



2002 Annual Meeting Report
The 50th Meeting of MACLAC
2002 A Symmetric Year
Illinois Wesleyan University
October 18 – 19, 2002

General Session 1 – Friday Afternoon

Jeff Frick, Illinois Wesleyan University, welcomed approximately 120 attendees to the meeting. IWU was a doctoral granting institution at one time, and they granted the first doctorate in Biology to an African-American citizen. President Alan Hutchcroft made a variety of announcements to start off the 50th annual meeting of MACTLAC.

The first keynote lecture was presented by Bruce Bursten, of the Ohio State University and the topic was introduced as physical organometallic chemistry. The talk had two major topics, beginning with metal complexes that exhibit so-called ‘metalloaromaticity.’ Calculations suggest that metalloaromatic complexes such Ti_8C_{12} should be relatively stable. The second portion of the talk dealt with theoretical heavy element chemistry and involved calculations of 6d and 5f orbitals.

Next Meeting

University of Evansville October 10 - 11, 2003

New Dimensions in Chemistry

visit the website – www.mactlac.org

General Session 2 – Friday Evening

At the Friday evening banquet, Archivist Anne Sherren made a presentation on the history of MACTLAC over the past five decades. The organization was founded in 1952 by Ed Hannish and held its first meeting at Monmouth College. The meetings have always had the same general format of discussion groups, workshops, and committees that allow members to talk about issues of teaching chemistry to undergraduates in a small college environment. A variety of old pictures were shown, and then photos were taken of all past Presidents that were present, as well as current officers.

The group then returned to the main lecture hall for the evening session, given by Mike Davis, graduate of IWU. The session was replete with demonstrations that Mike has conducted with his company Science Theater Productions. This group regularly performs chemical demonstrations at schools and in public venues. The flashy demonstrations were the perfect after-dinner session.

General Session 3 – Saturday Morning

The Saturday morning session was presented by William Flossi of Abbott Laboratories, Chicago and the topic was enantiomerically pure pharmaceuticals. Today, as much as 85 – 90% of drugs sold are racemic. In some cases one racemate is simply inactive, while in other cases it is metabolically converted into the active racemate. Unfortunately, in some cases one racemate is toxic. The need to synthesize and purify enantiomerically pure drugs is a growing portion of the pharmaceuticals industry. Asymmetric synthesis is challenging and chiral chromatography is costly. If a drug is intended to be sold as a racemic mixture, the FDA still requires separation of the mixture and separate testing for each racemate. In 1998, 69% of available drugs were sold as optically pure compounds.

MACTLAC General Business Meeting

1. President Alan Hutchcroft opened the general business meeting on Saturday morning.
2. John Moore, University of Wisconsin-Madison and editor of J Chem Ed gave a free year of the Journal to seven new faculty.
3. Susan Klein, Secretary-Treasurer presented the Treasurer’s Report – see below for the numbers.
4. Larry Ferren, Placement Officer presented a report on the numbers of schools and candidates using the placement service. See below for the full report.
5. Anne Sherren, Archivist presented a short supplementary report on archival activities.
6. New State Representatives were introduced and announced.
 - a. Matthew Riehl, Bethany Lutheran, Minnesota

In addition to the 61 traditional MACTLAC positions, 311 additional non-MACTLAC positions were discovered on the Internet, C & E News, and CUR e-mail notices forwarded to me by Anne Sherren over the course of the year and were electronically forwarded to the 55 candidates capable of receiving e-mail. There were insufficient monetary resources to mail out **all** of the additional non-MACTLAC positions to those who could not receive electronic mail; however, each MACTLAC position was sent out to those who could not receive e-mail. **Twenty four** separate overland mailings totaling 168 letters were made to the candidates.

All MACTLAC schools with positions open had their ads forwarded to Craig Bieler who placed them on the MACTLAC web page. I do not know how many people accessed the employment information by referring to the MACTLAC web page on the Internet.

Applicants were of several groups -- graduate students, new Ph.D.'s, postdoctorates, and visiting professors. **Eleven** of the candidates using the Placement Service reported finding employment, asked to be removed from the mailing list, or moved without a forwarding address. One MACTLAC placement candidate was hired by a MACTLAC college (DePauw University). This past year **seven** new candidates came into the Placement Service. Presently, (August 19, 2002) **fifty one** candidates in the Placement Service are looking for employment (44 e-mail and 7 overland-mail).

This year three schools requested resumes or information related to qualified candidates from the Placement service (Hillsdale, Westminster, Valpraiso). Mailings to first time candidates were made to acquaint them with the service. All of the first time mailings were done electronically. Electronic mail was sent to the e-mail candidates on a weekly and sometimes on a daily basis as positions were found.

Discussion Group Reports

Discussion Group A - Plenary Address – Bruce Bursten

Leader: Kimberly Lawler from Sagarin, Elmhurst
Recorder: Deborah McCarthy from St. Mary's College

The talk was generally thought of as fun and interesting. Discussion moved to a level of computational skills of incoming graduate students. Today these students are very sophisticated with computer and computational skills. Both increases in software and hardware skills have increases. Might be harder to "teach" the research because the computations are easier. Some discussion of elements 118 followed in terms of some theoretical molecules that Bruce has studied since it is a noble gas alone. Discussion moved to approachable level of teaching M.O. theory to first year students. How can it be done effectively? Bruce described some simple group theory he teaches in the honors course. Then moved the discussion to what effect students have moved away from buying organic model kits may affect students 2-D, 3-D capability.

