

# MACTLAC

MIDWESTERN ASSOCIATION OF CHEMISTRY TEACHERS IN LIBERAL ARTS COLLEGES



**2006 Annual Meeting Report  
The 54<sup>th</sup> Meeting of MACTLAC  
Whither Chemistry-Whether Chemistry  
Saint Mary's College  
October 27 – 28, 2006**

**General Session 1- Friday Afternoon – 1:00 pm**

Approximately 85 members were welcomed to the 54<sup>th</sup> annual meeting of MACTLAC at St. Mary's College campus by the meeting coordinator Philip Bays. He acknowledged the Saint Mary's chemistry faculty and departmental secretary and noted that the meeting was last held on the campus back in 1988.

The members were officially welcomed by Dr. Carol Mooney, President of Saint Mary's College. In her remarks Dr. Mooney spoke of the chemistry department and why she felt good about what the department has been doing. She listed an impressive number of achievements and indicated that in ten years she feels that there will be more female chemists than in the past.

After the first talk Indiana and Michigan were directed to caucus and elect new state representatives to serve for a three year term.

Dorothy Feigl then introduced the first speaker of the meeting.

**Next Meeting**

**Viterbo University October 19-20, 2007**

**Chemistry at the Interface of Biology, Chemistry, and Beyond**

**(full advertisement inside)**

Visit the website – [www.mactlac.org](http://www.mactlac.org)

**Plenary Address**

**Drugs, Energetic Materials, and Polymers: The Role of Microbial Catalysis**

Dr. Karen Draths  
Assistant Professor  
Michigan State University

Dr. Draths discussed the use of recombinant DNA methodology to engineer some very interesting drugs, energetic materials, and polymers. She began by discussing Tamiflu; its pharmacology and its expensive synthesis from quinic acid extracted from Cinchona bark or from shikimic acid at \$40,000/kg. She then used the biological synthesis of shikimic acid from glucose to discuss some principles involved in microbial engineering. Her lab has been able to use the recombinant DNA techniques to get shikimic acid to make Tamiflu at a rate of \$20/lb versus the current rate of \$600 /kilo that we now can get it from China.

She also discussed a pathway of biosynthesis from aminoshikimic acid to Tamiflu. Her lab sought two microbes that could be used to convert glucose to aminoshikimic acid. She went through the biochemical pathways for the biosynthesis and described the two microbes that had been bioengineered. She would like to go directly from glucose to aminoshikimic acid in *E. coli* but that will be tricky. She described the effort as "ongoing".

Dr. Draths then discussed how phloroglucinol is a precursor to 1,3,5-triamino-2,4,6-trinitrobenzene, an energetic material. She went through a biosynthetic pathway for phloroglucinol and looked at biosynthesis of acetylated phloroglucinols in *Pseudomonas fluorescens* Q2-87. If they jump expressed the PhID gene, they could get massive amount of phloroglucinol without acetylation. The problem was that the phloroglucinol was toxic to the cells, but they could get around the problem by running the media through an ion exchange resin to take up the phloroglucinol and as the resin became saturated with the phloroglucinol, they could remove the resin. This gave them a one step method for making phloroglucinol. The problem was that their method was not cheap enough for the US military industrial market.

Dr. Draths looked at precursors for the synthesis of Nylon 6, focusing on caprolactam and the need of a green synthesis of that material. Presently we can convert benzene to cyclohexanone and then on to caprolactam. She went over a bio- based synthesis of caprolactam from lysine to alpha- caprolactam to caprolactam. She can now take lysine to caprolactam in 75 % yield.

Dr. Draths finished her talk by looking at the wide variety of disciplines used by her group and how they intersect. She also listed the tools that were important in each field to her area of study. She said that the tools were important, but not at the levels that we attach to the major. She is seeking chemistry graduates with the chemistry tools of NMR, GC, MS, and HPLC in particular.

## General Session Two – Friday Evening

### Chemistry 2005 and 2015- Do We Have A Future or What?

Dr. Bill Carroll,  
2005 President of ACS

Dr. Carroll discussed the Enterprise Project in terms of how they identified 30 leaders in chemistry and asked them what is driving them in chemistry. This was reduced to notes and converted to a situation analysis before compressing everything into a paper of reasonable length. They tried to divide up the paper into three areas relating to adapting to changes in education, industry, and the government.

Relating to the educational portion of the study, Dr. Carroll gave a very detailed and insightful presentation in which he discussed such issues as how one might predict the future, the tendency to view the past and the future through the lens of the present, where future students will come from, what future students will see in schools, and what will be the future of faculties considering that half of the professors in the top 50 universities are 55 or older.

Some of the issues facing industry relate to the globalization of production, outsourcing, off shoring, and commodities versus specialties. He talked about the Chinese system where 20,000 graduates can not find work and related this to the idea that to survive one must become a specialty rather than a commodity.

Issues facing governments include intellectual property protection, homeland security versus immigration, and research funding. He said that there is a consensus that the economy will be governed by innovation; that we are no longer a low cost producer. If we try to remain a low cost producer, we will be commoditized out.

Dr. Carroll made some educational predictions:

1. We will see fewer foreign students in United States' graduate schools if there is no innovation from United States.
2. We will see a concentration of United States graduate programs de-emphasize their programs- the bottom low tier schools will form novel collaborations and alliances to reduce costs.
3. We will see an increase in the reliance of US students on community colleges.
4. Tenure will stabilize research "franchise players" teachers as free agents.
5. There will be no increased diversity without reform.

Dr. Carroll made some industrial predictions:

1. Globalization is inevitable- There will be some rebalancing.
2. United States manufacturing of commodities will go on.
3. There will be more exploration and importation strategy of energy, but he predicts there will be one more nuclear plant by 2015.

For chemistry and chemists Dr. Carroll predicted that the field would be multidisciplinary and cutting edge. There will be plenty of core chemistry that needs to be done. For individuals opportunities will still exist, but so will competition. To compete and market oneself the individual will need to differentiate, to continue to educate, and to avoid becoming a commodity.

Dr. Carroll predicted that in 2015 that the United States will still be the largest economy in the world. There will be more vibrant consumer markets in current economies in transition, and there will be significant resource constraints. Innovation and technology will be more important than ever before.

## General Session Three – Saturday Morning

### Proposed Revisions to the ACS Guidelines for Undergraduate Programs: Motivations, Changes and Possibilities

William Polik  
Edward and Elizabeth Hofma Professor of Chemistry  
Hope College

Dr. Polik began his talk by giving some background on CPT and its purpose. He listed its current membership and discussed a number of its function including the surveys and reports it sponsors. He discussed the recourses that are provided by CPT before going into the certification function of the committee.

Dr. Polik then discussed the benefits of ACS approval of a departmental program. He then went into the rationale for changing the approval process and proceeded to give the timeline for the revision of the approval process itself. The current year, 2006, is designated as the year to gather comments to the proposed revisions and publicize the proposed revisions. 2007 will be a year for CPT to review the comments and prepare and publicize the final draft. In 2008 the new revisions will be released.

He indicated that the goals of the revisions are to:

1. Simplify the guidelines and procedures for the approval process of chemistry programs.
2. Provide greater flexibility to approve departments for designing certified degrees.

3. Encourage innovation and improve curriculum and pedagogy to departments.
- 4 To define faculty and infrastructure attributes needed to give excellent education.

