

1. Mission

1. Mission

A. The mission of the Chemistry program at Columbus State University is:

1. To provide high quality degree programs in chemistry that prepare students for future work in industrial and government laboratories, graduate school, and professional school.

2. To provide quality educational service courses in chemistry to meet the needs of:

- a. Pre-medical and other pre-professional students
- b. Majors in Nursing, Biology, Geology, Engineering, and Environmental Science
- c. Future science educators in both undergraduate and graduate education programs
- d. Non-science majors taking core science courses

3. To maintain active research programs that incorporate undergraduate and graduate students and provide the critical opportunity for teaching through research.

4. To provide services to the University, Local Community, and the region including, but not limited to, educational outreach, awareness of chemistry issues, and consulting.

B. The relationship of the Chemistry program to the mission of Columbus State University is illustrated in the first two columns of the Major Field Assessment Matrices in Appendix A.

2. Teaching

2. Teaching

A. Assessment of Good Teaching: Below is our department's philosophy of conducting good teaching in chemistry.

1. The unity of the faculty is of great value to good performance and delivery of contents. Thus, our chemistry faculty are in good agreement regarding pedagogy, content of materials, techniques of delivery, and assessment instruments being followed in the department. In particular, in the introductory courses, contents are designed by the whole faculty rather than by individuals.

2. The chemistry faculty have developed classroom visitations for each other. Such an instrument has a great impact on faculty improvement of their lectures, techniques, and methodology of instruction.

3. The chemistry faculty have agreed to faculty peer evaluation instruments where the teaching component ranks as 60% of their all over evaluation. Classroom visitation is part of this evaluation instrument.

4. Faculty are encouraged to submit faculty evaluation forms from selected classes to demonstrate teaching excellence.

B. Rewarding: The department strives for faculty who excel in teaching. Several rewarding instruments have been followed over the years.

1. The merit raise allocated by the BOR is assigned to the faculty based primarily on teaching.

2. Financial support is provided to attend and present papers in national and international conference, particularly chemical education meetings.

3. The department provides support for faculty to attend educational workshops.

Our faculty recognize the value of good advising. This can be judged from retention data. Good advising results in good retention. Therefore, our department includes advising in the 60% for teaching noted above. The department Chair always comments on the advising performance during evaluation.

There is no separate mechanism for rewarding good advising. The reward is coupled with good teaching; therefore, the only reward available is the merit raise assigned by BOR.

Our faculty recognize the value of teaching through research. All of our chemistry faculty are research oriented. Their on-going research programs are utilized to attract students beginning in the sophomore year. These efforts are intensified during the senior year. As a requirement for the degree of chemistry, each senior has to spend one academic year as a resident in chemical research with one of the faculty. Such a research program is credited through an academic course titled "Senior Seminar." Such a course results in students submitting a senior thesis at the end of the academic year and presenting a talk to the department faculty and students regarding this thesis work. All faculty share in the evaluation of the senior's presentation.

The following table shows the names of the seniors, their thesis titles, and their mentors for the past six years.

Name of Student	Academic Year	Thesis Title/Advisor
Kelly Malone	1994-1995	Characterization of Poly(ethylene oxide) Through Inverse Gas Chromatography/Charles Lovelette
Billy Flowers	1994-1995	E.C.A.L.E. (electrochemical atomic layer epitaxy) Project/
Shelly L. Decker	1997-1998	The Synthesis and Characterization of Histidine and Histamine Complexes of Zinc (II) and Nickel (II)/Floyd Jackson
Dustin Dyer	1997-1998	Theory and Paractice of Cytosenser Microphysiometer/Charles Lovelette
Michelle Mitchell	1997-1998	Investigation of the Emission of Two Polycyclic Aromatic HydrocarbonsCompounds/Zeki Al-Saigh
Elena Vratonjic	1997-1998	Effect of Lead Toxicity in <i>T. Scripta</i> Specimens/Charles Lovelette
Marios Voulgaridis	1998-1999	Synthesis and Photochemistry of Fullerooids/Steve Buckner
Omar Al-saigh	1998-1999	Observation of Dual Fluorescence Lifetime for Fluoranthene in Condense Phase/Steve Buckner
Jennifer Taylor	1998-1999	Detection and Determination of Heavy Metals in Clams in Columbus Area/Jeff Zuiderveen
Twaskia S. Johnson	1998-1999	Synthesis and Characterization of Coordinated Imidazoles/Floyd Jackson
Christina Nescu	1998-1999	Characterization of Conductive Polymers Using Inverse Gas Chromatography/Zeki Al-Saigh
Brad Harris	1998-1999	Heavy Metal Concentration in Fish of the Chattahoochee River and the Implications on Human Health/Zeki Al-Saigh
Sunny Dawn Resch	1998-1999	The Synthesis and Characterization of a Model Compound of Two Polyimides/Floyd Jackson
Jack Howard	1998-1999	The Examination of Fluorescent Emission of Two Polycyclic Aromatic Compounds/Zeki Al-Saigh
Tara Snow Wehr	1999-2000	Spectroscopic Characterization of Galaxies in the Bootes Void/Shawn Cruzen
Gail King	1999-2000	The Effect of Heavy Metal on Bacterial Growth/Charles Lovelette
Walter Chambers	1999-2000	Lead Contamination in Catfish From Two Feeder Streams of the Chattahoochee River/Jeff Zuiderveen
Kimberly Seidler	1999-2000	The Halogenation of 3-Amino-1,2,4-triazine: A Rate Study and Possible Mechanism/Charles Lovelette
Vera Verdree	1999-2000	The Synthesis and Characterization of First Row Transition Metal Ions Containing Histamine and Histidine as Ligands/Floyd Jackson
Kandace Herring	1999-2000	Characterization of Conducting Polymers Using Inverse Gas Chromatography/Zeki Al-Saigh
Akins Doherty	1999-2000	Optical Temperature Sensors for Aqueous Environments/Steve Buckner
Eyasu Altaye	1999-2000	Characterization of Environmentally Friendly Polymer Using Inverse Gas Chromatography/Zeki Al-Saigh
Christie Bleckley	2000-2001	The Synthesis, Characterization, and Reactivity of Mono-poly Coordinated Imidazole Complexes with Cobalt (III)/Floyd Jackson
Robert Lane	2000-2001	Bromination of 1,2,4-Triazine/Charles Lovelette
Tien Nguyen	2000-2001	Characterization of Conducting Polymer by Using Inverse Gas Chromatography/Zeki Al-Saigh
Jerry Putnam	2000-2001	The Effects of Heavy Metal Ions on the Prophenoxidase Enzyme Cascade Activity in the Freshwater

Name of Student	Academic Year	Thesis Title/Advisor
		Crayfish/Charles Lovelette
Brandy Brown	2000-2001	Heavy Metal Analysis of Pond and River Catfish/Steve Buckner, Jeff Zuiderveen
Chrissy Smith	2000-2001	Heavy Metal Analysis-Theoretical Simulation/Zeki Al-Saigh
Jeff Faulk	2001-2002	Nanosecond Spectroscopy/Steve Buckner
Todd Smith	2001-2002	Synthesis of Polyimide using Dicyclohexyl Carboimide/Charles Lovelette
Tamika Weston	2001-2002	Detection of Flunitrazepam/Floyd Jackson

The instructional support center has hired retired faculty and seniors to help students in their chemistry assignments. A good asset to this program is Mr. Mahesh Sharma, who has invested 35 years in teaching introductory chemistry and is currently one of the leading tutors at CSU.

Faculty office hours is another way of helping students in their assignments. Faculty are required to post at least six hours per week as office hours. Some faculty go beyond this limit to offer help sessions in the evenings and during the weekends, particularly before exams. Chemistry students are also incorporated as lab assistants in the stockroom.

Columbus Sate University and the chemistry program has committed to internship and co-op services to better train our graduates. The university has created an office for creating co-op opportunities for students and placing, managing, and supervising these students while at work. The co-op office has worked very closely with the chemistry faculty who identify and recommend students at all levels for the co-op program.

The following table shows the name of selected students placed since 1996 and the name of their employer.

Name of Student	Year of Placement	Name of Employer
Tamika Weston	2001	Georgia Bureau of Investigation
Brian Brown	1999	Pratt & Whitney
Rodger Fontenot	1998	Callaway Chemicals
Anthony Brand	1997	Char-Boil
Kevin Breemes	1997	Char-Boil
Sunny Resch	1997	Callaway Chemicals
Omar Al-Saigh	1996	Pratt & Whitney
Anthony Glackmeyer	1997	Char-Boil

3. Curriculum

3. Curriculum

The Department of Chemistry has evolved in directions to serve the needs of our students and the regional community. Department activities are presently oriented toward undergraduate education in the physical sciences and engineering. However, we are committed to growth and expansion of the program through all available services to develop into a department recognized as a center of excellence. In order to achieve these goals, the department of chemistry focuses its efforts on understanding the relation between curriculum and outcomes, knowing how technology affects the program, knowing how relevant the program is to students, understanding the importance of having students think across disciplines, having courses that are offered frequently, understanding the role of the program in regards to other programs on campus, and understanding the relation of the program on diversity, multiculturalism, and international perspectives. The following sections address each of the above and how the department utilizes its resources to serve the community in these areas.

A. Relation between Curriculum and Outcomes

The baccalaureate degree programs in chemistry are designed to offer students a solid background in inorganic, analytical, organic, and physical chemistry, as well as exposure to applied chemistry, biochemistry, spectroscopy, and chemical analysis. Graduates are expected to understand quantitative interpretation, to think independently, and to apply skills and knowledge of chemistry to real-world problems. Because of the diverse goals of chemistry students, two degreed programs are available: Bachelor of Arts in Chemistry and Bachelor of Science in Chemistry.

Graduates from our department are expected to be able to:

- Demonstrate knowledge of the diverse areas of chemistry, both theoretical and practical.
- Communicate the rapidly changing field of chemical knowledge effectively.
- Estimate and interpret chemical information in the context of the day-to-day events.
- Demonstrate skills in quantitative and qualitative problem-solving related to the chemical sciences.
- Demonstrate theoretical knowledge of chemical instrumentation, including the operation of microprocessor-controlled instruments.
- Integrate the usage of computers in chemistry.
- Think independently and apply chemical knowledge to a problem.
- Enter into employment in the chemical industry or into graduate or professional schools.

Consequently, the department administers a standardized examination that is produced by Educational Testing Services (ETS). This exit examination is used as an in-house device to measure and track departmental progress as it relates to students. As a result, the faculty members in the department meet annually to review the results to modify the program and/or teaching pedagogy to improve student comprehension, which will in turn improve the scores on the examinations. Copies of all final examinations from courses taught during each semester are collected, reviewed, and filed for future reference. Additionally, copies of all syllabi are collected, reviewed, and filed.

B. Affects of Technology on the Program

Technology has played a vital role in the development of the chemistry program. Students enrolled in core courses and senior level courses have been affected by the increasing demands invoked by technology. Students in the upper level courses get hands-on experience with state-of-the-art laboratory equipment. Some of these instruments include various ultraviolet and visible spectrometers, various infrared spectrometers, a mass spectrometer, an electronic magnetic susceptibility balance, a polarimeter, electronic analytical balances, a fluorescence spectrometer, etc. Students in chemistry receive excellent hands-on experience with the equipment thus enabling them to compete anywhere in the country for jobs or graduate and/or professional school.

However, advances in computer technology have impacted all chemistry courses offered by the department. All faculty members in the department maintain web sites. On their respective web sites are course syllabi, class notes, semester assignments/quizzes, specific course instructions, and practice exams. Since the faculty members maintain their own web sites, the sites are frequently modified to include new material. Consequently, the communication between faculty members and students is excellent.

In an effort to reach and accommodate students that have scheduling conflicts for a number of personal reasons, the faculty members in the department have developed on-line courses, i.e. Survey of Chemistry I and II. However, only one of these courses is offered on-line each semester. For example, Survey of Chemistry I is offered as a traditional course during the fall semester; however, Survey of Chemistry II is offered as on-line course. In the spring semester Survey of Chemistry II is offered as a traditional course, but Survey of Chemistry I is offered as on-line course. Additionally, the instructor(s) provides a weekly one-hour tutorial session that meets in class for the students in the on-line courses. The faculty members in the department team-teach and/or alternate in teaching these on-line courses.

