

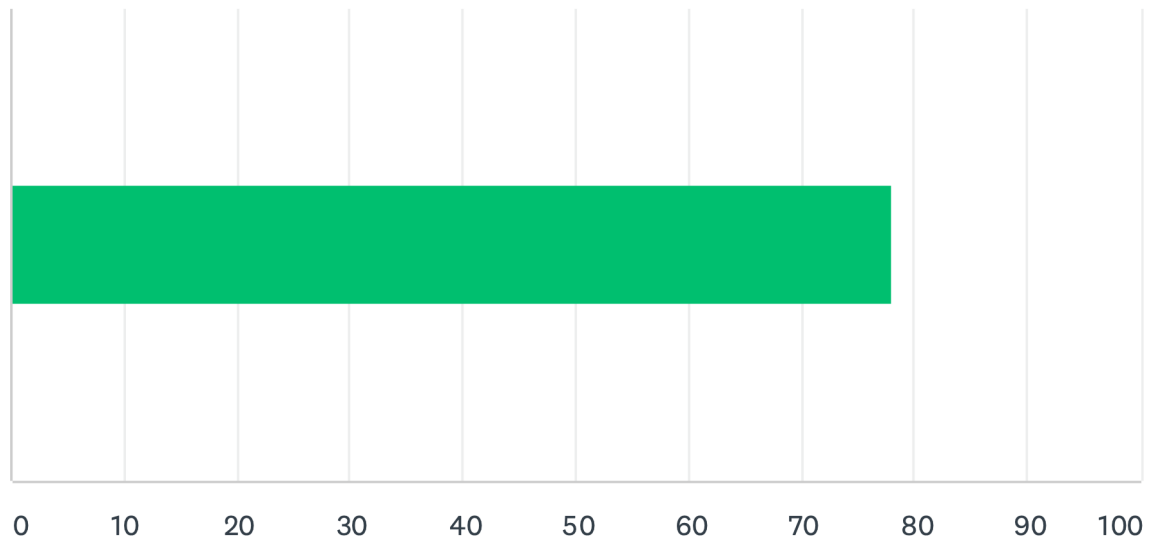
# FUTURE TRENDS IN NUCLEAR PHYSICS COMPUTING

**Survey results: Input from 44  
Ph.D students and postdocs**

# Survey

Q1 What fraction of your time do you spend on the software and computing aspects of your research, such as programming, analysis jobs, etc.?

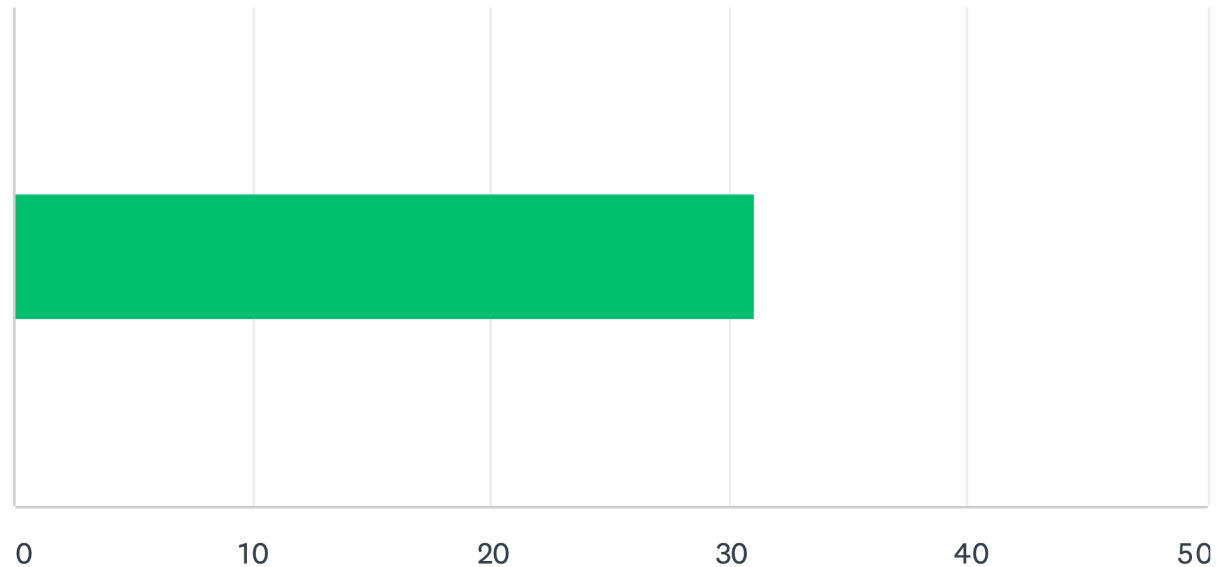
Answered: 44 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	78	3,435	44
Total Respondents: 44			

