

John W. Birks Curriculum Vitae

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GO3 Project Web Page: go3project.com

Date of Birth: December 10, 1946

Education: B.S., University of Arkansas, High Honors, 1968
M.S., University of California, Berkeley, 1970
Ph.D., University of California, Berkeley, 1974

Ph.D. Thesis: "Theory of the Dissociation of Diatomic Molecules and a Study of the Emission Spectra of IF," Principal Advisor: Professor Harold S. Johnston

Positions Held:

President, 2005-; Vice President; 2002-2005, 2B Technologies, Inc, (Co-Founder)
Executive Vice President, InDevR, Inc., Boulder, CO, 2002- (Co-Founder)
Director, Global Ozone Project, 2009- (Co-Founder)
President, Board of Directors, GO3 Foundation, Boulder, CO, 2010- (Co-Founder)
President, Board of Directors, Estes Institute, Estes Park, CO, 2013- (Co-Founder)
Professor Emeritus, 2002-; Professor, 1984-2002; Chair, 1995-8; Associate Professor, 1977-84;
Department of Chemistry and Biochemistry, University of Colorado, Boulder, CO
Fellow Emeritus, 2002-; Fellow, 1977-2002; Acting Director, 7/82-8/82, 8/83, 6/84-7/84, 5/85-6/86;
Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado,
Boulder, CO
Affiliated Professor, Program in Atmospheric and Oceanic Sciences (PAOS), University of Colorado,
Boulder, CO, 1992-2002
Affiliated Professor, Environmental Studies Program, University of Colorado, Boulder, CO, 1999-2001
Visiting Scientist, National Center for Atmospheric Research, Boulder, Colorado, 5/93-8/94
Guest Scientist, Department of Analytical Chemistry, Free University, Amsterdam, The Netherlands,
5/82-6/82, 7/83, 6/84, 6/87
Guest Scientist, Max Planck Institute for Chemistry, Gutenberg University, Mainz, Germany, 8/81-5/82
Assistant Professor, Department of Chemistry, University of Illinois at Urbana-Champaign, 1974-77

Awards:

Alfred P. Sloan Fellowship, 1979-81
Faculty Fellowships, University of Colorado Council on Research and Creative Work, 1981/82, 1986/87
and 1993/94 Academic Years
Leo Szilard Award for Physics in the Public Interest, American Physical Society, 1985
John Simon Guggenheim Fellowship, 1986
Witherspoon Peace and Justice Award, 1986
Thomas Jefferson Award, University of Colorado, 1989
Colorado Section Award, American Chemical Society, 1990
Teaching Fellowship, University of Colorado Council on Teaching, 1990
Hazel Barnes Prize (Highest CU Faculty Award), 2000
ACS Award for Creative Advances in Environmental Science and Technology, American Chemical
Society, 2003

Distinguished Lectures:

Ralph M. Johnson Distinguished Guest Lecture, College of Science, Utah State University, 1986
 William J. Probst Memorial Lecture, School of Science, Southern Illinois University at Edwardsville, 1987
 Featured Lecture, American Society for Mass Spectrometry, 35th Conference on Mass Spectrometry and Allied Topics, Denver, Colorado, 1987
 Frontiers of Science Lecture, University of Florida, Gainesville, Florida, 1988
 Council on Teaching Lecture, University of Colorado, Boulder, 1991
 Douglas G. Hill Memorial Lecture, Duke University, Durham, North Carolina, 1998

Number of Talks at Scientific Meetings, Seminars and Public Lectures: 301

Membership in Honorary and Professional Organizations:

American Association for the Advancement of Science
 American Chemical Society
 American Geophysical Union
 Alpha Chi Sigma (Professional, Chemistry)
 Phi Beta Kappa (Honorary, Arts and Sciences)
 Pi Mu Epsilon (Honorary, Mathematics)
 Sigma Xi (Scientific Research Society)

Undergraduate Courses Taught: General Chemistry II, Instrumental Analysis, Environmental Chemistry I, Environmental Chemistry II

Graduate Courses Taught: Analytical Spectroscopy, Analytical Electrochemistry, Chromatography and Analytical Separations, Atmospheric Chemistry

