

1. Bova, R. A., V. L. Robinson and D. R. Benson. 2020. Characterizing the Role that the Translational GTPase BipA Plays in Adaptation in *E. coli* MG1655. Submitted
2. Maher Gtari, D. R. Benson, F. Ghodhbane-Gtari, I. Nouioui, J. O. Dawson, I. Sutcliffe (eds). 2019. p. 1-4 In 19th International Meeting on *Frankia* and Actinorhizal Plants – Special Vol. Antonie v. Leewenhoek
https://www.researchgate.net/publication/329074548_19th_International_Meeting_on_Frankia_and_Actinorhizal_Plants
3. Brooks, J. M. and D. R. Benson. 2016. Comparative metabolomics of root nodules infected with *Frankia* strains and uninfected roots from *Alnus glutinosa* and *Casuarina cunninghamiana*. [Symbiosis DOI 10.1007/s13199-016-0379-x](https://doi.org/10.1007/s13199-016-0379-x).
4. Normand, P., D. R. Benson and L. S. Tisa. 2015. Genome characteristics of *Frankia* sp. reflect host range and host plant biogeography. p. 245-251 In *Biological Nitrogen Fixation*, DeBruijn, F., ed. John Wiley Sons.

5. Benson, D. R. and R. Kjelgren. 2014. Tacit diplomacy in the life sciences. A foundation for science diplomacy. *Science and Diplomacy* (AAAS). 3(1): <http://www.sciencediplomacy.org/perspective/2014/tacit-diplomacy-in-life-sciences>
6. Marcellino, N. and D. R. Benson. 2014. The good, the bad and the ugly: Tales of mold-ripened cheeses. *Microbiol Spectrum* 1(1): [doi:10.1128/microbiolspec.CM-0005-12](https://doi.org/10.1128/microbiolspec.CM-0005-12).
7. Marusov, G. P., A J Sweatt, K Pietrosimone, D R Benson, S J Geary, L K Silbart, S Challa, J Lagoy, D A Lawrence, and M Lynes. 2011. A Microarray Biosensor for Multiplexed Detection of Microbes Using Grating-Coupled Surface Plasmon Resonance Imaging. *Environmental Science and Technology* 46:348-359.
8. [Benson, D. R. *et al.*] 2014. Advances in science and technology: Understanding pathogenicity and virulence. National paper to the Biological and Toxins Weapons Convention Meeting of Experts, 2014 ([BWC/MSP/2014/MX/WP.2](#)).
9. [Benson, D. R.]. 2013. "Developments in science and technology - diagnostics: Submitted by the United States of America." National Paper to the Biological and Toxins Weapons Convention Meeting of Experts, 2013 ([BWC/MSP/2013/MX/WP.5](#)).
10. T. Persson, D. R. Benson, P. Normand, B. Vanden Heuvel, P. Pujic, O. Chertkov, H. Teshima, D. Bruce, C. Detter, R. Tapia, C. Han, J. Han, T. Woyke, S. Pitluck, L. Pennacchio, M. Nolan, N. Ivanova, A. Pati, M. Land, K. Pawlowski, and A. Berry. 2011. The genome of *Candidatus Frankia datiscae* Dg1, the uncultured microsymbiont from nitrogen-fixing root nodules of the dicot *Datisca glomerata*. *J. Bacteriol.* 193:7017-7018.
11. Bickhart, D. M. and D. R. Benson. 2011. Transcriptomes of *Frankia* sp. strain CcI3 in growth transitions. *BMC Microbiology* 11:192.
12. Benson, D. R., J. M. Brooks, Y. Huang, D. M. Bickhart and J. E. Mastronunzio. 2011. The biology of *Frankia* sp. strains in the post-genome era. *Mol. Plant Microbe Interact.* 24:1310-1316.
13. Huang, Y. and D. R. Benson. 2011. Growth and development of *Frankia* sp. strain CcI3 at the single-hypha level in liquid culture. *Archives Microbiology* 194:21-28.
14. Mastronunzio, J. E. and D. R. Benson. 2010. Wild nodules can be broken: proteomics of *Frankia* in field-collected root nodules. *Symbiosis* 50:13-26.
15. Bickhart, D. M., J. P. Gogarten, P. Lapiere, L. S. Tisa, P. Normand and D. R. Benson. 2009. Insertion sequence content reflects genome plasticity in strains of the root nodule actinobacterium *Frankia*. *BMC Genomics* 2009, 10:468-480.
16. J. E. Mastronunzio, Y. Huang, and D. R. Benson. 2009. Diminished Exoproteome of *Frankia* spp. in Culture and Symbiosis. *Appl. Environ. Microbiol.* 75: 6721-6728
17. Sen, A., S. Sur, A. K. Bothra, D. R. Benson, P. Normand and L. S. Tisa. 2008. The implication of life style on codon usage patterns and predicted highly expressed genes for three *Frankia* genomes. *Antonie van Leeuwenhoek* 93:335-346.