Wisconsin School of Engineering has capability to build 3-D models in layers. The students explore the "Chemistry" of protein molecules using different abstractions of these large molecules. These include space feeling, ball and stick, back bone models with side chains. It is an inquiry based kind of experiment. The discussion moved to the absent lack of kinesthetic capabilities in today's college students.

Finally we finished with a discussion of the inclusion of organic chemistry and molecular orbital theory in the text books which are of ten shipped. The value of teaching these topics more than once was discussed. The first time they see a topic they may only get a superficial sense of the topic. But in the case of organic chemistry, they will be getting an extensive treatment so it may be less useful.

Discussion Group B - Teaching General Chemistry

Leader: Vicki Hess of Indiana Wesleyan University
Recorder: Marge Legg of St. Ambrose University

Three Topics Addressed:

1. Lab Materials
2. Distance Learning
3. New ACS Textbook

1. Labs

75% use home-grown labs
Books- Labs
Distance Learning
Skills/Assessment before course gating

On-line Homework

“Home-grown” labs 75%

- Packaged
- Faculty over-time have written
 - Focus on process and analysis force them to do what we want.

Alverno - Denison – Homegrown- Guided Inquiry

- By Varge
- In House- More reliable
- Home Grown- Last 3 weeks student projects

Lake Forest – Homegrown book over 30 years less ambiguity so we are trying to open them up.

Liability with home grown labs- DEEP POCKET school liability covers you if you do something wrong.

Homegrown include “environmentally friendly” products.

Pre-labs open ended, practice writing

Liability

- Gross misconduct
- Get your own teacher’s liability
- Canoe instructor- student twisted an ankle and sued
- Sued after 9/11 – email from our campus - \$5,000,000 suit

Techniques to Motivate Students to Take Lab Seriously

- Convince them that they learn more in lab if they just pay attention
- Attendance is part of the grade
- Make up in another section
- Two afternoons a week- integration of lab in class is 2 ¾ per day/2 weeks 18 students
- Use lab manual in class for notes on exams
- Lab practical exam (assessment process) at the end of the semester
- Lab points count heavily in course grade

Distance Learning:

- On-line
 - Class outline, homework, exams, concern- textbook has so much material and so much other stuff
 - 10 problems on-line, 10 problems in the textbook

- John Moore Web-CT-Weekly homework, weekly quizzes. On-line pushes them to keep up= easier for teachers. Homework gives immediate feedback
- Black board doesn’t allow subscripts and superscripts
- OWL made for Chemistry
- Respondus imports into blackboard www.respondus.com
- VCE new grant for creating data bank
- Teaching a course on-line fits a need students-300 miles away- come on campus 6 times for 4 super labs Saturday and 2 exam days.
- Use CD-Roms of company out of business
- Thinkwell?
- On-line environmental non-major course 5-6 years. Many links to other sites homelabs.

ACS- Beta Version

- Textbook has 11 chapters
- 5 for the first semester
- Investigate this, Think about this, Good idea, or Not totally

Discussion Group C - Teaching Organic Chemistry

Leader: Bill Bordeaux from Huntington College

Recorder: Tracy Thompson from Alverno College

CD’s With Books

- Ege Chem tutor for organic chemistry
- McMurry-add’s spartan exercises ie. *cis* and *trans* alkenes bond angles

How have students been encouraged to use the discs? Assign right problems (problems that require Spartan).

- Biochemistry CD with Voigt and Voigt and Pratt is really nice; good mechanisms.
- Mary Campbell book on Biochemistry same level as a book Pratt is coming out with next year.
- Animation for mechanisms are nice to have on a CD.
- Jones has nice CD mechanisms

Books

- Francis Corey – 2 CD’s, one for teachers and one for the students (power point).
- McMurry and Fay – General Chemistry; one semester
- Brown and Foote – Tells more about the truth of why we know the mechanism is what is .

- Fox and Whitesell – (2 people using tis) divided into 1st half physical organic chemistry and the 2nd half is synthetic organic chemistry.
- Wade – (2)

Poll- Who is using what books?

- Wade = 5
 - Ege = 1
 - Carey = 2
 - Solomons = 4
 - Fox and Whitesell = 2
 - McMurry = 3
 - Brown/ Foote = 3
 - Bruice = 1
 - Jones = 1
- Who is still using the chalkboard? Many! Students need to learn to draw structures.
 - Students read McMurry and enjoyed it. Bill Bordeoux (student response is good). (Readable).
 - Strategy- give quizzes/everyday assignments on material not covered in class yet.
 - Movement away from lecture
 - How to deal with students that just don't/can't learn reactions
 - Small groups with peer assistants
 - Scale is “lowered”/ exams are difficult
 - § 80 = A
 - § 70 = B
 - § 60 = C
 - § 50 = D

Who still uses Molecular Models?

