CURRICULUM VITAE

Name: WILLIS H. FLYGARE
School of Chemical Sciences
University of Illinois
Urbana, Illinois 61801

Personal Information:

Date of Birth: July 24, 1936
Place of Birth: Jackson, Minnesota
Married, August 17, 1958, Ruth Marie Swansson; four children, Karna, John, Amy, Sarah

Education:

B.A., St. Olaf College, 1958
Ph.D., University of California, Berkeley, 1961

Honors:

Alfred P. Sloan Fellow, 1964-69
Assoc. Member of the Center for Advanced Study, U of I, 1967-68, 1978-79
Rolafson Lectures, Dept. of Chem., Univ. of Calif., Berkeley, April, 1971
Phi Lambda Upsilon Fresenius Award, 1971
Guggenheim Fellow, 1972, 1978-9
Leo Hendrick Baekeland Award, 1973
Member, National Academy of Sciences, 1974
Member, American Academy of Arts and Sciences, 1974
Centenary Lecturer, The Chemical Society, England, 1976
D.Sc., St. Olaf College, 1976
Irving Langmuir Prize in Chemical Physics, 1981

Professional Experience:

Instructor in Physical Chemistry, U of I, 1961-63
Assistant Professor, 1963-65
Associate Professor, 1965-66
Professor, 1966-
Associate Editor, Journal of Chemical Physics, 1969-71
Associate Editor, Review of Scientific Instruments, 1972-74
Editorial Board, Chemical Physics, 1972-
Editorial Board, Annual Review of Physical Chemistry, 1974-79
Editorial Board, Chemical Reviews, 1976-79
Editorial Board, Nouveau Journal de Chemie, 1976-
Member of Materials Research Council ARPA, 1968-
-Chairman of the Steering Committee, 1975-1980
Argonne Universities Association Review Committee for Chemistry Division, 1972-78, Chairman 1978.
NBS Office of Standard Reference Data Evaluation Panel, 1973-76
Solid State Sciences Panel, 1973-80
-Panel on Thin-Film Microstructure Science and Technology, National Research Council, 1979
Naval Studies Board, National Academy of Sciences, 1976-81
Directors Review Committee, Lawrence Livermore Laboratory, 1979-80
Committee on Chemical Sciences, National Academy of Sciences, 1979-1983
Chemistry Advisory Committee, National Science Foundation, 1979-1983
NSF-DOE ad hoc Review Committee for NRCC

Professional Activities:

American Physical Society (Fellow)
American Chemical Society
-Vice Chairman, Physical Division, 1978
-Chairman-Elect, Physical Division, 1980-Organized national meetings
-Chairman, Physical Division, 1981

Research Interests(Short Summary):

Theoretical aspects of molecular structure and dynamics; infrared and high resolution microwave spectroscopy in the gas phase and solid state; experimental and theoretical study of small electric and magnetic interactions in molecules; vibration and rotational relaxation phenomena; molecular Zeeman effect; light scattering in pure liquids and in solutions of biologically interesting molecules.

Summary of Current Research Interests

Several experimental and theoretical techniques are applied to obtain information about molecular structure and dynamics and the nature of intermolecular and intramolecular interactions. A close union of theory and experiment is attempted. New students are expected to participate in the laboratory development in an attempt to do new and interesting experiments. The experience gained in designing and constructing complex metal, glass, optical, electronic, high vacuum, and high pressure apparatus is vital to the student's future as a viable scientist.

Several of the areas of on-going research are listed below.

1. HIGH RESOLUTION MICROWAVE SPECTROSCOPY. Experimental and theoretical work involves the study of spin-rotation and spin-spin interactions. nuclear quadrupole interactions, internal rotation, conformational studies, molecular structure studies, and assignment and characterization of new molecules with emphasis on weakly bound van der Waals molecules.

2. MOLECULAR ZEEMAN EFFECT. Magnetic field perturbations in the rotational microwave spectrum lead to measurements of molecular g-values, molecular magnetic susceptibility anisotropies, molecular quadrupole moments, and the signs and magnitudes of electric dipole moments in stable molecules as well as van der Waals Molecular complexes.

