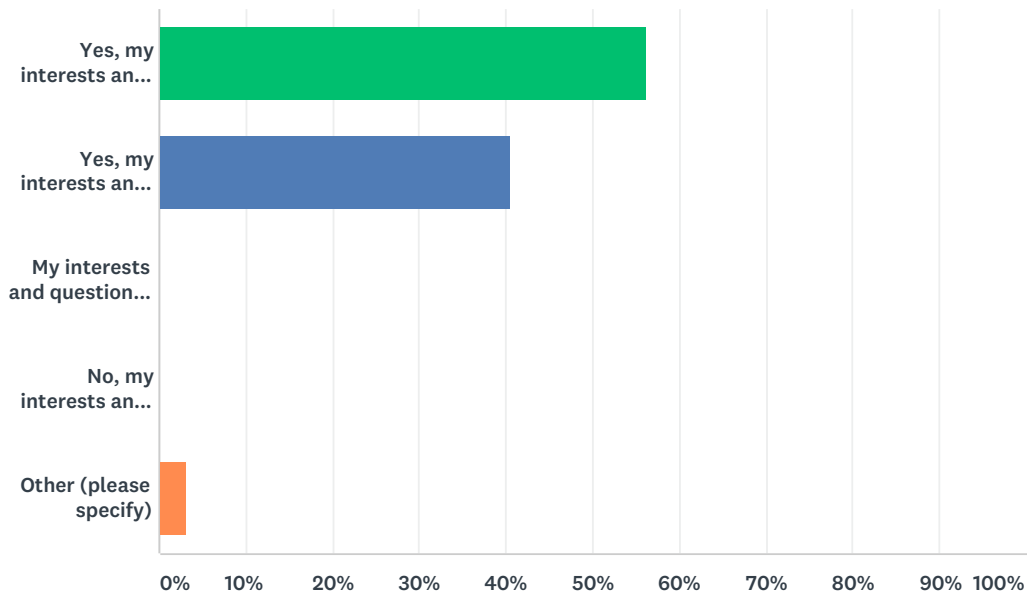


# Q1 Did the Open Data Workshop program address your interests and questions about LIGO data analysis?

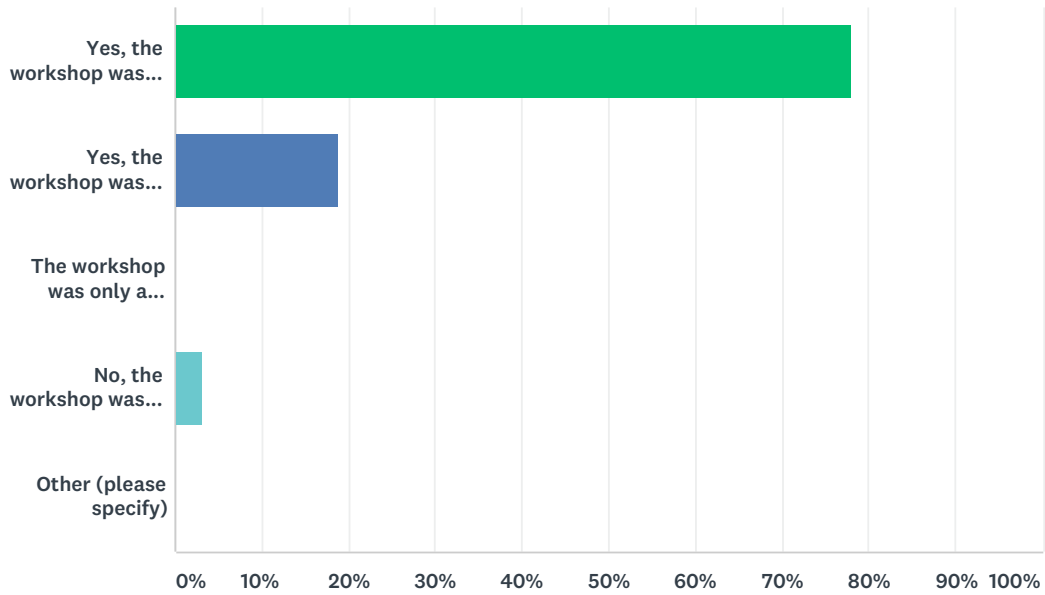
Answered: 32 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes, my interests and questions were fully addressed by the workshop	56.25%	18
Yes, my interests and questions were partially addressed by the workshop	40.63%	13
My interests and questions were only slightly addressed by the workshop	0.00%	0
No, my interests and questions were not addressed by the workshop	0.00%	0
Other (please specify)	3.13%	1
<b>TOTAL</b>		<b>32</b>

