

Performing as Scientists: An Improvisational Approach to Student Research and Faculty Collaboration

Raquell M. Holmes and Maryam M. Qureshi

Boston University
Center for Computational Science
3 Cunningham Street
Boston, MA 02215
email: raquell@bdu.edu

Abstract: The project described in this article is less about the content area, computational cell biology, and more about the educational practice of the students and faculty involved. Over the course of the past four years, Dr. Raquell Holmes has worked to create curricular resources that support the integration of modeling methods in biology education. For three of those years, students have been involved in the research required to develop chapters for a textbook in progress. This research experience for students is similar to other research experiences which include students identifying primary literature, participating in lab meetings, generating reports, and giving presentations. A unique feature of this research experience was its explicit focus on creating a group-learning environment. Students were hired based on their interests in the project and their willingness to work in groups. We describe the process that led to the creation of a group-learning environment that supports the development of both students and faculty as researchers and academics. We understand this to have been a cultural, performatory process and introduce both the metaphor and practice of performance, particularly improvisation, in undergraduate education and research.

Keywords: undergraduate research, cell cycle, performance, improvisation, groups

Introduction

In this article, we present how we created the research ensemble and our experience as student and faculty of creating an improvisational collaboration. The details of the schedule of our work completed each week have been documented in a suggested course outline developed at the BioQUEST Curriculum Consortium Workshop on Systems Biology (Holmes et. al., 2004). Here, our interest is in conveying the creation of a learning environment. We have intentionally broken the text into the different perspectives of the co-authors. The faculty perspective reflects the voice of Dr. Holmes. The Student Perspective, the voice of Ms. Qureshi, one of the student participants. Other sections reflect our joint opinion and description of the project design, performance, and learning.

Faculty Perspective

Over the past four years, I have worked with four groups of undergraduate students on the creation of a textbook for cell biologists. The approach that I have to working with students and creating learning environments has been informed over the past 15 years by my work in supplemental education youth programs, professional development workshops, organizational development and training in performance based approaches to education. Through this, I have learned to see all of human life activity as performance. By performance, I do not mean the measuring of success as in "a car's performance" or the identification of particular skills, but rather the activity of performing, as on a stage. In performing, actors, people, and students act both as who they are (students, non-experts, novices) and who they are becoming (scientists, experts, discoverers, graduate students).

The view of life as performance is an extension of work by the Russian developmental psychologist,

Lev Vygotsky. Vygotsky's work is visible in K-12 educational practice, theory and research and yet is less visible in discussions of college science education. Vygotsky identified learning and development as occurring in the "zone of proximal development". Some are interested in Vygotsky and his "zones of proximal development" as a way of looking at stages (Bodorova and Leong, 1996; Rogoff, 1984; Wood, Bruner and Ross, 1976). I am interested in this work as a view to co-learning and becoming. A commonly used example for understanding the ZPD as a joint activity is the early learning and development of babies. When a baby babbles with the family, those who "know" how to speak do not respond, "No, goo bibble does not mean anything." Or "You need to learn to speak." Instead they creatively accept and complete the meaning of the baby's babbling. Meaning is jointly created. Both parents and baby grow and develop individually and as a family. It is this co-creative, social activity that we see as performance. Performance is the process of learning together and creating an environment in which learning and development can occur. Parents relate to both where the baby is and that the baby is developing, becoming (Newman and Holzman 1997). The baby is related to as a speaker even as it is becoming a speaker.

I am interested in the process of becoming in the context of science and science education. In this context, Vygotsky presents a view in which learning occurs first socially and then individually (Vygotsky, 1978, p51). The importance is not in the faculty member creating an environment in which the students learn to become scientists, but rather that students and faculty member together create an environment in which science is done. Faculty and students are developing and learning. Products are created, but the products are one aspect of the larger activity of creating the group. The students were invited to create a working environment in which as a group they would become modelers and textbook writers. The language of theatre, particularly improvisation, is helpful to understanding the collaborative and co-creative process of building a learning environment. Co-learning, co-creating and becoming occurs in improvisational performances.

Language of Performance

Improvisation is often understood as theatrical spontaneity. However, to the professional performer, improvisation refers to a set of techniques and skills that are used to create a scene in the absence of a script. Basic skills of improvisational theatre include creating the ensemble (group) through listening, making and receiving offers, and "yes and". The ability to listen to what has been said by fellow performers is critical to being able to respond to what

they contribute. Contributions by performers are referred to as offers. The statement "The bird sat in the tree" is an offer. The responding performer must listen to what was said, accept the contribution and make their own offer in return i.e. "It was a humming bird." To continue to build an improvisational story, the performers say "yes, and". The performer does not take the time to evaluate the previous statement for rationale, feasibility, value for the story. Instead, the performer says "Yes, and it was the weirdest humming bird I have ever seen". "Yes, and" is both a philosophy and improvisational tool. It both builds the group as an ensemble and the group's "story".

The improvisational challenge in biology education and research is to create collaborative, scientific conversations that include the current understanding of the field, while saying "yes, and" to contributions of novice scientists in the performance.

Job posting

A job listing was posted for students interested in learning to create models and simulations in cell biology topic areas. The job required a minimum of 5-10hrs a week. No previous experience was required but a preference for students who had taken cell biology or biochemistry was expressed (See Job Listing below). Approximately eight students applied for the position. Students in the first research group suggested that students did better (willing to ask questions, could define their own directions) when they had some exposure to the biology. This was the second or third time that this position had been listed.

Job title: research assistant

Students will be responsible for running simulations of cell biological processes: calcium dynamics, cell cycle or signal transduction. Students will learn to create models and run simulations with pre-existing software. The simulations recreate results of previously published scientific studies. This job has flexible work hours, and requires a minimum of 5-10hrs a week with an hour and a half spent between 9 and 5 for team meetings. No experience required. Preferred background: one semester calculus, cell biology or biochemistry. Commitment through May or August (summer increased hours) also preferred.

Interviews

Faculty Perspective

Students were interviewed for the research assistant position. Students came from very different backgrounds: biology, engineering, computer science, psychology, and anthropology. They also came from different academic levels: freshman to graduate student. They were introduced to the goal of

our project, to create a textbook that teaches biologists about modeling. As an example of the work being done, I presented students with a draft chapter describing the process of modeling and the framework for modeling a specific process, e.g. the cell cycle. I emphasized to students that we would be learning the subject of modeling together. I had taken on the task of creating a textbook unlike previous books in the area; a text that could assist cell biologists like me to understand and do computational cell biology. Although I had experience with the topics we were investigating, I was not an expert. If the student joined the project, s/he would be my graduate student in the process of creating the materials. Performing as graduate students, these undergraduates would participate in conversations, asking questions, seeking answers and helping to define what we needed to do to advance the overall project. This is part of relating to the students as researchers even as they are becoming researchers.

We discussed the project, their interests in the topics and overall approach, learning through conversation, working as a group and not having the answers up front. In the course of these conversations, students would decide for themselves if they wanted to or were able to participate in the project.

My job as director in the interview was to identify ways that students could participate if they wanted to in the research project. At the conclusion of the interview, I asked each student a series of questions that would help me organize the cast, the research group. These questions grew out of the needs of the project and were designed to help me think about what the students would need in order to work as a group rather than individualistically. A sample of questions is provided.

Interview Questions

Have you ever worked in a group? What do you think about working in a group?

Do you have a computer at home?

Have you ever made web pages?

What is your favorite and least favorite biology topic?

What do you think about learning something that does not have a specific answer?

What interested you in this job?

