

Born Urbana, Illinois, 21 February, 1942

U.S. and Canadian citizen

Married, two children

EDUCATION

B.A. in Biochemical Sciences (*magna cum laude*), Harvard College, 1963 (honors thesis with A.M. Pappenheimer, Jr. on phages of *Corynebacterium diphtheriae*)

Ph.D. in Biological Sciences, Stanford University, 1969 (with C. Yanofsky on regulation of the tryptophan operon in *Escherichia coli*)

USPH Postdoctoral trainee in Microbiology, University of Illinois, 1968-1969 (with S. Spiegelman on RNA/DNA hybridization)

Postdoctoral Fellow and Research Associate, National Jewish Hospital and Research Center, Denver, 1969-1971 (with N.R. Pace on ribosomal RNA transcriptional units)

BFA (Photography), Nova Scotia College of Art and Design, 2013

SCHOLARSHIPS, FELLOWSHIPS, HONORS AND AWARDS

National Merit Scholarship, Harvard College, 1959-1963

National Science Foundation Predoctoral Fellowship, Stanford University, 1963-1968 (declined)

US National Cancer Institute Postdoctoral Fellowship, National Jewish Hospital and Research Center, 1969-1970

Medical Research Council Scholarship, Dalhousie University, 1971-1976 (*five-year full salary award*)

Atlantic Provinces Inter-University Council on the Sciences, Young Scientist of the Year Award, 1978
Ayerst Award, Canadian Biochemical Society, 1981

Max Forman Senior Faculty Award, Dalhousie University, 1982

Guggenheim Fellowship, Stanford, 1985-86 (*partial sabbatical salary*)

Fellow, American Association for the Advancement of Science, 1985-present

Fellow, Canadian Institute for Advanced Research, 1986-2007 (*full salary award, also Richard Ivey Fellow from 2000*)

Fellow, Royal Society of Canada, 1991-present

Award of Excellence, Genetics Society of Canada, 1991

Henry Friesen Award, The Canadian Society for Clinical Investigation and The Royal College of Physicians and Surgeons of Canada, 1996

Fellow, American Academy of Microbiology, 1999-present

Honorary Doctorate of Science Degree, University of Ottawa, 2000

Roche Diagnostics Prize for Biomolecular and Cellular Research, The Canadian Society of Biochemistry and Molecular and Cellular Biology, 2001

Canada Research Chair in Comparative Microbial Genomics, 2001-2008 (*seven-year full salary award plus research allowance*)

Elected Member, U.S. National Academy of Sciences, 2002-present

Institute Fellow, Canadian Institute for Advanced Research, 2008-present

Elected Member, Norwegian Academy of Science and Letters, 2009-present

NSERC Gerhard Herzberg Canada Gold Medal for Science and Engineering, 2013 (presented 2014)
(*Includes one million-dollar, five-year research grant, 2014-2019.*)

Max Beberman Distinguished Alumni Award, University High School, Urbana, Illinois, 2015

Killam Prize in Natural Sciences, 2017 (\$100,000 prize)

Motoo Kimura Lifetime Contribution Award, Society for Molecular Biology and Evolution, 2017

Honorary Doctor of Civil Law, University of King's College, Halifax, 2018

POSITIONS/TITLES

Assistant Professor (and MRC Scholar), Department of Biochemistry, Dalhousie University, 1971-1976
Associate Professor, Department of Biochemistry, Dalhousie University, 1976-1982
Sabbatical Professor, Harvard University, 1977-1978 (with W. Gilbert)
Professor, Department of Biochemistry and Molecular Biology, Dalhousie University, 1982-present
Sabbatical Professor, Stanford University, 1985-1986 (with C. Yanofsky)
Director, Canadian Institute for Advanced Research Program in Evolutionary Biology, 1986-2007
Canada Research Chair (Tier 1) in Comparative Microbial Genomics, 2001-2008
Senior Research Scholar, Dibner Institute for the History of Science and Technology, MIT, 2004-2005
Professor Emeritus, Department of Biochemistry and Molecular Biology, Dalhousie University (with continuing salaried post-retirement appointment as Professor, 2007-2019)

GRANT PANEL AND NATIONAL/INTERNATIONAL COMMITTEE MEMBERSHIPS (since 1991)

Consultant, Center for Prokaryotic Genome Analysis, 1987-1991
Inter-Council Human Genome Advisory Committee, 1990-1991
Medical Research Council, Biochemistry/Molecular Biology "B" Grants Committee, 1992-1995
Medical Research Council, Canadian Genome Analysis and Technology Program, Management Committee, 1992-1997
Sloan Foundation, Peer Review Committee for Young Investigators Awards, 1994-1998
Council, Society for Molecular Biology and Evolution, 1995-1998
Flavelle Medal Selection Committee, The Royal Society of Canada, 1998
Gairdner Foundation Awards Committee, 2001
College of Reviewers, Canada Research Chairs Program, 2001
Faculty of 1000, Microbial Genetics and Genomics, 2001
Scientific Advisory Board, Ecopia Biosciences Inc., 2001-2002
Scientific Advisory Board, Genome Prairie, 2001-2005
American Academy of Microbiology International Initiatives Committee, 2001-2004
CIHR Genomics Grants Committee, 2002-2004, 2005, 2008
US National Research Council Metagenomics Committee, 2005-2007
Committee on Election to Fellowship, American Academy of Microbiology, 2007-2009
Scientific Advisory Group, Ontario Genomics Institute, 2009
Advisory Board, Canadian Institute for Advanced Research - Integrated Microbial Biodiversity Program, 2008-2018
Expert Panel on the State and Trends of Biodiversity Science in Canada, Council of Canadian Academies, 2009-2011
Chair, Scientific Advisory Board, Hydrocarbon Metagenomics Project, Genome Alberta, 2009-2013
US National Academy of Sciences, committee to award Walcott and Miller Prize in Paleobiology, 2015-2018

EDITORIAL RESPONSIBILITIES (since 1991)

Editorial Board, *Journal of Molecular Evolution*, 1984-1992
Editorial Board, *Journal of Genetics*, 1985-1991
Editorial Board, *Molecular Biology and Evolution*, 1987-1995
Editorial Board, *Environmental Microbiology*, 2000-2013
Advisory Editorial Board, *Trends in Microbiology*, 2000-2015
Editorial Board, *Archaea*, 2001-2009

Editorial Board, *Biology Direct*, 2009-present
Editorial Board, *Proceedings of the US National Academy of Sciences*, 2002-present
Board of Reviewing Editors, *Science*, 2006-2009
Editorial Board, *Genome Biology and Evolution*, 2009-present
Editorial Board, *Biology and Philosophy*, 2016-present

OTHER CURRENT SOCIETY MEMBERSHIPS (see also HONORS AND AWARDS)

American Association for the Advancement of Science
American Society for Microbiology
Society for Molecular Biology and Evolution (honorary)
International Society for the History, Philosophy and Social Studies of Biology
Philosophy of Science Association

CURRENT LOCAL COMMITTEE MEMBERSHIPS

Advisory Committee, Centre for Comparative Genomics and Evolutionary Bioinformatics (CGEB),
Dalhousie University, 2008-present
Dalhousie Art Gallery Advisory Committee, 2004-present

TRAINING

Current Postdoctoral Fellows

Jeremy Wideman (Ph.D, Alberta)
Aaron Novick (Ph,D, Pittsburgh)

Former Postdoctoral Fellows

Phyllis R. Dobson (Ph.D. Dalhousie)
Richard A. Singer (Ph.D. Harvard)
Annalee Cohen (Ph.D. Dalhousie)
Michael Torres (Ph.D. Texas A&M)
Reginald H. Lau (Ph.D. Alberta)
Jason D. Hofman (Ph.D. Tennessee)
R. Keith Conover (Ph.D. UCLA)
William F. Walker (Ph.D. Illinois)
Marlene Snyder (Ph.D. Colorado)
Charles D. Daniels (Ph.D. Michigan)
Susan M. Logan (Ph.D. Victoria)
James R. Brown (Ph.D. Simon Fraser)
Arlin Stoltzfus (Ph.D. Iowa)
Nataraj Vettakorumakankav (Ph.D. Calgary)
Sandra Baldauf (Ph.D. Michigan)
Hans-Peter Klenk (Ph.D. Munich)
John Logsdon (Ph.D. Indiana)
Dave Faguy (Ph.D. Queen's)
Jan Andersson (Ph.D. Uppsala - co-supervised with A. Roger)
Alastair Simpson (Ph.D. Sydney - co-supervised with A. Roger)
Christophe Douady (Ph.D, Belfast)
Christian Blouin (Ph.D. Dalhousie - co-supervised with A. Roger)
Yuji Inagaki (Ph.D. Nagoya - co-supervised with A. Roger)
Uri Gophna (Ph.D. Tel Aviv)
Maureen O'Malley (Ph.D. Sussex)
Eric Bapteste (Ph.D. Paris)

Thane Papke (Ph.D. Montana State)
Camilla Nesbø (Ph.D. Oslo)
Olga Zhaxybayeva (Ph.D. Connecticut)
Carlos Mariscal (Ph.D. Duke)
Austin Booth (Ph.D. Harvard)
S. Andrew Inkpen (Ph.D. UBC)

Former Graduate Students

Ronald M. MacKay (Ph.D.)
Susan E. Douglas (Ph.D.)
Carmen Sapienza (Ph.D.)
Wen-Lian Xu (Ph.D.)
Robert L. Charlebois (Ph.D.)
Leonard C. Schalkwyk (Ph.D.)
Wan L. Lam (Ph.D.)
Cheryl Dollard (M.Sc.)
Andrew Roger (Ph.D.)
David Edgell (Ph.D.)
Patrick Keeling (Ph.D.)
Naomi Fast (Ph.D.)
John Archibald (Ph.D.)
Joel Dacks (Ph.D.)
Yan Boucher (Ph.D.)
David Walsh (Ph.D.)
Ellen Boudreau (Ph.D.)
Jeremy Koenig (Ph.D.)
Adrian Sharma (Ph.D.)
Tyler Brunet (MSc in Bioinformatics), co-supervised with C. Blouin

Former Undergraduate / Honours Students

Jessica Boyd
Susan Williamson
James MacWilliam
Andrew McKee
Karen McAllister
Jeremy Murray
Olof Sandblom
Amanda Doherty
Banoo Malik
Claire Richardson
Mike Dorey
Elizabeth Ryall
Joel Surette
Geoffrey Morris
David McLeod
Christine Sharpe
Tyler Brunet

Former Sabbatical Visitors:

Mike Dyall-Smith (Melbourne)
Francisco Rodriguez-Valera (Alicante)
Junetsu Ito (Arizona)

RESEARCH FUNDING

Continuously funded since 1971. Listed below are grants since 1991.

(Direct costs, Canadian dollars except where noted)

Strategic Research Initiatives Fund – Dalhousie University, Office of VP (Research):

2014-2016; \$200,000/annum; P.I. (with 10 co-applicants).

NSERC Herzberg Gold Medal in Science and Engineering: Discovery grant; 2014-2019,
\$200,000/annum.

Canadian Institutes of Health Research - Emerging Team Grant: Canadian Microbiome Initiative:

Modeling and mapping microbial diversity and function with marker genes, genomes and metagenomes (co-PI with R. Beiko, J. Bielawski & M. Ereshefsky), 2010-2013,

\$223,000/annum. No-cost extension to March 31, 2015.

Tula Foundation: CGEB Molecular Biology Postdoctoral Fellowship (plus research allowance)

07/2008-12/2010, \$64,000/annum.

Canadian Institutes of Health Research (Genomics): Integron metagenomics, 2006-2009,

\$141,917/annum.

Genome Atlantic (Award-in-Aid): Prokaryotic Genome Project, 04/2006-03/2007, \$85,469

Canadian Institutes of Health Research (Genetics) and formerly Medical Research Council of

Canada: Evolution of genome structure and function. Continuously funded from 1971 through 2007; last renewal 2002-2007, \$253,000/annum.

Crohn's & Colitis Foundation of Canada: The archaeal microbiota in inflammatory bowel disease

(IBD). 2-yr award: \$55,000 (2004-2005); \$45,000 (2005-2006).

Genome Canada (Genome Atlantic): A comparative understanding of prokaryotic genome evolution

and diversity. Ca. \$6 million (direct costs) over four years (2002-2006). Approximately \$2 million available for use by this lab.

Canada Research Chair (CIHR): Comparative Microbial Genomics, 2001-2008, \$200,000/annum

(including salary).

Canada Foundation for Innovation (to accompany Canada Research Chair): 2001-2002,

\$97,767.

Canadian Institutes of Health Research: Bioinformatic evaluation of theories in genomics,

2000-2003, \$61,986/annum. Combined into *Evolution of genome structure and function* in 2002.

Canadian Institutes of Health Research – Equipment Grant: 2000-2001, \$28,284

Dalhousie University Medical Research Foundation – Equipment Grant: 2000-2001, \$13,642

Canada Foundation for Innovation - Ongoing New Opportunities: A new laboratory for comparative

genomics (co-PI with A. Roger & M. Gray), 1999, \$200,000

Canadian Genome Analysis and Technology Program: Sequence of the genome of *Sulfolobus*

solfataricus (co-PI with M. Ragan & R. Charlebois), 1993-1997, \$227,500/annum.

