MACTLAC

MIDWESTERN ASSOCIATION OF CHEMISTRY TEACHERS IN LIBERAL ARTS COLLEGES

2012 Annual Meeting Report
The 60th Meeting of MACTLAC
Emerging Issues in Chemical Education
Albion College, Albion, MI
October 5-6, 2012

General Session 1, Friday Afternoon, 1:10 PM

Craig Bieler opened the 2012 meeting by welcoming everyone to Albion College. Craig then made several meeting announcements, and then thanked the meeting Exhibitors and Sponsors. Afterward, Craig introduced the Plenary Session speakers.

Plenary Address

A Panel Discussion of the Liberal Arts/Community College Interface
Dr. Lisa Lewis, Panel Moderator, Assistant Professor, Albion College
Dr. Natalie Crist, Visiting Assistant Professor, Albion College
Karen Cuzydlo, Associate Director of Transfer Admissions, Albion College
Drew Dunham, Associate Dean for Academic Affairs and Registrar, Albion College
Rev. Carol Mader, Academic Advisor, Lansing Community College
Paden McCown, Albion College chemistry major and community college transfer student
Sarah Simmons, Science Faculty, Gen Oaks Community College.

Dr. Lewis began the panel discussion by listing several statistics about students enrolled at community colleges. The general trend is for students to attend a community college for two or more years and then transfer to a four-year institution, which has obvious affects on four-year college enrollment.

Dr. Lewis then asked the panel "What is the typical student that attends community college?" The panel members described the wide range of students that they see at community college, from first generation students to 60- and 70-year old students coming back to finish a degree and/or learn new job skills. The panel agreed that community college faculty can have a real problem finding the right balance in their courses and in their advising for such a wide range of students. All members of the panel agreed that one of the main reasons traditional aged students chose to attend community colleges is price.

Dr. Lewis then asked the panel “How can four-year faculty support two-year faculty in their jobs?”. One panelist mentioned starting dialogs with community colleges registrars, and working on relationships to ensure that all of the credits transfer from the two-year schools to the four-year schools. It is also important that individual faculty talk with each other to ensure that the school's course sequencing line-up correctly. Transferring credits is always a problem, which makes it important for community college students to know where they want to transfer to ensure that all their credits do so. The two-year panelist all agreed that four-year schools must generate transfer guides for the two-year schools to achieve the best and easiest credit transfer, since the two-year schools don't have the time to generate those guides themselves due to the number of transfer possibilities. Another two-year panelist also mentioned that many two-year students don't really know anything about liberal arts colleges, so transfer guides could help open up possibilities for two-year students that they probably did not know about.

At this point, Dr. Lewis opened the discussion to audience questions.

Q: “How many transfer students does Albion have, and how many of those transfers have Associates degrees?”
A: Karen Cuzydlo answered that Albion has 45 transfers this year, and that they want to increase that in future years. Very few of those transfers have Associates degrees, since most have transferred after only one year at a community college.

Q: “How do you quality control the learning at the two-year schools?”
A: For quality control, relationships with two-year and four-year faculty can ensure that the two-year students learn the same things that their four-year counterparts do. Many two-year schools don't have good access to chemistry instrumentation, for example, so relationships with four-year schools can help fill that gap, for example. One problem that two-year schools have is that enrollments can be unpredictable, which means that the two-year schools often have to hire adjunct faculty on short notice leaving the school in a scramble to cover the course. Again, the panelists agreed that transfer guides would help with quality control as this would standardize advising and course work.

At this point, Michael Seymour described Hope's grant to have community college students do research at Hope during the summer as another way to build relationships between two-year schools, four-year schools, and their students. He also mentioned that transfer students must deal with a cultural change when moving from a two-year school to a four-year school. He thought that this may be a problem preventing more transfers. Good two-year advising is also a must, the panel agreed, as only very goal oriented students that do their research into where they want to transfer can successfully transfer without getting advising help. One-on-one advising is something that liberal arts colleges do well, but that community colleges can do better at.

Q: “How do you deal with summer school transfer credits?”
A: This is another area that affects all institutions that have students take classes at an institution near home during the summer. Good relationships help with these types of transfers. Michigan has a state-wide guest student application that all schools, public and private, use just for this purpose.

The only requirement for the application is that course must be approved by the home institution before the student enrolls at the guest institution. Again, transfer guides are very useful for summer transfer credits.

Dr. Lewis then asked the panelist if there was anything else that they wanted to say to the audience. Drew Dunham asked that all four-year faculty learn to respect their two-year counterparts. He emphasized that the courses at two-year schools, at least in the sciences, are the same as the four-year courses. Ms. Cuzydlo talked about how four-year schools must work with transfer students to allay their concerns about the cost of attending a private four-year school, how those costs can be minimized, and the benefits of attending a small private liberal arts school. Paden McCown, the Albion transfer student, agreed with Ms. Cuzydlo. Dr. Lewis then thanked all of the panel members, and brought the discussion to a close.