Student Perspective

"I was simply looking for a research assistantship and saw a posting for this job at the career office website. Having no research experience and never having gone for an interview like this before, I showed up with a smile on my face hoping for the best, having no clue what to expect."

Coming out of the office that day I felt that even if I never got a position, I was still satisfied with what I had accomplished that day. Not only had I gained insight into upcoming scientific methods that I had never heard about before, but I had had my first real job interview, and had come out of it having positive feelings about it. After waiting anxiously for about a week thinking whether or not my good feelings regarding the interview had just been one-sided or not, I was elated to read the good news in the email that was sent, telling me I had a position in the research group, and was invited to join Dr Holmes in the research for her textbook."

The Group

All students who were interested were accepted into the research group. However, not all students were able to participate. Family issues arose, schedule conflicts, etc. The students that accepted and able to participate were undergraduate women. The first task was to meet as a group. Emails were sent to determine a time in which the entire group could meet.

Creating Our Research Environment

In our culture and particularly in the sciences, our activity (conversation, writing, exercises, etc.) is often over-determined by what we consider to be true or correct. In order to discover possibilities and new ways of understanding, we need the freedom to explore and reshape our current understandings of what exists or is known. In order to create materials together, we (students and faculty) needed to break out of our traditional roles and learn to research together. Arenas in which we as adults are not constricted to our societal roles in life are in theater and play (Nachmanovitch, 1991; Newman, 1996). Improvisational exercises and games help build a playful environment in which we can learn to do new things. We used such games at the beginning of our group meetings to build an environment for playing with our understandings and the scientific materials (texts and concepts).

First meeting

In the first group meeting, we used an "icebreaker" or group building game which has been called by some "truth or pretend." We introduced ourselves to each other by saying three things about ourselves. One of the three things had to be a lie. Technically, the next part of the game is that people guess what is true and what is not. As part of building the group we used this cultural game to challenge ourselves to work with what each person says, whether it is true or not.

As a group, we developed a work strategy that included meeting times and making sure people had the materials they needed for the project. This was

part of building a collective understanding of how we would work together.

At the end of the first meeting, we reviewed the process of creating a computational model, the biological topic (cell-cycle) and left with reading materials for our future conversations.

Overview of Modeling Process

Biological process

Characteristic Experimental Results

Concept Maps: Components, Reactions

Writing equations: math and parameters

Computer programs for modeling

ASSIGNMENTS: Reading for biological topic.
Chapters 2, 3 of Murray and Hunt 1993

Faculty Perspective

I took for granted that the students both did and did not have the ability to model biological systems, just as babies do and do not have the ability to speak. In some ways, that was the point. I also assumed that readers of the textbook that we were creating both do and do not have the ability to model. The challenge for our group and the text were the same, create a context and approach by which non-modelers familiar with biology can become modelers. The context for the students was our research group.

My posture was, if students who were currently immersed in the details of mathematics, chemistry and biology could not understand or work with the information provided then it was unlikely that I was providing, describing or presenting what was needed to make the materials accessible to a novice audience. In the course of discovering what the group needed, it would become clearer what needed to be included in the chapter.

In our meetings, I would present my understanding of the biological system and the mathematical models that we were trying to create or teach others to create. I would also explicitly tell students where I still had questions.

Which of the two cell cycle models (Tyson, 1991; Goldbeter, 1991) do we want to introduce to readers? One is more detailed in its coverage of cell cycle factors and direct linkage to current experimental research (Tyson, 1991). The other is simple in that it has fewer factors but still covers the major components and behaviors of the cell cycle (Goldbeter, 1991).

Where do the parameter values
(concentrations, rate constants) used in the
simulations come from? Do they make sense

to us? Do we agree with the values or the
ones selected?

These are the same questions that one asks in the process of creating models. They are not known a priori. As modelers, we decide the level of complexity or detail needed to address the question we are posing. We also determine what parameter values are appropriate or consistent based on experimental findings and current knowledge in the field. Addressing these questions was part of our group process of becoming modelers.

I tell students the steps of the process that I have gone through to understand mathematical models: identify the biology in the words of the research paper, match the words to the equations and terms, and develop an understanding of the reasons those terms or rate equations are used. I do not expect the students to do exactly what I have done. I provide these steps as a guide to getting started.

Student Perspective

"I have taken many science courses at the university, including introductory biology, chemistry, physics, and organic chemistry among others. They have all emphasized problem and research based inquiry in some way. However, this was a learning experience unlike any other I had experienced. From the very beginning, the professor emphasized that this project was going to be a collective effort and we would be learning from each other. I thought this would turn out to be just another tactic science professors are attempting to adopt in their courses these days to make their teaching more interactive, yet intuitively keeping the student firmly in the learner's seat and the professor rooted to his or her task of imparting knowledge and testing students. However, I soon began to change my mind when, to my surprise, I started getting the feeling that maybe I could help in the actual shaping of this project. My professor would give us information to read during the course of a week, and then call us in for a meeting at the end of that week.

Whereas I thought it would turn into a session of the professor getting our viewpoints and then informing us of the correct interpretation of the article we had read, I began to realize that my interpretation, if different from another member's, could hold equal importance and both were equally valuable in terms of how we might use them in our project. Other than reminding us of the general direction we wanted to be heading, the professor did not intervene by giving an absolute answer to any of our questions. She left it to us and our conversation as a group to decide which aspects of the article were worth focusing on and would help achieve our goal.

It fully dawned on me just how important my input was in the direction of this project when I was

able to help answer a query we all had regarding a certain variable quoted in a paper. No one seemed to know where that variable came from until I told them what I had learned about reaction rates in my general chemistry course. We discovered that based on my explanation we were able to better understand one of the key points in the article. Later, I saw that my explanation had also been incorporated into the chapter. That was when I truly began to feel an ownership of this project and further stimulated my active involvement in the readings and conversations that took place. I have seen many of my modifications or ideas incorporated into the textbook. This gave me immense satisfaction and encouraged me to take the work even more seriously. I realized that each time I came up with an idea, it could very well appear in a published article that would be read by and inform many others."

Faculty Perspective

A key challenge was to develop the group voice that included students asking questions, raising concerns or challenges to what I, or others, would say. What I needed were students able to raise questions and look at the same materials as I with a critical eye. This was not something that I could create on my own. I could, however, lead in creating an environment where it is okay to be confused, have a different opinion, or not know something. I used myself and the text materials as building blocks for creating such an environment.

Most modeling papers do not provide all the information needed to recreate a model. If there was a question, it was likely that it stemmed from something not being said or written explicitly. It was our job to make it explicit. This is an important justification of student confusion or questions. It is too easy to believe that the reason they feel stuck or confused is because of their own limitations.

I tell students my own limitations as part of creating an environment that accepts limitations. I inform students that I have a familiarity and working language for mathematics, particularly differential equations, but my understanding is shallow. Students presently taking these courses (calculus) are much closer to the mathematics than I and needed to help shape what was said and meant in the chapters. I stressed that what I say is my current way of thinking about the material. What I say may change based on what we discover and talk about. I share these concepts (experiences and philosophy) with the students as part of creating an environment in which it is okay to be confused, to not know the answers, and to highlight the process of discovery and learning how to learn. The students are invited to participate as collaborators who have something to contribute

including newly developed skills from classes, opinions, questions, and novice views.

