**ROBERT E. SYNOVEC** **February 16, 2021**

**UNIVERSITY OF WASHINGTON, Seattle WA, USA**
**College of Arts and Sciences**

**Basic Data:**

Department: Chemistry Date of last promotion: 2001
Academic Rank: Professor
Birth Date: March 4, 1959

**Educational Background:**

| Institution | Degree | Dates |
|---|---|---|
| Bethel College, St. Paul, MN | B.A., Chemistry (Summa Cum Laude) | 1977-1981 |
| Iowa State University, Ames, IA | Ph.D., Anal. Chem. | 1981-1986 |

Ph.D. dissertation title: "Instrumental and Computational Techniques for Obtaining Analytical Data in High Performance Liquid Chromatography"

**Employment Record:**

1978-1981 Teaching Assistant, Chemistry and Mathematics, Bethel College, St. Paul, MN.
1981-1982 Teaching Assistant, Iowa State University, Ames, IA.
1982-1986 Research Assistant, Iowa State University, Ames, IA.
1986-1992 Assistant Professor of Chemistry, University of Washington, Seattle, WA.
1992-2001 Associate Professor of Chemistry, University of Washington, Seattle, WA.
2007-2011 Faculty Director, Center for Process Analytical Chemistry (CPAC), UW
2007-2020 Associate Chair, Graduate Education Program, Department of Chemistry
2001-present Professor of Chemistry, University of Washington, Seattle, WA

**Other Experience and Professional Memberships and Honors:**

1983 – present, American Chemical Society (ACS)
1984 Alpha Chi Sigma Graduate Research Award in Analytical Chemistry, ISU
1984 ACS Fellowship, ACS Division of Analytical Chemistry, ISU
1985 – 1986, Phillips Petroleum Fellowship in Analytical Chemistry, ISU
1986 Excellence in Graduate Research Award, Iowa State University (ISU)
1999 DuPont Educational Aid Grant, DuPont

1999 Visiting Faculty, Royal Golden Jubilee PhD Program, Chiang Mai University, Chiang Mai, Thailand
2000 Amersham Pharmacia Professor in Residence, Molecular Dynamics, Sunnyvale, CA
1992 – 2018, Assistant Editor for *TALANTA*
2018 – 2020, Associate Editor for *TALANTA*
2019 – present, Contributing Editor for *Trends in Analytical Chemistry (TrAC)*
2003 – present, Editorial Board for *J. Chromatography A*
2004 – present, Editorial Board for *Current Analytical Chemistry*
2009 – L. S. Palmer Award, Minnesota Chromatography Forum, Minneapolis, MN
2010 – present, member of the GC×GC Symposium Scientific Committee
2013 – GC×GC Scientific Achievement Award, 10$^{th}$ GC×GC Int. Symposium, Palm Springs, CA
2016 – Marcel Golay Award, 40$^{th}$ ISCC Symposium, Riva del Garda, Italy

**Brief Biographical Summary:**

**Robert E. Synovec** is a Professor of Chemistry at the University of Washington (UW) in Seattle WA. He obtained his Ph.D. in 1986 from Iowa State University, and then joined the UW Faculty that year. He served as Associate Chair of the Chemistry Graduate Education Program from 2007 – 2020. Synovec has graduated **45** PhD's, **4** Thesis Masters, and **7** Non-Thesis Masters students, with **10** Post Docs and **57** Undergraduate Researchers. His group pioneers the development of novel analytical instrumentation and methodology based upon chemical separation science, coupled with chemometric data analysis. The group investigates the basic principles of separation science, detection, and data analysis at both a fundamental and problem-solving level. He has ~**270** publications (including several invited manuscripts, book chapters, and reviews), with **~20** publications co-authored by undergraduate students. Synovec also has **~ 600** research presentations including ~ **250** invited lectures and invited presentations. Synovec served as an Assistant Editor of *TALANTA* from 1992 to 2018, and more recently as an Associate Editor from May 2018 to February 2020. In July 2019, Synovec accepted the assignment as Contributing Editor for *Trends in Analytical Chemistry (TrAC).* Synovec also serves on the editorial board for *J. Chromatography A* since January 2003. He co-chaired the International Symposium on Capillary Chromatography (ISCC) three times with Frank Svec: Portland, OR, May 2009, San Diego, CA, May 2011, and Palm Springs, CA, May 2013. Synovec serves on the GC×GC International Symposium scientific committee since 2010. In May 2013, Synovec was awarded the GC×GC Scientific Achievement Award at the 10$^{th}$ GC×GC International Symposium. This award has been instituted to recognize the pioneering contributions of key scientists in promoting GC×GC instrumentation, method development and/or applications. Synovec received the Marcel Golay Award at the 40$^{th}$ ISCC meeting in Riva del Garda, Italy, which is presented annually to a scientist in recognition of a lifetime of achievement in capillary chromatography.