The department is well equipped with an adequate number of computers for students to use and search the Internet. The department uses computers in various courses in a number of ways that directly affects students. Specifically, students are taught how to give "Power Point" presentations in the senior seminar courses. In several courses and the laboratory courses, students are instructed on the use of developing spreadsheets to perform various chemical and/or statistical calculations. Students prepare lab reports using word-processing. Additionally, students in advanced level courses are also taught how to perform complex chemical calculations using software that is designed for "hard-science" majors. Faculty members in the department are able to use the computers to construct molecules in three dimensions. Students gain a much clearer understanding of fundamental chemical concepts by having representative three-dimensional pictures of the object/molecule. Students are also instructed on how to conduct up-to-date literature searches on various chemical topics using the Internet and Galileo.

Lastly, computer simulated lab experiments are a part of the Principles of Chemistry I and II course material. In an effort to reduce the attrition rate at the introductory level, these activities were introduced to augment various topics discussed in the lecture component and to increase student comprehension. The simulations mimic actual lab activities and are reproducible so students are able to review the concepts and retain the meaning easier. Another advantage is that the activities do not require any chemical so there is no hazard. Yet the simulations mimic the actual experiment so closely that the students get a clear understanding of the dangers and problems that may occur. Feedback has been overwhelmingly positive from students who have performed the simulated experiments.

Examples of some of these simulations are as follows:

Crude Oil Distillation

Atomic Weight of Magnesium

Formula of a Hydrate

Reaction Between Cations and Anions

Hard Water

Gravimetric Analysis of Chloride

Specific Heat

Unknown Acid Base Titration

Redox Titration of Iron II)

Flame Test

Oxygen Production

C. Relevancy of the Program to Students

The department offers two undergraduate degrees, i.e. the Bachelor of Arts (B.A.) and the Bachelor of Science (B.S.). The Bachelor of Arts degree is for students interested in entering professional schools or occupations of an environmental nature. Specifically, the Bachelor of Arts degree program is designed for students interested in attending professional schools of medicine, dentistry or pharmacy, or in employment in fields such as education, business, sales, quality control and environmental occupations. The B. A. degree in chemistry requires satisfactory completion of courses in mathematics, physics, and biology, as well as in chemistry, in addition to the general requirements. These courses provide a broad foundation in the field and permit flexibility for evolving and changing student interests. A broad range of upper-level elective courses exists to expose students to modern fields within the chemical sciences and to help students broaden their college experience.

The Bachelor of Science degree is for students interested in entering the field of industrial chemistry or pursuing advanced study in chemistry or chemical engineering. Specifically, the Bachelor of Science degree program is designed for students who desire to enter the fields of industrial chemistry, chemical engineering, environmental chemistry, government research laboratories, or pursue graduate studies in chemistry. The BS in chemistry requires satisfactory completion of courses in mathematics, physics, and computer science, as well as in chemistry, in addition to the general requirements. These provide a broad foundation in the field and permit flexibility for evolving and changing student interests. A broad range of upper-level elective courses exists to expose students to modern fields within the chemical sciences and to help students broaden their college experience. Hence, faculty advisors work closely with each student to carefully plan and decide on their program of study.

Consequently, a vast majority of the graduates from the department obtain technical positions with local private chemical companies or they pursue studies to obtain a terminal degree in chemistry. To address the needs of these students, in 1998 the department introduced two additional elective courses, i.e. "Spectroscopic Identification of Organic Compounds" and "Spectroscopy and Photophysics" that will prepare the students to compete to an even greater degree. These courses are offered once a year and are team taught by the faculty in the department.

In an effort to make certain that students are fully prepared, students may participate in research under the guidance of a faculty member via two courses, "Senior Seminar" or "Selected Topics in Chemistry". These courses provide students with vital hands-on experience that students need to compete and succeed in the work force. Although these courses tend to be very time consuming for faculty members, they have proven to meet the needs of students, as well as the faculty. The students gain invaluable experience; meanwhile, the faculty remain current in their research and professional development. Students are also invited to attend regional and national scientific meetings of the American Chemical Society where leading scientists, as well as students, give formal presentations of their research. Students also attend the ACS job fair while in attendance at these conferences where they meet employers of various chemical companies and speak with recruiters from different graduate schools.

D. Importance of Students Thinking Across Disciplines

Chemistry is the center of life. It explores the nature of the materials that make up our physical environment, why they possess the different properties that characterize them, how their intimate structure may be understood, and how they may be manipulated and changed. Chemistry is the science that plays a major role in civilization and deals with composition, structure, and properties of matter and the changes that matter undergoes. Chemists are scientists who constantly seek answers to a variety of questions related to our lives; this includes medicine, foods, clothing, plastics, the environment...etc. In all of the chemistry courses students are expected to develop an understanding and have an appreciation for qualitative and quantitative interpretation of data as they relate to scientific problems, to be able to think independently, and to be able to apply skills and knowledge of chemistry to solve real world problems.

E. Frequency of Course Offerings

Below is a listing of the courses that are offered by the department. Since the department serves many other programs, the core curriculum courses are offered more frequently than major elective courses. Nearly all of the elective courses are offered at least once a year; however, these courses also depend on the number of students registered. Considering the number of students registering for the core curriculum courses, "Survey of Chemistry" and "Principles of Chemistry", at least one section of these are offered each semester.

COURSE	SEMESTER HOURS	FALL	SPRING
Survey of Chemistry 1 (CHEM 1151)	3	yes	yes
Survey of Chemistry Lab 1 (CHEM 1151)	1	yes	yes
Survey of Chemistry 2 (CHEM 1152)	3	yes	yes
Survey of Chemistry Lab 2 (CHEM 1152)	1	yes	yes
Principles of Chemistry 1 (CHEM 1211)	3	yes	yes
Principles of Chemistry Lab 1 (CHEM 1211)	1	yes	yes
Principles of Chemistry 2 (CHEM 1212)	3	no	yes
Principles of Chemistry Lab 2 (CHEM 1212)	1	no	yes
Quantitative Chemical Analysis (CHEM 2115)	3	yes	no
Quantitative Chemical Analysis Lab (CHEM 2315)	1	yes	no
Organic Chemistry 1 (CHEM 3111)	3	yes	no
Organic Chemistry Lab 1 (CHEM 3311)	1	yes	no
Organic Chemistry 2 (CHEM 3112)	3	no	yes
Organic Chemistry 2 Lab (CHEM 3312)	1	no	yes
Inorganic Chemistry (CHEM 3135)	3	yes	no
Inorganic Chemistry Lab (CHEM 3335)	1	yes	no
Biochemistry 1 (CHEM 3141)	3	yes	no
Biochemistry Lab 1 (CHEM 3345)	1	yes	no
Biochemistry 2 (CHEM 3142)	3	no	yes
Physical Chemistry 1 (CHEM 4111)	3	yes	no
Physical Chemistry 1 Lab (CHEM 4311)	1	yes	no
Physical Chemistry 2 (CHEM 4112)	3	no	yes
Physical Chemistry Lab 2 (CHEM 4312)	1	no	yes
Instru. Meth. of Chem. Anal. (CHEM 4175)	3	no	yes
Instru. Meth. of Chem. Anal. Lab (CHEM 4375)	2	no	yes
Senior Seminar 1 (CHEM 4795)	1	yes	no
Senior Seminar 2 (CHEM 4796)	1	no	Yes
Polymer Chemistry (CHEM 5105)	3	yes	no

COURSE	SEMESTER HOURS	FALL	SPRING
Spec. Ident. of Org. Compounds (CHEM 5115)	3	yes	no
Spectroscopy and Photo Physics (CHEM 5125)	3	no	yes
Selected Topics in Chemistry (CHEM 5555)	1 - 4	yes	yes
Environmental Organic Chemistry (CHEM 7165)	3	offered once	
Atmospheric Physics and Chemistry (CHEM 7175)	3	never offered	never offered
Aquatic Chemistry (CHEM 7185)	3	offered once	
Selected Topics in Environmental Chemistry (CHEM 7555)	1	yes	yes
Environmental Chemistry (ENVS 7115)	3	no	yes
Industrial Chemistry and Technology (CHEM 1105)	3	never offered	never offered

F. Service to General Education/Other Programs

The Department of Chemistry is vital to the general education at Columbus State University. Specifically, the program serves a number of programs in the College of Science, such as biology, geology, and nursing. The introductory courses, "Survey of Chemistry" and "Principles of Chemistry", are offered as electives in the general education program. Consequently, these courses normally have high enrollment and are offered each semester to satisfy student demands. The introductory courses are offered under AREA D for non-science disciplines.

The following table shows programs that require chemistry courses in various areas of their degrees.

PROGRAM	AREA							
	A	B	C	D	E	F	G	H
Biology (B.A. & B.S.)				X		X	X	
Chemistry (B.A. & B.S.)				X		X	X	X
Geology (B.S.)				X				
Computer Science (B.S.)				X				
Environmental Science (M.S.)	X	X						
Nursing (B.S.N)				X				
Mathematics (B.A. & B.S.)				X				
Psychology (B.A. & B.S.)				X				
Sociology (B.S.)				X				
Early Childhood Education (BSED)				X				
Middle Grades - Language Arts/Social Science (BSED)				X		X		
Middle Grades - Math/Science (BSED)				X		X		
Middle Grades Math/Science (BSED) (Biology/Chemistry)				X			X	
Middle Grades - Math/Science(BSED) (Geology)				X				
Sec. Sci. Ed. (Biology) (BSED)				X		X		
Sec. Sci. Ed. (Chemistry) (BSED)				X		X	X	
Sec. Sci. Ed. (Earth Science) (BSED)				X		X		
Non-sci. Sec. Education (BSED)				X				
MED Middle Grades Education			X					
MED Sec. Gen. Science Education		X						
EDS Middle Grades Education			X					
EDS Sec. Gen. Science Education		X						
College of Business (All degrees)				X				
College of Arts and Letters (All Degrees)				X				

G. Diversity, Multiculturalism, and International Perspectives

Although chemistry is highly mathematical, numerous scientists of diverse ethnicity have been important in its development. In all of the courses taught in the department, historical documentation is presented to show the importance and contribution of the many scientists. Not only are specific scientists noted in the documentation, but different cultures of certain time periods are discussed in order to explain the development of scientific concepts. Additionally, various cultures are also often discussed to explain how certain illnesses were treated and to illustrate how modern scientists have adopted and modified the treatment of the illnesses today. Many international environmental problems have chemical aspects. Among these are arsenic poisoning in Bangladesh, European acid rain, food supplies in Mauritania, global warming, and ozone depletion. Considering the global economy, the Bachelor of Arts degree requires six hours of instruction in a foreign language. By taking these courses, graduates from the department will be able to understand and communicate with international scientists.

4. Students

4. Students

The population of chemistry students shows diversity of students in terms of age, gender, and racial background. The table below shows the data for student diversity by gender, race and age since Fall 1996. It is clear that the percentage of females is very close to males; 64% are white and 42% of students are age 25 or higher.

YEAR	MALES	FEMALES	WHITE	BLACK	HISPANIC	ADULTS*	TOTAL
Fall 1996	17	17	26	6	1	20	34
Fall 1997	16	20	27	7	2	20	36
Fall 1998	25	13	26	6	1	16	38
Fall 1999	28	23	28	10	5	19	51
Fall 2000	18	14	16	7	4	5	32
Totals	104	87	123	36	13	80	191
%	54	46	64	19	7	42	-----

* = Adults is defined as students more than 25 years old.

International students representing several countries have graduated from the chemistry program at CSU. These countries are: Morocco, Saudi Arabia, Yugoslavia, Romania, Iran, Peru and Norway.

Over the years, the chemistry program has had a good relationship with industry in the area which has resulted in attraction of their adult employees to the program. The department has worked diligently to accommodate these employees and their work schedule. Many of these employees have graduated as chemists and returned to their companies to enjoy higher ranks.