Dr. Polik then gave an overview of the guidelines looking at program organization, curriculum, student skills, pedagogy, faculty requirements, infrastructure requirements, and methods of program evaluation. He compared the proposed curricular changes with the present curriculum. In summary there will be five one semester courses; one in each area of chemistry (organic, analytical, biochemistry, inorganic, physical chemistry) plus four more in depth courses to follow up or integrate. Students will learn skills. Departments will regularly evaluate themselves. Departments will create degree tracks.

#### Dr. Polik's Pre-discussion Session

Dr. Polik explained how the discussion group C was going to work. This session was supposed to focus on how we are going to be excellent through innovation. He showed how the current guidelines could be mapped onto the proposed guidelines. He called this Plan A- an imperfect fit but serviceable and helpful as a temporary solution. He wanted the discussion groups for Session C to revamp the curriculum to reflect chemistry, the profession, and to improve student learning. He called this Plan B- a plan that will take time and stages to implement and a plan that may involve a paradigm shift. He wanted this plan to have new courses and text books, new course sequences and degree tracks. It might involve changes to general chemistry and could redirect how some courses are packaged. He wanted us to create a new version of what chemistry might look like.

To do this we were divided into small groups. We were supposed to introduce ourselves, select a secretary, and begin work on the question "What innovations could be introduced into your curriculum under the proposed ACS guidelines?" After 30 minutes we were to report our results.

Sentence oral reports on progress- written notes will follow-

Group 1- This group had one semester of General Chemistry in the curriculum followed by a second semester that included the first year of Organic Chemistry. The second semester of Organic chemistry would follow the first semester of the second year.

Group 2 - This group felt that a lot of innovative chemistry has been done with the present curriculum. This group was worried about the labeling being done by the proposed guidelines. It wondered how some of the present innovation will be perceived by the new guidelines.

Group 3 - This group wanted extra interdisciplinary courses as well as team teaching in the new curriculum.

Group 4 - This group believed that some of the changes may allow more flexibility in the General Chemistry program. They suggested having problem solving classes where students look at problems from several viewpoints. They took several areas and applied them to a problem.

Group 5 - This group wanted to use upper level course to cross over into other departments, e.g. geochemistry and/or nuclear chemistry. They felt that this might relate to the issue of the number of faculty members in the department. Could some of the joint faculty count toward the five required for chemistry?

Group 6 - This group asked the question, "How do we define a department?" Can a faculty member from Argonne labs be considered to be a part of your department if your students work in collaboration with him/her? What about collaboration? What about consortia? What about regional groups?

Group 7 - This group also talked about interdisciplinary courses and team teaching of the interdisciplinary courses.

Group 8 - This group also echoed the concerns of group 2 relating to concerns over present creativity and how it will be interpreted in light of the new guidelines.

In a wrap up discussion Dr. Polik indicated that excellence and ACS approval are two separate and not mutually exclusive concepts. One can have an excellent ACS approved program or an excellent non-ACS approved program. ACS guidelines are available, however, to encourage excellence, a more flexible curriculum, evaluation of that curriculum, and innovation. He indicated that CPT is a different organization that it used to be. It used to be research dominated. Now it is more diverse. It used to be a closed door operation, but now it is responsive to what people have to say.

Dr. Polik agreed to carry back to CPT three ideas from his conversations with the MACTLAC group.

1. He understands the inaccuracy of the mailing list and the fact that it is not reaching a vast number of schools with quality chemistry programs.
2. The idea of "ACS Recognized" category to fulfill the need of smaller excellent institutions that do not quite meet the CPT guidelines but meet a lesser set of guidelines or would like to interact with CPT would be very useful.
3. Maybe there should be some way to do a head count of the chemistry faculty that could take into account in some way the formation of consortia of schools.

Rough notes of the discussion groups will follow in a later section of this report.

## MACTLAC General Business Meeting

1. President David Oostendorp opened the meeting at 10:00 am with a brief announcement that Wallis Hines, an attendee of this meeting had started attending MACTLAC in 1952; one year after the organization had been founded. David also mentioned that the position for Placement has been filled
2. Larry Ferren presented the secretary-treasurer report. He first reported on some of the items of business of the Friday morning executive council meeting.

Larry presented the following treasure's report.

### 2005– 2006 Treasurer's Report

assets	9/1/2005
checking	\$7388.42
savings	\$ 0.00
total assets	\$7388.42
<b>income</b>	
dues collected	\$ 546.00
Lawrence meeting	\$ 3378.00
interest	\$ 49.63
total	\$ 3973.63
<b>expenses</b>	
postage, duplicating, website	\$ 85.90
Lawrence meeting	\$ 4136.10
placement, archives	\$ 0.00
Bank charges	\$ 51.85
total	\$ 4270.45
assets	9/1/06
checking	\$7091.60
savings	\$ 0.00
total assets	\$7091.60
increase (decrease)	(\$ 296.82)

David Oostendorp mentioned that next year there will be the election of a new secretary-treasurer. There will be a need for someone to serve in this position. Volunteers would be welcome.

3. Tracy Thompson gave the Archivist report. Tracy announced that she had spent about \$80 of the \$1000 that she had received from the Executive Council the previous year. She is copying the archives onto acid free paper and is storing them in acid free boxes. She had talked about digitizing but now her goal is to get the records onto acid free paper. She mentioned that she might be able to get free labor for this effort. She has also discussed with the Archivist at Alverno College the topic of proper methods of storage of the materials.

Tracy mentioned that in the host guidelines she would like a statement indicating that the host institution should send the Archivist a folder of the meeting, a paper copy of the attendee list, and electronic copies of everything including the attendee list. If the host institution has photos, she would like them as well.

4. Dr. Anne Sherren announced Iota Sigma Pi, the women's honor society. This group is looking for (female) members and for female honor students in their junior year for the purpose of awarding scholarships. For more information people can pick up brochures, talk to Anne, or try the website: <http://www.iotasigmapi.info/>.
5. John Moore from the Journal of Chemical Education presented any person in his or her first year of teaching who was also attending the meeting a free one year subscription to the JCE. Three people qualified for the award and came forward. Thanks, John, for the continuation of this long-standing tradition of yours at MACTLAC. Your support is certainly appreciated.
6. David Oostendorp introduced Kent Renkema from the University of Evansville in Evansville, Indiana as the new Indiana representative for a three year term and Mark Nussbaum of Hillsdale College in Hillsdale, Michigan as the new Michigan representative for a three year term. These elections represent the new apportionment in the bylaws recently passed at the 2004 Clarke meeting. "Election of State Representatives shall occur on a rotational basis every three years (Michigan and Indiana; the next year Minnesota, Missouri, and Iowa; then the third year Illinois and Wisconsin)"
7. By acclamation the general membership approved sending letters of appreciation to the following:
  - David Oostendorp, outgoing President for his year of outstanding service
  - To outgoing State Representatives: Kristy Miller (Indiana) and Cindy Woodbridge (Michigan)
  - To Saint Mary's College for hosting the outstanding meeting (letters will be sent to President Carol Mooney and Philip Bays, Meeting Coordinator).