Student Perspective

"One key aspect of the research environment the Professor helped in creating was the comfort level. I felt completely at ease coming into the meeting prepared to tell everyone that I could not understand one or more points mentioned in the articles we had agreed to study, and felt I needed further discussions or materials to give me the information that would help me understand. This uninhibited learning attitude in me is not brought about in most other university courses, but sprung forth in my meetings with the research group because Dr. Holmes constantly emphasized that our questions and concerns would be most helpful for informing us what more needed to be included in the textbook. In other words, if we were having trouble with something, our readers would most likely also struggle with the same concepts, and therefore simply bringing those topics to the group's attention would be the first step towards our advancement of the project. Solving those problems or addressing those concerns would then be the second step. I took this stance to be an opportunity for me to carefully read the (often dense) literature provided to us and highlight all the areas that were too complicated or vague in the literature, and let the group decide if we would further investigate those concerns. Clearly I would not have done so had the Professor not repeatedly reassured us that this was expected and encouraged, and therefore it helped create our unique learning environment in which I was open to sharing my difficulties with the group and collectively coming up with ways we could enhance our understanding, thereby improving the quality of our textbook."

How are we doing?

Faculty Perspective

A few weeks into the project, the students and I were working successfully in individualistic ways despite our hour and a half weekly meetings. I would assign individual tasks to members of the group during our meetings. During the week, each would complete her task and return. The weekly meetings saved me time. I did not have to have separate meetings with each student. However, given my training in building groups and performance, I felt that we could have a stronger group activity in which we were together making use of what each person was able to learn, complete and contribute each week. It is in such group environments that the students and I could be stretched to develop and grow in our ways of thinking, talking and writing about the work. I also knew that this was not something that I could build. It had to be created by the group itself.

In the absence of building the group activity, I suspected that the work being completed by the students would not differ from any other class or classroom situation. For example, the faculty member presents a problem, points to a direction or method to address the problem, and the students follow that defined method or direction. Students had different skills: seeing detail, attention to method, or background knowledge of the biology. Were the students able to advance their understandings of the biology and modeling topics? Were they able to identify new issues? Most importantly, did they have the work conditions to do so? Rather than intuit or interpret the students' abilities, or the success or failure of the environment, I asked the students, "How are we doing as a group?" The question invites student evaluation of and direction to what we are able to do.

Student Perspective

"Another feature of our group learning process, that I felt differed from other learning experiences, was the atmosphere created in our meetings. Dr. Holmes often asked us how we felt we were doing as a group, how we were proceeding, or if there was any other way we wanted to work on this project that would be more supportive of our work together. She did not dictate how the research would be carried out, but gave us the materials and concepts that would help in our research. This gave us an opportunity to examine our roles and decide if we were comfortable with the pace or approach we were taking to obtain our conclusions. When given the opportunity to shape the project to our needs, we, the students, came up with the idea to meet together in groups of 2 or 3 prior to the weekly meeting with the Professor. We thought this would give us the chance to come up with a more enhanced understanding of the articles we were dealing with, along with a clearer picture of where to go next with this information. Therefore, although the Professor was constantly guiding our group, she was not directing its every step. We, the students, fully participated in determining what our next move should be in the research process and how to approach the material we were given to work with."

The overall production

We believe key features in the success of this project were the performances chosen by the participants. Students were asked to perform as graduate research students and the faculty member as a director and collaborator. The group met once a week for an hour and a half to discuss progress and determine the next steps. The students worked independently during the week to achieve the goals set in our meetings. In this way, the group created an environment in which questions could be freely posed. The group had the responsibility of determining how significant each

question or task was in relation to the creation of the text. Students developed skills as needed to address the question, "What do we need to understand so that we can teach others?" This included skills in reading and interpreting experimental results in research articles, and representing their results in graph and table formats. Together the group went from the simple concept maps describing cell cycle protein interactions to the identification of mathematical representations, discussion of rate equations and elucidating rate constants from research literature. (See Figure 1) This was an iterative, non-linear process through which a chapter on cell cycle dynamics was produced. The materials have also been used in professional development workshops for faculty (Investigating Interdisciplinary Interactions, BioQUEST 2005) and graduate students (Advanced Computing for Cell Biologists, 2005).

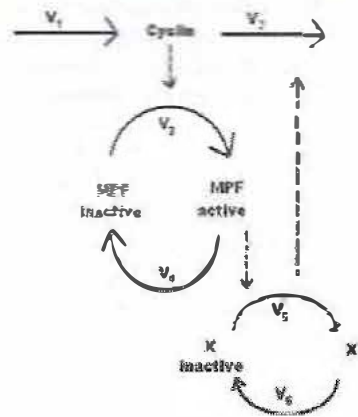
What's improv got to do with it?

In this article we relate to you our experience of how a group came to learn and grow together and how we understand this to be an improvisational performance. Improvisation, in the theatrical sense, is a process in which groups of people create an ensemble, listen to one another, and make and accept offers to create a scene. The scene in our case was to understand computer modeling of cell biology and introduce it to novice users. The improvisation in this context was to use everything available—our backgrounds, different levels of experience and attention to group efforts—to create a research ensemble of collaborators capable of writing a textbook and doing numerical models. None of us in the research group had ever undertaken such a task before, nor had any of us worked together prior to this project. We improvised how to divide tasks, what concepts to focus on, and how best we could improve our own understanding of materials given we were all starting from various base points. We accepted and related to each other as capable of doing the tasks we set ahead of ourselves. As a group we were able to accept help from the Professor, from each other, and draw information from published sources. As a by-product of this improvisational method we all learnt new skills and gained a vast amount of knowledge of concepts we had never formally been taught.

To us, life itself is an improvisation. We are faced with the challenge of dealing with the unknown everyday and there is no manual to go by. We all take cues from those around us, whether in an educational setting or not. To go beyond what we already know how to do, and to do something new and developmental, involves self-conscious building with those cues collectively. What was new and developmental for us was working collaboratively across academic status and disciplines and producing

an introductory chapter on modeling the cell cycle. The method was ~~improvisational and based on~~ group building. ~~Our attention was on the group's~~ understanding and not on whether any individual remembered the exact details of the cell-cycle process. As the environment was ~~driven by the~~

ensemble, we were freed to accept what each person contributed and to reshape it into a scientific narrative that reflected our growing collective understanding. The development of our understanding was not linear or individualistic; it was improvisational and group learning.



Difference Equations

$$\text{Cyclin} = \text{synthesis-degradation} = V_1 - V_2$$

$$\text{MPF} = \text{activation-inactivation} = V_3 - V_4$$

$$\text{Inactive MPF} = \text{inactivation-activation} = V_4 - V_5$$

$$X = \text{activation-inactivation} = V_5 - V_6$$

Ordinary Differential Equations

$$\frac{dC}{dt} = V_1 - V_2$$

$$\frac{dM}{dt} = V_3 - V_4 \quad \frac{dM_i}{dt} = V_4 - V_3$$

$$\frac{dX}{dt} = V_5 - V_6 \quad \frac{dX_i}{dt} = V_6 - V_5$$

Mass Action Rate Equations

$$V_1 = \text{constant}$$

$$V_4 = k \cdot \text{MPF}$$

$$V_2 = k \cdot \text{Cyclin} \cdot X$$

$$V_5 = k \cdot \text{MPF} \cdot X$$

$$V_3 = k \cdot \text{inactive MPF} \cdot \text{Cyclin}$$

$$V_6 = k \cdot X$$

Figure 1. Legend

Schematic of the conceptual model from Goldbeter, 1991 (upper left). Difference equations that describe the change in amounts of proteins are written as a function of the cellular processes (upper right). Ordinary differential equations that describe the changes in amounts of any given protein over time (bottom left). Rate equations for each cellular process (bottom right).