Here are few examples of adult corporate employees who have graduated from CSU with a chemistry degree:

Douglas Burch	Callaway Chemicals-Columbus
Patrick Coyle	Callaway Chemicals-Columbus
Jerry Putnam	Callaway Chemicals-Columbus
Sunny Resch	Callaway Chemicals-Columbus
Masoud Arabi	Pratt & Whitney
Sam Khoury	Cott Beverage USA

Student's learning is met by two methods: conventional course methods and non-conventional, non-class methods such as senior research thesis. All seniors in chemistry are tested every year using a major Field Assessment Instrument (ETS). The table below shows the results of the ETS Test taken for the past six years. Every year, faculty thoroughly examine the results of the ETS test characterizing the strengths and weaknesses of the program. Adjustments to the curriculum are made in the following year according to the results of the ETS test. Accordingly, several elective courses were developed to enhance student's chemistry background, particularly in spectroscopy.

These newly developed elective courses are:

- Photophysics and Photochemistry
- Spectroscopic Identification of Organic Compounds
- Polymer Chemistry
- Environmental Chemistry

The results of the Major Field Assessment Test are mixed between + 1.4% above the national norm to -11% below the national norm. This mix is a result of several factors. Among them are: the

sampling size is statistically too small to measure and the faculty also feel that a lack of upper level electives leads to low scores.

An estimate of student success can also drawn from employment of graduates. More than 95% of our graduates are in the work force and in graduate programs.

Major Field Assessment (ETS) Results

YEAR	STUDENTS' NAME	TOTAL SCORE	PHYSICAL SCORE	ORGANIC SCORE	INORGANIC SCORE	ANALYTICAL SCORE
1995		128				
		153				
		158				
		160				
	Average Dept. for 1995	149 (+1.4%)				
1995	National	147				
1997		151	30	49	58	55
		131	32	33	26	45
		136	56	20	43	45
		144	42	43	43	48
		146	60	20	54	58
	Average Dept. 1997	140 (-5.4%)	44	33	44	50
1997	National	148	37	43	46	47
1998		126	28	39	20	29
		143	39	46	58	36
		128	28	30	33	39
		131	42	30	29	32
		128	28	20	43	42
	Average Dept. 1998	131 (-11%)	33	33	37	36
1998	National	147	49	45	49	49
2000		131	46	27	26	42
		123	25	33	29	26
		129	28	33	43	29
		144	39	43	50	45
		139	42	43	47	32
		137	42	30	36	58
		133	32	30	43	42
		144	63	33	50	32
	Average Dept. 2000	133 (-9.5%)	44	30	41	38
2000	National	145	45	43	43	48

5. Faculty

5. Faculty

All chemistry faculty members have obtained PhD's and have published in the following disciplines:

Zeki Al-Saigh, Ph.D. University of Birmingham, England - Physical Chemistry

Steven Buckner, Ph.D. Purdue University - Analytical and Instrumental Chemistry.

Floyd Jackson, Ph.D. Howard University - Inorganic Chemistry

Charles Lovelette, Ph.D. Rensselaer Polytechnic Institute - Organic Chemistry

The courses being taught in the Fall of 2001 and projected for the Spring of 2002, as well as the chemistry faculty responsible for them, are listed below. The broad range of training and expertise is sufficiently adequate to cover the major sub-disciplines associated with a BS or BA degree. Introductory courses for both chemistry majors and students fulfilling a science requirement encounter each member of the faculty.

Introductory Courses Current Semester

Allen: Chem 1151L Survey of Chemistry Lab I- 4 sections; Chem 1152L Survey of Chemistry II Lab

Al-Saigh: Chem 1151, Survey of Chemistry I; Chem 1211L Principles Lab

Buckner: Chem 1152 Web-based Survey of Chemistry II, Chem 1151 Survey of Chemistry, Chem 1211L Principles Lab.

Jackson: Chem 1211 Principles of Chemistry I; Chem 1211L Principles Lab

Advanced Courses Current Semester (2XXX and above)

Al-Saigh: Chem 4111 Physical Chemistry; Chem 4311 Physical Chemistry Lab; Chem 4795 Senior Seminar I; Chem 4899 Special Problems in Chemistry

Buckner: Chem 2115 Quantitative Analysis; Chem 2315 Analysis Lab; Chem 4899 Special Problems

Jackson: Chem 3135 Inorganic Chemistry; Chem 3335 Inorganic Lab; Chem 4899 Special Problems

Lovelette: Chem 3111 Organic Chemistry; Chem 3311 Organic Lab(2 sections); Chem 3141 Biochemistry; Chem 4899 Special Problems.

Al-Saigh, Buckner, Jackson, and Lovelette: Chem 5115U/G Spectroscopic Identification Organic Molecules, team-taught.

Introductory Courses Spring Semester:

Allen: Chem 1151L Survey I Lab; Chem 1152L Survey II Lab; four sections.

Al- Saigh: Chem 1211 Principles of Chemistry I; Chem 1211L Lab

Buckner: Chem 1211 Lab

Jackson: Chem 1212 Principles II; Chem 1212 Lab

Lovelette: Chem 1152 Survey of Chemistry

Sharma: Chem 1151 Survey of Chemistry 1

Advanced Courses Spring Semester:

Al- Saigh: Chem 4112 Physical Chemistry 2; Chem 4312 Physical Chemistry Lab; Chem 4796 Senior Seminar; Chem 4899 Special Problems

Buckner: Chem 4175 Instrumental Methods; Chem 4375 Instrumental Lab; Chem 4899 Special Problems; Chem 5555U Environmental Chemistry.

Jackson: Chem 4899 Special Problems

Lovelette: Chem 3112 Organic 2; Chem 3312 Organic Lab; Chem 4899 Special Problems

Faculty Responsibilities Summarized

Dr. Zeki Al-Saigh

Dr. Al- Saigh has responsibility for Chem 4111, Physical Chemistry lecture and Chem 4311, the laboratory portion of the course. In addition, Dr. Al-Saigh has responsibility for Chem 4795, Senior Seminar. The other faculty who are responsible for individual student projects assists him. Finally, Dr. Al-Saigh contributes to a team-taught course, Chem 5115U/G, Spectrometric Identification of Organic Molecules. He is responsible for UV-Vis and Fluorescence Spectroscopy. The physical chemistry lecture and lab as well as senior seminar courses are continued into the spring semester. One should note in each semester Dr. Al-Saigh is associated with an introductory course in each semester as well.

Dr. Steven Buckner

Dr. Buckner has responsibility for Chem 2115, Quantitative Analysis lecture and Chem 2315, laboratory. In the spring semester he has responsibility for Chem 4175, Instrumental Analysis, Chem 4375, Instrumental Lab, and Chem 5555, Envs 7115, Environmental Chemistry. This year he is responsible for one section of Chem 1151 lecture as well as the above mentioned web-course of the second semester of the course. He has taught a variety of physics courses including algebra-based physics(both semesters). He has participated in the design and teaching of a lower level physics course known as "The Physics of Color and Sound". He has been actively involved in senior research projects. Dr. Buckner participates in the team-taught Chem 5115 U and G. His responsibility involves Mass Spectroscopy. He also teaches Chem 5125, Spectroscopy and Photophysics. A complete listing of all courses taught by Dr. Buckner past and present follows:

Courses taught (ug - undergraduate, gr - graduate):

All courses taught with associated lab except where noted with *
Survey of Chemistry 1 and 2 (CHEM 1151 and CHEM 1152, ug)
General Chemistry 1 and 2 (CHEM 1211 and CHEM 1212, ug)
Introductory Physics 1 and 2 (PHYS 1111 and PHYS 1112, ug)
Physics of Color and Sound (PHYS 1125, ug)
Quantitative Analysis (CHEM 2115, ug)
Advanced Analytical Chemistry (CHEM 309, ug)
Instrumental Analysis (CHEM 4175, ug)

Physical Chemistry for Life Sciences (CHEM 307, ug)
 Spectroscopic Identification of Organic Compounds (CHEM 5115, ug/gr, team taught)
 Spectroscopy and Photophysics (CHEM 5125, ug/gr, team taught)
 Undergraduate Seminar (CHEM 491-493, ug)
 Environmental Chemistry (ENVS 7115, ug and gr)

Dr. Floyd Jackson

Dr. Jackson has responsibility for Chem 3135, Inorganic Chemistry and Chem 3335, Laboratory. In addition, he is responsible for Chem 1211, Principles of Chemistry lecture and one section of 1211L, the associated laboratory. The lecture section of this course has over 100 students. Dr. Jackson continues with the second semester of the Principles course and a section of the Survey Course. Dr. Jackson as well, has involved a number of students in research projects. Dr. Jackson participates in the team-taught Chem 5115U and G. His responsibility involves Infrared Spectroscopy. A complete listing of all courses taught by Dr. Jackson is listed below:

Course	Name	Hours
Quarter System		
CHE 112	Basic Chemistry (Organic) II	4
CHE 121c	General Chemistry I	3
CHE 121L	General Chemistry Lab I 1	
CHE 122c	General Chemistry II	4
CHE 122L	General Chemistry Lab II 1	
CHE 308	Inorganic Chemistry	4
CHE 308L	Inorganic Chemistry Lab 1	
CHE 499	Special Problems in Chemistry	5
Semester System		
CHEM 1151	Survey of Chemistry I	3
CHEM 1152	Survey of Chemistry II 3	
CHEM 1211	Principles of Chemistry I 3	
CHEM 1211H	Principles of Chemistry I (Honors)	3
CHEM 1211L	Principles of Chemistry I 1	
CHEM 1212	Principles of Chemistry II 3	
CHEM 1212L	General Chemistry II Lab 1	
CHEM 3135	Inorganic Chemistry	3
CHEM 3335L	Inorganic Chemistry Lab 1	
CHEM 5115U	Spectro Ident/Organic Compounds	3
CHEM 5115G	Spectro Ident/Organic Compounds	3
CHEM 5125U	Spectroscopy and Photophysics	3
CHEM 4899	Special Problems in Chemistry	1

Dr. Charles Lovelette

Dr. Lovelette has responsibility for Chem 3111 Organic lecture and Chem 3311 Lab. In addition, he is responsible for Chem 3141, Biochemistry. In the spring semester, he continues with the Organic lecture and laboratory and has responsibility for Chem 1152 ,Survey of Chemistry(organic/biochemistry). Dr. Lovelette participates in the team-taught Chem 5115U and G. His responsibility involves NMR spectroscopy. Courses taught, in addition to those described above, are listed below:

Chem 1151 Survey of Chemistry I; web-based Survey I
 Chem 1211Principles of Chemistry I; Chem 1121L Laboratory
 Chem 3345 Biochemistry Lab

Chem 7165 Environmental Organic Chemistry
Chem 7185 Aquatic Chemistry

Faculty Specialization/Area of Expertise/ Research/Teaching

Dr. Steven Buckner

Area of Specialization, Analytical Chemistry with emphasis on development of optical diagnostics for fuels and combusting environments, fluorescence spectroscopy, mass spectrometry.

Grants in support: Air Force Office of Scientific Research; Development of Fluorescence-Based Chemical Sensors for Measurement of Temperature and Analysis of Dissolved Oxygen in Jet Fuels. (\$35,000, 1995); National Science Foundation, Utilization of GC/MS in the Undergraduate Curriculum.(\$60,000, 1995-97); Columbus State University; Development of Web-based Physics of Color and Sound;(\$2,000, 1999-2000); National Research Council; Development and Application of a diode-Pumped Doubly Resonant Optical Parametric Oscillator for High Resolution Spectroscopic Applications;(\$25,000,2001).

Teaching (activities other than described above); Web course design, development and delivery (Survey of Chemistry 1, and 2); Development of the course Physics of Color and Sound; Member of the American Chemical Society analytical Standardized Examination Committee (Exams for the years 1994-2000 and 2001-2100).

Dr. Floyd Jackson

Inorganic and General: Area of Specialization: Physical inorganic chemistry of transition metal complexes; bioinorganic chemistry of selected first row transition metals such as zinc and nickel; X-ray structure determination; polymer-metal/composite bond interactions using surface-sensitive analytical methods. Please refer to Dr. Jackson's vita for current citations.

Teaching (activities other than described above) University System of Georgia Teaching and Learning Grant (\$10,000); NOVA Planning Grant (\$30,000), Hampton University. Dr Jackson has been involved in a variety of web-based supplementation activities associated with the courses for which he has responsibility.

Dr. Mae E. Allen

Laboratory Coordinator/Instructor for Chem 1151 and 1152 Labs. Area of Specialization: Clinical Chemistry, Immunochemistry; Research Interests in Quality Assurance-Clinical Laboratories.