- Darling \$15 I used as fundraiser for chemistry student organization.
- Framework Molecular Models still cheaper than book store
- In back of Aldrich Catalog “Cochran” buy in bulk and make kits and sale!
- Can buy models in bulk from England- can't remember name flexible bands
- Vigil Publishers (not spheres, more inorganic shapes).
- Can make their own- pencil erasers, miniature marshmallows, toothpicks.
- Allen and Baron

How are reactions without clear mechanisms given?

How is SN₁/SN₂/E₁/E₂ presented in class?

Williamson's micro scale experiment- give students overview of general trends in class but follow with lab to see the reality of things.

Same experiment- change solvent polarity can change results.
Pick different R-X with same experiment.

On-line general/ organic chemistry courses?

- University of Illinois offers a course like this in organic.

Assessment Ideas

- Panel presentations

Request for outcomes/ critic/ assessment ideas.

Assessment of Program, student learning etc.

North Central is moving toward assessment of outcomes

Field Learning Assessment Guide

- At University of Wisconsin website
- Search SALG - Student Assessment of Learning gains
- Search FLAG - Field Learning Assessment Guide

Portfolio writing

Who is using ACS organic standardized exams?

Toledo Exam – Entrance Exam in Chemistry

Discussion Group D - Research Grants

Leader: Krisit McQuade from Bradley University

Recorder: Deborah Breiter from Rockford University

The group started by listing topics for discussions and we started with different agencies for funding. Agencies to target: The list of agencies for funding research included..

- PRF
- Research Corp

Dreyfus as the big names with special note of the PRF type G grants being for new professors (first 3 years) and funded at a 50 % rate. The list also included CUR, which funds the student. And your state Academics of Science and Board of Higher Education, which will fund chemical educations. As far as instrumentations, the list includes

- Pittcon
- CCLI-NFS
- Nalco
- Ocean Optics

There was also discussions about using your College's Developmental office to help target local industries for monies for research, summer scholars, and

instrumental athon. Some expressed concern that PRF, Research Corp, and Dreyfus only funded peoplw from institutions with a strong reputation for Publications.

Suggestions given to surmount this obstacle were to set realistic goals by net working with others doing similar research and getting feed back. It also seemed very important to demonstrate instrumental support, examples being matching funds. Preliminary data was also mentioned as important and to show feasibility.

We then discussed how it would be possible to start research with no current funding. Many suggested using sabbaticals for developing collaborations and publications and attending meetings for networking. Also start your research with worries obtained from a local industry or faculty developmental funds to get preliminary data. Some suggested that instrumentation grants and education grants might be the easiest to obtain and then try Research Corp before PFR or Dreyfus. Don't be discouraged by rejections and consider applying to more than one agency. We finished our discussion by discussing whether MACTLAC could serve as a sponsor for critiques sources? We could ask old members what area their research is in and would they be willing to critique others grant applications.

Discussion Group E - New Building Issues

Leader: John Hanson from Olivet Nazarene College
Recorder: Truman Turnquist from Mount Union College

This session on new building issues began by having each one in attendance share their names and interests in the designated topic. Those present were involved with building projects at unique stages from the planning stage to the building stage with few participants having completed buildings.

Several participants were interested in learning about problems that can arise in the process of building a new facility. Several responded by voicing their opinions that you can't assume anything about a building project including lighting, ventilation, acoustics, etc..

The building needs to be checked frequently while it is being built. Changes that are requested need to follow to see that they are adequately handled. Several mentioned the value of a faculty member serving as project shepherd and the importance of planning a move for the summer and preferably early summer.

Several mentioned that the quality of the case-ware had been a problem. A question was raised about light countertops in the lab and some responded by saying they showed too much staining on the light countertops they had seen.

Questions were raised about rising chairs and stools in the labs. It was commented that chairs for stools were necessary if the room was to be used for anything other

than a lab and that students prefer something to sit on. Some schools have used an adjacent classroom or spare at the end of the lab for pre-lab lectures or related classes.

With regard to a separated balance room it seems that most schools are not building separate rooms but are incorporating balances into the labs. To handle hazardous wastes most are building a small storage room to collect the annual waster.

Several schools have had a good experience when they have hired someone who is experienced in designing labs to help in the design stage.

Building should be designed with current and anticipated instructional practices in mind recognizing life of a building typically exceeds our ability to predict future instrumental practices.

Discussion Group F - Teaching Inorganic Chemistry

Leader: Bill Morrison from University of Evansville
Recorder: Matthew Riehl from Bethany Lutheran College

There are several concepts students have difficulties grasping. Ideas were proposed to help students understand these concepts. Tanabe-Sugano diagrams and frost diagrams were brought up as examples. Generally students learn most effectively from other students- discussing the ideas among themselves. In order to facilitate these discussions, group quizzes may be given to the students.

Another area that students have perpetual problems with is Solid State Structures. In general, it's more effective to use more than one model.

Another issue that was discussed was the ACS Certification. The ACS requires two semesters of inorganic chemistry in the core requirements. Most colleges offer only one semester of inorganic at the Senior or Junior level. The other semester requirements are usually filled through chapters and topics covered in general chemistry and specific labs in analytical and inorganic chemistry. Regardless, ACS will ask for evidence of material covered.

