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CURRICULUM VITAE

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Education

1964	B.A. (Honors), Indiana University, Bloomington, Indiana
1967	Ph.D., University of Illinois, Urbana, Illinois
1967-69	Postdoctoral Fellow, University of Illinois, Urbana, Illinois

Academic Positions

1969-74	Assistant Professor of Biophysics and Genetics, University of Colorado Medical Center
1969-74	National Jewish Hospital and Research Center, Division of Molecular and Cellular Biology
1975-82	Associate Professor of Biophysics and Genetics, University of Colorado Medical Center
1982-84	Professor of Biochemistry, Biophysics, and Genetics, University of Colorado Medical Center
1984-92	Professor of Biology, Indiana University
1992-94	Distinguished Professor of Biology, Indiana University
1994-96	Distinguished Professor of Biology and Chemistry, Indiana University
1996-99	Professor of Plant and Microbial Biology, and Molecular and Cell Biology, UC Berkeley
1999-08	Professor of MCD Biology, University of Colorado, Boulder
2008-	Distinguished Professor of MCD Biology, University of Colorado, Boulder

Professional Societies and Some Activities

National Academy of Sciences.
American Society for Microbiology.
American Society of Biological Chemists; Editorial Board of "J. Biol. Chem.,"1980-84.
National Speleological Society, Fellow; Bicking Award, 1987.
NRC/Space Science Board Committee on Planetary Biology and Chemical Evolution, 1985- 1989.
Space Science Board Mars Rover/Sample Return Advisory Committee, 1987-88.
Office of Technology Assessment Human Genome Mapping Review Board, 1987-88.
Co-Chairman, 1988 Gordon Conference on Nucleic Acids.
Co-Organizer, 1989 Cold Spring Harbor Meeting on RNA Processing.
Canadian Institute for Advanced Research, Program Associate, 1993-
NRC/Space Studies Board Committee on Planetary and Lunar Exploration, 1989-1995.
Co-Organizer RNA '96, 1996 RNA Society Meeting
Editorial Board, "RNA," the Journal of The RNA Society, 1995 -
Board Scientific Counselors, Natl. Center for Biotechnology Information, Natl. Lib. Medicine, 1994- 2000.
Editorial Board, “Environmental Microbiology”, 1998 -
Scientific Advisory Council, Paratuberculosis Awareness and Research Association (PARA), 2000-
Board of Directors, Monterey Bay Aquarium Research Institute (MBARI), 2000-
NRC/Space Studies Board Committee on Origin and Evolution of Life, 1999-2004

Some Recognition

1989, Fellow, American Association for the Advancement of Science.
1991, Member, National Academy of Sciences.
1991, Fellow, American Academy of Arts and Sciences.
1995, Fellow American Academy of Microbiology.

1996, Procter and Gamble Award in Applied and Environmental Microbiology (Am. Soc. for Microbiol.).
1997, D. Sc. (Honorary), University of British Columbia.
2001, Selman A. Waksman Award for Excellence in Microbiology (National Academy of Sciences).
2001, Fellow, John D. and Catherine T. MacArthur Foundation.
2007, Abbott-American Society for Microbiology Lifetime Achievement Award.
2008, RNA Society Lifetime Achievement Award.
2008, International Society for Microbial Ecology Tiedje-ISME Lifetime Achievement Award.

Current Research Support

1984-2012 Principal Investigator, USPHS Grant GM 34527; MERIT Award, 1993
2006-2011 Principal Investigator, NIOSH Grant R01 0H009064
2006-2014 Investigator, Alfred P. Sloan Foundation

Current Research Activities

Research interests revolve about the synthesis, structure and function of RNA; and the application of molecular biological tools to problems in environmental microbial biology.

One effort of the laboratory has been the study of Ribonuclease P, an RNA processing enzyme responsible for removing the 5' termini of tRNA precursors during their maturation. This is a particularly interesting enzyme because the catalytic element is itself RNA; RNase P is a ribozyme. Studies have included determination of the molecular structure of RNase P RNA, the nature of its interaction with tRNA precursors and other substrates, and the mechanism of the RNA-catalyzed reaction.

A second emphasis of the laboratory has been on development and use of molecular methods for analysis of phylogenetic and quantitative aspects of natural microbial communities without the requirement for laboratory cultivation. This is an important direction because only a few environmental microorganisms are cultured using standard techniques. Consequently, before the molecular developments, there was little access to the natural microbial world. The application of molecular technologies such as sequencing ribosomal RNA (rRNA) genes for phylogenetic analyses and the use of rRNA-based hybridization probes for *in situ* identification of microbes have revolutionized microbial ecology. Investigations have been broadly directed, for instance toward high-temperature environments, unusual symbioses, little-known (at the time) microbial ecosystems such as endolithic communities and marine picoplankton, environmental bioremediation, selected human diseases and the indoor environment all around us. Collectively, molecular results from this laboratory and others have dramatically revised our understanding of microbial diversity.

Publications:

1. Fraser, D., C.J. Pfau, and N.R. Pace. (1960). Identification of the protoplast-infecting and cell-infecting agent derived from T2 bacteriophage. Proc. Indiana Acad. Sci. 69:101-105.