Office of Naval Research (US): Archaeobacterial genetics, 1991-1995, US \$65,000/annum.

PUBLICATIONS

Note: as of 18 October, 2018, Google Scholar indicates 31,486 citations, and an h-index of 89 (43 since 2013). **Twenty-five most significant publications are shown in bold, with brief statements about their significance.**

Complete List of Publications

1. Miller, P.A., Pappenheimer, A.M., Jr. and Doolittle, W.F. (1966)
Phage-host relationships in certain strains of *Corynebacterium diphtheriae*. *Virology* 29: 410-425.
2. Doolittle, W.F. and Yanofsky, C. (1968)
Mutants of *Escherichia coli* with an altered tryptophanyl-transfer ribonucleic acid synthetase. *J. Bacteriol.* 95:1283-1294.
3. Doolittle, W.F. and Pace, N.R. (1970)
Synthesis of 5S ribosomal RNA in *Escherichia coli* after rifampicin treatment. *Nature* 228: 125-129.
4. **Doolittle, W.F. and Pace, N.R. (1971) Transcriptional organization of the ribosomal RNA cistrons in *Escherichia coli*. *Proc. Natl. Acad. Sci. U.S.A.* 68:1786-1790. Using transcriptional runoff and oligonucleotide cataloguing, showed 16S, 23S and 5S rRNA genes to be transcribed as a unit.**
5. Doolittle, W.F. (1972)
Ribosomal ribonucleic acid synthesis and maturation in the blue-green alga *Anacystis nidulans*. *J. Bacteriol.* 111:316-324.
6. Doolittle, W.F. (1973)
Postmaturational cleavage of 23S ribosomal ribonucleic acid and its metabolic control in the blue-green alga *Anacystis nidulans*. *J. Bacteriol.* 113:1256-1263.
7. Dobson, P.R., Doolittle, W.F. and Sogin, M.L. (1974)
Precursor of 5S ribosomal ribonucleic acid in the blue-green alga *Anacystis nidulans*. *J. Bacteriol.* 117:660-666.
8. Singer, R.A. and Doolittle, W.F. (1974)
Novel ribonucleic acid species accumulated in the dark in the blue-green alga *Anacystis nidulans*. *J. Bacteriol.* 118:351-357.
9. Doolittle, W.F. and Singer, R.A. (1974)
Mutational analysis of dark endogenous metabolism in the blue-green bacterium *Anacystis nidulans*. *J. Bacteriol.* 119:677-683.
10. Doolittle, W.F., Woese, C.R., Sogin, M.L., Bonen, L. and Stahl, D. (1975)
Sequence studies on 16S ribosomal RNA from a blue-green alga. *J. Mol. Evol.* 4:307-315.
11. Singer, R.A. and Doolittle, W.F. (1975)
Control of gene expression in blue-green algae. *Nature* 253:650-651.
12. **Bonen, L. and Doolittle, W.F. (1975)**

- On the prokaryotic nature of red algal chloroplasts. Proc. Natl. Acad. Sci. U.S.A. 72:2310-2314. Molecular proof, using oligonucleotide cataloging, of the endosymbiont hypothesis for the origin of plastids.**
13. Singer, R.A. and Doolittle, W.F. (1975)
Leucine biosynthesis in the blue-green bacterium *Anacystis nidulans*.
J. Bacteriol. 124:810-814.
 14. Bonen, L., Allen, G.V., Dobson, P.R. and Doolittle, W.F. (1976)
Nonribosomal nature of novel, stable ribonucleic acid species accumulated by blue-green bacteria. J. Bacteriol. 126:1020-1023.
 15. Bonen, L. and Doolittle, W.F. (1976)
Partial sequences of 16S rRNA and the phylogeny of blue-green algae and chloroplasts.
Nature 261:669-673.
 16. Cunningham, R.S., Bonen, L., Doolittle, W.F. and Gray, M.W. (1976)
Unique species of 5S, 18S and 26S ribosomal RNA in wheat mitochondria. FEBS Lett. 69:116-122.
 17. Cunningham, R.S., Gray, M.W., Doolittle, W.F. and Bonen, L. (1977)
The prokaryotic nature of wheat embryo mitochondrial 18S ribosomal RNA. Colloques internationaux C.N.R.S. (Acides nucleiques et synthese des proteines chez les vegetaux) 261:243-248.
 18. Bonen, L., Cunningham, R.S., Gray, M.W. and Doolittle, W.F. (1977)
Wheat embryo mitochondrial 18S ribosomal RNA: Evidence for its prokaryotic nature.
Nucleic Acids Res. 4:663-671.
 19. Lau, R.H., McKenzie, M.M. and Doolittle, W.F. (1977)
Phycocyanin synthesis and degradation in the blue-green bacterium *Anacystis nidulans*. J. Bacteriol. 132:771-778.
 20. Bonen, L. and Doolittle, W.F. (1978)
Ribosomal RNA homologies and the evolution of the filamentous blue-green bacteria. J. Mol. Evol. 10:283-292.
 21. **Doolittle, W.F. (1978)**
Genes in pieces, were they ever together? Nature 272:581-582. The first articulation of the "introns early" hypothesis, a stimulus for much experimental and computational work over the next decade
 22. Lau, R.H. and Doolittle, W.F. (1979)
Covalently closed circular DNAs in closely related unicellular cyanobacteria.
J. Bacteriol. 137:648-652.
 23. Bonen, L., Doolittle, W.F. and Fox, G.E. (1979)
Cyanobacterial evolution: results of 16S ribosomal ribonucleic acid sequence analyses. Can. J. Biochem. (C.H. Best memorial issue) 57:879-888.
 24. MacKay, R.M., Zablen, L.B., Woese, C.R. and Doolittle, W.F. (1979)

- Homologies in processing and sequence between the 23S ribosomal ribonucleic acids of *Paracoccus denitrificans* and *Rhodospseudomonas spheroides*. Arch. Microbiol. 123:165-172.
25. Hofman, J.D., Lau, R.H. and Doolittle, W.F. (1979)
The number, physical organization and transcription of ribosomal RNA cistrons in an archaeobacterium: *Halobacterium halobium*. Nucleic Acids Res. 7:1321-1333.
 26. **Doolittle, W.F. and Sapienza, C. (1980)**
Selfish genes, the phenotype paradigm and genome evolution. Nature 284:601-603.
With accompanying article by Leslie Orgel and Francis Crick, set stage for (still ongoing) debate over the "function" of transposable elements that make up the majority of many genomes. 1785 citations to date.
 27. Lau, R.H., Sapienza, C. and Doolittle, W.F. (1980)
Cyanobacterial plasmids: their widespread occurrence, and the existence of regions of homology between plasmids in the same and different species.
Mol. Gen. Genet. 178: 203-211.
 28. Doolittle, W.F. (1980)
Revolutionary concepts in evolutionary cell biology. Trends Biochem. Sci. 5:146-149.
 29. MacKay, R.M., Spencer, D.F., Doolittle, W.F. and Gray, M.W. (1980)
Nucleotide sequences of wheat embryo cytosol 5S and 5.8S rRNAs.
Eur. J. Biochem. 112:561-576.
 30. MacKay, R.M., Gray, M.W. and Doolittle, W.F. (1980)
Nucleotide sequence of *Crithidia fasciculata* 5S rRNA. Nucleic Acids Res. 8:4911-4917.
 31. Lau, R.H. and Doolittle, W.F. (1980)
Agu I; a more readily purified isoschizomer of Ava I. FEBS Lett. 121:200-202.
 32. Dover, G.A. and Doolittle, W.F. (1980)
Modes of genome evolution. Nature 288:646-647.
 33. Doolittle, W.F. and Bonen, L. (1981)
Molecular sequence data indicating an endosymbiotic origin for plastids. Ann. N.Y. Acad. Sci. 361:248-259.
 34. Sapienza, C. and Doolittle, W.F. (1981)
Genes are things you have whether you want them or not. Cold Spring Harbor Symp. Quant. Biol. 45:177-182.
 35. **Doolittle, W.F. (1981)**
Is nature really motherly? (A critique of J.E. Lovelock's Gaia: A New Look at Life on Earth). CoEvolution Quarterly 29:58-63. *Perhaps the most frequently cited explanation, for the general public, of why Darwinists find James Lovelock's very appealing and popular Gaia hypothesis untenable.*
 36. Doolittle, W.F. (1981)
5S ribosomal RNA genes and the *Alu* I family: evolutionary and functional significance of a region of strong homology. FEBS Lett. 126:147-149.

37. MacKay, R.M. and Doolittle, W.F. (1981)
Nucleotide sequences of *Acanthamoeba castellanii* 5S and 5.8S ribosomal ribonucleic acids: phylogenetic and comparative structural analyses. *Nucleic Acids Res.* 9:3321-3334.
38. Doolittle, W.F. (1981)
The endosymbiont hypothesis (a review of Lynn Margulis' Symbiosis in Cell Evolution).
Science 213:640-641.
39. MacKay, R.M., Spencer, D.F., Schnare, M.N., Doolittle, W.F. and Gray, M.W. (1982)
Comparative analysis and functional implications of 5S and 5.8S ribosomal RNA structure.
Can. J. Biochem. 60:480-489.
40. **Gray, M.W. and Doolittle, W.F. (1982)**
Has the endosymbiont hypothesis been proven? *Microbiol. Rev.* 46:1-42. *A review article widely regarded as the definitive statement on the status, after a decade, of efforts to prove Lynn Margulis' "serial endosymbiont hypothesis".*
41. Doolittle, W.F. (1982)
Evolutionary molecular biology: where it is going? *Can. J. Biochem.* (text of Ayerst Award Lecture) 60:83-90.
42. Sapienza, C. and Doolittle, W.F. (1982)
Unusual physical organization of the halobacterial genome. *Nature* 295:384-389.
43. Sapienza, C. and Doolittle, W.F. (1982)
Repeated sequences in the genomes of halobacteria. *Zbl. Bakt. Hyg. I, Abt. Orig. C3:* 120-127.
44. MacKay, R.M., Bonen, L., Stackebrandt, E. and Doolittle, W.F. (1982)
The 5S ribosomal RNAs of *Paracoccus denitrificans* and *Prochloron*. *Nucleic Acids Res.* 10:2963-2970.
45. Sapienza, C., Rose, M. and Doolittle, W.F. (1982)
High frequency genomic rearrangements involving halobacterial repeat sequences. *Nature* 299:182-185.
46. Walker, W.F. and Doolittle, W.F. (1982)
Redividing the basidiomycetes on the basis of 5S rRNA sequences. *Nature* 299:723-724.
47. Walker, W.F. and Doolittle, W.F. (1982)
Nucleotide sequences of 5S ribosomal RNA from four oomycete and chytrid water molds.
Nucleic Acids Res. 10:5715-5721.
48. MacKay, R.M. and Doolittle, W.F. (1982)
Two thraustochytrid 5S ribosomal RNAs. *Nucleic Acids Res.* 10:8307-8310.
49. Williamson, S.E. and Doolittle, W.F. (1983)
Genes for tRNA^{ile} and tRNA^{ala} in the spacer between the 16S and 23S rRNA genes of a blue-green alga: Strong homology to chloroplast tRNA genes and tRNA genes of the *E. coli* *rnnD* gene cluster. *Nucleic Acids Res.* 11:225-235.
50. Rose, M.R. and Doolittle, W.F. (1983)

- Molecular biological mechanisms of speciation. *Science* 220:157-163.
51. Rose, M.R. and Doolittle, W.F. (1983)
Parasitic DNA - the origin of species and sex. *New Scientist* 98:787-789.
 52. Xu, W.-L. and Doolittle, W.F. (1983)
Structure of the archaebacterial transposable element ISH50. *Nucleic Acids Res.* 11:4195-4199.
 53. Walker, W.F. and Doolittle, W.F. (1983)
5S rRNA sequences from four marine invertebrates and implications for base pairing models of metazoan sequences. *Nucleic Acids Res.* 11:5159-5164.
 54. Walker, W.F. and Doolittle, W.F. (1983)
5S rRNA sequences from eight basidiomycetes and fungi imperfecti. *Nucleic Acids Res.* 11:7625-7630.
 55. Walker, W.F. and Doolittle, W.F. (1983)
Systematics of basidiomycetes based on 5S rRNA sequences and other data (reply to Templeton). *Nature* 303:732.
 56. Daniels, C.J., McKee, A.H.Z. and Doolittle, W.F. (1984)
Archaebacterial heat shock proteins. *EMBO J.* 3:745-749.
 57. Douglas, S.E. and Doolittle, W.F. (1984)
Nucleotide sequence of the 5S rRNA gene and flanking regions in the cyanobacterium *Anacystis nidulans*. *FEBS Lett.* 166:307-310.
 58. Doolittle, W.F., Kirkwood, T.R.L. and Dempster, M.A.H. (1984)
Selfish DNAs with self-restraint. *Nature* 307:501-502.
 59. Douglas, S.E. and Doolittle, W.F. (1984)
Complete nucleotide sequence of the 23S rRNA gene of the cyanobacterium *Anacystis nidulans*. *Nucleic Acids Res.* 12:3373-3386.
 60. Daniels, C.J., Gupta, R. and Doolittle, W.F. (1985)
Transcription and excision of a large intron in the tRNA^{Trp} gene of an archaebacterium, *Halobacterium volcanii*. *J. Biol. Chem.* 260:3132-3134.
 61. Daniels, C.J., Hofman, J.D., MacWilliam, J.G., Doolittle, W.F., Luehrsen, K.R. and Fox, G.E. (1985)
Sequence of 5S ribosomal RNA gene regions and their products in the archaebacterium *Halobacterium volcanii*. *Mol. Gen. Genet.* 198:270-274.
 62. Lau, R.H., Visentin, L.P., Martin, S.M., Hofman, J.D. and Doolittle, W.F. (1985)
Site-specific restriction endonuclease from the filamentous cyanobacterium *Nostoc* species Mac PCC 8009. *FEBS Letts.* 179:129-132.
 63. Doolittle, W.F. (1985)
RNA-mediated gene conversion? *Trends Genet.* 1: 64-65.
 64. Doolittle, W.F. (1985)