Dr. Zeki Al-Saigh

Dr. Al-Saigh has been extremely active in the development of a novel surface characterization technique known as inverse gas chromatography. He is regarded by his peers as an expert in this area and has a substantial contribution to the literature in this field. He has been awarded numerous travel grants from the university to report on his work. In addition, Dr. Al-Saigh is responsible for the physical chemistry portion of the curriculum as well as the Senior Projects course. In addition, he has active research interests in the quantification of polycyclic aromatic hydrocarbons (PAH'S) in air, water and soil. The following table compiles the Faculty Development Grant monies awarded to Dr. Al-Saigh and their origins.

DATE	AGENCY	AMOUNT	FIELD	STATUS
5-12-92	CC Faculty Development	\$881	Presentation	Funded
11-20-92	CC Faculty Development	\$885	Attend Conference	Funded
2-9-93	CC Faculty Development	\$476	Presentation	Funded
11-23-93	CC Faculty Development	\$1,010	Presentation	Funded
Fall 1995	NSF, ILI Program	\$60,000	Purchasing	Funded
August 1995	Columbus College	\$300	Travel to the ACS meeting in Chicago	Funded
December 1995	Columbus College	\$1,250	Presentation at the Pacifichem International Congress, Honolulu, HI	Funded
Fall 1996	CSU Mini-grant	\$2,200	Support travel to Japan for a meeting	Not funded
Fall 1997	NSF	\$55,000	Purchase of HPLC	Not funded
Fall 1997	CSU Mini-grant	\$1,200	Travel to Las Vegas and Cancun meetings	Funded
March 21-26, 1999	CSU Mini-grant	\$550	ACS National Meeting, Anaheim, CA	Funded
May 1999	CSU Mini-grant	\$386.80	Sixth European Conference on Polymer Blends, Mainz, Germany	Funded
December 2000	CSU Mini-grant	\$200	Attend the Pacifichem 2000, Hawaii	Funded
September 2001	CSU Mini-grant	\$850	Attend the International IGC Conference, London, England	Approved

Dr. Charles Lovelette

Dr. Lovelette has research interests that involve the synthesis and characterization of novel nitrogen heterocycles for evaluation as potential antineoplastic agents. He has involved three undergraduate students in the recent past. In addition, Dr. Lovelette has been involved in environmental research which focuses upon the effects of heavy metal toxins such as lead and cadmium on physiological processes in common turtles, crayfish, and gram positive and negative bacteria. One student has received his Masters of Environmental Sciences degree under the direction of Dr. Lovelette. Dr Lovelette and Al- Saigh were successful in obtaining an NSF grant for the acquisition of an atomic absorption spectrophotometer, Dr. Lovelette was awarded a matching grant for the acquisition of a microphysiometer which has been employed in research evaluating the role of toxic metals upon cellular transport mechanisms. Dr. Lovelette is responsible for teaching organic and biochemistry at the introductory and advanced levels.

6. Facilities

6. Facilities

Space in LeNoir Hall currently assigned to the Chemistry program includes the following:

ROOM	FUNCTION
103	Research lab, IGC, Fluorescence, HPLC
106B	Time-resolved Spectroscopy
205	Physical chemistry lab
205A	Spectroscopy lab (IR/UV)
206	Research lab
206A	GC/MS; atomic absorption (AA)
207B	AA
208	X-ray diffraction
209	Analytical laboratory
210	Office
305	Research lab
305A	Cold room
306/310/310A	Organic chemistry lab/prep room
307	Survey of chemistry 1, 2 lab
308	Stockroom
309	Principles of chemistry lab
311	Office
312	Office
313	Office
309A	Balance room

Teaching Laboratory Space

We have experienced a sustained increase in our laboratory enrollment with respect to our introductory courses, Chem 1211/12 and 1151/52. The average size of our introductory lab sections is 35 students. The normal staffing situation is one faculty and one teaching assistant. This increase has stressed our faculty. Recent increases in the numbers of students taking advanced courses, in particular, organic chemistry and the attendant lab has added to the overall staffing situation. It was envisioned that offering the Survey of Chemistry sequence as web-based courses in addition to the traditional offering, would lessen the stress. However, this has not been as successful as anticipated. Research laboratory space is adequate at the present time and our faculty residing in 311 and 312 have small research laboratories as part of their office. The building housing the department, LeNoir Science Hall, is relatively new and represents a pleasant place to work and study.

Equipment

While the chemistry group has accumulated a substantial amount of modern scientific instrumentation: AA; GC; GC/MS; HPLC; IR; UV-VIS; Fluorescence (time-resolved and steady state); we have encountered some problems associated with the maintenance of the same. In past years we enjoyed the utilization of an NSF-funded program for instrument repair managed by our sister institution Georgia Tech. Approximately 5 years ago, this grant was terminated and our maintenance problems have increased. We have had opportunities to support local manufacturing facilities in accomplishing a variety of standard analyses but could not take on the responsibility. In effect, we could financially support our instrumentation maintenance and bring in some cash-flow to the department for student research. When functional, we incorporate instrumentation in all of our laboratory courses including introductory courses.

LeNoir Science Hall is equipped with 25 modern computers all connected to the institutional LAN. Students enrolled in the introductory courses are encouraged to make substantial use of the facility to

include data processing, laboratory report preparation and in many cases statistical analysis of experimental data. In addition, many courses have web-based supplementation which is readily accessible through this facility. Faculty are equipped with modern computers and have ready access to the information base available via the world -wide web.

Library Facilities

Faculty and students have access to a wide variety of on-line services related to current scientific literature. These services include: General Science Abstracts, Cambridge Life Sciences Collection, Current Contents, Ingenta and Environmental Abstracts. Students and Faculty have access to these databases from their offices and from any on-campus cluster. In addition, it is possible for students and faculty to connect to the University LAN and access this substantial source of current information. This service, called GALILEO, operates on a state-wide basis. In addition the library offers a rapid interlibrary loan system in conjunction with GALILEO, affording access to the scientific literature in a matter of a few days. Also, this system has provisions for the interlibrary loan of books. The department has access to Chemical Abstracts literature search schemes; however, this service is restricted to time periods when on-line rates are substantially reduced. A Chem Abstract search can be accomplished overnight. This short delay has not had a negative impact upon any research project. The library maintains a modest collection of current journals, in particular Science and Nature. However, the library collection of current journals is inadequate for our current faculty and represents an area for improvement.

Additional Infrastructure Support

The Computer Information and Networking Service has provided faculty the opportunity to construct web-based instructional support for both introductory and advanced courses. Faculty receive full support in the development and construction of web pages that supplement current coursework. Many of our introductory and advanced courses have such supplementation. Faculty are kept updated regarding new developments in web-based instruction.

7. Research and Scholarship

7. Research and Scholarship

All of the faculty members in chemistry heavily involve undergraduate chemistry majors in their research programs. We also periodically direct graduate students from the Environmental Science program.

Every graduating senior in chemistry is required to take a course entitled "Senior Seminar". This is a one-year course (two units per semester). The students choose a research mentor and they spend the entire year working with the faculty member on a mutually agreeable research problem. Generally, this problem is part of the research mentor's larger research program. The students begin with an appropriate literature survey and training in special techniques necessary for their work. During the laboratory phase they plan experiments, perform laboratory work, analyze data, and draw conclusions. They present two seminars to the entire department during the year, one at the end of each semester. The first gives a summary of their problem, results from the literature survey, and a progress report on their work. The second seminar is a summation of their year's experience. The students prepare a senior thesis and deliver it to the department prior to graduation. As noted in the Major Field Assessment Matrices in Appendix A, these activities support the University mission to educate students to think critically, communicate effectively, and be technologically literate.

The faculty research programs have a two-fold relationship to our Department's mission. The first important factor is that research experience is an absolutely essential tool for training any modern scientist. The research experience allows students to see first hand how the scientific method is applied, how research is conducted, and the problems and realities of scientific research. We often take students to scientific meetings where the results of our research are presented. The students have a chance (usually their first) to meet a broader cross-section of the scientific community. The second critical reason for maintaining research programs within the Chemistry program is that it allows individual faculty members to keep sharp in their discipline. When faculty keep abreast of their discipline the students benefit greatly. When faculty are involved in research they are much more prone to present recent developments and cutting-edge research as examples in the context of their lectures.

Faculty development in a broader context takes place on many levels. Along with maintaining active research programs the faculty pursue professional development through three primary activities: mentoring, collaborations, and workshops. When new faculty members enter the department a more senior faculty member is assigned to help wherever possible. They will visit lectures to give feedback on classroom teaching, they help in writing proposals and locating funding sources, and provide other input as needed. The faculty also maintain collaborations with other institutions as a means of broadening their experience. Since the University has not provided any support for sabbatical leave programs we have sought alternative venues for developing relationships and renewing ourselves. We have obtained support for summer research and leave programs (including National Research Council and Air Force Office of Scientific Research funding) and have actively sought collaborations with other researchers to fill this void. Finally, all of the faculty attend workshops whenever possible to keep abreast of new developments in teaching, instrumentation, and technology.

Faculty Publications, Presentations at Professional Conferences, and Students Directed in Undergraduate Research (along with their current affiliation)

Zeki Y. Al-Saigh (Ph.D., Physical Chemistry, Professor)

Publications:

1. Al-Ghamdi and Al-Saigh, Characterization of Conducting Polymers, **IGC Proceedings**
2. Al-Ghamdi and Al-Saigh, Characterization of Environmental Polymers, **IGC Proceedings**, (2001) In Press
3. Al-Saigh, Z. Y., Inverse Gas Chromatography, Chapter in "Modern Methods of Polymer Separation" Edited by H. G. Barth and J. W. Mays, John Wiley & Sons, Inc., New York, (2001), In Press.
4. Al-Ghamdi, A. and Al-Saigh, Z. Y., Characterization of Conducting Polymers by Inverse Gas Chromatography. I. Polyaniline Emeraldine Base, **Polymer**, (2001), Submitted.
5. Al-Ghamdi, A. And Al-Saigh, Z. Y., Miscibility and Surface Characterization of a Poly(Vinylidene Fluoride) - Poly(Vinyl Methyl ketone) Blend by Inverse gas Chromatography, **J. Of Polymer Science, Part B: Polymer Physics**, **B38**, 1155 (2000).
6. Al-Saigh, Z. Y. and Guillet, J., in "Inverse Gas Chromatography in Analysis of Polymers and Rubbers", Invited Chapter. **Encyclopedia of Analytical Chemistry: Instrumentation and Applications**, R. Meyers, Editor, PP. 7759-7792, John Wiley & Sons Ltd, Chichester, (2000).
7. Al-Saigh, Z. Y., Inverse Gas Chromatography as an Alternative Method for Polymer Characterization and Analysis, **Abstracts of Papers of The American Chemical Society**, (1999), **217**, 99-Cell.
8. Al-Saigh, Z. Y., Inverse Gas Chromatographic Characterization of Polyethylene Oxide Chromatography, **POLYMER**, (1999), **40**, 3479.
9. Al-Saigh, Z. Y., Invited Review: "Trends in The Inverse Gas Chromatographic Characterization of Polymer Blends", **Trends in Polymer Science**, (1997), **5**, 97.
10. Al-Saigh, Z. Y., Invited Review: Inverse Gas Chromatography for The Characterization of Polymer Blends, **International Journal for Polymer Analysis and Characterization**, (1997), **3**, 249-291.
11. Al-Saigh, Z. Y., Characterization of Poly(vinyl methyl ketone) Using the Inverse gas Chromatography Method, **Polymer International**, (1996), **40**, 25.
12. Al-Saigh, Z. Y., Invited Review: "Recent Advances in The Characterization of Polymers and Polymer Blends Using the Inverse Gas Chromatography Method", **POLYMERNEWS**, (1994) **19**, 271.
13. Al-Saigh, Z. Y., Characterization of Polycyclic Aromatic Hydrocarbons Using the Anomalous Fluorescence Method, Paper Submitted to The 23rd International Symposium on Environmental Analytical Chemistry, Jekyll Island, GA, June 14, 1993.
14. Al-Saigh, Z. Y., Inverse Gas Chromatography as an Alternative Method for Polymer Characterization, **Polymer Preprints**, (1992), **33**, 367.