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A Welcome Message from Our New President

One of the rewards of my 17th year with ACUBE is that I get to submit a welcome as new president. ACUBE is a community of peers who not only share their successes, concerns, motivations, resources, insights and hopes for teaching undergraduate biology, but make time to really listen to other members. You have helped me to address several of my own issues, to consider new and unanticipated approaches, and to better understand why I value teaching biology. I am better at what I do because of ACUBE.

In our 50th year as an organization, we should celebrate the successes of our organization and recognize that it is our members who move us forward. I am grateful for our past and present members who decided not just to join, but sustain ACUBE through an active membership that included presentations at the ACUBE annual meetings, manuscript submissions to *Bioscene*, service on the Steering Committee, attendance at annual meetings, providing resolutions, voting, bringing in new members, or sharing ACUBE resources such as acube.org with others.

In our early years, AMCBT (Association of Midwest College Biology Teachers) was known a regional fellowship of educators who recognized a set of shared problems facing undergraduate biology. Past issues included whether or not labs were essential in introductory biology, if curricula should include separate botany and zoology courses, how to teach evolution (oh, progress...), and what a non-biology major's course should include. Additionally, professional requirements were debated such as how many contact hours or how much research should be required.

We have a past to be proud of! Mario Caprio, editor of the Two Year College column in the *Journal of College Science Teaching* and president of the Society of College Science Teachers, passed away this fall. After many years of teaching, he observed that "we work in isolation on problems that yield information that may well serve the common good, but we do not often share what we learn..." Mario not only became active in NSTA, but he joined ACUBE and collaborated with several of our members. ACUBE, through the collaborative efforts of its members, presents a community space for meeting the challenges of teaching in the undergraduate setting.

We are a national organization on our way to becoming more globally aware. Our current membership honors both graduate students and honorary life members. We are one of several modern organizations that focus on undergraduate biology education, but one of the very few that include members from a wide variety of sub-disciplines. We still meet at region-wide institutions rather than public facilities or large hotels. ACUBE is run by elected or appointed volunteers and responds to the membership. We have an impressive journal, an admirable archive, and a very actively accessed website. We have collaborated with a number of other organizations such as ASM, SCST, NABT, BSA, and AIBS.

However, our organization has not been as active in other areas. We have not applied for funding for ACUBE dissemination projects such as increasing the accessibility of our resources, attending meetings of other professional societies to present on education, supporting interactive online spaces for improving communication between members. We have not decided to support our geographically remote members by holding an annual meeting outside of the Midwest. We do not support our journal with manuscripts from members, but require our editors to draw on authors who are outside the organization. (Some do elect to join.) The steering committee is often hard pressed to find members willing to run for positions within the organization. Most of our collaborations are through individuals, not groups. I'm sure each of you can list specific activities you wish ACUBE would support.

The future, as Tom Petty sings so plaintively, is wide open. What ACUBE becomes in this 21st century depends on us. Changes in our discipline are transforming how we look at ourselves as teachers and learners. Biology is experiencing a technological revolution on many fronts. The move towards collaborative interdisciplinary investigations using tools and methodologies for researching vast amounts of accessible molecular and computational data impacts biology education as well. Our organization will see a number of historians at the 50th annual meeting, but it is my expectation that mathematicians, computer scientists, social scientists, and numerous other disciplines will be represented in future meetings as we increasingly intersect with other professionals in research and in the classroom.

No longer are we locked away in the science building, but we find ourselves increasingly involved in a global community. Citations of *Bioscene* articles appear as resources in teaching and learning centers in Australia, as part of the bibliography for presentation papers in Sweden, and as quotes in an article from Nigeria. If biological science

is a global endeavor and our students are likely to have responsibilities as global citizens, shouldn't biological education more ~~appropriately~~ address global connections?

Considering the ~~transformative~~ role that biology has on our society, ACUBE's focus on supporting biology education is ~~critical~~. ACUBE ~~will become~~ what the members support.

I urge you to get involved.

● On the Lighter Side: Countdown of five unique ACUBE moments

5. On the way to the winter steering committee meeting at Loras College, nearly freezing with Tim and Bill next to a car with a very flat tire in bitter -38 degree weather. (Yes, Bill was still making jokes. Ask him about the well digger...)
4. Laughing with the majority supporting an impromptu resolution by a disappointed Ray to always serve at least one piece of cherry pie for dessert on Friday night. The following year at the Indiana State University meeting, Ray was presented with a whole cherry pie plus fork.
3. Voting to re-elect Harold as secretary against the infamous Jane Doe... It was a close race, but Harold triumphantly returned as secretary!
2. Editing manuscripts between ACUBE sessions as John in his own gentle fashion "coerced" new manuscripts from presenters... Oh, to be 6'5" with a commanding presence!
1. Providing a hasty explanation of why I was so red-faced while attempting to introduce the speaker for a Thursday night talk, I revealed that a woman working at the reception desk had finally tracked me down in the crowded "ladies room" with the announcement that "my man had arrived and wanted me to know he was in his room and ready..." The resulting roar of laughter from the audience was met with mild amusement from the speaker (a real trooper!) and my noticeably brilliant scarlet face!

Ethel Stanley
President, ACUBE 2006-2008

Call for Nominations

***Bioscene* Editorial Board**

We are soliciting nominations for four (4) *Bioscene* Editorial Board positions (terms through 2009). Board members provide input in the form of reviews and suggestions concerning the publication of *Bioscene* to the Editor. Board members are also expected to assist in the solicitation of manuscripts and cover art for *Bioscene*. Board members may be called upon to proofread the final copy of *Bioscene* prior to publication.

If you are interested in serving a 3-year term on the Editorial Board, please email the editor, Stephen S. Daggett, at stephen.daggett@avila.edu.

Rear View Mirror

*Edward Kos,
ACUBE Historian*

I feel as though I should start this article out with those famous words, "In a galaxy far, far, away...". What happened 50 years ago seems today almost to have been in another galaxy and certainly another time. ACUBE is the end result of the events of that time which I will note briefly.

In 1956 a seed was planted in the fertile minds of biological scientists of the Midwest. WW-II had been over for some 10 years and the unsuspected bonus of the GI Bill was producing a population of academics that was unanticipated. The sciences of the war were being revamped into new and unparalleled instrumentation. Scientists in overstocked specialties changed fields and brought new ways of looking at science into different scientific disciplines. The medical tragedies of WW-II brought new techniques to bear and many new recruits to the schools of medicine. Medical school training began to expand and the requirements for this was cause for change in the pre-med requirements. Entrance into medical school which was at one time possible with 30 undergraduate hours, began to demand more hours and eventually would require a bachelor's degree. But just what these hours should contain, at all levels, was a matter of dispute among different institutions. Students came to med schools with varied backgrounds and preparation. The norms were changing, but how much change could or should be made? To bring some light on the problems and hopefully to suggest solutions, a group of biologists from colleges and universities throughout the Midwest came together at Drake University in Des Moines, Iowa in the fall of 1956 to discuss pre-med requirements. What sorts of changes were suggested or made is not a hard historical statistic. What did result was the realization that there was a lot more in the biology curriculum that was ripe for change and expansion, and that there were biological scientists and educators who were interested in, and more to the point desirous of, making these suggestions and changes to the curriculum. The Midwest Conference of College Biology Teachers was held a year after these preliminary meetings, drawing 158 participants from all over middle America, at Drake University (home of its conception), Des Moines, Iowa, October 25th and 26th, 1957. At this meeting was born the "Association of Midwest College Biology Teachers" (biologists should appreciate the gestational timing). From that point on we began our odyssey of meetings

to exchange, encourage, and enhance the tools and study of biology education, which has been our hallmark.

