

Richard P. BaldwinChemistry
Department

CURRICULUM VITAE

for Personnel Actions

College of Arts and Sciences

Date_____
Faculty Member's Signature**I. EMPLOYMENT HISTORY:****A. Academic Institutions other than University of Louisville**

<u>Institution</u> <u>(Name and Location)</u>	<u>Years</u> <u>Service</u>	<u>Title of</u> <u>Position</u>
Purdue University	1/81-5/81	Visiting Assistant Professor
Aarhus University (sabbatical)	1/85-5/85	Visiting Lecturer

B. University of Louisville

Date appointed: July 1, 1976

Rank when appointed: Assistant Professor

Credit toward tenure when appointed? (Years) None

Date tenured: July 1, 1983

If currently untenured; date of mandatory tenure decision:

Promotion record: (if applicable, fill in following dates):

If appointed Instructor, date of promotion to Assistant Professor:

Date of promotion to Associate Professor: July 1, 1982

Date of promotion to Professor: July 2, 1987

C. Other relevant employment. (Give title, type of work, location, dates and other pertinent information)

D. Honors received:

Adjunct Professor, Department of Chemical Engineering, University of Louisville,
2003 – present.

Editor, *Analytica Chimica Acta*, 1/2000 - present

Professor Honoris Causa Faculty of Chemistry, University of Bucharest, awarded
6/2000.

Editorial Board, *Electroanalysis*, 1988-1995

II. EDUCATIONAL HISTORY: (Undergraduate, Graduate, and Post Graduate)

<u>Institution (Name and Location)</u>	<u>Dates Attended</u>	<u>Degree</u>
Thomas More College, Covington, KY	1966-70	B.A. (Chemistry), Summa Cum Laude
Purdue University, W. Lafayette, IN	1970-76 (Analytical Chemistry)	Ph.D.

What is the most common terminal degree for academicians in your discipline:

Ph.D.

Other relevant training. Describe:

III. TEACHING

A. Teaching and research appointments, other than University of Louisville

<u>Institution (Name and Location)</u>	<u>Academic Rank When Teaching</u>	<u>Courses Taught</u>
Purdue University (Spring, 1979) West Lafayette, Indiana	Assistant Professor	"Computers in Chemical Instrumentation"
Aarhus University, (Spring, 1985) Aarhus, Denmark	Associate Professor	"Chemically Modified Electrodes in Analytical Chemistry"

B. Courses taught, University of Louisville, last 5 years, including current offerings. Give course number, course title, semesters taught (fall, sp, sum) and credit hours.

2011-2012	Spring	Chem 209 - Intro to Chemical Analysis III (3 lecture, 13 lab sections) Chem 209 Honors - Intro to Chem Analysis III (1 lecture, 2 lab sections) Chem 621 – Electroanalytical Chemistry (team-taught with Professor Zamborini)
	Fall	Chem 208 – Intro to Chemical Analysis II (2 lecture, 10 lab sections)
2010-2011	Spring	Chem 209 – Intro to Chemical Analysis III (3 lecture, 13 lab sections) Chem 209 Honors - Intro to Chem Analysis III (1 lecture, 2 lab sections)
	Fall	Chem 209 – Intro to Chemical Analysis III (2 lecture, 7 lab sections) Chem 210 – Intro to Chemical Analysis IV (2 lecture, 4 lab sections)
2009-2010	Spring	Chem 209 – Intro to Chemical Analysis III (3 lecture, 10 lab sections) Chem 209 Honors - Intro to Chem Analysis III (1 lecture, 3 lab sections)
	Fall	Chem 207 – Intro to Chemical Analysis I (1 lecture, 6 lab sections) Chem 621 – Electroanalytical Chemistry (team-taught with Professor Zamborini)
2008-2009	Spring	Chem 207 – Intro to Chemical Analysis I (3 lecture, 13 lab sections) Chem 529 - Synthesis and Analysis II (1 lecture, 1 lab section)
	Fall	Chem 207 - Intro to Chemical Analysis I (2 lecture, 11 lab sections) Chem 625 – Advanced Analytical Chemistry (team-taught with Professor Zamborini)
2007-2008	Spring	Chem 207 – Intro to Chemical Analysis I (3 lecture, 12 lab sections) Chem 529 – Synthesis and Analysis II (1 lecture, 1 lab section)
	Fall	Chem 210 – Intro to Chem Analysis IV (2 lecture, 4 lab sections) Chem 625 – Advanced Analytical Chemistry (1/4, team-taught with Professors Higashi, Powe, and Zamborini)

C. Independent Study and Graduate Student Supervision:

- (1) List names of independent study students you supervise(d) and years:

Keith Jones, 1980
 Diane Packett, 1980-81
 Rhonda Johnson, 1982-83
 Paul Geno, 1983-84
 Phenius Lathon, 1986
 Laura Hurt, 1986-87
 Edward Fernane, 1988-89
 Cathy Allen, 1990-91
 Izumi Uchiyama, 1995
 Vadim Nazarenko, 1997
 William Josh Todd, 1997
 Josh Matthes, 2000
 Sara Peters, 2012

- (2) List names of Graduate students for whom you serve(d) as major professor. If degree has been granted, give year. If current student, give anticipated year of completion.

- (a) Master's

Edward N. Chaney	9/86
Janis W. Schlager	5/87
Steven T. Houpt	8/87
Andre Tolbert	8/89
Matthew Luo	3/94
Roderick Wilkinson	8/96
Jianfeng Hong	1/97
Kelly Meyers (with Buchanan)	5/01
Jayadeep Gullapalli (Electrical Eng.)	8/05

- (b) Ph.D.

John F. Price	8/82
K. Ravichandran	12/84
M. K. Halbert	5/86
Leonel M. Santos	8/87
Jiannong Ye	12/88
Sunil Prabhu	8/89
Peifang Luo	12/91
Xiaohe Qi	5/93
Phillip Voegel	8/97
Danielle Franco	12/08
Lukasz Sztaberek	12/09
Susan Carroll	8/11
Mohamed Marei	8/13
Kelsey Kaht	8/16

(c) Speed School

Douglas Johnson (MS, Electrical Eng., John Naber, Thesis Director)	2003
Radhika Mani (Ph.D., Chemical Eng., Mahendra Sunkara, Diss. Director)	2004
Randall Lowe (MS, Chemical Eng. Mahendra Sunkara, Thesis Director)	2005
Rekha Pai (Ph.D., Electrical Eng., Kevin Walsh, Diss. Director)	2007
Thomas Roussel (Ph.D., Bioengineering, Robert Keynton, Diss. Director)	2012

- (3) List names of Post-doctoral trainees, fellows, etc. you have supervised, last four years, including current year. (Give source of support)

Karsten N. Thomsen (Aarhus University, Aarhus, Denmark), Predoctoral Research Associate (sponsored by Danish Research Council)

- directed student's research, 1/89-9/89
- member of Ph.D. examination committee (Aarhus University, June, 1990)

Dr. Anton Ciucu (University of Bucharest), Visiting Research Associate (sponsored by University of Louisville), 1/91-12/91

Dr. Jiannong Ye (East China Normal University), Visiting Scientist (sponsored by University of Louisville), 1/92-6/94

Dr. Rafael Vasquez (University of Panama), Visiting Scientist (sponsored by Fulbright Foundation), 8/93-7/94

Dr. Weihong Zhou (Changchun Institute of Applied Chemistry), Predoctoral Research Associate (sponsored by University of Louisville), 1/95-3/96

- (4) List names of Graduate students' committees you served on other than as major professor. Indicate if Master's or Ph.D. students.

Numerous.

D. Other Contributions to Teaching:

List other contribution(s) such as productive innovations in teaching; development of new course offerings; significant revisions to current course offerings; contributions of the reviewee to the course offerings of the Department, Division or College; seeking and obtaining funds for the teaching program; writing of books and manuals for course use; development of software as a teaching tool; and other considerations as appropriate.

IV. SERVICE

A. Service to the University

List committee and related service. For committees, include name of committee, years of service and nature of participation (member, chairperson, secretary, etc.). For other service, give similar information.

1. Departmental, Divisional, Program

Departmental Service Assignments:2006-2007

Curriculum Committee
 Chem/Physics/Cleanroom Faculty Search Committee (Chair)
 Co-op/Undergrad Research Coordinator
 CGSA Faculty Adviser

2007-2008

Personnel Committee
 Chem/Physics/Cleanroom Faculty Search Committee (Chair)
 Co-op/Undergrad Research Coordinator
 CGSA Faculty Adviser

2010-2011

Personnel Committee
 Co-op/Undergrad Research Coordinator
 CGSA Faculty Adviser

2011-2012

Co-op/Undergrad Research Coordinator
 CGSA Faculty Adviser
 Safety Committee

2012-2013

CGSA Faculty Adviser
 Lab Safety Committee
 Supervisor: Bill Richmond
 Co-op Coordinator

2. **College** (indicate if A & S, Graduate, Medical School, etc.)

A & S Chairs' Outstanding Leadership Award Committee, 2005
 A&S Committee on On-line Student Course Evaluations, 2011-12

3. **University-Wide**

B. Service to the Community

List only community service related to your academic role and your professional expertise in your field in the University. Include period of participation.

Seminars: Numerous research talks at various universities and professional groups.
 1990-91 - Kemisk Institut, Aarhus University (Denmark)
 1991-92 - Kemisk Institut, Aarhus University (Denmark)

1992-93 - Cumberland College (Williamsburg, Kentucky)
 1993-94 - University of Evansville (Evansville, Indiana); Murray State University (Murray, Kentucky); San Jose State University (San Jose, California)
 1996-97 - Kemisk Institut, Aarhus University (Denmark); University of Louisville; University of Bucharest (Romania)
 1998-99 - Dept. of Chemical Engineering, University of Louisville; Western Kentucky University (Bowling Green, Kentucky); Minnesota Chromatography Forum (Minneapolis, Minnesota); 3M Corporation (Minneapolis, Minnesota)
 1999-2000 – Department of Chemistry, Iowa State University
 2000-2001 – Department of Chemical Engineering, University of Louisville
 2002-2003 – Department of Chemistry, University of Toledo
 Science Fairs: Judge, Sigma Xi Award, 1997-present, Louisville Regional Science Fair

C. Service to your Profession

List only professional service related to your academic role and your professional expertise in your field in the University. Include period of participation.