- Some broader evolutionary issues which emerge from molecular biological data. PSA 84 (Philosophy of Science Assoc.) 2:129-144.
65. Doolittle, W.F. (1985)
Archaeobacteria coming of age. Trends Genet. 1:268-269.
 66. Daniels, C.J., Douglas, S.E., McKee, A.H.Z. and Doolittle, W.F. (1986)
Genes for transfer RNAs in *Halobacterium volcanii*. Systematic and Applied Micro. 7:26-29.
 67. **Darnell, J.E. and Doolittle, W.F. (1986)**
Speculations on the early course of evolution. Proc. Natl. Acad. Sci. U.S.A. 83:1271-1275. A comprehensive scenario linking the RNA world to modern gene structure.
 68. Hofman, J.D., Schalkwyk, L.C. and Doolittle, W.F. (1986)
ISH51: a large, degenerate family of insertion sequence-like elements in the genome of the archaeobacterium, *Halobacterium halobium*. Nucleic Acids Res. 14:6983-7000.
 69. Doolittle, W.F. (1986)
The evolutionary significance of the archaeobacteria. Ann. N.Y. Acad. Sci. 503:72-77.
 70. Cline, S.W. and Doolittle, W.F. (1987)
Efficient transfection of the archaeobacterium *Halobacterium halobium*. J. Bacteriol. 169:1341-1344.
 71. Doolittle, W.F. (1987)
The origin and function of intervening sequences in DNA (a review). American Naturalist 130:915-928.
 72. Doolittle, W.F. (1987)
Genome evolution in review. (Review of *The Evolution of DNA Sequences*). Trends Genet. 3:82-83.
 73. Drouin, G., Hofman, J.D. and Doolittle, W.F. (1987)
Unusual rRNA gene organization in copepods of the genus *Calanus*. J. Mol. Biol. 196: 943-946.
 74. Doolittle, W.F. (1987)
What introns have to tell us: hierarchy in genome evolution. Cold Spring Harbor Symp. Quant. Biol. 52:907-913.
 75. Charlebois, R.L., Lam, W.L., Cline, S.W. and Doolittle, W.F. (1987)
Characterization of pHV2 from *Halobacterium volcanii* and its use in demonstrating transformation of an archaeobacterium. Proc. Natl. Acad. Sci. U.S.A. 84:8530-8534.
 76. Doolittle, W.F. (1987)
Bacterial evolution. Can. J. Microbiol. 34:547-551.
 77. Doolittle, W.F. (1988)
Hierarchical approaches to genome evolution. Can. J. Phil. 14 (suppl.):101-133.
 78. Snyder, M. and Doolittle, W.F. (1988)
P elements in *Drosophila*: selection at several levels. Trends Genet. 4:147-149.

79. Cline, S.W., Lam, W.L., Charlebois, R.L., Schalkwyk, L.C. and Doolittle, W.F. (1989) Transformation methods for halophilic archaeobacteria. *Can. J. Microbiol.* 35: 148-152.
80. Charlebois, R.L., Hofman, J.D., Schalkwyk, L.C., Lam, W.L. and Doolittle, W.F. (1989) Genome mapping in halobacteria. *Can. J. Microbiol.* 35:21-29.
- 81. Lam, W. and Doolittle, W.F. (1989)**
Shuttle vectors for the archaeobacterium *Halobacterium volcanii*. *Proc. Natl. Acad. Sci. U.S.A.* 86:5478-5482. The first reliable genetic system for any archaeal species, the basis of much subsequent work.
82. Cline, S.W., Schalkwyk, L.C. and Doolittle, W.F. (1989) Transformation of the archaeobacterium *Halobacterium volcanii* with genomic DNA. *J. Bacteriol.* 171:4987-4991.
83. Lam, W.L., Charlebois, R.L. and Doolittle, W.F. (1989) Progress in the molecular biology of the archaeobacteria. *UCLA Symp. Mol. Cell. Biol. (New Series)*, 122:265-272.
84. Conover, R.K. and Doolittle, W.F. (1990) Characterization of a gene involved in histidine biosynthesis in *Halobacterium (Haloferox) volcanii*: isolation and rapid mapping by transformation of an auxotroph with cosmid DNA. *J. Bacteriol.* 172:3244-3249.
85. Lam, W.L., Cohen, A., Tsoulouhas, D. and Doolittle, W.F. (1990) Genes for tryptophan biosynthesis in the archaeobacterium *Haloferox (Halobacterium) volcanii*. *Proc. Natl. Acad. Sci. U.S.A.* 87:6614-6618.
86. Doolittle, W.F. (1991) The origins of introns. *Current Biology* 1:145-146.
87. Charlebois, R.L., Schalkwyk, L.C., Hofman, J.D. and Doolittle, W.F. (1991) A detailed physical map and set of overlapping clones covering the genome of the archaeobacterium *Haloferox volcanii* DS2. *J. Mol. Biol.* 222:509-524.
88. Doolittle, W.F., Lam, W.L. and Schalkwyk, L.C. (1991) Evolution and basic features of gene and genome structure. *Symp. Soc. Gen. Microbiol.* 47:1-16.
89. Lam, W.L., Logan, S.M. and Doolittle, W.F. (1992) Genes for tryptophan biosynthesis in the halophilic archaeobacterium *Haloferox volcanii*: the *trpDFEG* cluster. *J. Bacteriol.* 174:1694-1697.
- 90. Cohen, A., Lam, W.L., Charlebois, R.L., Doolittle, W.F. and Schalkwyk, L.C. (1992)**
Localizing genes on the map of the genome of *Haloferox volcanii*, one of the Archaea. *Proc. Natl. Acad. Sci. U.S.A.* 89:1602-1606. The first complete genome map for an archaean based on genetic and physical data.
91. Lam, W.L., and Doolittle, W.F. (1992) Mevinolin resistant mutations identify a promoter and the gene for a eukaryotic-like 3-hydroxy-3-methylglutaryl coenzyme A reductase in the archaeobacterium

- Haloflex volcanii*. J. Biological Chem. 267: 5829-5834.
92. Cline, S.W. and Doolittle, W.F. (1992)
Transformation of members of the genus *Haloarcula* with shuttle vectors based on *Halobacterium halobium* and *Haloflex volcanii* plasmid replicons. J. Bacteriol. 174:1076-1080.
 93. Drouin, G., Sevigny, J.-M., McLaren, I.A., Hofman, J.D. and Doolittle, W.F. (1992)
Variable arrangement of 5S ribosomal RNA genes within the ribosomal DNA repeats of arthropods. Mol. Biol. Evol. 9: 826-835.
 94. Yan, B., Cline, S.W., Doolittle, W.F. and Spudich, J.L. (1992)
Transformation of a *bop-hop-sop-I-sop-II-Halobacterium halobium* mutant to *bop*⁺: effects of bacteriorhodopsin photoactivation on cellular proton fluxes and swimming behavior. Photochem. and Photobiol. 56: 553-561.
 95. Schalkwyk, L.C., Charlebois, R.L. and Doolittle, W.F. (1992)
Insertion sequences on plasmid pHV1 of *Haloflex volcanii*. Can. J. Microbiol. 39: 201-206.
 96. Doolittle, W.F. (1992)
What are the archaeobacteria and why are they important? Biochem. J. 58: 1-6.
 97. Doolittle, W.F., Lam, W.L., Schalkwyk, L.C., Charlebois, R.L., Cline, S.W. and Cohen, A. (1992)
Progress in developing the genetics of the halobacteria. Biochem. J. 58: 73-78.
 98. Doolittle, W.F. (1993)
Sol's World, the RNA World, Our World (Editorial). FASEB Journal 7: 1-2.
 99. Doolittle, W.F. and Stoltzfus, A. (1993)
Genes-in-pieces revisited. (News and Views) Nature 361: 403.
 100. Stoltzfus, A. and Doolittle, W.F. (1993)
Slippery introns and globin gene evolution. Current Biology 3: 1-3.
 101. Roger, A.J. and Doolittle, W.F. (1993)
Why introns-in-pieces? (News and Views) Nature 364: 289-299.
 102. Brown, J.R., Masuchi, Y., Robb, F.T. and Doolittle, W.F. (1994)
Evolutionary relationships of bacterial and archaeal glutamine synthetase genes. J. Mol. Evol. 38: 566-576.
 103. Doolittle, W.F. and Brown, J.R. (1994)
Tempo, mode, the progenote and the universal root. Proc. Natl. Acad. Sci. U.S.A. 91: 6721-6728.
 104. Dyall-Smith, M.L. and Doolittle, W.F. (1994)
Construction of composite transposons for halophilic archaeobacteria. Can. J. Microbiol. 40: 922-929.
 105. **Stoltzfus, A., Spencer, D., Zuker, M., Logsdon, J.M., Jr., and Doolittle, W.F. (1994)**

Testing the exon theory of genes: the evidence from protein structure.

Science 265: 202-207. *Strong statistical evidence against claimed proofs for “introns early” based on protein structure-gene structure correlations.*

106. Roger, A.J., Keeling, P.K. and Doolittle, W.F. (1994)
Introns, the broken transposons. *J. Gen. Physiol.* 49: 27-37.
107. Keeling, P.J., Charlebois, R.L., and Doolittle, W.F. (1994)
Archaeobacterial genomes: Eubacterial form, eukaryotic content. *Current Opin. Genet. Dev.* 4: 816-822.
108. Klenk, H.-P. and Doolittle, W.F. (1994)
Archaea and eukaryotes versus bacteria? *Current Biology* 4: 920-922.
109. Brown, J.R. and Doolittle, W.F. (1995)
Root of the universal tree of life based on ancient aminoacyl-tRNA synthetase gene duplications. *Proc. Natl. Acad. Sci. U.S.A.* 92: 2441-2445.
110. Stoltzfus, A., Spencer, D.F. and Doolittle, W.F. (1995)
Methods for evaluating exon-protein correspondences. *Comp. Appl. Biosci.* 11: 509-515.
111. Keeling, P.J. and Doolittle, W.F. (1995)
Concerted evolution in protists: Recent homogenization of a polyubiquitin gene in *Trichomonas vaginalis*. *J. Mol. Evol.* 41: 556-562.
112. Keeling, P.J. and Doolittle, W.F. (1995)
An archaeobacterial eIF-1A: New grist for the mill. *Mol. Microbiol.* 17: 399-400.
113. Keeling, P.J. and Doolittle, W.F. (1995)
Archaea: Narrowing the gap between prokaryotes and eukaryotes. (Commentary)
Proc. Natl. Acad. Sci. U.S.A. 92: 5761-5764.
114. Keeling, P.J. and Doolittle, W.F. (1996)
Methionine aminopeptidase-1: The *MAP* of the mitochondrion?
Trends Biochem. Sci. 21: 285-286.
115. Keeling, P.J., Baldauf, S.L., Doolittle, W.F., Zillig, W. and Klenk, H.-P. (1996)
An *infB*-homolog in *Sulfolobus acidocaldarius*. *Syst. Applied Microbiol.* 19: 312-321.
116. Keeling, P.J. and Doolittle, W. F. (1996)
A non-canonical genetic code in an early diverging eukaryotic lineage.
EMBO J. 15: 2285-2290.
117. Keeling, P.J., Klenk, H.-P., Singh, R.K., Feeley, O., Schleper, C., Zillig, W.,
Doolittle, W.F. and Sensen, C.W. (1996)
Complete nucleotide sequence of the *Sulfolobus islandicus* multicopy
plasmid pRN1. *Plasmid* 35: 141-144.
118. Baldauf, S.L., Palmer, J.D. and Doolittle, W.F. (1996)
The root of the universal tree and the origin of eukaryotes based on elongation
factor phylogeny. *Proc. Natl. Acad. Sci. U.S.A.* 93: 7749-7754.
119. **Roger, A.J., Clark, C.G. and Doolittle, W.F. (1996)**

A possible mitochondrial gene in the early-branching amitochondriate protist *Trichomonas vaginalis*. Proc. Natl. Acad. Sci. U.S.A. 93: 14618-14622. *Early support for the now widely accepted conclusion that the last common ancestor of all extant eukaryotes had mitochondria (not thought to be so in the early 1990s).*