## Q2 Was the Open Data Workshop a worthwhile investment of your time?

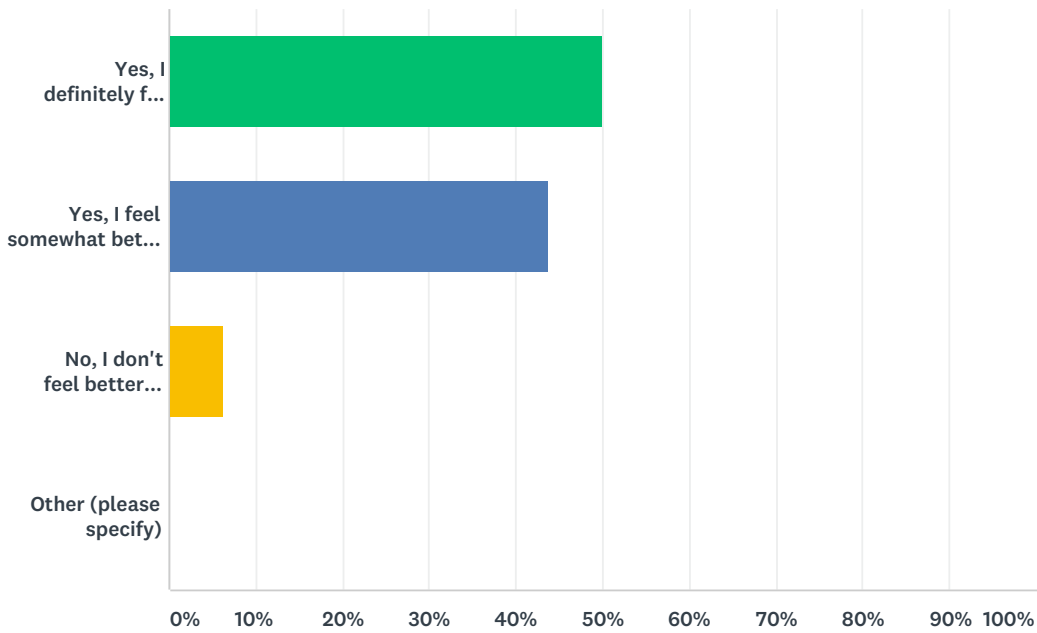
Answered: 32 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes, the workshop was definitely a worthwhile investment of my time	78.13%	25
Yes, the workshop was a somewhat worthwhile investment of my time	18.75%	6
The workshop was only a marginally worthwhile investment investment of my time	0.00%	0
No, the workshop was not a worthwhile investment of my time	3.13%	1
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>32</b>

### Q3 Do you feel better prepared to work with LIGO data after attending the workshop?

Answered: 32 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes, I definitely feel prepared	50.00%	16
Yes, I feel somewhat better prepared	43.75%	14
No, I don't feel better prepared	6.25%	2
Other (please specify)	0.00%	0
<b>TOTAL</b>		<b>32</b>