Editorial Board: *Electroanalysis* - 1988-97

Award Panel: ACS Award in Analytical Chemistry (Fisher Scientific), 1996-98
 ACS Division of Analytical Chemistry Award in Electrochemistry, 1989-92

External Participant/Adviser: "Biosensors in Environmental Monitoring", TEMPUS Structural Joint European Program, Anton A. Ciucu, Director, University of Bucharest, 1996-present - purpose of project is to initiate M.S. program in analytical chemistry at University of Bucharest

Symposium Organizer: Organized symposium "Electrochemical Detection in Capillary Electrophoresis" for Fall, 1995 Joint Southeast/Southwest Regional Meeting of the American Chemical Society in Memphis, Tenn.

Organized symposium on "Electrochemical Detection of the Future: Is There a Future after Catecholamines?" for Fall, 1992 National Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies in Philadelphia.

Professional Organizations:

- 1) American Chemical Society - Member, 1976-present
 Louisville Section - Newsletter Editor, 1976-81
 Executive Committee, 1979-84
 Treasurer, 1983-84
 Chairman-elect, 1986
 Chairman, 1987
 Past-Chairman, 1988
 Regional Meeting Steering Committee, 1985-86
 Regional Meeting Arrangements Chairman, 1985-86
- 2) The Electrochemical Society - Member, 1984-present
 Session Chair, Symposium on the Electrochemistry of Coal Slurries, 171st Meeting of the Electrochemical Society, Philadelphia, PA, May, 1987

- 3) Sigma Xi: Member, 1976-2002
 Chairman-elect, University of Louisville Chapter, 1994-95
 Chairman, University of Louisville Chapter, 1995-96
 Past Chairman, University of Louisville Chapter, 1996-97
- 4) Society for Electroanalytical Chemistry - Member, 1983-present
 Member, Board of Directors - 1998-2003
 Chairman, Membership Committee – 2000-2005
 Secretary – 2004-2006

Grant Proposal Review: NIH Study Section - Metallobiochemistry, Washington, D.C., October, 1996

NSF/EPSCoR Research Enhancement Grant Program, Frankfort, KY, March, 1993

NIH Study Section - Metallobiochemistry/Academic Research Enhancement Awards, Washington, D.C., October, 1991

Petroleum Research Fund, National Science Foundation, U.S. Environmental Protection Agency, U.S. Department of the Army, U.S. Department of Agriculture, Department of Energy, Research Corporation, Hong Kong Research Council

Manuscript Review: *Analyst, Analytical Chemistry, Analytica Chimica Acta, Bulletin des Societes Chimiques Belges, Carbohydrate Research, Electroanalysis, Electrochemical Communications, Electrophoresis, Industrial & Engineering Chemistry Research, Italian Journal of Food Science, Journal of Agricultural and Food Chemistry, Journal of the Electrochemical Society, Fuel, Journal of Chemical Education, Journal of Chromatography, Journal of Electroanalytical Chemistry and Interfacial Electrochemistry, Journal of Physical Chemistry, Langmuir, Mikrochimica Acta, Talanta*

External Promotion/Tenure Review: San Jose State University, 1990 (Fall)
 George Mason University, 2007 (Fall)

D. Book Reviews

List any reviews which have appeared in professional journals relating to your academic role and your professional expertise.

None

E. Consultantships

List name of agency or company, nature of consultantship and period of participation in activity.

Boehringer Mannheim, Indianapolis, Indiana - Electrochemical Sensors, 1989-90.

V. PROFESSIONAL ACTIVITY

A. Publications (Following each entry, indicate if the work is primarily a Scholarship of Discovery

(D), Application (A), Integration (I) or Teaching (T).

1. **Journal articles**

1. "Chronoamperometric Studies of Flash Photoemission at a Mercury Electrode", with S. P. Perone, *J. Electrochem. Soc.*, **123**, 1647 (1976).
2. "Photoelectrochemical Studies of Solvated Electron Interactions with Biological Systems", with S. P. Perone, *Photochem. Photobiol.*, **25**, 167 (1977).
3. "A New Electrochemical Approach to Trace Level Aldehyde and Ketone Analysis", with J. F. Price and J. W. Siria, *Proceedings of the Second U.S. Environmental Protection Agency Symposium on Process Measurements for Environmental Assessment*, (Atlanta, Ga.), **169** (1980).
4. "Adsorption Pre-concentration and Analysis of Dopamine at Platinum Electrode Surfaces", with J. W. Siria, *Anal. Lett.*, **13**, 577 (1980).
5. "Pre-concentration and Determination of Ferrocenecarboxaldehyde at a Chemically Modified Platinum Electrode", with J. F. Price, *Anal. Chem.*, **52**, 1940 (1980).
6. "The Electrochemical Behavior of Adriamycin at Carbon Paste Electrodes", with D. Packett and T. M. Woodcock, *Anal. Chem.*, **53**, 540 (1981).
7. "Voltammetry and Electrolysis of Coal Slurries and H-Coal Liquids", with K. F. Jones, J. T. Joseph, and J. L. Wong, *Fuel*, **60**, 739 (1981).
8. "Chemically Modified Carbon Paste Electrodes", with K. Ravichandran, *J. Electroanal. Chem.*, **126**, 293 (1981).
9. "A Microcomputer-based Data Acquisition System for Electroanalytical Instrumentation", with J. F. Price and S. L. Cooke, Jr., *Anal. Chem.*, **54**, 1011 (1982).
10. "The Electrochemical Determination of Adriamycin Compounds in Urine by Preconcentration at Carbon Paste Electrodes", with E. N. Chaney, Jr., *Anal. Chem.*, **54**, 2556 (1982).
11. "Phenylenediamine-Containing Chemically Modified Electrodes as Catalytic Voltammetric Sensors", with K. Ravichandran, *Anal. Chem.*, **55**, 1586 (1983).
12. "Liquid Chromatographic Determination of Hydrazines with Electrochemically Pretreated Glassy Carbon Electrodes", with K. Ravichandran, *Anal. Chem.*, **55**, 1782 (1983).
13. "Chloride-Assisted Electrochemical Monitoring of Cisplatin Following Liquid Chromatography", with W. N. Richmond, *Anal. Chim. Acta*, **154**, 133 (1983).
14. "Application of Electrochemical Detection for the Quantitation of 1,4-Dihydroxy-5,8-bis-[2-(2-hydroxyethyl)-amino-ethylamino]-9,10-anthracenedione Following Liquid Chromatography", with S. T. Houpt, *Anal. Lett.*, **B16**, 1343 (1983).
15. "Determination of Lidocaine and Active Metabolites in Blood Serum by Liquid Chromatography with Electrochemical Detection", with M. K. Halbert, *J. Chrom., Biomed.*

- Appl.*, **306**, 269 (1984).
16. "Phthalocyanine-containing Chemically Modified Electrodes for Electrochemical Detection in Liquid Chromatography/Flow Injection Systems", with K. M. Korfhage and K. Ravichandran, *Anal. Chem.*, **56**, 1514 (1984).
 17. "Enhancement of LCEC Response by Use of Electrochemically Pretreated Glassy Carbon Electrodes", with K. Ravichandran, *J. Liq. Chrom.*, **7**, 2031 (1984).
 18. "Enhanced Voltammetric Response by Electrochemical Pretreatment of Carbon Paste Electrodes", with K. Ravichandran, *Anal. Chem.*, **56**, 1744 (1984).
 19. "A Cyclic Voltammetry Experiment for the Instrumental Analysis Laboratory", with K. Ravichandran and R. K. Johnson, *J. Chem. Ed.*, **62**, 820 (1984).
 20. Book Review, "Ion-Selective Electrode Reviews. Volume 5", *J. Am. Chem. Soc.*, **106**, 7657 (1984).
 21. "Chemically Modified Carbon Paste Electrodes. IV. Electrostatic Binding and Electrocatalysis at Poly-4-Vinylpyridine-Containing Electrodes", with P. W. Geno and K. Ravichandran, *J. Electroanal. Chem.*, **183**, 155 (1985).
 22. "Electrocatalytic and Analytical Response of Cobalt Phthalocyanine Electrodes toward Sulfhydryl Compounds", with M. K. Halbert, *Anal. Chem.*, **57**, 591 (1985).
 23. "Determination of Hydralazine and Metabolites in Urine by Liquid Chromatography with Electrochemical Detection", with K. Ravichandran, *J. Chrom., Biomed. Appl.*, **343**, 99 (1985).
 24. "Voltammetric Determination of Doxorubicin in Urine by Adsorptive Preconcentration and Flow Injection Analysis", with E. N. Chaney, Jr., *Anal. Chim. Acta*, **176**, 105-112 (1985).
 25. "Determination of Cysteine and Glutathione in Plasma and Blood by Liquid Chromatography with Electrochemical Detection Using a Chemically Modified Electrode Containing Cobalt Phthalocyanine", with M. K. Halbert, *J. Chrom., Biomed. Appl.*, **345**, 43-49 (1985).
 26. "The Electrochemistry of Coal and Coal Liquids. II. Cyclic Voltammetry of H-Coal Liquids", with L. M. Santos, *J. Appl. Electrochem.*, **16**, 203-212 (1986).
 27. "Electrocatalytic Response of Cobalt Phthalocyanine Chemically Modified Electrodes Toward Oxalic Acid and α -Ketoacids" with L. M. Santos, *Anal. Chem.*, **58**, 848-852 (1986).
 28. "Voltammetric Determination of Traces of Ni(II) at a Chemically Modified Electrode Based on Dimethylglyoxime Containing Carbon Paste", with L. Kryger and J. K. Christensen, *Anal. Chem.*, **58**, 1790-1798 (1986).
 29. "Indirect Electrochemical Detection in Liquid Chromatography", with J. Ye and K. Ravichandran, *Anal. Chem.*, **58**, 2337-2340 (1986).
 30. "Amperometric Detection of Thiopurines in Plasma Using a Cobalt-Phthalocyanine Chemically Modified Electrode Following Liquid Chromatography", with M. K. Halbert, *Anal. Chim. Acta*, **187**, 89-97 (1986).

