



**Evaluation Summary Report**  
Tutorial: *Algebraic and Discrete Biological  
Models for Undergraduate Courses*

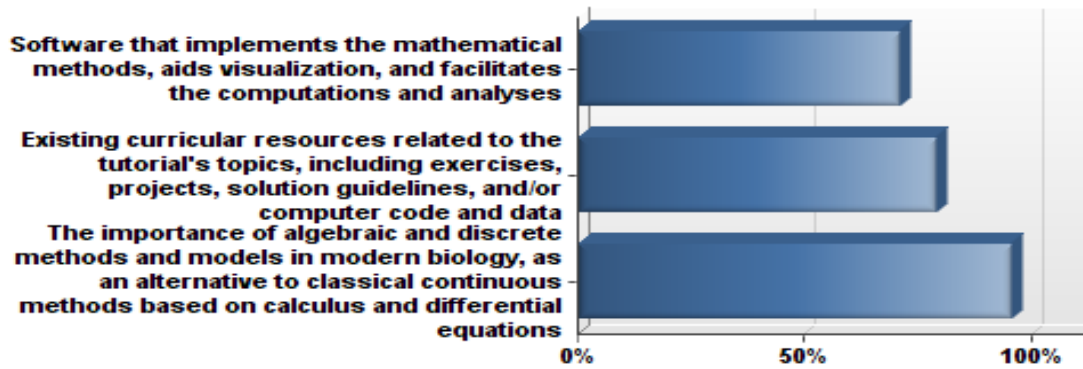
June 18-20, 2014

Pamela Bishop  
Evaluation Manager  
National Institute for Mathematical and Biological Synthesis  
August, 2014

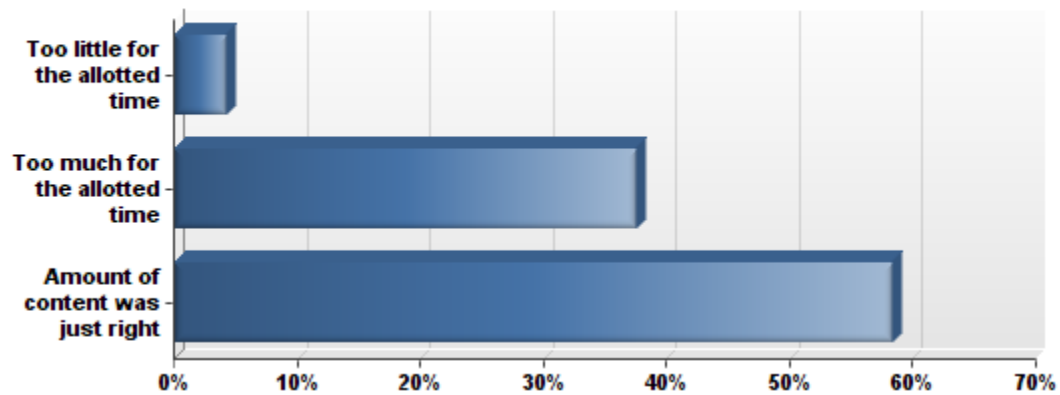
1. Please indicate your level of agreement with the following statements about this tutorial:



2. As a result of participating in this tutorial, I have a better understanding of:



3. How do you feel about the amount of content offered during the tutorial?



#### 4. What topics would you have liked to have covered in this tutorial if given more time?

*I'm not really interested in more topics but more work time with the existing topics.*

*More ecological applications*

*The advanced sessions in sequence rather than simultaneous. More time for hands on.*

*Practical simulation models in some typical infectious diseases*

*Additional coverage of the combinatorics of RNA folding*

*More background information in biology*

*Stochastic modeling*

*I would have like to have spent more time on Boolean algebra and different applications of networks.*

*I wish to know more on reverse engineering methods and involvement of more algebraic geometry*

*Boolean net*

*The time allocation is just right.*

*Techniques in virus modeling*

*Maybe more about how the topics have been actually implemented in various types of courses, especially already existing courses (rather than specifically newly-designed courses).*