8. Ron Amel issued an invitation to the 2007 MACTLAC meeting at Viterbo University October 19 -20, 2007 in La Crosse, WI. The topic is "Chemistry at the Interface of Biology, Chemistry, and Beyond." He mentioned that two speakers are being considered: Lawrence Que from the University of MN and Jim Gentile from the Research Corporation. He encouraged everyone to bring along a colleague from a biology department.
9. Future meeting sites were announced.
 

2008	University of Dubuque
2009	Hope College
10. Michael Collins of Viterbo University was nominated and elected as President-Elect (to serve as President 2007-2008) unopposed and by acclamation. Congratulations Michael!!
11. The new MACTLAC president, Michelle Applebee of Elmhurst College assumed the duties of office. She asked if there was any new business and encouraged the people to attend the meeting at Viterbo University next year.
12. Phil Bays announced that the evaluation form for the meeting could be returned at the registration table and that receipts for the meeting were available in room R 167. If anyone wanted to take the afternoon tour, he/she should meet at the back door of the science building at 1:10 pm.
13. There being no further business, the motion was made, seconded, and approved unanimously to adjourn (10:12 am.).

Respectfully submitted,

Larry Ferren  
Secretary-Treasurer

Honorary and Emeritus Members

*Honorary membership* is granted only by a unanimous vote of the Executive Council, and shall be reserved for those persons who have rendered extraordinary service to the Association or who have made noteworthy contributions to the improvement of chemistry teaching in member colleges. To be considered for honorary status, the candidate must be nominated by a colleague in a letter submitted to the Secretary-Treasurer at least one month prior to the Annual Meeting at which the letter is to be considered by the Executive Council. A second letter of support from another colleague should also be submitted at

least two weeks before the Annual Meeting. These letters should attest to the criteria needed for honorary membership status.

*Emeritus membership* is reserved for any person who has been an active member of MACTLAC for 10 years and who has retired from teaching. An Emeritus member will be excused from further payment of dues and will be listed as an Emeritus member. Anyone seeking Emeritus membership should request it, preferably by sending a letter of request to the Secretary-Treasurer of MACTLAC.

Elected to emeritus status at the 2006 Executive Council meeting were the following people:

Dr. Arlen Viste	Augustana College ( Sioux City, SD)
Dr. Wayne Wolsey	Macalester College (St. Paul, MN)
Dr. Luther Erickson	Grinnell College (Grinnell, IA)

# Chemistry at the Interface of Biology, Chemistry and Beyond

**MACTLAC 2007  
Viterbo University  
La Crosse, Wisconsin  
October 19-20, 2007**

*Bring a Colleague from your Biology Department ☺*

## MACTLAC News

### MACTLAC Placement

MACTLAC's Placement Officer maintains a list of faculty positions available within the MACTLAC Colleges. Our goal is to ensure that candidates are in contact with the colleges having positions available. The Placement officer also has a list of candidates who are seeking positions if any schools are interested in making contacts with promising candidates. See the advertisement for MACTLAC Placement on the next page.

A list of available positions is also kept on the website at <http://www.mactlac.org/>.

### MACTLAC Website

MACTLAC's website is located at <http://www.mactlac.org/>. Feel free to visit the site to get information on the organization and the services that it offers. Check out the links page. There are some things on that page that might be of interest to some of you.

### Listserv Set Up for MACTLAC Members

Craig Bieler, MACTLAC's webmaster, has set up a Listserv for the members of MACTLAC to use for discussion of topics of mutual interest.

*To subscribe:* Send an email to [imailsrv@mactlac.org](mailto:imailsrv@mactlac.org) with the phrase 'subscribe mactlacinfo (your full name)' as the body of the letter. Place nothing in the subject.

*To post:* Send your message to [mactlacinfo@mactlac.org](mailto:mactlacinfo@mactlac.org).

*To unsubscribe:* Send an email to [imailsrv@mactlac.org](mailto:imailsrv@mactlac.org) with the phrase 'unsubscribe mactlacinfo' as the body of the letter. Place nothing in the subject.

**MACTLAC Placement**

**Send All Positions**

**to**

**Larry Ferren**

**[lferren@olivet.edu](mailto:lferren@olivet.edu)**

**Refer Job Candidates**

**To the Same Address**

## Discussion Groups A

### Friday 3:15-4:00 p.m.

#### **Discussion Session: A1**

Date: October 27, 2006

Time: 3:15 pm

Topic: Health Sciences

Discussion Leader: Kathleen Antol

Name & e-mail of recorder: Kathleen Antol [kantol@saintmarys.edu](mailto:kantol@saintmarys.edu)

Notes:

Discussed one semester GOB as an insane idea.

Discussed text books.

Order of topics followed in texts was discussed.

Shared ideas.

The health sciences group began by discussing the idea proposed by some schools and/or nursing departments of a 1 semester only general organic biochemistry course. All MACTLAC members in attendance agreed that the idea is seemingly "insane" and that it was just as stress-laden on faculty as it was on students. The group also discussed and compared the text books that each was using. Discussion centered on the order in which the texts presented topics and the pros/cons of certain approaches. Also discussed: which GOB topics are most important for nurses to know. What topics are absolute? Which can be left out? Ideas were exchanged. Time ran out.

#### **Discussion Session: A2**

Date: October 27, 2006

Time: 3:15 pm

Topic: General Education

Discussion Leader: Dan Smith

Did not meet

#### **Discussion Session: A3**

Date: October 27, 2006

Time: 3:15 pm

Topic: General Chemistry

Discussion Leader: Willa Harper

Name & e-mail of recorder: Bryan Isaac [IsaacB@BethelCollege.Edu](mailto:IsaacB@BethelCollege.Edu)

Notes:

We started with introductions.

Question over how were keeping student's interest, since General Chemistry can appear similar to what it was 30 years ago.

Larry Funk (Wheaton) described their present approach: 1st term General, 2<sup>nd</sup> term is Inorganic chemistry. Down sides: no textbook for 2<sup>nd</sup> term, not as suited to Bio majors; upsides: intro to materials for engineering, better starts for chemistry majors.

Next question: How connected are labs to the course— typically very connected. How much of lab focuses on skills and how much on content?

One (St. Mary's- Phil Bays) to introduce content for use in class; [highlighted entropy section in General chemistry text.] Much discussion over relationship to lab/lecture... connections are important; order less important; leave opportunity for them to think through/ make decisions themselves.

Next topic: How to teach chemistry so as to attract more students and increase their interest?

- attempt to correlate class work with their familiarity outside of class;
- demonstrations are very valuable (note: also have students write about what they observe);
- set up a mystery to solve (CSI); have students work together

Molecular modeling ... as a lab... a good sense of chemistry for students; good pay off (good computerized methods were highlighted)

Much discussion about other issues:

- What about the math?
- What about interconnections with past material?
- How do you inspire them?

October 27, 2006

#### **Discussion Session: A4**

Date: October 27, 2006

Time: 3:15 pm

#### **MACTLAC MEETING DISCUSSION SECTION A4**

#### **TOPIC: ORGANIC CHEMISTRY LECTURE**

William B. Martin, Lake Forest College, Discussion Leader

Laura J. Kateley, Lake Forest College, Recorder

### **1. Opening remarks**

Organic chemistry is taught at different levels to meet different long-range student goals, e.g., it may be taught for pre-health professionals or for chemistry majors, or often to meet a diversity of goals with a single course. To gauge the success of a course, we look at student outcomes.

