

## CURRICULUM VITAE

**Gheorghe D. MATEESCU**

### Address

Office: Department of Chemistry  
Clapp Hall 205  
Case Western Reserve University  
Cleveland, Ohio 44106, USA  
Phone: USA (216) 368-2589

Home: 12700 Lake Ave., Apt. 2701  
Lakewood, Ohio. 44107 USA  
Phone: USA (216) 221-7719  
e-mail: gdm2@cwru.edu  
FAX: USA (216) 368-3006

### Academic Rank:

Emeritus Professor of Chemistry; Visiting Professor, Radiology

### Education

Licentiate in Pharmacy, School of Medicine and Pharmacy, Bucharest, 1951  
Ph.D. in Chemistry, Case Western Reserve University, Cleveland, 1971

### Experience

2006 – present	Visiting Professor, Radiology-Case Center for Imaging Research
2005 – present	Emeritus Professor, Case Western Reserve University (CWRU)
1978 – 2005	Professor of Chemistry, CWRU
1978 – 1999	Professor of Chemistry and Director, The Major Analytical Instruments Facility (MAIF), CWRU
1975 - 1978	Adjunct Professor of Chemistry; Director, MAIF, CWRU
1973 - 1975	Adjunct Associate Professor; Director, MAIF, CWRU
1970 - 1973	Senior Scientist; Director, MAIF, CWRU,
1968 - 1970	Research Associate, CWRU,
1964 - 1967	Senior Research Fellow, Romanian Academy of Sciences, Organic Chemistry Research Center, Bucharest
1960 - 1964	Assistant Professor, School of Medicine and Pharmacy, Bucharest,
1951 - 1964	Research Chemist, Clinical Chemistry. Central Laboratories of the Military Hospital, Bucharest,

### Endowment

*“Dumitru and Gheorghe D. Mateescu Award for Student Citizenship”*

### Awards and Honors

“George Emil Palade” Award for Science, Romanian Cultural Foundation, 1999  
The "G. Spacu" Award for Chemistry, Romanian Academy of Sciences, 1966  
“John S. Diekhoff” Award for Distinguished Graduate Teaching, CWRU, 1991  
Honorary Member, Romanian Academy, 1995  
Honorary Member, Romanian Biophysical Society, 1999  
Doctor *honoris causa*, School of Medicine and Pharmacy “Carol Davila” Bucharest 1999  
Doctor *honoris causa*, Polytechnic University of Bucharest, 1997  
"R. H. Martin" Lecturer, Université Libre de Bruxelles, 1973  
"Kahlbaum" Lecturer, University of Basle, 1977  
Visiting Professor, Universities of Paris (1977), Marseille (1982), Ljubljana (1987)  
Inter-Academy Exchange Fellow (USA NAS-Romanian Academy) 1967, 1982, 1990  
Professor, NATO Advanced Study Institutes, Greece and Italy (1983)  
Visiting Professor, Kyushu University, Japan, 1994 and 1996  
Member, *Global Development Committee*, (ISMIRM) International Society for  
Magnetic Resonance in Medicine, 2002-2004  
Member, *Education Committee*, (ISMIRM) International Society for  
Magnetic Resonance in Medicine, 2007 -

### Professional Boards and Committees

1973 Chairman, Surface Chemistry Symposium, Pittsburgh Conference on Analytical  
Chemistry and Applied Spectroscopy  
1973 Session Chairman, Bürgenstock Conference, Switzerland  
1975 Member, ASTM Committee for Surface Science  
1976 Session Chairman, Gordon Conference on Electron Spectroscopy  
1976 Editorial Advisory Board, J. de Microscopie et Spectroscopie Electroniques, Paris  
1977 Program Chairman, Symposium on Electron Spectroscopy,  
Journées de Chimie Organique d'Orsay, Paris  
1980 Editorial Advisory Board, Org. Magnetic Resonance  
1989 Chairman, Symposium on Magnetic Resonance Imaging  
Regional ACS Meeting, Cleveland  
1991 Chairman, Symposium on Magnetic Resonance of Rare Nuclei,  
International Isotope Society, Toronto  
1991 Chairman, Symposium on Magnetic Resonance Microimaging of Rare Nuclei  
First International Conference on Magnetic Resonance Microimaging, Heidelberg  
1993 Chairman, Symposium on Magnetic Resonance Microimaging of Rare Nuclei  
Second International Conference of Magnetic Resonance Microimaging, Heidelberg  
1993 Member, Founding Committee of the Division of Spatially Localized Magnetic  
Resonance of the Groupement AMPERE  
1995 Chairman, Symposium on Magnetic Resonance Microimaging of Rare Nuclei  
Third International Conference of Magnetic Resonance Microimaging, Würzburg  
1995 Organizer, International Workshop on Modern Nuclear Magnetic Resonance, Brasov,  
Romania  
1996 Organizer, International Workshop on Magnetic Resonance Imaging and Spectroscopy,  
Brasov, Romania

### Professional Boards and Committees (continued)

- 1997 Organizer, International Workshop on Magnetic Resonance Imaging and Spectroscopy, Brasov, Romania
- 1998 Organizer, International Workshop on Modern Spectroscopic Techniques in Biophysics, Neptun, Romania
- 1999 Organizer, International Workshop: An Introductory Course on MRI/MRS for Radiologists, Part 1, Neptun, Romania
- 1999 Member, Editorial Board, Romanian Chemical Reviews, Bucharest
- 2000 Organizer, International Workshop: An Introductory Course on MRI/MRS for Radiologists, Part 2, Sinaia, Romania
- 2001 Organizer, International Workshop on Advances in MRI and MRS, Sinaia, Romania
- 2002 Organizer, IX. International Workshop on Basics and Advances in MRI and MRS, Neptun, Romania
- 2003 Organizer, Summer School, 10<sup>th</sup> International Workshop on in MRI and MRS, Sinaia, Romania
- 2004 Organizer, International Summer School on in MRI and MRS, Brasov, Romania
- 2005 Organizer, Summer School and International Workshop on in MRI and MRS, Sinaia, Romania
- 2006 Organizer, International Summer School on in MRI and MRS, Poiana Brasov, Romania
- 2007 Organizer, International Summer School on in MRI and MRS, Poiana Brasov, Romania

### Professional Societies

American Chemical Society (ACS)  
International Society for Magnetic Resonance in Medicine (ISMRM)  
International Society of Oxygen Transport to Tissue (ISOTT)  
International Isotope Society (IIS)  
Groupement AMPERE

### Research Interests

Magnetic Resonance: Combined  $^{17}\text{O}$  /  $^{31}\text{P}$  Magnetic Resonance Imaging (MRI) and Localized Spectroscopy (MRS) studies of cell bioenergetics; uncoupling of oxydative phosphorylation by chemical and genetic agents. The chemistry of water monomers. Vibrational Spectroscopy.