31. "Profiling of Oxalic Acid and α - Ketoacids in Blood and Urine by Liquid Chromatography with Electrochemical Detection at a Chemically Modified Electrode", with L. M. Santos, *J. Chrom. Biomed. Appl.*, **414**, 161-166 (1987).
32. "LCEC of Ferro- and Ferricytochrome *c* at a Chemically Modified Electrode", with J. W. Schlager, *J. Chrom.*, **390**, 379-389 (1987).
33. "Chemical Preconcentration and Determination of Copper at a Chemically Modified Carbon Paste Electrode Containing 2,9-Dimethyl-1,10-phenanthroline", with S. V. Prabhu and L. Kryger, *Anal. Chem.*, **59**, 1074-1078 (1987).
34. "LCEC of Carbohydrates at a Cobalt Phthalocyanine-Containing Chemically Modified Electrode", with L. M. Santos, *Anal. Chem.*, **59**, 1766-1770 (1987).
35. "Voltammetric Determination of Traces of Nickel(II) with a Medium Exchange Flow System and a Chemically Modified Carbon Paste Electrode Containing Dimethylglyoxime", with K. N. Thomsen and L. Kryger, *Anal. Chem.*, **60**, 151-155 (1988).
36. "Electrochemistry and LCEC of Monosaccharides, Disaccharides, and Related Compounds at an Electrocatalytic Chemically Modified Electrode", with L. M. Santos, *Anal. Chim. Acta*, **206**, 85-96 (1988).
37. "Flow Injection Analysis of Electroinactive Anions at a Polyaniline Electrode", with J. Ye, *Anal. Chem.*, **60**, 1979-1982 (1988).
38. "Catalytic Reduction of Myoglobin and Hemoglobin at Chemically Modified Electrodes Containing Methylene Blue", with J. Ye, *Anal. Chem.*, **60**, 2263-2268 (1988).
39. "Preconcentration and Determination of Pb^{2+} at Crown Ether and Cryptand Containing Chemically Modified Electrodes", with S. V. Prabhu and L. Kryger, *Electroanalysis*, **1**, 13-21 (1989).
40. "LCEC of the Copper Protein Ceruloplasmin in Human Serum at a Polyaniline Chemically Modified Electrode", with J. W. Schlager and J. Ye, *Electroanalysis*, **1**, 133-140 (1989).
41. "Constant Potential Amperometric Detection of Carbohydrates by LCEC at a Cu-Based Chemically Modified Electrode", with S. V. Prabhu, *Anal. Chem.*, **61**, 852-856 (1989).
42. "LCEC of Ribonucleosides at a Cobalt Phthalocyanine-Containing Chemically Modified Electrode", with A. M. Tolbert and L. M. Santos, *Anal. Lett.*, **22**, 683-702 (1989).
43. "Liquid Chromatography and Electrochemical Detection of Alditols and Acidic Sugars at a Cobalt Phthalocyanine Containing Chemically Modified Electrode", with A. M. Tolbert, *Electroanalysis*, **1**, 389-395 (1989).
44. "Electrocatalysis and Detection of Aminosugars, Alditols, and Acidic Sugars at a Cu-containing Chemically Modified Electrode", with S. V. Prabhu, *Anal. Chem.*, **61**, 2258-2263 (1989).
45. "Amperometric Detection of Non-Electroactive Cations in Flow Systems at a Cupric

- Hexacyanoferrate Electrode", with K. N. Thomsen, *Anal. Chem.*, **61**, 2594-2598 (1989).
46. "High pH Ion-Exchange Separation and Electrochemical Detection of Alditols, Carbohydrates, and Acidic Sugars", with S. V. Prabhu, *J. Chromatogr.*, **503**, 227-235 (1990).
 47. "Constant Potential Amperometric Detection at a Copper-Based Electrode: Electrode Formation and Operation", with P. Luo and S. V. Prabhu, *Anal. Chem.*, **62**, 752-755 (1990).
 48. "Evaluation of Electrodes Coated with Metal Hexacyanoferrates as Amperometric Sensors for Non-Electroactive Cations in Flow Systems", with K. N. Thomsen, *Electroanalysis*, **2**, 263-272 (1990).
 49. "Chemically Modified Electrodes in Liquid Chromatography Detection: A Review" (Invited Review), with K. N. Thomsen, *Talanta*, **38**, 1-16 (1991).
 50. "Electrocatalytic Amperometric Detection at Polymeric Cobalt Phthalocyanine Electrodes", with X. Qi, H. Li, and T. F. Guarr, *Electroanalysis*, **3**, 119-124 (1991).
 51. "A Comparison of Metallic Electrodes for Constant Potential Amperometric Detection of Carbohydrates, Amino Acids, and Related Compounds", with P. Luo and F. Zhang, *Anal. Chim. Acta*, **244**, 169-178 (1991).
 52. "Constant Potential Amperometric Detection of Underivatized Amino Acids and Peptides at a Copper Electrode", with P. Luo and F. Zhang, *Anal. Chem.*, **63**, 1702-1707 (1991).
 53. "Determination of 2-Thiothiazolidine-4-carboxylic Acid in Urine by Liquid Chromatography with Electrochemical Detection", with A. Ciucu, *Electroanalysis*, **4**, 515-519 (1992).
 54. "LCEC of Underivatized Polypeptides and Proteins at Copper Electrodes", with P. Luo, *Electroanalysis*, **4**, 393-401 (1992).
 55. "The Determination of Sugars in Food Products by HPLC and Electrochemical Detection at a Copper Electrode", with P. Luo and M. Z. Luo, *J. Chem. Ed.*, **70**, 679-681 (1993).
 56. "Liquid Chromatography and Electrochemical Detection of Organic Peroxides by Reduction at an Iron Phthalocyanine Chemically Modified Electrode", with X. Qi, *Electroanalysis*, **5**, 547-554 (1993).
 57. "Amperometric Detection in Capillary Electrophoresis with Normal Size Electrodes", with J. Ye, *Anal. Chem.*, **65**, 3525-3527 (1993).
 58. "LCEC of Hydroxylamines by Oxidation at a Cobalt Phthalocyanine Chemically Modified Electrode", with X. Qi, *Electroanalysis*, **6**, 353-360 (1994).
 59. "Determination of Amino Acids and Peptides by Capillary Electrophoresis and Electrochemical Detection at a Copper Electrode", with J. Ye, *Anal. Chem.*, **66**, 2669-2674 (1994).
 60. "Determination of Carbohydrates, Sugar Acids, and Alditols by Capillary Electrophoresis and Electrochemical Detection at a Copper Electrode", with J. Ye, *J. Chromatogr. A*, **687**, 141-148 (1994).

61. "Characterization of Carbohydrate Oxidation at Copper Electrodes", with M. Z. Luo, *J. Electroanal. Chem.*, **387**, 87-94 (1995).
62. "Electrochemical Detection with Copper Electrodes in Liquid Chromatography and Capillary Electrophoresis", with P. D. Voegel, *American Laboratory*, **28**, 39-45 (January, 1996).
63. "Capillary Electrophoresis and Electrochemical Detection of Underivatized Oligo- and Polysaccharides with Surfactant-Controlled Electroosmotic Flow", with W. Zhou, *Electrophoresis*, **17**, 319-324 (1996).
64. "Selective Oxidation of Thiols to Disulfides At a Cobalt Phthalocyanine-Containing Chemically Modified Electrode", with X. Qi, *J. Electrochem. Soc.*, **143**, 1283-1287 (1996).
65. "Integrated Capillary Electrophoresis/Electrochemical Detection with Metal Film Electrodes Directly Deposited onto the Capillary Tip", with P. D. Voegel and W. Zhou, *Anal. Chem.*, **69**, 951-957 (1997).
66. "Analysis of Underivatized Carbohydrates by Capillary Electrophoresis and Electrochemical Detection", Chapter 40, "Handbook of Capillary Electrophoresis Applications", H. Shintani and J. Polonsky (eds.), Chapman & Hall Publishers, London, 1997, pp. 617-626.
67. "Profiling Clinically Important Metabolites in Human Urine by Capillary Electrophoresis and Electrochemical Detection at a Copper Electrode", with J. Hong, *J. Capillary Electrophoresis*, **4**, 65-71 (1997).
68. "Electrochemical Detection in Capillary Electrophoresis" (Invited Review), with P. D. Voegel, *Electrophoresis*, **18**, 2267-2278 (1997).
69. "Evaluation of Copper-based Electrodes for the Analysis of Aminoglycoside Antibiotics by CE-EC", with P. D. Voegel, *Electroanalysis*, **9**, 1145-1151 (1997).
70. "Electrochemically Induced Metallation of Polymeric Phthalocyanines", with W. J. Todd, F. Bailly, J. Pavez, P. W. Faguy, and R. M. Buchanan, *J. Am. Chem. Soc.*, **120**, 4887-4888 (1998).
71. "Electrochemical Detection in Capillary Electrophoresis with Dual-Parallel On-Capillary Electrodes", with P. D. Voegel, *Electrophoresis*, **19**, 2226-2232 (1998).
72. "Parallel and Serial Dual Electrode Detectors for Capillary Electrophoresis", with J. Ye, X. Zhao, and Y. Fang, *Chin. J. Chem.*, **16**, 226-233 (1998).
73. "Electrochemical Detection in Capillary Electrophoresis", Proceedings of the XIV National Conference on Analytical Chemistry, Romanian Society of Analytical Chemistry, September, 1998.
74. "Electrochemical Detection of Carbohydrates" (Invited Review), *J. Pharm. Biomed. Anal.*, **19**, 69-81 (1999).
75. "Recent Advances in Electrochemical Detection in CE" (Invited Review), *Electrophoresis*, **21**, 4017-4028 (2000).