Q2 What fraction of your time do you spend contributing to software and computing tasks for other members of your research or analysis group?

Answered: 44 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	31	1,367	44
Total Respondents: 44			

**Q3 How many computer science, engineering and/or programming courses did you take in college?**

**0** 9

**1** 14 mentioned S&C introduction in python

**2** 4

**3** 7

**4** 4

**5** 3

**8** 1

**10** 1

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4

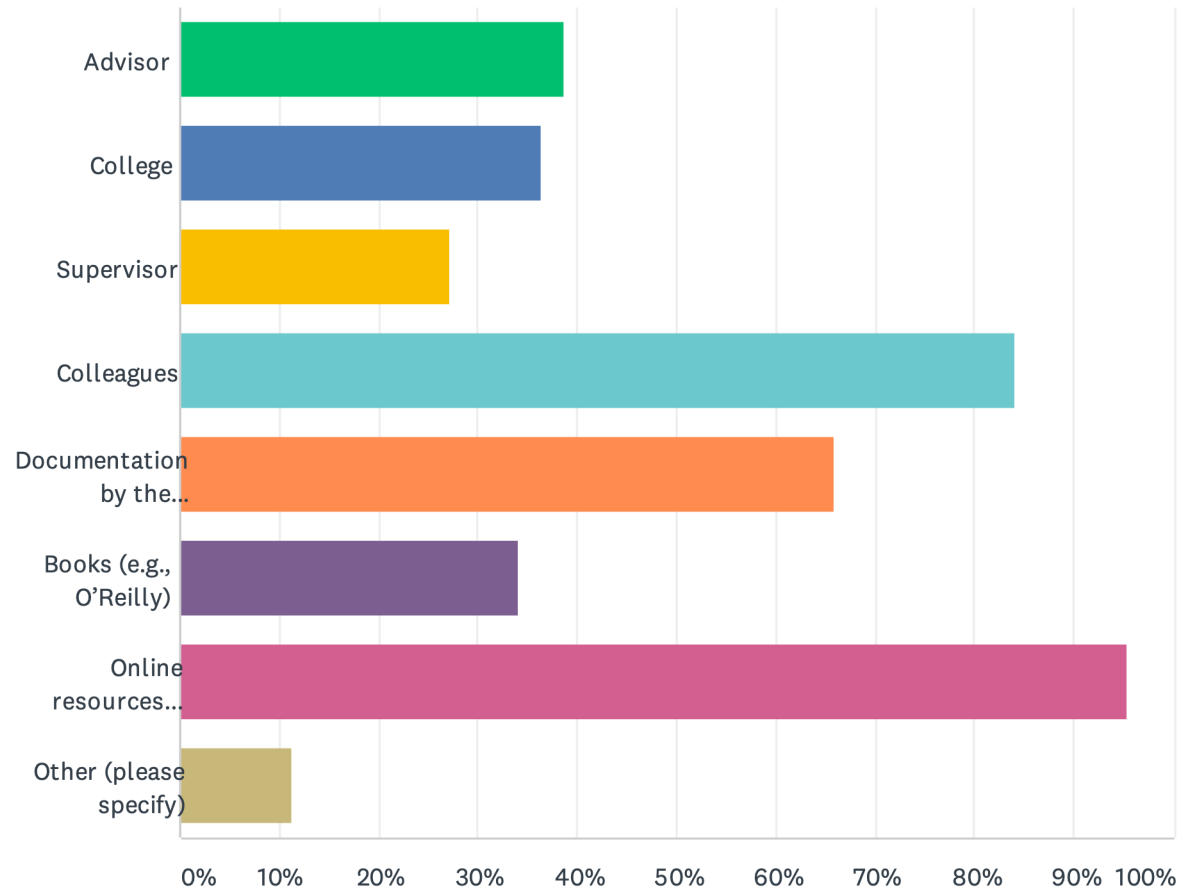
Full-time computer science major.