### Teaching Interests

MRI (Magnetic Resonance Imaging), MRS (Localized Magnetic Resonance Spectroscopy), New spectroscopies applied in chemistry; Fourier-transform (FT) IR and Raman Spectroscopy, FTNMR, 2D NMR, UV and X-ray Photoelectron Spectroscopy (UPS and XPS or ESCA-Electron Spectroscopy for Chemical Analysis), Ion Scattering Spectrometry (ISS), Secondary Ion Mass Spectrometry (SIMS).

## Consulting

Expertise in Magnetic Resonance Imaging and Spectroscopy and Instrumental Analytical Chemistry

## Books

- 1) *Infrared Spectroscopy. Applications in Organic Chemistry, English Edition*, with Margareta Avram, Wiley-Interscience, New York, 1972.  
Reprint Edition, R.E. Krieger Publishing Company, Huntington, New York, 1978.
- 2) *2D NMR: Density Matrix and Product Operator Treatment*, with A. Valeriu, Prentice Hall, New York, 1993.
- 3) *Basic Principles of Magnetic Resonance Imaging and*, in preparation.

## Journal Articles, Book Chapters, Proceedings

1. Die Konfiguration der Addukte des Cyclooctatetraens mit Malenisäure-anhydrid und Acetylenedicarbonsäuremethylester, with M. Avram and C. D. Nenitzescu, Liebigs Ann. Chem., 636 174 (1960).
2. Untersuchungen in der Cyclobutanreihe, VII. Über Dibenzotricyclooctadien und Dibenzocyclooctatetraen, with M. Avram, D. Dinu and C. D. Nenitzescu, Chem. Ber. 93, 1789 (1960).
3. Pyrylium Salts Obtained by Diacylation of Olefins. Di- and tri- acetylation of Alkylbenzene, with A. T. Balaban, M. Gavtat and C. D. Nenitzescu, J. Chem. Soc., (1961), 3564.
4. A Dimer of Cyclobutadiene, with M. Avram, I. Dinulescu, E. Marica and C. D. Nenitzescu, Tetrahedron Lett., 1, 21 (1961).
5. Pyrylium Salts by Olefin Bisacylation. Acetylation of Benzyl-ketones, with A. T. Balaban and C. D. Nenitzescu, Acad. R. P. R. Stud. Cerc. de Chimie, 9, 211 (1961); Acad. R. P. R. Revue de Chimie, 6, 295 (1961).
6. Infrared Spectrum of Dibenzotricyclooctadiene, with M. Avram, D. Dinu and C. D. Nenitzescu, Acad. R. P. R. Stud. Cerc. de Chimie 9, 427 (1961); Acad. R. P. R., Revue de Chimie, 8, 13 (1961).
7. Investigations in the Cyclobutane Series, VIII. Adducts of Benzocyclobutadiene with Some Cyclic Dienes, with M. Avram, D. Dinu, I. Dinulescu and C. D. Nenitzescu, Acad. RPR, Stud. Cerc. de Chimie 9, 435 (1961); Acad. R. P. R., Revue de Chimie 8, 77 (1963).
8. Investigations of the Infrared C-H Vibrations in Strained Molecular Systems, with M. Avram and I. Pogany, Revue de Chimie, 7, 665 (1962).
9. Structure et Réaction des Pyranol-Hydrazides, with A. T. Balaban, P. T. Frangopol and C. D. Nenitzescu, Bull. Soc. Chim. France, 1962, 298.
10. Untersuchungen in der Cyclobutanreihe, IX. Eine über 1,4-Dihenyl-2,3- naphthocyclobutadien Verlaufende Synthese von 1.4.5.8-Tetraphenyl-2.3;6.7-dibenzobiphenylen, with C. D. Nenitzescu, M. Avram and I. Dinulescu, Liebigs Ann. Chem. 653, 79 (1962).

11. Réaction d'Extension de Cycle. Synthèse dans la Série du Benzocyclooctène, with E. Cioranescu, A. Bucur, A. Mihai, and C. D. Nenitzescu, Bull. Soc. Chim. France, 1962, 471.
12. Über Diphenyldihydropentalene, with E. Cioranescu, A. Bucur, G. Mihai and C. D. Nenitzescu, Chem. Ber., 95, 2325 (1962).
13. Infrared Absorption Spectra of Pyrylium Salts, with A.T. Balaban and M. Elian, Tetrahedron 18, 1083 (1962).
14. Infrared Spectra of Some Diels-Alder Adducts of Cyclooctatetraene, with M. Avram and C. D. Nenitzescu, Acad. R. P. R. Stud. Cerc. de Chimie, 10, 65 (1962).
15. Investigations in the Cyclobutane Series, X. Some Reactions of Dibenzotricyclooctadiene and Dibenzocyclooctatetraene, with M. Avram, I. Dinulescu, D. Dinu, and C. D. Nenitzescu, Tetrahedron 19, 309 (1963).
16. Nuclear Magnetic Resonance and Infrared Spectra and Structure of the  $(C_4H_4Ag)^+$  Ion and of the Dimer  $C_8H_8$ , with M. Avram, H. P. Fritz, H. Keller, J. F. W. McOmie, N. Sheppard and C. D. Nenitzescu, Tetrahedron, 19, 187 (1963).
17. Zum Dimeren Cyclobutadien, with C. D. Nenitzescu, M. Avram, E. Marica, and I. G. Dinulescu, Angew. Chem. 75, 88 (1963).
18. Synthesis and Thermal Decomposition of Tricyclo [4.2.2.0<sup>2.5</sup>]deca-3,7,9-triene, with C. D. Nenitzescu, M. Avram, I. Pogany and M. Farcasiu, Acad. R. P. R., Stud. Cerc. de Chimie 11, 7 (1963).
19. Untersuchungen in der Cyclobutanreihe, XI. Über die Stereoisomeren Cyclooctatetraendichloride und das *cis*-3,4-Dichlorocyclobuten, with M. Avram, I. G. Dinulescu, M. Elian, M. Farcasiu, E. Marica and C. D. Nenitzescu, Chem. Ber., 97, 372 (1964).
20. Untersuchungen in der Cyclobutanreihe, XII. Zwei Stereoisomere Dimere des Cyclobutadiens, with M. Avram, I. G. Dinulescu, E. Marica, M. Elian, and C. D. Nenitzescu, Chem. Ber., 97, 382 (1964).
21. The Dimeric Structure of  $C_4H_4AgClO_4$ : A Reinvestigation of the Nuclear Magnetic Resonance Spectrum, with M. Avram, H. P. Fritz, H.J. Keller, C.G. Kreiter, J. F. W. McOmie, N. Sheppard and C. D. Nenitzescu, Tetrahedron Letters, 24, 1611 (1963).
22. A Rearrangement of the 3:4,7:8-Dibenzobicyclo[4.2.0]octa-3,7- diene System, with I. G. Dinulescu, M. Avram and C. D. Nenitzescu, Chem. & Ind., 1964, 2023.
23. Investigation in the Cyclobutane Series, XIV. A Transposition of the 3:4,7:8-Dibenzobicyclo[4.2.0]octa-3,7-diene System, with I. G. Dinulescu, M. Avram and C. D. Nenitzescu, Revue Roumaine de Chimie, 9, 351 (1964); Stud. Cerc. de Chimie, 12, 357 (1964).
24. Contributions to the Study of Acclimatized *Vinca Rosea* L. with I. Ciulei, E. Tarpo, O. Contz, M. Gheorghiu and N. Paslarasu, Farmacia 6, 321 (1965).
25. Isotopic Exchange of Active Methyl Hydrogen. Reactivity of  $\alpha$ - and  $\gamma$ -Methyl Groups and  $\beta$ -Hydrogen in Pyrylium Salts, with E. Gird, A. Vasilescu and A. T. Balaban, J. Labelled Compounds, 1965, 131.