Afterward, Craig introduced Dr. Donna Randall, President of Albion College, who then welcomed the Association to Albion and thanked them for coming to campus. Craig made a few more announcements, and then asked the Indiana and Michigan members to elect new state representatives.

General Session 2, Saturday Morning, 9:45 AM

Plenary Address

Will MCAT 2015 Impact the Chemistry/Biochemistry Curriculum? A Q&A with MR5 Committee Members of the AAMC

Dr. Lisa Lewis, Panel Moderator, Assistant Professor, Albion College
Karen Mitchell, Ph.D., MCAT Senior Director (via prerecorded video presentation)
Marc Kroopnick, Ph.D., M.Eng., Manager, MCAT^{2015} Development and Psychometrics (via Skype)

Dr. Lewis introduced this morning's session by describing the Dr. Mitchell's and Dr. Kroopnick's association with MCAT. She then started Dr. Mitchell's video presentation, which was also viewed at the recent ASC national meeting.

Dr. Mitchell described the MCAT^{2015} process, the components of the new test, current medical school prerequisites, and how the new test will change that. Dr. Mitchell described the general changes being seen in the applicant pool, as well as the changes in the profession, which is impacting medical school curriculum and prerequisites. These changes can be found in a variety of reports, such as the Scientific Foundations for Future Physicians Report (SFFP, 2009). Based on these changes, the SFFP report describes eight basic scientific competences that pre-med students should know before entering medical school.

The MR5 committee began reviewing the current MCAT exam in 2008, which will result in a new test to be administered starting in 2015. This will be the sixth revision of the exam. To generate the new exam, the committee asked stake-holders about the current exam and surveyed 2,700 medical

school and undergraduate faculty to compare what medical schools want their entering students to know with what they are being taught as undergraduates. The new test will combine knowledge with inquiry skills, which were rated highly important by medical school faculty. The new exam with have four sections, each with an individual score: Biological & Biochemical Foundations of Living Systems; Chemical & Physical Foundation of Biological Systems; Psychological, Social, & Biological Foundations of Behavior; and Critical Analysis & Reasoning Skills. All four sections are closely linked with the eight SFFP competences.

Dr. Mitchell next described the fact that more students are taking the MCAT exam later in their undergraduate training than in prior years. Most students first take exam as juniors, but 27% first take the exam as seniors, and another 27% first take it after their senior year. Most student apply to medical school in senior year.

Dr. Mitchell sees admissions moving toward competency based admissions at medical schools. Medical schools want more information about interpersonal and intrapersonal competencies earlier in the application process.

Dr. Mitchell described a survey that showed 75% of medical schools want less restrictive application pathways so that students have more flexibility to show competencies. For example, six AAMC schools don't require any courses for admission, three AAMC schools don't require any organic chemistry, and one school offers a parallel admissions process for traditional and non-traditional students. Regardless of the process, students must demonstrate competencies to be admitted at each school. Resources for the new exam can be found at www.aamc.org/mcat2015.

After Dr. Mitchell's presentation, Dr. Kroopnick came on-line to entertain questions about the new exam.

Q: "Will there be less chem on exam?"
A: The weight for chemistry on the new exam will be similar to the old exam. The physical science section on the current exam has about 50% general chemistry, and there is about 33% organic chemistry in the biology section. The new exam will have 33% general chemistry, 15% organic organic chemistry, and 50% biochemistry, with another 10% across all chemistry disciplines spread out over all four sections of the exam.

Q: "How do the new questions based on competencies match up with the traditional chemistry topics since competencies don't necessarily require specific knowledge?"
A: The new questions will consist of reading passages followed by questions based on the passage. Specific knowledge to answer questions will be in the passage itself. Thus, students will need knowledge of subject to correctly answer questions.

Q: "Biochemistry is more important in the new exam. Are you staying that students should take biochemistry before their junior year?"
A: For non-traditional students, this will not be a problem. For traditional students, yes, they should take biochemistry before their junior year.

Q: "What are the math requirements in the new exam?"
A: There are no specific math requirements for the new exam, only competencies, which are very high level. It is left to the individual undergraduate schools to map their courses to the new competencies.

Q: "What courses would you take as an undergraduate to prepare for this exam?"
A: Dr. Kroopnick said that he would do two things: take introduction to psychology and introduction to sociology, or whatever courses that the undergraduate school uses to introduce these topics. Philosophy and ethics are totally up to the undergraduate school, so a board base of course work should be sufficient here.

Q: "How will the scoring the new exam change?"
A: The scoring of the new exam is still to be determined. The current thinking is that it will be 1-15 points per section. The overall score will be the sum of the four section scores.

