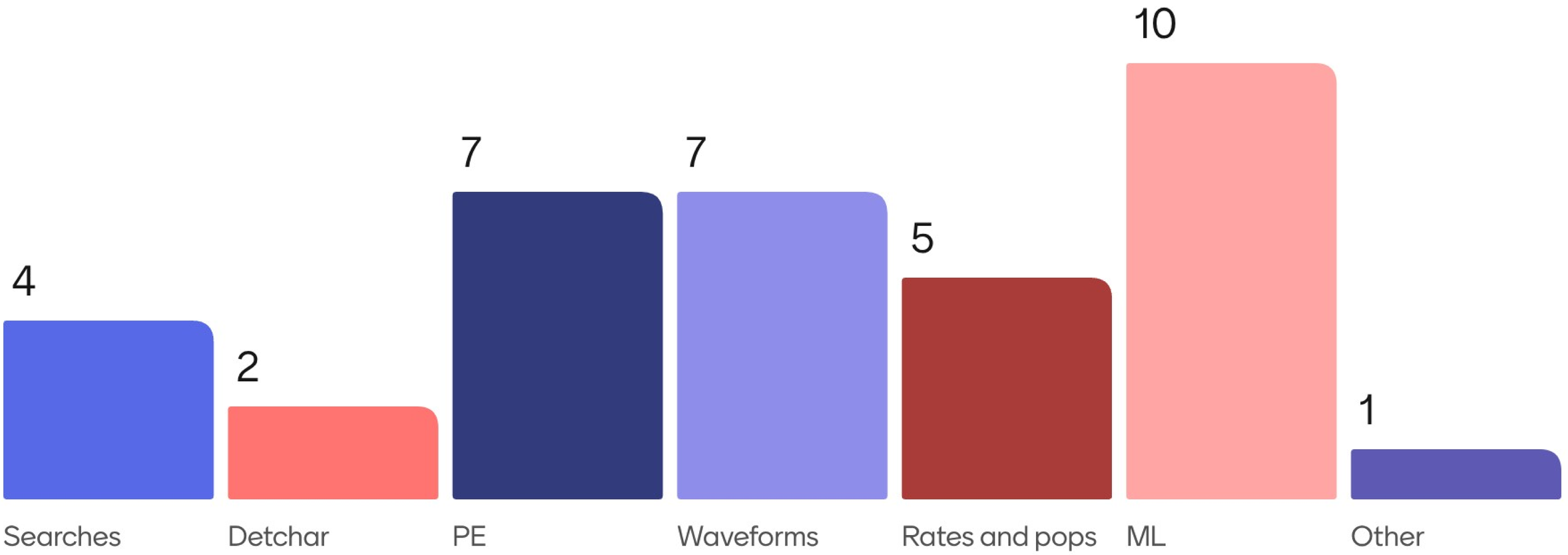
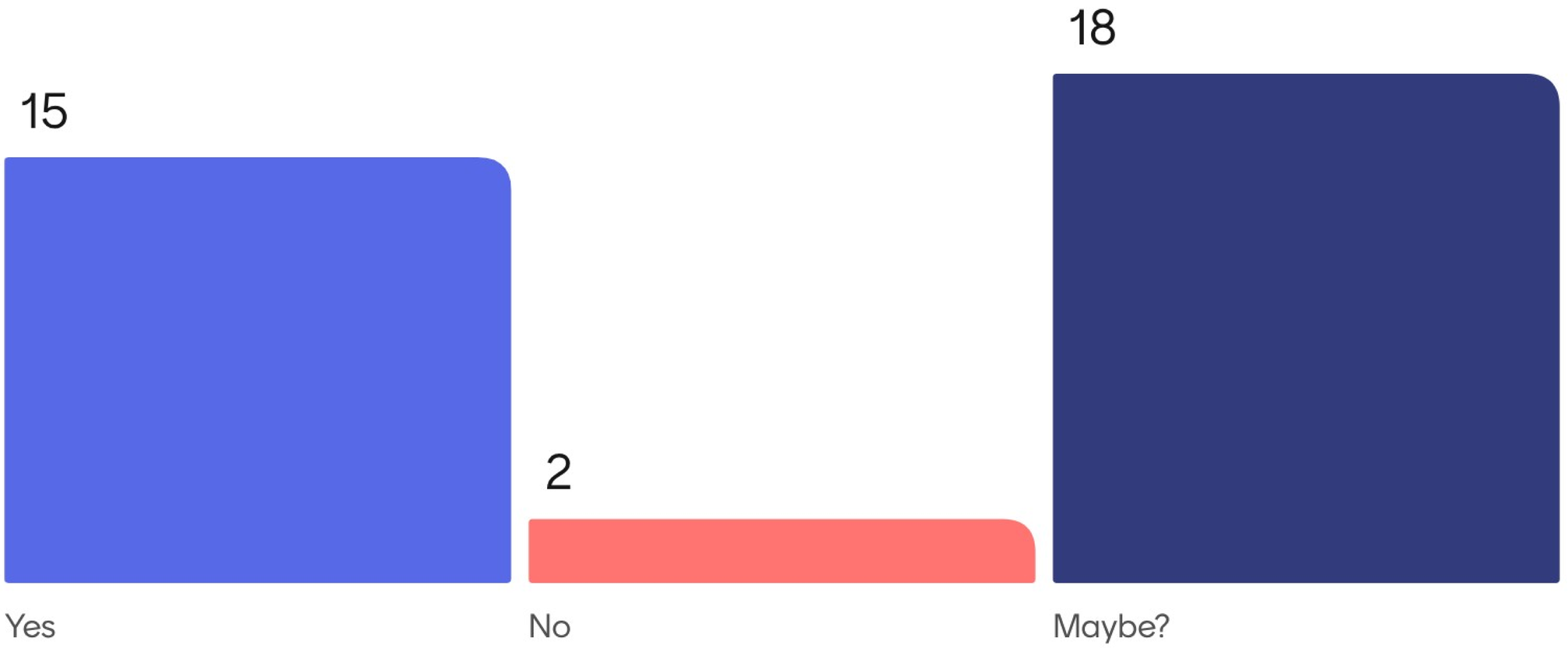
Wrap up discussion of ICERM workshop