Finally, attendees discussed the relative strengths of various textbooks for both descriptive and advanced inorganic chemistry.

Discussion Group G - Teaching Physical Chemistry

Leader: Jeff Cornelius from Principia College

Recorder: Cindy Woodbridge from Hillsdale College

1. Texts/Lab Books:

- Lecture: 9 participants use Atkins, 3 use McQuarrie and Simon and 2 use Levine. Students find McQuarrie and Simon to be very readable; after completing quantum, students find thermo easier.
- Lab: The majority of participants have lab integrated within the course rather than a separate course. 6 Participants use/recommend Shoemaker et.al. to students most participants use labs they have developed. Teresa Zolinsky's PChem Online ("PCOL" available through J.Chem. Ed) was mentioned as a source for Mathcad exercises and online labs.

2. Lab has two problems:

- finding experiments that fit available equipment and teaching students how to write up and present their data. Some approaches to addressing the latter point mentioned:
- Giving students sample discussion sections and asking them to rate each of having students present an oral report and guiding them through the development of the introduction and discussion; the keto/enol equilibria and application of particle in a box to conjugated dyes have been used for this requiring students to present lab reports as more of an industrial progress report of a lab director (the student) to the CEO (the instructor).

3. Spartan, CACHE, MathCad, and Excel are being used regularly. The program GenPlot was recommended also—students must do some programming.

4. Most participants have observed an increase in the number of women in their classrooms.

5. Also discussed, albeit briefly: Students other than chem. majors required to take PChem and their impact (if any) on course content. Concerns about students negative reactions to PChem and the loss of potential majors due to the PChem requirement

Discussion Group H - Teaching Biochemistry

Leader: Eugene Losey from Elmhurst College

Recorder: Tracy Thompson from Alverno College

2 term biochem (Elmhurst) (1st term no nucleic acid) Voet and Voet chemistry majors; pre-med majors, pre-requisite- 1 yr. of chemistry

Greenville College 1 semester of biochemistry every other year. Lehninger pre-requisite 1 year of organic.

Trinity Christian College 1 semester of biochemistry, pre-requisite full year of chemistry Lehninger.

Alban Nazarene 1 semester biochemistry moving toward 2 semesters 1 year of chemistry pre-requisites.

North park College 1 year pre-requisite organic chemistry 1 semester of biochemistry offered every year. Voet and Voet final exam ACS 1 semester Biochemistry.

Buena vista University 1 semester of biochemistry use of Stryer now using Lehninger organic chemistry 1 year and cell biology required.

University of Evansville 2 semesters of Biochemistry, Stryer 1 good CD Rom pre-requisites 1 year of organic 1 semester of general chemistry quantum and 1 semester of pchem. Second semester taught from journal articles based on an article in the JChemEd. Some articles out of "trends" and "Biochemistry"

Summary List of Questions:

Assign Topics to different people

- Presentations
- Discuss make of articles

Use articles in general chemistry to understand how a lab report is set up.

- Cornerstone University 1 semester every other year (Zubae text) 1 year.
- Bradley University 4 Biochemistry courses! 2 semester sequence (Voet, Voet and Pratt text), biochemistry survey (Horton), Advanced Biochemistry (Journal Articles).
- Huntington College 1 Semester Biochemistry (pre-requisite 2 years of chemistry) Voet, Voet, and Pratt "Railroad Train" ACS exam in Biochemistry is used
- Have used Campbell in the past.
- Alverno 1 Semester Biochemistry take organic chemistry I as a pre-requisite (Campbell)
- Wheaton College 1 Semester Biochemistry, ½ semester special topics, ½ semester advanced biochemistry, Organic is a pre-requisite.
- Carthage College 1 semester of Biochemistry (1 year of organic)
- Indiana Wesleyan 1 semester of Biochemistry (1 semester organic)

- Barat College 1 quarter Biochemistry course. Campbell general chemistry and organic are pre-requisites. Never used ACS exams. No Biochemistry lab.
- Anderson University 1 semester biochemistry Garrett and Grisham organic a full year.
- Jetson College 1 year of biochemistry. Taught in concert with Cell Biology. 1 year of organic
- Rockford College 1 year of biochemistry with lab. 1 year of organic (Stryer). 1st semester is on lipid metabolism and the 2nd semester is on medical case study. Medical Case Study book was written in the U.K. Stryer has supplement available. Some nutrition in the 2nd semester with case studies.
- Lake Forest 1st semester is biochemistry courses (2 courses). 1st course is protein, protein function, and Cell/Molecular Biology. The 2nd course is a seminar level course with pchem pre-requisite and physical biochemistry. The 2nd course is taught every other year. The book used was Morin
- Gnnell College Biochemistry 2nd semester taken by sophomores- co taking organic chemistry II. Had intro and Cell/Molecular Biology. The Book used was Stryer 5th edition. Will use Horton and Moran in the future. ½ of the course is structures of biomolecules and ½ of the course is metabolism. Plus 2 advanced Biochemistry classes, Biophysical and Enzyme Mechanisms. No pchem pre-requisite.

What to do for lab in semester class?

- Boyer Benjamin Cummings
- Switzer and Garity
- Robyt and White
- Ninfa and Ballou
- Farroulli

Lab

- Primers, Placid, Expressing Protein, Characterization. Can it be done?