Q: "How will biochemistry competencies match with first semester biochemistry?"
A: Schools are directed to use the iCollaborative resources to match their courses with the competencies. The link for iCollaborative is https://www.mededportal.org/icollaborative. Medical school relaxation of prerequisites should also add flexibility to the undergraduate curriculum.

Q: "What do you mean by curriculum 'efficiencies'?"
A: This is the integration of science disciplines so that they become competency based rather than being siloed as they are now.

Q: "By changing the exam, it places more importance on the exam than in the past. Will this make it more difficult for students to get into medical schools as there will be more pressure for them to do well on the exam than in the past?"
A: The exam will still only be one piece of the admissions pie as it has been in the past. It is up to the medical schools to take the new exam into account. Going to competencies adds more flexibility for students to demonstrate knowledge and skills that isn't present with the current exam.

Dr. Kroopnick closed the question/answer part of the session by clarifying that the redistribution of chemistry weight is a result of adding biochemistry to the tested disciplines.

MACTLAC Business Meeting

1. President Beth Jensen called the meeting to order at 8:56 AM. She then thanked Albion for hosting our meeting. She also thanked everyone for coming, and encouraged all to bring everyone from their respective departments to future meetings.

2. Mark Sinton presented the Treasurer's report. He noted for the members that the Association's finances have continued to rebounded due to the fact that the Beloit meeting donated their meeting profit to MACTLAC. He reminded the audience that the Association should not count on future host institutions to be so generous towards the Association. Mark also noted that the

increase in dues approved two years ago has yet to have an impact on the Association's finances since close to 60% of our membership is one or more years in arrears (see the Secretary's Report below). A motion to accept the Treasurer's report was made and seconded. The motion passed.

Year	2008	2009	2010	2011	2012
Beginning Assets					
Checking	$5,416.19	$4,453.08	$5,041.70	$5,631.52	$7,373.13
Savings	$0.00	$0.00	$0.00	$0.00	
Total Beginning Assets	$5,416.19	$4,453.08	$5,041.70	$5,631.52	$7,373.13
Income					
Dues	$370.00	$673.00	$445.00	$420.00	$175.00
Annual Meeting	$3,075.00	$464.27	$4,155.00	$4,280.11	
Interest	$1.79	$10.81	$12.49	$14.34	$7.39
Other	$0.00	$0.00	$101.00	$598.52	
Total Income	$3,446.79	$1,148.08	$4,713.49	$5,312.97	$182.39
Expenses					
Postage, copying, website	$51.70	$163.10	$363.98	$246.06	$47.09
Annual Meeting	$4,358.20	$376.96	$3,759.69	$3,325.30	
Placement, Archives	$0.00	$19.40	$0.00	$0.00	
Other	$0.00	$0.00	$0.00	$0.00	
Total Expenses	$4,409.90	$559.46	$4,123.67	$3,571.36	$47.09
Ending Assets	$4,453.08	$5,041.70	$5,631.52	$7,373.13	$7,508.43
Asset Change	-$963.11	$588.62	$589.82	$1,741.61	$135.30

3. Mark Sinton next presented the Secretary's report. Mark brought to the attention of the audience two facts: 1) about 16% of our membership have Emeritus and Honorary membership status (Emeritus and Honorary members do not pay dues), and 2) about 60% of the Association's membership is one or more years in arrears for dues. Thus, about 75% of are members are not paying dues. He also mentioned that should the membership stand at the end of the year as

reported below, he will be removing another 58 members from the membership database for being more than three years behind in their dues as described in paragraph 2 of the Association's By-Laws. A motion to accept the Secretary's report was made and seconded. The motion passed.

Year	2011	2012	2013
Beginning Membership	384	297	287
New Members	3	25	
Members Removed	90	35	
Ending Membership	297	287	
Member Dues Breakdown			
Emeritus and Honorary members	43	47	
Paid up members	86	65	
In arrears members	168	175	
Total Dues Paying Units	297	287	
Member Dues by Year			
Paid up	86	65	
One year behind	57	74	
Two years behind	64	43	
Three years behind	47	58	

4. John Zimmerman presented the Archivist's report. A motion to accept the Archivist's report was made and seconded. The motion passed.

    1. A MACTLAC poster was created for the Beloit meeting. It features lists of various pieces of historical information (meeting sites, officers, etc.).

    2. The sorting of archival material has been completed. The Xerox transfer of the sorted material to archival paper is in progress.

    3. I would like to nail down a directive as to how to deal with the older pictures. What is the most archive sensitive, yet efficient way to deal with the multitude of MACTLAC

prints on hold. Few of the prints are annotated, and many have limited photographic quality. To what extent do we want to proceed with a scanning digital archiving process? To what extent are we comfortable with posting images without permission?