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# Survey

Q4 Which of the following resources have you used for your software and computing work or research? Select all that apply.

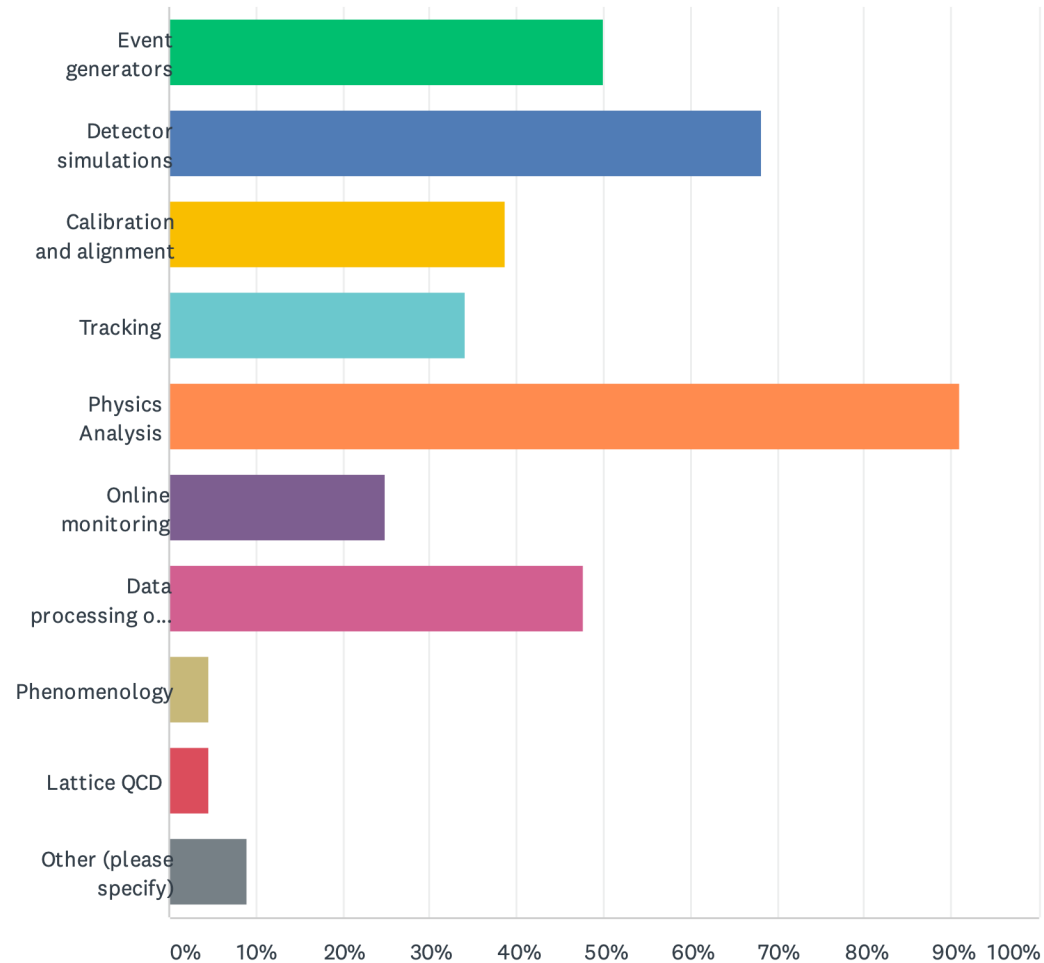
Answered: 44 Skipped: 0



# Survey

Q5 What aspects of nuclear physics software and computing do you work on? Select all that apply.