Seems like they are using the same methods in Cell Biology. Could do enzyme kinetics instead and biophysical labs.

“Biochemistry and Molecular Biology Education” Journal Voight’s Edition.

“Journal for Undergraduate Chemistry Research”

What about bringing favorite labs to future MACTLAC meeting or have a library of labs on a website.

- BIORad Kits (Call for technical help)
- Pharmacia (Call for technical help)

Who could act as a clearinghouse for this project?

R15@evansville.edu Ray Lutgring

Biorad offers Educational discounts.

Biochemistry Talk

- Nancy Peterson at North Central College innovative stuff with biochemistry experiments.

How do people deal with 1 semester of a biochemistry course?

- Take out DNA/RNA and put in biology so there is more time to cover enzyme kinetics.

Our jobs as faculty are to prioritize content and focus.

How many people are gaining or have experience with molecular visualization methods?

- Swiss PD Bviewer. How to look at, describe structures, and describe how ligand is binding.
- Protein Explorer has a website. Go to Gale Rhodes website at University of Southern Main (tutorial, links to protein, and has Visualization.

How are people with ACS accredited programs meeting biochemistry requirements?

Discussion Group I - Departmental Issues

Session Leader: Randall Wanke from Augustana College

Recorder: Jerry Lokensgard from Lawrence University

The leader opened by offering a list of possible discussion topics, including

- Assessment and accreditation
- Mentoring programs for new faculty
- Dealing with the biochemistry requirement for ACS certification
- Faculty evaluation issues
- Grant writing and equipment funding
- Initializing and campaigning on curricular change
- Requirements for secondary education certification
- Finding and mentoring part-time, full-time, temporary, or tenure track faculty.
- Supporting undergraduate research
- Safety and chemical hygiene issues
- Faculty relations

Initial discussion followed a comment that U. Minnesota-Morris has two programs for mentoring new faculty that do work-one official and supported by the Deans Office, which allows a new faculty member to apply for a mentor in a program that provides a little financial support for both participants. Because this is limited in the number of new faculty who can participate, the science and math division has also initiated a less formal program matching all new faculty with "teaching buddies" more experienced faculty members in their own discipline. Other participants described mentoring programs ranging widely a discussion groups that involve all the institutions untenured faculty in monthly conversations led by members of the group; on "educational issues" discussion group at Taylor involves both new and more experienced faculty; a program at Augustana that pairs new faculty with more experienced colleagues who can talk about teaching, carry out "safe" class visits in both directions, and the like, several others emphasized the need for such mentoring to be developed rather than evaluations, and focused on issues like advising, preparing assignments, and evaluation materials, writing and recommendation letters, etc.

Attention turned to curricular changes. A comment from Manchester concurred a solution to low enrollment senior-level courses competing for small numbers of majors and leaving some students with gaps in their preparation. A set of individual 4 credit courses in advance organic, advanced inorganic, and instrumental analysis each with 1 of was combined into a sequence of two 3-credit lecture only courses (organic and inorganic) and a 2-credit instrumental lab course. The perceived gain is that each instructor gives up some control, but the prospect of loss consultation among the instructors appear to be good.

The issue of meeting the biochemistry requirement for ACS certification was raised, though only about 8 or 9 people in the group of 21 have ACS certified majors. Of those, most (at least 7) have met the requirement by requiring a biochemistry course rather than by integrating biochemical topics throughout the curriculum. In most cases that meant one elective was eliminated for students desiring accreditation, though one person pointed out that this requirement has been a net addition to their polymer chemistry ACS track, since that track requires two polymer courses in addition to the core curriculum.

A couple people mentioned pressure from their administrations as a result of low enrollment upper level courses. A related discussion arose from a question about load credit for laboratory instruction. Practices varied widely, from treatment of a laboratory contact hour equally with a classroom hour, to situations in which a course with a lab and a course without a lab earn exactly the same load of credits. It was also noted that at some institutions different rules or practices seem to apply in different departments.

Discussion Group J - Outreach Issues

Leader: Phil Bay from St. Mary's College

Recorder: Bal Barot from Lake Michigan College

1. Recruiting Students
2. Contacting Chemistry teachers and guidance counselors

Example 1: What do chemists do?

- Work with chemicals. But chemicals poison people. Better state we design molecules. Solve problems = ACS has a tree video: It's all about Chemistry or Chemistry: it is everywhere.
- Frank/Indiana Wesleyan University: Week before spring a chemistry demon in one week, four or five sessions given practice exposure. Demo includes hands-on activities for home school kids; and others.
- Dan/Hammond University: Field Day invite dozen schools for competition like Chemistry Olympiad.
- Michelle/Elmhurst College: Non-chem majors we show and teach demo and then they go to schools for 25 demo as part of lab grades! Education majors and others do this and like it. We bring schools in with the help of education department. Two solids together, polymer and petridish, things.
- Phil Bay/St. Mary: Million dollar grant for interacting with students and teachers from area/jr high and homeschool and local disadvantaged kids. Teacher workshops for elementary AP science teachers are invited and very well received.