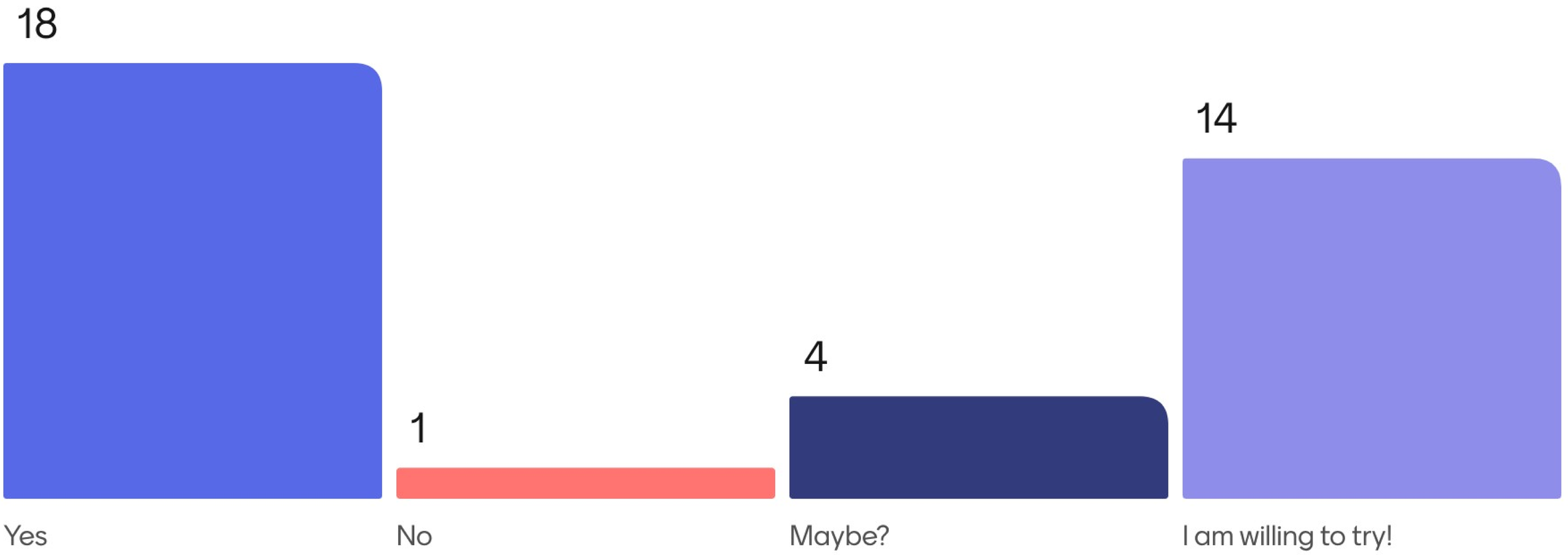
What is your field of expertise?