**Publications:**

**An * indicates an INVITED publication. An # indicates co-first author. Each entry is a peer reviewed manuscript unless noted otherwise. Principal author is underlined.**

1. "Quantitative Analysis Without Analyte Identification by Refractive Index Detection," R.E. Synovec, E.S. Yeung, *Anal. Chem.,* 1983, **54**, 1599-1603.

2. "Quantitative Gel-Permeation Chromatography Without Standards," R.E. Synovec, E.S. Yeung, *J. Chromatogr.*, 1984, **283**, 183-190.

3. "Correlation of Elution Orders in Different Liquid Chromatographic Systems Without Analyte Identification," R.E. Synovec, E.S. Yeung, *Anal. Chem.,* 1984, **56**, 1452-1457.

4.* "Characterization of Crude Oils using Liquid Chromatography Without Standards," R.E. Synovec, E.S. Yeung, in *Characterization of Heavy Crude Oils and Petroleum Residues,* B. Tissot, Ed., Editions Technip, Paris, 1984, pp-268-272. **Invited, peer reviewed conference proceeding.**

5. "Quantitation of Components in Crude Oils using Liquid Chromatography Without Identification," R.E. Synovec, E.S. Yeung, *J. Chromatogr. Sci.,* 1985, **23**, 214-221.

6. "Improvement of the Limit of Detection in Chromatography by an Integration Method," R.E. Synovec, E.S. Yeung, *Anal. Chem.,* 1985, **57**, 2162-2167. (Patent Awarded)

7. "A Laser-Based Circular Dichroism Detector for Conventional and Microbore Liquid Chromatography," R.E. Synovec, E.S. Yeung, *Anal. Chem.,* 1985, **57**, 2606-2610.

8. "Comparison of an Integration Procedure to Fourier Transform and Data Averaging Procedures in Chromatographic Data Analysis," R.E. Synovec, E.S. Yeung, *Anal. Chem.,* 1986, **58**, 2093-2095.

9. "Fluorescence Detected Circular Dichroism as a Detection Principle in High Performance Liquid Chromatography," R.E. Synovec, E.S. Yeung, *J. Chromatogr.,* 1986, **368**, 85-93.

10.* "Detectors for Liquid Chromatography," E.S. Yeung, R.E. Synovec, *Anal. Chem.,* 1986, **58**, 1237A-1256A. **Invited, peer reviewed A-page article**.

11.* "Laser-Based Circular Dichroism Detection of Molecules in Flowing Systems using High-Frequency Polarization Modulation," R.E. Synovec, E.S. Yeung, *AIP Conf. Proc.*, 1987, **160** (Adv. Laser Sci.-2), 615-617. **Invited, peer reviewed conference proceeding.**

12. "Effect of Ultrasonic Agitation in High Performance Size Exclusion Chromatography," R.E. Synovec, E.S. Yeung, *J. Chromatogr.,* 1987, **388**, 105-112.

13. "Refractive Index Effects in Cylindrical Detector Cell Designs for Microbore High Performance Liquid Chromatography," R.E. Synovec, *Anal. Chem.,* 1987, **59**, 2877-2884.