## Q4 What topics or activities covered in the workshop were most helpful for you?

Answered: 31 Skipped: 2

## Q5 What topics or activities would you like to have seen included in the workshop, that were not?

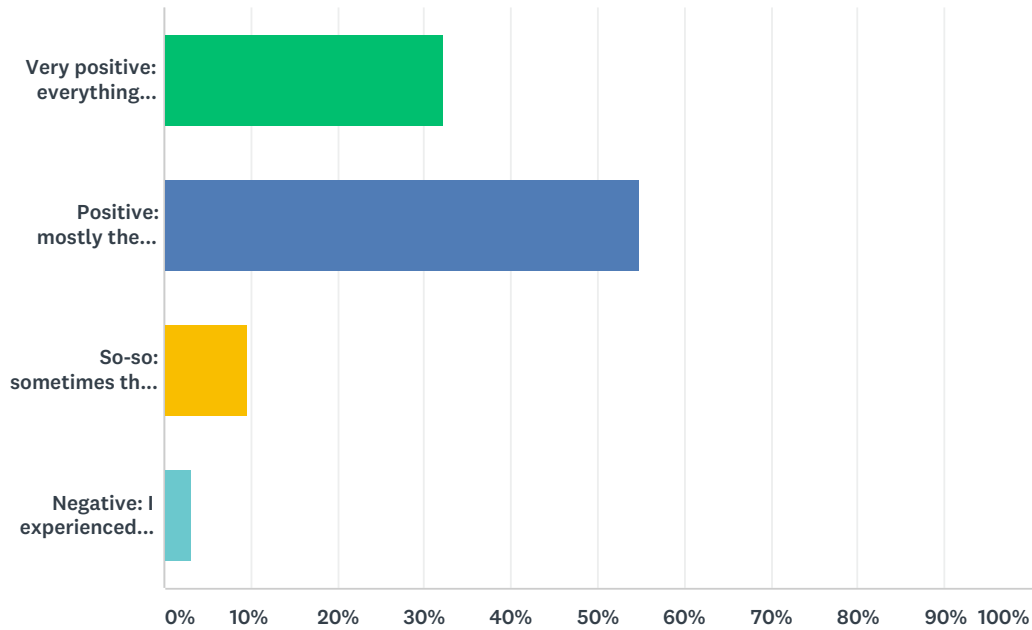
Answered: 28 Skipped: 5

**Q6 If you had to eliminate something from the workshop, what would you eliminate?**

Answered: 29 Skipped: 4

## Q7 What was your experience with the workshop tutorials?

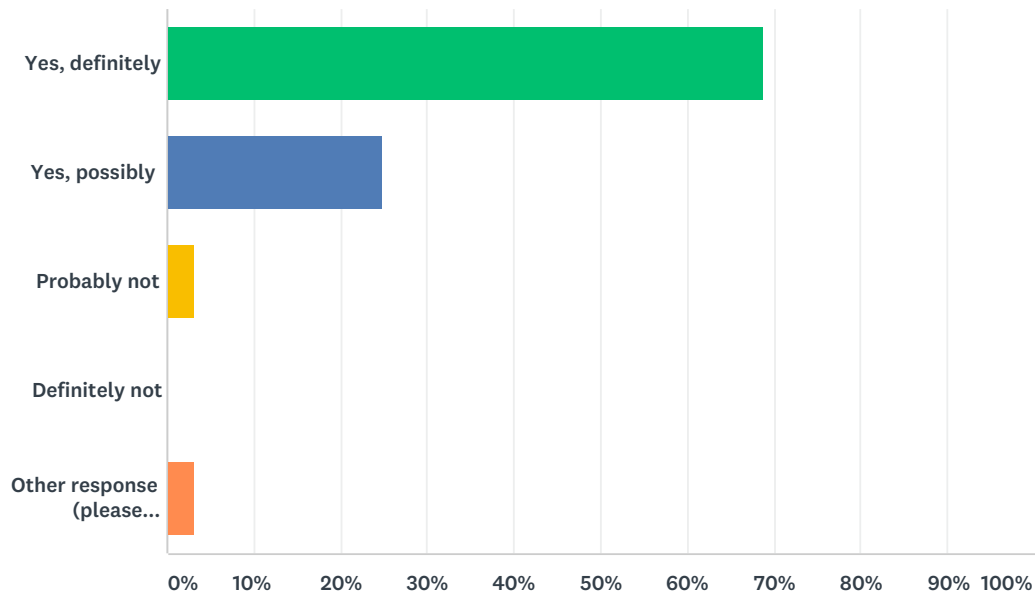
Answered: 31 Skipped: 2



ANSWER CHOICES	RESPONSES	
Very positive: everything worked well	32.26%	10
Positive: mostly the software worked without any problems	54.84%	17
So-so: sometimes the software worked OK, but I experienced a few significant problems (please specify below)	9.68%	3
Negative: I experienced several major problems with the software (please specify below)	3.23%	1
<b>TOTAL</b>		<b>31</b>