18. C. L. Santos, Vieira, J., Tavares, F., Benson, D. R., Tisa, L. S., Berry, A. M., Moradas-Ferreira, P., and Normand, P. 2008. On the nature of *fur* evolution: A phylogenetic approach in *Actinobacteria*. [BMC Evol. Biol. 8:185-198](#).
19. J. E. Mastrorunzio, L. S. Tisa, P. Normand and D. R. Benson. 2008. Comparative secretome analysis suggests low plant cell wall degrading capacity in *Frankia* symbionts. [BMC Genomics 9:47-65](#).
20. Swensen, S. and D. R. Benson. 2008. Evolution of Actinorhizal Host Plants and *Frankia* Endosymbionts. Chapter 4 In: [Frankia and Actinorhizal Plants](#). W. Newton, K. Pawlowski, eds.
21. Normand, P., P. Lapierre, L. S. Tisa, J. P. Gogarten, N. Alloisio, E. Bagnarol, C.A. Bassi, A.M. Berry, D. M. Bickhart, N. Choise, A. Couloux, B. Cournoyer, S. Cruveiller, V. Daubin, N. Demange, M. P. Francino, E. Goltsman, Y. Huang, O.R. Kopp, L. Labarre, A. Lapidus, C. Lavire, J. Marechal, M. Martinez, J. E. Mastrorunzio, B. C. Mullin, J. Niemann, P. Pujic, T. Rawnsley, Z. Rouy, C. Schenowitz, A. Sellstedt, F. Tavares, J. P. Tomkins, D. Vallenet, C. Valverde, L.G. Wall, Y. Wang, C. Medigue, & D. R. Benson. 2007. Genome sizes of facultatively symbiotic *Frankia* sp. strains reflect host plant biogeography. [Genome Res. 17:7-15](#).
22. Benson, D. R. and J. O. Dawson. 2007. Recent advances in the biogeography and genealogy of symbiotic *Frankia* and its host plants. [Physiologia Plantarum 130:318-330](#).
23. Nasr, H., A.-M. Domenach, M. H. Ghorbel and D. R. Benson. 2007. Divergence in symbiotic interactions between same genotypic PCR-RFLP *Frankia* strains and different Casuarinaceae species under natural conditions. [Physiologia Plantarum 130:400-408](#).
24. Normand, P, C. Queiroux, L. Tisa, D. Benson, Z. Rouy, C. Médigue. 2007. Exploring the genomes of *Frankia*. [Physiologia Plantarum 130:331-343](#).
25. Bassi, C. A. and D. R. Benson 2006. Growth characteristics of the slow-growing Actinobacterium *Frankia* sp. strain Cc13 on solid media. [Physiologia Plantarum 130:391-399](#).
26. Brian D. Vanden Heuvel, David R. Benson, Esteban Bortiri, and Daniel Potter. 2004. Low genetic diversity among *Frankia* spp. strain nodulating sympatric populations of actinorhizal species of Rosaceae, Ceanothus (Rhamnaceae) and *Datisca glomerata* (Datisceae) west of the Sierra Nevada (California). [Can. J. Microbiol. 50\(11\):989-1000](#).
27. Gawronski, J. D. and David R. Benson. 2004. Microtiter assay for glutamine synthetase biosynthetic activity using inorganic phosphate detection. [Anal. Biochem. 327:114-118](#).
28. Benson M. J, J. D. Gawronski D. E. Eveleigh and D. R. Benson. 2004. Intracellular symbionts and other bacteria associated with deer ticks (*Ixodes scapularis*) from Nantucket and Wellfleet, Cape Cod, Massachusetts. [Appl. Environ. Microbiol. 70:616-620](#).
29. Clawson, M. L., A. Bourret, and David R. Benson. 2004. Assessing the phylogeny of *Frankia*-actinorhizal plant nitrogen-fixing root nodule symbioses with *Frankia* 16S rRNA and glutamine synthetase gene sequences. [Mol. Phyl. Evol. 31:131-138](#).