76. "Electrochemical Detection of Carbohydrates at Constant Potential After HPLC and CE Separations" (Invited Chapter), in "Carbohydrate Analysis", ed. Z. El Rassi, *Journal of Chromatography Library*, **66**, Elsevier, Amsterdam, 947-959, (2002).
77. "Fully Integrated On-Chip Electrochemical Detection for Capillary Electrophoresis in a Microfabricated Device", with T.J. Roussel Jr., M.M. Crain, V. Bathlagunda, D.J. Jackson, J. Gullapalli, J.A. Conklin, R. Pai, J.F. Naber, K.M. Walsh and R.S. Keynton, *Anal. Chem.*, **74**, 3690-3697 (2002).
78. "Synthesis and Electrochemical Characterization of a Nanocomposite Diamond Electrode", with R. C. Mani, S. Sharma, M.K. Sunkara, J. Gullapalli, R. Rao, A.M. Rao, and J.M. Cowley, *Electrochemical and Solid State Letters*, **5**, E32-E35 (2002).
79. "Detection of Pesticides Using an Amperometric Biosensor Based on Ferrophthalocyanine Chemically Modified Carbon Paste Electrode and an Immobilized Bienenzymatic System", with A Ciucu and C. Negulescu, *Biosensors and Bioelectronics*, **18**, 303-310 (2003).
80. "Portable High Voltage Power Supply and Electrochemical Detection Circuits for Microchip Capillary Electrophoresis", with D.J. Jackson, J.F. Naber, T.J. Roussel, Jr., M.M. Crain, K.M. Walsh, and R.S. Keynton, *Anal. Chem.*, **75**, 3643-3649 (2003).
81. "Design and Development of Microfabricated Capillary Electrophoresis Devices with Electrochemical Detection", (Invited Paper) with R.S. Keynton, T.J. Roussel, Jr., M.M. Crain, D.J. Jackson, D.B. Franco, J.F. Naber, and K.M. Walsh, *Anal. Chim. Acta*, **507**, 95-105 (2004).
82. "Fabricating EC-Based Analytical Instruments", with R.S. Keynton, J.F. Naber, and K.M. Walsh, *MicroNano Newsletter*, **9**, November, 2004, p. 1.
83. "Nanocrystalline Graphite for Electrochemical Sensing of Neurological Solutes", with R.C. Mani, M.K. Sunkara, J. Gullapalli, J.A. Chaney, G. Bhimarasetti, J.M. Cowley, and A.M. Rao, *J. Electrochem. Soc.*, **152**, E154-E159 (2005).
84. "Nanoelectrode Ensembles Using Carbon Nanopipettes", with M. K. Sunkara, R.D. Lowe, and R.C. Mani, *Electrochem. and Solid-State Lett.*, **9**, H43-H47 (2006).
85. Book Chapter "Fabrication of a Glass CE Microchip with Integrated Electrodes", with M.M. Crain, R.S. Keynton, K.M. Walsh, T.J. Roussel, Jr., J.F. Naber, and D.J. Jackson, "Microchip Capillary Electrophoresis: Methods and Protocol", *Methods Mol Biol.*, ed. C.S. Henry, Humana Press, Totowa, New Jersey, March, 2006, pp. 13-26.
86. "Ingestion of a Denture Cleanser: Did It Cause Gastric Perforation?", with D.M. Ingram and G.M. Bosse, *J. Med. Toxicology*, **4**, 21-24 (2008).
87. "Room Temperature UV Adhesive Bonding of CE Devices", with S. Carroll, M.M. Crain, J.F. Naber, R.S. Keynton, and K.M. Walsh, *Lab on a Chip*, **8**, 1564-1569 (2008).
88. "Amperometric Techniques", with T.J. Roussel, Jr., D.J. Jackson, and R.S. Keynton, *Encyclopedia of Microfluidics and Nanofluidics*, Ed. Dongqing Li, Springer-Verlag, Berlin/Heidelberg, 2008.

89. "Fully Integrated Three Dimensional Electrodes for Electrochemical Detection in Microchips: Fabrication, Characterization, and Applications", with R.S. Pai, K.M. Walsh, M.M. Crain, T.J. Roussel, Jr., D.J. Jackson, R.S. Keynton, and J.F. Naber, *Anal. Chem.*, **81**, 4762-4769(9).
 90. "Self-Calibrating Microfabricated Iridium Oxide pH Electrode Array for Remote Monitoring", with S. Carroll, *Anal. Chem.*, **82**, 878-885 (2010).
 91. "Microfabricated Electrochemical Sensors for Exhaustive Coulometry Applications", with S. Carroll, M.M. Marei, T.J. Roussel, and R.S. Keynton, *Sensors and Actuators B*, **160**, 318-326 (2011).
2. Works "in press"

Works submitted, not yet accepted or rejected

B. Presentations at Scholarly Meetings

1. Invited Papers

1. "Chemically Modified Electrodes in Voltammetry and Chromatography", with K. Ravichandran, Symposium on Analytical Voltammetry, National Meeting of the American Chemical Society, Washington, D.C., August, 1983.
2. "Chemically Modified Carbon Paste Electrodes", with R. M. Buchanan, Symposium on Polymeric and Modified Electrodes, 166th Meeting of The Electrochemical Society, New Orleans, La., October, 1984.
3. "Electrocatalytic Chemically Modified Electrodes in Chromatographic Detection", with L. M. Santos and S. T. Houpt, Symposium on Analytical Techniques and Observations at the Interfacial Zone, Great Lakes Regional Meeting of the American Chemical Society, Milwaukee, Wi., June, 1986.
4. "Cyclic Voltammetry and Liquid Chromatography of Coal and Coal Liquids", with L. M. Santos, Symposium on the Electrochemistry of Coal Slurries, 171st Meeting of The Electrochemical Society, Philadelphia, Pa., May, 1987.
5. "Electrocatalysis at Chemically Modified Electrodes", Tri-State Catalysis Club Spring Symposium, Lexington, KY, April, 1988.
6. "Chemically Modified Electrodes for Trace Metal Preconcentration and Stripping", with S. V. Prabhu and P. Luo, Adsorption in Electroanalysis Symposium, Third Chemical Congress of North America, Toronto, Canada, June, 1988.
7. "Carbohydrate Oxidation at Cu-Based Chemically Modified Electrodes", with S. V. Prabhu, Poster, Gordon Conference on Physical Electrochemistry", New London, New Hampshire,

August, 1988.

8. "Analytical Applications of Electrocatalytic Modified Electrodes", Bioelectrochemistry Symposium, 15th Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Boston, October, 1988.
9. "Applications of Polyaniline Electrodes for Anion Detection in Ion Chromatography", with J. Ye, Symposium on Electrochemistry-Innovations and Applications, 40th American Chemical Society Southeast Regional Meeting, November, 1988, Atlanta.
10. "Chemically Modified Electrodes in LCEC", with S. V. Prabhu, 197th National Meeting of the American Chemical Society, Symposium on Electroanalysis with Chemically Modified Electrodes, Dallas, April, 1989.
11. "Analytical Applications of Electrocatalytic Modified Electrodes", with X. Qi and P. Luo, Symposium on Electrochemistry at Interfaces and Surfaces, 23rd American Chemical Society Great Lakes Regional Meeting, DeKalb, Il., May, 1990.
12. "LCEC at Copper Electrodes - Constant Potential Detection of Carbohydrates and Amino Acids", Symposium on Electrochemical Detectors in Liquid Chromatography, Seventeenth Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Cleveland, Ohio, October, 1990.
13. "Redox Processes of Biological Molecules at Copper Electrodes", with P. Luo and A. Pappa-Louisi, Fourth International Symposium on Redox Mechanisms and Interfacial Properties of Molecules of Biological Importance, 179th Meeting of the Electrochemical Society, Washington, D.C., May, 1991.
14. "LCEC of Polysaccharides at Copper Electrodes", with C. H. Allen, S. Bano, M. Z. Luo, and K. G. Taylor, Symposium on High-Performance Anion-Exchange Chromatography of Carbohydrates", 203rd National Meeting of the American Chemical Society, San Francisco, Cal., April, 1992.
15. "New Electrochemical Sensors Based on Catalytically Activated Electrode Surfaces", Symposium on Advances in Chemical Sensors, 24th Central Regional Meeting of the American Chemical Society, Cincinnati, Ohio, May, 1992.
16. "New Electrode Materials and Structures for Chemical Analysis", with P. Luo, X. Qi, and J. Ye, Symposium on Electrochemical Detection of the Future, 19th Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Philadelphia, PA, September, 1992.
17. "Electrochemical Detection of Traditionally Non-Electroactive Analytes", Symposium on Chemical Sensors for Analysis, 31st Eastern Analytical Symposium, Somerset, NJ, November, 1992.
18. "Applications of Cu Electrodes for Amperometric Detection in HPLC and Capillary Electrophoresis", with J. Ye, M. Luo, and P. D. Voegel, 4th International Seminar on Electroanalytical Chemistry, Changchun, People's Republic of China, October, 1993.
19. "Advances in Electrochemical Detection in Capillary Electrophoresis", with J. Ye and

- R. Wilkinson, 5th Beijing Conference and Exhibition on Instrumental Analysis, Beijing, People's Republic of China, October, 1993.
20. "New Applications of Copper Electrodes in Liquid Chromatography and Capillary Electrophoresis", with P. D. Voegel and M. Z. Luo, Symposium on Electrochemical Detection in Liquid Chromatography, 18th International Symposium on Column Liquid Chromatography, Minneapolis, Minnesota, May, 1994.
 21. "Electrochemical Detection in Capillary Electrophoresis", XIIth, National Conference on Analytical Chemistry, Constanta, Romania, September, 1994.
 22. "Capillary Electrophoresis with Electrochemical Detection at Cu Electrodes: Applications to Biochemical Systems", with J. Hong and J. Ye, 17th International Symposium on Capillary Chromatography and Electrophoresis, Wintergreen, Virginia, May, 1995.
 23. "CE with Electrochemical Detection at Cu Electrodes: Applications to Biochemical Systems", with J. Hong and W. Zhou, Symposium on "Capillary Electrophoresis: Separation, Detection and Applications", 210th National American Chemical Society Meeting, Chicago, Illinois, August, 1995.
 24. "Electrochemical Detection in Capillary Electrophoresis", with P. D. Voegel, W. Zhou, and M. Z. Luo, Symposium on "Electroanalytical Chemistry in the Midwest", 23rd Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Cincinnati, Ohio, October, 1995.
 25. "Design and Applications of Dual Electrode Amperometric Detection in Capillary Electrophoresis", with M. Z. Luo and P. D. Voegel, 5th International Seminar on Electroanalytical Chemistry, Changchun, People's Republic of China, October, 1995.
 26. "CE with Electrochemical Detection at Cu Electrodes: Applications to Biochemical Systems", with J. Hong, W. Zhou, and J. Ye, 6th Beijing Conference and Exhibition on Instrumental Analysis, Beijing, People's Republic of China, October, 1995.
 27. "CE with Electrochemical Detection at Cu Electrodes: Applications to Biochemical Systems", 1995 American Chemical Society Joint Southeast/Southwest Regional Meeting, Memphis, Tenn., November, 1995.
 28. "Electrochemical Detection in Capillary Electrophoresis", XIVth National Conference on Analytical Chemistry, Romanian Society of Analytical Chemistry, Piatra Neamt, Romania, September, 1998.
 29. "Electrochemical Detection of Carbohydrates in HPLC and CE", International Symposium on the Analysis of Carbohydrates, Swedish Chemical Society, Stockholm, Sweden, September, 1999.
 30. "Electrochemical Detection in Capillary Electrophoresis", XVth National Conference on Analytical Chemistry, Romanian Society of Analytical Chemistry, Brasov, Romania, September, 2000.
 31. "Integrated Electrochemical Detection in a Lab-on-a-Chip Format", with T. J. Roussel, Jr. D. J. Jackson, M. M. Crain, V. Bathlagunda, J. Gullapalli, J. A. Conklin, R. Pai, J. F. Naber, K. M.