A common focus of an organic chemistry course is structure and mechanism. What is the content of an organic chemistry course at the present time? How do we modernize the content? What currently significant reactions do we study? How do we handle spectroscopy? How is advanced organic chemistry presented?

Do the current courses include, for example, an introduction to organometallic chemistry using palladium catalysts?

### **2. Discussion and observations**

#### **Organometallic Reactions**

Organometallic chemistry was perceived to be an approachable topic for the undergraduate, with minimal emphasis on stereochemistry. If this is included, what is omitted? It was noted that many courses no longer include derivatization reactions.

One approach described a second semester in which students pre-selected topics and organometallic chemistry was a potential topic.

#### **Outside Examinations**

It was observed that the content of the MCAT might not be a very good indicator of the appropriateness of the topics in an organic chemistry course. On the other hand, a good course should provide students with the tools to handle this exam as well as others, e.g., the ACS exam. A comment was made that the MCAT lags behind current texts and the ACS exam does too, but not as much.

#### **Outside Presentations**

Do we provide our students with opportunities to hear sophisticated presentations by organic chemists? Most seemed to feel that students would benefit. What is the value of this experience? Should our students understand any of what is presented? Does the organic chemistry course enable students to have at least some understanding of what is new to them in these presentations?

## Spectroscopy

When and how is spectroscopy introduced? NMR is important in all of our courses, but the method and emphasis varies. Some do carbon 13, others emphasize proton NMR, some consider DEPT important. Many give the student a fair amount of hands-on NMR experience, e.g., analysis of products from their laboratory syntheses. All expect students to do at least some spectral interpretation using problem assignments. This is particularly important for a few departments without instrumentation.

Use of NUTS software or NMR Pipe to do Fourier transforms was mentioned. Only one course mentioned using NMR to look at impurities in student samples.

## Courses on General, Organic, and Biochemistry (GOB) and Courses for Nursing

How much organic chemistry is included in these courses? In addition to functional groups and some nomenclature, reactions types that occur in the human body are examined with some limited mechanistic features; include are hydrolysis, oxidation, etc. Intermolecular forces, such as those typical in proteins, are studied.

## Advanced Organic Chemistry Courses

Some have a laboratory and some do not. Some are focused on physical organic chemistry and others emphasize synthesis and/or mechanisms. Carey and Sundberg was mentioned as a valuable text. Advanced topics are also among the offerings, including topics such as 2D NMR, drug design, physical organic, polymers, and a course focused on using the literature. Topics such as these are under consideration for a new 3 week January term course for juniors and seniors.

## Discussion Session:A5 – Set of Notes Number 1

Date: October 28, 2006

Time: 3:15 pm

Topic: Physical Chemistry Lecture Discussion

Warren Kosman, Discussion Leader

Henry Bent, Recorder

### Demos

1. Coin on hot plate-  
Bimetallic coin. Invert after heated.
2. Excitation & de-limiters.  
Use of marbles. Select out of bag to produce population diagrams. Spread of energies.
3. Pendulum. Describe probability distributions
4. Nuclear shielding using can or metal ring & compass. J.Chem.Ed.

5. Triple point for CO<sub>2</sub> using polycarbonate tubing. Compare with phase diagram. J.Chem.Ed.  
Kinetics done using phenylenediamine. A→B→C. Also, with Co to distinguish between catalyst and intermediate.
6. Methylene blue kinetic demo.
7. Movie: “You Can’t Go Back.”

## Discussion Section A5 – Set of Notes Number 2

3:15 pm

27 October 2006

Time: 3:15 pm

Physical Chemistry

Discussion Leader: Warren Kosman

Recorder: Cindy Woodbridge, [cmwoodbridge@hillsdale.edu](mailto:cmwoodbridge@hillsdale.edu)

- 1) Demonstrations and AV materials incorporated within PChem lecture were discussed. One source mentioned was Norm Craig’s (Oberlin College) “A Demo a Day in Physical Chemistry.” Demonstrations that were shared included
  - a. Heating a bimetallic disc on a hotplate and discussion the conversion of heat (random motion) to work (ordered motion)
  - b. Using white/black marbles to describe populations
  - c. Using a simple pendulum (nut suspended on a string) to discuss harmonic motion and the harmonic oscillator
  - d. Demonstration of chemical shielding using a compass, soup can and magnet (this was published in JChem Ed ~ 7 years ago)
  - e. An apparatus for carbon dioxide sublimation that illustrates the triple point, phase equilibrium, densities of materials. The apparatus consists of a 10” x 0.5” piece of Lexan tubing with appropriately threaded ends. One end is plugged with a brass plug. The other end is fitted with a 4-way cross. The cross should be fitted with an adjustable pressure relief valve, a pressure gauge capable of reading up to 200 psi, and a manual valve. Will Polik (Hope College) provided a sketch of this apparatus.
  - f. Harry Bent’s Video “You Can’t go Back”
  - g. Kinetics using phenylenediamines. In the first reaction, DPD reacts quickly and a flash of color, Wurster’s red, is observed. In the second reaction, TPD reacts with bleach more slowly to form a blue (Wurster’s blue) radical cation. This demonstration is a nice illustration of steady state effects. Tom Kuntzleman (Spring Arbor University) provided detailed structures/reactions for this.
- 2) We also discussed the structure of PChem lecture, in particular the order in which one proceeds. Most participants use one of the two traditional formats: Thermo followed by Quantum or Quantum followed by Thermo; where kinetics was incorporated varied somewhat. Hope College employs the following approach: a semester of Macroscopic (w/ some Stat Thermo included) PChem followed by a semester of Quantum/Spectroscopy. A third semester, taken by PChem students

only, encompassed advanced topics like group theory. Valparaiso structures the year by starting with non-interacting particles (gases) and then moves to physical interactions and, finally, chemical interactions.

- 3) Some effects of adding a Biochemistry major or Biochemistry option were discussed as well. At Viterbo, Quantum used to be taught in the first semester, but the addition of a Biochemistry major required that the Thermo/Kinetics course, which the Biochemists needed) be taught first in the sequence.
- 4) Survey of textbooks in use: Atkins (2); Dill & Bromberg + McQuarrie's Quantum Chemistry (1); Engel & Reid (1); Laidler (2); Levine (1); McQuarrie & Simon (2)

#### Discussion Session: A6

Date: October 27, 2006

Time: 3:15 pm

Topic: Inorganic Chemistry

Discussion Leader: Bill Morrison, University of Evansville

Name & e-mail of recorder: Jason A. Cody, [cody@lakeforest.edu](mailto:cody@lakeforest.edu)

Notes:

Mike Collins @ Viterbo

Matthew Riehl @ Bethany Lutheran College

Jason Cody @ Lake Forest

Chris Van Orman @ Hillsdale

Frances Crean @ St. Xavier

Jim Goll @ Edwards College

Lori Watson @ Earlham

Kent Renkema @ U. Evansville

Changes in the field?

inorganic materials vs. organometallic

"Nanotechnology for Dummies" gives base

Continuing education opportunities

Nanotechnology is not in the textbooks

5 core courses approach to curriculum (CPT)

This means our prerequisite might change

Bonding|Group Theory|Organometallic ratios?

Some materials topics are covered in Physics sequence

Is our sub field relevant to students?