## Q8 Would you be interested in taking part in similar workshops in the future?

Answered: 32 Skipped: 1

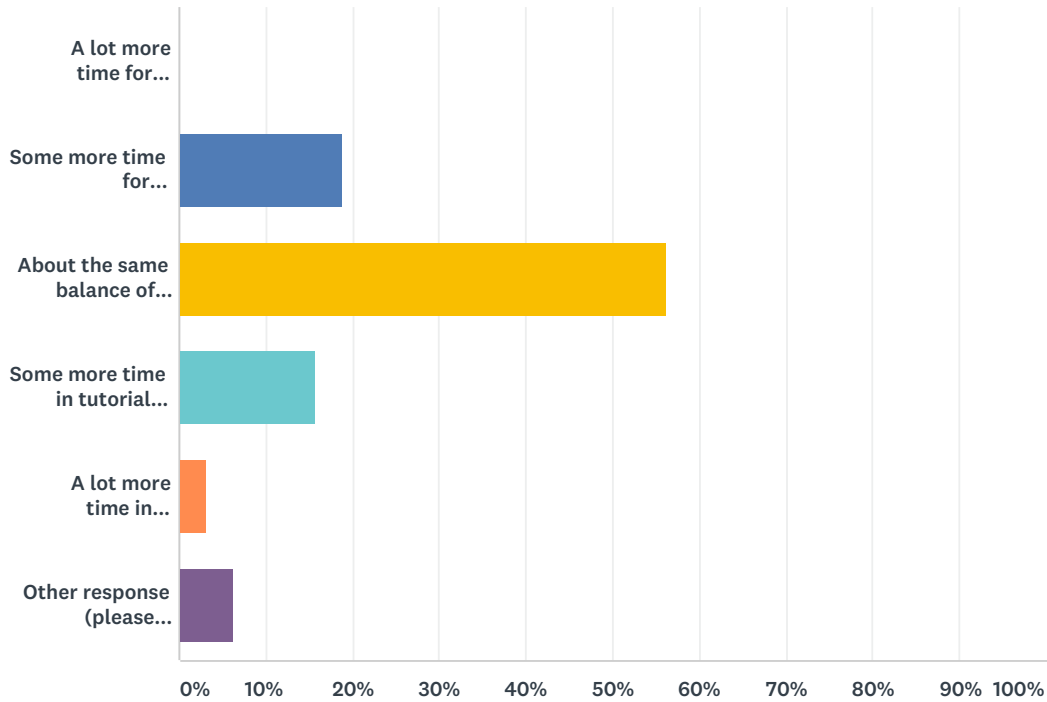


ANSWER CHOICES	RESPONSES	
Yes, definitely	68.75%	22
Yes, possibly	25.00%	8
Probably not	3.13%	1
Definitely not	0.00%	0
Other response (please specify)Other (please specify)	3.13%	1
<b>TOTAL</b>		<b>32</b>



### Q9 What balance of presentations versus tutorial sessions would be beneficial for future workshops?

Answered: 32 Skipped: 1



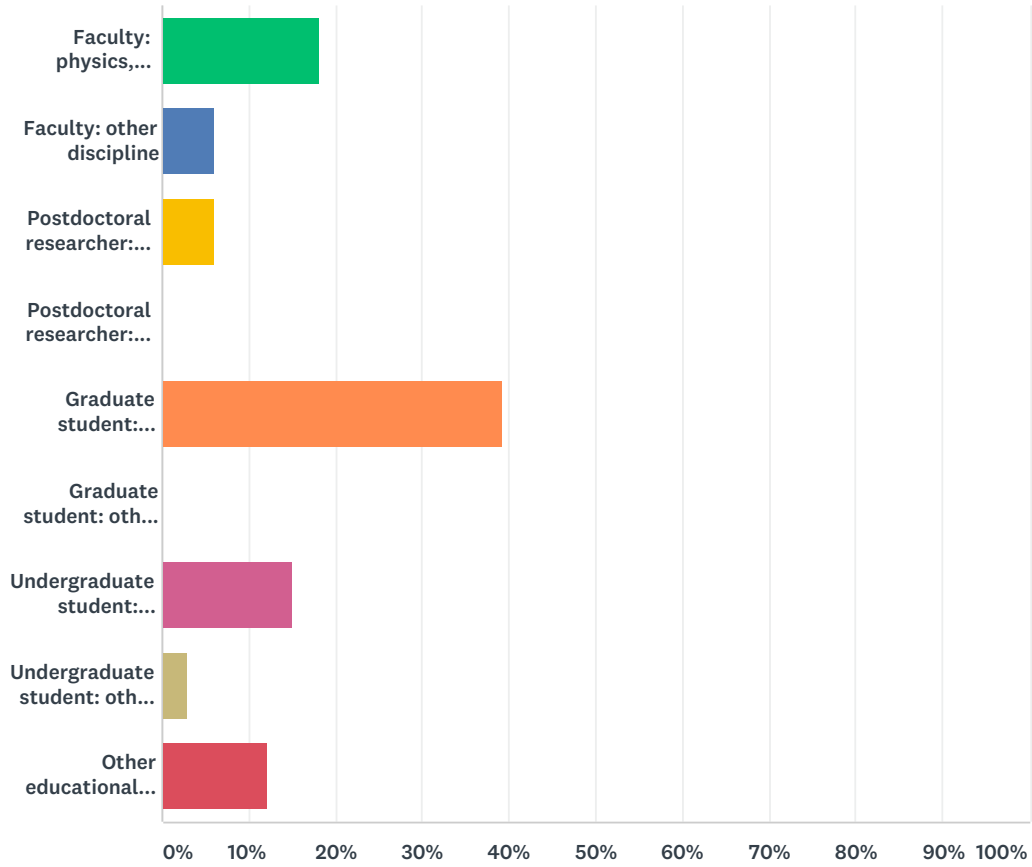
ANSWER CHOICES	RESPONSES	
A lot more time for presentations	0.00%	0
Some more time for presentations	18.75%	6
About the same balance of presentations and tutorials	56.25%	18
Some more time in tutorial sessions	15.63%	5
A lot more time in tutorial sessions	3.13%	1
Other response (please specify)	6.25%	2
<b>TOTAL</b>		<b>32</b>