Did discussions with other-field experts spark any fresh ideas?



As an expert from other field, do you think you can contribute somewhere else?



What field or topic do you feel most equipped to contribute to?

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Did you come across any exciting topics this week?

Normalizing flows

Yes

Interpretable neural networks for GW analysis!

JAX

Yes

Variational inference

anomaly detection

Yes

Did you come across any exciting topics this week?

Image segmentation	VI	Ed	DINGO
Yes	Yes	No	Glitch classification

Did you come across any exciting topics this week?

Perhaps	Sì	JAX	No
memes	We're all tired	Jax	Yes again

Did you come across any exciting topics this week?

Hyperparameter Tuning Frameworks

JAX

Variational inference applications

The discussion session about trust issue was interesting to me.

Preprocessing

JAX

Yes! Gwen are sooo cool

Bayesian neural net

Did you come across any exciting topics this week?

LLM

JAX

Glitch populations

Image segmentation

JAX

uv

Simulation Based Inference

YOLO

Did you come across any exciting topics this week?

Gravitational waves	UV	JAX	uv
YOLO	small language models	Uv	Population inference

Did you come across any exciting topics this week?

ICERM

SBI

GWskynet

Data catalogue concerns and how we're dealing with it

EOB

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PR 3G era

In this final session people would like to talk about/ pose these challenges

1.Techniques to quantify ML model interpretability- using posterior probabilities and uncertainty estimation

2.PE (for 3G era?) and error quantification (applicable to other fields)

3.ML in waveforms and interpretability (someone asked to know more about waveforms but I was not sure what)