14. "High Speed and Super Speed Size-Exclusion Chromatography of Polymers for Process Analysis," C.N. Renn, R.E. Synovec, *Anal. Chem.,* 1988, **60,** 200-204.

15. "Dual Beam Absorbance Measurements by Position Sensitive Detection," C. N. Renn, R. E. Synovec, *Anal. Chem.,* 1988, **60**, 1188-1193.

16. "Improved Detection in Super-Speed Size-Exclusion Chromatography by Reducing On-Column Dilution and Detector Noise," C. N. Renn, R. E. Synovec, *Anal. Chem.,* 1988, **60**, 1829-1832.

17. "Refractive Index Gradient Detection of Femtomole Quantities of Polymers by Microbore Size-Exclusion Chromatography," D. O. Hancock, R. E. Synovec, *Anal. Chem.,* 1988, **60**, 1915-1920.

18. "Rapid Characterization of Linear and Star-Branched Polymers by Concentration Gradient Detection," D. O. Hancock, R. E. Synovec, *Anal. Chem.,* 1988, **60**, 2812-2818.

19. "Early Detection of C-130 Aircraft Engine Malfunction by Principal Component Analysis of the Wear Metals in C-130 Engine Oil," D. O. Hancock, R. E. Synovec, *Appl. Spectrosc.*, 1989, **43**, 202-208.

20. "Microbore LC and Refractive Index Gradient Detection of Low Nanogram and Low PPM Quantities of Carbohydrates," D. O. Hancock, R. E. Synovec, *J. Chromatogr.,* 1989, **464**, 83-91.

21. "Examination of the Automated Solute-Independent Calibration Technique," C. N. Renn, R. E. Synovec, *Anal. Chem.*, 1989, **61**, 1915-1921.

22. "Pointing Stability Limited, Dual Beam Absorbance Measurements by Position Sensitive Detection," C. N. Renn, R. E. Synovec, *Appl. Spectrosc.,* 1989, **43**, 1393-1398.

23.* "New Directions in Process Liquid Chromatography," R.E. Synovec, L.K. Moore, C.N. Renn, D.O. Hancock, *Am. Lab.,* 1989, October, 82-87. **Invited, non-peer reviewed article.**

24.* "Novel Approaches in Detector Instrumentation for Process Liquid Chromatography," R.E. Synovec, *AIP Conf. Proc.*, 1989, **191**, 716-721. **Invited, peer reviewed conference proceeding**.

25.* Review of "Instrumental Methods of Analysis," 7th ed., by H.H. Willard, L.L. Merritt, Jr., J.A. Dean, F.A. Settle, *Anal. Chem*., 1989, **61**, 417A-418A. **(invited review)**

26.* Review of "Preparative-Scale Chromatography," Chromatographic Science Series, Vol. 46, Eli Gruska, ed., *JACS*, 1989, **111**, 8768-8769. **(invited review)**

27.* Review of "On-Line Process Analyzers," by Gary D. Nichols, *Anal. Chem*., 1989, **61**, 1376A-1377A. **(invited review)**

28.* "Fiber Optic Absorbance and Fluorescence Measurements in High Temperature Liquid Chromatography," R.E. Synovec, C.N. Renn, L.K. Moore, *Proc. SPIE-Int. Soc., Opt. Eng.*, 1990, **1172**, 49-59. **Invited, peer reviewed conference proceeding**.

29. "Single Optical Fiber, Position-Sensitive Detector Based Multi-Wavelength Absorbance Spectrophotometer," C.N. Renn, R.E. Synovec, *Anal. Chem.,* 1990, **62**, 558-564.

30. "Ratio of Sequential Chromatograms for Quantitative Analysis and Peak Deconvolution: Application to Standard Addition Method and Process Monitoring," R.E. Synovec, E.L. Johnson, T.J. Bahowick, A.W. Sulya, *Anal. Chem.,* 1990, **62**, 1597-1603.