26. Investigations in the Cyclobutane Series, XVII. Addition of Halogens to *cis*-3,4-Dichlorocyclobutene, with M. Avram, I. G. Dinulescu, A. Juvara and C.D. Nenitzescu, *Revue Roumaine de Chimie*, 13, 1075 (1968).
27. Investigations in the Cyclobutane Series, XVIII. Elimination of Hydrogen Halides from Stereoisomeric 1,2,3,4-Tetrahalocyclobutanes, with M. Avram, I. G. Dinulescu, I. Pogany and C.D. Nenitzescu, *Revue Roumaine de Chimie*, 13, 1085 (1968).
28. Investigations in the Cyclobutane Series, XIX. Halogen Elimination from 1,2,3,4-Tetrahalocyclobutanes, with M. Avram, M. Rentea, I. G. Dinulescu and C. D. Nenitzescu, *Revue Roumaine de Chimie*, 13, 1097 (1968).
29. Investigations in the Cyclobutane Series, XX. Stereoisomeric 1,2,3,4- Tetrabromocyclobutanes by the Hunsdiecker Reaction, with M. Avram and C. D. Nenitzescu, *Revue Roumaine de Chimie*, 14, 101 (1969).
30. Investigations in the Cyclobutane Series, XXIII. Bicyclotrimerization of *tert*-Butylacetylene to a PdCl<sub>2</sub> Complex of Dewar-Benzene, with M. Avram, E. Avram, I. G. Dinulescu, F.Chiraleu, and C. D. Nenitzescu, *Chem. Ber.*, 102, 3996 (1969).
31. Investigations in the Cyclobutane Series, XXIV. A Transposition of the Tricyclo [4.2.0.0<sup>2.5</sup>] octane System to Tricyclo [4.2.0.0<sup>2.4</sup>]octane System, with M. Avram, I. G. Dinulescu and C. D. Nenitzescu, *Chem. Ber.*, 102, 4008 (1969).
32. A New Dibenzohomotropylium Cation, with C. D. Nenitzescu and G. A. Olah, *J. Am. Chem. Soc.* **1968**, *90*, 6235.
33. The Tetraphenylcyclobutadiene Dication, with G. A. Olah, *J. Am. Chem. Soc.* **1970**, *92*, 1430.
34. The Benzenium Ion (C<sub>6</sub>H<sub>7</sub>)<sup>+</sup> and its Degenerate Rearrangement, with G. A. Olah, R. H. Schlosberg and D.P. Kelly, *J. Am. Chem. Soc.* **1970**, *92*, 2546.
35. Photoelectron Spectroscopy of Stable Organic Ions. Carbon 1s Electron Binding Energies of the *tert*-Butyl, Trityl, and Tropylium Cations, with G. A. Olah, L. Wilson and M. Gross, *J. Am. Chem. Soc.* **1970**, *92*, 7231.
36. The Fluoromethyl Alcohol, with G. A. Olah, *J. Am. Chem. Soc.* **1971**, *93*, 781.
37. The Benzenium Ion and Monoalkylbenzenium Ions, with G. A. Olah, R.H. Schlosberg, R. D. Porter, Y. K. Mo and D. P. Kelly, *J. Am. Chem. Soc.* **1972**, *94*, 2034.
38. Applications of Electron Spectroscopy in Organic Chemistry, with J. L. Riemenschneider, *Electron Spectroscopy*, D.A. Shirley, Ed., North Holland Publishing Company, Amsterdam-London, 1972, pp 661-680.
39. Electron Spectroscopy of Organic Ions. Carbon 1s Electron Binding Energies of Norbornyl, 2-Methylnorbornyl, and Related Cations. Differentiation between "Non classical" Carbonium and "Classical" Carbenium Ions, with G. A. Olah and J. L. Riemenschneider, *J. Am. Chem. Soc.* **1972**, *94*, 2529.