## Q10 If you could change one thing about the workshop, what would it be?

Answered: 27 Skipped: 6

## Q11 Tell us about your educational level

Answered: 33 Skipped: 0



ANSWER CHOICES	RESPONSES	
Faculty: physics, astronomy or cognate discipline	18.18%	6
Faculty: other discipline	6.06%	2
Postdoctoral researcher: physics, astronomy or cognate discipline	6.06%	2
Postdoctoral researcher: other discipline	0.00%	0
Graduate student: physics, astronomy or cognate discipline	39.39%	13
Graduate student: other discipline	0.00%	0
Undergraduate student: physics, astronomy or cognate discipline	15.15%	5
Undergraduate student: other discipline	3.03%	1
Other educational background and level (please specify)	12.12%	4
<b>TOTAL</b>		<b>33</b>

## Q12 Any other comments or suggestions about the workshop?

Answered: 25 Skipped: 8

What topics or activities covered in the workshop were most helpful for you?

Open-Ended Response

The talks were great in explaining the concepts and the afternoon programming sessions were great for diving into the material. The workshop as a whole was quite helpful.

Access of the LIGO data and its calibration

CBC matching

Day 2.

CBC overview by Alan Weinstein

CBC

General overviews of the data analysis are very helpful for understanding. The conversations during the hands-on sessions are extremely useful.

Pycbc

Most helpful was the chance to interact with the organizers/facilitators in the afternoon sessions. The facilitators were very willing to help.

The most helpful were the talks on LIGO strain data quality and parameter estimation, and all the three workshop series in using pycbc

Introductions to PyCBC and GWpy!

Honestly, all of them. It was an excellent event.

The tutorials on data analysis, especially the Bayesian analysis

Hands-on

Getting a broad overview of the tools available at hand to analyse ligo data, and getting to use them for the first time.

pyCBC (specifically generating waveforms), Katerina's talk on PE data analysis

BBH detection and parameter estimation

The morning talks and the challenges were the most helpful

parameter estimation

PyCBC and Data Access notebooks. I thought that all the talks were of high quality so it's hard to "choose" but the CBC PE by Katerina was particularly of interests for me (I'm working in PE) and I was really glad to be presented DetChar in more details in the Monday and Sunday talks.

Python methods and the openness of the instructors

What was detected, methods of data analysis, and signal extraction

Most of the talks have been helpful but the discussion and the Q&A with LIGO people have been the best thing for me here.

Both the lectures and the hands on sessions were helpful but for different reasons. The lectures clarified things that I have read but did not fully understand, and also gave me new ideas about future research. The hands on sessions were invaluable for understanding how to work with the notebooks.

pycbc-inference

I enjoyed the lectures, as they provided a deep overview of the concepts behind data analysis. I particularly liked the information in Day 2 about the CBC analysis because that was what I was most interested in.

tutorials on pyCBC and GWpy

it answered a lot of my questions about how all the pieces went together. I really enjoyed learning about the engineering of the detector more than anything, even though it wasn't

exactly the point of the workshop.  
gwpy,pycbc, Q-transform, unmodeled bursts  
Processing the LIGO data , Hands-on

What topics or activities would you like to have seen included in the workshop, that were not?