4. I would also like to listen to ideas as to the relationship between the MACTLAC web site and the archived material.

5. Larry Ferren then presented the Placement Officer's report. A motion to accept the Placement Officer's report was made and seconded. The motion passed.

   In 2012, 16 applicants used the Placement Service, and 25 positions were listed with the Placement Service. Of all the positions advertised, all 25 were MACTLAC Colleges. All the positions advertised were either located by way of advertisements placed with the Placement Service, C & E News, the Internet, or electronic notices forwarded to me by various sources. The 25 MACTLAC positions were advertised only to those candidates who had e-mail capabilities. Of the 25 MACTLAC positions listed, 10.0% were Inorganic Chemistry, 33.3% were Organic Chemistry, 10.0% were Analytical Chemistry, 6.7% were Physical Chemistry, 30.0% were Biochemistry, 3.3% were Chemistry Education and 6.7% were other areas of chemistry (Introductory level).

   All MACTLAC schools with positions open had their advertisements 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 as our newly revamped site no longer has a counter on it, and I was not able to get a count of the number of people who visited the placement page.

   Applicants to the Placement service were of several groups—graduate students, Ph.D.'s as post doctorates, and some professors at MACTLAC schools looking for other positions, but the largest group would have been graduate students. This past year **three** new candidates came into the Placement Service, and **two** candidates had their names removed from the service after securing a position. Presently, (September, 2012) **16** candidates are in the Placement Service looking for employment.

   This past year no schools requested resumes or specific information related to qualified candidates from the Placement service. Electronic mail was sent to the e-mail candidates as positions were sent to me.

   The MACTLAC schools are very good at sending me notices of open positions. I appreciate the notices and try to respond promptly when a notice comes in to get it out to everyone on the electronic list and to get it to Craig for posting on the web page.

6. Beth Jensen announced that Philip Bays (St. Mary's College), Clarence Josefson (Millikin University), and William Mungall (Hope College) have been awarded Emeritus membership

status. She directed Mark Sinton to send Philip, Clarence, and William a certificate designating their new membership status.

7. Beth Jensen then introduced the new State Representatives elected at the end of Friday's Plenary Session. Dr. Todsapon Thananatthananchon from the University of Evansville is the new Indiana representative, while Michael Seymour from Hope College will continue as the Michigan representative.

8. Beth Jensen next opened the floor for nominations for President-Elect. Jaime Mueller from St. Mary's University of Minnesota nominated herself. Jaime was elected as President-Elect by voice vote.

9. A motion to have the Secretary-Treasurer send letters of thanks to the following individuals was made. The motion was seconded and passed.

    Outgoing officer: President Beth Jensen
    Outgoing state representative: Bill Morrison (Indiana representative)
    Host institution: Albion College
    Host organizer: Craig Bieler

10. Bernhard Hansert invited the Association to Westminster College for the 2013 meeting. The meeting will be held on October 4th and 5th, 2013. The theme of the meeting will be Frontiers in Chemistry.

11. Beth Jensen announced the Association's future meeting sites.

    2013: Westminster (West)
    2014: Alverno (Central)
    2015: Millikin University (East)
    2016:
    2017: Monmouth College (West)

12. Beth Jensen next handed off the meeting to Christine DeVries, the incoming President.

13. Christine DeVries asked if there was any other business. Mark Sinton announced to the audience a small change in the By-Laws approved by the Executive Council at their Friday morning meeting: the sentence "The meeting registration fee shall be waved for graduate and post-doctoral students." was added to paragraph 8. This is something that has been done in the last few years in an informal manner, so the Executive Council decided to make the practice official by adding the statement to the By-Laws. Mark also announced the recent death of Sister Marguerite Neumann, BVM. Sister Marguerite joined MACTLAC as a faculty member at Mundelein College in Chicago before moving to Clarke University in Dubuque, IA. An audience member asked about the fact that searching for the Association's web site is not appearing high in the search results. Our web master, Craig Bieler, will be looking into that.

14. There being no other business, Christine DeVries called for a motion to adjourn, which was made and seconded. The motion passed. The meeting adjourned at 9:30 AM.

Respectfully submitted,
Mark Sinton
MACTLAC Secretary-Treasurer

Discussion Groups

Liberal Arts/Community College Interface: Continuing the Discussion

Friday, October 5th, 2013
3:00-4:00 PM

The group continued the discussion from the first plenary session. Topics discussed were:

misconceptions about community college students;
how to advise students toward AA or other degrees;
GPA versus ability of the student;
coordinators for general courses and how they act as some degree of quality control;
discussion of building relationships between schools and who to reach out to at the CCs;
challenges of teaching community college students; and
pressure from high schools to get their chemistry classes credited by community colleges.