3. TRANSIENT EXPERIMENTS AND MOLECULAR RELAXATION. Coherent transient absorption and emission experiments are in progress modeled after the corresponding experiments in magnetic resonance. Theoretical and experimental work involves analyzing the results of multiple pulse experiments to obtain the relaxation times, T_1 and T_2. These relaxation times are then related back to the intermolecular potential function. Fourier transform spectroscopy has also been developed and is now being used to look for new molecular speices (transients) as well as in high resolution applications.

4. INFRARED-MICROWAVE AND MICROWAVE-MICROWAVE DOUBLE RESONANCE. Both steady-state saturation dip and transient multiple pulse experiments are being examined to measure rotational and vibrational relaxation processes.

5. UNSTABLE MOLECULES. Several experimental methods of observing molecular transients such as ions and van der Waals molecules are being pursued with a design in some cases of following up on the radio astronomy studies of the same transient species.

6. RAYLEIGH LIGHT SCATTERING. A series of studies on the depolarized light scattered from a pure liquid, liquid mixtures, and the isotropic form of molecules which form liquid crystals is designed to study rotational relaxations and orientational pair correlations of molecules in the liquid state. The effects of the local electric field and electric and magnetic field alignment are also being studied.

Publications: See attached list

Ph.D. Degrees Granted Under my Direction at Illinois:

1. J. T. Lowe (June 1965); I. Calculation of the Deuteron and Oxygen Field Gradients and the Proton Diamagnetic Shielding in Formaldehyde. II. Observation by High Resolution Microwave Spectroscopy of the Spin-Rotation and Nuclear Quadrupole Interactions at O^{17} in $O^{17}CH_2$.

2. M. L. Unland (June 1966); Microwave and Double Resonance Spectra of 2-Chloropropene and Rotational Relaxation Experiments on Carbonyl Sulfide.

3. R. G. Lett (June 1966); Microwave Spectra, Internal Rotation, ^{14}N Quadrupole Interaction, and Vibrational Studies in Methylthiocyanate, Methylisocyanate, and Methylisothiocyanate.

4. M. T. Bowers (June 1966); Rotation in the Solid State: A Study of Hydrogen and Deuterium Halides Isolated in Rare Gas Solids.

5. V. W. Weiss (August 1966); Barriers to Internal Rotation in the Halopropenes and High Resolution Microwave Spectroscopy.

6. G. I. Kerley (September 1966); Theoretical Study of the Rotation and Vibration of Matrix-Isolated Molecules.

7. Mei-Kuo Lo (August 1967); Microwave Zeeman Effects in 1 to 10 cm Wavelength Region.

8. M. K. Kemp (August 1968); Microwave Spectroscopic Studies in Small Ring Compounds; 1-Methylcyclopropene and Ethylenimine.

9. R. S. Scott (December 1968); Microwave Spectroscopy of Hydroxide Doped Alkali Halide Crystals.

10. J. M. Pochan (August 1969); Microwave Spectroscopic Studies; Cyclopropanone, Molecular Zeeman Effects, and Supersonic Nozzle Beam Applications.

11. R. G. Stone (September 1969); Microwave Spectroscopic Studies of Nuclear Quadrupole Coupling, Barriers to Internal Rotation, and the Zeeman Effect.

12. S. L. Hsu (September 1970); Barrier Studies by Microwave Spectroscopy.

13. R. L. Shoemaker (December 1970); Molecular Zeeman Effect Studies and Infrared-Microwave Double Resonance.

14. J. H. S. Wang (August 1971); Studies of Ionic Impurities in the Alkali Halide Lattices and the Molecular Zeeman Effect.

15. R. C. Benson (April, 1972); Molecular Zeeman Studies of Ring Molecules and Molecular Beam-Microwave Spectrometer Development.

16. B. R. Ware (August, 1972); The Invention and Development of Electrophoretic Light Scattering.

17. H. L. Tigelaar (December, 1972); Molecular Zeeman Studies of Four-Membered Rings and Linear Coupled Molecules; Development of a Free Radical Spectrometer; and Interstellar Molecular Studies

18. S. L. Rock (January, 1973); Molecular Rotational Zeeman Effect and Supersonic Nozzle Beam Microwave Spectrometer Studies.