Open-Ended Response

Maybe a little more of the mathematical concepts of GR and gravitational waves in the talks and/or programming lessons. Only if the workshop were a week long though, because I am still working through the tutorials/challenges anyway.

The current topics have covered most of issues that I want to know.  
Topics were great, hands-on sessions should be more challenging  
face-to-face interaction.

n/a

Nothing

Maybe some topic-based analysis, e.g. applying the techniques on searching for non-tensor polarizations. A follow-up workshop might be very useful.

Lal inference

One possible idea would be to have two "tracks," say for experienced attendees and newcomers.

I'd like to learn more about error handling

I'd love to see one talk that summarizes start-to-finish LIGO data analysis, from data collection to online searches to parameter estimation

The workshop was very well organized in my view, with a good mixture of hands-on and pedagogical material. It might have helped to have a 15-30 minute session at the end of the hands-in workshops to sum up what was covered and to take questions that everyone could hear the answers to instead of having questions and answers limited to single participants.

Treatment of time sources where the signal does not fall in a single bin

More info about how skymaps are produced

A more complete coverage of how signal processing is carried out would have been more helpful, rather than providing all the code in a wrapper all at once. I learnt more about the nuances regarding, for eg., how PSDs are computed, what kind of and what size of filters are used, through individual discussions with Alex and not through the 1-2 slides that covered it or simply running the tutorial code which difectly gave the final output plots. I'd recommend at least one tutorial going through under the wrapper routines for computing the PSDs and spectrograms and whitening (using just numpy+scipy). P.S. I wish this form had a bigger text box to avoid writing sentences which seem to be tending to infinity.

More detail on PE. Specifically for GW170817, but in general what modifications to standard MCMC are needed to do PE for GWs. It was a shame that the PE MCMC tutorial ended at the sine wave example.

Include more details about excess power

tutorial on burst searches

I firstly wish I had more time to cover more notebooks !

something that would have formalized interactions between people, some sort of introduce yourself thing. Who are the attendees?

The Wifi debacle on the 2nd floor of West Bridge put me 1/2-day behind, so I'm in catch-up mode now. But I'm grateful for all the documentation!

More around CCSN and other kind of GW signals apart from CBC. Also, being a researcher I hate to say this, but I've missed something about the policies of LSC, i.e. data release, environmental channels release, how to become an active member, etc.

A few more lectures

overview of the software project

Not in particular topics or activities, but I think it would have been useful if the powerpoint slides for each presentation was available to us while the presentations were happening so we could actually click on the links or go to the webpages that the presenters were referring to. I would have liked to know more about the details of control loop that keeps test masses in place.

if anything, more on unmodeled bursts

Quasi Normal Mods

If you had to eliminate something from the workshop, what would you eliminate?
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Open-Ended Response
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Nothing. Everything was great! I am sure the internet connectivity issues will be better next time anyway :)

Please do not eliminate any activities.

Calibration talk

2-5 tutorials

n/a

Nothing

It might be more efficient to put the basic parts of the tutorials as pre-assignments before the workshop.

Introductory lectures

I'm not sure. Most of what was discussed was relevant, so I'm not sure what should be eliminated.

All talks were useful

I didn't get much out of the talk about mutli-messenger astronomy. It didn't seem applicable to this workshop.

Nothing! it was great!

The first day on engineering

Nothing really

I would add another day or two to be honest...

The overview talks. While interesting, they were a bit too general to be useful.

nothing

Nothing

nothing, it was all helpful

The complexity of the Bayes Theorem stuff - but explore the question of 'is it real' at a less formal level.

I don't grasp it all yet, but I wouldn't eliminate anything. It's all part of the story.

I wouldn't eliminate anything, I would include more things and extend the workshop 1 more day

Nothing, I found all my time here worthwhile.

It's hard to say

I would probably eliminate some of the lecture details of the engineering aspect of LIGO instrumentation because I personally was not too interested in it, but perhaps there are other engineers in the audience who liked it.