Some of the issues that attendees thought community college transfer students may have are:

lack of test taking skills;
not ready for structure;
more hours in class;
lonely feeling because they haven't been at the four-year school from the first year;
have mixers or clubs to encourage involvement; and
minorities may feel singled out having come from areas with large populations to smaller.

Mobile Technologies in Teaching

Friday, October 5th, 2013
3:00-4:00 PM

<u>Topics of General Interest and Discussion</u>

- Incorporating mobile technology in to our teaching
- How does this integrate into testing
- DyKnow software – class management software
  Tablet computer (college owned: $80K grant to College)
- Clicker (older tech)

- Vernier Technology LabQuestII
- Lots of "apps": how do we keep up?
- All faculty were provided iPads (at one college)
- How are people using iPads?
- What technology should we invest in?
- DyKnow...how much front end work for faculty?
- ACS-ChemEd group working on organizing "mobile tech".
- Electronic P-Chem Lab reports
    - Wikis
    - Google Docs
    - Wolfram Alpha
    - Cell phone spectrometer

<u>What Apps do people use</u>

1. Spartan ~ $30
2. Molecules App
3. Chem DC
4. MolSoft
5. ACS Mobile App
6. Whiteboard – free (Educreations/Champ)
7. Insensitive – NMR
8. Reflite – Electromagnetic spectrum
9. ChemSpyder –spectral game
10. Mobile Molecular Data Sheet (MMDS) $23
12. Other ACS apps
13. Socratic "clicker" technology on smartphones and tablet

The Emergence of Online Courses

Friday, October 5th, 2013

3:00-4:00 PM

What about the lab?

LabPaq (Hands-On labs)

Hybrid

What about Safety?

Summer lecture – lab on campus – fall

Time constraints, support

What is out there – being offered?

Administrative environment

Cheating – 3rd party proctor (expensive!)

In-class exams

ACS response to online courses

Social Media in Teaching and Mentoring

Friday, October 5th, 2013

3:00-4:00 PM

Facebook pages

Discussion of how we use it. Crowd sourcing questions

Example: Asking alums about ACS certified degree

Using it for assessment

Jobs

Texting

Research students only

YouTube videos

Khan Academy

POGIL – need to educate student what the importance of this approach is.

In Lab: mechanics vs theory

using YouTube and other social media.

General Chemistry

Friday, October 5th, 2013

3:00-4:00 PM

Textbooks (free, online?):

$52.08 Gilbert, et al 3rd Ed (effectively "$12.08" when paired with two semesters of online)

E-book (Masterson-Hurley) access code + Cengage OWL: $63

Silberberg (~$100 e-book)

McQuarrie: publisher promises no new editions for a while (newer printings have fewer errors): students can find copies for $90

Online homework:

~6 faculty use online homework

All programs have advantages & disadvantages

Students appreciate immediate feedback

Provides some directed feedback (common wrong answers)

Decreased grading time for faculty

Concerns about different sections of general chemistry using/not using online homework

Some problems with Flash programs with iPads

Some faculty include additional homework/classwork problems

Additional costs are a concern for some students

4 online homework programs used:

Sapling (not bundled with any text, works with McQuarrie)

Very flexible, can write your own questions, you have one tech support person assigned to you, $30/term

Smartwork (WW Norton)

Similar description to Sapling, $20/term

Connect (McGraw-Hill)

OWL (Cengage Learning)

Lecturing technologies:

PowerPoint slides (used sparingly if at all)

Document Camera

Overhead Transparencies

Chalk board

Put notes (outline/skeleton form, unsolved problems) online ahead of time so students can add their own notes onto them during class

Clickers (only two faculty use clickers?)

Useful tool when integrated well into lecture

Process can be streamlined with publisher-provided clicker slides

Student-purchased or college-purchased?

Websites: used in class or as homework

TED-ED: high-quality videos for general chemistry, < 5 minutes

U. of Nottingham "Periodic Table of Videos"

J Chem Ed Digital Library

Ionic Viper: Gen chem, inorganic, p-chem (can post to it, too)

Macro Galleria: polymers

Demonstrations:

"A Demo A Day" book of 365 demos that are easy to do

A fun one: add very hot water into a bucket of liquid N_2

Chemical Hygiene concerns with demonstrations

Is safety a part of the demo description?

Document waste stream analysis for demos if done with labs?

Move a given demo to the laboratory?

Does the Chem Ed website have comments about demo safety?

ACS Exams:

Teach to the exam or not? (Mostly we don't)

One person administers it on the last lab day; it's the 4th exam; can replace an earlier exam in the term

There is an article in J Chem Ed that gives the scales for raw score to exam score (e.g. 35/70 --> 75%)

Liberal Arts Chemistry

Friday, October 5th, 2013

3:00-4:00 PM

Discussion Topics

- Seminar (Chris Rohlman)
- Class size and online students (Martha Faner)
- Teaching labs using virtual components
- Lab science mandatory course (Paul Robert)
- Kitchen chemistry class fills up
- Science and art
- How simple can we make chemistry without over simplifying...
- Acceptance rates for liberal arts schools
- Motivation and intelligence are key factors plus willingness to be educated
- Drawing the line between behind students and the advanced students
- Show them "Finding the Elements" a two hour NOVA episode on PBS
- They might be Giants "meet the elements" (music)
- Copyright issues with mixing texts...