40. Electron Spectroscopy of Organic Ions. Alkyl- and Aryloxocarbenium Ions, with J. Louise Riemenschneider, J. Svoboda and G. A. Olah, *J. Am. Chem. Soc.* **1972**, *94*, 7191.
41. Photoelectron Spectra of Adamantane and 1-Bromoadamantane, with S. D. Worley, *Tetrahedron Lett.* **1972**, 5285.
42. Photoelectron Spectra and MINDO-SCF-MO Calculations for Adamantane, with S. D. Worley, Charles W. McFarland, Raymond C. Fort, Jr. and Curtis F. Sheley, *J. Am. Chem. Soc.* **1973**, *95*, 7530.
43. Fourier Transform C-13 NMR and X-ray Photoelectron Spectroscopic Study of the 2-Norbornyl Cation, with G. A. Olah, G. Liang and J. L. Riemenschneider, *J. Am. Chem. Soc.* **1973**, *95*, 8698.
44. 2-Adamantyl Cations, with G. A. Olah and G. Liang, *J. Org. Chem.* **1974**, *39*, 3753.
45. The Structure of Visual Pigments. Carbon-13 NMR Spectroscopy of N-*all-trans* Retinylidenepropylimine and Its Protonated Species, with J. Shriver and E. Abrahamson, *J. Am. Chem. Soc.* **1976**, *98*, 2407.
46. The Nonprotonated Nature of the Chromophore-Protein Bond in Visual Pigments as Determined by C-13 NMR Spectroscopy with J. Shriver, R. Fager, D. Torchia and E. Abrahamson, *Nature*, **1977**, *270*, 271.
47. Carbon-13 NMR Study of the Benzenium, Naphthalenium, and Anthracenium Ions, with J. Staral, G. Liang, D. Forsyth and G.A. Olah, *J. Am. Chem. Soc.*, **1978**, *100*, 6299.
48. A Proton and Carbon-13 NMR Spectroscopy Study of the Conformation of a Protonated 11-*cis*-Retinal Schiff Base, with J. Shriver and E. Abrahamson, *Biochemistry*, **1979**, *18*, 4785.
49. The Hydronium Ion ( $\text{H}_3\text{O}^+$ ). Preparation and Characterization by High Resolution  $^{17}\text{O}$  NMR Spectroscopy, with G.M. Benedikt, *J. Am. Chem. Soc.*, **1979**, *101*, 3959.
50. An X-ray Photoelectron Spectroscopy Study of Nickel and Nickel-base Superalloy Surface Alteration in Simulated Hot Corrosion Conditions with S. Smith, W. Carter, F. Kohl, C. Stearns and G. Fryburg, *Oxidation of Metals*, **1980**, *14*, 415.
51. Investigation of the Protonated or Nonprotonated Nature of the Schiff Base Linkage between Retinal and Opsin. A Preliminary N-15 Study, with D. Muccio, W. Copan and E.W. Abrahamson, *Federation Proceedings*, **1980**, *39*, 2096.
52. Nuclear Magnetic Resonance Studies of Rhodopsin and Bacteriorhodopsin, with D. D. Muccio, W. G. Copan, and E. W. Abrahamson, *J. Photochem.* **1981**, *17*, 63.
53. Comparative C-13 NMR Studies of Labeled Retinal in Rhodopsin and Bacteriorhodopsin, with D. D. Muccio, W. G. Copan, and E. W. Abrahamson, *Biophysical J.* **1982**, *37*, 273.
54. Carbon-13 NMR Spectroscopy of the Chromophore of Rhodopsin, with J. W. Shriver and E.W. Abrahamson, *Met. Enzym.* **1982**, *81*, 698.

55. Synthesis and High Resolution C-13 and N-15 NMR of Visual Pigments and Related Systems, with W. G. Copan, D. D. Muccio, D. V. Waterhous, and E. W. Abrahamson, *Synthesis and Applications of Isotopically Labeled Compounds*; Duncan & Susan, Eds.; Elsevier: Amsterdam, **1983**, pp.123-132.
56. On the Structure and Interactions of Retinylidene Chromophores in Rhodopsin and Bacteriorhodopsin, with D. V. Waterhous, M. Iqbal, D. D. Muccio, W. G. Copan and E. W. Abrahamson, *Biochemistry*, **1983**, 22, 22.
57. New Dimensions in O-17 Nuclear Magnetic Resonance Spectroscopy, with G.M. Benedikt and M.P. Kelly. *Synthesis and Applications of Isotopically Labeled Compounds*; Duncan & Susan, Eds.; Elsevier: Amsterdam, **1983**, 483-484.
58. N-15 and C-13 NMR Study of the Effects of Hydrogen Bonding and Protonation in Linear Schiff Bases, Models for Structural Studies of Rhodopsin and Bacteriorhodopsin, with D.D. Muccio, W. G. Copan, E. W. Abrahamson, *Org. Magn. Reson.*, **1984**, 22, 121-124.
59. Solution and Solid State C-13 and N-15 NMR Studies of Visual Pigments and Related Systems: Rhodopsin and Bacteriorhodopsin, with E. W. Abrahamson, J. W. Shriver, W. G. Copan, D. D. Muccio, M.Iqbal, and V.Waterhous. *Spectroscopy of Biological Molecules*, C. Sandorfy and Th. Theophanides, Eds.; Reidel: Dordrecht, **1984**, NATO ASI Series C, Vol. 139, pp 250-283.
60. Teaching the New NMR: A Computer-aided Introduction to the Density Matrix Treatment of Double-quantum Spectrometry, with A. Valeriu. *Magnetic Resonance*, Petrakis and Fraissard, Eds.; Reidel: Dordrecht, **1984**, NATO ASI Series C, Vol. 124, pp 501-524.
61. Teaching the New NMR: A Computer-aided Introduction to the Density Matrix Formalism of Multipulse Sequences, with A. Valeriu. *Spectroscopy of Biological Molecules*, C. Sandorfy and Th. Theophanides, Eds.; Reidel: Dordrecht, **1984**, NATO ASI Series C, Vol. 139, pp 206-249.
62. New Models for Experimental NMR Studies of Visual Pigments and Bacteriorhodopsin, with M. Iqbal, *Biochemistry*, **1984**, 23, 3357.
63. Nuclear Magnetic Resonance Investigation of the "Opsin Shift" in Rhodopsin and Bacteriorhodopsin, with D. V. Waterhous, M. Iqbal, W. G. Copan, D. D.Muccio, E. W. Abrahamson and J. W. Shriver, *Biophysical J.* **1984**, 45, 2932,.
64. Synthesis of <sup>13</sup>C Single and Double Labelled [<sup>13</sup>C<sub>2</sub>]Retinals, Precursors for NMR studies of Visual Pigments and Related Systems, with M. Iqbal, *J. Labelled Cpds.* **1985**, 22, 623-634.
65. Bridgehead Adamantyl, Diamantyl, and Related Cations and Dications, with G.A. Olah, G.K. Surya Prakash, J.G. Shih, V.V. Krishnamurti, G. Liang, G. Sopus, V. Buss, T.M. Gund and P.v.R. Schleyer, *J. Am. Chem. Soc.* **1985**, 107, 2764-2772.
66. Double Quantum Coherence and Triple Resonance NMR of Double Labelled Retinals:

A New Avenue for Unambiguous Assignments in Rhodopsin and Bacteriorhodopsin, with M. Iqbal and C. Wheeler, *Biophys. J.* **1985**, *47*, 358.