*More about how to implement these ideas into undergraduate courses*

*As an algebraist I actually enjoyed each topic. So next time I would be interested in taking one or two topics and doing them in more detail. For the first meeting of this type I have been to it was just right.*

*Additional models useful for Cell Biology courses*

#### 5. What do you feel was the most useful aspect of the tutorial?

*I would have never encountered this material without the tutorial.*

*Learned so many mathematical tools*

*Dialog in small groups, particularly addressing questions or misunderstandings.*

*The format was really nice -- lecture/tutorial, exercises, and then discussions. The flexibility with discussion time was very useful.*

*Gene expression and suppression using Boolean network; Also phylogenetic tree construction*

*The group work/discussions facilitated by the organizers; working with and learning from professionals in both mathematics and biology.*

*Getting biology and math faculty in the same room is always a good idea.*

*How important mathematics is for biologists*

*The interactive presentations between and a mathematician and a biologist. I really enjoyed the biological insights given at the beginning of some of the presentations by a biologist. I think that this is a great approach for math bio courses that I will try to incorporate into my future teaching.*

*The presentations were the most useful to me.*

*I thought that being able to go with a biologist from my institution to be most useful because the tutorial provided the opportunity for us to begin a dialog and understand how we can use our skills in each other's field and it also allowed us to see how others work together in a way that we will be able to duplicate.*

*Having a biologist and several mathematicians to explain the topics from different perspectives*

*Examples*

*A quick and easy to understand introduction to different models, and how they can be applied to different problems.*

*The activities along with the introductory lectures.*

*The one on one conversation*

*Learning about new (to me) ways to apply algebra and linear algebra*

*Exposure to ideas, access to notes and textbooks on the subject, discussions with people at the tutorial*

*Working in groups with others- the biologists needed the mathematicians, and the mathematicians needed the biologists. Mors discussion/working within small groups was helpful for a more complete view/understanding of each topic. The presenters encouraged this and really helped us*

*The style of the presentations, which were not "research talks" but more like lectures, walking the audience through the material from the beginning. Great way to show how to incorporate these advanced topics into the classroom.*

*The best method was when examples were mixed in with the abstract ideas as opposed to the abstract ideas first followed by examples.*

*Having the breakout session after intro lecture was very useful and got farther into the topic, solidifying the idea that I could move to implement this in my course activities (although I would have like to go to all the breakout sessions!)*

## **6. What would you change about the tutorial?**

*There might have been times where it would have been helpful to group the biologists together.*

*The length of days should be long say 4 or 5 days. And the daily lectures/lab be a little shorter to end like 3:30 or 4 pm*

*More time more clear directions for hands on problems, sometimes was not clear*

*Hands on and presentations more integrated. More formal small groups, intermixing expertise.*

*I was hoping for a little less on the technical biology/math details and more thoughts or discussion on how to effectively implement/incorporate these into a classroom, e.g., group activities, worksheets, course projects, etc. It would be neat to have participants create, edit, share, or discuss curricula materials throughout the tutorial as well.*

*Testing the level of understanding of participants by writing a short quiz or submitting answers to exercises*

*Nothing*

*There was insufficient time and direction to get much out of the practical "lab" work. The lectures went on for 2+ hours in most cases - I suspect few people will be able to implement any of the modules in their courses without a great deal of individual work to learn software, the bio/math (whichever is not their forte). There was almost no discussion of HOW to teach the material, but the lectures were almost entirely focused on "look how cool this math is" and "here is a toy biology example" in which to set it.*

*Participants may be given readings to prepare them for the level of discussion at UT*

*I am not sure*

*I would have preferred a more detailed timeline of events before I left town to attend.*

*I would have liked to see a biology lab incorporated into the tutorial.*

*More technically organized computer sessions. A computer lab with the used software would both save time and gives everybody chance to access a computer*

*No class after 5 o'clock*

*It would be useful to have the notes, etc available a day or two before the presentations so we can skim beforehand and/or follow along easier during.*