N/A

if I HAD to? Having it start so early in the day wasn't very fun. But I'm a night owl, so.

nothing

I will not eliminate any thing. I will enlarge the list of the topics.

If you could change one thing about the workshop, what would it be?
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Open-Ended Response
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I think ideally it would be about a week long. Maybe five days? Maybe six? The 2.5 days were obviously an experiment since this was the very first workshop, but the experiment succeeded so well that the next obvious step is to make it longer so everybody can gain even more from it.

The workshop has already been well prepared even the trainee may meet the problem to install the software in the beginning.

Make hands-on session more challenging and less "shift-enter". Perhaps splitting people in different levels would help.

Day 1 and tutorials

none

Nothing

It might be useful if some in-depth elaboration on the software, e.g. whitening, q-transform, band-passing et al, could be given during the hands-on sessions. But everyone has done a great job already.

Less introductory lectures, more focus on advanced stuff

As mentioned above, you may wish to consider having different "tracks" depending on experience with LIGO data, Python coding, and various software packages.

The internet connection should be more reliable



See above comment on editing Jupyter notebooks to be less complete.

It was great. I go to a ton of conferences and this one was excellent.

More detailed discussions about how the LIGO analysis could be adopted for other purposes, perhaps with a to-do list or to be put in touch with other LIGO team members who are pursuing these analyses

Guided tutorials (which combine a lecture and a hands-on code running) would be a good idea. I know its hard, since everyone likes to work at their own pace, but I thought the purpose of splitting us into smaller groups was a step towards that. Instead, we ended up working independently sitting in the auditorium (which I hate, but totally understand!).

Either make the tutorial notebooks less complete or expand the challenges.

Make the software more organized.

I would dedicate more time in the talk to Markov Chain Monte Carlo methods and add some additional description of burst searches

A video introduction from Rai, Kip and Barry. An explanation of why this is being done - to what extent is it a search for real collaborators and to what extent is it a 'pay-forward for public funding'. "We chose to go to the moon because it is hard" inspired years of scientists (me) and years of public support for funding. Is this the beginning of that - don't go to the moon - inspire the public through events like the neutron stars. Make Alan the next Carl. A general flowchart of the steps from data acquisition through signal analysis would be helpful: what we apply and when. I know, from astrophotography, that some of this is an art, but in general, what are the steps.

Apart from what I've said above everything was perfect.

Possibly organize hands-on groups by research interests and go more in-depth into the tutorials that are most pertinent to that group's research.

the content of the presentations to be more associated with tutorial sessions

I would spread out the lectures so that the hands-on sessions could be broken down into more sections, each corresponding to the last lecture.

Maybe invest more time on tutorials

I would readjust... something about the workshop part? Maybe have the room assignments be flexible?

nothing.

It would be usefull to plan some time for participant presentations of their scientific problems and programs and corresponding discussions with experts.

Please comment here on any problems that you experienced with the tutorials/software

The only problems I experienced were my own fault; still building up my Python skills. But I was able to get help when needed and everything was fantastic! So much fun to get a GW signal out of the mock data and work with the real GW signals as well.

n/a

Super good!

The tutorials are fantastic. It will be very useful if we can work/collaborate on some projects using the given softwares.

As you know, there were difficulties with wi-fi, but that wasn't a major issue. As someone with minimal experience with Python, there were many steps that I had to be walked through, but as mentioned above, the organizers were quite helpful and forthcoming.

The software and tutorials are a work in progress and interaction with the users will improve them.

I wish the tutorials allowed for more hands-on analysis. Instead of being completely filled out for us, I would have preferred Jupyter notebooks that guided us through writing our own code (including documentation, hints on which functions to use, etc.). I'd strongly recommend following the model that Adam Miller uses for some of his data science tutorials, found here: <https://github.com/LSSTC-DSFP/LSSTC-DSFP-Sessions/>

The wi-fi being down was not the workshop's fault! All the software etc. worked well for me, except Jupyter notebooks kept telling me that I didn't have the right version of Python when I did. I moved to Azure and all was well.

There were plenty of times that the code hung up

The tutorials worked great and were well-organized. Only complaint is that many functions were black-boxes. In many cases, there were links to get more information (this was great!) but more such explanation/documentation of why certain choices are made would be helpful.

While the tutorials are a good resource, it was frustrating that the python notebooks had done pretty much everything for us. I found it difficult to learn from them, especially those without challenges.