Ph.D. Degrees Granted at Illinois (continued)

19. C. L. Norris (August 1973); Molecular Zeeman Effect Studies and Time Resolved Infrared-Microwave Double Resonance.

20. T. D. Gierke (August 1974); Depolarized Rayleigh Light Scattering Studies of Orientational Pair Correlations in a Nematic Liquid Crystal. The Coupled Translational-Rotational Diffusion of Rod-like Macromolecules and the Method of Atom Dipoles.

21. S. L. Hartford (April 1975); Quasielastic Rayleigh Laser Light Scattering from Macromolecules, Electrophoretic Light Scattering, and the Molecular Zeeman Effect and Deuterium Coupling Constant in Methinophosphide.

22. T. G. Schmalz (October 1975); Microwave Transient Phenomena and Magnetic Susceptibility Calculations.

23. T. Raj (July 1976); Applications of Laser Light Scattering Spectroscopy to Biopolymers.

24. S. J. Bertucci (August 1976); Light Scattering Studies of Orientational Pair Correlations in Pure Liquids and Mutual Diffusion in Binary Solutions.

25. A. K. Burnham (August 1977); Light Scattering and Electric Birefringence Studies of Gases and Liquids and Magnetic Studies of Aromaticity.

26. W. E. Hoke (June, 1978); Transient Rotational Relaxation Studies and Fourier Transform Microwave Spectroscopy.

27. L. E. Duda (September 1979) Rotational Spectroscopy of Molecular Ions.

28. T. J. Balle (June 1980) Fabry-Perot Cavity in Pulsed Fourier Transform Molecular Beam Microwave Spectroscopy.

Post Doctoral Appointments and Visiting Scientists

1. W. Hüttner, NSF, 1966-68.
2. P. Foster, NSF, 1966-68.
3. G. I. Kerley, MRL, 1966-67.
4. S. L. Srivastava, NSF, 1966-67.
5. D. H. Sutter, Fellow of the Deutsche Forschungsgemeinschaft, 1967-68.
6. J. Zahrt, MRL, 1967-68.
7. S. G. Kukolich, Visiting Assistant Professor, 1968-69.
8. A. C. Ferguson, MRL, 1968-69.
9. R. P. Blickensderfer, NSF, 1968-70.
10. R. S. Scott, MRL, 1969.
11. D. VanderHart, 1968-69.
12. Wm. Von Holle, MRL, 1969-71.
13. Kent Hancock, NSF, 1969-70.
14. J. J. Ewing, Visiting Assistant Professor, NSF, 1969-71.
15. H. Jetter, NSF, 1970-72.
16. J. McGurk, NSF, 1970-73.
17. I. Chabay, Biophysical trainee, 1972-74.
18. G. Alms, MRL, 1973-75
19. S. Durana, NSF, 1973-75
20. H. Mäder, NSF, 1973-75
21. D. Siebert, Visiting Assistant Professor, 1973-74.
22. J. Ekkers, NSF, 1973-75
23. D. Bauer, NSF, 1975-77
24. J. Merski, MRL, 1975-77
25. T. G. Schmalz, NSF, 1976-77
26. K. F. Gebhardt, MRL, 1977-79
27. A. C. Legon, NSF, 1980-

A. Supervision of Research

Number of current Doctoral candidates: 8

Number of Postdoctorals: 2

B. Administrative Experience and Services at the University of Illinois

1. Member of University Committee on Chemical Physics, (1962-72); Chairman (1964-72).

2. Treasurer of local A.C.S. (1962-63).

3. Member of Departmental Service Laboratories Committee (1962-68); Chairman (1966-67).

4. Faculty Supervisor of Departmental Electronics Shop (1962-66).

5. Member of Departmental Courses and Curricula Committee (1964-68).

6. Member of Ad Hoc Committee To Study Departmental Reorganization (Marcus Committee) (1964-65).

7. Member of Subcommittee of the LAS Policy and Development Committee to Study General Education (Gulley Committee) (1964-65).

8. Member of Ad Hoc Departmental Committee To Study the Laboratory Reorganization for Undergraduates (Beak Committee) (1966-68).