120. Roger, A.J., Smith, M.W., Doolittle, R.F. and Doolittle, W.F. (1996)
Evidence for the heterolobosea from phylogenetic analysis of genes encoding glyceraldehyde-3-phosphate dehydrogenase. *J. Euk. Micro.* 43: 475-485.
121. Sensen, C.W., Klenk, H.-P., Singh, R.K., Allard, G., Chan, C.C.-Y., Liu, Q.Y., Penny, S.L., Young, F., Schenk, M., Gaasterland, T., Doolittle, W.F., Ragan, M.A. and Charlebois, R.L. (1996)
Organizational characteristics and information content of an archaeal genome: 100 kbp of contiguous sequence from *Sulfolobus solfataricus* P2. *Mol. Microbiol.* 22: 175-191.
122. Keeling, P.J., Doherty-Kirby, A.L., Teh, E.M. and Doolittle, W.F. (1996)
Linked genes for calmodulin and E2 ubiquitin-conjugating enzyme in *Trichomonas vaginalis*. *J. Euk. Micro.* 43: 468-474.
123. Keeling, P.J. and Doolittle, W.F. (1996)
Alpha-tubulin from early-diverging eukaryotic lineages: Divergence and evolution of the tubulin family. *Mol. Biol. Evol.* 13: 1297-1305.
124. Ragan, M.A., Logsdon, J.M., Jr., Sensen, C.W., Charlebois, R.L. and Doolittle, W.F. (1996)
An archaeobacterial homolog of pelota, a meiotic cell division protein in eukaryotes. *FEMS Micro. Lett.* 144: 151-155.
125. Edgell, D.R., Fast, N.M. and Doolittle, W.F. (1996)
Selfish DNA: The best defense is a good offense. *Current Biology* 6: 385-388.
126. Charlebois, R.L., Gaasterland, T., Ragan, M.A., Doolittle, W.F. and Sensen, C.W. (1996)
The *Sulfolobus solfataricus* P2 genome project. *FEBS Letters* 398: 88-91.
127. Doolittle, W.F. (1996)
At the core of the Archaea. (Commentary) *Proc. Natl. Acad. Sci. U.S.A.* 93: 8797-8799.
128. Edgell, D.R. and Doolittle, W.F. (1996)
Archaeobacterial genomics: the complete genome sequence of *Methanococcus jannaschii*. *BioEssays* 19: 1-4.
129. Keeling, P. J. and Doolittle, W. F. (1997)
Evidence that eukaryotic triose phosphate isomerase is of alpha-proteobacterial origin. *Proc. Natl. Acad. Sci. U.S.A.* 94: 1270-1275.
130. Edgell, D.R., Klenk, H.-P. and Doolittle, W.F. (1997)
Gene duplications in evolution of archaeal family B DNA polymerases. *J. Bacteriol.* 179: 2632-2640.
131. Brown, J.R., Robb, F.T., Weiss, R. and Doolittle, W.F. (1997)
Evidence for the early divergence of tryptophanyl- and tyrosyl-tRNA synthetases. *J. Mol. Evol.* 45: 9-16.

132. Charlebois, R.L., Sensen, C.W., Doolittle, W.F. and Brown, J.R. (1997)
Evolutionary analysis of the *his* CGABdFDEHI operon from the archaeon *Sulfolobus solfataricus*. *J. Bacteriol.* 179: 4429-4432.
133. Bochar, D.A., Brown, J.R., Doolittle, W.F., Klenk, H.-P., Lam, W., Schenk, M.E., Stauffacher, C.V. and Rodwell, V.R. (1997)
3-Hydroxy-3-Methylglutaryl coenzyme A reductase of *Sulfolobus solfataricus*. DNA sequence, phylogeny, expression in *Escherichia coli* of the *hmgA* gene, and purification and kinetic characterization of the gene product. *J. Bacteriol.* 179: 3632-3638.
134. Baldauf, S.L. and Doolittle, W.F. (1997)
The origin and evolution of slime molds (Mycetozoa). *Proc. Natl. Acad. Sci. U.S.A.* 94: 12007-12012.
135. Stoltzfus, A., Logsdon, J.M., Jr., Palmer, J.D. and Doolittle, W.F. (1997)
Intron "sliding" and the diversity of intron positions. *Proc. Natl. Acad. Sci. U.S.A.* 94: 10739-10744.
- 136. Brown, J.R. and Doolittle, W.F. (1997)**
***Archaea and the prokaryote-to-eukaryote transition. Microbiol. Mol. Biol. Rev.* 61: 456-502. The first comprehensive argument concerning the impact of lateral gene transfer on our understanding of the Tree of Life.**
137. Keeling, P.J. and Doolittle, W.F. (1997)
Widespread and ancient distribution of a non-canonical genetic code in diplomonads. *Mol. Biol. Evol.* 14: 895-901.
138. Doolittle, W. F. (1997)
Why we still need basic research (Henry Friesen Award Lecture, 1996).
76 *Annales CRMCC*, 30(2), March 1997.
139. Logsdon, J. M, Jr. and Doolittle, W.F. (1997)
Origin of antifreeze protein genes: A cool tale in molecular evolution (Commentary).
Proc. Natl. Acad. Sci. U.S.A. 94: 3485-3487.
140. Doolittle, W.F. (1997)
Fun with genealogy (Commentary). *Proc. Natl. Acad. Sci. U.S.A.* 94:12751-12753.
141. Edgell, D.R. and Doolittle, W.F. (1997)
Archaea and the origin(s) of DNA replication proteins. *Cell* 89: 995-998.
142. Edgell, D.R., Malik, S.-B., and Doolittle, W.F. (1998)
Evidence of independent gene duplications during the evolution of archaeal and eukaryotic family B DNA polymerases. *Mol. Biol. Evol.* 15: 1207-1217.
143. Sensen, C.W., Charlebois, R.L., Chow, C., Clausen, I.G., Curtis, B., Doolittle, W.F., Duguet, M., Erauso, G., Gaasterland, T., Garrett, R.A., Gordon, P., de Jong, I.H., Jeffries, A.C., Kozera, C., Medina, N., De Moors, A., van der Oost, J., Phan, H., Ragan, M.A., Schenk, M.E., She, Q., Singh, R.K. and Tolstrup, N. (1998).
Completing the sequence of the *Sulfolobus solfataricus* P2 genome. *Extremophiles* 2: 305-312.

144. Keeling, P.J., Klenk, H.-P., Singh, R.K., Schenk, M.E., Sensen, C.W., Zillig, W. and Doolittle, W.F. (1998).
Sulfolobus islandicus plasmids pRN1 and pRN2 share distant but common evolutionary ancestry. *Extremophiles* 2: 391-393.
145. Fast, N.M., Roger, A.J., Richardson, C.A. and Doolittle, W.F. (1998)
U2 and U6 snRNA genes in the microsporidian *Nosema locustae*: evidence for a functional spliceosome. *Nucleic Acids Res.* 26: 3202-3207.
- 146. Doolittle, W.F. (1998)**
You are what you eat: a gene transfer ratchet could account for bacterial genes in eukaryotic nuclear genomes. *Trends Genet.* 14: 307-311. A still popular explanation for why gene transfer from organelles and (in phagotrophs) food bacteria is unidirectional and inevitable.
147. Doolittle, W.F. and Logsdon, J.M., Jr. (1998)
Archaeal genomics: Do archaea have a mixed heritage? *Current Biology* 8: R209-R211.
148. Doolittle, W.F. (1998)
A paradigm gets shifty. (News and View) *Nature* 392: 15-16.
149. Faguy, D.M. and Doolittle, W.F. (1998)
Cytoskeletal proteins: The evolution of cell division. *Current Biology*, 8: R338-R341.
150. Logsdon, J.M., Stoltzfus, A. and Doolittle, W.F. (1998)
Molecular evolution: Recent cases of spliceosomal intron gain? *Current Biology* 8: R560-R563.
151. Doolittle, W.F. and Akam, M. (1998)
Genomes and evolution. (Issue introduction) *Current Opin. Genet. Dev.* 8: 613-615.
152. Brown, J.R. and Doolittle, W.F. (1999)
Gene descent, duplication and horizontal transfer in the evolution of glutamyl- and glutaminyl-tRNA synthetases. *J. Mol. Evol.* 49: 485-495.
153. Hirt, R.P., Logsdon, J.M. Jr., Healy, B., Dorey, M.W., Doolittle, W.F. and Embley, T.M. (1999)
Microsporidia are related to fungi: evidence from the largest subunit of RNA polymerase II and other proteins. *Proc. Natl. Acad. Sci. U.S.A.* 96: 580-585.
154. Roger, A.J., Sandblom, O., Doolittle, W.F., and Philippe, H. (1999)
An evaluation of elongation factor 1a as a phylogenetic marker for eukaryotes. *Mol. Biol. Evol.* 16: 218-233.
155. Fast, N.M. and Doolittle, W.F. (1999)
Trichomonas vaginalis possesses a gene encoding the essential spliceosomal component, PRP8. *Mol. Biochem. Parasitol.* 99: 275-278.
156. Fast, N.M., Logsdon, J.M., Jr. and Doolittle, W.F. (1999)
Phylogenetic analysis of the TATA box binding protein (TBP) gene from *Nosema locustae*: evidence for a microsporidia-fungi relationship and spliceosomal intron loss. *Mol. Biol. Evol.* 16: 1415-1419.

157. **Archibald, J.M., Logsdon, J.M., Jr. and Doolittle, W.F. (1999)**
Recurrent paralogy in the evolution of archaeal chaperonins. *Current Biology* 9: 1053-1056. *A model (and data bearing on) neutral processes for the evolution of molecular complexity (Constructive Neutral Evolution, or CNE).*
158. **Doolittle, W.F. (1999)**
Phylogenetic classification and the universal tree. *Science* 284: 2124-2128. *Perhaps the most frequently cited paper (1818 citations to date) on the implications of lateral gene transfer for prokaryotic phylogeny and the meaning of any Tree of Life.*
159. Doolittle, W.F. (1999)
 Lateral gene transfer, genome surveys, and the phylogeny of prokaryotes -- Technical Comments. *Science* 286: 1443a.
160. Doolittle, W.F. (1999)
 Lateral genomics. (Millennium combined issue of *Trends Cell Biol.*, *Trends Biochem. Sci.* and *Trends Genet.*). *Trends Cell Biol.* 9: M5-M8.
161. Doolittle, W.F. (1999)
 Rethinking the origin of eukaryotes. *The Biological Bulletin*, 196: 378-380.
162. Faguy, D.M. and Doolittle, W.F. (1999)
 Genomics: Lessons from the *Aeropyrum pernix* genome. *Current Biology* 23: R883-R886.
163. Charlebois, R.L., Singh, R.K., Chan-Weiher, C.C., Allard, G., Chow, C., Confalonieri, F., Curtis, B., Duguet, M., Erauso, G., Faguy, D., Gaasterland, T., Garrett, R.A., Gordon, P., Jeffries, A.C., Kozera, C., Kushwaha, N., Lafleur, E., Medina, N., Peng, X., Penny, S.L., She, Q., St Jean, A., van der Oost, J., Young, F., Zivanovic, Y., Doolittle, W.F., Ragan, M.A., and Sensen, C.W. (2000)
 Gene content and organization of a 281-kbp contig from the genome of the extremely thermophilic archaeon, *Sulfolobus solfataricus* P2. *Genome* 43: 116-136.
164. Faguy, D.M. and Doolittle, W.F. (2000)
 Horizontal transfer of catalase-peroxidase genes between Archaea and pathogenic bacteria. *Trends Genet.* 16: 196-197.
165. Inagaki, Y. and Doolittle, W.F. (2000)
 Evolution of the eukaryotic translation termination system: Origins of release factors. *Mol. Biol. Evol.* 17: 882-889.
166. Boucher, Y. and Doolittle, W.F. (2000)
 The role of lateral gene transfer in the evolution of isoprenoid biosynthesis pathways. *Mol. Microbiol.* 37: 703-716.
167. Archibald, J.M., Logsdon, J.M. and Doolittle, W.F. (2000)
 Origin and evolution of eukaryotic chaperonins: phylogenetic evidence for ancient duplications in CCT genes. *Mol. Biol. Evol.* 17: 1456-1466.
168. Doolittle, W.F. (2000)
 Uprooting the tree of life. *Scientific American* (February), 90-95.
169. **Baldauf, S.L., Roger, A.J., Wenk-Siefert, I. and Doolittle, W.F. (2000)**

A kingdom-level phylogeny of eukaryotes based on combined protein data.