67. Oxygen-17 Magnetic Resonance Imaging, with G. M. Yvars and T. Dular, *Proc. Soc. Magn. Reson. Med.* **1987**, *6*, 929.
68. Water, Ions and O-17 Magnetic Resonance Imaging, with G. M. Yvars and T. Dular. *Water and Ions in Biological Systems*, Lauger, Packer and Vasilescu, Eds.; Birkhauser: Basel-Boston, **1988**, pp 239-250.
69. Liver Microsomal Metabolism of the Environmental Carcinogen 3-Nitrofluoranthene, with P. Howard and M. Consolo, *Carcinogenesis*, **1988**, *9*, 911-917.
70. Determination of the Structure of H-Bonded Complexes of Some Anomalous Acid Salts of Dibasic Acids by Means of Solid-Phase Carbon-13 Nuclear Magnetic Resonance Spectroscopy and X-ray Diffraction, with J. E. Barry, M. Finkelstein, S. D. Ross, A. Valeriu and Ch. Svensson, *J. Org. Chem.* **1988**, *53*, 6058-6061.
71. Oxygen-17: A Physiological, Biochemical and Anatomical MRI Contrast Agent,, with G. Yvars, D. Pazara, J. LaManna, D.W. Lust, K. McCracken, M. Mattingly and W. Kuhn, *Proc. Soc. Magn. Reson. Med.* **1988**, *7*, 600.
72. <sup>17</sup>O-<sup>1</sup>H Magnetic Resonance Imaging in Plants, Animals, and Materials, with G. Yvars, D.I. Pazara, N.A. Alldridge, J.C. LaManna, D.W. Lust, M. Mattingly and W. Kuhn, *Synthesis and Application of Isotopically Labelled Compounds*, Baillie & Jones, Eds.; Elsevier: Amsterdam, **1989**, pp 499-508.
73. Oxygen-17 MRI and MRS of the Brain, the Heart and Coronary Arteries with G.M. Yvars, L. Maylish-Kogovsek, J.C. LaManna, W.D. Lust and D. Sudilovsky, *Proc. Soc. Magn. Reson. Med.* **1989**, *8*, 659.
74. Oxygen-17 MRS: in vivo Evaluation of Water Uptake and Residence Time in the Mouse Brain after Injection of O-17 Labelled Water, with G.M. Yvars, J.C. LaManna, W.D. Lust and D. Sudilovsky, *Proc. Soc. Magn. Reson. Med.* **1990**, *9*, 1236.
75. Oxygen-17 Magnetic Resonance: In Vivo Determination of Nascent Mitochondrial Water in Animals Breathing <sup>17</sup>O-enriched Air, with J. LaManna, D. Lust, L. Mars and J. Tseng, *Proc. Soc. Magn. Reson. Med.* **1991**, *10*, 1031.
76. Oxygen-17 and Proton Microscopy in Materials Analysis, with G. Yvars and R. Kinsey. *Advanced Tomographic Imaging Methods for the Analysis of Materials*, J. Ackerman, Ed.; Mat. Res. Soc. Symp. Proc. **1991**, *217*, 61-66.
77. From Materials Testing to Brain Function Testing, *Spectroscopy International* **1991**, *3*, 14-18.
78. Interleave <sup>17</sup>O-<sup>31</sup>P MRS: Novel Approach for *In Vivo* Determination of Defects in Oxidative Phosphorylation, with D. Fercu, *Proc. Soc. Magn. Reson. Med.* **1993**, *12*, 110.

79. High resolution etchants and electrolytes for accurate revealing of surface and deep dislocations and precipitates in InP structures, with Maria Faur, Mircea Faur, Manju Ghalla, Sheila Bailey and Valentina Voljin, Conf. Rec. IEEE Photovoltaic Spec., 23rd **1993**, 747-51.
80. Concerted  $^{17}\text{O}/^{31}\text{P}$  magnetic resonance spectroscopy: a novel approach for *in vivo* correlation of oxygen consumption and phosphate metabolism, with D. Fercu, Adv. Exp. Biol. **1994**, 361, 234.
81. Characterization of  $\text{H}_3\text{PO}_4$ -equilibrated Nafion-117 membranes using  $^1\text{H}$  and  $^{31}\text{P}$  NMR spectroscopy, with S. Wasmus, A. Valeriu, D.A. Tryk and R.F. Savinell, Solid State Ionics, **1995**, 87-92.
82. *In vivo*  $^{17}\text{O}$  magnetic resonance spectroscopy: determination of temperature effects on metabolic rates ( $Q_{10}$  factor), with M.E. Cabrera, Adv. Exp. Med. Biol. **1997**, 585-590.
83.  $^{17}\text{O}$  and  $^{31}\text{P}$  magnetic resonance imaging and spectroscopy: *In vivo* investigations of cell bioenergetics, in: Spatially Resolved Magnetic Resonance, P. Blumler, B. Blumich, R. Botto, E. Fukushima (Eds.), with Marco Cabrera and Dan Fercu, Proceedings of the 4<sup>th</sup> International Conference on Magnetic Resonance Microscopy, Wiley-VCH, **1998**, 421-429.
84. Functional Oxygen-17 Magnetic Resonance Imaging and Localized Spectroscopy, Adv. Exp. Med. Biol. **2002**, 213-218.