Yes, but they may not know it

We must show our enthusiasm and show them the connects to other interests.

Descriptive chemistry?

outside reading in parallel

descriptive chemistry through Redox

Where does Inorganic fall in curriculum?

senior year, junior year; second & senior

Can group theory appear throughout?

yes, but the students fear the topic and it doesn't appear in textbooks

Computational chemistry in curriculum?

yes, as often as possible but few inorganic resources available (as they are in organic examples)

Bioinorganic?

many biochemistry majors choose inorganic as elective- because proteins often contain metal atoms

this is where their interest lies

Textbooks in use?

Mielser & Tarr      Shriver, Atkins, Langford

Housecroft & Sharpe

Lab texts?

15 year old microscale book will soon be out of print

Newest Angilici book is not microscale

#### Discussion Session: A7

Date: October 27, 2006

Time: 3:15 pm

Topic: Classroom Work- Biochemistry

Discussion Leader: Kristy Miller- University of Evansville

Name & e-mail of recorder: Doug Schirch, [dougms@goshen.edu](mailto:dougms@goshen.edu)

Notes:

I. Introduction: 6 present

II Discussion 1 and 2 semester biochemistry courses. What does your school do? If 2 semesters, how is it broken down? What pre-requisite does your school require? Discussion of dept. politics involved between biology and chemistry departments. Pressure to weaken pre-requisites.

What texts are used? Lehninger, Horton, Voght & Voght, Stryer.

Some courses have case studies or published papers presented by students.

How many have ACS test? 3 do. How useful do you find it?

Mixed opinions about usefulness.

Do schools have 1 or 2 semester labs? Most have 2 semesters of lab to go with

two semesters of class.

Digression to how GOB taught. Usually 2 semesters, but growing pressure to switch to 1 semester.

Discussion moved to how labs are run, budget, and pace-setting.

**Discussion Session: A8**

Date: October 27, 2006

Time: 3:00

Topic: Analytical/ Instrumental

Discussion Leader: St. Carol Meyers

Name & e-mail of recorder: Anne Gull, [anneg@saintjoe.edu](mailto:anneg@saintjoe.edu)

Notes:

Is there a difference between Analytical and Instrumental? Yes

How many have separate courses in Instrumental and Analytical? Several hands rose.

St. Carol brought copy of list of instruments that USF has.

Which instrument is most important to you?

Lori from Lake Forest: GCMS- used in airborne pollutant detections (she also does the up keep- no service contract) She purchased with start up funds.

Scott Carr: classical analytical can be taught without instruments at all.

M. Applebee (Elmhurst): Instrumental is 6-mini course modules on HPLC, NMR, Spectroscopy, Electrochemistry, \_\_\_\_, \_\_\_\_. Had a lot of these PhCon grants, CCLI,

Discussed how to repair instruments. or how to run instruments. Instant manuals with digital camera.

Discussed how we find time to get/keep instruments running.

SMC has agreed to get instruments fixed. They have decided that a service contract is not worth it.

In small departments, an analytical chemist becomes the default. We need a users group to talk about expertise of fixing instruments.

Lori: Idea about grant for students to be trained on instruments so they are there.

Discussed regular students' lab assistants who normally don't work with instruments.

Lake Forest has a lab requirement in every chemistry course, so instruments are used regularly.

Discussed Computer Center (IT) conditions for certain instruments.

Lake Forest- Computer upgrades can pay for instrument upgrades so computer people don't have to support old computers.

Rockford College- a person who rents space from industry can make instrument available to students and hire students.

Summary: instrument variety

1. faculty have to service instruments (time & money)
2. Curriculum wise- get instruments usage into course
3. ACS certified school-  
Lake Forest discussion of contact hrs. 22-24 is some  
Viterbo  
Elmhurst  
St. Mary's  
Rockford

How much electrochemistry is taught in Instrumental? Not much is taught because it's usually last.

A lot of electrochemistry advances are relevant to biochemistry/ molecular biology, so we may need to revisit electrochemistry about including it.

Anderson- writing course for Analytical

How are data recorded?

lab notebook and computer and file and journal style lab report.

**Discussion Session: A9**

Date: October 27, 2006

Time: 3:00

Topic: Karen Draths

Discussion Leader: Karen Draths

No notes were submitted.

**Friday 4:30 – 5:15 p.m.**

### Discussion Groups B

#### Discussion Session: B1

Date: October 27, 2006

Time: 4:30 pm

Topic: Health Sciences Laboratory Exchange

Discussion Leader: Joe Ward

Name & e-mail of recorder: Sunil Malapati, [sunil.malapati@clarke.edu](mailto:sunil.malapati@clarke.edu)

Notes:

Custom Lab manuals- Hinckley (Houghton- Mifflin)

Analysis of Milk

everyone would like to have a copy of the lab

How creative are the labs?

molecular models of isomerism

mutarotation of glucose

Chemstation -software

Datastudio- Pasco Xplore1x

user friendly portable

price friendly

labs for iron, Zirconium burning Calorimetry

browning aApples

invertase reaction

textbooks

#### Discussion Session: B2

Date: October 27, 2006

Time: 4:30 pm

Topic: General Education Laboratory Exchange

Discussion Leader: Jason Cody

Name & e-mail of recorder: Jason Cody, [cody@lakeforest.edu](mailto:cody@lakeforest.edu)

Notes:

Dave Oostendorp Loras College  
make paint, frescoes

Chemistry & Art 24 students 2hrs +3 hrs. lab,  
last 6 weeks projects

Bal Barot  
Anne Gull

Lake Michigan College  
St. Joseph's College

Intro Chem for liberal arts  
Core 1-10 taken by all student; core 5&6  
are physical and life science

10-12 faculty team teaching

mixed up powders- which is flour, sugar, etc?  
Chem 101- 2 hour labs, 2 hour class time

Books: Changing Chemistry in Changing Times  
Caveman Chemistry (series of labs)

Difference with H.S.?

content similar, level of understanding of abstract concepts deeper; science is a  
process not a list of facts

Labs- one approach is to use over the counter materials for comparison/analysis.

The ACS text Chemistry in Context has labs

GEC redesign

Science courses must have 1. scientific method, 2. a research component, 3. at  
least 10 page of process writing, 4. all have a math prerequisite for linear regression, etc.

#### Discussion Session: B3

Topic: General Chemistry Laboratory Exchange

Discussion Leader:

Name & e-mail of recorder: Karen Nordell Pearson, [nordell@lawrence.edu](mailto:nordell@lawrence.edu)

Introduction done

I.	Lab reports	
	write out	(1 in second semester)
	lab notebook	4
	worksheets	1
	online (memory sticks)	1

-several have combination of lab notebook/report and worksheets

-there are concerns about legibility (electronic notebooks?)

