

NIMBioS

National Institute for Mathematical
and Biological Synthesis

Tutorial

The Search for Selection

EVALUATION SUMMARY REPORT

3-7 JUNE 2019

Erica Echols

Evaluation Specialist

Dr. Pamela Bishop

Associate Director for STEM Evaluation

Figure 1. Please check the appropriate box to indicate your level of agreement with the following statements about this tutorial:

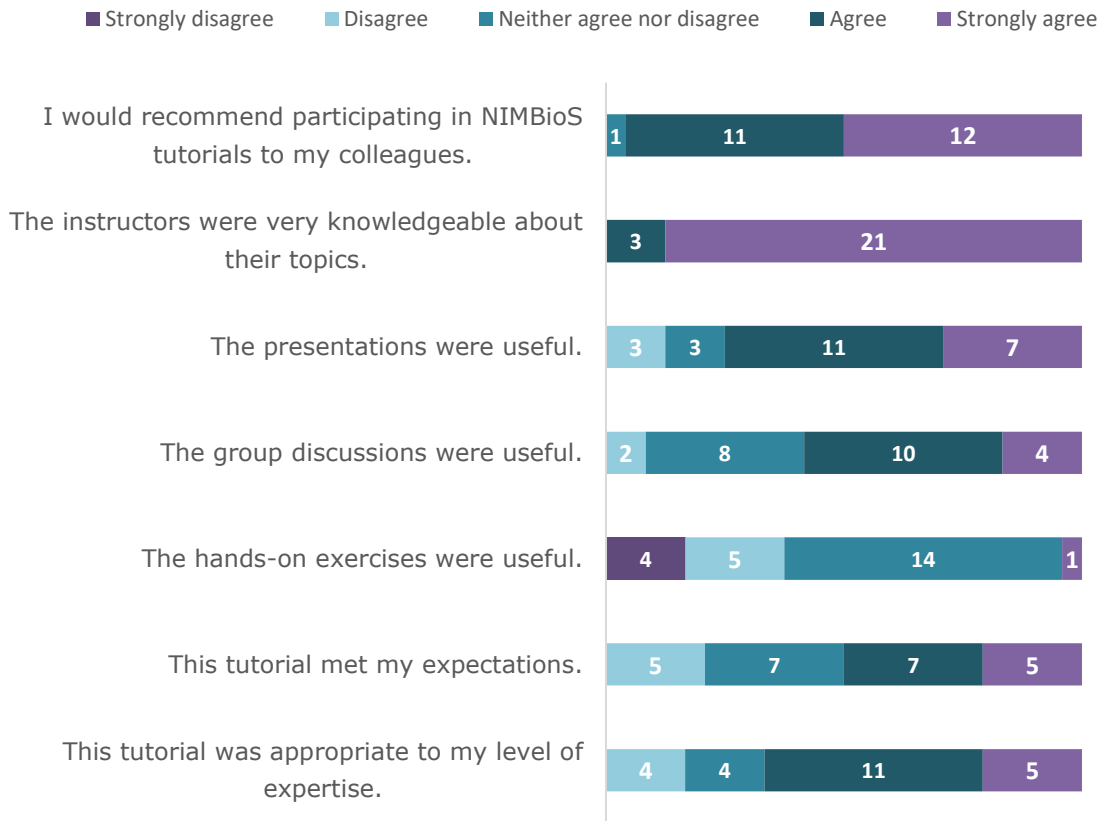


Figure 2. As a result of participating in this tutorial, I have a better understanding of:

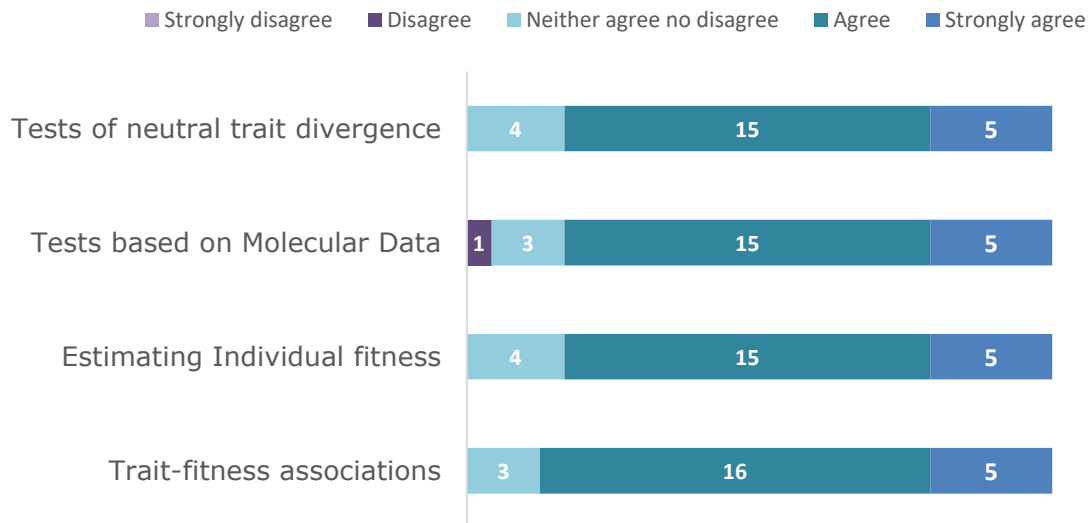
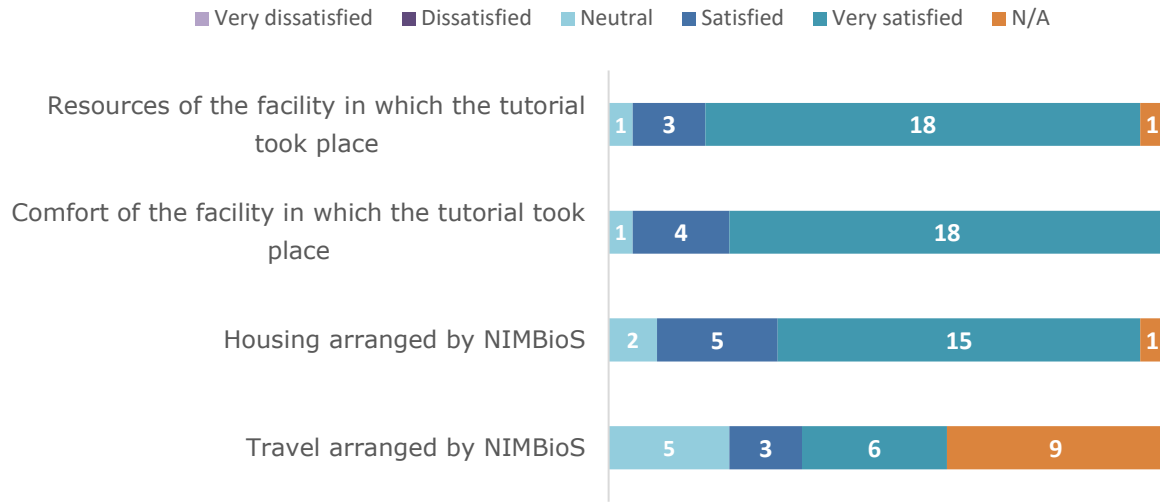


Figure 3. Please indicate your level of satisfaction with the tutorial accommodations:



Comments:

It would have been nice not to have to share a room with a stranger, but I understand this would not be cost-effective. Other than that, everything was fairly satisfactory at the hotel.

Everything was terrific. Thanks!

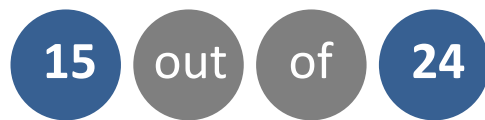
It's really a shame that you cannot open a window. I felt that the air circulation (despite ventilation) was very limited. Otherwise it was a very comfortable room.

Thank you! The housing and food were excellent.

It was fantastic.

The seminar room was a great size and felt really modern and clean, the only minor issue for me was that the room temperature of the seminar room was quite chilly.

There was no fridge in the room. Thus one cannot even store a bottle of water or a sandwich. Generally the hotel seemed uncaring about participants, and provided poor service. This is bizarre and wrong since I am sure that NIMBioS pays them good money from hard-won NSF grants. I think the hotel people take NIMBioS for granted.



attendees felt this was a very effective format for achieving their goals.

21 out of 24

attendees were satisfied or very satisfied with the opportunities provided during the tutorial presentations and discussions to ask questions and/or make comments.

The tutorial format would have been more effective if:

...there were a directed group discussion covering the content covered each day of the tutorial.

- 1) There were computer based data analysis sessions included.
- 2) The instructor had covered less but in more depth.

I think "not a very effective format" is too strong of a phrase, but I think the format maybe could be improved by mixing up the format throughout the day. For instance, the lectures are great for covering a large amount of information, but not great for going deep into a particular topic. There could be one session during the day where the class reads a paper using a particular technique, and then there is a journal club type discussion about the paper, how they used the technique, the pros / cons, etc. That might help mix up the format a bit and get more participation from a wider group of people

...it included a few substantive examples/exercises to work through.