### Communications

85. Steric Configuration of Some Halogenated Derivatives of Cyclobutane, with M. Avram and C. D. Nenitzescu, Third National Conference of Chemistry, Timisoara, Romania, 1966.
86. ESCA Study of Cationic Intermediates, with G. A. Olah, First IUPAC Conference on Physical Organic Chemistry, Crans sur Sierre, Switzerland, 1972.
87. X-ray Electron Spectroscopy and CMR: A New Insight into the Origin of the Carbon-13 Chemical Shifts in Neutral and ionic Molecules, First Annual Rocky Mountain Regional ACS Meeting, Ft. Collins, Colorado, June, 1972.
88. Carbon-13 Relaxation Times in Neutral and Ionic Molecules, with G. Pouzard, 14th ENC (Experimental NMR Conference), Boulder, Colorado, April, 1973.
89. The Observation of an Interionic  $^{13}\text{C}\{-^{19}\text{F}\}$  Nuclear Overhauser Effect and its Potential Application in Molecular Structure and Reaction Mechanism Studies, with G. Pouzard, Fifth Regional ACS Meeting, Rochester, N.Y., 1973.
90. New Dimensions in O-17 Nuclear Magnetic Resonance Spectroscopy, with L. A. Wilson, 14th ENC (Experimental Nuclear Magnetic Resonance Spectroscopy Conference), Boulder, Colorado, April, 1973.
91. High Resolution O-17 Nuclear Magnetic Resonance Spectroscopy, 8th Central Regional ACS Meeting, Akron, Ohio, May 1976.

92. Carbon-13 Relaxation times, Chemical Shifts, and Coupling Constants of neutral and Ionic Molecules. Purines and Pyrimidines, Abstracts of Papers, ORGN 40, with G. Pouzard, National ACS Meeting, Dallas, Texas, 1973.
93. Hydrocarbon Transformation Reactions over Solid Superacid and Intercalated Friedel-Crafts Catalysts, with G. Olah, G. Messina, J. Bukala and J. Olah, First Chemical Congress of the North American Continent, Mexico City, November 1975, Abstr. PHSC 153.
94. The "Magic Water" and its High Resolution O-17 NMR Spectrum, with G. M. Benedikt, ENC (Experimental Nuclear Magnetic Resonance Conference) **20**, 28, 1979.
95. The Hydronium Ion. Preparation and Characterization by O-17 NMR, with G. Benedikt, 178th ACS National Meeting, PHYS 19, 1979.
96. High Resolution O-17 NMR of Water, with G. Benedikt and M.P. Kelly, ENC (Experimental NMR conference), **23**, 34a, 1982.
97. Simultaneous Observation of H<sub>2</sub>O, HDO and D<sub>2</sub>O by Means of O-17 NMR, The "Anomalous" Isotope Shift in D<sub>3</sub>O<sup>+</sup>, with G. Benedikt., ENC, **23**, 35a, 1982.
98. Solution and Solid State C13 and N15 NMR of Labeled Rhodopsin and Bacteriorhodopsin (Including Whole Cells of *H. halobium*), with D. Muccio, W. Copan, V. Waterhous, M. Iqbal and E.W. Abrahamson. ENC, **24**, 64a, 1983.
99. A Computer Generated Movie on 2D (Two-Dimensional) NMR, ENC, **24**, 6, 1983.
100. New Models for Experimental Studies of Visual Pigments and Bacteriorhodopsin, with M. Iqbal, ENC, **25**, IIc13, 1984.
101. Teaching the New NMR: The Density Matrix Approach, with A. Valeriu., ENC, **24**, 10, 1984
102. High Resolution <sup>17</sup>O NMR and the Chemistry of Water Monomers, with Butenhof, K.J., Benedikt, G.M., Brescic, I., 1986. IX. ISMAR (Int. Soc. Magn. Reson.) Meeting, Rio de Janeiro.
103. Oxygen-17 NMR Imaging, with G. Yvars and T. Dular, ENC **28**, 1987.
104. <sup>17</sup>O-<sup>1</sup>H NMR Microscopy, with G. Yvars, D. Pazara and N. Alldridge, ENC, **29**, 189, 1988.
105. NMR Microscopy, Applications in Agricultural and Food Chemistry, with G. Yvars, D. Pazara and N. Alldridge, 196th National ACS Meeting, Los Angeles, September, 1988.
106. O-17 NMR Microscopy Applied to Plant Anatomy and Physiology, with G. Yvars and N. Alldridge, ACS Regional Meeting, Cleveland, 1989, 159a.
107. NMR Microscopy in Materials Research, with G. Yvars and D. Pazara, ACS Regional Meeting, Cleveland, 1989, 157a.
108. NMR Microscopy: Principles and Applications of <sup>17</sup>O-<sup>1</sup>H Imaging, Regional ACS Meeting, Cleveland, 1989, 209a.
109. O-17 NMR Imaging: Theory and Experiment, with G. Yvars, ENC **30**. 197a 1989.

110.  $^{17}\text{O}$ - $^1\text{H}$  Double Resonance NMR Microscopy: Potential and Limitations, with G. Yvars, D. Pazara and N. Alldridge, Eastern Analytical Symp., **27**, 169a, 1989.
111. Oxygen-17 Imaging of Non-Biological Materials, FACSS **17**, 127, 1990.
112. Volume Selective Oxygen-17 MR Measurements on a Mouse Model for Stroke with L. Maylish-Kogovsek, G. Yvars, J. LaManna, V.D. Lust and D. Sudilovski, IUPAB (Intl. Union of Pure & Appl. Biochemistry), Whistler, 1990.
113. The Chemistry of Water Monomers, with L. Maylish-Kogovsek, IUPAB Conference, Vancouver, 1990.
114. Volume Selected O-17 Spectroscopy in Experimental Cerebral Ischemia, with G. Yvars, J. LaManna, D. Lust and D. Sudilovski, ENC *31*, 205a, 1990.
115. A Unique Test of Brain Function: In Vivo Localized  $^{17}\text{O}$ -MR Spectroscopy in Respiration Experiments with Synthetic  $^{17}\text{O}$ -Air, with J. LaManna and D. Lust, ENC *32*, 194a, 1991.
116. Magnetic Resonance Microimaging with Protons and Oxygen-17, Joint Central-Great Lakes ACS Regional Meeting, Indianapolis, 1991.
117. Applications of  $^{17}\text{O}$  MRI and MRS in Biomedicine, First International Conference on NMR Microscopy, Heidelberg, 1991.
118. Oxygen-17 MRI and MRS: In-Vivo Determination of Cell Metabolism in Respiration Experiments with O-17 Labeled Air, 4th Int. Symposium on The Synthesis and Applications of Isotopes and Isotopically Labelled Compounds, Toronto, 1991.
119. In-Vivo Determination of Oxygen Utilization by Localized  $^{17}\text{O}$  Magnetic Resonance Spectroscopy: Detection of Metabolic Water in Mice Breathing  $^{17}\text{O}$ -Enriched Air with J. C. LaManna, W. D. Lust, L. M. Mars, J. Tseng and B. Cordisco, ISOTT (Int. Soc. Oxygen Transp. to Tissue), Curaçao, D8, 1991.
120. Oxygen-17 MRI and MRS: In-vivo Detection of Nascent Mitochondrial Water, European EN Conference, Lisbon, 1992.
121. Oxygen-17 MRS: Oxygen-17 MRS: In Vivo Detection of Changes Caused by Exogenous Agents in the Rate of Mitochondrial Metabolism, 15th International Conference on Magnetic Resonance in Biological Systems, Jerusalem, 1992.
122. Oxygen-17 / Phosphorus-31 Magnetic Resonance Spectroscopy: Novel Approach for *In Vivo* Evaluation of Defects in Mitochondrial Metabolism. with D. Fercu, 10th Congress of ESMRMB (European Society for Magnetic Resonance in Medicine and Biology), Rome, June 1993.
123. Recent advances in  $^{17}\text{O}$ -MRI and MRS. Detection limits and biomedical applications, with M. Cabrera, 3rd International Conf. on MR Microscopy ("Heidelberg Conference") Würzburg, August 1995, 28a.
124. Introduction to k-space in MR imaging and spectroscopy, International Workshop on Advances in MRI and MRS, Sinaia, Romania, June 2001.
125. Functional oxygen-17 magnetic resonance imaging and localized spectroscopy ISOTT (International Society for Oxygen Transport to Tissue), Philadelphia, August 2001