15. Al-Saigh, Z. Y., Thermodynamics of Poly(Ethyl Methacrylate)- Solvent Systems using Inverse Gas Chromatography, II, **Polymer**, (1991), **32**, 459.
16. Chen, C. T., and Al-Saigh, Z. Y., Characterization of Semicrystalline Polymers by IGC II: A Blend of Poly(Vinylidene Fluoride) and Poly(Methyl Methacrylate), **Macromolecules**, (1991), **24**, 3788.
17. Chen, C. T., and Al-Saigh, Z. Y., Melting Point Depression of Poly(Vinylidene Fluoride) and Poly(Ethyl Methacrylate) Blend by Inverse Gas Chromatography: An Indication of the Blend Miscibility, **Polymer Preprints**, (1990), **31**, 586. Presented to the ACS National Meeting, Boston, April, 1990.
18. Chen, C. T., and Al-Saigh, Z. Y., Melting Point Depression of Poly(Vinylidene Fluoride) and Poly(Ethyl Methacrylate) Blend by Inverse Gas Chromatography, International Conference on Polymer Analysis and Characterization Proceedings, (1990), pp. **A-44**, Brno, CZ.
19. Chen, C. T., and Al-Saigh, Z. Y., Characterization of Poly(Ethyl Methacrylate) by Inverse Gas Chromatography, **Polymer**, (1990), **31**, 1170.
20. Chen, C. T., and Al-Saigh, Z. Y., Thermodynamics of Poly(Ethyl Methacrylate)-Solvent System by Inverse Gas Chromatography International Conference on Polymer Analysis and Characterization, Austin, TX, April 6, 1989.
21. Chen, C. T., and Al-Saigh, Z. Y., Characterization of Semi-crystalline Polymers by IGC I: Poly(Vinylidene Fluoride), **Macromolecules**, (1989), **22**, 2974.
22. Chen, C. T., and Z. Y. Al-Saigh. Characterization of Semi-crystalline Polymers by Inverse Gas Chromatography, **Polymer Preprints**, (1989), **30**, 166. Presented to the ACS National Meeting, Dallas, TX, April 9, 1989.
23. Anderson, A. B., Z. Y. Al-Saigh, and W. K. Hall. Hydrogen on MoS₂. Theory of its Heterolytic and Homolytic Chemisorption, **J. Phys. Chem.**, (1989), **92**, 803.
24. Munk, P., T. W. Card, P. Hattam, M. J. El-Hibri, and Z. Y. Al-Saigh. Inverse Gas Chromatography V: The Diffusion Phenomena on the Column, **Macromolecules**, (1987), **20**, 1278.
25. Al-Saigh, Z. Y. Characterization of Polymers and Polymer Blends Using the Inverse Gas Chromatography Method. Paper presented to the 31 Annual Pentasectional ACS meeting, Lawton, OK., April 19, 1986.
26. Card, T. W., Z. Y. Al-Saigh, and P. Munk. Inverse Gas Chromatography II: The Role of Solid Support, **Macromolecules**, (1985), **18**, 1030.
27. Munk, P., Z. Y. Al-Saigh, and T. W. Card. Inverse Gas Chromatography III: Dependence of Retention Volume on the Amount of Probe Injected, **Macromolecules**, (1985), **18**, 2196.
28. Plummer, B. F., Z. Y. Al-Saigh, and M. Arfan. Synthesis of Aceanthrene, **J. of Organic Chemistry**, (1984), **49**, 2069.
29. Al-Saigh, Z. Y., Physical Chemistry Textbook, by Alberty, Arabic Edition, John Wiley & Sons, Publishers.

30. Card, T. W., Z. Y. Al-Saigh, and P. Munk. Inverse Gas Chromatography: Diffusion in the Bubble Flow Meter, **J. of Chromatography**, (1984), **301**, 261.
31. Al-Saigh, Z. Y. and P. Munk, Study of Polymer-Polymer Interaction Coefficients in Polymer Blends Using Inverse Gas Chromatography, **Macromolecules**, (1984), **17**, 803.
32. Al-Saigh, Z. Y. and J. R. Majer, Dual Fluorescence of Trifluorobromoacetone in the Gas Phase, **J. Physical Chemistry**, (1984), **88**, 1157.
33. Plummer, B. F., Z. Y. Al-Saigh, and M. Arfan, Anomalous Fluorescence of Aceanthrylene, **Chemical Physics Letters**, (1984), **104**, 389.
34. Plummer, B. F. and Z. Y. Al-Saigh, Electronic Excited States and Anomalous Fluorescence of Cyclopenta (c,d) Pyrene, **J. Physical Chemistry**, (1983), **87**, 1579.
35. Plummer, B. F. and Z. Y. Al-Saigh. Anomalous Fluorescence and Low-Temperature Absorption Spectra of Naphtho (1,8-cd) (1, 2, 6) Thiadiazine and its Derivatives, **Chemical Physics Letters**, (1982), **91**, 427.
36. Al-Hamadany, R., K. A. Abdulla, A. Abdul-Rahman, and Z. Y. Al-Saigh. Preparation and Light-Induced Reactions of Substituted 1,4-Benzoquinone, **J. of Praktische Chemie**, (1982), **324**, 498.
37. Benzit, S., Z. Y. Al-Saigh, and G. R. Dobson. Solid State Structure and Reactivity of Metal Carbonyl Complexes, **J. Coordination Chem.**, (1981), **11**, 159.
38. Ali, A. M. J. and Z. Y. Al-Saigh. Photodecomposition of Azobenzenes, **J. of Chem. Tech. and Biotech.**, (1980), **30**, 440.
39. Akrawi, B. and Z. Y. Al-Saigh. Fluorescence of Perfluorophenyl Chloride in Liquid Phase, **Indian J. of Chem.**, (1980), **19A**, 408.
40. Ali, A. M. J. and Z. Y. Al-Saigh. Photochemistry of Pentafluoriodobenzene, **J. of Science and Education**, (1979), **1**, 67.
41. Ali, A. M. J. and Z. Y. Al-Saigh. Absorption and Photoisomerization of Azobenzenes, **Indian J. Chem.**, (1978), **16**, 910.
42. Rahman, A. Abdul and Z. Y. Al-Saigh. Fluorescence of Acetyl Quinone. Paper presented to the 26th IUPAC Congress, Tokyo, Japan (1977) and published in its journal.
43. Akrawi, B. A. and Z. Y. Al-Saigh. Polarographic Behavior of Transdecafluoroazobenzene, **J. Iraqi Chem. Soc.**, (1977), **2**, 85.
44. Ali, A. M. J. and Z. Y. Al-Saigh. Fluorescence of Perfluoroacetic Anhydride in the Gas Phase, **J. Iraqi Chem. Soc.**, (1977), **2**, 97.
45. Majer, J. R. and Z. Y. Al-Saigh. Reactions of Chlorodifluoro Methyl Radicals, **J. of Fluorine Chemistry**, (1977), **10**, 565.
46. Majer, J. R., J. C. Robb, and Z. Y. Al-Saigh. Photochemistry of 1, 1, 1-Trifluoro, 3-Bromoacetone, **Trans. Farad. Soc.**, (1976), **72**, 1697.
47. Al-Saigh, Z. Y. and J. R. Majer. Hydrogen Abstraction Reaction from Fluorinated Aliphatic Acids, **J. of Fluorine Chem.**, (1976), **7**, 589.

48. Harhas, A. H., A. I. Kashab, and Z. Y. Al-Saigh. Behavior of 4-Cinnamylidene 5 (4H) oxazolones toward Grignard Reagents, **Indian J. Chem.**, (1972), **10**, 41.

Presentations

26th IUPAC Congress, Tokyo, Japan - 1977; paper on Fluorescence of Acetyl Quinone

31st Annual Pentasectional ACS Meeting, Lawton, OK, April 19, 1986, paper on "Characterization of Polymers and Polymer Blends Using the Inverse Gas Chromatography Method"

197th ACS National Meeting, Dallas, TX, April 1989; paper on semicrystalline polymers

Second International Symposium on Polymer Analysis and Characterization, Austin, TX, April 7, 1989; paper on characterization of poly(ethyl methacrylate)

199th ACS National Meeting, Boston, MA, April 1990; paper on melting point depression of polymer mixture

Third International Conference on Polymer Analysis and Characterization, Brno, Czechoslovakia, July 1990; paper on Melting Point Depression of Poly(vinylidene Fluoride) and Poly(Ethyl Methacrylate)

204th ACS National Meeting, Washington, D.C., August, 1992, presented a paper for the polymer section, paper on "Characterization of Semi-crystalline Polymers by Inverse Gas Chromatography"

23rd International Symposium on Environmental Analytical Chemistry Meeting, Jekyll Island, GA, June 1993, paper on "Nanosecond Spectroscopy of Polycyclic Aromatic Hydrocarbons".

5th Chemical Congress of North America, Cancun, Mexico, Nov. 11-15, 1997, paper on "Surface Characterization of Polymers".

217th ACS National meeting, Anaheim, CA, March, 1999, paper on Inverse Gas Chromatography as an alternative Method for Polymer Characterization

1st International Conference on Inverse gas chromatography, London, Sept. 17, 2001. Two papers on the Characterization of Conducting and Environmental Polymers

6th European Conference on Polymer Blends, Mainz, Germany, May, 1999, paper on "Surface Characterization of Polymer Blends".

Students Directed

Winter and spring 1991: Dae Sung Lee working on polymer Characterization

Fall 1991: Mike Haithcock working on Polymer Characterization.

Fall 1991: David Lee working on polymer characterization

Spring 1995: Two students; Billy Flowers and Kelly Malone, working on polymer characterization.

Summer 1995: Billy Flowers, working on his own research in electrochemistry.

Fall 1995: Sam Khoury, working on the characterization of conducting polymers.

Winter 1996/1997: Sam Khoury, working on the characterization of conducting polymers.

Fall 1997/1998: Angela Guthrie, working on the Characterization of Polymers.

Fall 1997/1998: Michelle Mitchell working on computer interfacing.

Fall 1998/1999: Jack Howard working on Environmental Chemistry.

Fall 1998/1999: Christina Nescu working on conducting polymers.

Fall 1999/2000: Candence Herring Working on conducting polymers.

Fall 1999/2000: Eyasu Altaye working on environmental polymers.

Fall 1999/2000: A post-doctoral Fellow in the form of Sabbatical Leave, Dr. Ali Al-Ghamdi working on the Characterization of Environmentally Friendly Polymers

Fall 2000/2001: Tien Ngugen Working on Characterization of Conducting polymers.

Fall 2001/2002: Currently a Graduate a student Mohammed Al-Melibari working on the Characterization of Environmentally Friendly polymers.

Steven W. Buckner (Ph.D., Analytical Chemistry; Associate Professor)

Patents

"Optical Method for Quantitating Dissolved Molecular Oxygen in Fuel"; Gord, J.R.; Buckner, S.W.; Weaver, W.L.; Grinstead, K.D., U.S. Patent 5,919,710.