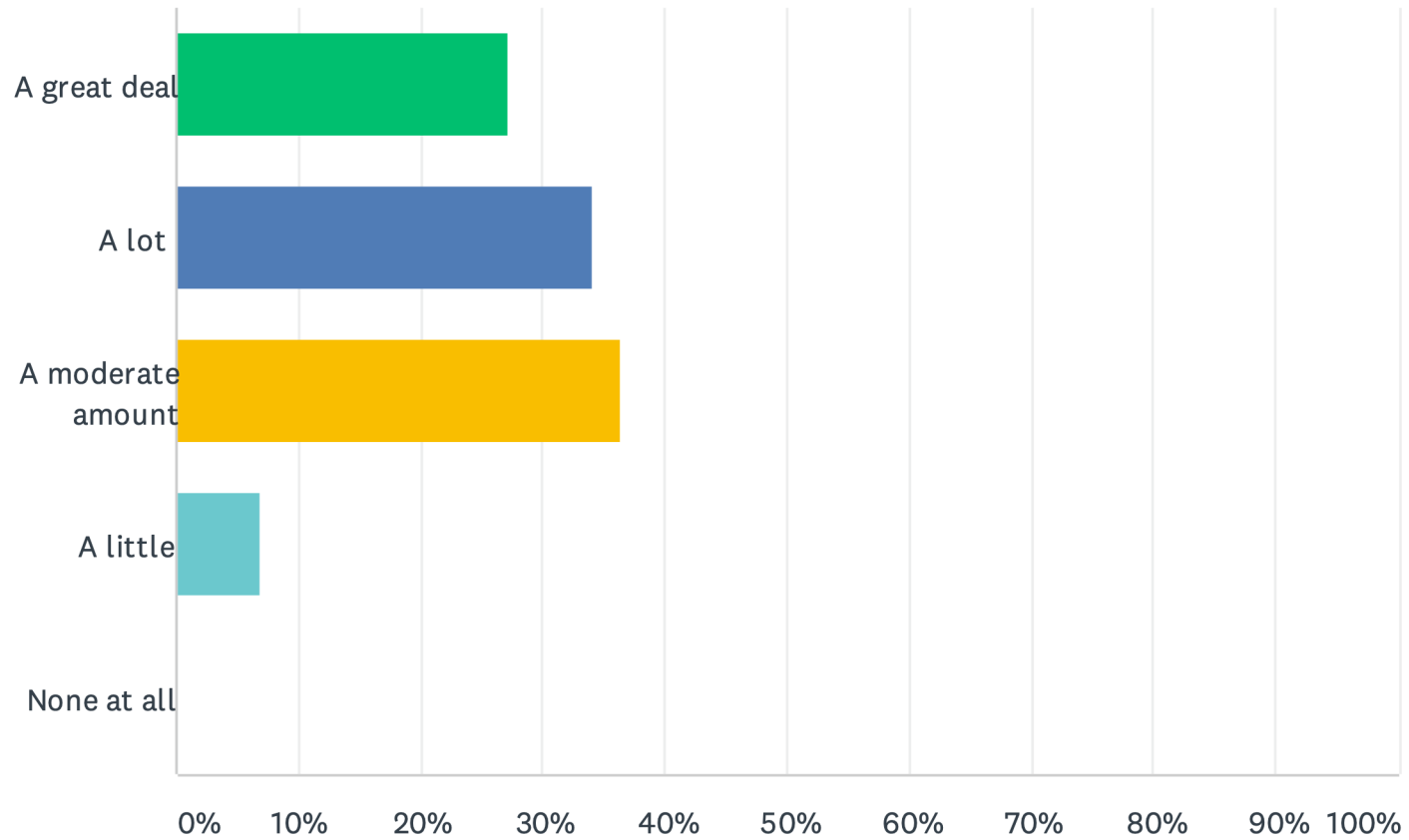
Answered: 44 Skipped: 0



#	OTHER (PLEASE SPECIFY)
1	DAQ and real-time data suppression
2	detector analysis with cosmic ray
3	Slow controls