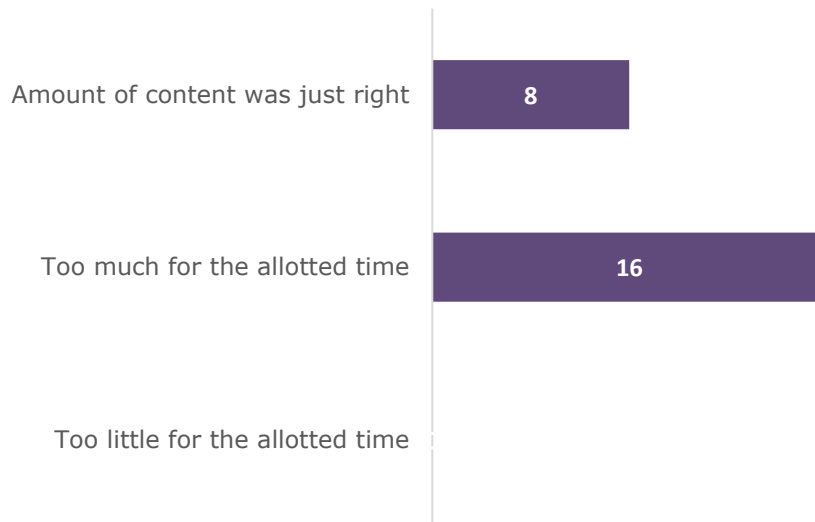
See previous comments. More hands-on activities, slower pace needed.

...hands-on problem solving sessions were included.

More practice and alternative teaching resources were used.

1. The pace would have been slower, with derivations and with exercises to get an intuitive feel for at least some of the tests.
2. The schedule should be from at 10 AM - 6 PM, not 9 AM - 5 PM.

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



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

To create a better balance of time invested in statistical methods and theory. More theory would be great.

More in-depth coverage of, and also hands-on exposure to the most popular methods. While the instructor did an excellent job of explaining when to use different tests, that information is not likely to "stick" very well in the way it was delivered. I would have preferred to have had group discussions to allow students to exercise their understanding of what tests for selection to apply given: (1) certain types of data, and (2) a mock research question.

Much more detail on fewer topics. Tried to cover way too much in the allotted time, therefore everything was superficial and rushed.

More detailed explanations of topics covered.

It'd have been nice to have some more practical information about these analyses. This was a very good overview but I don't feel like it prepared me to conduct the analyses on my own - I was hoping to come away with that.

Gene-environmental associations. Although a few case studies were highlighted, some hands-on exercises may have been useful. As well as attention to how results can be presented in the context of a study. Now there was a very strong emphasis on the "mechanics" of the different tests, and less on the interpretation of the results (especially if they are less clear cut).

The coverage / sequencing requirements for some of the molecular tests and how that varies across tests.

I would like to have covered a little more about the codon models, especially those that allow for variation in omega across branches of a phylogeny.

How to actually obtain signatures of selection bioinformatically.

More time to explain the details and the mathematical reasoning of each test and approach. I would have liked to exercise the models with real data. Besides, it would have been wonderful if packages and software were introduced.

Go deeper into topics being discussed, no need for more material.

Though the purpose of the tutorial was to give a broad overview of different techniques, I think it would have been useful to see some hands-on examples of data analysis with some of the current software and tests.

I would have liked the presentation speed to be a bit slower, so in other words, the same information covered in a slightly longer tutorial.

Working examples in R or Python with existing datasets.

More discussion on the more recent methods using molecular data.

Different types of tests for detecting non-genetic adaptation, such as histone modifications and DNA methylation.

If given more time, I would like the tutorial to have covered practical aspects of the search for selection, including implementation aspects (e.g., programs, tutorial runs, etc.) and also experiment design for facilitating and promoting data analysis.

No other topics. If anything, FEWER tests but covered in more topics. I would have liked more depth not more topics.

Data preparation for the different tests.

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

The math part of the tutorial, I wish there was more such as Eigen values and vectors, estimating parameters, matrix decomposition.

The methods summaries were helpful in that the instructor did an excellent job of explaining when to use different tests.

Meeting other participants. Somewhat useful for the broad overview.

The lectures

It was a terrific broad overview of lots of different topics - many of which I knew very little about previously.

I like that there was a broad overview, although this also had the tendency of becoming overwhelming. I like the fact that some background information was included about how the field "evolved" (i.e. first types of tests, improvements of earlier methods etc.).