*More about implementation in undergraduate courses, put materials for lectures/discussion online before the workshop*

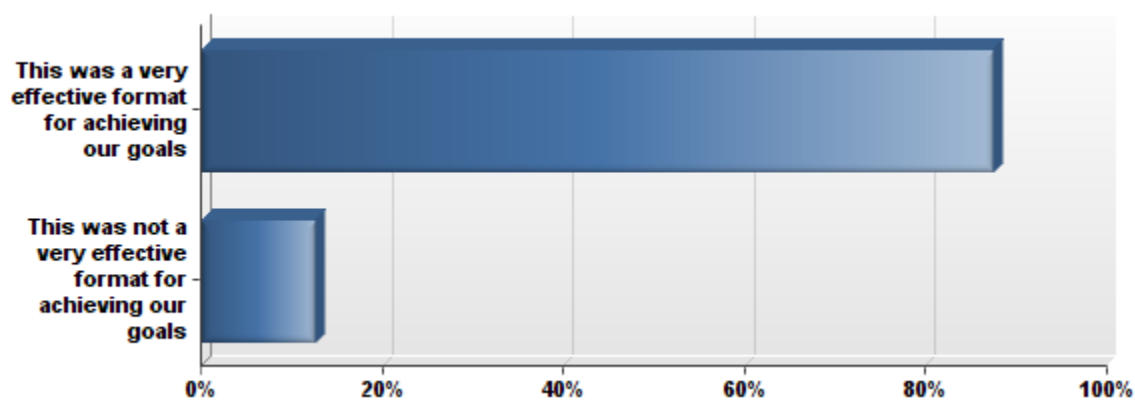
*I wish we'd had more time- but one can have too much of a good thing.*

*Although "hands-on" lab sessions were advertised, they seemed to be, at times, short-changed in favor of getting through additional topics by the presenter. I would possibly pare things down a little bit, and actually provide more time for participants to sit and work through some problems, especially from the point of view of what would be done in the classroom. (I realize finding the balance for how much to do this is difficult)*

*Nothing. I would like a more specialized follow up though.*

*It was very well done. I would suggest a short intro session (maybe optional at the start of the day?) going over some mathematical rules/concepts for the biologists, for things that would come up in the day. I haven't solved matrices in decades or worked often with multiple indexes ( $k=1$  to  $n$  but not  $= j$ ,  $j$  1 to  $n$ , etc) and wasn't too aware of the preference/association rules for Boolean logic (do the Ands first, etc). I needed to sit near a mathematician and ask a few questions to follow some of the math; I would have appreciated a little primer/review of some things, so I didn't get lost. Because of the more informal atmosphere I talk to my neighbor and follow, but I think maybe some of the biologists just struggled along. Keep the informal atmosphere though.*