Issue: Inquiry based on Science

- Wonder Science grades 1st through 4th, one Saturday per month it is an ACS project.
- Merit 13 and go for Boy Scouts/Girl Scouts
- Award for Chemistry students for Professional presentations
- ACS chemistry week in the mall, demonstration and chemical musical presentation!
- Project SEED for ACS/minority students/St. Mary's summer exposure for disadvantage/ Elmhurst College to take science/math classes on the campus. 7th graders do titration and run AA/Math and Science Academy.
- Radio Talk show in Canada about Chemistry. Good and reliable information if provided by chemistry professor.
- Survey of visiting high school students. If they are interested in science, they should be contacted.
- Make nylon rope (flint scientific sells it). Keep 5 extinguishers ready during demo. Presentation.
- Liability issue? How do you address? Transferring chemicals, bringing students to the chem. labs are issues. EPA regulations, Use of safety

glasses, hazardous material use are issues. Wonderscience solves some of these problems.

Anybody do Long Distance Learning?

- Bill Rudman from Lake Michigan : General Chemistry is taught online and 4 super Saturday labs.
- Michelle from Elmhurst: Chemistry for non-majors: one meeting on campus and it meets General Education requirements.

Do you work with Teachers?

- Local ACS does chemistry Olympiad and Spectroscopy for school teachers workshops, Elementary and grade school teachers are given kits costing \$500/teacher.
- ACS: University of Wisconsin Madison has Outreach Programs. There is a booth in 50th annual meeting of MACTLAC here in IWU Bloomington, IL.
- High School students can finish requirements in 3 1/2 years and the last semester students can take college chemistry classes in (Davenport, IA) high schools. In Michigan it is taking place too. High School teachers have to be certified as adjunct instructors of the community colleges.
- Pit Gravel Lab: Go in lab and do pit gravel density and do mole calculation from it. This gives idea of mole.

Discussion Group K - Laboratory Demonstrations

Session Leader: William Martin (wmartin@lfc.edu)

Session Recorder: Christine Renner (crener@carthage.edu)

The session started off with a bang when Bill Martin ignited a H₂/O₂ balloon.

Bill's introductory comments included a reminder that laboratory experiments are a form of demonstrations. Issues to consider when planning demos include preparation time, instructor finesse, excitement factor (fire, color), cleanup time and proper disposal of hazardous materials. New faculty often begin their careers using many demos and eventually trail off due to time issues. Demo safety concerns include (a) the quantity of hazardous waste generated by many older demos (such as the dichromate volcano), (b) the handling of high energy compounds (c) students performing demos (are they familiar enough with the chemistry to prevent an accident?), (d) spectator safety (goggles?) and (e) cautioning students regarding dangers and unacceptability of repeating demos on their own.

Members of the audience then shared examples of successful demos:

- Balloon submersion in liquid N₂ done with a translucent balloon so that liquification of O₂ can be seen; used to discuss gas laws in a physical chemistry course
- Freezing a glove in liquid N₂, drip liquid O₂ off of the fingers, then show paramagnetism with a strong magnet (Jordan Bennett, Denison Univ.)
- Flame tests: using methanol solutions of metal salts (Ruth Nalliah, Huntington Coll.) or aqueous solutions of metal chlorides, a milk jug and a Meeker burner (Dawn Wiser, Lake Forest Coll.)
- To demonstrate the heat of sublimation for CO₂, place a dry ice plug in a Beral pipet, hold with tweezers and observe solid => liquid, the pipet can sometimes explode, though (Bob Gayhart, Bradley Univ.)
- Microscale demos viewed with a document camera are preferable to videotaped demos (Wayne Wesolowski, Benedictine Univ.), test tubes in a rack can be viewed by a large lecture audience using a 45° mirror and document camera
- Demos can also be done on an overhead projector: the Pb(NO₃)₂ + KI reaction is particularly spectacular, a small chunk of Na in a petri dish containing a phenolphthalein solution works well, but the Na chunk can fly out of the dish
- A microscale version of the Lucas test can be done with a few drops of various alcohols in test tubes (Ernie Trujillo, Grinnell College)
- Participatory demos are encouraged, such as the stretched rubber band touched to the lips to demonstrate entropy/enthalpy (Larry Funck, Wheaton College)
- A dramatic exothermic reaction that should be performed behind a safety shield: a small amount of LiAlH₄ vs. NaBH₄ in water (Bill Martin, Lake Forest College)
- Hazardous reactions can be used to teach safety: a small amount of SOCl₂ tossed into a hood sink containing water emits a big fireball (as well as HCl and SO₂), done prior to an experiment, students see what can happen if they fail to handle the material carefully.
- Adding a gummy bear to melted KClO₃ in a test tube produces an impressive flame, smoke and KCl (Jim Fryling, Cornerstone Univ.) but Bill Martin cautioned this demo is rather dangerous
- A safe general chemistry demo involves cabbage juice and various acids/bases, it was suggested to finish the demo with basic solution and then add dry ice
- Demos that use grocery materials are inexpensive and accessible to non-science students: dancing raisins in Sprite, disposable diaper polymers stirred in water, and Alka Seltzer/film canister rockets (done outside with cautions to the students about not trying this at home and/or scaling up the reaction)
- In the laboratory portion of a non-science majors January term course, students perform demos at elementary students, using kitchen chemistry, elephant toothpaste, color changes and nontoxic precipitations such as iron carbonate (Charles Ophardt, Elmhurst College)
- A simple, safe demo for general and organic chemistry: grape pop run through a Sep-Pak cartridge, colors are removed and blue/purple dyes can be separated (Lou Sysma, Trinity Christian College)