In 1966, our 10th Annual Meeting was held at Southeast Missouri State University in Cape Girardeau, Missouri on October 7-8. The principal speaker for the meeting was David Gates, then Curator of the Missouri Botanical Garden who spoke on "Energy Exchange in the Biosphere". The format followed the group discussion format established basically 10 years earlier. Topics included: Problem of Junior College Programs; Educational Opportunities at Argonne National Labs; Audio-Tutorial Teaching; Courses in Related Sciences for the Biology Major, and; Masters Program for the Preparation of Biology Teachers. These were repeated on the second day, with the addition of: Certification for College Biology Teachers. The luncheon address on the second day was by Jack Carter, a member of the Association, who spoke on "The Impact of BSCS Biology on College Biology Teaching". The development of this program was the major topic of AMCBT's annual program at the University of Kansas in 1964 held in conjunction with the Commission on Undergraduate Biological Science, and in which the BSCS Curriculum was introduced.

Our 20th anniversary brought us to our founding home, Drake University in Des Moines, Iowa. The meeting was held on October 1st and 2nd. The meeting had some of its historical sessions such as Ben Olson's "Film Festival", an introduction to some of the newest biology teaching films, the usual field trips and a series of Group Discussions to select from, all following the general theme of "New Interfaces with Biology". The Opening Day luncheon talk was by Don Scoby, "A Blueprint for Survival: An alternative life style". At the General Session after lunch, we were addressed by one of our founders, Leland P. Johnson of Drake University, who spoke on "What Biology Teaching Ought to Be". A panel of 4 members then responded to Dr. Johnson's challenges. Later that day the First Group Discussion met and the sessions were: A. Biology interfacing with Human values; B. Human Chromosome Techniques; C. Use of Simulation and Games; D. Biology Electives for Non-Biology Majors. The speaker at the evening banquet was Theodore Jahn of UCLA who spoke on "Locomotion

in Protozoa". Dr. Jan also showed some film of some of the methods used by protozoa to move. Discussion sessions. One covered Biology Interfacing with Health Careers; Use of Phase Contrast Microscopy; Use of computers in Undergraduate Biology; Biology for the Disadvantaged. Another was: Biology Interfacing with Non-Health Careers; Human Chromosome Techniques; Population Sampling that Anyone Can Do. And the third of the day: General Biology for Non-Majors; General Biology for Majors; Anatomy and Developmental Biology; Human Anatomy and Physiology; Botany and Plant Science; General Zoology and Invertebrates; Microbiology, and; Environmental Science.

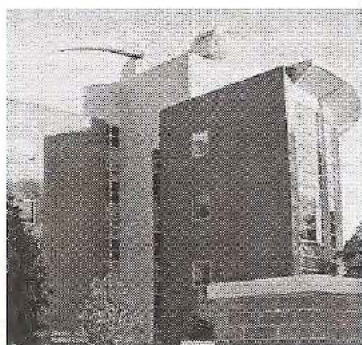
The 30th Annual meeting was held on September 26th and 27th at Sangamon State University, Springfield, Illinois. The central theme was "Biology and Public Policy". There were Exhibits and Displays, a Film and Video Festival, and Field Trips and Tours. The opening session was a panel discussion moderated by Dr. Richard Sames for Sangamon and the panelists were from Academe, Industry, Government, and the NSF. The panel discussion was followed by Concurrent Sessions I and II. Session I was: A. Science Education and Public Policy; B. Evolution, Creationism and Public Policy; C. AIDS and Public Policy; D. Fertility Regulation and Public Policies. Concurrent Session II held later in the afternoon consisted of A. Strategic Simulation in Microbial Genetics; B. The Advantages, Successes and Logistics of Incorporating a Backpacking Trip as Part of a Field Biology Class; C. Teaching College Biology in China; D. Gulf Coast Research Laboratory: A Valuable Teaching Resource. The Keynote Address after dinner that evening was titled: "What Should Society Expect From Scientists?", presented by Dr. George Kieffer of the University of Illinois, Urbana. Saturday Session III was a presentation by Dr. Rachelle Hollander of NSF, on "Funding and Ethical Issues in the Biological Sciences", followed by questions and answers. Session IV groups were: A. Citizen's Environmental Radiation Monitoring Program; B. Teaching Parasitology as an Honors Seminar; C. Measuring Common Biological Potentials; D. Freshman-Sophomore Field Experiences at Lincoln Land Community College; E. Anonymous Street Drug Analysis Program in a University. Session V consisted of Disciplinary Sections dealing with labs that work and included: A. Introductory Biology; B. Zoology; C. Botany; D. Anatomy and Physiology; E. Field Biology.

The 40th Annual Meeting was held at Loras College, Dubuque, Iowa on September 19-21, 1996. The

Saturday morning was devoted to three Group

Thursday evening welcome was a presentation open to all of Dubuque, "Novae - The Spectacular End to a Double Star's Life" by Mary Jane Taylor of Loras College. Friday morning started out with breakfast having tables set up for different biological interests, an idea which came out of prior meetings. This was followed by 5 Field Trips and a Workshop: Antibodies as Tools in Biology. A pre-lunch Keynote Address was given by Margaret Waterman of Southeast Missouri State University. After lunch there were more field trips (3) and a set of Concurrent Sessions (I): 1. The Independent Research Project: An Opportunity for Teaching On-Demand"; 2. Field Investigation on a Shoe String: Do-it Yourself; 3. Workshop for Prospective Authors; 4. A Reform of Science Education: A Case for Local Action and Global Thinking. Workshops II in the afternoon consisted of: 1. CASE IT: Student Generated Case Studies; 2. AMCBT/Web Page Construction Workshop; 3. Generating Gastropod Graphics: Using Fossils, Shells and Computers to Investigate Evolutionary Morphospace; 4. Plankton/Diatom Identification and Biology. The Banquet address was "Aldo Leopold, Cranes and Conservation Biology: Lessons from History" delivered by Curt Meine, International Crane Foundation. There was a unique workshop scheduled for late night, Workshop III, "Environmental Biology and the World Wide Web". Concurrent Sessions II on Saturday morning consisted of: 1. A Day in the Life of a Planet: Collaborative Learning on the Internet; 2. Emerging Diseases: A Workshop Approach; 3. Fears, Problems, and Successes of Students Conducting Field Investigations; 4. Making Anatomy Useful for the Health Science Student: Incorporating Clinical Applications with Cadavers. Concurrent Sessions III consisted of: 1. Developing a Personal Land Ethic: Aldo Leopold; 2. Arachnophilia: A Service Learning Approach to Biology; 3. AMCBT Revisited; 4. Essay Exams in Introductory Courses Using Peer Graders. The last Concurrent Sessions (IV) of the meeting were: 1. Students Tell Us; 2. Labless Labs; 3. Creative Thinking for Teachers; 4. A Microbiology Lab for Nursing Students: Culture and Sensitivity Techniques.

In all of these meetings I am amazed at how early the members of what is now ACUBE cottoned on to the real meat of education in the biological sciences and how they keep revisiting those areas which have the greatest impact on our profession. It really is true, the more things change, the more they stay the same.