30. Silvester, W. B. and D. R. Benson. 2002. Making Nitrogen Available in Forests: The Role of Nitrogen-Fixing Plants. pp. 135-155 In *Biotechnology in Sustainable Forestry and Food Security*.
31. Marcellino, E. Beuvier, R. Grappin M. Guéguen and D.R. Benson. 2001. Diversity of *Geotrichum candidum* strains isolated from traditional cheesemaking fabrications in France. [Applied Environ. Microbiol. 67:4752-4759.](#)
32. Clawson, M. L. and D. R. Benson. 1999. Natural diversity of *Frankia* strains in actinorhizal root nodules from promiscuous hosts in the family Myricaceae. [Applied Environ. Microbiol. 65:4521-4527.](#)
33. Clawson, M. L. and D. R. Benson. 1999. Dominance of *Frankia* strains in stands of *Alnus incana* subsp. *rugosa* and *Myrica pensylvanica*. [Can. J. Bot. 77:1203-1207.](#)
34. Clawson, M. L., M. Caru and D. R. Benson. 1998. Diversity of *Frankia* strains in root nodules of plants from the families Elaeagnaceae and Rhamnaceae. [Appl. Environ. Microbiol. 64:3539-3543.](#)
35. Clawson, M. L., D. W. Stephens, W. B. Silvester, S. C. Resch, and D. R. Benson. 1997. Typical *Frankia* infect exotic actinorhizal plants in New Zealand. [New Zealand J. Bot. 35:361-367.](#)
36. Benson, D. R., D. W. Stephens, M. L. Clawson, W. B. Silvester. 1996. Amplification of 16S rRNA genes from *Frankia* in root nodules of *Ceanothus griseus*, *Coriaria arborea*, *Coriaria plumosa*, *Discaria toumatou*, and *Purshia tridentata*. [Appl. Environ. Microbiol. 62:2904-2909.](#)
37. Harriott, O. T., T. J. Hosted, and D. R. Benson. 1995. Sequences of *nifX*, *nifW*, *nifZ*, *nifB* and two ORFs in the *Frankia* nitrogen fixation gene cluster. [Gene 161:63-67.](#)
38. Hosted, T. J., D. A. Rochefort, and D. R. Benson. 1993. Close linkage of genes encoding glutamine synthetases I and II in *Frankia alni* CpII. [J. Bacteriol. 175:3679-3684.](#)
39. Benson, D. R. and W. Silvester. 1993. The biology of *Frankia*: actinomycete symbionts of actinorhizal plants. [Microbiol. Rev. 57:293-319.](#)
40. Kumada, Y., D. R. Benson, D. Hillemann, T. J. Hosted, D. A. Rochefort, C. J. Thompson, W. Wohlleben, and Y. Tateno. 1993. Evolution of the glutamine synthetase gene: One of the oldest genes ever studied. [Proc. Natl. Acad. Sci. USA 90:3009-3013.](#)
41. Berry, A., O. T. Harriott, R. A. Moreau, S. Osman, A. D. Jones, and D. R. Benson. 1993. Hopanoid Lipids Compose the *Frankia* vesicle envelope, presumptive barrier of oxygen diffusion to nitrogenase. [Proc. Natl. Acad. Sci. USA 90:6091-6094.](#)
42. Marcellino, N. and D. R. Benson. 1992. Scanning electron and light microscopic study of microbial succession on Bethlehem St. Nectaire cheese. [Appl. Environ. Microbiol. 58:3448-3454.](#)
43. Zhang, X., and D. R. Benson. 1992. Utilization of amino acids by *Frankia* sp. strain CpII. [Archiv. Microbiol. 158:256-261.](#)

44. Harriott, O. T., L. Khairallah, and D. R. Benson. 1991. Isolation and structure of the lipid envelopes from the nitrogen-fixing vesicles of *Frankia*. [J. Bacteriol. 173:2061-2067.](#)
45. Rochefort, D. A. and D. R. Benson. 1990. Molecular cloning, sequencing and expression of the glutamine synthetase II (glnII) gene from the actinomycete root nodule symbiont *Frankia* sp. strain CpI1. [J. Bacteriol. 172:5335-5342.](#)
46. Schultz, N. A., D. R. Benson. 1990. Enzymes of ammonia assimilation in the hyphae and vesicles of *Frankia* sp. strain CpI1. [J. Bacteriol. 172:1380-1384.](#)
47. Schultz, N. A., D. R. Benson. 1989. Developmental potential of *Frankia* vesicles. [J. Bacteriol. 171:6873-6877.](#)
48. Tsai, Yu-Li, D. R. Benson. 1989. Physiological characteristics of glutamine synthetases I and II of *Frankia* sp. strain CpI1. [Arch. Microbiol. 152:382-386.](#)
49. Tunlid, A., N. A. Schultz, D. R. Benson, D. B. Steele, D. C. White. 1989. Differences in fatty acid composition between vegetative cells and N₂-fixing vesicles of *Frankia* sp. strain CpI1. [Proc. Natl. Acad. Sci. USA. 86:3399-3403.](#)
50. Edmands, J. A., N. A. Noridge, D. R. Benson. 1987. The actinorhizal root nodule symbiont *Frankia* sp. strain CpI1 has two glutamine synthetases. [Proc. Natl. Acad. Sci. USA 84:6126-6130.](#)
51. Noridge, N. A. and D. R. Benson. 1986. Isolation and nitrogen-fixing activity of *Frankia* sp. strain CpI1 vesicles. [J. Bacteriol. 166:301-305.](#)
52. Mazzucco, C. E., D. R. Benson. 1984. Ammonium ([¹⁴C]methylammonium) transport by *Frankia* sp. strain CpI1. [J. Bacteriol. 160:636-641.](#)
53. Benson, D. R., S. E. Buchholz, D. G. Hanna. 1984. Identification of *Frankia* strains by two-dimensional polyacrylamide gel electrophoresis. [Appl. Environ. Microbiol. 47:489-494.](#)
54. Benson, D. R. 1984. Consumption of atmospheric nitrogen, pp. 155-198 In E. R. Leadbetter and J. S. Poindexter, (eds.), *Bacteria in Nature*, Vol. 1, Plenum Publ. Corp., N. Y.
55. Benson, D. R., D. Hanna. 1983. *Frankia* diversity in an alder stand as estimated by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. [Can. J. Bot. 61:2919-2923.](#)
56. Benson, D. R. 1982. Isolation of *Frankia* strains from alder actinorhizal root nodules. [Appl. Environ. Microbiol. 44:461-465.](#)
57. Benson, D. R., D. J. Arp, R. H. Burris. 1980. Hydrogenase in N₂-fixing actinorhizal root nodules and symbionts. [J. Bacteriol. 142:138-144.](#)
58. Benson, D. R., D. J. Arp, R. H. Burris. 1980. Cell-free nitrogenase and hydrogenase from actinorhizal root nodules. *Science* 205:688-689.
59. Benson, D. R. and D. E. Eveleigh. 1979. Nitrogen-fixing homogenates from *Myrica pensylvanica* (bayberry) root nodules. [Soil Biol. Biochem. 11:331-334.](#)