Advisory Committees, Consultantships and Public Service

Science Advisor, Denver Regional Laboratory, U.S. Food and Drug Administration	1980-82
Sierra Club, Committee on War and the Environment, Charter Member	1982-90
Science Advisory Board, Conference on The Long-Term Worldwide Biological Consequences of Nuclear War	1983
Committee on the Atmospheric Effects of Nuclear Explosions, National Research Council	1983-84
Drafting Committee, "National Research Plan for Nuclear Winter," National Climate Program Office, NOAA, Report to the Office of Science, Technology and Policy	1984
Proposal Review Panel, Exploratory Research Program, Environmental Protection Agency	1984-1992
Science Advisory Board, Sievers Research, Inc.	1984-1998
Hewlett-Packard, Analytical Chemistry Workshops, Instructor	1985-91
Scientific Programs Evaluation Committee, National Center for Atmospheric Research	1985
Symposium on Chemiluminescence and Photochemical Reaction Detection in Chromatography, organizer and host, Alanspark, Colorado, May 15-18, 1986	1986
Colloquium on the Chemistry of the Lower and Middle Atmosphere, National Center for Atmospheric Research, co-organizer and co-instructor with Susan Solomon, July 7-25, 1986	1986
University Corporation for Atmospheric Research, University of Colorado Representative	1987-88
Atmospheric Chemistry Workshop, sponsored by NASA Upper Atmosphere Theory and Data Analysis Program, Keystone Resort, Colorado, co-instructor with Susan Solomon and John Pyle, July 25-31, 1987	1987

Symposium on Chemiluminescence, 29th Rocky Mountain Conference, Denver, Colorado, organizer and chair	1987
Symposium on "Hidden Dangers: The Environmental Consequences of Preparing for War," CU, Boulder, CO, organizer and host	1988
Chair, Future Actions Committee, CHEMRAWN (CHEMical Research, Applied to World Needs) VII, "The Chemistry of the Atmosphere: Its Impact on Global Change," International Union of Pure and Applied Chemistry, Baltimore, Maryland, December 2-6, 1991	1989-92
External Review Committee, Department of Chemistry and Biochemistry University of Maryland, College Park, Maryland	1991
External Review Committee, Physical Sciences Graduate Program, University of California, Irvine, California	1992
Consultant to NCAR on the Commercial Aircraft Sensing Humidity (CASH) Project	1992-94
Symposium on Atmospheric Chemistry, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlanta, Georgia, organizer and chair	1993
Session on Atmospheric Chemistry, Symposium on Environmental Chemistry, American Chemical Society National Meeting, Denver, Colorado, organizer and chair	1993
Advisory Committee and External Review, Atmospheric Chemistry Division, National Center for Atmospheric Research	1993
Awards Selection Committee, American Chemical Society	1993-96
Proposal Review Panels, Small Business Innovative Research (SBIR) Program, National Science Foundation	1993-94
Proposal Review Panel, Global Change Program, National Oceanic and Atmospheric Administration	1993
Series Editor, <i>Topics in Environmental Chemistry</i> , Oxford University Press	1993-99
Symposium on Environmental Analytical Chemistry, Federation of Analytical Chemistry and Chemical Spectroscopy Societies (FACSS) Meeting, Providence, Rhode Island, organizer and session chair	1997
Co-Founder, 2B Technologies, Inc. , Golden, CO	1998
Co-Founder, InDevR, Inc. , Boulder, CO	2002
Founder and Director, Global Ozone Project , Boulder, CO	2009-
Co-Founder and President of the Board of Directors, GO3 Foundation , Boulder, CO	2010-
Co-Founder and President of the Board of Directors, Estes Institute , Estes Park, CO	2013-