Science 290: 972-977. *An early and widely cited (1328 citations) use of concatenated gene sequences in deep eukaryote phylogeny.*

170. Van de Peer, Y., Baldauf, S.L., Doolittle, W.F. and Meyer, A. (2000)
An updated and comprehensive rRNA phylogeny of (crown) eukaryotes based on rate-calibrated evolutionary distances. *J. Mol. Evol.* 51: 565-576.
171. Inagaki, Y., Dacks, J.B., Doolittle, W.F., Watanabe, K.I. and Ohama, T. (2000)
Evolutionary relationship between dinoflagellates bearing obligate diatom endosymbionts: insight into tertiary endosymbiosis. *Int. J. Syst. Evol. Microbiol.* 50: 2075-2081.
172. Doolittle, W.F. (2000)
The nature of the universal ancestor and the evolution of the proteome. *Current Opin. Struct. Biol.* 10: 355-358.
173. Nesbø, C.L., L'Haridon, S., Stetter, K.O. and Doolittle, W.F. (2001)
Phylogenetic analyses of two "archaeal" genes in *Thermotoga maritima* reveal multiple transfers between Archaea and Bacteria. *Mol. Biol. Evol.* 18: 362-375.
174. Inagaki, Y. and Doolittle, W.F. (2001)
Class-I release factors in ciliates with variant genetic codes. *Nucleic Acids Res.* 29: 921-927.
175. Noel, C., Gerbod, D., Fast, N.M., Wintjens, R., Delgado-Viscogliosi, P., Doolittle, W.F. and Viscogliosi, E. (2001)
Tubulins in *Trichomonas vaginalis*. Molecular characterization of α -tubulin genes, posttranslational modifications, and homology modeling of the tubulin dimer. *J. Euk. Microbiol.* 48: 647-654.
176. Nesbø, C., Boucher, Y. and Doolittle, W.F. (2001)
Defining the core of nontransferable prokaryotic genes: The euryarchaeal core. *J. Mol. Evol.* 53: 340-350.
177. Boucher, Y., Huber, H., L'Haridon, S., Stetter, K.O. and Doolittle, W.F. (2001)
Bacterial origin for the isoprenoid biosynthesis enzyme HMG-CoA reductase of the archaeal orders Thermoplasmatales and Archaeoglobales. *Mol. Biol. Evol.* 18: 1378-1388.
178. Archibald, J.M., Blouin, C. and Doolittle, W.F. (2001)
Gene duplication and the evolution of group II chaperonins: implications for structure and function. *J. Structural Biol.* 135: 157-169.
179. She, Q., Singh, R.K., Confalonieri, F., Zivanovic, Y., Allard, G., Awayez, M.J., Chan-Weiher, C. C.Y., Charlebois, R.L., Chow, C., Clausen, I.G., Curtis, B., DeMoors, A., Doolittle, W.F., Duguet, M., Erauso, G., Fletcher, C., Gaasterland, T., Garret, R.A., Gordon, P., Heikamp-de Jong, I., Jeffries, A., Kozera, C., Medina, N., Peng, X., Ragan, M.A., Redder, P., Sensen, C.W., Thi-Ngoc, H.P., Tolstrup, N. and van der Oost, J. (2001)
The complete genome of the crenarchaeon *Sulfolobus solfataricus* P2. *Proc. Natl. Acad. Sci. U.S.A.* 98: 7835-7840.
180. Boucher, Y., Nesbø, C.L., and Doolittle, W.F. (2001)
Microbial genomes: dealing with diversity. *Current Opin. Microbiol.* 4: 285-289.

181. Doolittle, W.F. (2001)
Fascinations of the Third Domain. (Review of *The Surprising Archaea*, by John L. Howland, Oxford University Press, 2000). *Science* 291:1707.
182. Andersson, J.O., Doolittle, W.F. and Nesbø, CL (2001).
Are there bugs in our genome? (Perspective). *Science* 292: 1848-1850.
183. Dacks, J.B. and Doolittle, W.F. (2001)
Reconstructing/deconstructing the earliest eukaryotes: How comparative genomics can help. *Cell* 107: 419-425.
184. Archibald, J.M., O'Kelly, C.J. and Doolittle, W.F. (2002)
The chaperonin genes of jakobid and jakobid-like flagellates: implications for eukaryotic evolution. *Mol. Biol. Evol.* 19: 422-431.
185. Inagaki, Y., Blouin, C., Doolittle, W.F. and Roger, A.J. (2002)
Convergence and constraint in eRF1 domain 1: evolution of stop codon recognition. *Nucleic Acids Res.* 30: 532-544.
186. Dacks, J.B. Marinets, A., Doolittle, W.F., Cavalier-Smith, T. and Logsdon, J.M., Jr. (2002)
Analyses of RNA polymerase II genes from free-living protists: phylogeny, long branch attraction and the eukaryotic big bang. *Mol. Biol. Evol.* 19: 830-840.
187. Dacks, J.B. and Doolittle, W.F. (2002)
Novel syntaxin gene sequences from *Giardia*, *Trypanosoma* and algae: implications for the ancient evolution of the eukaryotic endomembrane system. *J Cell Science* 15: 1635-1642.
188. Inagaki, Y., Doolittle, W.F., Baldauf, S.L., and Roger, A.J. (2002)
Lateral transfer of an EF-1 α : origin and evolution of the large subunit of ATP sulfurylase in eubacteria. *Current Biology* 12: 772-776.
189. Nesbø, C.L., Nelson, K.E., and Doolittle, W. F. (2002)
Suppressive subtractive hybridization detects extensive genomic diversity in *Thermotoga maritima*. *J. Bacteriology*, 184: 4475-4488.
- 190. Gogarten, J.P., Doolittle, W.F. and Lawrence, J.G. (2002)**
Prokaryotic evolution in light of gene transfer. *Mol. Biol. Evol.* 19: 2226-2238. A definitive collective statement on the role of lateral gene transfer in genome evolution.
191. Doolittle, W.F. (2002)
Diversity squared. *Environ. Microbiol.* 4: 10-12.
192. Boucher, Y. and Doolittle, W.F. (2002)
Something (else) new under the sea. (News and View). *Nature* 417: 27-28.
193. O'Malley, M.A., Roger, A.J. and Doolittle, W.F. (2002)
Can commercial protection be good for science? (Commentary) *Nature* 419: 111.
194. Doolittle, W.F. (2002)
Thinking laterally about genes. (Commentary) *Nature*: 418: 589-590.
195. Dacks, J.B., Davis, L.A.M., Sjogren, A.M., Andersson, J.O., Roger, A.J. and Doolittle,

- W.F. (2003)
Evidence for Golgi bodies in proposed 'Golgi-lacking' lineages. *Proc. Biol. Sci.* 270 Suppl. 2: S168-S171.
196. Nesbø, C.L. and Doolittle, W.F. (2003)
Targeting clusters of transferred genes in *Thermotoga maritima*. *Environ. Microbiol.* 5: 1144-11543.
 197. Moriya, S., Dacks, J.B., Takagi, A., Noda, S., Ohkuma, M., Doolittle, W.F. and Kudo, T. (2003)
Molecular phylogeny of three oxymonad genera: Pyronympha, Dinonympha and Oxymonas. *J. Euk. Microbiol.* 50: 190-197.
 198. Douady, C.J., Delsuc, F., Boucher, Y., Doolittle, W.F. and Douzery, E.J.P. (2003)
Comparison of Bayesian and maximum likelihood bootstrap measures of phylogenetic reliability. *Mol. Biol. Evol.* 20: 248-254.
 199. Papke, R.T., Douady, C.J., Doolittle, W.F. and Rodriguez-Valera, F. (2003)
Diversity of bacteriorhodopsins in different hypersaline waters from a single Spanish saltern. *Environ. Microbiol.* 5: 1039-1045.
 200. Nesbø, C.L. and Doolittle, W. F. (2003)
Active self-splicing group I introns in the 23S rRNA genes of hyperthermophilic bacteria, derived from introns in eukaryotic organelles. *Proc. Natl. Acad.Sci. U.S.A.* 100: 10806-10811.
 201. Doolittle, W.F., Boucher, Y., Nesbø, C.L., Douady, C.J., Andersson, J. and Roger, A.J. (2003)
How big is the iceberg of which organellar genes in nuclear genomes are but the tip? *Phil. Trans. Royal Soc. Lond. B*, 358: 39-58.
 202. Boucher, Y., Douady, C.J., Papke, R.T., Walsh, D.A., Boudreau, M.E.R., Nesbø, C.L., Case, R.J. and Doolittle, W.F. (2003)
Lateral gene transfer and the origins of prokaryotic groups. *Ann. Rev. Genetics* 37: 283-328.
 203. Papke, R.T. and Doolittle, W.F. (2003)
Phage evolution: new worlds of genomic diversity. *Current Biology* 13: R606-R607.
 204. Boucher, Y., Kamekura, M. and Doolittle, W. F. (2004)
Origins and evolution of isoprenoid lipid biosynthesis in archaea. *Mol. Microbiol.* 52: 515-527.
 205. Dacks, J.B. and Doolittle, W.F. (2004)
Molecular and phylogenetic characterization of syntaxin genes from parasitic protozoa. *Mol. Biochem. Parasit.* 136: 123-136.
 206. Boucher, Y., Douady, C.J., Sharma, A.K., Kamekura, M. and Doolittle, W.F. (2004)
Intragenomic heterogeneity and intergenomic recombination among Haloarchaeal rRNA genes. *J. Bacteriol.* 186: 3980-3990.
 207. Walsh, D.A., Baptiste, E., Kamekura, M. & Doolittle, W. F. (2004)

- Evolution of the RNA polymerase B' subunit gene (rpoB') in Halobacteriales: a complementary molecular marker to the SSU rRNA gene. *Mol. Biol. Evol.* 21: 2340-2351.
208. Doolittle, W.F. (2004)
Q&A (Interview). *Current Biology* 14: R176-177.
 209. Gophna, U., Charlebois, R.L. and Doolittle, W.F. (2004)
Have archaeal genes contributed to bacterial virulence? *Trends Microbiol.* 12: 213-219.
 210. Baptiste, E., Boucher, Y., Leigh, J. and Doolittle, W.F. (2004)
Phylogenetic reconstruction and lateral gene transfer. *Trends Microbiol.* 12: 406-411.
 211. Charlebois, R.L. and Doolittle, W.F. (2004)
Computing prokaryotic gene ubiquity: Rescuing the core from extinction. *Genome Research* 14: 2469-2477.
 - 212. Papke, R.T., Koenig, J.E., Rodriguez-Valera, F. and Doolittle, W.F. (2004)**
Frequent recombination in a saltern population of *Halorubrum*. *Science* 306: 1928-29.
The first evidence for recombination among archaea in the environment.
 213. Doolittle, W.F. (2005)
Some thoughts on the tree of life. *Harvey Lectures Series* 99: 111-128.
 214. Gophna, U., Doolittle, W.F. and Charlebois, R.L. (2005)
Weighted genome trees: refinements and applications. *J. Bacteriol.* 187: 1305-1316.
 215. Gophna, U., Baptiste, E., Doolittle, W.F., Biran, D. & Ron, E.Z. (2005)
Evolutionary plasticity of methionine biosynthesis. *Gene* 355: 48-57.
 216. Baptiste, E., Susko, E., Leigh, J., MacLeod, D., Charlebois, R.L. and Doolittle, W.F. (2005)
Do orthologous gene phylogenies really support tree-thinking? *BMC Evol. Biology* 5: 33.
 217. MacLeod, D., Charlebois, R.L., Doolittle, W.F. and Baptiste, E. (2005)
Deduction of probable events of lateral gene transfer through comparison of phylogenetic trees by recursive consolidation and rearrangement. *BMC Evol. Biology* 5: 27.
 218. Walsh, D.A. and Doolittle, W.F. (2005)
The real 'domains' of life. *Current Biology* 15: R237-R240.
 219. Walsh, D.A., Papke, R.T. & Doolittle, W.F. (2005)
Archaeal diversity along a soil salinity gradient prone to disturbance. *Environ. Microbiol.* 7: 1655-1666.
 220. Nesbø, C.L., Boucher, Y., Dlutek, M., and Doolittle, W.F. (2005)
Lateral gene transfer and phylogenetic assignment of environmental fosmid clones. *Environ. Microbiol.* 7: 2011-2026.
 221. Mongodin, E.F., Nelson, K.E., Daugherty, S., DeBoy, R.T., Wister, J., Khouri, H., Weidman, J., Walsh, D.A., Papke, R.T., Sanchez-Perez, G., Sharma, A.K., Nesbø, C.L., MacLeod, D., Baptiste, E., Doolittle, W.F., Charlebois, R.L., Legault, B. & Rodriguez-Valera, F. (2005)
The genome of *Salinibacter ruber*: convergence and gene exchange among hyperhalophilic bacteria and archaea. *Proc. Natl. Acad. Sci. U.S.A.* 102: 18147-18152.