31. "Ion Chromatographic Determination of Oxalate in Plasma: Correlation Study with an Enzymatic Method," K.J. Skogerboe, T. Felix-Slinn, R.E. Synovec, *Anal. Chim. Acta,* 1990, **237**, 299-304.

32. "Flow Dependence and Sensitivity of the Refractive Index Gradient Measurement with the Z-Configuration Flow Cell at Low Reynolds Number," D.O. Hancock, C.N. Renn, R.E. Synovec, *Anal. Chem.,* 1990, **62**, 2441-2447.

33.* "Liquid Chromatography: Equipment and Instrumentation," R.E. Synovec, E.L. Johnson, L.K. Moore, C.N. Renn, *Anal. Chem.,* 1990, **62**, 357R-370R. **Invited fundamental review.**

34. "Refractive Index Gradient Detection of Biopolymers Separated by High Temperature Liquid Chromatography," R.E. Synovec, C.N. Renn, *J. Chromatogr.,* 1991, **536**, 289-301

35.* "Molecular Weight Sensing of Polyethylene Glycols by Flow Injection Analysis and Refractive Index Gradient Detection," V. Murugaiah, R.E. Synovec, *Anal. Chim. Acta,* 1991, **246**, 241-249. **Invited, peer reviewed manuscript for young analytical chemists.**

36. "Thermal Gradient Microbore Liquid Chromatography and Dual-Wavelength Absorbance Detection," C.N. Renn, R.E. Synovec, *Anal. Chem.*, 1991, **63**, 568-574.

37.* "Sensitive Laser-Based Measurements of Hydrodynamically Generated Concentration Gradients," R.E. Synovec, V. Murugaiah, *SOQUE Lasers '90 Conf. Proc.: Lasers in Chemistry,* 1991, **13**, 763-771. **Invited, peer reviewed conference proceeding**.

38.* "A Novel Approach for the Refractive Index Gradient Measurement in Microliter Volumes Using Fiber Optic Technology," R.E. Synovec, C.N. Renn, *Proc. SPIE-Int. Soc. Opt. Eng.*, 1991, **1435**, 128-139. **Invited, peer reviewed conference proceeding**.

39.* "Gradient Microbore Liquid Chromatography with Dual-Wavelength Absorbance Detection: Tunable Analyzers for Remote Chemical Monitoring," R.E. Synovec, L.K. Moore, A.W. Sulya, *Proc. SPIE-Int. Soc. Opt. Eng.,* 1991, **1434**, 147-158. **Invited, peer reviewed conference proceeding**.

40. "The Effect of Temperature on Separation Efficiency for High-Speed Size Exclusion Chromatography," C.N. Renn, R.E. Synovec, *Anal. Chem*., 1992, **64**, 479-484.

41. "Sequential Chromatogram Ratio Technique: Evaluation of the Effects of Retention Time Precision, Adsorption Isotherm Linearity, and Detector Linearity on Qualitative and Quantitative Analysis," T.J. Bahowick, R.E. Synovec, *Anal. Chem.*, 1992, **64**, 489-496.

42.* "Trace Analysis of Organics in Ground Water by On-Column Preconcentration and Thermal Gradient Microbore Liquid Chromatography with Dual Wavelength Absorbance Detection," L. K. Moore, R.E. Synovec, *ACS Symposium Series,* 1992, 508 (Pollution Prevention in Industrial Processes), Chapter 20, 243-257. **Invited, peer reviewed book chapter.**

43. "Radial Measurement of Hydrodynamically Generated Concentration Profiles for Molecular Weight Determination," V. Murugaiah, R.E. Synovec, *Anal. Chem.*, 1992, **64**, 2130-2137.

44.* "Liquid Chromatography: Equipment and Instrumentation," T.J. Bahowick, V. Murugaiah, A.W. Sulya, D.B. Taylor, R.E. Synovec, R.J. Berman, C.N. Renn, E.L. Johnson, *Anal. Chem.,* 1992, **64**, 255R - 270R. **Invited fundamental review.**

45. "Uncoupling the Effects of Convection and Diffusion on Refractive Index Gradient Detection in High Temperature Liquid Chromatography" L.R. Lima III, R.E. Synovec, *Anal. Chem.,* 1993, **65**, 128-134.