Analytical Chemistry

Friday, October 5th, 2013

4:15-5:15 PM

About half of us are imposters with a degree in something other than analytical chemistry: trained analytical chemists are hard to find for academia.

8 out of 8 institutions represented require analytical chemistry
3 out of 8 institutions represented require instrumental analysis

Techniques include:

extensive project with wine analysis
writing instrument reports
building a circuit
projects – misc

Individual work was stressed

Electronic lab notebooks – iLabber

Become permanent/unchangeable documents after lab time

Biochemistry

Friday, October 5th, 2013

4:15-5:15 PM

Apps for Biochem
- iMol

Computational computing software
- Spartan (any biochemistry usage?)
- Molecular visualization class (Beloit)
- VMD

Visualization
- PyMOL

Biochemistry Prerequisites
- 1 or 2 semesters of Organic
- no analytical, some require molecular/cell biology

Course Content in Biochemistry
- Topics and Relation to MR5
  - Nucleotide metabolism

Lab separate or together?

Size (growing!)

Textbook usage
- Lehninger, 2 use
- Voet & Pratt, 2 use
- Berg, 1 uses
- McMurry Organic Chemistry of Bio Pathways
- Understanding Science (website)
- Others
  - Biochemistry Free and Easy, Kevin Ahern
  - Methods in Biophysics, Garland.

Inorganic Chemistry

Friday, October 5th, 2013

4:15-5:15 PM

What do you cover?
- 1 semester vs 2 semester

Texts?

- Shriver has too many errors.
- Huey is classic, not in print.
- Cotton & Wilkinson

Understand symmetry better

- dictates bonding

Level of analytical techniques involved

- covered in other classes?
- IR for sulfides, carbonyls?

Labs – combined with others, stand alone, or none?
Unit cells at end, space groups
Do something you are interested in
Beloit software for downloading: http://chemistry.beloit.edu/classes/programs
What can you do on an iPad?
If it's in General Chemistry then no need—reduce survey and description
Present based on d-block chemistry
Red/Ox

- covered in General Chemistry
- no battery or plating
- use in catalytic cycle

ACS exams?
Find a story

- Identify what they need to know
- Depends on what is covered in other classes

Organic Chemistry
Friday, October 5th, 2013
4:15-5:15 PM

Textbooks

- Klein, Solomon, Hornback, Wade, Loudon/Straumanis, Carey (2 schools),
- Fleming & Jones
- Maybe change from Carey to Solomon

How many people in classes

- ~25-32 people in a classroom

How do you use a textbook in class?
Online Homework

- have used it in the past but no one is using it now

Khan Academy for Organic Chemistry
showed how to be a coach

Discussion of how POGIL works
ACS final exam
4 of 7 schools use it
Why not use? Expense & Doesn't reflect modern chemistry

What do you like about teaching organic?
Eureka moment, answer "why" question, the lab

Discussion of labs:
Is anyone else being peer-audited?
EPA/OSHA auditing
"Greening" everything

Physical Chemistry

Friday, October 5th, 2013
4:15-5:15 PM

The discussion began with folks describing how the physical chemistry sequence was structured at each respective institutions: quantum first or thermodynamics first, and why? Physical Chemistry is generally structured so that thermodynamics is taught first semester, followed by quantum mechanics second semester (or vice versa). Because of this arrangement, and because biochemistry majors only take one semester of physical chemistry, most, if not all of these majors miss out on some major aspect of physical chemistry. This problem was discussed.

Whether or not electrochemistry is presented in physical chemistry courses was discussed. Some folks mentioned that departments might consider coming up with a list of topics that definitely should be presented to chemistry students, and that instructors would check off these topics as they were covered. This checklist sheet would be available for all instructors in the department to view. This way, the instructors within a particular department would know what topics have been covered and to what degree of depth each topic has been covered.

A number of first of the semester physical chemistry labs were discussed. Possibilities: showing videos that deal with physical chemistry topics, glassblowing, thermometry, data fitting, viscosity measurements, determination of the heat capacity of gases.

Some interesting demonstrations were discussed: Ruben's tube and filling a hollow egg shell with hydrogen gas. Projects with thermal imaging cameras were also mentioned.

Textbooks used were discussed: McQuarrie and Simon, Atkins (Quantum Matter and Change), Engel and Reid, and Laidler. It was mentioned that Laidler has some solved problems online that are freely accessible.