60. Benson, D. R. and D. E. Eveleigh. 1979. Ultrastructure of the nitrogen-fixing symbiont of *Myrica pensylvanica* L. (bayberry) root nodules. [Bot. Gaz. 140\(Suppl.\):S15-S21.](#)
61. Benson, D. R., D. E. Eveleigh, V. A. Greenhut. 1979. Scanning electron microscopy of the N₂-fixing root nodules of *Myrica pensylvanica* L. (bayberry). [New Phytol. 83:755-760.](#)
62. Tiffney, W. N., D. R. Benson, D. E. Eveleigh. 1979. Does *Arctostaphylos uva-ursi* have nitrogen-fixing root nodules. [Amer. J. Bot. 65:625-628.](#)

Chapters, Reviews

63. Benson, D. R. 2016. Marcellino, Mother Noella. In *The Oxford Companion to Cheese*. Oxford University Press.
64. Normand, P., Benson, D. R., Berry, A. M. and L. S. Tisa. 2014. 183. Family *Frankiaceae*. In E. Rosenberg et al. (eds.), *The Prokaryotes – The Actinobacteria*, DOI 10.1007/978-3-642-30138-4_183, Springer-Verlag Berlin Heidelberg.
65. Normand, P. and D. R. Benson. 2012. Order *Frankiales* ord. nov. pp. 508-510 In *Bergey's Manual of Systematic Bacteriology, Volume 5*, Spinger-Verlag, New York, ISBN 978-0-387-95043-3.
66. Normand, P. and D. R. Benson. 2012. Family I. *Frankiaceae* Becking 1970, 201^{AL} emend. Hahn, Lechevalier, Fischer and Stackebrandt 1989, 241 emend. Normand, Orso, Cournoyer, Jeannin, Chapelon, Dawson, Evtushenko and Misra 1996, 8 emend. Stackebrandt, Rainey and Ward-Rainey 1997, 487. pp. 511 In *Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria*. , Spinger-Verlag, New York, ISBN 978-0-387-95043-3
67. Normand, P. and D. R. Benson. 2012. Genus I. *Frankia* Brunchorst 1886, 174^{AL}. p. 511-518 In *Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria*, Spinger-Verlag, New York, ISBN 978-0-387-95043-3
68. Normand, P., A. Berry, and D. R. Benson. 2012. Family II. *Acidothermaceae* Rainey, Ward-Rainey and Stackebrandt 1997, 487^{VP}. pp. 519 In *Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria*, Spinger-Verlag, New York, ISBN 978-0-387-95043-3
69. Normand, P., A. Berry and D. R. Benson. 2012. Genus I. *Acidothermus* Mohagheghi, Grohmann, Himmel, Leighton and Updegraff 1986, 442^{VP}. pp. 519-520 In *Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria*, Spinger-Verlag, New York, ISBN 978-0-387-95043-3
70. Normand, P. and D. R. Benson. 2012. Genus I. *Cryptosporangium* Tamura, Hayakawa and Hatano 1998, 1003^{VP}. p. 521-523 In *Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria*, Spinger-Verlag, New York, ISBN 978-0-387-95043-3
71. Normand, P. and D. R. Benson. 2012. Family IV. *Geodermatophilaceae* Normand 2006, 2277^{VP} (effective publication: Normand, Orso, Cournoyer, Jeannin, Chapelon, Dawson, Evtushenko and Misra 1996, 8). p. 526 In *Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria*, Spinger-Verlag, New York, ISBN 978-0-387-95043-3