9. Member LAS Policy and Development Committee (1966-67).

10. Member of Ad Hoc Committee To Choose a New Department Head of Chemistry (1967).

11. Member of Committee on Staff, Department of Chemistry (1968-71).

12. Member of Committee on Student Affairs (1968-69).

13. Member of Ad Hoc Committee to Study the Future of Biochemistry at the University of Illinois (Drickamer Committee).

14. Member of the Executive Committee of the Division of Physical Chemistry of the American Chemical Society (1969-72).

15. Member of Committees to Choose a Head, School of Chemical Sciences and Head, Department of Chemistry (1970).

16. Member of Affirmative Action Committee in School of Chemical Sciences (1972-).

17. Member of LAS Liberal Education Committee (1973-75).

18. Member of University of Illinois Promotion and Tenure Committee (1975-77).

19. Member of University of Illinois Honorary Degrees Committee (1975-77).

B. Administrative Services (continued)

20. Member of Department of Chemistry Student Admissions Committee (1974-76).

21. Member of Department of Chemistry Committee on Staff (1975-78).

22. Member of the University Research Board (1979-82).

23. Member of Committee to choose a new Chancellor for the University of Illinois campus (1979).

C. Research Support

1. December 1, 1961 to November 30, 1963; $28,500.00, National Science Foundation, "High Resolution Microwave Spectroscopy."

2. September 1, 1962 to August 31, 1963; $3,000.00, American Cyanimide Faculty Grant.

3. September 1, 1963 to August 31, 1964; $2,662.00, University of Illinois Research Board, "Matrix Isolation Studies."

4. September 30, 1964 to August 31, 1965; $9,500.00, Materials Research Laboratory (MRL), University of Illinois, "Matrix Isolation Studies."

5. September 1, 1964 to August 31, 1965; $3,000.00, American Cyanimide Faculty Grant.

6. February 15, 1964 to February 14, 1966; $30,000.00, National Science Foundation, "High Resolution Microwave Spectroscopy" (continuation of 1. above).

7. September 1, 1965 to August 31, 1966; $21,404.00, Materials Research Laboratory, University of Illinois, "Matrix Isolation Studies."

8. September 1, 1964 to August 31, 1966; $10,000.00, DuPont Grant-in-Aid for Research.

9. September 1, 1966 to August 31, 1967; $22,455.00, Materials Research Laboratory, University of Illinois, "Matrix Isolation Studies."

10. September 15, 1965 to September 14, 1967; $70,700.00, National Science Foundation, "High Resolution Microwave Spectroscopy" (continuation of 6. above).

11. September 1, 1964 to August 31, 1966; $16,000.00, Alfred P. Sloan Foundation.

12. September 1, 1966 to August 31, 1968; $16,500.00, Alfred P. Sloan Foundation.

13. July 1, 1967 to June 30, 1968; $30,000.00, Materials Research Laboratory, University of Illinois, "Study of Ionic Impurities in the Alkali Halide Lattices."

14. September 15, 1967 to September 14, 1968; $39,300.00, National Science Foundation (continuation of 10. above).

15. September 15, 1968 to September 14, 1969; $57,500.00, National Science Foundation (continuation of 14. above).

16. July 1, 1968 to June 30, 1969; $40,000.00, MRL (continuation of 13. above).

17. March 1, 1968; $32,000.00, for an electromagnet system, National Science Foundation.

C. Research Support (Continued)

18. July 1, 1969 to June 30, 1970; $40,000.00, MRL (continuation of 16 above).

19. June 1, 1969 to May 31, 1971; $30,000.00, Petroleum Research Fund, "Molecular Zeeman Effect."

20. October 1, 1969 to September 31, 1970; $67,000.00, National Science Foundation (continuation of 14. above). This is the first year of a four-year grant.

21. July 1, 1970 to June 30, 1971; $40,000, MRL (continuation of 18. above).

22. October 1, 1970 to September 31, 1971, $67,000.00, National Science Foundation (continuation of 20. above). This is the second year of a four year grant.

23. July 1, 1971 to June 30, 1972; $46,000, MRL (continuation of 21. above).

24. October 1, 1971 to September 31, 1972, $67,000, National Science Foundation (continuation of 22. above).

25. July 1, 1972 to June 30, 1973; $50,000, MRL (continuation of 23. above).

26. October 1, 1972 to September 31, 1973, $67,000, National Science Foundation (continuation of 24. above).

27. July 1, 1973 to June 30, 1974, $69,000, MRL (continuation of 25. above).

28. October 1, 1973 to September 31, 1974, $73,000, National Science Foundation (continuation of 26. above).

29. July 1, 1974 to June 30, 1975, $69,000, MRL (continuation of 27. above).

30. October 1, 1974 to September 31, 1975, $75,000, National Science Foundation (continuation of 28. above).

31. 1975 Special Equipment Grant from National Science Foundation, $23,000, for microwave Fourier transform spectroscopy.