2. Pace, N.R. and S. Spiegelman. (1966). The synthesis of infectious RNA with a replicase purified according to its size and density. Proc. Natl. Acad. Sci. USA 55:1608-1615.

3. Pace, N.R. and S. Spiegelman. (1966). The *in vitro* synthesis of an infectious mutant RNA with a normal RNA replicase. Science 153:64-67.

4. Mills, D.R., N.R. Pace, and S. Spiegelman. (1966). The *in vitro* synthesis of a non-infectious complex containing biologically active viral RNA. Proc. Natl. Acad. Sci. USA 56:1778-1785.

5. Spiegelman, S., I. Haruna, and N.R. Pace. (1966). Properties of a purified RNA replicase. Biochim. et Biophys. Acta. Lunteren Symposium. The Netherlands, pp. 3-28.

6. Spiegelman, S., I. Haruna, and N.R. Pace. (1966). Studies on the synthesis of a viral nucleic acid with a purified enzyme. Second International Symposium for Cellular Chemistry.

7. Bishop, D.H.L., J.R. Claybrook, N.R. Pace, and S. Spiegelman. (1967). An analysis by gel electrophoresis of Qβ RNA complexes formed during the latent period of an *in vitro* synthesis. Proc. Natl. Acad. Sci. USA 57:1474-1481.

8. Pace, N.R., D.H.L. Bishop, and B. Spiegelman. (1967). Examination of the Qβ replicase reaction by sucrose-gradient and gel electrophoresis. J. Virol. 1:771-778.

9. Pace, N.R., D.H.L. Bishop, and B. Spiegelman. (1967). The kinetics of product appearance and template involvement in the*in vitro* replication of viral RNA. Proc. Natl. Acad. Sci. USA 58:711-718.

10. Pace, N.R. (1967). *In vitro* studies of viral RNA replication. Ph.D. Thesis, The University of Illinois. Urbana. 139 pp.

11. Spiegelman, S., I. Haruna, N.R. Pace, D.R. Mills, D.H.L. Bishop, J.R. Claybrook, and R. Peterson. (1967). Studies in the replication of viral RNA. J. Cell Physiol. Suppl. 70:35-64.

12. Pace, N.R., I. Haruna, and S. Spiegelman. (1968). The preparation of an RNA replicase capable of synthesizing biologically active viral RNA. In "Methods in Enzymology," vol. 12, pt. B, Colowick and Kaplan (eds.), pp. 540-555.

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14. Bishop, D.H.L., N.R. Pace, and S. Spiegelman. (1967). The mechanism of replication: a novel polarity reversal in the *in vitro* synthesis of Qβ RNA and its complement. Proc. Natl. Acad. Sci. USA 58:1790-1797.

15. Pace, N.R., D.H.L. Bishop, and S. Spiegelman. (1968). The immediate precursor of viral RNA in the Qβ replicase reaction. Proc. Natl. Acad. Sci. USA 59:139-144.

16. Pace, N.R., D.H.L. Bishop, D.R. Mills, M. Taylor, and S. Spiegelman. (1968). *In vitro* replication of viral RNA. Arch. Roum. Path. Exp. Microbiol. 27:519-540.

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20. Doolittle, W.F. and N.R. Pace. (1970). The synthesis of 5S ribosomal RNA in *E. coli* treated with rifampicin. Nature 228:128-129.

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23. Doolittle, W.R. and N.R. Pace. (1971). Transcriptional organization of the ribosomal RNA cistrons in *Escherichia coli*. Proc. Natl. Acad. Sci. USA 68:1786-1790.

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26. Pace, N.R., M.L. Pato, J. McKibbin, and C.W. Radcliffe. (1973). Precursors of 5S ribosomal RNA in *Bacillus subtilis*. J. Mol. Biol. 75:619-631.

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44. Meyhack, B. and N.R. Pace. (1978). Involvement of the mature domain in the *in vitro* maturation of *Bacillus subtilis* precursors 5S ribosomal RNA. Biochemistry 17:5804-5810.

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53. Walker, T.A., K. Johnson, G.A. Olsen, M. Peters, and N.R. Pace. (1982). Enzymatic and chemical structure mapping of mouse 28S ribosomal RNA contacts in 5.8S ribosomal RNA. Biochemistry 21:2320-2329.

54. Peters, M., T.A. Walker, and N.R. Pace. (1982). Independent binding sites in mouse 5.8S ribosomal RNA for 28S ribosomal RNA. Biochemistry 21:2330-2335.

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57. Pace, N.R. (1983). Protein-polynucleotide recognition and the RNA-processing nucleases in prokaryotes. In "Processing of RNA," D. Apirion (ed.), CRC Press, pp. 1-34.

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66. Gardiner, K.J., T.L. Marsh, and N.R. Pace. (1985). Ion dependence of the *Bacillus subtilis* RNase P reaction. J. Biol. Chem. 260:5415-5419.

67. Lane, D.J., D.A. Stahl, G.J. Olsen, D.J. Heller, and N.R. Pace. (1985). A phylogenetic analysis of the genera *Thiobacillus* and *Thiomicrospira* by 5S ribosomal RNA sequences. J. Bacteriol. 163:75-81.

68. Marsh, T.L. and N.R. Pace. (1985). RNase P catalysis differs from ribosomal RNA self-splicing. Science 229:79-81.

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