Sources of Demonstrations include:

- Shakhshiri, B. Z. *Chemical Demonstrations: A Handbook for Teachers of Chemistry*, Volumes 1–4
Ealy, J. L. and Summerlin, L. R. *Chemical Demonstrations: A Sourcebook for Teachers*; American Chemical Society: Washington, DC, 1988; Volume 1.
- Summerlin, L. R.; Borgford, C. L.; Ealy, J. B. *Chemical Demonstrations: A Sourcebook for Teachers*; American Chemical Society: Washington, DC, 1988; Volume 2.
- *Journal of Chemical Education*
- Flinn Scientific, Inc. – www.flinnsci.com – materials can be purchased with a credit card, free handouts accompany each order, many provide demos to be done with 2 L soda bottles
- Sae, Andy S.W. *Chemical Magic from the Grocery Store*. Kendall/Hunt Publishing, 1996
ISBN: 0787229008

Discussion Group L - Discussion of Flossi Address

Leader: Forrest Frank from Illinois Wesleyan

Recorder: Douglas Armstrong from Olivet Nazarene University

In response to comment and questions from persons in attendance, Mr. Flossi said:

1. He is “still learning” as he works in industry.
2. He briefly mentioned some of the methodologies there at Abbott, including “combichem”, HPLC, SAR.
3. He has a Masters Degree, and he said Abbott does not hire many Bachelors- level people, now a days.
4. He had been at Abbott a little over 5 years now, and is now in a different group than his original group.
5. Backgrounds students need to get into a place like Abbott include biochemistry, and a very good knowledge of organic synthesis. Also the person must have good communication skills, and must “get along well” with others. Also, an understanding of how assays are run, what a K; means, metabolic pathways.
6. While at Abbott, he has worked in three anti-viral areas, as follows: influenza, HIV, and HCV.
7. A medicinal chemistry course can be put together and taught, so as to including biochemistry, synthetic organic chemistry, biology, etc.
8. Little or nothing is being done at Abbott concerning genetic disorders.
9. He does not have any restrictions placed on him with regard to reagents he may use, with respect to moving to pilot plant. Now the philosophy is “make it however you can” without sacrificing yields, or other aspects, so basically the “green chemistry” restrictions have not hit (yet).

10. To do the work he described in his presentation, it took approximately 3 months, with 6 chemists working on it.
11. Abbott has an intern program in the summers for students.
12. Much emphasis is placed on safety.
13. A person working at Abbott must take good notes on what he/she does in the lab. Must be very methodical, and must “multi-task” or be able to run more than one reactions at the same time.
14. He uses HPLC a lot, to purify his products.
15. He has gained the trust of his boss, so he can come in at 10AM if he want and stay until 7PM.

Discussion Group M - Teaching Analytical Chemistry

Leader: Chris Dunlap from St. Mary’s College

Recorder: Stan Burden from Taylor University

Issues:

- Electronics in Analytical Chemistry
Only 2 out of 14 teach any electronics no one teacher Lab View in Analytical
- Hybrid Classes (Quant/Instructional)
- Lab Repertoire
Gravimetric – Everyone does 1 (14/14)
Acid Base Titration 12/14
Redox 11/14
Complex 10/14
Precipitation 3/14
Project Labs 6/14
1 2 Weeks 1 4 weeks
1 3 Weeks 1 5 weeks
Electrogravimetric anveloper for CU
Use copper gauze for electrode – 2% error
Most use a blend between wet and instrumental
ISE 7/14
AAS 6/14
UV/Vis 11/14
HPLC 5/14
GC 4/14
IC 2/14
- Status of Equivalence
- Spreadsheets
All use and most just expect student to know how to use Excel
Other graphics programs:
Some use “Origins” – makes better plots
“Graphical Analipsis” makes better plots but

“Curve Filter” – has better capability for solving non-linear equations for X given by Y

- Depth of Equilibrium Treatment
- Textbooks
 - Enhe - 1
 - Harvey – 1
 - Harris – 3 (2 using short version)
 - Shoog (fundamentals) – 7
 - Harvey- too superficial students not like because they find it confusing.
 - Enhe – Has good CD accompanying it
- Instrument Maintenance
- Maintenance Contracts
 - Only one person had one (on FTIR for \$2K/year). Most felt better about calling in outside maintenance on a per need basis.

Discussion Group N - Young Faculty Issues

Discussion leader: Elizabeth Tremier – Grinnell
Discussion recorder: Pamela Trotter - Augustana

The discussion revolved primarily around how to balance the expectations of teaching and research in order to gain tenure. These notes are fragments of the discussion.