32. 1975 Special Equipment Grant from University of Illinois Research Board, $11,000, for a PDP8/e laboratory computer.

33. October 1, 1975 to September 31, 1976, $75,000, National Science Foundation (continuation of 30. above).

34. July 1, 1975 to September 1, 1976, $75,000, MRL (continuation of 29. above).

C. Research Support (continued)

35. October 1, 1976 to September 30, 1977, $50,000, MRL (continuation of 34. above).

36. October 1, 1976 to September 30, 1977, $75,000, National Science Foundation (continuation of 33. above).

37. October 1, 1977 to September 30, 1978, $50,000, MRL (continuation of 35. above).

38. October 1, 1977 to April 30, 1978, $38,000, National Science Foundation (continuation of 36. above).

39. August 1, 1978 - July 30, 1979, $60,000, MRL (continuation of 37 above).

40. May 1, 1978 - April 30, 1979, $80,000, National Science Foundation (continuation of 38 above).

41. August 1, 1979 to July 30, 1980, $55,000, MRL (continuation of 39 above).

42. May 1, 1979 to April 30, 1980, $80,000, National Science Foundation (continuation of 40 above).

43. September 1, 1979 to August 31, 1980, $15,000, Petroleum Research Fund.

. Invited Lectures in the Last Few Years

May 14, 1970, Chemistry Colloquium, University of North Carolina, Durham, North Carolina.

June 1 to June 6, 1970, Series of three seminars, U.C.L.A., Los Angeles, California.

June 9, 1970, Chemical Physics Colloquium, National Research Council, Ottawa, Canada.

December 14, 1970, Chemistry Department Colloquium, University of Arkansas, Fayetteville, Arkansas.

April 5, 1971, Chemistry Department Colloquium, University of North Carolina, Rayleigh, North Carolina.

April 6 and 7, 1971, Dupont Lectures, Chemistry Department, Clemson University, Clemson, South Carolina.

April 26-30, 1971, Rolofson Lectures, Chemistry Department, University of California, Berkeley, California.

April 28, 1971, Molecular Physics Colloquium, I.B.M. Research Laboratory, San Jose, California.

May 3, 1971, Chemistry Department Colloquium, Stanford University, Palo Alto, California.

May 18, 1971, Physical Chemistry Seminar, University of Wisconsin, Madison, Wisconsin.

May 19, 1971, Theoretical Institute Seminar, University of Wisconsin, Madison, Wisconsin.

June 16, 1971, Invited Seminar, Ohio State Symposium on Molecular Spectroscopy and Structure, Ohio State University, Columbus, Ohio.

September 30, 1971, Chemistry Department Seminar (2), University of Michigan, Ann Arbor, Michigan.

October 11, 1971, Laboratory of Molecular Physics Seminar, Southern Illinois University, Carbondale, Illinois.

October 14, 1971, Chemistry Department Seminar, Columbia University, New York, N.Y.

October 21, 1971, Seminar, Annual Review of Electronics, Engineering College, University of Illinois.

December 5, 1971, Physical Chemistry Seminar, Department of Chemistry, University of Illinois.

April 10, 1972, Seminar, M.I.T., Meeting on Light Scattering in Solutions of Biological Macromolecules, M.I.T., Cambridge, Mass.

April 14, 1972, Chemistry Colloquium, Department of Chemistry, University of Houston, Houston, Texas.

April 21, 1972, Seminar, Eastman Kodak, Rochester, New York.

April 28, 1972, Seminar, Kamerlingh Ohnes Laboratory, Leiden, The Netherlands.

May 4, 1972, Physical Chemistry Seminar, Physical Chemistry Institute, Tech. University, Munich, Germany.

May 5, 1972, Seminar, Theoretical Institute, Tech. University, Munich, Germany.

May 10, 1972, Chemical Physics Colloquium, Max-Planck Institute for Molecular Beams, Gottingen, Germany.