## 7. How do you feel about the format of the tutorial?

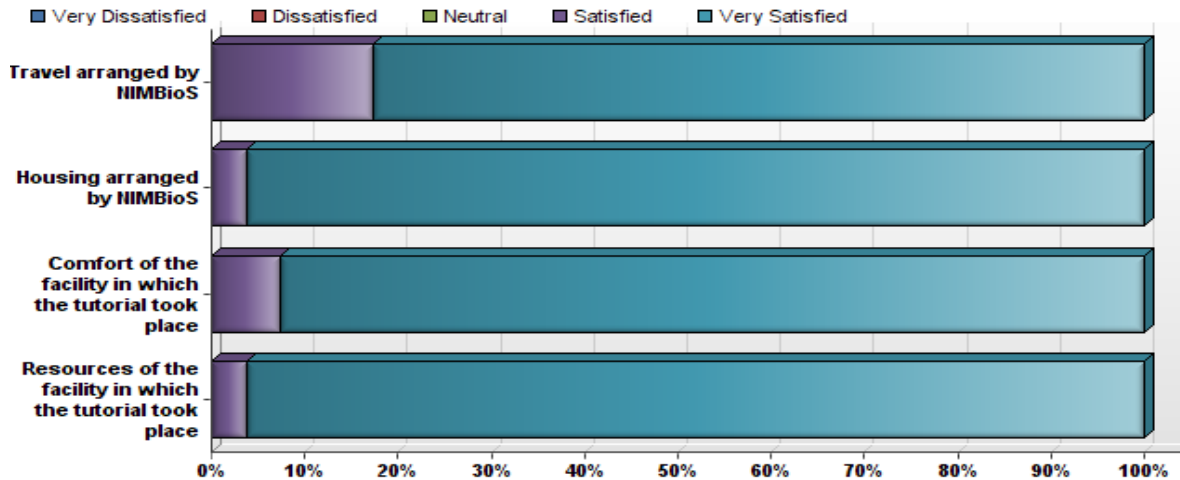


## 8. The tutorial format would have been more effective if:

*If the lectures and lab times were spread out a little*

*There was much more time for lab work, group discussions, discussion of pedagogical challenges for implementing this material, developing or reviewing classroom-ready materials, etc. As presented, the material was more like "here are some examples you could work up for your classes later"... which is fine, but is much less likely to be implemented when busy faculty head home.*

## 9. Please indicate your level of satisfaction with the tutorial accommodations:



## 10. Comments about accommodations:

*Spectacular.*

*Very comfortable, and the walk to/from NIMBioS was pleasant.*

*It was adequate*

*Fantastic!*

*Everyone at 4 Corners Sheraton hotel was so helpful and friendly*

*Great job NIMBIOS. Thanks!*

*Well thought and comfortable*

*Great! Friendly staff. Close to campus.*

*I was a little distressed to find that most meals handled by the staff did not meet my dietary requirements. Sending in a form that says "I am allergic to X" and then being served "X" at a meal was rather odd. While the conference was really great, I was hungry most of the time because I couldn't eat the "special meals" they ordered for me, as these were full of things I was not able to eat. Also, I had to send my travel form three times. I sent my form and another form together. Hers was received, while mine was not. I find it odd, that when forms were faxed together only one was received. I then received emails about sending my form in, and another set of emails saying, oh no we found your form. After that, another set of emails was sent telling me that my travel plans were not set because they didn't have my form. So instead of traveling with my conference partner, we traveled separately...*

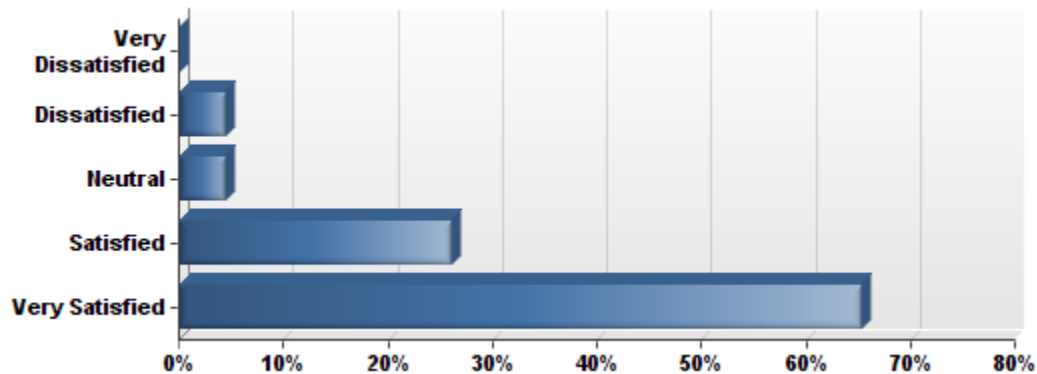
*Great!*

*Great! Thanks for the support.*

*Perfect.*

*I appreciate and am thankful for green practices (recycling, compost bins, and compostable utensils) that were very evident at NIMBioS. The hotel also allowed us to indicate we could skip having sheets/towels replaced (decision each day) which also saves resources. NIMBioS was very helpful in telling me about travel options, I did choose to drive so did not use their provided travel option.*

## 11. How satisfied were you with the opportunities provided during tutorial presentations and discussions to ask questions and/or make comments?