126. Mitochondria and NMR: New Insights at High Fields, ENC (Experimental NMR Conference)  
30. 104a 2002.

127. Potential and Limitations of Oxygen-17 MR Perfusion Measurements, International  
Workshop on Cerebral Perfusion, Venice, March 2004.

### **Invited Lectures**

Pittsburgh Analytical Conference, March 1972

Correlation Between X-ray Electron Spectroscopy, Nuclear Magnetic Resonance, and  
Vibrational Spectroscopy.

Great Lakes ACS Regional Meeting, Houghton, Michigan, June 1972

X-Ray Electron Spectroscopic Study of Organic Ions in Superacid Media.

164th National ACS Meeting, New York, August 1972

New Applications of Electron Spectroscopy.

"R.H. Martin" Lecturer, University of Brussels, Belgium, 1972

Applications of Electron Spectroscopy in Organic Chemistry.

University of Marseille, France, 1973

Recent Advances in Electron Spectroscopy.

University of Nice, France, 1973

The Total Protonation of Nucleic Acid Bases.

University of Montpellier, France, 1973

X-ray Photoelectron Spectroscopy and FT-NMR as Complementary Methods.

University of Rennes, France, 1973

Recent Advances in Electron Spectroscopy.

University of Paris, France, 1973

Principles and Applications of Electron Spectroscopy in Organic Chemistry.

University of Orsay, France, 1973

Oxygen-17 and Carbon-13 NMR Studies of Biologically Important Molecules.

University of Göttingen, Germany, 1973

Perspective of using  $^{17}\text{O}$  FT-NMR for the Elucidation of Metabolic Pathways.

International Conference on Electron Spectroscopy, Leipzig, 1975

Applications of X-ray Photoelectron Spectroscopy in Organic Chemistry.

Harvard University, March, 1975

Chemical Applications of X-ray Photoelectron Spectroscopy. Potential and Limitations,  
Correlations with other Methods.

French Chemical Society ("Journées Parisiennes"), Paris, 1975

X-ray Photoelectron Spectroscopy. Principles and Applications.

GECCO (Groupe d'Etudes de Chimie Organique) Annecy, September, 1976

Nouvelles Spectroscopies en Chimie Organique.

173rd ACS National Meeting, New Orleans, March, 1977

Friedel-Crafts Centennial Symposium.

ESCA Studies of Friedel-Crafts Intermediates.

SECO (Semaine de Chimie Organique) Nice, April 1977

ESCA-ISS-SIMS en Chimie Organique.

“500th Anniversary” of the University of Uppsala, May 1977

Symposium on Electron Spectroscopy.

The Role of ESCA in Multiple-Method Investigations of Surfaces.

"Kahlbaum" Lecturer, University of Basel, June 6-12, 1977

1) Concerted ESCA-ISS-SIMS Spectroscopy.

2) Photoelectron Spectroscopy of Rapidly Equilibrating Species.

3) Recent  $^{17}\text{O}$  and  $^{15}\text{N}$  Nuclear Magnetic Resonance Studies.

8th International Conference on X-ray Optics and Microanalysis, Boston, August 13-24, 1977

Concerted ESCA, ISS and SIMS Investigations in Surface Analysis.

Journées de Chimie Organique d'Orsay, Symposium on Electron Spectroscopy, 1977

Introduction à l'ESCA: Principes, Instrumentation et Notions Fondamentales pour le Chimiste Organicien.

175th ACS National Meeting, Anaheim, California, March 1978

Symposium on Molecular Processes at Solid Surfaces.

Combined ESCA-ISS-SIMS: A New Approach to Surface and Molecular Structure Investigation.

13th Microbeam Analysis Society Meeting, Ann Arbor, Michigan, 1978

A Kaleidoscopic View of Recent Developments in ESCA-ISS-SIMS.

Substrate Conditioning Conference, Society of Manufacturing Engineers, Rosemont, Illinois, October 1978

Chemical Characterization of Surfaces: Techniques and Principles.

11th ACS Central Regional Meeting, Columbus, Ohio, May 1979

Symposium on New Trends in Surface Analysis.

ESCA, ISS-SIMS, and NMR in Structural Determinations and Analytical Chemistry.

Analytical Science Discussion Group, Dow Chemical, Midland, Michigan, February 1980

Principles and Applications of ESCA and Related Techniques.

Symposium on Advances in Surface Finishing, Treating and Coating of Materials.

General Electric Corporate R&D, Schenectady, N.Y., April 1980

Surface Characterization Techniques.

International Symposium on the Synthesis and Applications of

Isotopically Labelled Compounds, Kansas City, Missouri, June 1982

Synthesis and High Resolution  $^{13}\text{C}$  and  $^{15}\text{N}$  NMR of Visual Pigments and Related Systems.