**ACUBE 50th Annual Meeting
Millikin University
Decatur, IL
October 26-28, 2006**

***The Revolution and Evolution of Biology Education:
Where 50 Years Can Take Us***

Call for Abstracts

From the description of DNA structure in 1953 to the recent discovery of "Hobbits" in Flores, the field of biology has undergone a revolution. At the same time, textbooks for "introductory" biology have rapidly grown from 200 pages to well over 1000 pages. As the amount of information has grown, biology education has evolved to include PBL, case studies, computer simulations, open-ended laboratory projects, and many other innovative methods.

The importance of biology over the last half century is undeniable. For example, 14 of 35 individuals "Who Made a Difference" in a special issue of Smithsonian Magazine are biologists or are influenced by biological topics. As biology continues to blossom, our importance as teachers will make the 2006 Annual Meeting a momentous event for our society. Potential topics for presentations include historical reflections, changes in curriculum, interdisciplinary courses, changes in educational technology, the Web and student learning, seemingly constant threats to teaching evolution, current cutting-edge techniques, and even your newest, untested, and most radical ideas.

Many of you can show us where we came from in the last 50 years, what we should be doing now, and where we should be headed in the next 50 years. Please consider sharing your experiences, your knowledge, and your techniques with us at the 50th ACUBE Annual Meeting in Decatur, IL. Given the importance of this meeting, any type of presentation is welcome. We encourage you to submit a poster, paper or workshop but will gladly try to accommodate additional presentation formats.

Please send a 200-word abstract and the information below as e-mail attachments, by mail, or by fax by June 30, 2006 to

Conrad Toepfer, Brescia University, 717 Frederica St., Owensboro, KY 42301
Ph: 270-686-4221, Fax: 270-686-4222, e-mail: conrad.toepfer@brescia.edu

Proposed Title: _____

Presentation type: _____ 90-min workshop _____ 45-min paper _____ Poster _____ Other (Please explain)
(Rank in order of preference)

Equipment/facility needs: _____ 35 mm slide projector _____ Overhead projector
_____ Macintosh projection system _____ Macintosh computer lab
_____ PC projection system _____ PC computer lab
_____ Lab benches _____ Other (explain)

Name of presenter(s): _____

Work address(es): _____

Presenter phone number: _____ e-mail: _____

ACUBE

Association of College and University Biology Educators

Formerly the Association of Midwest College Biology Teachers (AMCBT)

NAME: _____ DATE: _____

TITLE: _____

DEPARTMENT: _____

INSTITUTION: _____

STREET ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

ADDRESS PREFERRED FOR MAILING: _____

CITY: _____ STATE: _____ ZIP CODE: _____

WORKPHONE: _____ FAX NUMBER: _____

HOME PHONE: _____ EMAIL ADDRESS: _____

MAJOR INTERESTS

- ☐ 1. Biology
- ☐ 2. Botany
- ☐ 3. Zoology
- ☐ 4. Microbiology
- ☐ 5. Pre-professional
- ☐ 6. Teacher Education
- ☐ 7. Other _____

SUB DISCIPLINES: (Mark as many as apply)

- ☐ A. Ecology
- ☐ B. Evolution
- ☐ C. Physiology
- ☐ D. Anatomy
- ☐ E. History
- ☐ F. Philosophy
- ☐ G. Systematics
- ☐ H. Molecular
- ☐ I. Developmental
- ☐ J. Cellular
- ☐ K. Genetics
- ☐ L. Ethology
- ☐ M. Neuroscience
- ☐ N. Other _____

RESOURCE AREAS (Areas of teaching and training): _____

RESEARCH AREAS: _____

How did you find out about ACUBE? _____

Have you been a member before: _____ If so, when? _____

DUES (Jan-Dec 2005) Regular Membership \$25 Student Membership \$15 Retired Membership \$5

Return to: Association of College and University Biology Educators, Attn: Tom Davis, Executive Secretary,
Department of Biology, Loras College, 1450 Alta Vista, Dubuque, IA 52004-0178

ACUBE 50TH Annual Meeting

October 26-28, 2006
Millikin University
Decatur, IL

The Revolution and Evolution of Biology Education: Where 50 Years Can Take Us

Preliminary Program

Thursday, October 26th

- | | | |
|----------------------------------|--|--|
| 12:30-2:30 PM | Pre-Conference Field Trip: Mari-Mann Herb Farm
Led by Maribeth King , Mari-Mann founder | Meet at Registration Area
1st Floor Leighty-Tabor
Science Building (LTSC) |
| 3:00-5:00 PM | Pre-Conference Field Trip: Rock Springs
Conservation Area
Led by Dr. Judy Parrish , <i>Millikin University</i> | Continue from
Mari-Mann or meet at
registration area
LTSC301 |
| 3:00 - 5:00 PM
6:00 - 8:00 PM | Steering Committee Meeting
Registration and Reception
<i>H'ors d'oerves</i> | <i>Registration: 1st floor LTSC</i>
<i>Reception: LTSC 115</i> |
| 8:00 - 9:00 PM | Opening Session

Welcome to ACUBE:
ACUBE President: Ethel Stanley , <i>Beloit College</i>
Welcome to Millikin University

Greetings from the Conference Chairpersons
Program Chair: Conrad Toepfer , <i>Brescia University</i>
Local Arrangements Chairs: Harold Wilkinson , Neil Baird ,
<i>Millikin University</i>

OPENING PRESENTATION (Public Welcome to Attend)
Marc Abrahams , Editor
<i>Annals of Improbable Research</i> | LTSC 001 |
| 9:15 - 10:15 PM | Steering Committee Meeting | LTSC 301 |

Friday, October 27th

7:00 AM - 5:00 PM	Registration table (Register, pay dues, buy T shirts, etc.)	1st Floor LTSC
7:15 - 8:20 AM	Hot Breakfast (Mentors and Mentees meeting or by Interest Group)	Richards Treat University Center (RTUC): Fireplace and Parquet Rooms
7:30 - 10:30 AM	Field Trip: Birding, Macon County Conservation District Led by <i>Dr. David Horn, Millikin University</i>	Meet at Registration Area 1st Floor LTSC
9:00 AM - Noon and 2:00 - 5:00 PM	SUSTAINING MEMBER EXHIBITS	LTSC 224
8:30- 10:00 AM	CONCURRENT WORKSHOP SESSION 1	
10:00 - 10:30 AM	POSTER SESSION 1 Refreshments provided	LTSC 221 Refreshments: Located between LTSC 224 and 221
10:30- 11:15 AM	CONCURRENT PAPER SESSION 1	
11:30 - 12:30 PM	Luncheon and First Business Meeting <i>First and Final Call for Nominations!!</i> <i>Out of this World Teaching Idea contributions</i>	RTUC Fireplace and Parquet Rooms
12:30 - 1:30 PM	Luncheon Program <i>Celeste Carter, Foothills Community College</i>	RTUC Fireplace and Parquet Rooms
1:45 - 2:30 PM	CONCURRENT PAPER SESSIONS 2	
2:45 - 3:15 PM	POSTER SESSION 2 Refreshments provided Posters from morning available for review	LTSC 221 Refreshments: Between LTSC 224 and 221
3:00 - 5:00 PM	Field Trip 1: Wabash Railroad Depot Antique Mall and Merchant Street shops Led by <i>Karen Baird, Richland Community College</i> Field Trip 2: Behind the scenes tour of Scovill Zoo Led by <i>David Webster, Assistant Director Scovill Zoo</i>	Meet at Registration Area
3:30 - 4:15 PM	CONCURRENT PAPER SESSION 3	