Publications

32. Buckner, S.W.; Forlines, R.A.; Gord, J.R.; "Fluorescence Exciplex Lifetime Thermometry", Appl. Spec., **53**, 115 (1999).
31. Buckner, S.W.; Pope, R.M.; "C-H Bond Activation Versus Ring Cleavage in the Gas Phase Reactions of Nb⁺ and Ta⁺ with Toluene and Picoline", Int. J. Mass Spectrom., **182**, 197 (1999). (**Ben Freiser Memorial Issue**).
30. Cooper, B.T.; Buckner, S.W.; "Relaxation of Vibrationally Excited Gas Phase Cr(CO)₅", J. Am. Soc. Mass Spectrom., **10**, 950 (1999). (**invited article**).
29. Cooper, B.T.; Parent, D.L.; Buckner, S.W.; "Oxidation Reactions and Photochemistry of Aluminum Cluster Anions (Al_n⁻, n = 1 - 23)", Chem. Phys. Lett., **401**, 284 (1998).
28. Cooper, B.T.; Johnson, J.A.; Buckner, S.W.; "Photodissociation and Photoinduced Electron Transfer involving Gas Phase Dinuclear Metal Carbonyl Complexes", Inorg. Chem., **34**, 5375 (1995)
27. Gord, J.R.; Buckner, S.W.; Weaver, W.L.; "Dissolved Oxygen Quantitation in Fuel Through Measurements of Dynamically Quenched Fluorescence Lifetimes", *Proceedings of the International Congress on Instrumentation in Aerospace Simulations Facilities*, 39.1-39.1 (1995)
26. Pope, R.M.; Buckner, S.W.; "Activation of Aromatic Ring Systems by Early Transition Metal Ions. Implications for the Metal-Catalyzed [2+2+2] Cycloaddition of Alkynes and Nitriles.", Org. Mass Spec., **28**, 1616 (1993). (**invited article for 25th Anniversary Issue**)
25. Cooper, B.T.; Buckner, S.W.; Simplified Electron Ejection in Fourier Transform Ion Cyclotron Resonance Spectroscopy Using Suspended Trapping"; Org. Mass. Spec., **28**, 914 (1993).
24. Wilson, K.L.; Cooper, B.T.; Buckner, S.W.; "Bond Activation by d⁰ Metal Carbene Complexes in the Gas Phase"; Rapid Commun. Mass Spec., **7**, 844, (1993).
23. Wilson, K.L.; Buckner, S.W.; "Solvation of Transition Metal Ion Complexes in the Gas Phase", Rapid Commun. Mass Spec., **7**, 848, (1993).
22. Pope, R.M.; VanOrden, S.L.; Cooper, B.T.; Buckner, S.W.; "Retro-Alkyne Cyclotrimerization in Thermal Gas Phase Metal Ion-Arene Reactions"; Organometallics, **11**, 2001, (1992).
21. Pope, R.M.; Buckner, S.W.; "Photoassisted Gas Phase Ligand Switching", Organometallics, **11**, 1959 (1992).
20. VanOrden, S.L.; Pope, R.M.; Buckner, S.W.; "Partitioning of Exothermicity into the Products of Gas Phase Nucleophilic Displacement Reactions"; Org. Mass. Spec.; **26**, 1003, (1991).
19. VanOrden, S.L.; Pope, R.M.; Buckner, S.W.; "Electron Transfer in Gas Phase Ligand Switching", Organometallics; **10**, 1089, (1991).
18. VanOrden, S.L.; Buckner, S.W.; "Decarboxylation in the Reactions of O⁻ with Metal Carbonyl Complexes in the Gas Phase"; Polyhedron; **10**, 2487, (1991).

17. VanOrden, S.L.; Buckner, S.W.; "Mechanistic and Kinetic Aspects of Chemical Ionization Mass Spectrometry of Polycyclic Aromatic Hydrocarbons and their Halogen Substituted Analogs Using Oxidizing Chemical Ionization Reagents. A GC/MS and FTMS Study"; Anal. Chem. Acta; **246**; 199 (1991). **(invited article for special issue on Young North American Analytical Faculty)**
16. Buckner, S.W.; VanOrden, S.L.; "Steric Effects in The Oxidative Addition Reactions of Gaseous V(CO)₅"; Organometallics; **9**; 1093 (1990).
15. Gord, J.R.; Freiser, B.S.; Buckner, S.W.; "Kinetic Energy Release in Thermal Ion-Molecule Reactions: The Nb²⁺/Benzene Charge Transfer Reaction"; J. Chem. Phys.; **94**, 4282 (1991).
14. Gord, J.R.; Freiser, B.S.; Buckner, S.W.; "Kinetic Energy Release in Thermal Ion-Molecule Reactions: The Single Charge Transfer Reactions of V²⁺ and Ta²⁺ with Benzene"; J. Phys. Chem.; **95**; 8274 (1991). **(R.B. Bernstein memorial issue)**
13. Gord, J.R.; Freiser, B.S.; Buckner, S.W.; "Formation of Thermodynamically Stable Dications in the Gas Phase by Thermal Ion-Molecule Reactions: Nb²⁺ with Small Alkanes"; J. Chem. Phys.; **91**, 753 (1989).
12. Gord, J.R.; Buckner, S.W.; Freiser, B.S.; "Gas Phase Photoinduced Reactivity of RhC₅H₆⁺ with Cyclopentane"; J. Am. Chem. Soc., **111**; 3753 (1989).
11. Buckner, S.W.; Freiser, B.S.; "Generation of Primary Amide Complexes of Fe⁺, Co⁺, and Rh⁺ in the Gas Phase"; Polyhedron; **8**; 1401 (1989).
10. Buckner, S.W.; MacMahon, T.J.; Byrd, G.D.; Freiser, B.S.; "Reactions of Nb⁺ with Alkanes and Alkenes in the Gas Phase", Inorg. Chem.; **28**; 3511 (1989).
9. Buckner, S.W.; Freiser, B.S.; "Heterodinuclear Transition Metal Cluster Ions in the Gas Phase. Reactivity and Thermochemistry of NbFe⁺ and NbFeL⁺ (L = O, CO, alkenes)"; J. Phys. Chem.; **93**; 3667 (1989).
8. Buckner, S.W.; Freiser, B.S.; "Chemistry and Photochemistry of Bare Metal Cluster Ions in the Gas Phase" in "Gas Phase Inorganic Chemistry"; D. Russell, Ed.; Plenum Press, New York; 1989. **(invited chapter)**
7. Gord, J.R.; Buckner, S.W.; Freiser, B.S.; "Generation of Metal Cluster Ions Through Laser Desorption of Modified Surfaces"; Chem. Phys. Lett.; **153**; 577 (1988).
6. Buckner, S.W.; Gord, J.R.; Freiser, B.S.; "Gas Phase Chemistry of Transition Metal Imido and Nitrene Ion Complexes. Oxidative Addition of N-H Bonds in NH₃ and Transfer of NH from a Metal Center to an Alkene", J. Am. Chem. Soc.; **110**; 6606 (1988).
5. Buckner, S.W.; Freiser, B.S.; "Reactivity, Photochemistry, and Thermodynamics of Simple Metal-Ligand Ions in the Gas Phase", Polyhedron; **7**; 1583 (1988). **(invited article for special issue on Metal-Ligand Bonding Energetics)**
4. Buckner, S.W.; Gord, J.R.; Freiser, B.S.; "Gas Phase Studies of Zn₂⁺, Ag₃⁺, and Ag₅⁺", J. Chem. Phys.; **88**; 3678 (1988).
3. Buckner, S.W.; Freiser, B.S.; "Formation, Chemistry, and Thermochemistry of Primary Amide Complexes of Fe⁺ and Co⁺ in the Gas Phase"; J. Am. Chem. Soc.; **109**; 4715 (1987).
2. Huang, Y; Buckner, S.W.; Freiser, B.S.; "Activation of C-H and C-C Bonds in Alkanes by Heterodinuclear Metal Cluster Ions in the Gas Phase" in "The Physics and Chemistry of Small Clusters"; P. Jena, Ed.; NATO ASI Series, Plenum Corp.: New York, 1987; p. 891.

1. Buckner, S.W.; Freiser, B.S.; "Bimolecular Reactions of Doubly Charged Metal Ions in the Gas Phase. Formation of NbCH_2^{2+} "; J. Am. Chem. Soc., **109**; 1247 (1987).

Presentations

Invited Presentations

"Fluorescence Excimer Lifetime Thermometry. Internet Delivery of a Physics Course on Waves and Vibrations", Texas A&M University, Commerce Department of Chemistry, Commerce, TX, March 2000.

"Photochemistry in Gas and Condensed Phases", Southwest Oklahoma State University Department of Chemistry and Physics, Weatherton, OK, April 2000.

"Photochemistry of Anionic Metal Complexes"; Buckner, S.W.; 18th Annual Meeting of The Federation of Analytical Chemistry and Spectroscopy Societies and the Thirtieth Pacific Conference on Chemistry and Spectroscopy; Anaheim, CA; October 6-11, 1991.

"Kinetic and Mechanistic Aspects of Organic Ion-Molecule Reactions"; Buckner, S.W., 18th Annual Meeting of The Federation of Analytical Chemistry and Spectroscopy Societies and the Thirtieth Pacific Conference on Chemistry and Spectroscopy; Anaheim, CA; October 6-11, 1991.

"Photodissociation Experiments in FTMS"; Buckner, S.W.; Sanibel Conference on Ion Activation and Dissociation Methods in Mass Spectrometry; Sanibel Island, FL; January 29 - February 2, 1991.

"Gas Phase Ion-Molecule Reaction Studies Using Fourier Transform Mass Spectrometry"; Buckner, S.W.; Idaho University Departmental Seminar; November 17, 1989.

"Gas Phase Ion-Molecule Reaction Studies Using Fourier Transform Mass Spectrometry"; Buckner, S.W.; Boise State University Departmental Seminar, November 16, 1989.

"Kinetic Energy Release Studies in Fourier Transform Ion Cyclotron Resonance Spectroscopy"; Buckner, S.W.; VanOrden, S.L.; 16th Annual Meeting of The Federation of Analytical Chemistry and Spectroscopy Societies; Chicago, IL; October 1-6, 1989.

"Formation, Thermochemistry, and Reactivity of Small Organometallic Ions and Transition Metal Cluster Ions in the Gas Phase", The Upjohn Company; Kalamazoo, MI; December 10, 1987.

"Multistep Metal Ion Chemistry and Photochemistry Using FTMS"; Buckner, S.W.; Freiser, B.S.; 5th Asilomar Conference on Mass Spectrometry"; Pacific Grove, CA; Sept. 28 - Oct. 2, 1986.

Contributed Presentations

"Ultrabroadband Doubly Resonant Optical Parametric Oscillator for Mid-Infrared Combustion Spectroscopy" Buckner, S.W., with others, 43rd Rocky Mountain Conference on Analytical Chemistry; Denver, CO, July 29 - August 2, 2001.

"Delivering 1000-Level Physics and Chemistry Courses via the Internet", Buckner, S.W., Cruzen, S.T., 39th Annual USG Computing Conference, Rock Eagle, GA, October 2000.

"Temperature Measurements using Fluorescence Lifetimes", Southeast Analytical Chemistry Conference, Auburn, AL, September 1998.

"Use of Fluorescence Lifetimes of Intramolecular Excimer Formers for Temperature Measurement in Liquids" Buckner, S.W., Forlines, R.A., Gord, J.R., 39th Rocky Mountain Conference on Analytical Chemistry; Denver, CO, Aug. 3 -7, 1997.

"Fluorescence Excimer Lifetime Thermometry" Buckner, S.W., Gord, J.R.; ACS National Meeting, New Orleans, LA, March 1996.

"Modeling Infrared Radiative Relaxation of Gas Phase Ions"; Buckner, S.W.; Cooper, B.T.; 42nd ASMS Conference on Mass Spectrometry and Allied Topics; Chicago, IL; May 30-June 4, 1994.

"Photoactivated Gas Phase Ligand Switching"; Pope, R.M.; Buckner, S.W.; 41st ASMS Conference on Mass Spectrometry and Allied Topics; San Francisco, CA; May 3-June 4, 1993.

"Photodissociation and Relaxation of Gas Phase Aluminum Cluster Ions"; Cooper, B.T.; Parent, D.C.; Buckner, S.W.; 41st ASMS Conference on Mass Spectrometry and Allied Topics; San Francisco, CA; May 30-June 4, 1993.

"Activation of Aromatic Rings in Thermal Energy Gas Phase Ion-Molecule Reactions"; Pope, R.M.; Buckner, S.W.; 41st ASMS Conference on Mass Spectrometry and Allied Topics; San Francisco, CA; May 30-June 4, 1993.

"Solvation Energetics of Gas Phase Metal Ion Complexes", Buckner, S.W.; Wilson, K.L.; 27th Society of Western Analytical Professors Meeting, Riverside, CA; January 22-24, 1993.

"Photochemical Effects in Gas Phase Ion-Molecule Reactions", Buckner, S.W.; Cooper, B.T.; 204th ACS National Meeting, Washington, D.C.; August 23-28, 1992.

"Retro-Alkyne Cyclotrimerization in Thermal Gas Phase Metal Ion-Arene Reactions", Buckner, S.W.; Pope, R.M.; 204th ACS National Meeting, Washington, D.C.; August 23-28, 1992.

"Photodissociation and Photoinduced Electron Detachment in Dinuclear Metal Carbonyl Anions", Cooper, B.T.; Buckner, S.W.; 40th ASMS Conference on Mass Spectrometry and Allied Topics; Washington, D.C.; May 31-June 5, 1992.