46. "Chromatographic Determination of Copper Speciation in Jet Fuel," D.B. Taylor, R.E. Synovec, *Talanta*, 1993, **40**, 495-501.

47. "High Speed Chromatographic Analysis of High Fructose Corn Syrup for Process Monitoring," D.R. Dunphy, R.E. Synovec, *Talanta,* 1993, **40**, 775-780.

48.* "Molecular Weight Determination of Polymers by Flow Injection Analysis and Refractive Index Gradient Detection," V. Murugaiah, L.R. Lima, III, R.E. Synovec, Proceedings of the ACS, Division of Polymeric Materials: Science and Engineering, 1993, **69**, 410-411. **Invited, peer reviewed conference proceeding**.

49. "Axial Thermal Gradient Microbore Liquid Chromatography by Flow Programming," L.K. Moore, R.E. Synovec, *Anal. Chem.*, 1993, **65**, 2663-2670.

50. "Liquid Chromatographic Determination of Copper Speciation in Jet Fuel Resulting from Dissolved Copper," D.B. Taylor, R.E. Synovec, *J. Chromatogr. A*, 1994, **659**, 133-141.

51. "Analysis of Unresolved Chromatographic Peaks by the Absorbance Ratio and Sequential Chromatogram Ratio Techniques Coupled with Peak Suppression," T.J. Bahowick, D.R. Dunphy, R.E. Synovec, *J. Chromatogr. A*, 1994, **663**, 135-150.

52. "Isocratic Mixed Mode Liquid Chromatographic Separation of Phospholipids with Octadecylsilane-Silica Stationary Phases," L.R. Lima, III, R.E. Synovec, *Talanta,* 1994, **41**, 581-588.

53. "Dynamic Surface Tension Detection by Optically Probing a Repeating Drop Rate," L.R. Lima, III, D.R. Dunphy, R.E. Synovec, *Anal. Chem.*, 1994, **66**, 1209-1216.

54.* "Liquid Chromatography: Equipment and Instrumentation," C.A. Bruckner, M.D. Foster, L.R. Lima, III, R.E. Synovec, R.J. Berman, C.N. Renn, E.L. Johnson, *Anal. Chem.,* 1994, **66**, 1R-16R. **Invited fundamental review.**

55.* "Chemical Sensing of In-Situ Extracted Organics by Direct Detection of Mode-Filtered Light," R.E. Synovec, C.A. Bruckner, L.W. Burgess, M.D. Foster, *Proc. SPIE-Int. Soc. Opt. Eng.,* 1994, **2293**, 167-177. **Invited, peer reviewed conference proceeding**.

56.* "Molecular Weight Determination of Polymers by Flow Injection Analysis and Refractive Index Gradient Detection," V. Murugaiah, L.R. Lima, III, R.E. Synovec, *ACS Symposium Series,* 1994, **581** (Hyphenated Techniques in Polymer Characterization), Chapter 3, 25-43. **Invited, peer reviewed book chapter.**

57.* Review of "Process Gas Chromatography Fundamentals and Applications" by R. Annino and R. Villalobos, *Anal. Chem.,* 1994, **66**, 302A-303A. **(invited review)**

58. "Laser-Based Dynamic Surface Tension Detection for Liquid Chromatography by Probing a Repeating Drop Radius," L.R. Lima, III, R.E. Synovec, *J. Chromatogr. A,* 1995, **691**, 195-204.

59. "Fiber Optic-Based Mode-Filtered Light Detection for Small Volume Chemical Analysis," R.E. Synovec, A.W. Sulya, L.W. Burgess, M.D. Foster, C.A. Bruckner, *Anal. Chem.,* 1995, **67**, 473-481.