- Walsh, and R. S. Keynton, Symposium on Advances in Electrochemical Detection in Capillary Electrophoresis, 2001 Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Detroit, Michigan, October, 2001.
32. “Integration of On-chip Electrochemical Detection In a Microfabricated Capillary Electrophoresis Device”, with T. J. Roussel, M.M. Crain, V. Bathlagunda, D.J. Jackson, J. Gullapalli, J. A. Conklin, R. Pai, J.F. Naber, K.M. Walsh and R. S. Keynton, Hilton Head 2002 Solid-State Sensor and Activator Workshop, Hilton Head, South Carolina, June, 2002.
 33. “Microfabricated Multi-electrode Arrays for Electrochemical Detection in Lab-on-a-Chip Devices”, with D. Franco, T. Roussel, Jr., Jayadeep Gullapalli, Mark M. Crain, Douglas J. Jackson, Robert S. Keynton, Kevin M. Walsh, and John F. Naber, International Symposium on Sensor Science, Nanjing, China, June, 2004.
 34. “Nanocarbon Phases: Neurological Sensors and Transdermal Drug Delivery”, with J. Gullapalli, R.C. Mani, R.D. Lowe, Jr., and M.K. Sunkara, NanoMat2004 International Workshop on Nanomaterials, Lexington, KY, September, 2004.
 35. “New Electrode Materials Derived from Carbon Nano-Structures”, with M.K. Sunkara, R.C. Mani, and R.D. Lowe, 10th International Symposium on Electroanalytical Chemistry, Changchun, PRC, October, 2005.
 36. “Integrated On-Chip Electrochemical Detection and Sample Processing at High Surface Area Microfabricated Electrodes”, with L. Sztaberek, D.B. Franco, R. Pai, K.M. Walsh, J.F. Naber, and R.S. Keynton, Beijing Conference and Exhibition on Instrumental Analysis, October, 2005.
 37. “Progress toward a Smart Electrochemical Sensing Device for Water Quality Detection”, R.P. Baldwin, S. Carroll, and L. Sztaberek, 12th International Symposium on Electroanalytical Chemistry, Changchun, PRC, August, 2009.
 38. “Progress toward a Smart Electrochemical Sensing Device for Water Quality Monitoring”, R.P. Baldwin, S. Carroll, and L. Sztaberek, ANALYSDAGARN, Uppsala, Sweden, June, 2010.
 39. “A Calibration-Free Coulometric Detection System for Remote Sensing Applications”, R.P. Baldwin, S. Carroll, M. Marei, T.J. Roussel, and R.S. Keynton, 9TH International Society of Electrochemistry Spring Meeting, Turku, Finland, May, 2011.
 40. “Application of Microfabricated Electrochemical Sensors in Long-term Monitoring of Metals in Water Systems”, R.P. Baldwin, S. Carroll, L. Sztaberek, M. Marei, T.M. Roussel, and R.S. Keynton, NATO Advanced Research Workshop on Portable Chemical Sensors for the Rapid Detection of Chemical and Biological Agents and Other Weapons of Terrorism, Lund, Sweden, July, 2011.
 41. M.M. Marei, T.J. Roussel, R.S. Keynton, and R.P. Baldwin, “Calibration-Free Microfabricated Electrochemical Sensor Based on Coulometry”, 20th Royal Australian Chemistry Institute R&D Conference in Analytical and Environmental Chemistry (**Oral – INVITED**), Deakin University, Geelong, Australia, December, 2012.

Contributed Papers

1. "Chronoamperometric Studies of Flash Photoemission at a Mercury Electrode", with S. P. Perone, 147th Meeting of the Electrochemical Society, Toronto, Canada, May, 1975.
2. "A Photoelectrochemical Approach to the Study of Electron Addition Processes", 29th American Chemical Society Southeastern Regional Meeting, Tampa, Florida, November, 1977.
3. "Application of Chemically Modified Electrodes to organic Voltammetric Analysis", with J. F. Price and J. Siria, ACS/CSJ Chemical Congress, Honolulu, Hawaii, April, 1979.
4. "Chemically Modified Platinum Electrodes in Organic Voltammetric Analysis--A Study with Ferrocene Carboxaldehyde", with J. F. Price and J. Siria, 31st American Chemical Society Southeastern Regional Meeting, Roanoke, Virginia, October, 1979.
5. "A New Electrochemical Approach to Trace Level Aldehyde and Ketone Analysis", with J. F. Price and J. W. Siria, Second U.S. Environmental Protection Agency Symposium on Process Measurements for Environmental Assessment, Atlanta, Ga., February, 1980.
6. "The Electrochemistry of Coal", with K. F. Jones, Area Collegiate Chemistry Meeting, Murray State University, Murray, Kentucky, April, 1980.
7. "The Electrochemical Behavior of Coals, H-Coal Liquids, and Fe^{2+} Ion", with K. F. Jones, J. T. Joseph, and J. L. Wong, Conference on the Chemistry and Physics of Coal Utilization, Morgantown, W. Va., June, 1980.
8. "Applications of Chemically Modified Electrodes for Organic Analysis", with J. F. Price, K. Ravichandran, and D. L. Packett, Second Symposium on the Environmental and Industrial Applications of LCEC and Voltammetry, Indianapolis, Indiana, May, 1981.
9. "A Microprocessor-Based Data Acquisition System for Electroanalytical Instrumentation", with J. F. Price and S. L. Cooke, Jr., 33rd Annual Southeastern Regional Meeting of the American Chemical Society, Lexington, Kentucky, November, 1981.
10. "Laboratory Microcomputer Applications Programs", with S. L. Cooke, Jr. and J. F. Price, 33rd Annual Southeastern Regional Meeting of the American Chemical Society, Lexington, Kentucky, November, 1981.
11. "Determination of Adriamycin by Adsorption and Differential Pulse Voltammetry at Carbon Paste Electrodes", with E. N. Chaney, Jr., 33rd Annual Southeastern Regional Meeting of the American Chemical Society, Lexington, Kentucky, November, 1981.
12. "Electrolysis of Coals and Coal Liquids at Graphite Electrodes", with L. M. Santos, 33rd Annual Southeastern Regional Meeting of the American Chemical Society, Lexington, Kentucky, November, 1981.
13. "Chemically Modified Carbon Paste Electrodes", with K. Ravichandran, 33rd Annual Southeastern Regional Meeting of the American Chemical Society, Lexington, Kentucky, November, 1981.
14. "A Microcomputer Data Acquisition System for Electroanalytical Chemistry", with J. F. Price, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, NJ, 1982.

15. "The Electrochemical Behavior of Lidocaine at Carbon Paste Electrodes", with M. K. Halbert, 1982 Symposium on the Biomedical Applications of LCEC and Voltammetry, Indianapolis, Indiana, May, 1982.
16. "Analytical Applications of Electrocatalytic Chemically Modified Electrodes", with K. Ravichandran, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, New Jersey, March, 1983.
17. "Determination of Cancer Chemotherapy Agents by Liquid Chromatography with Electrochemical Detection", with W. Richmond, S. T. Houpt, and K. M. Korfhage, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlantic City, New Jersey, March, 1983.
18. "Analytical Applications of Phthalocyanine-containing Chemically Modified Carbon Paste Electrodes", with M. K. Halbert and K. M. Korfhage, National Meeting of the American Chemical Society, St. Louis, April, 1984.
19. "Improvement of Heterogeneous Rate of Reduction of Ferricytochrome c at a Quinone Chemically Modified Electrode", with R. M. Buchanan and K. Ravichandran, National Meeting of the American Chemical Society, St. Louis, April, 1984.
20. "Enhanced Detection in LCEC by Use of Electrochemically Pretreated Electrodes", with K. Ravichandran, National Meeting of the American Chemical Society, St. Louis, April, 1984.
21. "The Anodic Electrochemistry of H-Coal Liquids - Voltammetric and Chromatographic Applications", with L. M. Santos, National Meeting of the American Chemical Society, St. Louis, April, 1984.
22. "4,4'-Dithiodipyridine Modified Gold Electrode for Direct Electrochemical Detection of Cytochrome c in Liquid Chromatography", with J. W. Schlager, National Meeting of the American Chemical Society, Chicago, September, 1985.
23. "Electrochemical Detection of Sulfhydryls with Cobalt Phthalocyanine-containing Chemically Modified Electrodes Following Liquid Chromatography", with M. K. Halbert, National Meeting of the American Chemical Society, Chicago, September, 1985.
24. "Amperometric Detection of α -ketocarboxylic Acids by Phthalocyanine-containing Chemically Modified Electrodes", with L. M. Santos, National Meeting of the American Chemical Society, Chicago, September, 1985.
25. "LCEC Assay of Organic Acids in Physiological Fluids at Cobalt Phthalocyanine-containing Chemically Modified Electrodes, with L. M. Santos, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, March, 1986.
26. "Chemical Preconcentration and Voltammetric Determination of Ni(II) at a Dimethylglyoxime-containing Chemically Modified Electrode", with L. Kryger and J. K. Christensen, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, March, 1986.
27. "Preconcentration and Determination of Pb^{2+} at an $AlPO_4$ -containing Carbon Paste