222. Gophna, U., Thompson, J.R., Boucher, Y., and Doolittle, W.F. (2006)
Complex histories of genes encoding 3-hydroxy-3-methylglutaryl-Coenzyme A reductase. *Mol. Biol. Evol.* 23: 168-178.
223. Susko, E., Leigh, J., Doolittle, W.F. & Baptiste, E. (2006)
Visualizing and Assessing Phylogenetic Congruence of Core Gene Sets: a Case Study of the gamma-Proteobacteria. *Mol. Biol. Evol.* 23: 1019-1030.
224. Gophna, U., Charlebois, R.L. and Doolittle, W.F. (2006).
Ancient lateral gene transfer in the evolution of *Bdellovibrio bacteriovorus*. *Trends Microbiol.* 14: 64-69.
225. Boucher, Y., Nesbø, C.L., Joss, M.J., Robinson, A., Mabbutt, B.C., Gillings, M.R., Doolittle, W.F. and Stokes, H.W. (2006)
Recovery and evolutionary analysis of complete integron gene cassette arrays from *Vibrio*. *BMC Evol. Biol.* 6: 3.
226. Nesbø, C.L., Dlutek, M., & Doolittle, W.F. (2006)
Recombination in *Thermotoga*: implications for species concepts and biogeography. *Genetics* 172: 759-769.
227. Nesbø, C.L., Doolittle, W.F., Mongodin, E.F. and Nelson, K.E. (2006)
Outside forces helped shape the *Thermotoga* metagenome. *Microbe* 1: 235-241.
228. Nesbø, C.L., Dlutek, M., Zhaxybayeva, O. and Doolittle, W.F. (2006)
Evidence for existence of "Mesotogas", members of the order *Thermotogales* adapted to low-temperature environments. *Appl. Environ. Microbiol.* 72: 5061-5068.
229. Zhaxybayeva, O., Gogarten, J.P., Charlebois, R.L., Doolittle, W.F. and Papke, R.T. (2006)
Phylogenetic analyses of cyanobacterial genomes: quantification of horizontal gene transfer events. *Genome Res.* 16: 1099-1108.
230. Legault, B.A., Lopez-Lopez A., Alba-Casado, J.C., Doolittle, W.F., Bolhuis, H., Rodriguez-Valera, F. & Papke, T.R. (2006)
Environmental genomics of *Haloquadratum walsbyi* in a saltern crystallizer indicates a large pool of accessory genes in an otherwise coherent species. *BMC Genomics* 7: 171.
231. Doolittle, W.F. and Papke, R.T. (2006)
Genomics and the bacterial species problem. *Genome Biology* 7: 1161-1167.
232. Gophna, U., Sommerfeld, K., Gophna, S., Doolittle, W.F. and van Zanten, S.J.O.V. (2006)
Differences between Crohn's disease and ulcerative colitis patients in tissue-associated intestinal microflora. *J. Clinical Microbiol.* 44: 4136-4141.
233. Doolittle, W.F. (2006)
Species. *Microbiology Today (SGM)* 33: 148-151.
234. Sharma, A.K., Spudich, J.L. and Doolittle, W.F. (2006)
Microbial rhodopsins: functional versatility and genetic mobility. *Trends Microbiol.* 14: 463-469.
235. Case, R.J., Boucher, Y., Dahllöf, I., Holmström, C., Doolittle, W.F., Kjelleberg, S. (2007)

- The 16S rRNA and rpoB genes as molecular markers for microbial ecology. *Appl. Environ. Microbiol.* 73: 278-288.
236. **Doolittle, W.F. and Bapteste, E. (2007)**
Pattern pluralism and the Tree of Life hypothesis. *Proc. Natl. Acad. Sci. U.S.A.* 104: 2043-2049. *A reinterpretation of the Tree of Life as it is affected by lateral gene transfer, now generally accepted.*
237. Zhaxybayeva, O., Nesbø, C.L. and Doolittle, W.F. (2007)
 Systematic overestimation of gene gain through false diagnosis of gene absence. *Genome Biology* 8: 402.
238. Doolittle, W.F. and Zhaxybayeva, O. (2007)
 Evolution: reducible complexity -- the case for bacterial flagella. *Current Biol.* 17: R510-512.
239. Zhaxybayeva, O., Gogarten, J.P. and Doolittle, W.F. (2007)
 A hyperconserved protein in *Prochlorococcus* and marine *Synechococcus*. *FEMS Microbiol. Lett.* 274: 30-34.
240. Cullen, J.J., Doolittle, W.F., Levin, S.A. and Li, W.K.W. (2007)
 Patterns and prediction in microbial oceanography. *Oceanography* 20: 34-46.
241. Sharma, A.K., Walsh, D.A., Bapteste, E., Rodriguez-Valera, F., Doolittle W.F., Papke, R.T. (2007)
 Evolution of rhodopsin ion pumps in haloarchaea. *BMC Evol. Biol.* 7: 79.
242. Papke, R.T., Zhaxybayeva, O., Feil, E.J., Sommerfeld, K., Muise, D. and Doolittle, W.F. (2007)
 Searching for species in haloarchaea. *Proc. Natl. Acad. Sci. U.S.A.* 104: 14092-14097.
243. Boucher, Y., Labbate, M., Koenig, J.E. and Stokes, H.W. (2007)
 Integrons: mobilizable platforms that promote genetic diversity in bacteria. *Trends Microbiol.* 15: 301-309.
244. Bapteste, E., Susko, E., Leigh, J., Ruiz-Trillo, I., Bucknam, J. and Doolittle, W.F. (2008)
 Alternative methods for concatenation of core genes indicate a lack of resolution in deep nodes of the prokaryotic phylogeny. *Mol. Biol. Evol.* 25: 83-91.
245. **Sharma, A.K., Zhaxybayeva, O., Papke, R.T. and Doolittle, W.F. (2008)**
Actinorhodopsins: Proteorhodopsin-like gene sequences found predominantly in non-marine environments. *Environ. Microbiol.* 10: 1039-56. *First report, based on metagenomic survey, of what has turned out to be an important proteorhodopsin gene family important the physiology of fresh-water bacteria.*
246. Koenig, J.E., Boucher, Y., Charlebois, R.L., Nesbø, C., Zhaxybayeva, O., Bapteste, E., Spencer, M., Stokes, H.W., and Doolittle, W.F. (2008)
 Integron-associated gene cassettes in Halifax Harbour: assessment of a mobile gene pool in marine sediments. *Environ. Microbiol.* 10: 1024-38.
247. Doolittle, W.F. (2008)
 Microbial evolution: stalking the wild bacterial species. *Current Biology* 18: R565-567.

248. Beiko, R.G., Doolittle, W.F. and Charlebois, R.L. (2008)
The impact of reticulate evolution on genome phylogeny. *Systematic Biol.* 57: 855-856.
249. Nesbø, CL, Baptiste E, Curtis B, Dahle H, Lopez P, Macleod D, Dlutek M, Bowman S, Zhaxybayeva O, Birkeland NK, and Doolittle WF (2009)
The genome of *Thermosiphon africanus* TCF52B: lateral genetic connections to the Firmicutes and Archaea. *J. Bacteriology* 191: 1974-1978.
250. Dipippo, J.L., Nesbø, C.L., Dahle, H., Doolittle, W.F., Birkland, N.-K. and Noll, K.M. (2009)
Kosmotoga olearia gen. nov., sp. nov., a thermophilic, anaerobic heterotroph isolated from oil production fluid. *Int. J. Syst. Evol. Microbiol.* 59: 2991-3000.
251. Doolittle, W.F. (2009)
The practice of classification and the theory of evolution, and what the demise of Darwin's Tree of Life Hypothesis means for both of them. *Phil. Trans. Roy. Soc. Lond., Series B.* 364: 2221-2228.
252. Jezbera, J., Sharma, A.K., Brandt, U., Doolittle, W.F. and Hahn, M.W. (2009)
'*Candidatus* Planktophila limnetica', an *Actinobacterium* representing one of the most numerically important taxa in freshwater bacterioplankton. *Int. J. Syst. Evol. Microbiol.* 59: 2864-2869.
- 253. Doolittle, W.F. and Zhaxybazyeva, O. (2009)**
On the origin of prokaryotic species. *Genome Research* 19: 744-756. A rational and pluralistic approach to the bacterial "species problem".
254. Zhaxybayeva, O., Swithers, K., Lapierre, P., Fournier, G., Bickhard, D., DeBoy, R.T., Nelson, K.E., Nesbø, C.L., Doolittle, W.F., Gogarten, J.P. and Noll, K.M. (2009)
On the chimeric nature, thermophilic origin and phylogenetic placement of the Thermotogales. *Proc. Natl. Acad. Sci. USA* 106: 5865-5870.
255. Sharma, A.K., Sommerfeld, K., Bullerjahn, G.S., Matteson, A.R., Wilhelm, S.W., Jezbera, J., Brandt, U., Doolittle, W.F. and Hahn, M.W. (2009)
Actinorhodopsin genes discovered in diverse freshwater habitats and among cultivated freshwater Actinobacteria. *ISME J.* 3: 726-37.
256. Joss, M.J., Koenig, J.E., Labbate, M., Polz, M.F., Gillings, M.R., Stokes, H.W., Doolittle, W.F. and Boucher Y. (2009)
ACID: annotation of cassette and integron data. *BMC Bioinformatics* 21: 118.
257. Koenig, J.E., Sharp, C., Dlutek, M., Curtis, B., Joss, M., Boucher, Y., and Doolittle, W.F. (2009)
Integron Gene Cassettes and Degradation of Compounds Associated with Industrial Waste: The Case of the Sydney Tar Ponds. *PLoS One* 4: e5276.
258. Doolittle, W.F. (2009)
Eradicating typological thinking in prokaryotic systematics and evolution. *Cold Spring Harb. Symp. Quant. Biol.* 74: 197-204.
259. Zhaxybayeva, O., Doolittle, W.F., Papke, R.T. and Gogarten, J.P. (2009)

- Intertwined evolutionary histories of marine *Synechococcus* and *Prochlorococcus marinus*. *Genome Biol. Evol.* 2009: 325-339.
260. Doolittle, W.F. and Zhaxybayeva, O. (2010)
Metagenomics and the units of biological organization. *Bioscience* 60: 102-112.
261. Doolittle, W.F. (2010)
The attempt on the life of the Tree of Life: science, philosophy and politics. *Biology and Philosophy* 25: 455-473.
262. Nesbø, C.L., Kumaraswamy, R., Dlutek, M., Doolittle, W.F. and Foght, J. (2010)
Searching for mesophilic Thermotogales bacteria: "mesotogas" in the wild. *Appl. Environ. Microbiol.* 76: 4896-4900.
263. Gray, M.W., Lukes, J., Archibald, J.M., Keeling, P.J. and Doolittle, W.F. (2010)
Cell biology. Irremediable complexity? *Science* 330: 920-921.
264. Zhaxybayeva, O. and Doolittle, W.F. (2011)
Lateral gene transfer (Primer). *Current Biol.* 21: R242-R246.
265. Koenig, J.E., Bourne, D.G., Curtis, B., Dlutek, M., Stokes, H.W., Doolittle, W.F. and Boucher, Y. (2011)
Coral-mucus-associated *Vibrio* integrons in the Great Barrier Reef: genomic hotspots for environmental adaptation. *ISME J.* 5: 962-972.
266. Doolittle, W.F., Lukes, J., Archibald, J.M., Keeling, P.J. and Gray, W.M. (2011)
Comment on "Does constructive neutral evolution play an important role in the origin of cellular complexity?" *Bioessays* 33: 427-429.
267. Lukes, J., Archibald, J.M., Keeling, P.J., Doolittle, W.F. and Gray, M.W. (2011)
How a neutral evolutionary ratchet can build cellular complexity. *IUBMB Life* 63: 528-537.
268. Doolittle, W.F. (2012)
Evolutionary biology: A ratchet for protein complexity. *Nature* 481: 270-271.
269. Nesbø, C., Bradnan, D., Adebusuyi, A., Dlutek, M., Petrus, A., Foght, J., Doolittle, W. and Noll, K. (2012)
Mesotoga prima gen. nov., sp. nov., the first described mesophilic species of the Thermotogales. *Extremophiles* 16: 387-393.
270. Zhaxybayeva, O., Swithers, K.S., Foght, J., Green, A., Bruce, D., Detter, C., Tapia, R., Han, S., Teshima, H., Han, J., Woyke, T., Pitluck, S., Nolan, M., Ivanova, N., Pati, A., Land, M.L., Dlutek, M., Doolittle, W.F., Noll, K.M. and Nesbø, C.L. (2012)
Genome sequence of the mesophilic Thermotogales bacterium *Mesotoga prima* MesG1.Ag.4.2 reveals the largest Thermotogales genome to-date. *Genome Biol. Evol.* 4: 700-708.
271. Doolittle, W.F. (2012)
Population genomics: how bacterial species form and why they don't exist. *Current Biol.* 22: R451-453.
272. Doolittle, W.F. (2012)

- Microbial neopleomorphism. *Biology and Philosophy* 28: 351-378.
273. Doolittle, W.F. (2013)
Carl R. Woese (1928-2012). *Current Biol.* 23: R183-85.
- 274. Doolittle, W.F. (2013)**
Is junk DNA bunk? A critique of ENCODE. *Proc. Natl. Acad. Sci. USA* 110: 5294-5300.
Situating claims for genomic “function” within comparative genomics and definitions based on the theory of natural selection.
275. Doolittle, W.F., Fraser, P., Gerstein, M.B., Graveley, B.R., Henikoff, S., Huttenhower, C., Oshlack, A., Ponting, C.P., Rinn, J.L, Schatz, M.C., Ule, J., Weigel, D. and Weinstock, G.M. (2013)
Sixty years of genome biology. *Genome Biol.* 14: 113.
276. Doolittle, W.F. (2013)
The spliceosomal catalytic core arose in the RNA world ... or did it? *Genome Biol.* 14: 141.
277. Doolittle, W.F. (2014)
Natural selection through survival alone, and the possibility of Gaia. *Biology and Philosophy* 29: 415-423.
278. Doolittle, W.F. (2014)
How natural a kind is ‘eukaryote?’ *Cold Spring Harbor Perspect. Biol.* 6: pii: a015974.
279. Doolittle, W.F. (2014)
The trouble with (group II) introns. *Proc. Natl. Acad. Sci. USA* 111: 6536-6537.
280. Doolittle, W.F., Brunet, T.D.P, Linquist, S, and Gregory, T.R. (2014)
Distinguishing between “function” and “effect” in genome biology. *Genome Biol. Evol.* 6: 1234-1237.
281. Hahn, M.W., Schmidt, J., Taipale, S.J., Doolittle, W.F. and Koll, U. (2014)
Rhodoluna laticola gen. nov., sp. nov., a planktonic freshwater bacterium with stream-lined genome. *Int. J. Syst. Evol. Microbiol.* 64: 3254-3263.
282. Brunet, T.D. and Doolittle, W.F. (2014)
Getting “function” right. *Proc. Natl. Acad. Sci. USA* 111: E3365.
- 283. Booth, A. and Doolittle, W.F. (2015)**
Eukaryogenesis, how special really? *Proc. Natl. Acad. Sci. USA* 112: 10278-85. *An attempt to remove biases from interpretations of the prokaryote: eukaryote transition.*
284. Keeling, P.J., McCutcheon J.P. and Doolittle WF. (2015)
Symbiosis becoming permanent: Survival of the luckiest. *Proc. Natl. Acad. Sci. USA* 112: 10101-10103.
285. Eme, L. and Doolittle, W.F. (2015)
Microbial diversity: a bonanza of phyla. *Curr. Biol.* 25: R227-R230.
286. Brunet, T.D. and Doolittle, W.F. (2015)