Ph.D. Theses Directed

1. Thomas, J. Leck, 1979, "A Determination of the Rate Constant and Products for the Reaction of the Chlorine Oxide Radical with the Hydroperoxyl Radical"
2. Brian Shoemaker, 1981, "Singlet-Delta Molecular Oxygen as a Tool for Selective Chemiluminescent Detection in Chromatography"
3. Richard A. Borders, 1981, "A Direct Determination of the Activation Energy for the Reaction of Nitric Oxide with Ozone"
4. Richard D. Stratton, 1981, "Development of a Vacuum Ultraviolet Atomic Emission Detector for Chlorine"
5. John W. Vanderzanden, 1981, "Chemiluminescence in the Reactions of Cl with ClOCl, OClO and O₃"
6. Mitchell S. Gandelman, 1983, "Photochemical Reaction Detectors for High-Performance Liquid Chromatography"
7. Kenneth W. Sigvardson, 1984, "Peroxyoxalate Chemiluminescence Detection in Liquid Chromatography"
8. Julie K. Nelson, 1984, "Fluorine-Induced Chemiluminescence Detection of Reduced Sulfur Compounds in Gas Chromatography"
9. Andrew P. Ongstad, 1985, "A Study of Two Reactions Important in Stratospheric Chemistry: $O + NO_2 \rightarrow NO + O_2$ and $O + ClO \rightarrow Cl + O_2$ "
10. Christine A. Ennis, 1985, "Studies of the Generation and Reactions of Gaseous HOCl"
11. Elizabeth A. Mishalanie, 1985, "Fluorine-Induced Chemiluminescence Detection of Organosulfur Compounds in Microbore High Performance Liquid Chromatography and a Study of the Ultraviolet Absorption Spectrum of Gaseous Hypochlorous Acid"
12. Alan J. Hills, 1987, "Kinetics Investigations of Atmospheric Reactions"
13. Curtis L. Shellum, 1988, "Chromatographic Detection Based on Singlet Oxygen Photochemistry"
14. James R. Poulsen, 1988, "Photochemical and Chemiluminescent Reaction Detection of Quinones in HPLC"
15. Kathy L. Rowlen, 1989, "Whole Column Detection Chromatography"
16. Andrew A. Turnipseed, 1990, "Kinetics of the Reactions of BrO Radicals with ClO and BrO, and the Chemiluminescent Reactions of Fluorine with Dimethyl Sulfide"
17. Thomas G. Chasteen, 1990, "Fluorine-Induced Chemiluminescence Detection of Biologically Methylated Tellurium, Selenium, and Sulfur Compounds and Methyl-dithiocarbonylhydrazide as a Formaldehyde Derivatization Reagent"
18. Robert E. Milofsky, 1991, "Kinetics, Mechanism and Analytical Applications of Photoinitiated Peroxyoxalate Chemiluminescence"
19. Garrett N. Brown, 1991, "Photocatalysis and Photoelectrochemical Detection at Semiconducting Titanium Dioxide"
20. Sherry L. Stephens, 1992, "Ozone as a Sink for Atmospheric Carbon Aerosols"
21. Kevin L. Kelly, 1992, "Theory and Application of Preparative-Scale Whole Column Detection Chromatography"

22. Daniel R. Rodier, 1993, "Measurement of Tropospheric Aldehydes and Ketones by Derivatization with Dansyl Hydrazine and 2,4-Dinitrophenyl Hydrazine"
23. Paul T. Buckley, 1993, "Photochemistry of Atmospheric Ozone Cluster Molecules and Bromoform Emission from Arctic Ice Algae"
24. David O. De Haan, 1994, "Heterogeneous Reactions of Chlorine Peroxide on Ice Surfaces Doped with Halide Ions: Reaction Kinetics and Atmospheric Significance"
25. Priscilla L. Burrow, 1995, "Determination of the Mechanism of the Sulfur Chemiluminescence Detector"
26. Andrew G. Hadd, 1995, "Kinetics and Mechanism of the Imidazole-Catalyzed Peroxyoxalate Chemiluminescence Reaction"
27. Karl G. Knapp, 1996, "Vertical Profiling of Ozone and Meteorological Parameters in the Lower Atmosphere Using Kite and Balloon Platforms"
28. David W. Lehmpuhl, 1997, "Development of a New Derivatization Method for the Determination of Airborne Aldehydes and Ketones Using Gas Chromatography and the Analysis of Atmospheric Aerosols Using Atomic Force Microscopy"
29. John A. Bogner, 1998, "Development and Application of Lightweight Instruments for Vertical Profiling of Ozone and Carbon Monoxide"
30. Rhonda L. Skaggs, 1998, "Development of a Microcartridge Technique for the Measurement of Carbonyl Compounds and Emissions from Plants and a New Technique for the Measurement of Argon as a Passive Tracer"
31. Jill K. Robinson, 1999, "Luminol-Hydrogen Peroxide Chemiluminescence Detector for the Analysis of Nitric Oxide in Exhaled Breath"
32. Laura R. Kuck, 1999, "Measurement of Carbon Dioxide Fluxes in the Amazon Basin and the Design, Development and Testing of Two New Carbon Dioxide Detectors"
33. Amy E. Michel, 2001, "Atomic Force Microscopy Studies of Carbonaceous Materials and their Reactivity"
34. Christine M. Karbiwnyk, 2001, "Use of CFCs as Internal Standards for Measurements of Non-Methane VOCs Sampled onto Solid Adsorbent Cartridges"
35. James E. Boulter, 2002, "Development of a 'Low-Pressure Counterflow Exchanging Virtual Impactor' for Aerosol Analysis and Measurement of Ozone Mixing Ratios and Meteorological Parameters Through the Boundary Layer at Summit, Greenland"
36. Bryan P. Wert, 2002, "Development, Validation, and Application of a High Performance Tunable Diode Laser Absorption Spectrometer for Airborne Formaldehyde Measurements"
37. Kristen Schulz, 2003, "Measurements of Landscape-Scale Fluxes of Carbon Dioxide at Two AmeriFlux Sites Using a New Vertical Profiling Technique"
38. Brian Lerner, 2003, "Implications of Metal Carbonyl/Ozone Chemiluminescence upon Stratospheric Measurements of Oxides of Nitrogen"
39. Kevin L. Wilson, 2005, "Water Vapor Interference in the UV Absorption Measurement of Ozone"