May 24-26, 1972, Seminar, European Physical Society on Light Scattering in Polymers, Strasbourg, France.

June 4-6, 1972, General Colloquium on Radio Astronomy, Kieler Woche, University of Kiel, Kiel, Germany.

June 12, 1972, Physics Colloquium, University of Ulm, Ulm, Germany.

June 21, 1972, Chemistry Colloquium, University of Karlsruhe, Karlsruhe, Germany.

June 30, 1972, Radio Astronomy Seminar, Max-Planck Institute of Radio Astronomy, Bonn, Germany.

July 14, 1972, Chemistry Colloquium, Yale University, New Haven, Conn.

August 15-17, 1972, Seminar, International Union of Molecular Biology Meeting on Relaxation Processes in Molecular Biology, Copenhagen, Denmark.

September 17-19, 1972, Seminar, Second European Conference on Microwave Spectroscopy, Bangor, Wales.

September 27, 1972, Physical Chemistry Colloquium, Department of Chemistry, University of Illinois, Urbana, Illinois.

October 18, 1972, Chemistry Colloquium, Department of Chemistry, University of Rochester, Rochester, New York.

October 19, 1972, Chemistry Colloquium, Department of Chemistry, Case Western Reserve University, Cleveland, Ohio.

January 12, 1973, Chemistry Colloquium, Department of Chemistry, Northwestern University, Evanston, Illinois.

January 22-26, 1973, Series of three Seminars, Department of Chemistry, Michigan State University, East Lansing, Michigan.

June 26, 1973, Lecture on Transient Effects in Microwave and Infrared Spectroscopy; First International Symposium in Laser Spectroscopy, Vail, Colorado.

June 28, 1973, Seminar on Magnetic Field Perturbations and the Electronic Structure of Molecules; Meeting on the Critical Evaluation of Molecular Structure, Dartmouth College, Hanover, New Hampshire.

October 29, 1973, Seminar on Magnetic Interactions in Molecules, North New Jersey A.C.S. Spectroscopy Symposium, Seton Hall University, New Jersey.

October 30 and 31, 1973, Dupont Lectures in Chemistry (2 lectures), Department of Chemistry, Georgia Institute of Technology, Atlanta, Georgia.

November 2, 1973, Seminar on Light Scattering, Materials Research Section, Allied Chemical Corp., Morristown, New Jersey.

November 3, 1973, Seminar on Transient Effects in Microwave Spectroscopy, N.S.F. Meeting, Washington, D. C.

January 14, 1974, Seminar on Light Scattering, Department of Chemistry, University of Chicago, Chicago, Illinois.

March 15, 1974, Semicentennial Seminar on Chemical Research, Texas Tech University, Lubbock, Texas.

August 28, 1974, Physical Chemistry Seminar on Light Scattering, University of Illinois, Urbana, Illinois.

September 26, 1974, Chemistry Colloquium, Department of Chemistry, Cornell University, Ithaca, New York.

November 6, 1974, Chemistry Colloquium, Department of Chemistry, Illinois Institute of Technology, Chicago, Illinois.

January 15, 1975, Chemistry Colloquium, Department of Chemistry, Rice University, Houston, Texas.

February 11, 1975, Joint UCLA, USC, and CalTech Chemical Physics Seminar, Los Angeles, California.

February 13, 1975, Chemistry Colloquium, Department of Chemistry, University of Arizona, Tucson, Arizona.

February 14, 1975, Chemistry Colloquium, Department of Chemistry, University of California at Irvine, Irvine, California.

March 19, 1975, Physics Colloquium, Department of Physics, Notre Dame University, South Bend, Indiana.

April 1, 1975, Invited Seminar at Denver American Physical Society Meeting on Advances in Light Scattering.

April 2, 1975, Chemistry Colloquium, Department of Chemistry, Colorado State University, Fort Collins, Colorado.

April 11, 1975, Chemistry Colloquium, Department of Chemistry, University of South Carolina, Columbia, South Carolina.

July 1, 1975, Plenary Lecture, Fourth International Meeting on Energy Transfer, Loccum, Germany.

November 3, 4, 1975, Faraday Lectures (2), Departments of Chemistry and Physics, Northern Illinois University, DeKalb, Illinois.