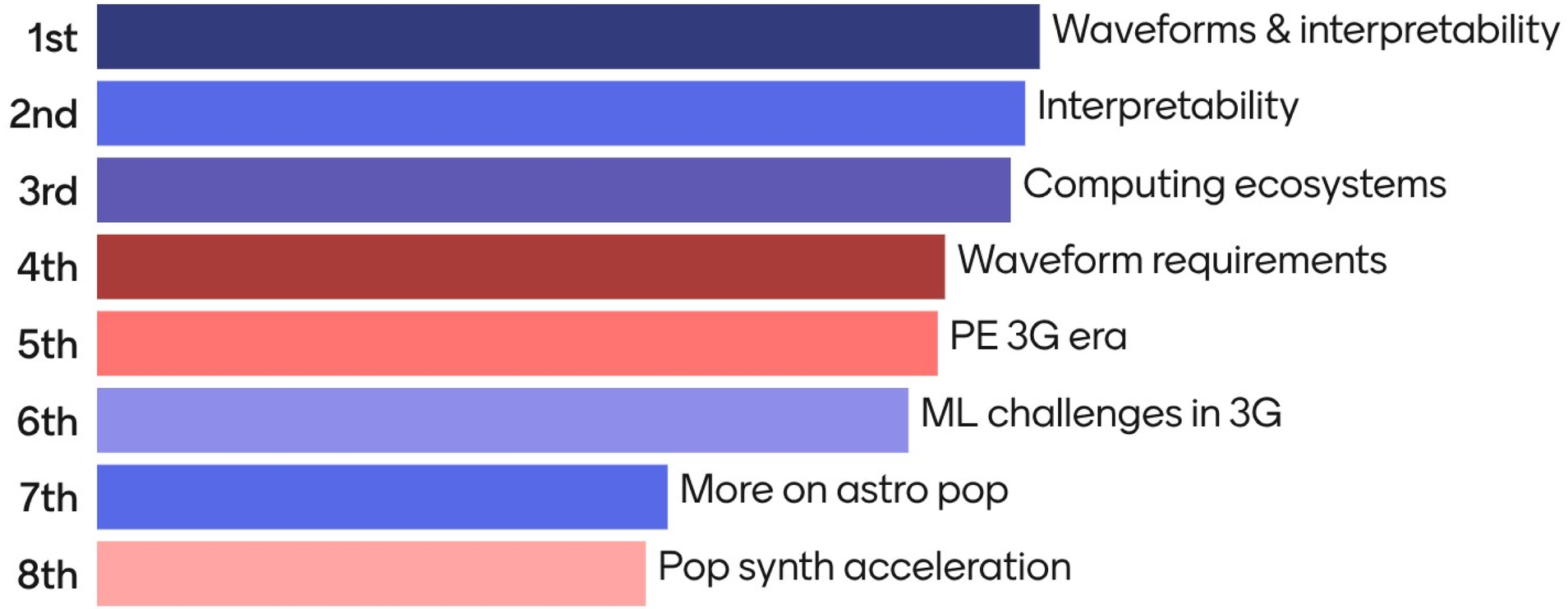
4.ML in the 3G era (challenges and pitfalls?)

5.Waveform requirements (applicable to populations)

6.Accelaration of binary population with GPUs (maybe ML?)

7.How to build sustainable ecosystem of software algorithms and pipelines with lack of funds

8.Astrophysical population inference and modelling



Can scientific machine learning advance gravitational wave astronomy?

Yes

Definitely!

Certainly

Maybe

Yes if pick our battles carefully

For sure

Perhaps

Definitely! I think it's already been useful, but it's good to have other non ML tools

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Can scientific machine learning advance gravitational wave astronomy?

It already is

+1 on picking the battles carefully

It can help with systematics.

It's a yes for me

Hpefully

Use ML to estimate waveform biases

Infrastructure built for ML purposes (like jax) will definitely be very useful. ML itself might not solve all our problems.

maybe GW is too simple for ML, maybe it is well suited for more empirical sciences like biology

Can scientific machine learning advance gravitational wave astronomy?

Yes. Optimistically speaking, ML will dominate all areas of gravitational wave data analysis within the next five years.

We have to be very careful to only implement ML when it is justified and addresses a specific well motivated problem. I worry people will use ML to advance their grant applications instead of science

It's useful for the parts of the parameter space that we cannot search with traditional methods due to high computational costs.

It’s not just the machines who will be learning

Should LIGO or other GW agencies invest in ML computing architectures?

Redoing what's already been done

Adding complexity to infrastructure

Make sure we learn, not just the machines.

What are the pitfalls and challenges of machine learning in gravitational waves?

Expecting ML to solve everything

Lack of training data (simulations)

People don't trust it

Not understanding the problem

Redoing what's already been done

What algorithm(s) to trust more? Benchmarking?

Adding complexity to infrastructure

How can we calibrate a machine learning model to ensure its predicted probabilities are reliable?

What are the pitfalls and challenges of machine learning in gravitational waves?