M.S. Theses Directed

1. Elizabeth A. Hill, 1981, Thesis: "The Detection of Ozone-Induced Chemiluminescence from Analytes in the Solid State"
2. Jac-E L. Cook, 1981, Thesis: "The Temperature Dependent Rate Constant and Stratospheric Implications of the Reaction $\text{Cl} + \text{HOCl} \rightarrow \text{Products}$ "
3. Jenifer E. Tavernier, 1987, Thesis: "Fluorine-Induced Chemiluminescence Detection of Organosulfur Compounds in Capillary Gas Chromatography"
4. Kelley M. Wells, 1990, Thesis: "Development of an Element Selective Detector for Gas Chromatography"
5. Maxim Khaytsus, 1992, Thesis: "Computer Simulation Model of Preparative Scale Whole Column Detection Chromatography"
6. Joseph P. Smith, 1992, Thesis: "Ground Based Measurements of Atmospheric NO_3 at Middle and Polar Latitudes During Sunrise and a Method of Determining the NO_3 Altitude Distribution," with Susan Solomon
7. Chris Cantzler, 1997, Research Paper: "Nitric Oxide Detection by Luminol Chemiluminescence"
8. Erika Watson, 1998, Research Paper: "Chemiluminescence in the Reaction of Sulfur Vapor with Ozone"
9. William R. Eberle, 2002, Thesis: "Microcalorimetric Measurement of Water Vapor Based on the Reaction of $\text{SO}_3 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4$ "

Postdoctoral Students Mentored

1. Robert J. Glinski (Ph.D., University of Minnesota), 1984/85
2. William T. Foreman (Ph.D., University of North Carolina), 1988/89
3. William Scott (Ph.D., University of California, Berkeley), 1993/94
4. Andreas Grömping (Ph.D., University of Münster, Germany), Dec 1991- Aug 1993
5. Tyrrell Smith (Ph.D., University of California, Irvine), 1995/96
6. Anke Seeber, (Ph.D., University of Münster, Germany), 1995/96
7. Marta Lores (Ph.D., Spain) 1996
8. Detlev Helmig (Ph.D., University of Duisburg, Germany), 1996-2000

Senior Visiting Scientists Hosted

1. John Kennish, University of Alaska, 1984
2. Gerald Gübitz, University of Graz, Austria, 1988/89
3. Lubos Nondek, Water Research Institute, Prague, Czechoslovakia, 1991/92
4. Oleg Zoui, Fulbright Fellow, Academy of Sciences, Kiev, Ukraine, 1994/95, 2000/01
5. David Griffith, University of Wollongong, Australia, 1997