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73. Normand, P. and D. R. Benson. 2012. Genus III. *Modestobacter* Mevs, Stackebrandt, Schumann, Gallikowski and Hirsch 2000, 344^{VP} emend. Reddy, Potrafka and Garcia-pichel 2007, 2018. pp. 534-537 In Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria, Springer-Verlag, New York, ISBN 978-0-387-95043-3
74. Normand, P. and D. R. Benson. 2012. Family VI. *Sporichthyaceae* Stackebrandt, Rainey and Ward-Rainey 1997, 487^{VP}. p. 542 In Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria, Springer-Verlag, New York, ISBN 978-0-387-95043-3
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76. Normand, P. and D. R. Benson. 2012. Family I. *Kineosporiaceae* Zhi, Li and Stackebrandt 2009, 596^{VP}. p. 560 In Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria, Springer-Verlag, New York, ISBN 978-0-387-95043-3
77. Normand, P. and D. R. Benson. 2012. Genus I. *Kineosporia* Pagani and Parenti 1978, 401^{AL} emend. Itoh, Kudo, Parenti and Seino 1989, 172 emend. Kudo, Matsushima, Itoh, Sasaki and Suzuki 1998, 1253. p. 560-563 In Bergey's Manual of Systematic Bacteriology, Volume 5 The Actinobacteria, Springer-Verlag, New York, ISBN 978-0-387-95043-3.
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80. Tisa, L.S., D.R Benson, G.B. Smejkal, P. Lapierre, J. P. Gogarten, P. Normand, M. P. Francino, and P. Richardson. 2008. Living large: Elucidation of the *Frankia* EAN1pec genome sequence shows gene expansion and metabolic versatility. In F. Dakora, W. E. Newton, C. Elmerich, V Newton (eds) [Proceeding of the 15th International Congress on Nitrogen Fixation](#). p. 255-256.
81. Benson, D. R., B. Vandenheuvel, B. and D. Potter. 2004. [Actinorhizal Symbioses: Diversity and Biogeography](#). pp. 97-127 In: *Plant Microbiology*, M. Gillings and A. Holmes ed., BIOS Scientific Publishers, Oxford.
82. Benson, D. R., and M. L. Clawson. 2000. Evolution of the actinorhizal plant nitrogen-fixing symbiosis, pp. 225-236 in *Prokaryotic Nitrogen Fixation: A Model System for the Analysis of a Biological Process*, ed. Eric Triplett, Horizon Scientific Press, Wymondham, England.

83. Marcellino, N. and D. R. Benson. 1997. Characteristics of Bethlehem cheese, an American fungal-ripened cheese. pp. 114-120, In T. M. Cogan, P. F. Fox & R. P. Ross (eds.), 5th Cheese Symposium, Teagasc, Dublin, Ireland.
84. Benson, D. R., N. A. Schultz. 1989. Physiology and biochemistry of *Frankia* in culture. pp. 107-127, In C. R. Schwintzer and J. D. Tjepkema eds., The biology of *Frankia* and actinorhizal plants. Academic Press, Orlando.
85. Benson, D. R. 1988. The genus *Frankia*: Actinomycete symbionts of plants. Microbiological Sciences 5:9-12.
86. Tjepkema, J. D., C. R. Schwintzer, D. R. Benson. 1986. Physiology of actinorhizal root nodules. [Ann. Rev. Plant Physiol. 37:209-232.](#)
87. Benson, D. R., C. E. Mazzucco, T. J. Browning. 1984. Physiological aspects of *Frankia*, pp. 175-182, In P. W. Ludden and J. E. Burris (eds.), Nitrogen Fixation and CO₂ Metabolism, Proc. 14th Steenbock Symposium, American Elsevier Publ. Co., N.Y.
88. Burris, R. H., D. J. Arp, and D. R. Benson et al. 1980. The biochemistry of nitrogenase, pp. 37-54, In W. D. P. Stewart and J. R. Gallon (eds.), Nitrogen Fixation, Academic Press, N. Y.

Recent Abstracts (last 10 yrs)