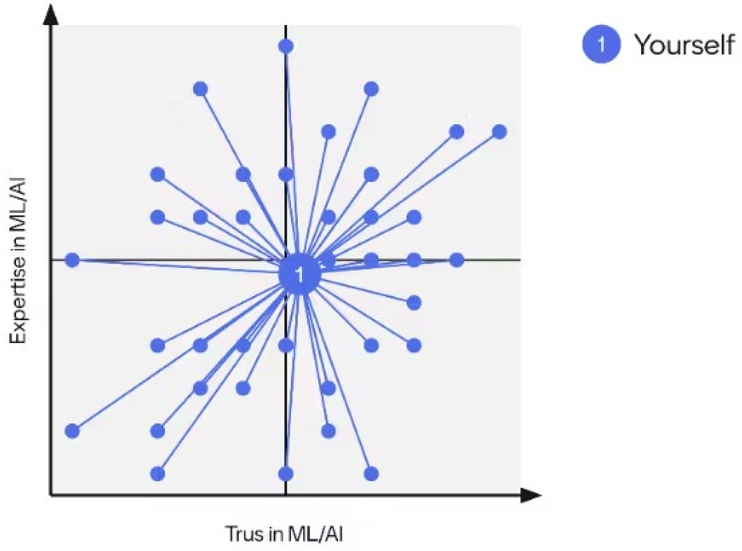
Need to find more ways to validate results

Not following through with great ideas and bringing things to scale (i.e. publishing and moving on)

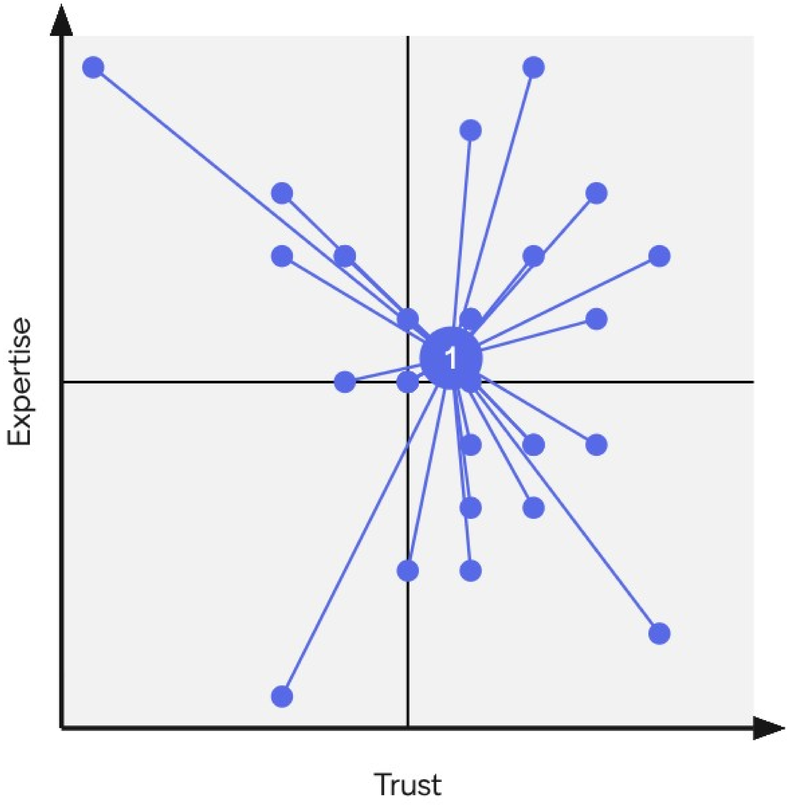
Most of the approaches are restricted by what they have been trained on.

Sheeran

Five days went by. Where do you stand with ML/AI?



1 Yourself



1 Yourself

What's one word or phrase that sums up what you're taking away from this workshop?

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Is there a specific question or challenge you'd like to pose to the group?

Nope, just wanted to say you're all awesome! - Anonymous participant