Publications

1. "Hematopoietic and Immunological Alterations in Mice Produced by ^{89}Sr -Induced Marrow Hypoplasia," C. W. Gurney, L. W. Klassen, J. W. Birks, and E. Allen, *Experimental Hematology* **22**, 27-30 (1972).
2. "Experimental Medullary Aplasia," L. W. Klassen, J. W. Birks, E. Allen and C. W. Gurney, *Journal of Laboratory and Clinical Medicine* **80**, 8-17 (1972).
3. "Exposure of Radiologists During Special Procedures," R. C. Riley, J. W. Birks, E. Palacios, and A. W. Templeton, *Radiology* **104**, 679-683 (1972).
4. "Activation Energies for the Dissociation of Diatomic Molecules are Less than the Bond Dissociation Energies," H. S. Johnston and J. W. Birks, *Accounts of Chemical Research* **5**, 327-335 (1972).
5. "Effects of Nuclear Explosions on Stratospheric Nitric Oxide and Ozone," H. S. Johnston, G. Z. Whitten and J. W. Birks, *Journal of Geophysical Research* **78**, 6107-6135 (1973).
6. "Theory of the Dissociation of Diatomic Molecules and a Study of the Emission Spectra of IF," Ph.D. Thesis, University of California, Berkeley, California, Lawrence Berkeley Laboratory Report LBL-2743 (1974).
7. "Chemiluminescence of IF in the Gas Phase Reaction of I_2 with F_2 ," J. W. Birks, S. D. Gabelnick and H. S. Johnston, *Journal of Molecular Spectroscopy* **57**, 23-46 (1975).
8. "Hypoxia-Induced Thrombocytopenia in Mice," J. W. Birks, L. W. Klassen, and C. W. Gurney, *Journal of Laboratory and Clinical Medicine* **86**, 230-8 (1975).
9. Book Review: *Source Testing for Air Pollution Control*, by H. B. H. Cooper, Jr. and A. T. Rossano, Jr.; J.W. Birks, *Journal of the American Chemical Society* **97**, 6608 (1975).
10. "Ne-H-H Potential Energy Surface Including Electron Correlation," J. W. Birks, H. S. Johnston and H. F. Schaefer III, *Journal of Chemical Physics* **63**, 1741-1747 (1975).
11. "Alternative Refrigerants," T. J. Leck and J. W. Birks, *Nature* **260**, 8; *ibid.* **262**, 642 (1976).
12. "Studies of Reactions of Importance in the Stratosphere. I. Reaction of Nitric Oxide with Ozone," J. W. Birks, B. Shoemaker, T. J. Leck and D. M. Hinton, *Journal of Chemical Physics* **65**, 5181-5185 (1976).
13. "Studies of Reactions of Importance in the Stratosphere. II. Reactions Involving Chlorine Nitrate and Chlorine Dioxide," J. W. Birks, B. Shoemaker, T. J. Leck, R. A. Borders and L. J. Hart, *Journal of Chemical Physics* **66**, 4591-4599 (1977).
14. "Direct Measurement of Activation Energies: An Alternative Formulation of the Kinetics Problem," J. W. Birks, *Analytical Chemistry* **49**, 1074-1076 (1977).
15. "A Chemiluminescent Detector for Gas Chromatography with Selectivity for Iodine," R. H. Getty and J. W. Birks, *Analytical Letters* **12**, 469-476 (1979).
16. "Monte Carlo Quasiclassical Trajectory Study of the Collision-induced Dissociation of Hydrogen by Neon," T. Lehr and J. W. Birks, *Journal of Chemical Physics* **70**, 4843-4848 (1979).
17. "High Speed Pulse Amplifier/Discriminator and Counter for Photon Counting," R. A. Borders, J. W. Birks and J. A. Borders, *Analytical Chemistry* **52**, 1273-8 (1980).
18. "Pulse Pair Generator for Testing Pulse Amplifiers," R. A. Borders, J. W. Birks and J. A. Borders, *Analytical Chemistry* **52**, 1366-8 (1980).