4	Containerizing software

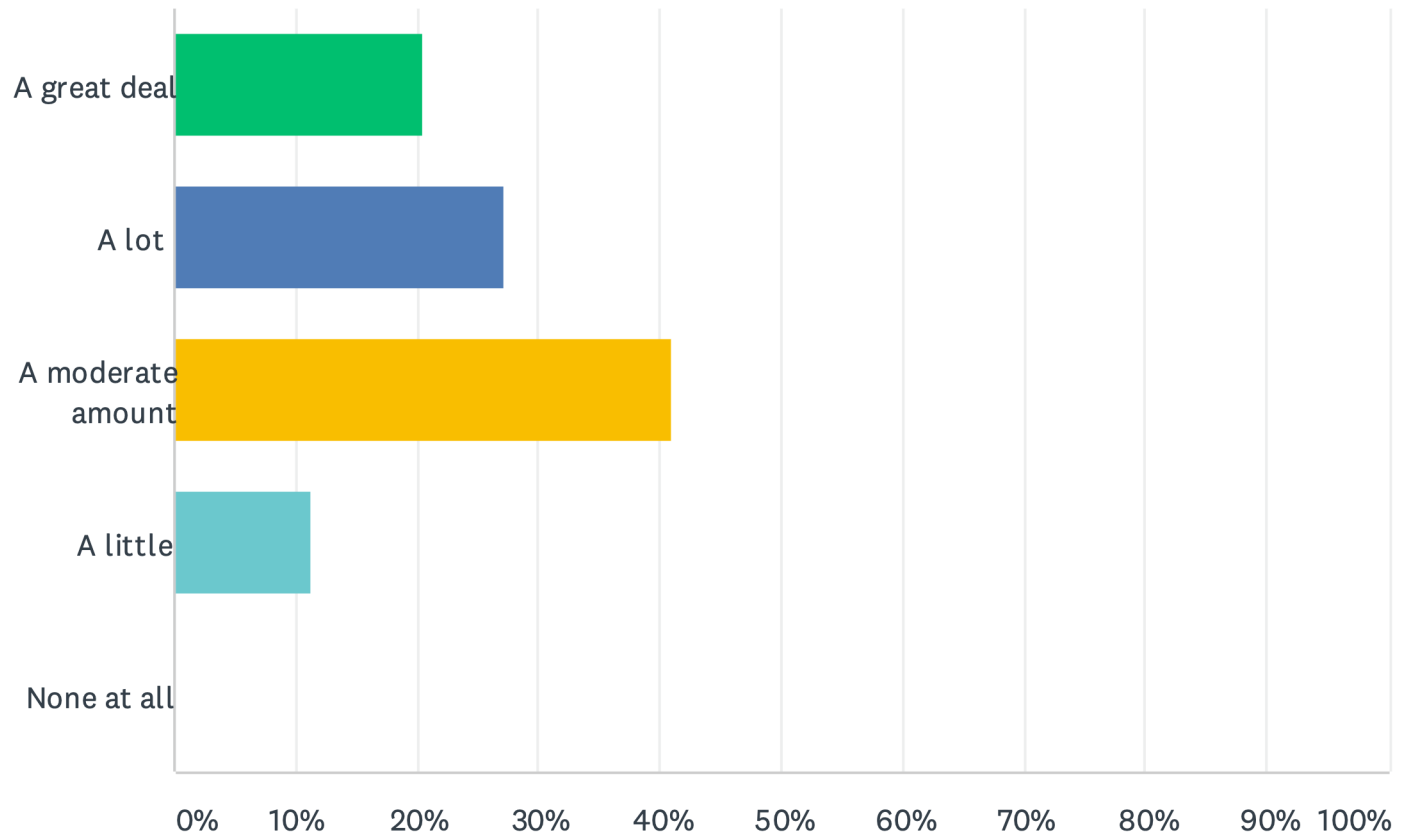
## Q6 Are you currently able to perform the software and computing tasks needed for your research?