60. "Correlation of Quantitative Analysis Precision to Retention Time Precision and Chromatographic Resolution for Rapid, Short-Column Analysis," T.J. Bahowick, R.E. Synovec, *Anal. Chem.*, 1995, **67**, 631-640.

61.* "The Influence of Organic Compounds on Cloud Droplet Growth," M. L. Shulman, M. C. Jacobson, T. E. Young, R. E. Synovec, R. J. Charlson, *Proceedings of the ACS*, Division of Environmental Chemistry, 1995, **35**, 163-165. **Invited, peer reviewed conference proceeding**.

62. "Liquid Chromatographic Sensing in Water on a Thin-Clad Optical Fiber by Mode-Filtered Light Detection," M.D. Foster, R. E. Synovec, *Anal. Chem.*, 1996, **68**, 1456-1463.

63. "Enhanced Surfactant Determination by Ion-Pair Formation using Flow Injection Analysis and Dynamic Surface Tension Detection," T. E. Young, R. E. Synovec, *Talanta*, 1996, **43**, 889-899.

64. "Gas Chromatographic Sensing on an Optical Fiber by Mode-Filtered Light Detection," C. A. Bruckner, R. E. Synovec, *Talanta*, 1996, **43**, 901-907.

65. "Dissolution Behavior and Surface Tension Effects of Organic Compounds in Nucleating Cloud Droplets," M. L. Schulman, M. C. Jacobson, R. J. Charlson, R. E. Synovec, T. E. Young, *Geophysical Research Letters*, 1996, **23**, 277-280.

66. "Reversed Phase Liquid Chromatography of Organic Hydrocarbons with Water as the Mobile Phase," M. D. Foster, R. E. Synovec, *Anal. Chem.*, 1996, **68**, 2838-2844.

67. "High-Speed Liquid Chromatography of Phenylethanolamines for the Kinetic Analysis of [$^{11}$C]-meta-Hydroxyephedrine and Metabolites in Plasma," J. M. Link, R. E. Synovec, K. A. Krohn, J.H. Caldwell, *J. Chromatogr. B*, 1997, **693**, 31-41.

68.* "Parallel-Column Gas Chromatography Coupled with Mass Spectrometry and Chemometrics," R. E. Synovec, B. J. Prazen, B. R. Kowalski, *Proc. 19th Int. Symp. Cap. Chromatogr and Electrophoresis*, 1997, pp. 366-367. **Invited conference proceeding**.

69.* "High-Speed Short Column Capillary Gas Chromatography with Chemometrics," R. E. Synovec, C. A. Bruckner, B. J. Prazen, *Proc. 19th Int. Symp. Cap. Chromatogr. and Electrophoresis*, 1997, pp. 148-149. **Invited conference proceeding**.

70. "Dynamic Surface Tension and Adhesion Detection for the Rapid Analysis of Surfactants in Flowing Aqueous Liquids," N. A. Olson, R. E. Synovec, W. B. Bond, D. M. Alloway, K. J. Skogerboe, *Anal. Chem.*, 1997, **69**, 3496-3505.

71. "Simultaneous Flame Ionization and Absorbance Detection of Volatile and Non-Volatile Compounds by Reversed Phase Liquid Chromatography with a Water Mobile Phase," C. A. Bruckner, S. T. Ecker, R. E. Synovec, *Anal. Chem.*, 1997, **69**, 3465-3470.

72. "Standardization of Second Order Chromatographic/Spectroscopic Data for Optimum Chemical Analysis," B. J. Prazen, R. E. Synovec, B. R. Kowalski, *Anal. Chem.,* 1998, **70**, 218-225.

73. "Bonded Stationary Phases for Reversed Phase Liquid Chromatography with a Water Mobile Phase: Application to Subcritical Water Extraction," T. E. Young, S. T. Ecker, R. E. Synovec, N. T. Hawley, J. Lomber, C. M. Wai, *Talanta*, 1998, **45**, 1189-1199.