19. "Studies of Reactions of Importance in the Stratosphere. III. Rate Constant and Products of the Reaction Between ClO and HO₂ Radicals at 298 K," T. J. Leck, J. L. Cook and J. W. Birks, *Journal of Chemical Physics* **72**, 2364-73 (1980).
20. "Chemiluminescent Aerosol Spray Detector for Liquid Chromatography," J. W. Birks and M. C. Kuge, *Analytical Chemistry* **52**, 897-901 (1980).
21. Book Review: *Polluted Rain*, Ed. by T. Y. Toribara, M. W. Miller and P. E. Morrow; J.W. Birks, *Journal of Chemical Education* **58**, A228-A229 (1981).
22. "Studies of Reactions of Importance in the Stratosphere. IV. Rate Constant for the Reaction Cl + HOCl → HCl + ClO over the Temperature Range 243-365 K," J. L. Cook, E. A. Ennis, T. J. Leck and J. W. Birks, *Journal of Chemical Physics* **74**, 545-9 (1981).
23. "Generalized Chemiluminescence Spray Cell for Liquid Chromatography Detection: Selective Detection Using O₂(¹Δ_g)," B. Shoemaker and J. W. Birks, *Journal of Chromatography* **209**, 251-64 (1981).
24. "Products of the Reaction Between Cl and HOCl," J. L. Cook, C. A. Ennis, T. J. Leck and J. W. Birks, *Journal of Chemical Physics* **75**, 497-8 (1981).
25. "Ozone-induced Chemiluminescence of Organic Analytes Deposited on Solid Substrates," E. A. Hill, J. K. Nelson and J. W. Birks, *Analytical Chemistry* **54**, 541-546 (1982).
26. "Formation of Oxygen Atoms in the Reaction of Chlorine Atoms with Ozone," J. W. Vanderzanden and J. W. Birks, *Chemical Physics Letters* **88**, 109-114 (1982).
27. "High Precision Measurements of Activation Energies over Small Temperature Intervals: Curvature in the Arrhenius Plot for the Reaction NO + O₃ → NO₂ + O₂," R. A. Borders and J. W. Birks, *Journal of Physical Chemistry* **86**, 3295-3302 (1982).
28. "Photooxygenation/Chemiluminescence High Performance Liquid Chromatographic Detector for the Determination of Aliphatic Alcohols, Aldehydes, Ethers and Saccharides," M. S. Gandelman and J. W. Birks, *Journal of Chromatography* **242**, 21-31 (1982).
29. "The Atmosphere after a Nuclear War: Twilight at Noon," P. J. Crutzen and J. W. Birks, *Ambio*, **11**, 114-125 (1982). Also published as a chapter in *Nuclear War: The Aftermath*, Pergamon Press (New York, 1983) and as a chapter in *The Aftermath: The Human and Ecological Consequences of Nuclear War*, Pantheon Books (New York, 1983). Translated into Swedish, Japanese and German.
30. "Photoreduction-Fluorescence Detection of Aliphatic Alcohols, Aldehydes and Ethers in High Performance Liquid Chromatography," M. S. Gandelman and J. W. Birks, *Analytical Chemistry* **54**, 2131-2133 (1982).
31. "Photochemical Reaction Detection in HPLC," J. W. Birks and R. W. Frei, *Trends in Analytical Chemistry* **1**, 361-367 (1982).
32. "Atmospheric Effects of a Nuclear War," J. W. Birks and P. J. Crutzen, in *The Consequences of Nuclear War on the Global Environment*, Hearing before the Subcommittee on Investigations and Oversight of the Committee on Science and Technology, U.S. House of Representatives, Ninety-seventh Congress, September 15, 1982, **No. 171**, Washington, D.C.: U.S. Government Printing Office, 1983.
33. "Peroxyoxalate Chemiluminescence Detection of Polycyclic Aromatic Hydrocarbons in Liquid Chromatography," K. W. Sigvardson and J. W. Birks, *Analytical Chemistry* **55**, 432-435 (1983).
34. "Fluorine-Induced Chemiluminescence Detector for Reduced Sulfur Compounds," J. K. Nelson, R. H. Getty and J. W. Birks, *Analytical Chemistry* **55**, 1767-1770 (1983).