- Multilevel selection theory and the evolutionary functions of transposable elements. *Genome Biol. Evol.* 7: 2445-2457.
287. Booth, A. and Doolittle, W.F. (2015)
Reply to Lane and Martin: Being and becoming eukaryotes. *Proc. Natl. Acad. Sci. USA* 112(35): E4824.
288. Doolittle, W. F. (2015)
Rethinking the Tree of Life. *Microbe* 10: 319-323.
289. Doolittle, W.F. (2015)
Philosophy, who needs it? (Review of *Philosophy of Biology* by P. Godfrey-Smith). *Curr. Biol.* 25: R31-R35.
290. Mariscal, C. and Doolittle, W.F. (2015)
Eukaryotes first: how could that be? *Phil. Trans. R. Soc. Lond. B.* 370: 20140322.
291. Eme, L. and Doolittle, W.F. (2015)
Archaea (a primer). *Curr. Biol.* 25: R851-R855.
292. Doolittle W.F. and Brunet, T.D.P. (2016)
What is the Tree of Life? *PLoS Genetics*: 12: e1005912.
293. Booth A., Mariscal C. and Doolittle W.F. (2016)
The Modern Synthesis in the light of microbial genomics. *Ann. Rev. Microbiol*, 70: 279-297.
- 294. Inkpen, S.A. and Doolittle, W.F. (2016)**
Molecular phylogenetics and the perennial problem of homology. *J. Mol. Evol.* 83: 184-192. A reformulation of the homology concept as it is used on molecular phylogenetics.
295. Eme, L. and Doolittle, W.F. (2016)
Microbial evolution: xenology (apparently) trumps paralogy. *Curr. Biol.* 22: R1181-R1183.
296. Doolittle, W.F. and Booth, A. (2017)
It's the song, not the singer: an exploration of holobiosis and evolutionary theory. *Biology & Philosophy* 32: 5-24.
297. Doolittle, W.F. (2017)
Making the most of clade selection. *Philosophy of Science* 84: 275-295.
298. Doolittle, W.F. (2017)
Darwinizing Gaia. *J.Theor. Biol.* 434: 11-19.
299. Inkpen, S.A., Douglas, G.M., Brunet, T.D.P., Leuschen, K., Doolittle, W.F., and Langille, M.I. (2017) The coupling of taxonomy and function in microbiomes. *Biology & Philosophy* 32: 1225-1243.
300. Brunet, T.D.P. and Doolittle, W.F. (2017) The generality of Constructive Neutral Evolution. *Biology & Philosophy* 33: 2 <https://doi.org/10.1007/s10539-018-9614-6>
301. Doolittle, W.F. and Brunet, T.D.P. (2017) On causal roles and selected effects: our genome is mostly junk. *BMC Biology* 15: 116.

302. Doolittle, W.F. (2018) Speciation without species: a final word. *Philosophy, Theory and Practice in Biology*, *in press*.
303. **Doolittle, W.F. (2018) Processes and patterns of interaction as units of selection: an introduction to ITSNTS thinking. *Proc. Natl. Acad. Sci. USA* 115: 4006-4014. A new general theory about the evolution of communities (an expansion of #296).**
304. Wideman, J.G., Inkpen, S.A., Doolittle, W.F., and Redfield, R. (2018) Mutationism, not Lamarckism, captures the novelty of CRISPR-Cas. *Biology & Philosophy*, *in press*.
305. Mariscal, C. and Doolittle, W.F. (2018) Life and Life only: a radical alternative to life definitionism. *Synthese*, *online*.
306. Doolittle, W.F. (2018) We simply cannot go on being so vague about “function”. *Genome Biology*, *in press*.
307. Doolittle, W.F. (2019) On the selected-effect functions of complex adaptations. *Philosophy of Science*, *submitted*.

Book Chapters:

- Doolittle, W.F., Lam, W.L. and Schalkwyk, L.C. (1991)
Evolution and basic features of gene and genome structure. *Symp. Soc. Gen. Microbiol.* 47: 1-16.
- Dyall-Smith, M., Holmes, M., Kamekurn, M. and Doolittle, W.F. (1992)
Halobacterial vector development and the opportunities for gene expression and analysis. *Proceedings, Vth International Congress on Retinal Proteins*, pp. 89-92.
- Doolittle, W.F. (1992)
The prokaryote-eukaryote transition: changing perspectives. In *Frontiers of Life*, J. Tran Thanh Van, K. Tran Thanh Van, J.C., Mounolou, J. Schneider and C. McKay (eds.), pp. 175-193, Edition Frontieres, Gif-sur-Yvette, France.
- Doolittle, W.F. (1993)
Epilogue. In *The Biochemistry of Archaea (Archaeobacteria)*, M. Kates, D.J. Kushner, A.T. Matheson (eds.), pp. 565-571. Elsevier Science Publishers, Cambridge, U.K.
- Cline, S., Lam, W.L. and Doolittle, W.F. (1993)
Transformation of *Halobacterium halobium*. In *Protocols for Archaea Research*, E.M. Fleischmann, A.R. Place, F.T. Robb and H.J. Schreier (eds.), Cold Spring Harbour Laboratory Press, pp. 3.1.1- 3.1.5.
- Cline, S., Lam, W.L. and Doolittle, W.F. (1993)
Transformation of *Haloferax volcanii*. In *Protocols for Archaea Research*, E.M. Fleischmann, A.R. Place, F.T. Robb and H.J. Schreier (eds.), Cold Spring Harbour Laboratory Press, pp. 3.2.1- 3.2.6.
- Doolittle, W.F. (1994)
Evolutionary creativity and complex adaptations: A molecular biologist's perspective. In *Creative Evolution*, J.H. Campbell and J.W. Schopf (eds.), Jones and Bartlett Publishers, Inc., pp. 47-73.

- Sensen, C.W., Charlebois, R.L., Singh, R.K., Klenk, H.P., Ragan, M.A. and Doolittle, W.F. (1996)
Sequencing the genome of *Sulfolobus solfataricus* P2. In *Bacterial Genomes: Physical Structure and Analysis*, de Bruijn, Lupski and Weinstock (eds.), Chapman and Hall, New York, London.
- Doolittle, W.F. (1996)
Some aspects of the biology of cells and their possible evolutionary significance. Symp. Soc. Gen. Micro. 64: 1-21.
- Doolittle, W.F. (1999)
Microbial evolution: the new synthesis. In *Microbial Biosystems: New Frontiers* (Proceedings of the 8th International Symposium on Microbial Ecology), C.R. Bell, M. Brylinsky and P. Johnson-Green (Eds.), Atlantic Canada Society for Microbial Ecology, Halifax, Canada.
- Doolittle, W.F. (2000)
Forward to *Comparative Genomics: Empirical and Analytical Approaches to Gene Order Dynamics, Map Alignment and the Evolution of Gene Families*, D. Sankoff and J.H. Nadeau (Eds.), pp. vii-viii, Kluwer Academic Publishers B.V.
- Doolittle, W.F. (2000)
Another branch of the family. A review of *The Variety of Life: A Survey and Celebration of All the Creatures That Have Ever Lived*, by Colin Tudge. The New York Times (June 18 edition, Sunday Book Review Section).
- Doolittle, W.F. (2004)
Bacteria and archaea. In *Assembling the Tree of Life*, J. Cracraft & M. Donoghue, Eds., from Tree of Life Symposium, American Museum of Natural History, Oxford University Press, New York.
- Doolittle, W.F. (2004)
If the Tree of Life fell, would we recognize the sound? In J. Sapp (Ed.), *Microbial Phylogeny and Evolution*, pp. 119-133, Oxford University Press, USA.
- Doolittle, W.F. (2005)
The origin and early evolution of life. In *Evolutionary Science and Society: Educating a New Generation*, J. Cracraft & R.W. Bybee (Eds.), pp. 35-42, Biological Sciences Curriculum Study, American Institute of Biological Sciences, Washington.
- Walsh, D.A., Boudreau, M.E., Bapteste, E., and Doolittle, W.F. (2007)
The root of the tree: lateral gene transfer and the nature of the domains. In *Archaea: Evolution, Physiology and Molecular Biology*, R. Garrett & H.-P. Klenk (Eds.), pp. 29-37, Blackwell Publishing.
- Doolittle, W.F., Nesbø, C.L., Bapteste, E. & Zhaxybayeva, O. (2008)
Lateral gene transfer. In *Evolutionary Genomics and Proteomics*, M. Pagel & A. Pomiankowski (Eds.), pp. 45-79, Sinauer.
- Lovejoy, T.E. et al. (13 co-authors) (2010) *Canadian Taxonomy: Exploring Biodiversity, Creating Opportunity*. Canadian Council of Academies Press, Government of Canada.

Doolittle, W.F. (2012) Craig Venter's new life: the realization of some thought experiments in biological ontology. In *Thought Experiments in Science, Philosophy and the Arts*, M. Frappier, L. Meynell & J.R. Brown (Eds.), pp. 160-176, Routledge.

Doolittle, W.F. (2012) Postphylogenetics. In *Microbes and Evolution: The World That Darwin Never Saw*, R. Kolter & S. Maloy (Eds.), pp. 269-274, ASM Press, Washington.

Doolittle, W.F and Zhaxybayeva, O. (2013) What is a prokaryote? Introductory chapter for 4th edition of *The Prokaryotes*, a 9-volume reference book and fully hyperlinked Online Encyclopedia, edited by Eugene Rosenberg, Edward F. DeLong, Fabiano Thompson, Stephen Lory and Erko Stackebrand, pp. 21-37, Springer Verlag, Berlin.

INVITED CONFERENCE PRESENTATIONS AND SEMINARS (1995-present):

From 1971-1994 not all records retained. With an average of 5-10 per year, total number of presentations during those years was ~180.

Gene Action '95, Asilomar Conference Center, Pacific Grove, California, 1995

Genetics in Biology and Medicine, Toronto, Ontario, 1995

CIAR Bioinformatics Meeting, Montreal, Quebec, 1995

CIAR Earth Systems and Evolution, Annual Meeting, Halifax, Nova Scotia 1995

University of British Columbia, Biochemistry Department seminar, Vancouver, BC, 1995

Oregon State University, Graduate Student seminar, Corvallis, Oregon, 1995

DuPont Central Research and Development, Newark, Delaware, 1995

Gordon Conference on Origin of Life, Ventura, California, 1996

Gordon Conference on Frontiers of Molecular Evolution, Ventura, California, 1996

134th Meeting of the Society of General Microbiology, Warwick, UK, 1996

CIAR Student Meeting, Halifax, Nova Scotia, 1996

Workshop on Molecular Evolution, Woods Hole, Massachusetts, 1996

CIAR RNA Meeting, Sidney, British Columbia, 1996

Thermophiles - Molecular Evolution and the Origin of Life, Athens, Georgia, 1996

Pontifical Academy of Sciences - The Origin and Early Evolution of Life, The Vatican, Italy, 1996

West Coast Bacterial Physiologists Annual Asilomar Conference, California, 1996

The American Society for Microbiology, Miami Beach, Florida, May 1997

The Pfizer, Inc.-Olga G. Nalbandov/Beckman Institute Symposium on "Bioinformatics, Structure and Function", Urbana, Illinois, May 29-June 1, 1997

Workshop on Molecular Evolution, Woods Hole, Massachusetts, August 1997

CIAR Evolutionary Biology Annual Meeting, Chaffey's Locks, Ontario, August 1997

Evolution: A Molecular Point of View, Woods Hole, Massachusetts, October 1997

65th Conjoint Meeting on Infectious Diseases, CACMID, St. John's, Newfoundland, October 1997

Fairfield Osborn Lecture, The Rockefeller University, New York, November 1997

The Toronto Hospital, Surgical Directorate Rounds, Toronto, Ontario, November 1997