- Electrode", with S. Abdollahi, 38th Southeastern Regional Meeting of the American Chemical Society, Louisville, Ky., November, 1986.
28. "Chemical Preconcentration and Determination of Copper at a Modified Carbon Paste Electrode Containing 2,9-Dimethyl-1,10-phenanthroline", with S. V. Prabhu and L. Kryger, 38th Southeastern Regional Meeting of the American Chemical Society, Louisville, Ky., November, 1986.
 29. "Determination of Captopril in Plasma by LCEC at a Cobalt Phthalocyanine-containing Chemically Modified Electrode", with S. T. Houpt, 38th Southeastern Regional Meeting of the American Chemical Society, Louisville, Ky., November, 1986.
 30. "Indirect Electrochemical Detection in Ion Exchange Chromatography", with J. Ye, 38th Southeastern Regional Meeting of the American Chemical Society, Louisville, Ky., November, 1986.
 31. "A New Chemically Modified Electrode Detector for Carbohydrates", with L. M. Santos, 38th Southeastern Regional Meeting of the American Chemical Society, Louisville, Ky., November, 1986.
 32. "Chemically Modified Electrodes in LCEC", with L. M. Santos, 1987 International Electroanalytical Symposium, Chicago, May, 1987.
 33. "Preconcentration and Electrochemical Stripping of Trace Metals at Crown Ether and Cryptand Containing Chemically Modified Electrodes", with S. V. Prabhu, 194th National Meeting of the American Chemical Society, New Orleans, August, 1987.
 34. "LCEC of Metalloproteins at Electrocatalytic Chemically Modified Electrodes", with J. Ye, 194th National Meeting of the American Chemical Society, New Orleans, August, 1987.
 35. "LCEC of Nucleosides and Related Compounds at a Cobalt Phthalocyanine Containing Chemically Modified Electrode", with A. M. Tolbert, Third Chemical Congress of North America, Toronto, Canada, June, 1988.
 36. "CME Electrocatalysis for the Analytical Chemistry of Redox Proteins", with J. Ye, Third Chemical Congress of North America, Toronto, Canada, June, 1988. 37.
"Oxidation of Carbohydrates at Chemically Modified Electrodes Containing Transition Metal Catalysts", with S. V. Prabhu, 15th Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, October, 1988, Boston.
 38. "Applications of Copper Electrodes in Flow Injection and Liquid Chromatography", with P. Luo, Workshop on Electrochemical Approaches in Molecular Biology, Brno, Czechoslovakia, August, 1990.
 39. "Amperometric Detection of Non-Electroactive Cations at Hexacyanoferrate-coated Electrodes", with X. Qi and K. N. Thomsen, Heyrovsky Centennial Congress on Polarography, Prague, Czechoslovakia, August, 1990.
 40. "LCEC of Thiols at Electrocatalytic Electrodes Modified with Metal Phthalocyanine Polymers", with X. Qi, 200th National Meeting of the American Chemical Society, Washington, D.C., August, 1990.

41. "Constant Potential Amperometric Detection at Copper Electrodes", with P. Luo and F. Zhang, 200th National Meeting of the American Chemical Society, Washington, D.C., August, 1990.
42. "Constant Potential Amperometric Detection of Peptides and Proteins at Copper Electrodes in Liquid Chromatography", with P. Luo and A. Pappa-Louisi, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Chicago, Illinois, March, 1991.
43. "Aqueous and Non-aqueous Applications of Metallophthalocyanine Electrodes in LCEC", with X. Qi, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Chicago, Illinois, March, 1991.
44. "LCEC of Hydrosulfide at Cobalt Phthalocyanine Chemically Modified Electrodes", with X. Qi, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, New Orleans, Louisiana, March, 1992.
45. "Redox-active Oxo-bridged Dimanganese Complexes Containing Mixed Pyridine/Imidazole Tripod Ligands", with J. Ye, R. M. Buchanan, and R. J. O'Brien, 204th National Meeting of the American Chemical Society, Washington, D.C., August, 1992.
46. "Capillary Electrophoresis with Amperometric Detection at Copper Electrodes", with J. Ye (Poster), 1993 International Electroanalytical Symposium, Indianapolis, Indiana, May, 1993.
47. "Applications of *In Situ* IR Spectroelectrochemistry to the Study of Electrocatalytic Processes at Metallophthalocyanine Electrodes", with J. Hong, P. W. Faguy, and N. Marinkovic (Poster), 1993 International Electroanalytical Symposium, Indianapolis, Indiana, May, 1993.
48. "Electrochemical Characterization of Carbohydrate Oxidation at Copper Electrodes", with M. Z. Luo (Poster), 1993 International Electroanalytical Symposium, Indianapolis, Indiana, May, 1993.
49. "Electrochemistry and Catalytic Properties of Novel Dinuclear Complexes", with Z. Wang and R. M. Buchanan (Poster), 1993 International Electroanalytical Symposium, Indianapolis, Indiana, May, 1993.
50. "LCEC of Oligo- and Polysaccharides at a Copper Electrode", with P. D. Voegel (Poster), 1993 International Electroanalytical Symposium, Indianapolis, Indiana, May, 1993.
51. "Continuous Electrochemical Elimination of Sulfide at a Flow-Through Cobalt Phthalocyanine Electrode", with J. Ye (Poster), 1993 International Electroanalytical Symposium, Indianapolis, Indiana, May, 1993.
52. "Extending the Role of Cu Electrodes in HPLC and Capillary Electrophoresis", with P. D. Voegel, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Chicago, Illinois, March, 1994.
53. "Polysaccharide Analysis by HPLC and Capillary Electrophoresis with Electrochemical Detection", with P. D. Voegel, 22nd Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, St. Louis, Missouri, October, 1994.
54. "Dual Electrode Amperometric Detection in Capillary Electrophoresis", with M. Z. Luo and

- P. D. Voegel (Poster), 17th International Symposium on Capillary Chromatography and Electrophoresis, Wintergreen, Virginia, May, 1995.
55. "Dual Electrodes for Use in Capillary Electrophoresis", with P. D. Voegel and K. M. Walsh (Poster), 23rd Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Cincinnati, Ohio, October, 1995.
 56. "Capillary Electrophoresis of Complex Polysaccharides with Electrochemical Detection at a Copper Electrode", with W. Zhou, 23rd Annual Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies, Cincinnati, Ohio, October, 1995.
 57. "New Electrode Designs for CEEC", with P. D. Voegel, 1995 American Chemical Society Joint Southeast/Southwest Regional Meeting, Memphis, Tenn., November, 1995.
 58. "Capillary Electrophoresis of Complex Polysaccharides with Electrochemical Detection at Cu Electrodes", with W. Zhou, 1995 American Chemical Society Joint Southeast/Southwest Regional Meeting, Memphis, Tenn., November, 1995.
 59. "A Novel Electrochemical Detector for Use in a Dual-Capillary Electrophoresis System", with P. D. Voegel, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Atlanta, Georgia, March, 1997.
 60. "Electrocatalytic Properties of Poly-Co-Tetraaminophthalocyanine Modified Electrodes", with M. Huang, P. W. Faguy, J. Shaw, J. Pavez, J. Wang, F. Bailly, and R. M. Buchanan (Poster), 213th National Meeting of the American Chemical Society, San Francisco, California, April, 1997.
 61. "Oxygen Reduction on Poly-Cobalt Tetraaminophthalocyanine-Modified Electrodes", with M. Huang, J. Pavez, R. M. Buchanan, and P. W. Faguy, 191st Electrochemical Society Meeting, Montreal, Canada, May, 1997.
 62. "Polymerized Phthalocyanines for Electrochemical Applications", with J. Pavez, J. Shaw, F. Bailly, R. M. Buchanan, and P. W. Faguy (Poster), 3rd Annual Kentucky EPSCoR Conference, Lexington, Kentucky, May, 1997.
 63. "Amperometric Biosensors Based on Iron Phthalocyanine for the Detection of Selected Oxidase Substrates", with A. A. Ciucu, M. Tudorache, and L. Stoica, Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Orlando, Florida, March, 1999.
 64. "Conducting Tetraaminophenoxyphthalocyanine Polymers" with K. Meyers, R.M. Buchanan and P.W. Faguy (Poster), 1999 Annual Meeting of the Tri-State Catalysis Club, Louisville, Kentucky, April, 1999.
 65. "Synthesis and Properties of a New Class of Hybrid Aminophthalocyanine conducting Polymers", with K.M. Meyers, R.M. Buchanan and P.W. Faguy, 218th National Meeting of the American Chemical Society, New Orleans, LA, August, 1999.
 66. "Accuracy of Computational Models for Predicting Flows in Microfabricated Capillary Electrophoresis Devices", with T. J. Roussel, Jr., D. Jackson, M. M. Crain, J. F. Naber, K. M. Walsh, and R. S. Keynton, HSEMB, February, 2001.