"Reactions of Vibrationally Excited Chromium Pentacarbonyl Anion with Molecular Oxygen"; Cooper, B.T.; Wilson, K.L.; Buckner, S.W.; 40th ASMS Conference on Mass Spectrometry and Allied Topics; Washington, D.C.; May 31-June 5, 1992.

"A Detailed Mechanism for Collisionless Relaxation of Highly Vibrationally Excited Metal Complexes", Cooper, B.T.; Buckner, S.W.; 18th Annual meeting of The Federation of Analytical Chemistry and Spectroscopy Societies and the Thirtieth Pacific Conference on Chemistry and Spectroscopy; Anaheim, CA; October 6-11, 1991.

"Gas Phase Photochemistry of Anionic Metal Carbonyl Complexes", Cooper, B.T.; Buckner, S.W.; 39th ASMS Conference on Mass Spectrometry and Allied Topics; Nashville, TN; May 19-24, 1991.

"Reactions of V⁺ with Small Organic Molecules"; Pope, R.M.; VanOrden, S.L.; Cooper, B.T.; Buckner, S.W.; 39th ASMS Conference on Mass Spectrometry and Allied Topics; Nashville, TN; May 19-24, 1991.

"Reactions of Laser Desorbed Metal Ions with Benzene" Pope, R.M.; VanOrden, S.L.; Buckner, S.W.; 39th ASMS Conference on Mass Spectrometry and Allied Topics; Nashville, TN; May 19-24, 1991.

"The Role of Electron Transfer in Gas Phase Ligand Switching and Chlorine Atom Transfer Reactions" VanOrden, S.L.; Pope, R.M.; Buckner, S.W.; Pacific Conference on Chemistry & Spectroscopy; San Francisco, CA; October 31 - November 2, 1990.

"Collisionless Relaxation of Vibrationally Excited Ions via Infrared Fluorescence" Cooper, B.T.; Buckner, S.W.; Pacific Conference on Chemistry & Spectroscopy; San Francisco, CA; October 31 - November 2, 1990.

"Non-Statistical Energy Disposal in a Gas Phase S_N2 Reaction" Van Orden, S.L.; Pope, R.M.; Buckner, S.W.; Pacific Conference on Chemistry & Spectroscopy; San Francisco, CA; October 31 - November 2, 1990.

"Unusual Energy Disposal in the Gas Phase S_N2 Reactions as Determined by Kinetic Energy Release Fourier Transform Ion Cyclotron Resonance Mass Spectrometry" Buckner, S.W.; Van Orden, S.L., Pope, R.M.; 38th ASMS Conference on Mass Spectrometry and Allied Topics; Tucson, AZ; June 4-9, 1990.

"Ring Cleavage and Substitution in PAH's and substituted Benzenes by O^- " Van Orden, S.L.; Malcomson, M.E.; Buckner, S.W.; 38th ASMS Conference on Mass Spectrometry and Allied Topics; Tucson, AZ; June 4-9, 1990.

"Nucleophilic Activation vs. Electron Transfer in the Gas Phase Reactions of Anions with Neutral Metal complexes and its Relationship to the Homogeneously Catalyzed Water - Gas Shift Reaction" Buckner, S.W.; Van Orden, S.L.; 38th ASMS Conference on Mass Spectrometry and Allied Topics; Tucson, AZ; June 4-9, 1990.

"Steric Effects in the Oxidative Addition Reactions of $V(CO)_5^-$ in the Gas Phase. An FT-ICR Study" Buckner, S.W.; Van Orden, S.L.; 38th ASMS Conference on Mass Spectrometry and Allied Topics; Tucson, AZ; June 4-9, 1990.

"Kinetic Energy Release Studies in Fourier Transform Mass Spectrometry"; Buckner, S.W.; 22nd Society of Western Analytical Professors Meeting, Seattle, WA; January 28, 1989.

Buckner, S.W.; Freiser, B.S.; "Formation, Chemistry and Thermochemistry of Primary Amide Complexes of Fe^+ and Co^+ in the Gas Phase"; 21st Great Lakes Regional Meeting, Chicago, IL; June 12, 1987.

Buckner, S.W.; Freiser, B.S.; "Reactivity of Heterodinuclear Transition Metal Cluster Ions in the Gas Phase"; International Symposium on the Physics and Chemistry of Small Clusters; Richmond, VA; Oct. 28 - Nov. 1, 1986.

Buckner, S.W.; Freiser, B.S.; "Multiply Charged Metal Ions in the Gas Phase"; 8th East Coast Ion Molecule Reaction and I.C.R. Symposium; Newark, DE; Oct. 18, 1986.

Tews, E.C.; Buckner, S.W.; Huang, Y.; Freiser, B.S.; "Reactivities of Heterodinuclear Transition Metal Cluster Ions with Small Hydrocarbons in the Gas Phase Using Fourier Transform Mass Spectrometry"; 34th Annual Conference on Mass Spectrometry and Allied topics; Cincinnati, OH; June 11, 1986.

Buckner, S.W.; Freiser, B.S.; "Gas Phase Chemistry of Nb^+ and Ta^+ with Small Hydrocarbons. Reactivity, Structure, Thermochemistry, and Kinetics"; 20th Great Lakes Regional Meeting, Milwaukee, WI; June 2, 1986.

Students Directed

at CSU

Alan Forlines

Benjamin Davis(Ph.D.)

Lisa Aut

Simohammed Hajab

Marios Voulgaradis

Omar Al-Saigh

Akinwunmi Doherty

Current Affiliation

Innovative Scientific Solutions Inc.

Naval Research Laboratory

Chemistry Teacher, Virginia

Working in Atlanta

Professional Basketball in Europe

Johnson and Johnson

Working in Atlanta

Floyd R. Jackson (Ph.D., Inorganic Chemistry, Associate Professor)

Publications and Presentations

F. Jackson, J. Dillard, D. Dillard, B. Holmes, H. Parvatareddy, R. Zatorski, "The Durability of Adhesively Bonded Titanium: Performance of Plasma Sprayed Polymeric Coating Pretreatments", *The J. Adhesion*, Vol. 65, pp. 217-238, 1998.

F. Jackson, J. Dillard, D. Dillard, B. Holmes, H. Parvatareddy, R. Zatorski, "The Durability of Adhesively Bonded Titanium: Performance of Plasma Sprayed Polymeric Coating Pretreatments", *The Adhesion Society Meeting*, Feb. 18-21, 1996.

F. Jackson, J. Dillard, D. Dillard, B. Holmes, H. Parvatareddy, R. Zatorski, "The Durability of Adhesively Bonded Titanium: Performance of Plasma Sprayed Polymeric Coating Pretreatments", *American Chemical Society, Southeast-Southwest Regional Meeting*, Nov. 29-Dec. 1, 1995.

American Chemical Society, 199th National Meeting, "Computer Molecular Modeling as an Aid to Synthesis of Energetic Compounds Containing Transition Metals". Boston, Mass April 22-27, 1990. J. P. Jasinski, **F. R. Jackson**, and R. J. Butcher.

American Chemical Society, 199th National Meeting, "Use of Coordination Chemistry to Organic Synthetic Problems". NMR and Other Spectroscopic Characterization and Crystal Structures of Nitration Precursors, Boston, [Co(trien)(pyrazole)Cl]Cl₂ and [(histidino)-Co(dien)]Cl₂", Mass April 22-27, 1990. W. Darby, R. J. Butcher, **F. R. Jackson**, and E. Sinn.

American Chemical Society, 199th National Meeting, "Heterometallic Oxygen-Bridged Trinuclear Complexes. X-ray Crystallographic and EXAFS Characterization", April 22-27, 1990. E. Sinn, W. Darby, R. J. Butcher, **F. R. Jackson**, and B. Letafat.

NATO Advanced Study Institute conference on "The Chemistry and Physics of the Molecular Processes in Energetic Materials", Molecular Modeling as an Aid in the Synthesis of High Energy Compounds, Altavilla Milicia, Sicily, Italy, September 3-15, 1989, **Floyd R. Jackson** and Jerry Jasinski.

American Chemical Society, 191st National Meeting, "Synthesis and Characterization of a New Series of Asymmetric Trinuclear Nickel(II) Complexes", New York, NY, April 13-18, 1986, R. J. Butcher and **F. R. Jackson**.

Publications in Preparation

I am currently preparing three papers for publication in referred scientific journals. The titles of these papers are:

“Electrophilic Substitution in Mono-, Bi-, and Triimidazole Coordinated Complexes of Cobalt(III)” (Nearly Complete)

"Histidine as a Bidentate Ligand"

“Structural and Magnetic Properties of a Trinuclear Ni(II) Schiff-Base Complex”

Students Mentored Before Coming to CSU

Student	Degree	Year	Committee
Ms. Angela Williams	MS (Biochemistry)	1994	member
Mr. Mathewos Eshete	MS (Phys. Chem.)	1995	member
Ms. Marquel S. Price	MS (Inorg. Chem.)	1995	member
Mr. Rajesh B. Nair	MS (Inorg. Chem)	1994	Advisor/Chair
Ms. Cheryl Todd	MS (Inorg. Chem.)	1998	Advisor/Chair

Mr. Rajesh B. Nair continued his graduate studies in inorganic chemistry to pursue the terminal degree (Ph.D.) at the University of South Carolina, Columbia, SC. He recently completed the Ph.D. degree and is currently employed with an industrial position. Ms. Cheryl Todd also continued her graduate studies in inorganic chemistry where she is currently pursuing the Ph.D. at Virginia Tech.

Students Directed at CSU

Since my employment with CSU I have served as research mentor to four undergraduate students. I am currently a research committee member to one graduate student. The students that I have mentored have engaged in all aspects of the research projects stated in section IV. These students are listed below:

Name	Major	Degree	Year
(1) Shelly Decker	Chemistry	BA	Aug. 97 – May 98
(2) Sunny Resch	Chemistry	BS	Aug. 97 – May 99
(3) Shaun Johnson	Chemistry	BS	Aug. 98 – Dec. 99
(4) Vera Verdree	Chemistry	BS	Aug. 99 – May 00
(5) Tracy Ferring	Environment Science	MS	Jan. 00 – Present

Charles A. Lovelette (Ph.D., Organic Chemistry, Associate Professor)

Publications

1. Studies in Non-bridgehead Fused Nitrogen Heterocycles. Fused 1,2,3-Triazoles. C.A. Lovelette and L.Long Jr., *J. Org.Chem.*, 37, 4142 (1972).
2. Oxidation of Pyrimidine Derivatives by Flavoproteins. J.J. McCormack, B. Allen and C.A. Lovelette, Presented Joint Meeting ASPET/SOT August 1978, Houston TX.
3. 1,2,4-Triazines. Synthesis of Selected Members of the s-Triazolo[3,4-f]1,2,4-triazine and Tetrazolo[1,5-f] 1,2,4-triazine Ring Systems. C.A. Lovelette, *J. Heterocycl. Chem.*, 16, 555 (1979).
4. 1,2,4-Triazines. 2. A Convenient One-pot Procedure for the Preparation of 1,5(2H,4H)-1,2,4-Triazinedione (6-Azauracil). C.A. Lovelette, *J. Heterocycl. Chem.*, 16, 1649 (1979).
5. 1,2,4-Triazines. 3. Halogen-Sulfur Exchange in the Preparation of 5,6-disubstituted-1,2,4-Triazines. R.E. Neumann and C.A. Lovelette, *J. Heterocycl. Chem.*, 17, 823 (1980).
6. 1,2,4-Triazines. 4. Regioselective Ring Closure Involving 6-Amino-5-hydrazino-3(2H)-1,2,4-triazinone and Single Carbon Ring-closure Reagents. C.A. Lovelette and K. Geagen, *J. Heterocycl. Chem.*, 19, 1345 (1982).
7. Genotoxicity, Carcinogenicity and Mode of Action of the Food Mutagen, 2-Amino-3-methylimidazo[4,5-f]quinoline (IQ) and Analogs. W.S. Barnes, C.A. Lovelette, C. Tong, G.M. Williams, and J.H. Weisburger, *Carcinogenesis*, 6, 441 (1985).
8. Convenient Synthesis of 1-Substituted-2,5(4H)-piperazinediones. C.A. Lovelette and K. Geagan, *J. Heterocycl. Chem.*, 23, 229 (1986).
9. Genotoxicity, Carcinogenicity and Mode of Action of the Food Mutagen, 2-Amino-3-methylimidazo[4,5-f]quinoline (IQ). J.H. Weisburger, W.S. Barnes, C.A. Lovelette, C. Tong, T. Tanaka and G.W. Williams, *Environmental Health Perspectives*, Vol. 67, pp. 121-127 (1986).
10. Improved Synthesis of the Food Mutagen, 2-Amino-3,7,8-trimethylimidazo[4,5-f]quinoxaline and activity in a Mammalian DNA Repair System. C.A. Lovelette, W.S. Barnes, J.H. Weisburger and G.W. Williams. *J. Agric. Food Chem.*, 35, 912 (1987).