5:00PM	ACUBE Committee Meetings	
	<i>Web Committee Meeting</i>	LTSC 202
6:00 - 7:00 PM	Social Hour Cash bar	RTUC Fireplace and Parquet Rooms
7:00 - 9:00 PM	Dinner and Second Business Meeting (two-minute speeches prior to dinner; balloting after dinner, new officers announced at end of presentation) <i>The 2006 Out of this World Teaching Idea Award</i>	RTUC Fireplace and Parquet Rooms
8:00 - 9:00 PM	Dinner Program Malcolm Campbell, Davidson College Director, Genome Consortium for Active Teaching "Biology education 2056: balancing innovation with improvement."	RTUC Fireplace and Parquet Rooms

Saturday, October 28th

7:30 - 8:45 AM	Continental Breakfast (by Interest Group)	RTUC Fireplace and Parquet Rooms
7:45 - 8:45 AM	Bioscene Editorial Board Meeting	RTUC Fireplace and Parquet Rooms
9:00 - 11:15 PM and 12:15 - 1:30 PM	SUSTAINING MEMBER EXHIBITS	LTSC 224
8:45 - 9:30 AM	CONCURRENT PAPER SESSION 4	
9:45 - 11:15 AM	CONCURRENT WORKSHOP SESSION 2	
11:15 AM - 12:15 PM	Luncheon and Third Business Meeting	
	Resolutions: Brenda Moore, Truman State University	
	Executive Secretary Report: Tom Davis, Loras College	
	<i>Bioscene:</i> Steve Daggett, Avila University Presidential Address: Ethel Stanley, Beloit College 2007 Meeting (51st) at Loras College; Program Chair: Pres Martin, Hamline University Adjournment: Ethel Stanley, President	RTUC Fireplace and Parquet Rooms
12:30 - 1:30 PM	Steering Committee Meeting Includes newly elected members!	LTSC 301
1:30 - 1:45 PM	BIOQUEST Workshop Introduction	LTSC 001
1:15 - 4:00 PM	BIOQUEST Workshop Sessions	

Housing Preview

50th Annual ACUBE Fall Meeting

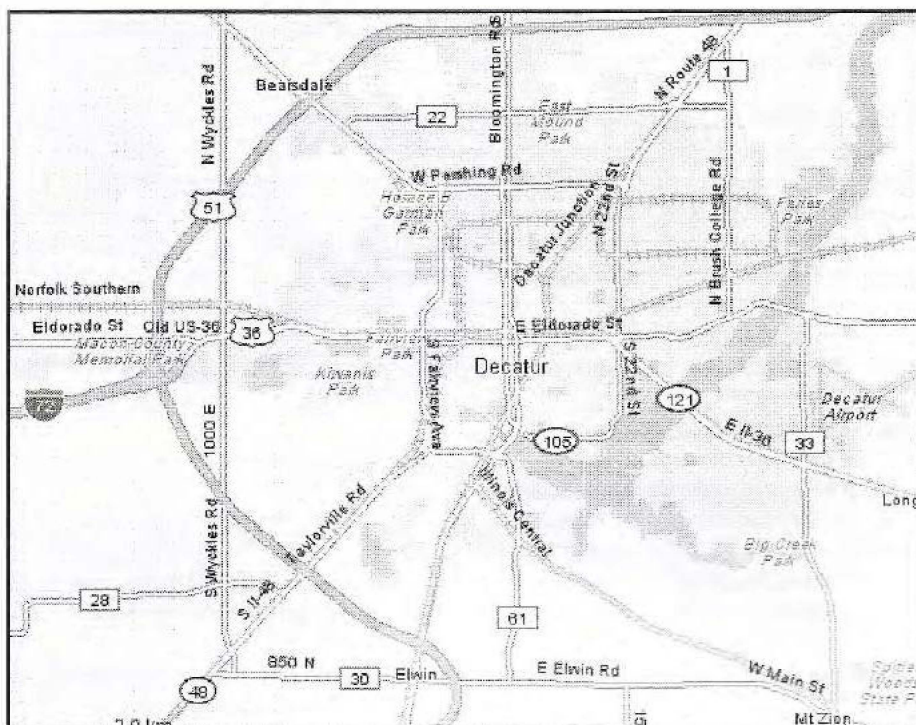
Millikin University Decatur, IL

Group rates have been secured for blocks of rooms at six motels / hotels. All rates are per night plus tax. No other discounts apply to group rates. Be sure to mention ACUBE when making your reservations in order to get the group rate.

Rooms not reserved by September 26, 2006 will be released to the general public.

Two of the facilities (numbers 5 and 8 on the list) are located less than 3 miles west of campus near the intersection of I-72 and US 36 where US 36 intersects with Wyckles Road. The four other facilities (numbers 2, 6, 7, and 11 on the list) are

located 6 miles north and east of campus just north of the intersection of I-72 and US 51. A shopping mall and many restaurants are located nearby. Other lodging possibilities beyond the six with group rates can be found on the website of the Decatur Area Convention and Visitors Bureau: <http://www.decaturcvb.com>



Hotel Locations

#2

Baymont Inn
5100 Hickory Pt. Frontage Road
Decatur, IL 62526
217-875-5800
rate: \$50 single

#6

Fairfield Inn
1417 Hickory Point Dr.
Forsyth, IL 62535
217-875-3337
rate: \$66.00 flat rate (1-4 persons)

#8

Decatur Hotel and Conference Center
(formerly Holiday Inn Select)
Route 36 and Wyckles Rd.
Decatur, IL 62522
217-422-8800
rate: \$82.00 flat rate (1-4 persons)

#5

Days Inn
333N. Wyckles Rd.
Decatur, IL 62522
217-422-5900
rate: \$46.95 Dbl/Dbl

#7

Hampton Inn
1429 Hickory Point Dr.
Forsyth, IL 62535
217-877-5577
rate: \$66.00 flat rate (1-4 persons)

#11

Ramada Limited
355 E. Hickory Point Rd.
Decatur, IL 62526
217-876-8011

ACUBE Winter Steering Committee Meeting

Millikin University
Room 202 Leighty-Tabor Science Center
Decatur, IL

January 28, 2006; 8:30 AM

Present: Ethel Stanley, Lynn Gillie, Tom Davis, Conrad Toepfer, Melissa Daggett, Harold Wilkinson, Bobby Lee, Neil Baird

Absent: Brenda Moore, Wyatt Hoback, Tim Mulkey

I. Call to Order

The meeting was called to order by President Ethel Stanley at 8:56 am.

II. Approval of Minutes

Certificate of Insurance added to "New Business" as agenda item
The agenda was approved unanimously.

III. Approval of Fall Minutes

Bobby Lee will email the Secretary (Laura Salem) a handout presented at the Fall 2005 Steering Committee. The handout will be added to the minutes of the Fall 2005 meeting.

Minutes from 2nd Fall Steering Committee Meeting were approved unanimously with the above addition.

IV. Committee Reports

A. Executive Secretary-Tom Davis

Tom Davis submitted report summarizing ACUBE finances, membership, annual meeting deposit, funds transferred, 2006 dues notices, cash flow report, and ACUBE organization status. Tom Davis is still working on cash flow segment of the report. The report was approved by members of the Steering Committee.

Tom Davis will be looking into legal advice regarding taxation of nonprofit organizations.

At the previous meeting it was mentioned that *Bioscene* may be distributed exclusively online, which would save the organization a significant amount of money.

Ethel Stanley mentioned that the majority of manuscripts are submitted as responses to being handed a hard copy of the *Bioscene* journal.

Putting together the *Bioscene* journal is an intensive job and as is the work of the Executive Secretary. The possibility of budgets for these positions were discussed.