67. "Computer Simulations of Separation and Flow Within Microfabricated Channels", with T. Roussel, Jr., R. Keynton, K. Walsh, M. Crain, J. Naber, and D. Jackson, PittCon 2001, New Orleans, LA, March, 2001.
68. "A Systematic Approach to the Application of Multiple Electrodes for Electrochemical Detection in Microchip Analysis Systems", with M. Crain, K. Walsh, R. Keynton, J. Naber, and T. Roussel, Jr., PittCon 2001, New Orleans, LA, March, 2001.
69. "A Compact Battery Powered High Voltage Power Supply for Capillary Electrophoresis Using Microchip Capillaries", with D. Jackson, J. Naber, K. Walsh, R. Keynton, M. Crain, T. Roussel, Jr., and M. Diaconu, PittCon 2001, New Orleans, LA, March, 2001.
70. "A Portable Battery Powered Electrochemical Detection Circuit", with D. Jackson, J. Naber, K. Walsh, R. Keynton, M. Crain, T. Roussel, and M. Diaconu, PittCon 2001, New Orleans, LA, March 2001.
71. "Sensitive Detection of Pesticides Using Cobalt Phthalocyanine Modified Electrodes and Immobilized Cholinesterases", with A. Ciucu, PittCon 2001, New Orleans, LA, March, 2001.
72. "Alternative Fabrication Methods for Capillary Electrophoretic Device Manufacturing", with J. A. Conklin, et al., 14th IEEE/EDS University Government Industry Microelectronics Symposium, Richmond VA, June, 2001.
73. "Integrated Electrochemical Detection for Lab on a Chip Analytical Micro-systems", with R. S. Pai, et al., 14th IEEE/EDS University Government Industry Microelectronics Symposium, Richmond VA, June, 2001.
74. "A Portable Battery Powered Electrochemical Detection Circuit with a 1,000 volt CE Power Supply for Microchip Capillaries", with V. Bathlagunda, et al. 14th IEEE/EDS University Government Industry Microelectronics Symposium, Richmond VA, June, 2001.
75. "Accuracy of Computational Models for Predicting Flows in Microfabricated Capillary Electrophoresis Devices", with T.J. Roussel, D.J. Jackson, M.M. Crain, J.F. Naber, K.M. Walsh, and R.S. Keynton, 19th Annual Houston Conference on Biomedical Engineering Research, 2001.
76. "A Fully-Integrated Capillary Electrophoresis System with On-Chip Electrochemical Detection", T.J. Roussel, Jr., M.M. Crain, D.J. Jackson, R.S. Pai, V. Bathlagunda, J.A. Conklin, K.M. Walsh, J.F. Naber, and R.S. Keynton, 2001 Research Louisville! Conf., Louisville, KY, 2001.
77. "Integration of 'On-Chip' Electrochemical Detection in a Microfabricated Capillary Electrophoresis Device", with T.J. Roussel, Jr., M.M. Crain, V. Bathlagunda, D.J. Jackson, J.A. Conklin, R. Pai, J.F. Naber, K. M. Walsh, J. Gullapalli, and R. S. Keynton, Proceedings of the 2002 Joint IEEE-EMBS/BMES Conference, Houston, TX, 2002.
78. "Electroplating for Three Dimensional Lab-on-a-Chip Electrodes and Microstructures," with R. S. Pai, T.J. Roussel, Jr., M.M. Crain, D.J. Jackson, R.S. Keynton, J.F. Naber, and K.M. Walsh, Proceedings of the 2002 Joint Institute for Electrical and Electronic Engineers – Engineering in Medicine and Biology/Biomedical Engineering Society Conference, Houston, TX, 2002.
79. "Integrated On-Chip Electrochemical Detection on Microfabricated Capillary Electrophoresis Platforms", with T.J. Roussel, Jr., M.M. Crain, D. Franco, J. Gullapalli, D.J. Jackson, R.S. Keynton, J.F.

- Naber, and K.M. Walsh, 2002 American Institute for Chemical Engineers National Meeting, Indianapolis, IN, Oct., 2002.
80. "A Novel Nanocomposite Diamond Electrode for Electrochemical Sensing of Neurological Fluids", with R.C. Mani, M. Sunkara, and J. Gullapalli, 2002 American Institute for Chemical Engineers National Meeting, Indianapolis, IN, Oct., 2002.
 81. "Nanocomposite Films and Free-standing Whiskers Containing Diamond and graphite Phases", with R.C. Mani, S. Sharma, M. Sunkara, J. Gullapalli, R. Rao, A.M. Rao, and J.M. Cowley, 2002 American Institute for Chemical Engineers National Meeting, Indianapolis, IN, Oct., 2002.
 82. "Electroplating for Three Dimensional Lab-on-a-Chip Electrodes and Microstructures", with R.S. Pai, T.J. Roussel, Jr., M.M. Crain, D.J. Jackson, R.S. Keynton, J.F. Naber, and K.M. Walsh, Kentucky Nano Materials Workshop, Louisville, KY, Sept., 2003.
 83. "Carbon Nanopipettes: Synthesis and Electrochemical Properties", with R.C. Mani and M.K. Sunkara, 2003 American Institute for Chemical Engineers National Meeting, Indianapolis, IN, November, 2003.
 84. "Microfabricated Multi-electrode Arrays for Electrochemical Detection in Lab-on-a-Chip Devices", with D. Franco, T.J. Roussel, Jr., J. Gullapalli, M.M. Crain, D.J. Jackson, R.S. Keynton, K.M. Walsh, and J.F. Naber (Poster), PittCon 2004, Chicago, March, 2004.
 85. "Microfabricated Multi-electrode Arrays for Electrochemical Detection in Lab-on-a-Chip Devices", with D. Franco, T.J. Roussel, Jr., J. Gullapalli, M.M. Crain, D.J. Jackson, R.S. Keynton, K.M. Walsh, and J.F. Naber (Poster), Kentucky EPSCoR Meeting, Lexington, KY, May, 2004.
 86. "Fabrication and Characterization of a Novel Three-Dimensional Microelectrode for Lab on a Chip Systems", with R.S. Pai, M.M. Crain, T.J. Roussel, Jr., D.J. Jackson, R.S. Keynton, J.F. Naber and K.M. Walsh, Solid State Sensors, Actuators and Microsystems Workshop 2004, Hilton Head Island, SC, Jun 6-10, 2004.
 87. "Dual Capillary Electrophoresis Devices with Electrochemical Detection on a Single Platform", with R. Dorairaj, T.J. Roussel, M.M. Crain, D.J. Jackson, D. Franco, K.M. Walsh, J.F. Naber, and R.S. Keynton (Poster), Nanomat2004, International Workshop on Nanomaterials, Lexington, KY, September, 2004.
 88. "A Novel Three Dimensional Microelectrode: Fabrication and Characterization", with R.S. Pai, M.M. Crain, T.J. Roussel, Jr., D.J. Jackson, R.S. Keynton, J.F. Naber, and K.M. Walsh (Poster), Nanomat2004, International Workshop on Nanomaterials, Lexington, KY, September, 2004.
 89. "Nanoarray Electrochemical Sensors for Fast Detection of Neurological Solutes", with R.D. Lowe, Jr., R.C. Mani, and M.K. Sunkara (Poster), Nanomat2004, International Workshop on Nanomaterials, Lexington, KY, September, 2004.
 90. "Electrochemistry in New Forms of Carbon", with R. Mani and M. Sunkara, 206th Meeting of The Electrochemical Society, Hawaii, October, 2004.
 91. "Three Dimensional Microelectrode for Lab on a Chip Systems", with R.S. Pai, M. M. Crain, T. J. Roussel Jr., D. J. Jackson, R. P. Baldwin, R. S. Keynton, J. F. Naber, and K. M. Walsh, 3rd Annual International IEEE-EMBS Special Topic Conference on Microtechnologies in Medicine and Biology,

May, 2005, Hawaii, pp. 18-21.

92. "Nanoarray Electrochemical Sensing for the Rapid Detection of Neurological Solutes", with R.D. Lowe, Jr., R.C. Mani, and M.K. Sunkara, 2005 AIChE National Meeting, Cincinnati, Ohio, October, 2005.
93. "Nanoarray Electrochemical Sensing for the Rapid Detection of Neurological Solutes", with R. Lowe, Jr., R. Mani, and M. Sunkara, 208th Meeting of The Electrochemical Society, Los Angeles, CA, October, 2005.
94. "Electrode Microfabrication for Integrated Lab-on-a-Chip Applications", with D.B. Franco, A.M. Sanchez, M.M. Crain, R.S. Pai, K.M. Walsh, R.S. Keynton, and J.F. Naber, PittCon 2007, Chicago, February, 2007.
95. "Application of Microfabrication Techniques for the Development of a Miniaturized ASV System", with L. Sztaberek, M. Martin, T. Roussel, Jr., R. Keynton, K. Walsh, and J. Naber (Poster), PittCon 2007, Chicago, February, 2007.
96. "Application of Microfabrication Techniques for the Development of a Miniaturized Hg-free ASV System" with M. Martin, L. Sztaberek, T. Roussel, Jr., R. Keynton, K. Walsh, J. Naber, B. Vaughn, and D. Jackson, 234th National Meeting of the American Chemical Society, Boston, August, 2007.
97. "Room Temperature UV Adhesive Bonding of CE Devices", with S. Carroll, M. Crain, J. Naber, R. Keynton, and K. Walsh, 235th National Meeting of the American Chemical Society, New Orleans, April, 2008.
98. "Microfabrication Techniques for the Development of a Miniaturized Hg-free ASV Sensor for Drinking Water", with L. Sztaberek, M. Martin, T. Roussel, Jr., R. Keynton, J. Naber, and K. Walsh, 235th National Meeting of the American Chemical Society, New Orleans, April, 2008.
99. "Low Temperature Adhesive Bonding of CE Devices", with S. Carroll, M.M. Crain, J.F. Naber, R.S. Keynton, and K.M. Walsh (Poster), 2008 University/Government/Industry Micro-Nano Symposium, Louisville, KY, July, 2008.
100. "Microfabricated Electrochemical Sensor for a Water Monitoring System", with L. Sztaberek, M. Martin, T. Roussel, Jr., K.M. Walsh, and R.S. Keynton (Poster), 2008 University/Government/Industry Micro-Nano Symposium, Louisville, KY, July, 2008.
101. "A Calibration-free Coulometric Detection System for Remote Monitoring", with T.J. Roussel, S. Carroll, M. Marei, and R.S. Keynton (Poster), IEEE Sensors 2010, Hawaii, November, 2010.
102. "Calibration-free Microfabricated Electrochemical Smart Sensor Networks", with Mohamed Marei, Fourth Annual Graduate Research Symposium, University of Louisville, Louisville, KY, March, 2012.
103. "Calibration-Free Micro-Fabricated Electrochemical Sensor for Heavy Metal Determination", with Mohamed Marei, T.J. Roussel, and R.S. Keynton, PittCon2013, Philadelphia, PA, March, 2013.

C. Patents**(1) Issued**

1. Patent No. US 7,344,628 B2, "Capillary Electrophoresis-Electrochemical Detection Microchip Device and Supporting Circuits", with D.J. Jackson, T.J. Roussel, Jr., M.M. Crain, R.S. Keynton, J.F. Naber, K.M. Walsh, and J.G. Edelen, filed 2/10/03, issued 3/18/08.
2. U.S. Patent Application Serial No. 11/524,357, "Capillary Electrophoresis Systems And Methods", with R. Dorairaj, R.S. Keynton, T.J. Roussel, M.M. Crain, D.J. Jackson, K.M. Walsh, J.F. Naber, and D.B. Franco, revised/pending 5/10.