## 12. Please indicate any suggestions you have for facilitating communication among participants during the tutorial:

*It took a while for the presenters to get organized on Word Press. It might have been useful to use the site to capture participant products and sustain discussions.*

*None*

*More formalized small group structure, intermixing expertise. Possibly changing group structure on different days.*

*I believe the coffee breaks were great for facilitating communication; I wouldn't change them*

*None*

*Send out a list-serv.*

*Communication from my perspective worked well. I got to know a couple of biologist well. They answered my questions with the appropriate detail.*

*Some attendees may liked to have pre-viewed some of the documents & exercises, so having a blog or list of what was coming up the next day with downloadable materials may be useful. I may not have fully noticed what was available, so maybe it was there!*

## 13. Additional comments:

*I don't want to seem too down on this tutorial. I knew that I was challenging myself with the topic area. It might have helped to have some material to review/study in advance.*

*Tutorial was excellent*

*It was terrific to meet some new folks interested in biomathematics and to renew acquaintances with others. Lots of excellent discussions, and new collaborations, were fostered. In every way, it was a worthwhile event. Thanks to all at NIMBioS for making it possible.*

*Thanks! This was a great tutorial and I hope to be involved with NIMBioS in the future.*

*The tutorial was helpful. It opened my eyes to more research avenues and made me interact with other intellectuals where we exchanged ideas*



*I have included some critical comments - but I do recognize how very challenging it is to produce a quality faculty development workshop. This topic, in particular, is even more difficult, given the multi-disciplinary nature, and broad perspectives, of the participants. Nonetheless I hope my comments might be useful in refining the next iteration. Best of luck and thank you.*

*I think that this kind of tutorials is very important for the interaction of mathematicians and biologists interested in teaching mathematics with applications to biology and also allows the participants to exchange ideas about resources and pedagogy.*

*Keep up the good work. It would've been nice to have a chemist's point of view on all the biochemistry that was done.*

*This is one of the best professional development experiences I have ever had in my 6 years of being a university mathematics professor. I wish I could participate in more like this, but funding is an issue in small, private minority serving institutions like mine, so NIMBioS paying for the travel made it possible for me to participate, which is way I haven't been able to participate in some of the opportunities offered by MAA. Also, the length for the tutorial was just right. MAA workshops at 5 days are really too long for me to be gone from my young children.*

*It was a great opportunity for a pure mathematician like me to learn more on the interactions between mathematics and biology. I am very determined and confident to do more research on the field. This workshop managed to endow me with the basics. I am really glad to be a part of this tutorial.*

*Thank you for such a great workshop. One of the best workshops I have attended.*

*There should be a listserv for participants to communicate after the tutorial, or something on the WordPress blog that alerts us via email when someone posts something (this may already exist, but I don't know where it is) -- otherwise, people will post on the blog, and I won't know about it unless I go to the blog randomly on my own, which will seldom if ever happen.*

*Overall a GREAT experience....a one-of-a-kind opportunity to get together with other folks who value both teaching and research in the math-bio community.*

*I cannot imagine anything else that could have been done to improve the organizers' experience. Thank you!*

*A small note: As one who generally eats vegetarian, I very much appreciated the diversity (and quality!) of the lunch and dinner items that were so kindly made available to workshop members. A second small note: Directions, etc. to our housing and the location of NIMBIOS were super. Once in the building, though, due to the building's structure, it was not at all clear where to head on the first day, and a few of us were similarly unsure. Perhaps an additional note or posting on the door to direct us downstairs for breakfast and nametags on the first morning could be made? A third not-so-small note: REAL KUDOS to the NIMBIOS staff members. You all were fantastic. I hope to have the chance to visit again.*

*This was the best workshop/conference I have ever attended.*

*This was an excellent tutorial and I hope to return to NIMBioS for another, I will encourage my colleagues to do likewise.*