-interest in general propagation of skills

II. How to record data sheets  
have it written on board  
talk through it with students

use pre-lab questions to relate labs

III. Pre-lab questions  
 vast majority use pre-labs  
 some use computer-based  
 can be used to set up data tables  
 grammar is a great concern & most will deduct for it  
 writing across the curriculum has made a difference

IV. Labs  
 formation of zinc iodide (Stoichiometry) T. Miller  
 Alka-seltzer/ vinegar (limiting reagent) T. Miller  
 Bromocresol green (equilibrium) M. Seymour  
 Titration/Standardization/base in (pH/titration) W. Burns  
 Alka-Seltzer 2 week  
 Kool-Aid labs T. Miller

-discovery- can have frustration, especially at first  
 -current generation doesn't know how to handle no instruction esp. in calculations  
 -interpersonal interactions can have huge impact

V. Calculations  
 Becoming too black boxed  
 students overly depend on calculator  
 can be harmful to students if we are overly helpful

VI. Retention  
 most schools do not look at retention within class to reflect on instructor

#### Discussion Session: B4

Topic: Organic Chemistry Laboratory Exchange

Date: October 27, 2006

Time: 4:15 pm

Discussion Leader: Susan Klein - Manchester College

Name and email of recorder: Steve Wathen, [swathen@sienahts.edu](mailto:swathen@sienahts.edu)

Notes:

- \$ Using lab notebooks, importance of communication skills (written as well as oral)
- \$ Susan Klein's ACS affaires make their own lab notebooks
- \$ Using lab exams to see if students can demonstrate knowledge without relying on lab partners. Written exam or skills exam.
- \$ Green Chemistry - macroscale versus microscale, biodiesel lab is using bleach for oxidation "green" chemistry?
- \$ TLC labs:

- Pigments in spinach
- Pigments in inks
- pigments in green peppers, red, yellow peppers
- TLC of analgesics
- following a reaction by TLC
- using Spartan to calculate dipoles, predict order of elution on TLC
- biodiesel - visualize with I<sub>2</sub>
- using lab texts or handouts, using lab technique book

\$ Does anyone use unknowns? mostly just with spectra

#### Discussion Session: B5

Date: October 27, 2006

Topic/Title: Physical Chemistry Laboratory Exchange

Discussion Leader: Dawn Wisler

Name and e-mail of recorder: Lori Watson, [wasolo@earlham.edu](mailto:wasolo@earlham.edu)

- \$ Do you use a text or create your own?  
 -Texts are too expensive, don't do most of the experiments, physical set-ups rarely match the description  
 -One user Sime, 1990 but it's out of print, has good section on lab technique, treatment of data, etc.  
 - Prentice -Hall custom labs from HalPay'on - minimum 25 copies, but book representatives may help with few runs.
- \$ One hard question is what can you do with your equipment? Gases are somewhat problematic.
- \$ There's a split between people who have lecture only and lecture with labs. Some have physical chemistry only every other year.
- \$ Some have relatively large classes (2 have 30), mostly due to requirements from biochemistry major. Most have between 8-15 per year, or every other year.
- \$ Computational Chem.  
 -Hyper Chem - Gaussian - Increasingly important  
 -Particular ones-  
   Bam's colorimeter of Naphthalene (Compute and Measure) - J. Chem Ed.  
   Entropy Compute (J. Chem Ed)
- Students respond better when computation is integrated with experiment.
- J. Chem Ed - 1,3 cycloaddition -do experiment in Org II, computation in p-chem Ref. Martin, WB. Kateleg, L., Wigen, DC, Brummond...
- Any new experiments? Particularly bio application?  
 -Vibrational Spectra of SO<sub>2</sub>: Matt el Rod  
 extend analysis related to greenhouse radiation trapping. This is what the Kyoto protocol was based on. So relate to current political climate.  
 -Thermodynamics of protein/ Ligand binding. Submitted to J. Chem Ed. Measure K<sub>d</sub> at different T, get ΔH's, ΔS's of binding.

- § Students seem to have more fun picking experiments.
- Viscosity - styrene in different solvents (in Sime) could make this biological focus.
  - Nanotech - through UW-Madison
    - mrec on-line lab manual
    - nanodots -> p-chem particle in a box
  - Lasers –
    - Vibrational spectra of I<sub>2</sub> with laser induced fluorescence instead of absorbance. Need tunable laser.
    - IR and Raman Spectrum
  - Experiment by Luther Erikson, J. Chem Ed
    - Different mixtures, measure lots of things
    - Density, boiling point diagrams, etc.
    - They are given the identity of the 2 components

- § How do you schedule lab?
- Rotate among several experiments
  - The 3-hr lab is mostly to introduce it. They may need other time during the week.
  - Fewer labs, more emphasis on lab writing
    - 3-wk exp -> 2 lab periods data collection then data analysis, then writeup
  - Those that have labs as separate classes, sometimes have lab lecture.

- § Most favor groups of two-three is not ideal
- § Podcasts instead of pre-lab lectures with/quizzes
- § Non instrument dependent labs
- gases, weight/density -> then boil, good demonstration of non ideality
  - UV versus kinetics - bromination
  - conductivity measurements
  - J. Chem Ed - paper pointed to study opalescence of a mixture
- § One lab report is an oral laboratory (this case keto/enol tautomerization)

**Discussion Session: B6**

Date: October 27, 2006

Time: 4:30pm

Topic/Title: Laboratory Exchange – Inorganic Laboratory Exchange

Discussion Leader: Larry Funk

Name and e-mail of recorder: Kenton Renkema, [kr79@evansville.edu](mailto:kr79@evansville.edu)

Notes: Introduction

- § How is Inorganic being taught?

Wheaton - 2<sup>nd</sup> semester bonding, descriptive

- upper level - advanced topics (2 credits)

North Central

- Sophomore, descriptive, Acid/Base, Solid-state

- Upper Level, Huheey -bonding

- Lab analysis/synthesis 80%

- Lab synthesis/-more analysis

Viterbo - fall senior year - lab/lecture (4hr)

- 2<sup>nd</sup> semester for ACS majors

Goshen

- 1 semester Jr/Sr, classic G Chem, PChem leads in (3 lect/1lab)

- Organometallic, air-sensitive, powder diffraction

U. Evansville

- 4<sup>th</sup> semester qual, descriptive, Redox, coordination lab

- Jr/Sr Advanced bonding, Symmetry, Organometallic lab

Hillsdale - Sr-level, P-Chem precursor, (3 credit/1lab)

- 5-6 labs, synthesis - analysis, Inert, Glovebox

**Discussion Session: B7**

Date: October 27, 2006

Time: 4:30 pm

Topic/Title: Biochemistry Lab Exchange

Discussion Leader: Deborah Breiter

Name and e-mail of recorder: Kristy Miller, [km123@evansville.edu](mailto:km123@evansville.edu)

Notes:

Introductions were made and description of departments (ACS accredited, # of faculty, etc).

There were discussions of math requirement for department with biochemistry majors.

Discussion moved to how many semesters and credit hours of labs.

D. Breiter mentioned that many of biochemistry labs seem to involve proteins but not carbohydrates or lipids. However she has students make their own soap for a lipid lab (makes good Christmas present), students test pH, and pick own molds and “add ins” (oatmeal, flowers, etc.) Students pick own recipe and explain things like saponification, etc.

There was also mention of extraction of fatty acid esters from nutmeg.

Protein biochemistry labs that were discussed (separation of cytochrome c and hemoglobin, protein concentration, tyrosinase kinetics, also spirileana protein). Lysozyme denature and renaturation.

Carbohydrate biochemistry lab discussed was reacting unknowns with different reactants.

Also polarimetry of unknown. One group identified an unknown carbohydrate using polarimetry.

Beginning biochemistry labs involve calibrating pipets, pH meters, making pH meters, making solutions.