1. P. Normand, P Pujic, LS Tisa, JP Gogarten, N Alloisio, AM Berry, N Choisine, A Couloux, S Cruveiller, V Daubin, N Demange, MP Francino, L Labarre, C Lavire, B Mullin, Z Rouy, C Schenowitz, Anita Sellstedt, F Tavares, JP Tomkins, D Vallenet, C Valverde, L Wall, C Medigue, & DR Benson. 2006. What the genomes of *Frankia* tell us about the symbiosis. Symposium - 7th European Nitrogen Fixation Congress, Aarhus, Denmark.
2. C. A. Bassi, L. S. Tisa and D. R. Benson. 2006. Breaking the *Frankia* CcI3 speed limit. Poster at 14th International Meeting on Frankia and Actinorhizal Plants, Umea, Sweden.
3. J.M. Niemann, J.D. Tjepkema, D. R. Benson, and L.S. Tisa: 2006. Effect of Environmental Stimuli on the Expression of Truncated Hemoglobin in *Frankia*. Poster at 14th International Meeting on *Frankia* and Actinorhizal Plants, Umea, Sweden.
4. L. S Tisa, J. M. Niemann, T. Rawnsley, T. Furnholm, D. R Benson, G. B. Smejkal, P. Lapierre, J.P.Gogarten, Y. Huang, J. Mastronunzio, C. A. Bassi, M. P. Francino, and P. Richardson: 2006. Elucidation of the *Frankia* EAN1pec genome sequence shows gene expansion and versatility. Poster at 14th International Meeting on Frankia and Actinorhizal Plants, Umea, Sweden.
5. J. Mastronunzio, L. S. Tisa, P. Normand and D. R. Benson. 2006. The common secretome of *Frankia*. Poster at 14th International Meeting on Frankia and Actinorhizal Plants, Umea, Sweden.
6. D. Bickhart and D. R. Benson. 2006. Analysis of the abundance of atypical Insertion Sequence families in *Frankia* strains CcI3, ACN14a and EAN1pec. Poster at 14th International Meeting on *Frankia* and Actinorhizal Plants, Umea, Sweden.
7. L. S Tisa, J. M. Niemann, T. Rawnsley, T. Furnholm, D. R Benson, G. B. Smejkal, P. Lapierre, J.P.Gogarten, Y. Huang, J. Mastronunzio, C. A. Bassi, M. P. Francino, and P. Richardson: 2006. Post-Genomic Exploration of the Actinorhizal Symbiosis: What can we learn from the *Frankia* genomes and where do we go from here? 5th International Symbiosis Society Congress, Vienna, Austria.

8. Mastronunzio, J., L. S. Tisa, P. Normand and D. R. Benson. 2007. The reduced secretome of *Frankia* suggests symbiosis by passivity. ASM Annual Meetings, May, Toronto.
9. Bickhart, D. M., P. Lapierre, and D. R. Benson. 2007. *Frankia* strain genome differences are related to the presence and activity of mobile genetic elements. ASM Annual Meetings, May, Toronto.
10. Huang, Y. 2007. Growth kinetics of individual hyphae and development of *Frankia* sp. strain CcI3 in liquid culture. ASM Annual Meetings, May, Toronto.
11. Bickhart, D.M., P. Lapierre, J.P. Gogarten, and D.R. Benson. 2008. Comparative genome analysis of Insertion Sequences in *Frankia* sp. Presented at the 108th General Meeting of the Am. Society for Microbiol., Boston, MA.
12. Mastronunzio, J.E., Huang, Y., and D.R. Benson. 2008. Proteomics of *Frankia* sp. strain CcI3 in Root Nodules. Presented at the 15th International Meeting on *Frankia* and Actinorhizal Plants, Bariloche, Argentina.
13. Huang, Y., J.E. Mastronunzio, and D.R. Benson. 2008. Shotgun proteomics sheds light on *Frankia* metabolism in culture. Presented at the 108th General Meeting of the Am. Society for Microbiol., Boston, MA.
14. Huang, Y. and D. R. Benson. 2007. Growth Kinetics of Individual Hyphae and Development of *Frankia* sp. CcI3 in Liquid Culture. ASM General 106th meeting, 2007, Toronto, Canada.
15. J.M. Brooks and D.R. Benson. 2009. Genome Mining Reveals a Treasure Trove of Lantibiotics in *Frankia*. Presented at the 109th General Meeting of the American Society for Microbiology, Philadelphia, PA.
16. J.M. Brooks, L.S. Tisa, P. Normand, and D.R. Benson. 2008. Genome Mining Reveals the Core Secondary Metabolome of *Frankia*. Presented at the 108th General Meeting of the American Society for Microbiology, Boston, MA.
17. J. M. Brooks and D. R. Benson. 2011. Characterization of Secondary Metabolite Biosynthesis Genes from *Frankia* sp. HFPCcI3. Presented North Eastern Microbiologists: Physiology, Ecology and Taxonomy (NEMPET) Conference. Blue Mountain Lake, New York.
18. Brooks, J. M. and D. R. Benson. 2011. Cloning and Characterization of a Tryptophan Halogenase Involved in Antibiotic Biosynthesis in *Frankia* sp. CcI3. 2011. Presented at the 46th Region I Meeting of the American Society for Microbiology, Randolph, MA
19. Brooks, J. M. and D. R. Benson. 2014. Metabolomic Profiling of Roots and Nodules in *Frankia*-Plant Symbioses. 114th General Meeting ASM, Boston, MA, May.
20. Bova, R., and D. R. Benson 2016. Characterizing the Role that the Translational GTPase BipA Plays in Adaptation in *E. coli* MG1655. ASM Annual Meeting, Boston, MA.