Answered: 44 Skipped: 0



## Q7 Are you confident performing software and computing tasks needed for your research?

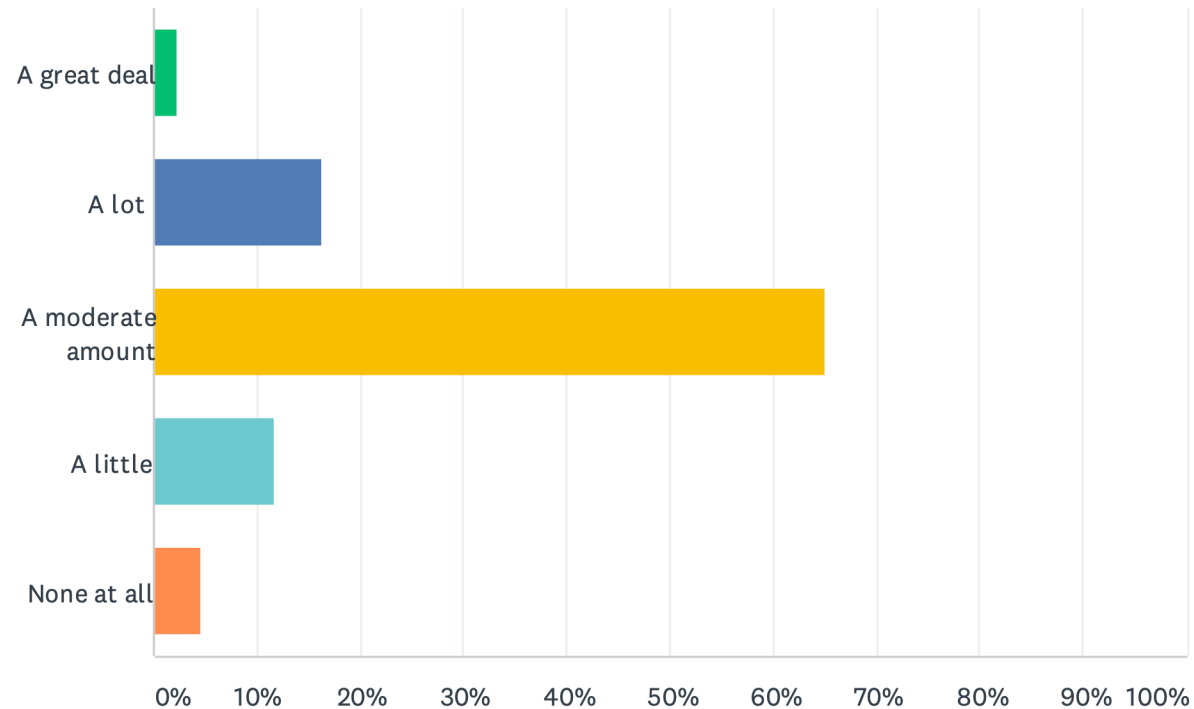
Answered: 44 Skipped: 0





## Q8 Are the documentation tools you use adequate?

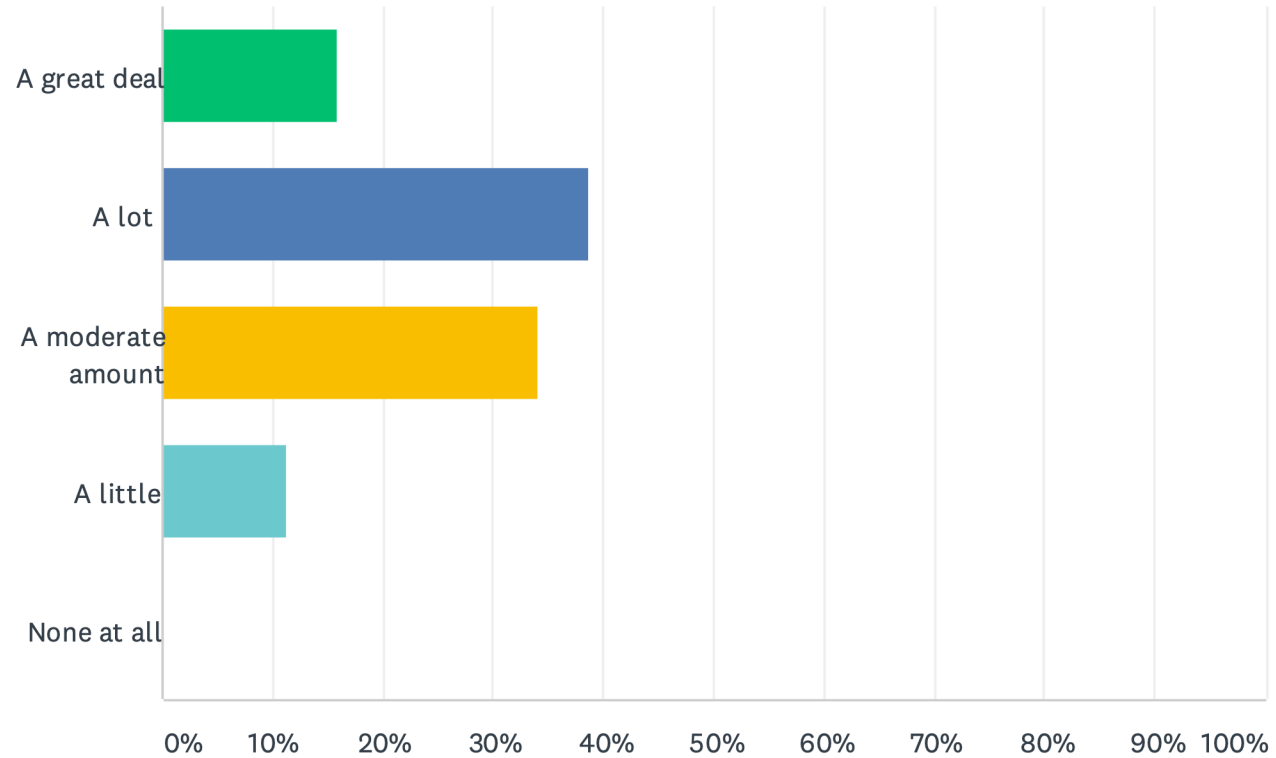
Answered: 43 Skipped: 1



#	PLEASE COMMENT
1	For Python, I can find easy to use resources and/or ask questions online and get ready answers. For ROOT, it feels like the documentation is outdated and esoteric, and trying to get answers online is merely an exercise in frustration.
2	I don't understand the question
3	Not always, no. But this may be a symptom of the code base I use not being supported (just bad timing).
4	Documentation in the two collaborations that I have worked with are awful, outdated, and only experts know what still works and what changes have been done.