(2) Applied for and Pending

1. U.S. Utility Patent Application # 10/936,889, "Conical Carbon Nanopipettes: Methods Of Making And Applications", with M.K Sunkara et al., revision filed 7/08.

D. Extramural Grants and Contracts**(1) Projects completed.**

1. "Electroanalytical Methods for Pt and Pd Chemotherapy Agents", American Cancer society Institutional Research Grant, \$2,525, 11/82-12/83.
2. "The Electrolytic Reduction of Coal - Pilot Project", Standard Oil Company of Indiana, \$1,000, 1/84-1/85.
3. "Modified Electrodes in Trace Analytical Chemistry" (with L. Kryger, Aarhus University), NATO, \$5,370, 10/85-4/87.
4. "Modified Electrodes in Trace Analytical Chemistry" (with L. Kryger, Aarhus University), NATO, \$3,000, 7/87-7/89 (renewal).
5. "Chemically Modified Electrodes in LCEC", Burdick & Jackson Research Grant, \$2,000, 8/88-7/89.
6. "Analytical Applications of Electrocatalytic Chemically Modified Electrodes" (R. M. Buchanan, Co-PI), National Science Foundation EPSCoR, \$85,000, 1986-91.
7. "Electrocatalysis at Modified Electrode Surfaces" (J. O. Egekeze, Co-PI), Research Opportunities Award Supplement to NSF EPSCoR Project, \$10,000, 6/90-5/91.
8. "Electro-reduction of NO_3^- in Tobacco", Brown & Williamson Corp., \$16,460, 6/91-1/92.

9. "Preparative Applications of Electrocatalytic Modified Electrodes", National Science Foundation EPSCoR Phase II, \$120,930, 1/92-8/95.
10. "Electrochemical Applications of Polymerized Phthalocyanines", with P. W. Faguy and R. M. Buchanan, Department of Defense EPSCoR, \$270,357, 7/96-6/99.
11. "Polymerized Phthalocyanines for Electrochemical Applications", with P. W. Faguy and R. M. Buchanan, Department of Defense Augmentation Awards for Engineering Research Training, \$143,941, 6/97-5/00.

(2) Current projects (include only those that have received final notification of award).

1. "An Integrated Monolithic Capillary Electrophoresis System with Electrochemical Detection", with Kevin Walsh, R. S. Keynton and John Naber, National Science Foundation (XYZ on a Chip), \$520,000, 9/99 – 8/02.
3. "Implementation of Deep Reactive Ion Etching Technology for Advancement of Micro/Nanotechnology research at the University of Louisville", with Kevin Walsh (P.I.), Robert Keynton, and John Naber (Co-P.I.'s), NSF Major Research Instrumentation Grant, \$333,000, 9/00 to 8/02.
3. "Cellular Electrophysiology on a Chip", Kevin Gillis (PI, University of Missouri-Columbia), NSF (XYZ on a Chip), \$98,331 (UofL Subcontract), 10/00-9/03.
4. "Biomedical Nano- and Micro-Electromechanical Systems", with R. Keynton (PI), K. Walsh, B. Alphenaar, E. Wang, K. Kang, J. Naber, and G. Pantalos, NSF-EPSCOR, \$2,490,056, 1/02-12/04.
5. "Integrated Materials Architecture: From Nanoscale Studies to Microdevice Development", Kevin Walsh (P.I.), Robert Keynton, John Naber, C.S. Jayanthi, S. Liu, S.Y. Wu, Craig Grimes, Elizabeth Dickey, Susan Sinnott, and Andrew Mason (Co-P.I.'s), NSF/Ky EPSCoR, \$439,364 (NSF) and \$513,088 (Ky) = \$952,452 Total. Walsh is P.I. of the UofL MEMS effort, Jayanthi is P.I. of the UofL Physics/Nanoscience Effort, and Grimes is the P.I. of the UK MEMS effort, 9/03-8/06.
6. "Chip-based Electrochemical Sensor Networks for Monitoring Heavy Metals", R.S. Keynton, K. M. Walsh, and J.H. Naber (co-PIs), NSF, \$300,000, 9/05-8/08.

(3) Proposals submitted, not yet acted on

1. "Acquisition of an Advanced Dry Etching Tool for Patterning Nano-structured Dielectric Devices", Sergio Mendes (PI), NSF-MRI, \$540,000, submitted 1/08.
2. "Early Life Exposure to Hazardous Waste Substances", T.B. Knudsen, PI, NIH/NIEHS Superfund Basic Research and Training Program, \$13.5M, submitted 2/07. This proposal contains 4 linked projects – one of which "Chip-based Electrochemical Sensor Network for Heavy Metal Detection in Water" (roughly \$2.5M/5 years) is my group's sub-project.

(4) Proposals submitted, not funded, (if applicable, state if approved for content but unfunded because of agency's allocation).

1. "Chemically Modified Electrodes in Trace Level Organic Analysis", National Science Foundation (Chemical Analysis), 7/80, \$61,190 - not funded, approved for content.
2. "Direct and Mediated Electrolysis of Coals and Coal Liquids", Petroleum Research Fund, 7/81, \$41,800 - not funded, approved for content.
3. "Chemically Modified Electrodes in Trace Level Organic Analysis", National Science Foundation (Chemical Analysis), 3/82 (resubmitted), \$104,706 - not funded, approved for content.
4. "Electroanalytical Methods for Pt and Pd Antitumor Drugs", National Institute of Health, 6/82, \$75,116 - not funded, approved for content.
5. "Electroanalytical Methods for Pt and Pd Antitumor Drugs", American Cancer Society, 10/82, \$58,600 - not funded, approved for content.
6. "Electrochemical Approaches for the Analysis of Coal Liquids", Department of Energy, 2/83, \$89,059 - not funded, approved for content.
7. "Analytical Applications of Electrocatalytic Chemically Modified Electrodes (R. M. Buchanan, Co-PI), National Science Foundation (Chemical Analysis), 5/84, \$270,057 - not funded, approved for content.
8. "Determination of Dietary Flavonoids and Phenols" (J. L. Wong, Co-PI), National Institutes of Health, 12/84, \$149,933 - not funded, approved for content.
9. "Determination of Dietary Flavonoids and Phenols" (J. L. Wong, Co-PI), National Institutes of Health, 11/85 (resubmitted), \$156,382 - not funded, approved for content.
10. "Metal Preconcentration at Chemically Modified Electrodes" (L. Kryger and R. M. Buchanan, Co-PIs), National science Foundation (Chemical Analysis), \$134,795 - not funded, approved for content.
11. "Analytical Spectroscopy for Sophomore and Senior Undergraduates", (PI: Peter Faguy), National Science Foundation, 11/92, \$73,450 - not funded.
12. "Analytical Spectroscopy for Sophomore and Senior Undergraduates", (PI: Peter Faguy) National Science Foundation, \$75,000, resubmitted 11/93.
13. "Near-IR Spectroscopy in Undergraduate Chemical Education", (PI: M. Cecilia Yappert) National Science Foundation, \$39,100, submitted 11/94.
14. "Applications of Biosensors in Capillary Electrophoresis", National Research Council, \$11,550, submitted 9/96.
15. "Polymeric Phthalocyanine Modified Electrodes as Glucose Sensors", Robert Buchanan (PI), National Institutes of Health, \$203,806, submitted 3/98.

16. "Acquisition of Critical Equipment for the Development of a MEMS Center at the University of Louisville", Kevin Walsh (P.I.), National Science Foundation (EPSCoR), \$987,338, 6/99 – 5/01.
17. "Biosensors for Environmental Monitoring", with A.A. Ciucu (co P.I.), NATO advanced Research Workshop, \$29,300, 6/00.
18. "Vapor Phase Synthesis and Doping of Diamond: Low Dimensional and Large Single Crystals", with M.K. Sunkara (P.I.) and B. Alphenaar, KSEF, \$100,000, submitted 10/01.
19. "Development of Fully Integrated Micro Total Analysis Systems with EC Detection for DOE Applications", R.P. Baldwin (P.I.), K. Walsh, R. Keynton and J. Naber (Co-P.I.), DOE EPSCoR (pre-proposal), \$1,200,000, 1/00 – 12/04.
20. "Development of New MEMS Technologies and Applications Using Ultra Precision Micro Mechanical Milling/Drilling Process", R.S. Keynton (P.I.), K.M. Walsh, J.F. Naber, M. Sunkara, R.W. Cohn (co-P.I.'s), Department of Defense, \$239,540, 6/00.
21. "Chip-based Electrochemical Sensor Networks for Monitoring Water Quality", R.P. Baldwin (PI), R.S. Keynton, J.F. Naber, K.M. Walsh, and C. Metcalf, NSF – Sensors and Sensor Networks, \$2,500,000, submitted 2/04.
22. "Controlled Drug Delivery and Nanoarray Electrochemical Sensing Using Carbon Nanopipettes", M.S. Sunkara (co-PI), NSF, \$100,000, submitted 11/04.
23. "Microfabricated Electrochemical Sensors for Monitoring Pollutants in Drinking and Waste Water Systems", R.P. Baldwin (PI), R.S. Keynton, K.M. Walsh, and J.F. Naber (co-PI's), NSF-PIRE (pre-proposal), submitted 11/06.
24. "Acquisition of a Low Pressure Chemical Vapor Deposition System for Applications in Micro/Nano Technology", S.P. McNamara (PI), NSF-MRI, \$465,000, submitted 1/07.
25. "MicroPC-GC for Clinical Analysis of Volatile Metabolites in Clinical Samples", X. Fu (PI), X. Zhang, R.P. Baldwin, and K.M. Walsh (co-PIs), Clinical & Translational Science Pilot Grant Program (U of L), \$50K, submitted 2/10.

E. College and University Grant Funds

1. "Development of a Polymeric Glucose Sensor for Electrochemical Detection", (R.M. Baldwin, P.I.), College of Arts and Science Research Award, \$3,200, April, 2000.
2. "Establishment of a Science Education Forum" (J. Chalmers, Co-PI), Proposal to Enhance Undergraduate Curriculum, College of Arts & Sciences, \$5000, April, 1991 (not funded).
3. "Enzyme-based Electrochemical Biosensors", Arts & Sciences Research Council, \$3000, 7/91-6/92.