### Discussion Session: B8

Date: October 27, 2006

Time: 4:15

Topic/Title: Analytical/Instrumental Laboratory Exchange

Discussion Leader: Michelle Applebee (Elmhurst)

Name and e-mail of recorder: Mark Nussbaum, [Mnussbaum@hillsdale.edu](mailto:Mnussbaum@hillsdale.edu)

#### Notes:

- \$ Have the students design their own experimental procedures for a given, broadly-described experiment. Makes them take ownership for what they're doing.
- \$ Importance of sampling/sample preparation
- \$ Solid-phase microextraction of snow samples (GC-MS for benzene or other aromatics); getting representation sampling or understanding the limitations of the sampling.
- \$ Trace metals in waste water treatment sludges (e.g. Pb)
- \$ Measurements of Pb - by Atomic Absorption
- \$ Use of short ("Rocket") HPLC columns for fast chromatography
  - Students develop experimental procedures, calibration standards, etc.
  - 5 min. run times; looking @ caffeine in green teas
  - Caffeine/benzoate/aspartame in soft drinks
- \$ Varying pH w/ HPLC to see why retention times change (e/g/ benzoic acid)
- \$ Separating food dyes (e.g. Kool-Aid dyes) using spectroscopy
- \$ Vitamin C clock reaction (i.e., measuring time vs. ascorbic acid concentration)
- \$ Fluorescence of quinine in urine, after drinking tonic water (students take their own urine samples)
- \$ Aflatoxin in coffee - fluorescence measurements of  $\alpha$  -  $\beta$ -aflatoxins in different types of coffees.
- \$ Do you have students go to the library?
  - Online access to ACS journals, etc.; may not need to go to the building.
- \$ SCI Finder Scholar - very helpful search engine, would be nice to have a MACTLAC group license, or shared access.
- \$ Electronic nose - "smell prints"
- \$ Interest in sharing our favorite labs on a common site
- \$ What software do our students need to know?
  - Excel (spreadsheet, Solver)
  - Igor Pro software; simple to program
  - Data collection software (LabView) - St. Olaf developed great interface with it.
  - Can we get "retrofits" of old software; OLIS is a company that does it (e.g. for

HP or Beckman instrument)

- \$ -Adv/Disadv. of having instruments interfaced with computers vs. having them collect and plot their own data
- \$ Titrations by mass vs. volume
- \$ Titrations of wine and other real-life samples
- \$ Kinetic assays / biochemistry (w/ uv-vis absorbance)

### Discussion Session: B9

Date: 2006

Time: 4:30 pm

Topic/Title: Lab Safety

Discussion Leader: Harry Elston (Midwest Chemical Safety)

Name and e-mail of recorder:

#### Div Chem Health & Safety

Can put in for membership

Small colleges do not have chemical health

safety officers on campus

-tend to depend on facilities people for things like air flow; safety showers, etc.

#### Health-

-governed by OSHA or state DOL

-forms basis for safety litigation

-offset by workman comp for employers

-students not covered under workman's comp seek redress through litigation

-OSHA is not going to come in unless you kill somebody (an employee, not a student where they don't have jurisdiction)

-Environmental- U.S. (EPA) or state regulations- this is where we are more likely to get in trouble

Regulations are vary complex (EPA)

Relief for colleges & universities may be forthcoming in two or three years- move to performance based regulations

OSHA- coming to small campuses more and more

[Won't discuss workmen's comp at this session]

#### Foundation

-safe plans

- chemical hygiene for lab sciences on campus

- other plans for other areas

-more centered on safety issues than chemical hygiene  
good ladders, etc.

### Health and Safety Exposure Control

- how do you know that the hoods are working?
- what are you doing about it?
- cost/benefit considerations

### Next hot button issue: Chemical Security

- how are chemicals kept safe from unauthorized use
  - not regulated at schools yet
  - will within 5 years

### Environmental [a revenue stream for regulating agencies like EPA]

- waste management the major issue
- \$1000-\$5000 fines per incident- 3 improperly labeled bottles= 3 incidents for smaller schools- Region 1 east coast currently being targeted

Midwest not targeted yet, but coming

Relief is 2-3 years away-

- EPA allowing labs to develop an environmental plan and their evaluation of compliance will be performance based- with demonstrated compliance with the plan being criterion for judgment

### Chemical Aging

- NaCl doesn't age- inorganic salts probably last forever, effectively
  - organics a whole different solution
  - solvents become useless
  - oxidation (e.g., ethers) can occur on standing
  - will be putting shelf life on chemicals
    - Fischer is starting to do this now
- NO REGULATION THAT SAYS YOU CAN ONLY KEEP A CHEMICAL FOR SO LONG
- In some ways if you call something waste, you can keep it forever  
If you are a conditionally exempt small quantity generator- you are free of some regulations

Can request a EPA # for just a subunit on a campus (e.g., a chemistry department) & get a more "lenient" status from EPA

Does doing a complete audit put us at risk? If you know what you are not doing and don't care- you are in trouble

If you can show that you are doing something - may be OK even if not up to speed yet.

Are there published check lists that could be used to see if you are up to speed?  
-Not immediately available

Labeling problem-

Have to label bottle as hazardous waste-  
Label "Hazardous Waste"

Recycle? How to be true recycling  
using again in a facility is reusing, e.g., redistilling acetone  
recycling means sending something off to be turned into something else  
-Sham recycling- all my hazardous wastes in a container and keep it forever [effectively storing it] - was used by some by now a one year limit has been imposed to prevent this.  
-Recycling and reusing solvents is fine  
-What's left in the still pot- its still "an experiment"  
-When it goes into a bottle to be sent off its "hazardous waste"

Where to store the wastes:

- 2 types
- central accumulation area- volume determined by your status
- 1-55 gal drum- satellite area

CONDITIONS:

need proper ventilation, good lighting, 3-6 air changes/

Transporting chemicals (e.g. FOR DEMONSTRATIONS AT SCHOOLS)

- transporting waste over public roads
- need a licensed transportation
- transporting on campus-NOT REGULATED-  
solution: bring groups to campus whenever possible

### Pregnant Student

- cannot advise them- decision must be students in consultation with her physician
- student, her physician and chemistry teacher can confer- chemist should supply list of all chemicals to be encountered in laboratory along with their MSDS
- may need more data or toxicological data and need a primary PATTY'S TOXICOLOGY
- keep a record of interaction signed by student to acknowledge the informed decision
- Essentially- following this protocol- the physician recommends dropping the course 100% of the time

## **Notes for Breakout Sessions for William Polik**

**Saturday 11:00-11:30 a.m.**

That which follows are the raw notes of each group that met during the 30 minute session during discussion session C. I have made no attempt to align these with particular

discussion leaders that were assigned to groups unless that information was recorded on the sheet for fear of attributing the wrong comments to the wrong persons. Some are in pretty rough shape, but that is the way I received them.

**Discussion Session: C**

Date: October 28, 2006

Time: 11:00 am

Topic/Title: Innovation of Curriculum within New CPT Guidelines

Discussion Leader:

Name and e-mail of recorder: Bruce Baldwin, [bbaldwin@arbor.edu](mailto:bbaldwin@arbor.edu)

Notes:

General chemistry is outside of foundation. This is a problem for working within same school curriculum at certain schools that are already innovating.