- A. Introductions and suggested issues to discuss
- Ø Getting tenure
 - Ø Changing demands (research vs. teaching)
 - Ø Research money
 - Ø Publications
 - Ø Review processes for promotion and tenure
 - Ø Collaboration in research
 - Ø How to balance

Several “spies” – chairs (directors) – present to learn about young faculty concerns

- B. Prioritizing concerns for discussion
1. Balancing research and teaching
 - Ø Research is teaching – a way to motivate students
 - Ø Can spark a life-long interest in chemistry – a career
 - Ø Keeps you sane
 2. But balance?
 - Ø Do you revamp class – or spend time in research?
 - Ø Do your best to do both

- Ø Have more than one student to motivate each other
- Ø Incremental improvements – rather than revamping the entire course
- Ø Repeat courses – modify/polish
- Ø Keeping students by beating bushes to keep the project going from summers: Common time commitments; 4-5 hrs PI, 6 hrs students
- Ø Go to organic chemistry courses and ask for volunteers
- Ø Get repeat research students
 - Young
 - Keep them
 - They’ll know how to do it
- Ø Get money to attract students
- Ø Students are overscheduled

3. Research money
 - Ø Get grant money?
 - Ø Some schools provide, but only for summer
4. Student credit for research?
 - Ø Elective in major
 - Ø Requirement for major (ACS certification)
 - Ø Go away or during school year (often seniors) – requirement for major
5. Teaching load credits for research students?
 - Ø Some get small credit for research students
 - Ø Some require multiple students for any credit
 - Ø Three semester research sequence
 - Proposal/writing intro
 - Proposal 3-10 pg, present orally
 - Do project or go away
 - Ø Added burden to faculty – no real credit, even though required for degree
 - Ø Since senior project – no “growing” students to continue
6. Summer research for credit can work – intense time-less disjointed
7. Collaboration to get research money
 - Ø Interdepartment collaboration?
 - Biochemistry and biology within institution
 - ü Access to “stuff”
 - ü Work together requires effort – similar interest
 - Other institutions

- ü Former colleagues
 - ü Difficult because it's their project
 - ü Look for outreach
8. Writing grants together?
 - Ø At different institutions – is it possible?
 - Ø Sub-contracting? – separate budgets
 - Ø Budgets separate – can lose on overhead – may end up paying double overhead
 - Ø Who administers at college?
 - Development office
 - Grants
 - Self – paperwork
 9. Sources
 - Ø Merck Foundation – chemistry/biology interface
 - Ø NSF – research opportunity award – with NSF-awarded PI
 - Ø Private funds easier to deal with – less paperwork
 10. Publications!
 - Ø Students as authors important
 - Ø Confirmation experiments may be needed
 - Ø Writing may be a hurdle
 11. Pre-tenure sabbaticals to get research done?
 - Ø Some schools have competition
 - Ø Others – only after tenure
 - Ø Some give no release time at all for research – other than summer
 12. Some institutions specify that authors need to be undergraduates – so this slows down progress
 13. Taking students to meetings – VERY important
 14. Expectations for tenure explicit?
 - Ø Most not explicit
 - Ø Some – one publication with student authors (others two)
 - Ø Spelling out of research expectations may not help if the support is not there
 - No start-up money
 - No release time
 - Insufficient instrumentation
 - New push for research may be unrealistic because of insufficient instrumentation

15. Overload and service demands may be unrealistic given the expectation for research as well
16. Committee load?
 - Ø What's expected?
 - Ø What's enough?
17. Communicate with administrators
 - Ø Let them know how realistic the expectations are
 - Ø They may not understand that “research didn't work”
 - Ø Let them know demands
 - Ø Educate them!
18. Choosing research project is important
 - Ø Needs to be doable
 - Ø Needs to be publishable
 - Ø Get published wherever
19. Mentoring as faculty
 - Ø Different experiences
 - Ø Good – be willing to talk about it – free advice both for teaching and to read proposal
 - Ø Ask for it!
 - Ø They know it was different when they went through – more difficult to advise
 - Ø “Research” push – is it new?
 - Ø Find a recent person who got tenure under similar conditions – knowing about those who didn't isn't always helpful
 - Ø Multi-task

Discussion Group O - MACTLAC – 50 Years and Going Strong

Leader: Anne Sherren from North Central College

Recorder: Ron Amel from Viterbo University

What should we be doing to continue and grow stronger?

1. Need to make MACTLAC a priority- especially for young faculty. It's important to be able to meet with the colleagues in our sub disciplines.
2. Set up list serve of membership – so to communicate needs – share ideas- ask questions- and communicate information. NOTE: Honorary and emeritus members may not be make use of e-mail.

- 3 Make young faculty feel welcome also strongly encourage their attendance of MACTLAC meetings. Perhaps waive registration fees for new faculty. Identify new people on registration form- give them a special badge so that members can welcome them.
- 4 Problems regarding attendance:
 - Many Conflicts
 - i. Admissions open house
 - ii. Competing chemical meetings
 - iii. Homecoming activities
 - iv. Family Responsibilities (especially for out young women)

Many new faculty are on temporary appointments.

Should we by-laws provide for membership hosting a meeting is another to issue. Include Ohio? Certainly!

Post meeting info in J Chem Ed and C+EN?

Newsletter? Once or twice a year. Introduce a new position- Newsletter Editor.

State reps could/should promote meeting attendance- especially to your faculty- also to schools which have fallen off in attendance.

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