Moving towards paperless lab books (electronic lab books), and the use of Google Docs for submission of lab reports were discussed. In addition, pre-lab exercises and "tickets" (work that students must complete before being allowed into lab) were discussed.

Some safety issues were covered, mostly in context of bomb calorimetry experiments.

Ask Dr. Safety
Friday, October 5th, 2013
4:15-5:15 PM

No report was submitted for this session.

Finding a Job at a Primarily Undergraduate Institution
Friday, October 5th, 2013
4:15-5:15 PM

Four graduate students and post doctorate students and two visiting professors met with Larry Ferren from the MACTLAC Placement service to discuss the issues related to finding a full time position at a MACTLAC institution. The meeting started out with each person introducing himself and telling a little about his situation, the nature of his job search, etc.

A number of questions were addressed in the discussion session. How many applicants are there applying per position? When in the year are the positions opening up? What is the time table for a job search? What type of documentation is presently required for a job search, and how specific does it need to be for the school you are applying to? How important is research in the private undergraduate institution (PUI)? If I am going to have to do research at a PUI and manage a budget, is there any place where I can get some training in this area? What are some sources of funding for research at the PUI? What can I expect for start-up funds at the PUI? Are there any resources that one can use to see how much one can earn at a typical PUI? What is a typical teaching load at a PUI? Where can I go to see postings of job openings for PUI's?

These were some typical questions that sparked the discussion. The discussion covered the entire range of topics of teaching at the PUI, from the application process to the balance between teaching and research, starting up research, and to research at a teaching institution.

Each of the visiting professors in the sessions was asked to share with the group his or her impressions as to how competitive he or she felt his or her situation was when he or she received the present teaching position.

Advice was given to the prospective teachers to get experience as adjunct teachers by teaching at community colleges. The benefit of having the experience for the resume was discussed as well as the difficulty that some people would have in getting their PhD advisors to allow them to teach at a

community college as an adjunct. Another idea put forth was to do some filling in at a college as a substitute when a professor has to be gone.

Larry Ferren agreed to get each of the people at the session onto the placement notification list.

MR5 and MCAT^{2015}: Continuing the Discussion

Saturday, October 6th, 2013

11:00 AM-12:00 PM

Additional online Resources:

August 2012 ACS Presentations on Chemistry and the Pre-medical Curriculum:
http://presentations.acs.org/common/presentations.aspx/Fall2012/CHED/CHED019

Association of American Medical Colleges: Can obtain pdf copy of preview guide here:
https://www.aamc.org/tudents/applying/mcat/mcat2015/admins/

HHMI's report on Creating Scientifically Literate Physicians:
http://www.hhmi.org/grants/sffp.html

Discussion during this breakout session focused on the chemistry curriculum and how we can best serve the pre-med student given the upcoming changes in the MCAT exam.

It was acknowledged that a strong math background is a good predictor of success in the scientific fields.

In Years 1 and 2 of a student's college career is it best to have a one semester or two semester sequence of either or both general chemistry or organic chemistry. Which would best serve the student who is pre-med? What topics should be included in these courses and would a chosen text drive the content?

It was acknowledged that students must double-up in their lab courses particularly during their 2nd and 3rd years in order to best prepare for the MCAT. A heated discussion also ensued which debated the benefit of a 'spiral' approach to introducing topics (multiple exposures) versus a linear approach to learning (building upon previous knowledge). The 'absorption rate' of topics by the student is a key point.

Finally, given the increased emphasis on biochemical, genetics, and molecular biology concepts on the MCAT, is it important for students to take a two semester sequence of biochemistry rather than a one semester course?

Mobile Technologies in Teaching

Saturday, October 6th, 2013

11:00 AM-12:00 PM

Place to share favorite science mobile apps:

http://www.scimobileapps.com/index.php?title=Category:Chemistry

See the Friday discussion group notes for more information about this topic.

Environmental, General, and Liberal Arts Chemistry

Saturday, October 6th, 2013

11:00 AM-12:00 PM

Our general chemistry courses can be designed to teach students that "Chemistry is not a dead thing in a book. It's a process, a way of approaching a problem." (G. Lisensky)

Textbooks (+ online homework software)

Tro + Mastering ~$130-175?
Olmstead (almost out-of-print?)
Gilbert (3) $130? E-book + online homework = $52
Masterson, et al + OWL (online homework from Cengage Learning, access code $63)

What is Environmental Chemistry? (approaches, prerequisites, texts, etc)