The current database does not send dues notices to individuals. One idea raised was the possibility of attaching *Bioscene* as an email attachment.

A larger dues amount could be paid for hard vs. electronic versions of *Bioscene*.

Certificate of Insurance is required by Millikin University regarding liability, injury, and listing Millikin as co-insured. The organization may have to buy insurance to cover the dates of the meeting. Tom Davis will look into the insurance issue.

~~Bobby Lee~~ inquired about looking into the years that individual members joined the organization in order to analyze the membership quantitatively. Bobby Lee will email Tom Davis a list of questions regarding membership.

B. Membership-Bobby Lee and Wyatt Hoback

Wyatt Hoback is compiling data from survey given at the Fall 2005 meeting.

Bobby Lee distributed a map of ACUBE members showing geographical distribution. It was suggested that a new map be assembled showing meeting attendance versus total membership.

Past members have been able to request letters sent to the Department Chairs stating that they presented and/or attended an ACUBE meeting. This may aid in keeping new members during their professional development. The ACUBE organization is a national organization, a distinction that would be helpful to new faculty and department chairs.

One possibility is to develop a packet for new faculty to promote professional development via participation at ACUBE meetings.

Contact information for questions/problems should be on the website.

It was suggested that the best way to recruit new members is to have a satisfied current membership. Having larger *Bioscene* issues (and less issues per year) might peak the interest of a larger portion of the membership. Another possibility is to have ACUBE leadership (President or others) contact new membership more frequently.

Five emails suggested by membership committee to be sent to all ACUBE members:

1. Paper submission reminder
2. Annual meeting reminder
3. *Bioscene* availability
4. Website update notice
5. President's letter

Mentoring program for new members will be added to the registration sheet.

C. Nominations—Hugh Cole, Melissa Daggett, Conrad Toepfer

Current Recommendations:

Steering Committee—(Peter White, Shawn Nordell, Greg Fitch,
Carol Kasper, Ted Wilson, Cynthia Horst)
President Elect (4 year position)—(Susan Singer, Susan Lewis, Mark Bergland)

D. Awards—Honorary Life and Carlock

Honorary Life—a nominee has been chosen

Carlock Award—

Motion to add post-docs as potential recipients of the Carlock Award was brought to the committee. Bill Brett can provide new wording at the fall meeting

E. Constitution—Lynn Gillie, Ethel Stauley

No report. Constitution and By-laws has been updated and posted on the Website under Governance.

F. ~~Images~~—Margaret Waterman, Tim Mulkey, Bill Brett, Karen Klyzek,
Nancy Sanders

The membership form on the ACUBE website needs to be altered to add Tom Davis as the second person.

Contacts page including roles and responsibilities of ACUBE leadership needs to be added. Also could post frequently asked questions and answers. Steering Committee members will send frequently asked questions to Ethel Stanley for review.

Committee could also post map of ACUBE membership.

G. History Committee—Ann Larson, Jeanine Yackey, Ed Kos

This committee will have a report at Millikin University in Fall 2006.

History of the Carlock Award could be discussed.

Sam Sampson from Southeast Missouri State will put together timelines, such as changes in biology equipment over the past 50 years. This could be turned into a souvenir.

Laura Salem will contact Ed Kos regarding his role at the Fall 2006 meeting.

One suggestion raised by the committee: have Honorary Life members “reminisce” about the last 50 years of Biology in one of the concurrent sessions.

H. Resolutions—Brenda Moore

The committee welcomes any resolutions, particularly pertaining to the 50th anniversary of the organization. Potential resolutions should be sent to Ethel Stanley.

One issue raised by Ethel Stanley was the recent statement by the NRC describing biology as a collaborative, interdisciplinary field and stating that biology education is not keeping up with the advances in the field of biology.

I. *Bioscene*—Tim Mulkey, Stephen Daggett

- a. Tim Mulkey and Bill Brett are waiting to receive articles from reviewers to finish the August, December, and March issues of *Bioscene*.
- b. The editors of *Bioscene* are still deciding on which printer to use.
- c. Tim Mulkey needs a current mailing list from Tom Davis.
- d. Steve Daggett has written a new set of author and reviewer guidelines, drawing heavily on previous guidelines but giving some more structure to the review process. Bill Brett is currently reviewing the guideline revisions.
A budget for the *Bioscene* editor or co-editors was discussed by the Steering Committee.

J. Planning Upcoming Meeting

Millikin University, October 26-28, 2006

Breakfast on October 27 will include both Interest Groups and Mentoring.

Field Trips have been chosen.

- Mari-Mann Herb Farm (Oct. 26)
- Rock Springs Conservation Area (Oct. 26)
- Birding (Oct. 27)
- Wabash Railroad Depot Antique Mall and Merchant Street Shops (Oct. 27)
- Behind the scenes tour of Scovill Zoo (Oct. 27)

Short abstracts may be included for field trips.

May need to rent a van for transportation to field trips.

Invited Speakers

- Marc Abrahams: Editor, *Annals of Improbable Research*

~~Web Committee~~ can add links to Abrahams' research
~~Program Local Arrangements~~ Chairs will develop fliers on
the speakers to send to Ethel. The information will be distributed to the entire membership.
Tentative: Celeste Carter, Foothill Community College
Malcolm Campbell

BioQUEST Workshops will be offered on Saturday afternoon following
ACUBE meeting. Costs for BioQUEST attendance are shown below:

BioQUEST + ACUBE: no additional fee

BioQUEST + ACUBE (Saturday only): \$55

Add a link to the BioQUEST website on the program. Links should
be sent to Conrad Toepfer.

Food

Cost has been estimated and menu items have been chosen.

Souvenirs

Mugs or other coffee cup variety, notebook organizer/holder, pens,
flash drives, pins (possibly cube shaped) were all suggested

Exhibitors: Steering Committee members should submit ideas to Neil

Baird and Harold Wilkinson

- Morton Publishing
- iWorks
- Ken-O-Vision
- Benjamin Cummings
- BioQUEST
- ASM-Ed
- other education groups solicited by Ethel Stanley (NABT, CBE
and NSTA)
- Illinois Natural History/Conservation group?
- Carolina Biological?
- display of *Bioscene* showing the work of 7 different editors

Call for Nominations

President-Elect & Steering Committee Members

ACUBE members are requested to nominate individuals for the office of President-Elect and two at-large positions on the ACUBE Steering Committee. Self nominations are welcome.

If you wish to nominate a member of ACUBE for a position, send a Letter of Nomination to the Chair of the Nominations Committee: Dr. Conrad Toepfer, Brescia University, 717 Frederica St., Owensboro, KY 42301 (270-686-4221, conrad.toepfer@brescia.edu).

2005 Membership Committee Minutes

January 2, 2006 Present: Bobby Lee, Brenda Moore, Wyatt Hoback

Goals:

1. Increase new membership
2. Retain membership

These two goals are directly related. A primary way to increase new membership is through recruitment by existing members. Thus, keeping existing members engaged with ACUBE will lead to word-of-mouth recruitment.

Objectives:

Be responsive to existing members and attract potential new members.

Actions:

Due Date

Responsibility

Mailings

- Welcome packet
- for 2 excellent *Bioscene* issues
- 1 or 2 newsletters (email?)

Mass emailing — all members

- Paper submission reminder
- Annual meeting reminder
- *Bioscene* availability
- Website update notice
- President's letter

Website

- Up-to-date information

Annual Meeting

- Informative sessions
 - Member survey
- Encourage peer contact
 - Mentoring program
- Fun and unique field trips