Presentations

1. The Halogenation of 3-Amino-1,2,4-triazine and 3-Amino-1,2,4-triazin-5-one: A Rate study and Possible Mechanism: Presented at the Southeastern Regional ACS Meeting, Birmingham AL, Oct 1994. Elizabeth Wright- coauthor.
2. Regioselective Ring-closure of 5-Amino-6-hydrazino-(2H)1,2,4-triazin-5-one. Presented at the Southeastern Regional ACS Meeting, Birmingham AL, Oct 1994. Elizabeth Wright- coauthor.
3. Effects of lead(II) ion on the activity of 5-aminolevulinic acid dehydratase (ALAD) in *T. scripta* (slider turtles). Presented American Chemical Society National Meeting, March, 1996, New Orleans Louisiana. Elizabeth Wright- coauthor

4. Effects of lead(II) ion on the prophenoloxidase enzyme system and the genotoxicity of lead(II), cadmium(II) and chromium(VI) in *P. acutissimus* (Crayfish). Presented, National American Chemical Society Meeting, March, 1996, New Orleans Louisiana. E. Wright - coauthor.

Directed Students

In vitro inhibition of ALAD (alpha-aminolevulinate dehydrogenase) by Pb(+2):
Presented Southeastern Regional ACS Meeting. - D. Dwyer

Effect of Pb(+2) and Cd(+2) on the log growth rate of *E. coli*. - E. Vratonjic

Effect of Pb(+2) and Cd(+2) on the log growth rate of *B. subtilis*. - G King

Mono- vs. Disubstitution of bromine, 3-amino-1,2,4-triazine, a rate study. - R. Lane

Reinvestigation of the determination of prophenoloxidase activity in Crayfish: Effects of Pb(+2). - J. Putnam

Masters Thesis Environmental Science: Heavy Metal Inhibition of the Prophenoloxidase Cascade in Crayfish. An in vitro Investigation. - H Eikas.

8. Service

8. Service

The faculty members in the Department of Chemistry have served on numerous committees at the departmental, university, local and national levels. At the local level, faculty members have served the community by serving as Science Fair Judges and monitors for the Science Olympiad. In addition, the faculty members have provided demonstrations at local events at the Space Science Center and Peachtree Mall during the Annual National Chemistry Week. The members of the faculty have also served on international committees. The following section documents the participation on various committees and involvement in community activities of the faculty in the department.

Mae Allen, PhD

1. Faculty Senate – Senator, 1998 – 2001
2. Committee on Committees, 1999 – 2000
3. Admissions Appeals Committee, 1997 – 2000
4. Graduation Committee/COS Marshal, 1998 – 2000
5. Recruitment Committee, 1998 – 2000
6. CSU Support Day Volunteer, March 2000
7. CSU Orientation, Fall Academic Advising Sessions
8. CSU Student Information Desk – Spring Semesters
9. Reviewer of Publications, American Association of Blood Banks
10. Georgia State Advisor, American Society of Clinical pathologists
11. Inspection Team Coordinator, College of American Pathologists

Zeki Al-Saigh, PhD (Physical)

1. Member of the Columbus College Honor Scholarship Committee, 1992-1994.
2. Member of the Major Fields Assessment Committee, 1994-97
3. Member of Student's Services Committee (SACS), 1994
4. Appointed by the VPAA as a member of two task force committees, 1995
 - a. Developed evaluation instruments for administrators
 - b. Developed an instrument for a research service award
5. Facilities and Safety Committee, 1995-1997
6. BOR Chemistry Curriculum Committee, 1995-present
7. Environmental Science Advisory Committee, 1995-1999
8. School of Science Technician Search Committee (1997)
9. NCATE Steering Committee, 1998
10. P-16 Initiative, 1998-1999
11. Facilities and Safety Committee, 1998-1999
12. Scholastic Honors Committee, 1998- present
13. Education Preparation Program Re-design Committee, 1998-1999
14. Faculty Development Committee, alternate member, 1999-2000

15. Recruitment committee, 1999-2001
16. Faculty Development Committee, member, 2001-2002
17. International Committee on European Studies, 20001-2002

Steve Buckner, PhD (Analytical)

1. College of Science Personnel Committee (Chair, 2001)
2. Departmental Promotion and Tenure Committee (Chair, 2001)
3. College of Science Post-Tenure Review Committee (Member, 1998; Chair of Committee, 2000)
4. Member of Multiple Pre-tenure and Tenure Review Committees
5. University Academic Standards Committee (1999-2000)
6. Member of the Graduate Council (1996 to present)
7. Faculty Senate (1999-2001)
8. Human Subjects Review Committee (1995 to present)
9. Faculty Search Committees (for Director of Environmental Science Program, for Chair of Mathematics Department, Chair of Inorganic Chemist search committee, Biophysical Chemistry search)
10. Admissions Appeals Committee (1995 to 1998)
11. Community Outreach
12. Demonstrations on chemistry and physics (**Space Science Center**)
13. Provide presentations/demonstrations on Science and Engineering Day
14. Science Monitor for Science Olympiads
15. Served as judge at the annual Science Fair for local Junior high and High School
16. Consultant to Columbus Fire and Safety Equipment Co. 1994-1995, 1997
17. Member of the American Chemical Society Committee for Development of the ACS Quantitative Analysis Examination, 1998-1999
18. This standardized exam will be in use from 2001 to 2010
19. Member of the American Chemical Society Committee for Development of the ACS Quantitative Analysis Examination, 1993-1994. The standardized exam is in use from 1994 to 1999.
20. Reviewer National Science Foundation
21. Reviewer Petroleum Research Fund
22. Reviewer Journal of the American Society for Mass Spectrometry
23. Reviewer International Journal of Mass Spectrometry
24. Reviewer Applied Spectroscopy
25. Book Review Panel for Polymer News

Charles Lovelette, PhD (Organic)

1. Medical School Advisory
2. Variety of Faculty Search
3. Dean's Research Advisory
4. College Tenure/Promotion
5. Animal Safety/Handling
6. Served as judge at the annual Science Fair for local Junior high and High School
7. Served as advisor for high school science projects
8. Science Monitor for Science Olympiads
9. Provide presentations/demonstrations on Science and Engineering Day

Floyd R. Jackson, PhD (Inorganic)

1. University Retention Task Force, Fall 1998 – Spring 1999
2. Department of Communications Search Committee, Fall 2000 – Spring 2001
3. James Burke/Hunter Lecture Series Committee Fall 1999 – Spring 2000
4. Science Fair Judge, Greater Columbus Science and Engineering Fair, 1998 – 2001
5. University College Committee (University Advisory Council, Fall 1997 – Spring 1998)
6. Retention Committee (Institutional Committee, Fall 1998 – Present)
7. Partners-in-Education Committee (Institutional Committee, Fall 1999 – Present)
8. Special Needs / Disabilities Committee (Institutional Committee, Fall 1998 – Spring 2001)
9. General Education Assessment Team (Strategic University Team, Fall 1997 – Present)
10. Honors Scholarship Committee (Senate Committee, Fall 1998 – Present)
11. Serve as Contact person for students wishing to participate in summer programs as interns at academic, government, or private agencies. (1997 – present)
12. Minority Affairs Committee (Senate Committee, Fall 1999 – Present)
13. American Chemical Society Award Committee for the George C. Pimentel Award in Education (January 1, 1996 –December 31, 1998)
14. Reviewer of Proposals for The National Institutes of Health (1995)
15. Chair of Hampton-Roads Local Section of the American Chemical Society (January 1996 - January 1997)

Columbus State University Comprehensive Program Review				
Department of Chemistry and Geology				
Programs: BA Chemistry and BS Chemistry				
Quantitative Measures				
Measure	1998/1999	1999/2000	2000/2001	2001/2002
Number of Declared Majors - Fall Semester				
BA Chemistry				
Full-Time	8	5	6	5
Part-Time	1	3	2	3
Total	9	8	8	8
BS Chemistry				
Full-Time	20	29	19	19
Part-Time	9	14	5	5
Total	29	43	24	24
Combined Undergraduate				
Full-Time	28	34	25	24
Part-Time	10	17	7	8
Total	38	51	32	32
Number of Degrees Conferred - Fiscal Year				
BA Chemistry	6	2	1	
BS Chemistry	3	5	8	
Combined Undergraduate	9	7	9	
Credit Hour Production - Fall Semester				
Below 1000 Level Courses	0	0	0	0
1000 Level Courses	959	911	918	1,036
2000 Level Courses	51	34	15	32
3000 Level Courses	305	236	209	240
4000 Level Courses	53	62	32	18
5000U Courses	6	0	12	9
5000G Courses	0	0	0	3
6000 Level Courses and Above	0	0	0	0
Average Course Enrollment - Fall Semester				
Below 1000 Level Courses	0	0	0	0
1000 Level Courses	37	41	33	41
2000 Level Courses	13	8	4	8

3000 Level Courses	21	16	17	19
4000 Level Courses	7	4	3	1
5000U Courses	2	0	4	3
5000G Courses	0	0	0	1
6000 Level Courses and Above	0	0	0	0
Number of Faculty/Staff by EFT - Fall Semester				
Full-Time Faculty	6/12 @ .75	5/11 @ .75	5/11 @.75	5/11 @.75
Part-Time Faculty	0.0	0.0	0.0	0.0
Full-Time Staff	0.5	0.5	0.5	0.5
Part-Time Staff	2 grad assist	2 grad assist	2 grad assist	1.3 grdasst
	2 stu assist	2 stu assist	2 stu assist	.45 stuasst
Prorated Departmental Budget - Fiscal Year				
State Funds	\$469,556	\$406,752	\$423,955	\$434,673
Private\Grant Funds	\$457	\$5,730	\$81,527	\$15,595
Total	\$470,013	\$412,482	\$505,482	\$450,268
Prorated Personal Service Budget - Fiscal Year				
	\$451,735	\$397,132	\$404,055 *	\$419,387 *
Prorated Operating Expense Budget - Fiscal Year				
	\$17,610	\$15,350	\$15,402 *	\$13,832 *
(Includes Travel)				
Prorated Equipment Expenditures - Fiscal Year				
	\$668	\$0	\$4,498 *	\$0
Cost per Major - Fiscal Year				
	\$12,368	\$8,088	\$13,249 *	\$13,584 *
(Total Expenditures/Number of Declared Majors)				
Credit Hours Taught Fall and Spring Semesters				
	2,278	2,391	2,334	
Cost per Credit Hour Fall and Spring Semesters				
	\$206	\$173	\$181 **	
Program-Specific Scholarship Funds Awarded				
Fall Semester	\$0	\$0	\$0	\$0
Spring Semester	\$0	\$0	\$0	
Percent of Non-Productive Grades (i.e., W, WF, F, and U)				
Lower Division Courses	21%	23%	28%	
Upper Division Courses	14%	12%	15%	
Graduate Courses	0%	0%	0%	

Averages for Declared Majors - Fall Semester				
BA Chemistry				
Average SAT Verbal Score	465, n=6	480, n=7	511, n=7	519, n=8
Average SAT Math Score	513, n=6	481, n=7	497, n=7	530, n=8
Average Undergraduate GPA	2.58	2.22	2.97	
* Computed for 2000/2001 and 2001/2002 using state funds only				
BS Chemistry				
Average SAT Verbal Score	485, n=19	506, n=30	505, n=18	505, n=15
Average SAT Math Score	537, n=19	525, n=30	516, n=18	508, n=15
Average Undergraduate GPA	2.77	2.75	2.72	
Combined Undergraduate Averages				
Average SAT Verbal Score	480, n=25	501, n=37	507, n=25	510, n=23
Average SAT Math Score	531, n=25	517, n=37	511, n=25	516, n=15
Average Undergraduate GPA	2.72	2.66	2.78	