Air-water-soil
Analytical chemistry taught through environmental chemistry
All have General Chemistry as a prerequisite
One has lab under separate enrollment; most are integrated
No lab texts suggested, acquire procedures/experiments from separate sources
Soil: emphasize sampling technique
Where, how, asking permission/providing results/engaging homeowners, ethics
Phosphorus at depths
Heavy metals at lead mine samples or just dirt (AA)
Campus garden site, faculty back yard
Soils contaminated with organics (hexanes, etc)
Water: (no examples given)
Air: (no examples given)
Manahan text (U. Missouri)
2nd edition was online for free for a time (currently in 3rd ed)
Some preference for the second edition
Two used Baird's text

Teaching methods:

POGIL is used by some in organic chemistry, but not much implementation of "pure POGIL" in general chemistry

Difficulty in organic labs since last lab just wants to "give the answers" and not work through the process

Student buy-in/commitment is key (also TA's, instructors, etc)

Other peer-learning methods discussed including successful plan for organic lecture (problem sets) that was a "disaster" for general

Beloit College Lab-first approach (1st semester gen chem for majors + non-majors):

Three meetings/week @ Two hours each meeting; 20+ students per section

Non-majors learn the process of science; majors learn to teach to non-scientists

Get the data, then learn principles when trying to make sense of their own numbers

Gases (global warming), Liquids (bio-fuels), Solids (LED's): Environment/energy story tied together

Structure & Properties: organic functional groups, IMF's, only introduce acid-base

Skip topics that aren't core for a given lab (analytical re-teaches acid-base & equilibrium, already)

Some students learn that chemistry isn't as awful as they thought, increase number of majors

Thematic approach: sustainability integrated throughout course

Student teams of 3 present a sustainability issue related to college

Friday lectures are for guest speakers, team time, and presentations

Physical Science and Everyday Thinking (PSET) is a one-semester curriculum that someone has used

ACS Exams: half use it, half do not

Useful Technology tools:

Posting videos of lab techniques-students bring smartphones/iPad/tablets to watch while setting up experiments provide a box of Ziploc baggies to provide some protection for tools

YouTube videos can be useful (animations + music, others)

Instructional videos for in class or as homework assignments

Play to guide mindset as students enter lecture

Upper Division Interdisciplinary Labs

Saturday, October 6th, 2013

11:00 AM-12:00 PM

- Incorporate with "Green Chemistry"
- How to structure Interdisciplinary Labs
- Oil, bio-diesel, microbiology
- Advanced organic with application
- Inorganic/Medicinal connection
- Workshops with Art
    - Paper making (corn husk)
    - Chromatograph (paper)
    - Prussian blue

- Microfabrication (Analytical Chem paper)
- Electroplating
- Photography
- Bioanalytical
    -Glucose/blood
- Forensics (dirt)
- Food/Brewing
- GC technology

Vendors and Sponsors

The organizers of this year's meeting wish to express their thanks to the following vendors and sponsors:

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MACTLAC Weather Report

It has become somewhat of a tradition to mention something about the weather surrounding the MACTLAC meeting.

Friday's Weather

Friday saw an overcast day with light wind and precipitation in Albion, Michigan. The temperature ranged from a low of 42°F (5.6°C) to a high of 60°F (16°C). The day had a light wind (7 mph or 10 kph) out of the west southwest. The barometric pressure held steady at 30.04 inHg (763.0 mmHg), and then slowly decreased. The day saw 0.08 in (0.20 cm) of rain.

Saturday's Weather

Saturday saw another overcast with light wind, but no significant precipitation. The temperature ranged from a low of 38°F (3.3°C) to a high of 47°F (8.3°C). The wind came out of the west at 8 mph (10 kph). The barometric pressure rose slowly throughout the day to 30.05 inHg (764.0 mmHg). The day saw only a trace of precipitation.

MACTLAC News

Placement

MACTLAC's Placement Officer maintains two lists: 1) a list of faculty positions available within the MACTLAC member colleges, and 2) a list of candidates seeking positions with member colleges. Our goal is to ensure that candidates are in contact with the colleges having positions available. If you are currently recruiting new faculty, are looking for a teaching position at a Liberal Arts college, or have any other questions, please contact the Placement Officer. A copy of the list of available positions can also be found at www.mactlac.org.

Website

The address for the Association's website is www.mactlac.org. Feel free to visit this site to get information on our organization and the services that it offers. Be sure to check out the links page as there are some things on that page that may be of interest to you.

Honorary and Emeritus Membership

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 to the Secretary-Treasurer. These letters should attest to the criteria needed for honorary membership status. An Honorary member will be excused from further payment of dues and will be listed as an Honorary member.

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 to the Secretary-Treasurer of MACTLAC.

2013 Meeting

Our 2013 meeting will be held at Westminster College in Fulton, Missouri, on October 4th and 5th. The meeting theme will be Frontiers in Chemistry. Featured speakers will include Jerry Atwood from the University of Missouri-Columbia, a recognized expert on superamolecular chemistry. We hope to see as many of you as possible in Fulton next fall for another excellent meeting!