35. "Liquid Chromatographic Detection of Cardiac Glycosides and Saccharides Based on the Photoreduction of Anthraquinone-2,6-disulfonate," M. S. Gandelman, J. W. Birks, U. A. Th. Brinkman and R. W. Frei, *Journal of Chromatography* **282**, 193-209 (1983).
36. "Darkness at Noon: The Environmental Effects of Nuclear War," J. W. Birks, *Sierra* **68**, No. 3 (May/June) 58-61 (1983). Also published in *Social Issues Resources Series (SirS)*, **Vol. 3, Pollution**, E. C. Goldstein, Ed.
37. "Atmospheric Effects of a Nuclear War," J. W. Birks and P. J. Crutzen, *Chemistry in Britain* **19**, 927-930 (1983).
38. "Liquid Chromatographic Detection of Cardiac Glycosides, Saccharides and Hydrocortisone Based on the Photoreduction of 2-*tert*-Butylanthraquinone," M. S. Gandelman and J. W. Birks, *Analytica Chimica Acta* **155**, 159-171 (1983).
39. "Peroxyoxalate Chemiluminescence Detection of Polycyclic Aromatic Amines in Liquid Chromatography," K. W. Sigvardson, J. M. Kennish and J. W. Birks, *Analytical Chemistry* **56**, 1096-1102 (1984).
40. "Studies of Reactions of Importance in the Stratosphere. V. Rate Constants for the Reactions $O + NO_2 \rightarrow NO + O_2$ and $O + ClO \rightarrow Cl + O_2$ at 298 K," A. P. Ongstad and J. W. Birks, *Journal of Chemical Physics* **81**, 3922-30 (1984).
41. "Detection of Nitro Polycyclic Aromatic Hydrocarbons in Liquid Chromatography by Zinc Reduction and Peroxyoxalate Chemiluminescence," K. W. Sigvardson and J. W. Birks, *Journal of Chromatography* **316**, 507-518 (1984).
42. "National Research Plan for Nuclear Winter," M. May, P. Lunn, V. Derr, B. Toon, J. Pollack, S. Thompson, E. W. Bierly, D. Anderson, J. Campbell, D. W. Benson, J. Bishop, M. Yerg, A. D. Hecht, R. D. Cess, D. Ward, J. Birks, H. D. Orville, and L. Radke, Report to the Office of Science Technology and Policy from the National Climate Program Office, NOAA, 1984.
43. Book Review: *Detection and Measurement of Hazardous Gases*, Ed. by C. F. Cullis and J. G. Firth; J.W. Birks, *Journal of the American Chemical Society* **106**, 7658 (1984).
44. "Recent Developments in Luminescence Detectors for Continuous Flow Systems Including HPLC," R. W. Frei and J. W. Birks, *European Spectroscopy News* **57**, 15-20 (Dec. 1984/Jan. 1985).
45. *The Effects on the Atmosphere of a Major Nuclear Exchange*, G. F. Carrier (Chairman), William J. Moran (Vice Chairman), J. W. Birks, R. W. Decker, D. M. Eardley, J. P. Friend, E. M. Jones, J. I. Katz, S. M. Keeny, C. B. Leovy, C. L. Longmire, M. B. McElroy, W. Press, J. P. Ruina, E. M. Shoemaker, L. Smith, O. B. Toon and R. P. Turco, National Academy Press, Washington, D. C. (1985).
46. "Applications of a New Laboratory Source of HOCl: Product Distribution in the $Cl + HOCl$ Reaction and Equilibrium Constant for the Reaction $Cl_2O + H_2O = 2 HOCl$," C. A. Ennis and J. W. Birks, *Journal of Physical Chemistry* **85**, 186-191 (1985).
47. "Yields of Molecular Hydrogen in the Elementary Reactions $HO_2 + HO_2$ and $O(^1D_2) + H_2O$," R. J. Glinski and J. W. Birks, *Journal of Physical Chemistry* **89**, 3449-3453 (1985).
48. "Phosphorescence Spectra of Thioformaldehyde and Thioformaldehyde- d_2 by Chemiluminescence: Identification of the 4_1^1 Band," R. J. Glinski, J. K. Nelson Getty and J. W. Birks, *Chemical Physics Letters* **117**, 359-364 (1985).
49. "Nuclear War Perturbations of Global Atmospheric Chemistry," S. L. Stephens and J. W. Birks, *BioScience* **35**, 557-562 (1985).

50. "Whole Column Detection Chromatography: Computer Simulations," D. G. Gelderloos, K. L. Rowlen, J. W. Birks, J. P. Avery and C. G. Enke, *Analytical Chemistry* **58**, 900-903 (1986).
51. "Nuclear Exchanges," J. W. Birks and K. S. Birks, *Sierra* **71**, No. 1, 126-127 (1986).
52. "Selective Detection of Organosulfur Compounds in High Performance Liquid Chromatography," E. A. Mishalanie and J. W. Birks, *Analytical Chemistry* **58**, 918-923 (1986).
53. "Selenoformaldehyde Phosphorescence Observed in the Reaction of Molecular Fluorine with Dimethyldiselenide," R. J. Glinski, E. A. Mishalanie and J. W. Birks, *Journal of the American Chemical Society* **108**, 531-532 (1986).
54. "Ultraviolet Absorption Spectrum of Gaseous Hypochlorous Acid," E. A. Mishalanie, C. J. Rutkowski, R. Hutte and J. W. Birks, *Journal of Physical Chemistry* **90**, 5578-5584 (1986).
55. "Studies of Reactions of Importance in the Stratosphere. VI. Temperature Dependence of the Reactions $O + NO_2 \rightarrow NO + O_2$ and $O + ClO \rightarrow Cl + O_2$," A. P. Ongstad and J. W. Birks, *Journal of Chemical Physics* **85**, 3359-3368 (1986).
56. "Possible Toxic Environments Following a Nuclear War," J. W. Birks and S. L. Stephens, In *The Medical Implications of Nuclear War*, Institute of Medicine, National Academy Press, pp. 155-166 (1986).
57. "Solid State Peroxyoxalate Chemiluminescence Detection of Hydrogen Peroxide Generated in a Post-Column Photochemical Reaction," J. R. Poulsen, J. W. Birks, G. Gübitz, C. Gooijer, N. H. Velthorst and R. W. Frei, *Journal of Chromatography* **360**, 371-383 (1986).
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12. J. W. Birks, P. C. Andersen, A. A. Turnipseed, and C. J. Williford, "Method for Measuring Air Pollutants Using a Folded Tubular Photometer, U.S. Patent Application, January 25, 2018.