University of Marseille, December 1982

Teaching the New NMR: A Computer Generated Movie.

University of Montreal, September 1984

NMR Studies of Visual Pigments and Bacteriorhodopsin.

University of Toronto, October 1985  
Investigations of the Opsin Shift by Means of Nuclear  
Magnetic Resonance.

International Conference on Water and Ions in Biological Systems, Bucharest, May 1987  
Water, Ions and O-17 Magnetic Resonance Imaging.

Symposium of the International Isotope Society, Innsbruck, Austria July 1988  
Combined  $^{17}\text{O}$  and  $^1\text{H}$  Magnetic Resonance Microscopy  
in Plants, Animals and Materials: Present Status and Potential.

196th National ACS Meeting, Los Angeles, September 1988  
NMR Microscopy. Applications in Agricultural and Food Chemistry.

Swarthmore College, November 1989  
Teaching the New NMR: a Computer-aided Introduction to the  
Density Matrix Description of Multipulse Sequences.

European Congress of NMR Imaging, April 30-May 5, 1990  
 $^{17}\text{O}$  Magnetic Resonance Imaging. *In Vivo* Applications.

22nd Central Regional ACS Meeting, June 1990  
The Chemistry of Magnetic Resonance Imaging: From  $^1\text{H}$  to  $^{17}\text{O}$ .

Polytechnic Institute of Bucharest, July, 1990  
Advances in  $^{17}\text{O}$  NMR.

Polytechnic Institute of Bucharest, July, 1990  
The Principles of MRI (Magnetic Resonance Imaging).

International Union of Pure and Applied Biochemistry, Vancouver, July 1990  
Volume Selective  $^{17}\text{O}$  MR Measurements on a Mouse Model for Stroke.

VARIAN Conference, August, 1990  
 $^{17}\text{O}$  Imaging of Materials.

FACSS, Federation of Analytical Chemistry and Spectroscopy Societies, October, 1990.  
Oxygen-17 Imaging of Non-biological Material.

Indiana University of Pennsylvania, October, 1990  
Teaching the New NMR: a Computer-aided Introduction to Density Matrix Treatment.

Materials Research Conference, November 26, 1990  
Oxygen-17 and Proton Microscopy in Materials Analysis.

Xavier University, December 7, 1990  
Teaching the New NMR: a Computer-aided Introduction to the  
Density Matrix Description of Multipulse Sequences.

4th International Symposium on The Synthesis and Applications of Isotopes and Isotopically  
Labelled Compounds, Toronto, 1991  
Oxygen-17 MRI and MRS: *In-Vivo* Determination of Cell Metabolism in Respiration  
Experiments with  $^{17}\text{O}$  Labeled Air.

Eastern Analytical Symposium, Somerset, New Jersey, 1992  
Oxygen-17, Forty Years Later.

Bethany College, West Virginia, October 1992  
Teaching the New NMR. A Computer Generated Movie.

Ohio State University, October 20, 1992  
Oxygen-17 MRI and MRS, Novel Approach for Noninvasive Determination of the  
Uncoupling of Oxidative Phosphorylation.

Youngstown State University, April 1993  
Oxygen-17 Magnetic Resonance: Studies of Cell Bioenergetics.

Cancer Research Center, Frederick, Maryland, May 1993  
2D NMR: Density Matrix Formalism.

Eastern Analytical Symposium, Somerset, New Jersey, 1993  
Principles and Methods of 2D NMR, a Short Course.

National ACS (American Chemical Society) Meeting, Washington D.C., August 1994.  
*In Vivo* Oxygen-17 NMR: Novel Bioanalytical Method for Monitoring Cell  
Bioenergetics (Mitochondrial Oxygen Consumption, Oxidative Phosphorylation).

Sunbor Institute, Osaka, Japan, November 1994  
Biomedical Applications of Oxygen-17 NMR.

Kyushu Institute of Technology, Kitakyushu, Japan, December, 1994  
The Nuclear Magnetic Resonance Spectroscopy of Oxygen.

Tohoku University, Sendai, Japan, January 1995  
The Fundamental Chemistry of Water Monomers.

Hokkaido University, Sapporo, Japan, January 1995  
The Fundamental Chemistry of NMR Imaging.

Institute of Advanced Materials Studies, Kyushu University, Fukuoka, Japan, January 1995  
Multinuclear NMR Investigations of the Nascent Mitochondrial Water.

Butler University, Indianapolis, October 1995  
Teaching the New NMR to Advanced Undergraduate Students.

Hokkaido University, Sapporo, Japan, February 1997  
The Fundamental Chemistry of NMR Imaging.

Romanian Academy, Bucharest, June 1997  
Oxygen-17 Magnetic Resonance Imaging and Spectroscopy:  
A Tool of the Future in Chemical and Biomedical Research  
(a Tale of Two Countries).

Polytechnic University of Bucharest, June 1997  
Between Bucharest and Cleveland:  
Sharing a Lifetime of Teaching and Research.

E.I. DuPont de Nemours R&D Laboratories, April 1998  
Principles of Magnetic Resonance Microscopy.

Romanian Biophysical Society, Bucharest, July 2001  
FTIR and Raman Spectroscopies in Biophysical Research.

Romanian Biophysical Society, Bucharest, July 2001  
Magnetic Resonance in Biophysical Research.

Muskingum College, New Concord, Ohio, March 25, 2002  
NMR and its Never-Ending Wonders: In vivo MRI & MRS (Magnetic Resonance Imaging and Spectroscopy) in Plants, Animals and Humans.

SAGES (Seminar Approach to General Education) – Case Western Reserve University, 2003  
The Life of a Mind. Interview and Lecture on Magnetic Resonance Imaging.

International Summer School on MRI and MRS, Sinaia 2005  
The Fourier-Transform: all you wanted to know, but did not dare to ask.

Autumn School on Modern Biophysical Techniques for Human Health, Poiana Brasov, Oct. 2005  
A Bird's-eye View of MRI: Relaxation, Resolution, Revolution,  
Supramolecular Chemistry, <sup>17</sup>O

Winter Seminar, Klosters, Switzerland, January 2006  
A Bird's-eye View of MRI: From the Water Monomer to Nascent Mitochondrial Water

International Summer School on MRI and MRS, Poiana Brasov, Romania, June 2006  
Two-dimensional (2D) MR Spectroscopy: Basic Principles