74. "Hydrophobic Interaction Chromatography Coupled with Dynamic Surface Tension Detection for the Determination of Surface Active Species in Protein Formulations," N. A. Olson, K. J. Skogerboe, R. E. Synovec, *J. Chromatogr. A*, 1998, **806**, 239-250.

75. "Bridging the Gap between Process Gas Chromatography and Chemometrics," R. E. Synovec, C. A. Bruckner, B. J. Prazen, *At Process*, 1998, Vol. III, No. 3,4, 132-138.

76. "Comprehensive Two-Dimensional High Speed Gas Chromatography (GC×GC) with Chemometric Analysis," C. A. Bruckner, B. J. Prazen, R. E. Synovec, *Anal. Chem.*, 1998, **70**, 2796-2804.

77. "Second Order Chemometric Standardization for High Speed Hyphenated Gas Chromatography: Analysis of GC/MS and GC×GC Data," B. J. Prazen, C. A. Bruckner, R. E. Synovec, B. R. Kowalski, *J. Microcolumn Separations*, 1999, **11**, 97-107.

78. "Enhanced Chemical Analysis Using Parallel Column Gas Chromatography with Single Detector Time-of-Flight Mass Spectrometry and Chemometric Analysis," B. J. Prazen, C. A. Bruckner, R. E. Synovec, B. R. Kowalski, *Anal. Chem.*, 1999, **71**, 1093-1099.

79. "Whole-Column Radioactivity Detection: Simultaneous Separation and Enhanced Detectability," J. M. Link, R. E. Synovec, *Anal. Chem.*, 1999, **71**, 2700-2707.

80.* "Comparison of the Binding Constant of Decanesulfonate with β-Cyclodextrin as Determined by Liquid Chromatography with a Water Mobile Phase and Flow Injection Analysis Coupled with Dynamic Surface Tension Detection," T. E. Young, K. E. Miller, R. E. Synovec, *Microchemical Journal*, 1999, **62**, 70-82. **Special issue honoring P. K. Dasgupta, peer reviewed.**

81.* "Advances in High-Speed Multidimensional Gas Chromatography Coupled with Chemometric Analysis," R. E. Synovec, C. G. Fraga, W. W. C. Quigley, K. J. Johnson, *Proc. 21st Int. Symp. Cap. Chromatogr. and Electrophoresis*, 1999, p.20. **Invited conference proceeding**.

82.* "Capillary-Based Hyphenated Chemical Analyzers using Liquid Chromatography with a Water Mobile Phase," R. E. Synovec, P. G. Vahey, W. W. C. Quigley, C. G. Fraga, B. J. Marquardt, L. W. Burgess, *Proc. 21st Int. Symp. Cap. Chromatogr. and Electrophoresis*, 1999, p. 216. **Invited conference proceeding**.

83. "The Relative Importance of Background and Signal in Quantifying Chromatographic Radioanalytes: Post-Column Versus Whole Column Radiation Detection," J. M. Link, R. E. Synovec, *J. Labelled Cpd. Radiopharm*., 1999, **42**, (Suppl. 1), S883-S885.

84. "Reversed Phase Liquid Chromatography with UV Absorbance and Flame Ionization Detection Using a Water Mobile Phase and a Cyano Propyl Stationary Phase: Analysis of Alcohols and Chlorinated Hydrocarbons," W. W. C. Quigley, S. T. Ecker, P. G. Vahey, R. E. Synovec, *Talanta*, 1999, **50**, 569-576.

85. "Novel Calibration of a Dynamic Surface Tension Detector: Flow Injection Analysis of Kinetically-Hindered Surface Active Analytes," K. E. Miller, K. J. Skogerboe, R. E. Synovec, *Talanta*, 1999, **50**, 1045-1056.

86. "A Novel Raman Waveguide Detector for Liquid Chromatography," B. J. Marquardt, P. G. Vahey, R. E. Synovec, L. W. Burgess, *Anal. Chem.*, 1999, **71**, 4808-4814.