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1. *Chemiluminescence and Photochemical Reaction Detection in Chromatography*, J. W. Birks, Ed., New York: VCH Publishers (1989).
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Other Publications

1. "Environmental Chemistry," J. W. Birks, Chapter in *CIRES, 1967-2002, Pioneering a Successful Partnership*, Carl Kisslinger, Ed., CIRES, Boulder, CO, 2002.

Recent Presentations (of more than 300)

- February 11, 2014, EPA Air Quality Conference, Durham, North Carolina, GO3 Project: "Enabling Student Scientists to Measure Air Pollutants and Promote AQ Awareness."
- March 25, 2015, EPA Region 4 (Southeast Region) Air Monitoring Conference, Chattanooga, Tennessee, "2B Tech Model 211 Scrubberless Ozone Monitor for Interference-Free Measurements."
- September 22, 2015, International Ozone Association – Pan American Group (PAG) Conference, Dallas, Texas, "Interference-Free Measurements of Dissolved Ozone In Dirty Water Using a New MicroSparge™ Technology."
- October 19, 2015, Analytical and Environmental Chemistry Division and Atmospheric Chemistry Program Seminar, University of Colorado, Boulder, Colorado, "Portable Air Pollution Monitors and the Global Ozone (GO3) Project."
- September 21, 2016, Association of Air Pollution Control Agencies, 2016 Fall Business Meeting, Session on Preparing for Personal Air Sensors: Communication, Context and Perspectives, Raleigh, North Carolina, "Personal Ozone Monitor (POM) and Application to GO3 Treks."
- December 7, 2016, NIH/NIEHS Environmental Health Science FESFEST, Raleigh, North Carolina, Session on Stories from the Field on Community-Engaged Research and Citizen Science from Current Challenges to Future Possibilities, "The Global Ozone Project and GO3 Treks."
- December 8, 2016, NIH/NIEHS Environmental Health Science FESFEST, Raleigh, North Carolina, Session on Validation of Sensors for Personal Exposure 2 (VOCs, gases, and metals), "Personal Ozone Monitor (POM) and Personal Air Monitor (PAM)."
- December 8, 2016, NIH/NIEHS Environmental Health Science FESFEST, Raleigh, North Carolina, Session on Commercialization of Sensors, "Approaches to Commercialization of Personal Air Pollution Monitoring Technologies."

Recent Federal Research Grants (of more than 50)

CDC/SBIR Phase I (2B Technologies)	"Rapid Iodine Analyzer"	9/06-3/07	\$99,982
CDC/SBIR Phase II (2B Technologies)	"Rapid Iodine Analyzer"	9/08-9/10	\$697,582
NIH/NIEHS SBIR Phase I (2B Technologies)	"Personal Ozone Monitor"	9/08-3/09	\$98,622
NIH/NIEHS SBIR Phase II	"Personal Ozone Monitor"	9/10-3/13	\$736,230
NIH/NIEHS SBIR Phase I	"Personal Exposure Monitoring of the Air Pollutants Ozone and Black Carbon as a K-12 Educational Tool" (GO3 Treks)	5/14-10/14	\$149,690
NIH/NIEHS SBIR Phase II	"Personal Exposure Monitoring of Air Pollutants as a K-12 Educational tool" (GO3 Treks"	8/15-8/17	\$984,180