The breadth of topics covered; the knowledge of Bruce and the ability to ask him questions

Learning how the equations relate to the phenomena of interest.

Nice breadth, appropriate depth, clarity of presentation.

The fourth and fifth day were the instructor showed the theoretical foundations of estimating fitness landscapes and individual fitness surfaces.

It addressed a wide range of models to choose from according to my statement of the problem in my current research. The instructor was able to efficiently answer all the questions asked.

Worked examples

The ecological tests were most useful to my field of research.

Getting an overview of the different tools available for us to use.

Networking opportunity with other participants.

The classification of a very broad range of analyses into different categories, with their different focuses, underlying theories, and types of data required, was the most helpful aspect to me.

The book being made available

The way the different types of analyses were organized by the instructor to be present and some fundamental and conceptual discussions on selection.

The survey was excellent.

The divergence-based tests

What, if anything, would you change about the tutorial?

The slide format:

- Sometimes I felt that the use of pictures, diagrams and show connections btw different equations would be more effective than the current slides used. Generally, the slides were too wordy.
- I am a visual learner, and most of the time the focus is in people that learn best by listening.

More hand-on experience with the material presented. See previous two entries for ideas.

More time spent on key topics, including computer-based exercises analyzing real datasets. Slides had way too many words and the instructor spoke too quickly. Very difficult to keep up.

More detailed explanations of concepts from a non-mathematical perspective.

I would extend to a full 5 days rather than 4.5 - the last section felt a bit rushed, would have preferred to have a little more background/a little slower pacing.

I was hoping for an R component where we'd do some tutorials together. That would have been terrific.

Maybe it would be good to include some hands on exercises. It would require dropping details of certain topics, but I think it would help me understanding the topics on a somewhat deeper level.

Overall it was great, but some of the slides that were screenshots from the book I think made some people tune out when they were faced with a huge block of text. If there was a way to condense that text down into a few bullet points summarizing the topic, that might help people stay more engaged. Perhaps use fewer large blocks of text on slides and opt for bullet points instead (possibly with reference to the page/chapter numbers where the larger block can be found).

As an action-oriented scientist, I might have liked for the group (or subgroups) to actually analyze some data. Even better if it might lead to a publishable contribution. I would think this could be easily done by adding one coordinator, and setting up one or more topics (metanalyses, reanalysis of public data, etc.) for people to try their hands at in the evenings, or on a dedicated day or two.

I would suggest working through a few examples and exercises.

I would ask for the instructor to have a first slide at the beginning of the presentations of each method and test showing the exact type of data required to perform the test and the assumptions and limitations of the test.

The time given was short, I would rather prefer to take this course with plenty of time.

Have more whiteboard examples and give students the opportunity to work out a basic examples ourselves

It may not be practical, but the density of content was often overwhelming, especially for me as I am relatively new to all of these analytical methods. I'm not sure if the amount of content should be reduced or spread out over more time or if more background information should be added. Or perhaps have a separate tutorial that is more introductory, even for graduate students that may not be as adept at using these analytical techniques.

My main suggestion would be to consider reworking the PowerPoint presentations to try to distill each slide into a main take-home point or message. I think that this would be most effectively done by moving away from underlined text in screenshots of book pages. In doing so, I expect it would also make organization of the presentations easier, which might help to reduce the number of times it's necessary to jump back and forth through slides or even skip over slides entirely. For me, this would add value to

the tutorial. I like to take my own notes regardless of having available ppt files for download because it helps me to stay focused and engaged with the material, but the format of the presentations made it hard for me to keep up.

I felt that there was too much material in too little time. In addition there were no group exercises or opportunities to work through analyses with real-world data. I and other students expected a hands-on workshop featuring different instructors each day and hands-on examples. While this workshop was very informative I do not feel like I gained very much practical experience. This is less the fault of the instructor and more an issue of how the course was advertised.

Instead of two 90 min lectures for mornings and afternoons with 30 min breaks in between, do two 60 min lectures with 15 min breaks in between and end with a 60 min hands on problem solving session with the examples that were shown on the slides and include programming components too. The lecturer should follow the schedule strictly in order to accommodate the people watching the live stream.

I guess that a week-long tutorial, covering only theory and a single instructor is a bit fatiguing. So I would change the exclusive theory focus and include practice exercises and have other instructors contributing.

A lot of slides were excerpts from the book, which made them a little hard to follow. The pace should be slower and some of the math should be examined more closely. It goes so fast that one must take it on faith. Doing some of the derivations would help.