87. "Comprehensive LC x GC for Enhanced Headspace Analysis," W. W. C. Quigley, C. G. Fraga, R. E. Synovec, *J. Microcolumn Separations*, 2000, **12**, 160-166.

88.* "Enhancing the Limit of Detection for GC×GC Data Using Bilinear Chemometric Analysis," C. G. Fraga, B. J. Prazen, R. E. Synovec, *J. High Resolut. Chromatogr.*, 2000, **23**, 215-224. **Special issue honoring John Phillips, peer reviewed.**

89. "Rapid Polymeric Surfactant Characterization Using a Novel Flow-Injection System and Dynamic Surface Tension Detection," K. E. Miller, R. E. Synovec, *Anal. Chim. Acta*,

2000, **412**, 149-160.

90.* "Review of Analytical Measurements Facilitated by Drop Formation Technology," K. E. Miller, R. E. Synovec, *Talanta*, 2000, **51**, 921-933. **Invited review, peer reviewed.**

91. "Development of a Positive Pressure Driven Micro-Fabricated Liquid Chromatographic Analyzer through Rapid-Prototyping with Poly(dimethylsiloxane): Optimizing Chromatographic Efficiency with Sub-nanoliter Injections," P. G. Vahey, S. H. Park, Y. Xia, B. J. Marquardt, L. W. Burgess, R. E. Synovec, *Talanta*, 2000, **51**, 1205-1212.

92. "Comprehensive Two-Dimensional Gas Chromatography and Chemometrics for the High-Speed Quantitative Analysis of Aromatic Isomers in Jet Fuel Using the Standard Addition Method and an Objective Retention Time Alignment Algorithm," C. G. Fraga, B. J. Prazen, R. E. Synovec, *Anal. Chem.,* 2000, **72**, 4154-4162.

93. "Multidimensional Analysis of Poly(ethylene glycols) by Size Exclusion Chromatography and Dynamic Surface Tension Detection," K. E. Miller, E. Bramanti, B. J. Prazen, M. Prezhdo, K. J. Skogerboe, R. E. Synovec, *Anal. Chem.*, 2000, **72**, 4372-4380.

94. "Increasing the Number of Analyzable Peaks in Comprehensive Two-Dimensional Separations through Chemometrics," C. G. Fraga, C. A. Bruckner, R. E. Synovec, *Anal. Chem.,* 2001, **73**, 675-683.

95. "New Method for Separation and Determination of Denatured Caseins by Hydrophobic Interaction Chromatography," E. Bramanti, F. Ferri, G. Raspi, L. Lampugnani, M. C. Spinetti, K. E. Miller, R. E. Synovec, *Talanta*, 2001, **54**, 343-349.

96. "Separation and Determination of Denatured Caseins by Hydrophobic Interaction Chromatography. Part II. Method Validation and Applications," E. Bramanti, C. Sortino, G. Raspi, R. E. Synovec, *Analyst*, 2001, **126**, 995-1000.

97. "Dynamic Surface Tension Analysis of Dodecyl Sulfate Association Complexes," W. W. C. Quigley, A. Nabi, B. J. Prazen, N. Lenghor, K. Grudpan, R. E. Synovec, *Talanta*, 2001, **55**, 551-560.

98.* "Increasing the Utility of High-Speed Comprehensive Two-Dimensional Separations with Chemometrics," R. E. Synovec, B. J. Prazen, K. J. Johnson, C. G. Fraga, *Proc. 24th Int. Symp. Cap. Chromatogr. and Electrophoresis*, 2001, 6 pages, WEB publication at http://www.meetingabstracts.com. **Invited conference proceeding**.

99.* "High-Speed Valve-based Comprehensive GC × GC with Independently Controlled Temperature Programming," K. J. Johnson, B. J. Prazen, R. E. Synovec, *Proc. 24th Int. Symp. Cap. Chromatogr. and Electrophoresis*, 2001, 5 pages, WEB publication at http://www.meetingabstracts.com. **Invited conference proceeding**.

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