For some the new guidelines- They may actually restrict innovation.

The new guidelines don't seem to encourage innovation, because some current innovative curricula describe the content in inter-disciplinary ways. Many classes from traditional labels are distributed among fewer umbrella courses.

Talking about content (skills, etc.) will allow true flexibility while talking about courses and labels seems to not allow integration of concepts and skills.

Degree tracks

From a present viewpoint the degree tracks seem to require extra classes added to the present curriculum.

New ideas?

Replacing seems to not be desirable because our current curriculum is solid and well reasoned.

We seem to emphasize the  $\Delta S$ .

**Discussion Session: C**

Date: October 28, 2006

Time: 11:00 am

Topic/Title: New Curriculum Innovations Supported by the Proposed ACS Guidelines

Discussion Leader: Group Discussion

Name and e-mail of recorder: Mark Muyskens, [muym@calvin.edu](mailto:muym@calvin.edu)

Notes #1:

1. Too much P. chem in intro chem part of 1<sup>st</sup> year (especially thermo) is Intro to P. Chem 1<sup>st</sup> year Gen Chem & Intro to Phys Chem
2. 1<sup>st</sup> Semester Organic Chemistry really introduction to 2<sup>nd</sup> semester organic truly more in depth  
  
Grinnell College using a text this year that does this
3. New courses: polymers, material science, medicinal chemistry
4. spiral approach in all courses  
1<sup>st</sup> sem general chemistry only introduces topic that will be used in other courses
5. Teaching course differently must do an interdisciplinary course; could involve research

Notes #2

1. More flexibility for in-depth choices - Geochemistry, i.e.
2. Build on strengths of faculty - diversify selves from other colleges by specializing
3. Projects which are long-term that bring in several topics.
4. Maybe we could list the topics that we think need to be covered in 4 years and put them in whatever classes they fit in, not necessarily the ones they are usually put in.

-If we have to send syllabi in, it would squelch innovation.

-Do the foundations have to be done before advanced?

-Could Gen Chem II become P Chem I?

-Gen Chem no longer counts for approval?

-Teaching everything is less important than problem solving techniques.

-Chemical analysis and problem-solving class as a foundation?

-External Individual Studies - look at problems from several viewpoints - solve problems, analyze, do panel presentations, papers, assess selves (dept can assess), portfolio, and video-tape presentation.

-Joint collaborative initiative with other colleges may limit flexibility.

**Discussion Session: C**

Date: October 28, 2006

Time: 11:00 am

Topic/Title: New Curriculum Innovations Supported by the Proposed ACS Guidelines

Discussion Leader: Group Discussion

Name and e-mail of recorder:

Notes #3

1. Special tracks are a double edge sword - not enough professors to have analytical, organic, inorganic, etc (courses)...every year, but gives us an opportunity to teach more classes. Lower level credit courses to have more of them (½ credit vs. 1 credit)
2. Organic in 1 semester? Can't get into mechanisms and spectroscopy that way. Same with physical, what is fundamental? CPT supposes that you have enough faculty and students and time to offer the specialized course at 2<sup>nd</sup> semester.
3. Changing labs? Instrumentation required is costly.
4. General chemistry one semester or two? Maybe two tracks, to push some ahead to organic or analytical second semester 1<sup>st</sup> year or second semester is inorganic.

Innovation:

One-2-one idea

One semester general chemistry

2 semesters organic (split by the summer) - organic chemists in the room agreed.

one semester analytical (required for most)

**Discussion Session: C**

Date: October 28, 2006

Time: 11:00 am

Topic/Title: New Curriculum Innovations Supported by the Proposed ACS Guidelines

Discussion Leader: Group Discussion

Name and e-mail of recorder:

Notes #4:

1. Assignments/some expectations that direct students to look toward interdisciplinary connections.
2. \*\*Extend the interdisciplinary objective to courses - e.g. forensic chemistry, Environmental, chemistry, material chemistry - and consider value-added by team-teaching.
3. Consider what you're really teaching now...the same title has been on the course for decades, but so often the content has changed.
4. What about doing away completely with our sub-disciplines...would we promote innovation by considering a different framework - one example: structure, synthesis, analysis, kinetics.

5. Another avenue for innovations, instead of content...these foundation building blocks...what about more attention to a broad overview...teaching course objectives in the context of an overall theme.

Discussion Session: V

Date: October 28, 2006

Time: 11:00 am

Topic/Title: New Curriculum Innovations Supported by the Proposed ACS Guidelines

Discussion Leader: Group Discussion

Name and e-mail of recorder:

Notes #5

Pros

\*More attractive to students –

Cons

Big complaint is that the new guidelines are not flexible and they change sequence of courses – The kind of textbook might be a turn-off,

We need to do more fun stuff in lab.

1. Allow for innovations outside ACS guidelines - outside school experience.
2. Long distance learning, full-time faculty not needed for quality
3. Broaden meaning of (department) - not just expertise in a school -Using expertise/resources that allow meeting the curriculum goals and outcomes department sets up for itself
4. Students stockroom workers learn - give lab hrs 300 level course - assisting organic lab (1 credit)
5. Defining excellence:
6. High cost of journals

Discussion Session: VI

Date: October 28, 2006

Time: 11:00 am

Topic/Title: New Curriculum Innovations Supported by the Proposed ACS Guidelines

Discussion Leader: Group Discussion

Name and e-mail of recorder:

Notes #6:

1. Advanced courses from other departments (i.e. Geochemistry taught by a Geology professor, Nuclear Chemistry by physicist)
2. Can faculty in other departments count towards the total number of faculty if they teach related courses.
3. In-depth course topics: Forensic, Environmental Science

Discussion Session: VII

Date: October 28, 2006

Time: 11:00 am

Topic/Title: New Curriculum Innovations Supported by the Proposed ACS Guidelines

Discussion Leader: Group Discussion

Name and e-mail of recorder: Dawn Wisler, [wisler@lakeforest.edu](mailto:wisler@lakeforest.edu)

Notes #7:

Dawn Wisler, [wisler@lakeforest.edu](mailto:wisler@lakeforest.edu)

1. 2<sup>nd</sup> semester of organic becomes an organic polymer chemistry course or 2 cycle approach to organic, 1<sup>st</sup> semester, hit each chapter introductory topics. 2<sup>nd</sup> semester hit mechanisms.
2. P-chem: 1<sup>st</sup> semester foundation, but, what should it include?
3. 2<sup>nd</sup> semester P-chem lab combined with analytical lab.
4. Concern: New guidelines might restrict current innovation. For examples: Will it be required to offer analytical? If so, it eliminates the option to incorporate analytical into other courses rather than teaching an analytical course explicitly.

## VENDORS

Thanks to the vendors, sponsors and their representatives for coming to this year's MACTLAC meeting.

Chemical Education Division  
Anasazi Instruments  
Chemical Analytics, Inc.  
Midwest Chem Safety  
Griffin Analytical

## MACTLAC Officers for 2006 -2007

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## MACTLAC Weather Report

It has become somewhat of a tradition to mention something of the weather surrounding the MACTLAC meeting. The weather at this meeting was mixed. Friday was characterized as a grey, drizzly, fall day. It started out about 45 degrees in the morning. Saturday was better than Friday. It was a cool, blustery day with light clouds. Again, the temperature was about 45 degrees.