November 5, 1975, Chemistry Colloquium, Department of Chemistry, University of Utah, Salt Lake City, Utah.

The following are a series of lectures in Britain as a guest of the British Chemical Society.

January 12, 1976, Centenary Lecture, Oxford University.
January 14, 1976, Centenary Lecture, Southampton University.
January 15, 1976, Centenary Lecture, Leeds University.
January 16, 1976, Centenary Lecture, University of Strathclyde, Glasgow.
January 19, 1976, Centenary Lecture, Trinity College, Dublin.
January 20, 1976, Centenary Lecture, University of Dublin, Dublin.
January 21, 1976, Centenary Lecture, University of Newcastle.
January 22, 1976, Centenary Lecture, Tilden Symposium, London.
January 23, 1976, Centenary Lecture, University of Coventry.

March 17, 1976, Materials Science Seminar, Sandia Laboratories, Albuquerque, New Mexico.

April 13, 1976, Chemistry Colloquium, Department of Chemistry, University of Wisconsin, Madison, Wisconsin.

April 22, 1976, Chemical Physics Colloquium, Harvard-M.I.T., Chemical Physics, Cambridge, Massachusetts.

June 14-23, 1976, Series of Six Lectures on Light Scattering, Department of Chemistry, Colorado State University, Fort Collins, Colorado.

February 18, 1977, Chemistry Colloquium, Department of Chemistry, University of Nebraska, Lincoln, Nebraska.

March 16, 1977, Chemistry Seminar, Mobil Oil Research Laboratory, Dallas, Texas.

October 3, 1977, Chemistry Colloquium, Department of Chemistry, University of Minnesota, Minneapolis, Minnesota.

October 13, 1977, Chemistry Colloquium, Department of Chemistry, Penn State University, College Park, Pennsylvania.

December 1, 1977, Plenary Lecture, Chemical Applications of Lasers; Present Status, University of North Carolina, Chapel Hill, N. C.

February 22, 1978, Invited seminar, Light Scattering in Chemistry, Physics and Biology, Royal Society Discussion, London.

March 8, 1978, Chemistry Colloquium, Department of Chemistry, University of Illinois, Urbana, Illinois.

March 22, 1978, Chemistry Colloquium, Rohm and Haas, Philadelphia, Penn.

March 23, 1978, Chemistry Colloquium, Department of Chemistry, Temple University, Philadelphia, Pennsylvania.

October 18, 1978, Chemistry Colloquium, Department of Chemistry, University of Pennsylvania, Philadelphia, Pennsylvania

October 20, 1978 - Chemistry Colloquium, Central Research, DuPont, Inc. Wilmington, Delaware

November 16, 1978, Chemistry Colloquium, Department of Chemistry, University of California at Riverside

February 7, 1979, Theoretical Chemistry Colloquium, Cambridge University, Cambridge, England

March 26, 1979, Chemistry Colloquium, Department of Chemistry, Indiana State University, Terre Haute, Indiana

April 20, 1979, Chemistry Colloquium, Department of Chemistry, University of New Orleans, New Orleans, Louisiana

May 11, 1979, Light Scattering Seminar, Engineering Development Division, Beckman Instruments, Fullerton, California

May 31, 1979 - Physics Colloquium, Department of Physics, University of Florida, Gainesville, Florida

June 6, 1979 - Symposium on Fourier Transform Spectroscopy Seminar on Microwave Methods, Canadian Chemical Society, Vancouver, Canada

June 7, 1979 - Chemistry Colloquium, Department of Chemistry, University of Washington, Seattle, Washington.

October 4, 1979 - Chemistry Colloquim, Department of Chemistry, Columbia University, New York, New York

October 11, 1979 - Chemistry Colloquim, Department of Chemistry, West Virginia Institute of Technology, Montgomery, West Virginia

November 7, 1979 - Physical Chemistry Colloquim, University of Illinois, Urbana, Illinois

December 6, 1979 - Harvard-MIT Chemical Physics Colloquim, Harvard University, Cambridge, Massachusetts

February 27, 1980 - Physical Chemistry Colloquim, Bell Telephone Laboratory, Murray Hill, New Jersey

March 25, 1980 - ACS Symposium on Modern Developments in Spectroscopy, Houston, Texas