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

Bruce paused often for questions, which was very good. However, he often interrupted the person before they had finished asking the question and started answering what he thought they were asking. This was annoying, because the rest of the audience didn't necessarily know what question was being answered, and because he sometimes anticipated wrong and the answer did not, in fact, address the question (this happened to me).

Include option for social media handles (if applicable) with contact info

The Wordpress site was a bit difficult to navigate. It would have been nice to know people's optional twitter handles for communication in that way.

It really is up to the group to organize themselves. This group was great at doing that, but I can imagine that this is different for other groups. An ice breaker in the city center may be a good way to get the group together.

I think it's a great idea to have people introduce themselves before the tutorial even begins, but doing so through the Wordpress website was too difficult. Perhaps a large email thread could be started by

the organizers where the participants just reply all to everyone with a brief introduction. I feel like having it via email might make it so that more people participate

Again, if group projects could be outlined - maybe we could be connected with a subset of colleagues with shared interests ahead of time and arrive with some lit searching etc. already completed. I'm at a stage where getting papers out is crucial, but more importantly I learn best when I have to use the tools being described.

A small/mini project in group would work best

Dr. Walsh was very open to questions and forming a dialogue which helped to facilitate communication and provide understanding for the topics that were discussed.

Instructor was very open to questions. However it was common for a participant to be "cut off" mid-way through asking a question by the instructor trying to offer a response. In several cases this led to misinterpretation of the question. A better approach to encourage learning by everyone would be to allow the full question to be asked before trying to respond. Even if the instructor knows where they are going with a question, the rest of us may not and do not benefit from half of an inquiry.

Set up a slack group with all the participants

Smaller discussion groups with subsequent updates sharing for the all group for example.

Additional comments:

The first day of the tutorial could start around 10 AM instead of 8 AM. That is because there are people that coming from very different time zones that would allow everyone to be well adapted.

NIMBioS organization, facilities, food etc. were excellent. But the course itself was a missed opportunity. I feel like all I know now that I didn't know prior to the course is that certain types of selection tests exist, and a few of the statistical pitfalls one can fall into. But I would need to do a lot more reading to understand any specific test properly, and find out how to actually perform it. Bruce should have mostly focused on one or two keys tests per day and shown us how to perform them (both mathematically and practically with real data using R scripts/Linux etc.). Instead, it mostly felt like one long sales pitch for his book.

From speaking to other course participants (who were all great people), it seemed like a lot of people felt this way (course too rushed, slides too wordy, no practical sessions, or even any info on programs to use to run specific tests). The course really wasn't what I was expecting, and I wouldn't recommend it to other people - seemed like a waste of a week for me. A different type of course on the same broad topic (tests for selection) would be a better use of NIMBioS resources in my opinion.

Thank you for the great opportunity.

Loved it! Learned a lot, had a great time in Knoxville.

This was a great tutorial. I both got out a lot more and a bit less than I'd hoped. I learned a lot of new topics that I didn't expect to become this familiar with. That said, I didn't feel like I came away with the depth of practical information on a few topics that I'd hoped for. I was really hoping to be able to conduct more of these analyses on my own at the end of the session and I still have a long ways to go before actually implementing them. It would have been ideal if the breadth of topics could have been a bit narrower but if morning lectures could be followed by afternoon R tutorials.

Thank you for the opportunity. Bruce is inspirational in his depth and breadth of knowledge and the monumental amount of work that goes into creating the textbook and affiliated workshop such as this. I feel lucky to have been able to participate.

Dr. Walsh did an excellent job and the tutorial was a great experience. A big 'thank you' to all NIMBioS organizers.

Thanks for a terrific workshop - the instructor was well-prepared, exceptionally knowledgeable, and a good communicator. Occasionally he answered questions slightly different than the ones being asked - but I usually learned something anyhow. I was a little bit annoyed with one participant that seemed to want to lecture us all about their very peripheral work with bacteria... though I can also understand that addressing this might have been hard or counter-productive to open discussion.

I would like to deepest gratitude to the course organizers for giving me such an opportunity. I also would like to thank to provide me the grant so that I can make it. It would nice to consider full scholarship for people who otherwise aren't able to attend.

While much of the information presented in the tutorial was new to me, I was still able to learn from it. Despite feeling like much of the information was far more advanced than I anticipated, I was able to understand the information but perhaps more importantly, I got some introduction to the information so that I can now build upon it.

The tutorial website was a little bit non-intuitive for me to navigate. It took a bit of poking around to find the location of the PowerPoint presentations.

Overall an excellent course! Just requires different advertising (it is a class, not a workshop or hands-on tutorial) and slightly different in-class communication practices.