CIAR Programs Meeting, Toronto, Ontario, November 1997

St. Francis Xavier University, Antigonish, Nova Scotia, March 1998

NASA Astrobiology Program (Life: From Local Origins to Global Persistence), Durham, NH, June, 1998

CIAR Annual Meeting, Evolutionary Biology Program, Mont-Rolland, Quebec, July 1998

Opening Plenary Lecture, Eighth International Symposium on Microbial Ecology, Halifax, Nova Scotia, August 1998

Molecular Evolution Workshop, Marine Biological Laboratory, Woods Hole, MA, August 1998

Keystone Symposia, Archaea: Bridging the Gap Between Bacteria and Eukarya, Taos, New Mexico, January 1999

Bridging Two Worlds: From the Archaean to the Proterozoic, UCLA Center for Study of Evolution and the Origin of Life, Los Angeles, California, February, 1999

Gordon Conference on Origins of Life, Ventura, California, February 1999

ASM Colloquium, Microbial genome sequencing: Current status and future needs, New Orleans, March 1999

CIAR All-Programs Congress, Banff, Alberta, May 1999

European Developmental Biology Congress (EDBC-99), Oslo, Norway, June 1999

American Society for Microbiology, Microbiology Biodiversity Conference, Chicago, Illinois, August 1999

CIAR Annual Meeting of the Evolutionary Biology Program, Banff, Alberta, October 1999

University of Connecticut, Molecular and Cell Biology, Storrs, CT, November 1999

University of Toronto, Biochemistry Department, November 1999

University of PEI, Charlottetown, January 2000

Microbial Genomes IV, Chantilly, Virginia, February 2000

AAAS Annual Meeting 2000, Washington, DC, February 2000

MRC Legacy Symposium, Ottawa, March 2000

University of Arizona, Ecology and Evolutionary Biology, Tucson, May 2000

Montana State University, Thermal Biology Institute, Bozeman, May 2000

American Society for Microbiology (ASM) Annual Meeting, Los Angeles, CA, May 2000

New England BioLabs, Beverly, MA, May 2000

State University of New York at Albany, Center for Molecular Genetics, June 2000

NSF Microbe Workshop, Woods Hole, MA, August 2000

EMBO Workshop on Origins of Cells and Organelles, Hoor, Sweden, September 2000

CIAR Annual Meeting of the Evolutionary Biology Program, Digby, N.S., October 2000

Ottawa Hospital Research Institute, Centre for Molecular Medicine, Ottawa, November 2000

Dalhousie University Symposia on Technology and Change, Halifax, November 2000

University of Pennsylvania, Department of Biology, Philadelphia, PA, December 2000

University of Montreal, Department de Biochimie, Quebec, February 2001

Keystone Symposium, Microbe Interactions with their Environments. Taos, NM, March 2001

Yale University, Molecular Biophysics and Biochemistry, April 2001

University of Western Ontario, May 2001

American Society for Microbiology (ASM) Annual Meeting, Orlando, May 2001

Canadian Society of Biochemistry, Molecular & Cellular Biology, 44th Annual Meeting, Alliston, Ontario, June 2001

U.S. Department of Energy Workshop, Baltimore, Maryland, June 2001

Gordon Conference on Archaea, Andover, New Hampshire, August 2001

CIAR Annual Meeting of the Evolutionary Biology Program, Val-David, Quebec, October 2001

Ecopia BioSciences Inc., Saint-Laurent, Quebec, October 2001

Stanford University, Department of Biological Sciences, January 2002

Gordon Research Conference on Molecular Evolution, Ventura, CA, January 2002

AAAS Annual Meeting, Boston, MA, February 2002

CIAR Research Council Meeting, Toronto, April 2002

Astrobiology Science Conference, NASA Ames Research Center, Moffett Field, CA, April 2002

Genome Canada National Genomics Conference, Montreal, May 2002

ASM General Meeting, Salt Lake City, May 2002

Tree of Life Symposium, New York, May-June 2002

CIAR All-Programs Meeting, Victoria, BC, June 2002

EMBL Distinguished Visitor Series, Heidelberg, Germany, June 2002

Royal Society of London, UK, June 2002

ISMB'02 Meeting, Edmonton, Alberta, August 2002
SIAC Genome Canada Workshop, Toronto, August 2002
Ecopia (SAB) Meeting, Montreal, August 2002
CIHR Institute of Genetics Workshop, Ottawa, September 2002
CIAR Annual Meeting, Evolutionary Biology Program, Harrison Hot Springs, BC, September 2002
AAM (ASM) Colloquium, Longboat Keys, Florida, October 2002
Microbial Evolution Conference, UQAM, Montreal, October 2002
Science College Public Lecture Series, Concordia University, Montreal, October 2002
Dalhousie Faculty of Arts and Social Sciences, Crosscurrents Series, January 2003
CIAR Program Director's Annual Meeting, Toronto, February 2003
Princeton University, Department of Ecology and Evolutionary Biology, March 2003
U.S. National Academy of Sciences Annual Meeting, April 2003
Madison Medical School Symposium, Wisconsin, May 2003
Keynote Address, Cold Spring Harbor, New York, May 2003
Genetics Society of Canada Conference, King's College, Halifax, June 2003
Bioinformatics Symposium, Stockholm, Sweden, June 2003
Gordon Research Conference on Origin of Life, Bates College, Maine, July 2003
CIAR Annual Meeting of the Evolutionary Biology Program, White Point, N.S., September 2003
European Prokaryotic Genomics Conference, Gottingen, Germany, October 2003
International Congress on Systems Biology, St. Louis, MO, November 2003
Biology Department Series, MIT, Cambridge, MA, February 2004
Cubist Pharmaceuticals, Lexington, MA, April 2004
CIAR Program Director's Annual Meeting, Toronto, April 2004
Harvey Lecture, The Rockefeller University, New York, April 2004
CB van Niel Memorial Lecture, Hopkins Marine Station, Monterey, CA, April 2004
American Society for Biochemistry and Molecular Biology, Boston, MA, June 2004
Genomes and Evolution '2004, Pennsylvania State University, June 2004
Wichita State University, Biological Sciences, Wichita, KS, September 2004
University of Massachusetts, Organismic & Evolutionary Biology, Amherst, MA, October 2004
University of Connecticut, Molecular & Cell Biology, Storrs, CT, November 2004
AIBS/NABT Symposium, Chicago, IL, November 2004
Universite de Sherbrooke, Department de biochimie, Quebec, April, 2005
International Conference on Microbial Genomes, Halifax, NS, April 2005
ASM 105th General Meeting, Atlanta, GA, June 2005
Annual Meeting of the Canadian Society of Microbiologists, Halifax, NS, June 2005
Microbial Diversity Course Symposium, MBL, Woods Hole, MA, June 2005
Cold Spring Harbor Symposium (Gilbert retirement), Cold Spring Harbor, NY, July 2005
CIAR Annual Meeting of the Evolutionary Biology Program, Parksville, BC, September 2005
University of Nebraska, Biological Sciences, October 2005
Dalhousie University, Anatomy and Neurobiology, November 2005
National Academy of Sciences, A.M. Sackler Colloquia, Irvine, CA, December 2005
CIAR Program Director's Meeting, Toronto, January 2006
National Academy of Sciences, Metagenomics Meeting, Washington, DC, January 2006
National Academy of Sciences, CMC Meeting, Irvine, CA, February 2006
McMaster University, Department of Biology, Hamilton, Ontario, February 2006
Keynote Address, University of Michigan, College of Literature, Science and Arts, March 2006
CIAR Founders Network, University of Toronto, March 2006
University of Michigan, Department of Ecology and Evolutionary Biology, March 2006
Phylogenomics Conference, St. Adele, QC, March 2006
Society for General Microbiology Meeting, Warwick, UK, April 2006

Layman Endowment Lectures, Northern Illinois University, April 2006
 National Academy of Sciences, Metagenomics Meeting, Washington, DC, May 2006
 National Academy of Sciences, Metagenomics Meeting, Washington, DC, July 2006
 American Academy of Microbiology Colloquium, Washington, DC, September 2006
 International Metagenomics Conference, San Diego, CA, October 2006
 National Academy of Sciences, Metagenomics Meeting, Irvine, CA, October 2006
 Genome Canada International Conference, Quebec City, October, 2006
 University of Pittsburgh, Biological Sciences, Pittsburgh, PA, October 2006
 University of Pennsylvania, Microbiology, Philadelphia, PA, November 2006
 Dalhousie University, Biology Department, Halifax, November 2006
 University of Toronto, Cell and Systems Biology, Toronto, December 2006
 University of King's College, Trust in Science Forum, Halifax, March 2007
 Annual Meeting of the Society for Molecular Biology and Evolution, Halifax, June 2007
 CIFAR Integrated Microbial Biodiversity, Program Meeting, Vancouver, October 2007
 Symposium on Evolution, The Rockefeller University, NY, May 2008
 CIFAR Integrated Microbial Biodiversity, Program Meeting, Quebec, May 2008
 Dalhousie University, Medical Humanities Day Forum, Halifax, May 2008
 Microbiome Workshop, Toronto, June 2008
 Marine Biological Laboratory symposium course, Woods Hole, MA, June 2008
 Atlantic OMICS Symposium, Moncton, NB, August 2008
 Marker Lectureship, Pennsylvania State University, October 2008
 Norman Giles Lecture, University of Georgia, Athens, Georgia, March 2009
 University of Cincinnati, Molecular Genetics, Biochemistry & Microbiology, April 2009
 74th Cold Spring Harbor Symposium on Quantitative Biology, NY, May-June 2009
 Perspectives on the Tree of Life Workshop, Halifax, NS, July 2009
 Dalhousie University, Department of Philosophy Seminar, Halifax, August 2009
 RiboClub Annual Meeting, Sherbrooke, Quebec, September 2009
 Current Issues in Darwinian Theory Workshop, Dalhousie University, Halifax, October 2009
 Mount Allison University Seminar Series, Sackville, NB, October 2009
 Invited lecture on Darwinian Revolution, University of King's College, March 2010
 University of British Columbia, Department of Botany seminar, Vancouver, BC, April 2010
 Distinguished Lecture Series speaker, University of Alberta, Edmonton, AB, April 2010
 Dalhousie University, Public Lecture for Int'l Behavioural and Neural Genetics Society, May 2010
 Thought Experiments Workshop, Dalhousie University, Halifax, June 2010
 Annual Meeting of Canadian Society of Microbiologists, McMaster University, Hamilton,
 June 2010
 Microbial Diversity Course Lectures, Marine Biological Laboratory, Woods Hole, MA, July 2011
 Centre for Structural and Functional Genomics, Symposium on Integrative Genomics: From
 Microbes to Humans, Concordia University, Montreal, February 2012
 Invited Lecture on Human Genome Project, University of King's College, Halifax, March 2012
 Annual Meeting of Society for Molecular Biology and Evolution, Dublin, Ireland, June 2012
 American Society for Cell Biology, San Francisco, December 2012
 Isaac Walton Killam Hospital Grand Rounds, Halifax, January 2013
 Universite de Laval (IBIS Conference), April 2013
 Dartmouth College, New Hampshire, April 2013
 University of Iowa (Darwin Days speaker), Iowa City, February 2014
 McGill University (Bierman's Lecture, Department of Physiology), Montreal, May 2014
 American Society of Microbiology, Plenary session convenor and speaker, Boston, May 2014
 Calgary Summit of Philosophers of Science, University of Calgary, September 2014
 Sackler Colloquia of the National Academy of Sciences, Irvine, CA (organizer), October 2014
 Royal Canadian Institute / NSERC Foundation Lecture, Ryerson University, Toronto, November
 2014

Genome Atlantic-Human Genetics and Genomics Seminar, Dalhousie University, February 2015

Keynote Lecture, International Society for the History Philosophy and Social Studies of Biology, Montreal, July 2015

Carleton University, George R. Carmody Lecture in Biology, Ottawa, September 2015

Joint Genome Institute, Exploring Diversity of Life Meeting, Pacifica, California, December 2015

Oral History of RNA World at Library of Congress, Washington DC, March 2016

Unseen Partners: Manipulating Microbial Communities that Support Life on Earth, University of Michigan, Ann Arbor, May 2016 (Debate with Norman Pace)

Philosophy of Biology at Madison, Keynote Speaker, Madison, Wisconsin, May 2016

Philosophy of Science Association Biennial General Meeting, Atlanta, Georgia, November 2016

Invited participant in Roundtable Discussion on Canada's Fundamental Science Review, Toronto, October 2016

Biodiversity Seminar Series, and Microbial Evolution and Biogeochemistry Meeting, UBC, Vancouver, March 2017

Species in the Age of Discordance Conference, Salt Lake City, March 2017

BAGECO (Bacterial Genetics and Ecology), Introductory Plenary, Aberdeen, June 2017

Society for Molecular Biology and Evolution, Austin, Texas, July 2017

SoCIA (Social and Conceptual Issues in Astrobiology) Reno, Nevada, April 2018 (keynote)

Orkney International Science Festival, Scotland, September 2018 (public lecture)

University of Exeter, UK, September 2018

Boston Colloquium for Philosophy of Science. October 2018

Philosophy of Science Association Biennial Meeting, Seattle. November 2018

Long-Term Trends in Evolution Workshop, University of Arizona, March 2019

Huck Institute Distinguished Lecturer, Penn State University, March 2019