Wifi was a bit slow to download the 130MB of data from LOSC but it wasn't much of an issue in the end.

One expects problems. What impressed me was the willingness of the LIGO folks to engage in finding the solution.

I should have gone to Azure Notebooks first. I had previously downloaded Docker, but it didn't work for me.

The software worked but the connection didn't as you know. My recommendation is that next time you advise on not only downloading the docker/python modules before the workshop (which I did) but on downloading all necessary data for the activities and that you prepare the tutorials to use data in our drive and not on the internet.

I had installed some of the software directly onto my computer without using dockers or azure, and my computer couldn't find the files again for some reason. The software worked well in azure though!

It's fine

my computer is old and incompatible with pyCBC/lal, but this was fixed by using azure notebooks.

There are not enough detailed instructions for the beginners. Sometimes ine is not able to start the work without the help of tutors. 2 Exzamples: Instollation of Python on Windows 10 2)The address <http://0.0.0.0:8888/?token=9089f357e3054585b80828d6b54867832fdade480683b488> does not work at all.

Any other comments or suggestions about the workshop?
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Open-Ended Response
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Comment: this was a fantastic workshop and I could not be happier with how much I learned and interacted. Thank you to all the organizers and everybody who helped make this a reality. Since I wasn't the target audience I didn't fill out the main part so as not to bias the sample. I felt that a couple of starter points could be clarified in the tutorials. Let everyone know that the code written in the tutorials is working code, but you suggest that they experiment with the code (or similar code) in separate cells (If using azure). I personally made the mistake of experimenting with the code in the cells that had code in them, but I should have just copied the code to an empty cell and experimented (which I did later). I also wonder if you had considered breaking up the presentations and tutorials into smaller chunks, so that right after a segment on pycbc you o the pycbc tutorial. Right after the presentation on skymaps, you do the skymap tutorial. Then the morning and afternoon sessions would be more blended (lecture then tutorial).

Hopefully LIGO can continue to hold such kind of workshop.

Thanks for your time, is was a great workshop!

Awesome

I would like to thank Alan, Joanh, Katerina and Ben for the conversations. It really helped me a lot.

This workshop had the "full" days on Sunday-Monday. There's a chance that some participants might find it easier on their schedules if the "full" days could be Saturday and Sunday, but I understand that there are logistical concerns which may prevent that. Just a thought.

Thank you for this great opportunity! Well done!

Food was great!

THANK YOU!

Great first workshop!

Nop

Thanks a tonne everyone for organising this and giving your time! I found it incredibly helpful as a new grad student just beginning some data analysis. Thanks to the tutorials, I'll no longer

be swimming blindfolded in the immense pycbc documentation. I'll just be swimming with open eyes ;)

As someone who is outside the collaboration, the most useful aspect of the workshop was getting to meet LIGO members and experts! Many thanks to everyone who helped out! Thanks to the committee

Thank you!

Well firstly thank you all very much for organizing this workshop. We could feel it was greatly prepared, the speakers gave high quality presentations and the tutorials are very handy. I don't have much more to suggest. Actually I realize now that I wished I had had a bigger look at the tutorials before coming so that during the hands on sessions I could directly work on the parts which I struggle the most with and ask technical questions that I'll probably get afterwards. But it's something to change on my side!

In 1979 I left this field and Rai and went off on my career because out was going to take over 30 years of effort with no support by the physics department at MIT. Often I wondered what might have been, if only, if only. So the thrill of whitening data and seeing the signal pop up as I adjusted the time window was a culmination of 35 years of 'if only'. Thank you. And thank you all for putting up with those of us who pushed as hard as we could against the assertion that 'there is no such thing as a silly question'.

It would be great to have a workshop listserv or Facebook group to talk about what we've done and to get suggestions on how to proceed -- ways to keep in touch once we leave here. Thank you very much for your kindness and very nice organization.

Thank you so much for this extraordinary learning opportunity. This project truly is a model for how science should be done, because science is hard. And we need to enlist all of the thinkers we can get to investigate gravitational wave astronomy. I can't wait to see what this project discovers next.

no

It was really helpful for me! Thank you all so much for putting this together :)

I don't think it would be very understandable to someone without a lot of prior knowledge of physics/LIGO. I understand there wasn't a lot of time to literally school everyone on this stuff but the presentations got kind of jargon-heavy at times.

Well done! Congratulations!