Edited Books

"Selected Papers from the 7TH INTERNATIONAL CONFERENCE ON *FRANKIA* AND ACTINORHIZAL PLANTS. Ed. D. R. Benson. Kluwer Publ. Co., Dordrecht, Netherlands. Plant and Soil Vol. 118, Nos. 1-2 (1989).

"Papers from the 19 International Meeting on *Frankia* and Actinorhizal Plants." Ed. M. Gtari, D.R. Benson, I. Nouioui, J. O. Dawson, F. Ghodhbane-Gtari. Antonie van Leeuwenhoek Vol 112, No. 1 (2019).

Invited Lectures

“Depth and Breadth of Diversity in the *Frankia* symbiosis”. Invited presentation at the 11th International Frankia and Actinorhizal Plant Conference, June, 1998.

“Biodiversity of *Geotrichum candidum* strains isolated from traditional cheese.” French Chapter of the American Institute of Wine and Food, Paris, invited presentation. 1998.

“Biodiversité des souches de *Geotrichum candidum* isolées des fromages français”. Institut National de la Recherche Agronomique, Poligny, France, invited presentation. 1998.

“Biodiversity of *Geotrichum candidum* strains isolated from surface-ripened cheeses”. COST Symposium: Quality and Microbiology of Traditional and Raw Milk Cheeses, Dijon, France, 1998.

“Diversity and molecular ecology of *Frankia* in the actinorhizal symbiosis.” Univ. Chile, Santiago. 1999.

“Molecular evolution of *Frankia* in the actinorhizal symbiosis.” Univ. Chile, Santiago. 1999.

“Coastal nitrogen cycling”. UMass Nantucket Field Station. 1999.

“Evolution of the actinorhizal root nodule symbiosis.” UMass Nantucket Field Station. 1999.

“Cheese wars - biodiversity in a moldy world” Presented at Dept. Nutrition, UConn. 2000.

“Evolution of the actinorhizal symbiosis.” Invited presentation, Univ. Chile, Santiago. 2000.

“Biochemical adaptations to cold environments”, Invited presentation, UMass Nantucket Field Station. 2001.

“Nitrogen-fixing symbioses in near-shore environments”, Invited presentation, UMass Nantucket Field Station, 2001.

“French Lessons in fungal biodiversity”, Invited presentation at The American Cheese Society meetings, Knoxville, TN.

“Cheese Fungi - Cat's Fur and Toadskin”, Invited seminar at the Copia, Napa, CA. California Milk Advisory Board Meeting. 2002.

“Biodiversity and ecology of fungal surface ripened cheeses.” Cornell University, Ithaca, NY. April, 2003.

“Sequencing of the *Frankia* CcI3 genome”. National Science Foundation, Awardees Conference, Arlington, January, 2004.

“Living Small, the reduced genome of *Frankia* sp. strain CcI3”. Univ. Umea, Sweden. 2006.

“Workshop on Genome Analysis of *Frankia*”, Univ. Umea, Sweden. 2006

“*Frankia* genomes recapitulate host biogeography”, Rutgers Univ., 2007

“Unraveling the molecular interactions in the *Frankia* symbiosis” Invited presentation at the 20th North American Symbiotic Nitrogen Fixation Congress. Milwaukee. 2007.

“The *Frankia* proteome using heterologous root nodules” Bariloche, Argentina, 2008

“Proteomics of *Frankia* in culture, in vesicles and in root nodules”. Tunis, Tunisia. 2009.

“Biological warfare and biological weapons.” Invited presentation, UConn Medical School, 2013.

“The kitchen sink approach to the *Frankia* symbiosis.” Invited presentation, Rutgers University, 2013.

“Principles and Potential of Molecular Diagnostics.” Geneva, Switzerland, Meeting of Experts for the Biological Weapons Convention. 2013.

“Jefferson projects and science diplomacy initiatives” Washington, DC, National Academy of Sciences, 2013.

“Mental porpoising and the motatorious life” Invited presentation. Rutgers University, 2014.

“The strange history of biological warfare, Part I and Part II” CLIR public presentation, 2015.

Administrative Activities

As Department Head:

- In response to an accelerated expansion of the University, oversaw the expansion of the Department of Molecular and Cell Biology to ~250 personnel including 44 faculty members (34 tenure-track from 24), 170 graduate students, 13 postdocs and several support staff with a total core budget of about \$6.2 million.

- Undergraduate Education
 - Managed a greater than doubling in undergraduate course enrollment;
 - In 2013, MCB advised over 280 Molecular and Cell Biology majors, and over 800 Biological Sciences majors. With a long reputation for academic excellence, MCB was home to 18 of 48 total University Scholars at UConn, all of the Goldwater Scholars, and the highest number of Honors students (over 150).
- Graduate Education
 - Led a merging of five graduate fields of study (Biochemistry, Cell Biology, Genetics, Microbiology and Structural Biology/Biophysics) into one field of study (Molecular and Cell Biology) while strengthening cognate Areas of Concentration to build administrative and national visibility.
 - Revamped graduate admissions procedures to attract and reward the best and brightest students by establishing summer fellowships, recruiting events and personal contacts with top tier students.
 - Established ethics, laboratory safety and broadening courses to anticipate new requirements for graduate training from state and federal agencies.
- Research
 - With the influx of new faculty members and an emphasis on successful grant writing, extramural funding expenditures more than doubled over five years, topping \$5.3 million and yielding ~\$1.7 million returned as indirect costs to the University per annum.
 - Established a secure website for depositing successful grant applications and other tools provided by faculty members so that new hires had exemplars of successful applications.
 - Negotiated increased indirect cost returns to the department, and to faculty for research investment. The fruits of this investment included more effective graduate student recruiting, enhanced infrastructure and increased negotiating flexibility for attracting highly recruited young scientists during faculty searches.
 - Developed and implemented plan for attracting new faculty, rebalancing research and teaching, renovating research and teaching laboratories, and improving safety for research and teaching labs.
- Outreach.
 - Encouraged faculty members to stand for media interviews, participate in topical podcasts, coffee house presentations and summer workshops for K-12 students. As Head, my practice was to recognize and encourage individuals who participated in public outreach.
 - Opened a new website to highlight departmental success;
 - Initiated a more general audience “MCB News” newsletter, written by an enthusiastic faculty member, that appeared quarterly, and on-line, distributed to alumni, administration, legislators and others in appropriate positions;
 - Faculty retreat tasked to junior faculty members and graduate students for planning, and “universalizing” the event by inviting sister departments in Physiology and Neurobiology, Pharmacy, Pathobiology and the Health Center, as a way to foster interdisciplinary contacts.

As a Jefferson Fellow

- Served as a Senior Science Advisor to the Biological Policy Staff in the Bureau of International Security and Non-proliferation (BPS/ISN)
 - Advised on issues related to microbiology, molecular biology and academic science.

- Provided perspectives in technical areas related to the Biological and Toxin Warfare Convention (BWC), Dual-Use Research of Concern (DURC), including synthetic DNA and other emerging technology areas.
- Shepherded the Department of State's response to the Presidential Policy Directive on National Strategy for Countering Biological Threats (PPD-2)
- Initiated outreach to raise awareness among scientists about current policy issues implicit in the BWC at an international level
- Served as a delegate to the Meeting of Experts (MXP) at the BWTC in Geneva
- Initiated and participated in a side meeting "mini-university" to inform diplomats about current developments in science and technology at the BWTC MXP
- Co-authored an article in Science Diplomacy (AAAS), "Tacit Diplomacy in Life Sciences."
- Continues to serve as an *ad hoc* advisor to ISN/BPS

PhD students

Rebecca Bova, 2020, Postdoctoral Fellow, Uniformed Services, Walter Reed Medical Center

James Brooks 2013, Assoc. Professor, Charleston Southern Univ.

Ying Huang 2011, returned to China.

Derek Bickhart 2010, USDA-ARS, Research Geneticist, USDA, ARS, Madison, WI.

Juliana Mastronunzio 2009, Postdoc Dept. Internal Medicine, Section of Infectious Disease, Yale University School of Medicine, New Haven, CT; Laboratory Faculty, Fairfield Univ.; Senior Scientist at Symbiologica

Jeffrey Gawronski 2004, Res Scientist, Microbiol & Physiol Systems, UMass Med. School, Worcester, MA

Noella Marcellino 2003, Abbey Regina Laudis & Adjunct at Univ. Vermont, Burlington, VT

Michael Clawson 1999, Res. Mol. Biologist, USDA-ARS, Clay Center, NE

Olivia Harriott 1994, Professor, Fairfield Univ., Fairfield, CT

Xiaojun Zhang 1993, Asst. Professor, Indiana State Univ. deceased

Jack Leonard 1992, CTO, SeqWell, Boston MA

Thomas Hosted 1992, Principle Scientist, Schering Plough Corp., Madison, NJ (retired)

Deborah Rochefort 1990, Professor of Microbiology, Shepherd Univ., Shepardville, WV (retired)

Nancy Schultz 1988, VP Global Quality Assurance, Unilever Corp. Madison, CT (retired)

Rebecca Bova - Current

MS students

Jannie Edmunds – Wentworth Douglas Hospital, NH

Charles Mazzucco – Bristol-Myers Squibb, CT

Malika Meemongkolkiat – Federal Health Services, Thailand

Nancy Noridge – Unilever Corp. CT

Aaron Bourret – Novartis Pharmaceuticals Corp.

Carla Bassi – Unilever Corp., CT

Frank Zappulla – USDA-ARS Plum Island, NY