## Q9 Are the computing resources you need readily available?

Answered: 44 Skipped: 0

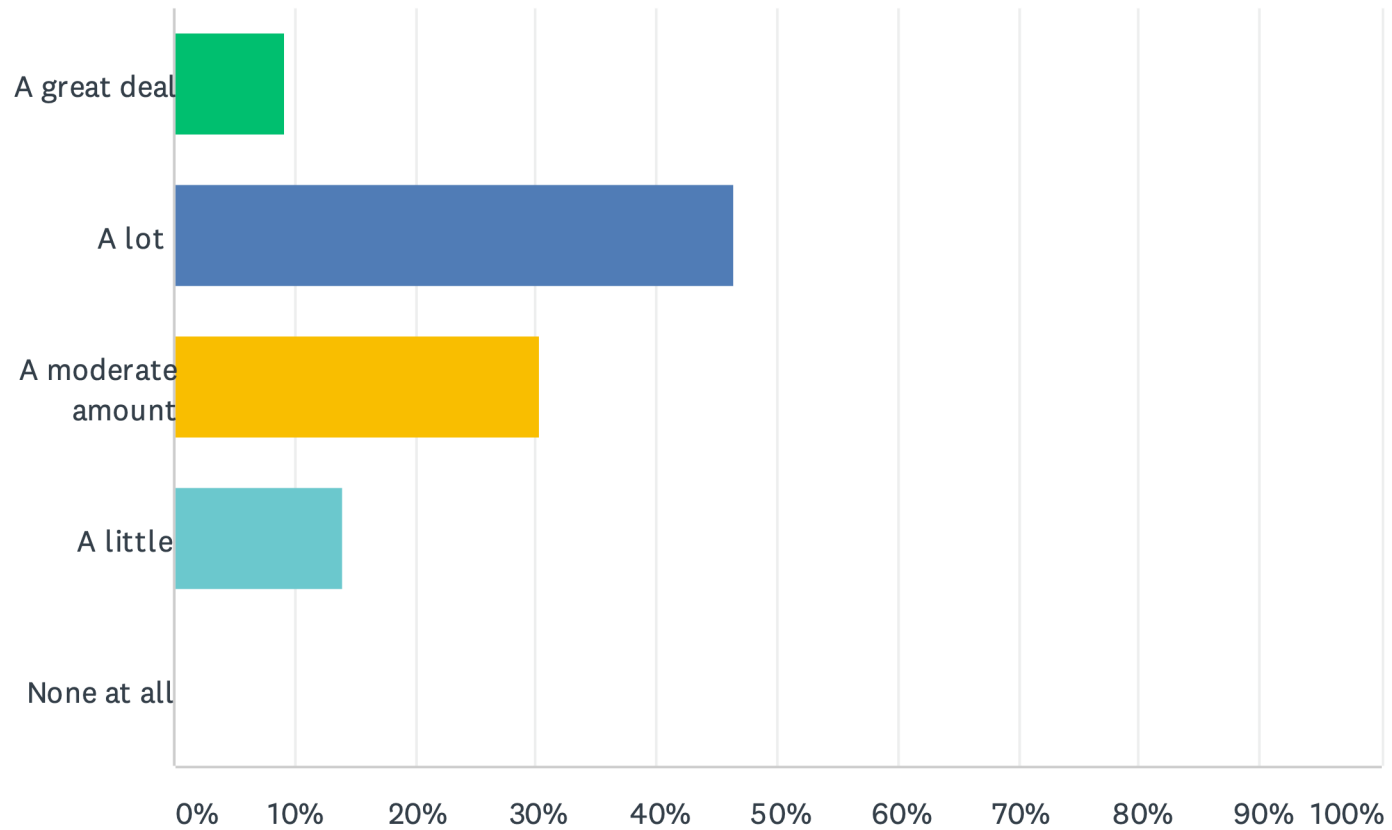


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It seems that funds are spent mostly on computing resources, but very little on computing expertise (if we had half the computers and twice the number of software experts we would be in a much better place)

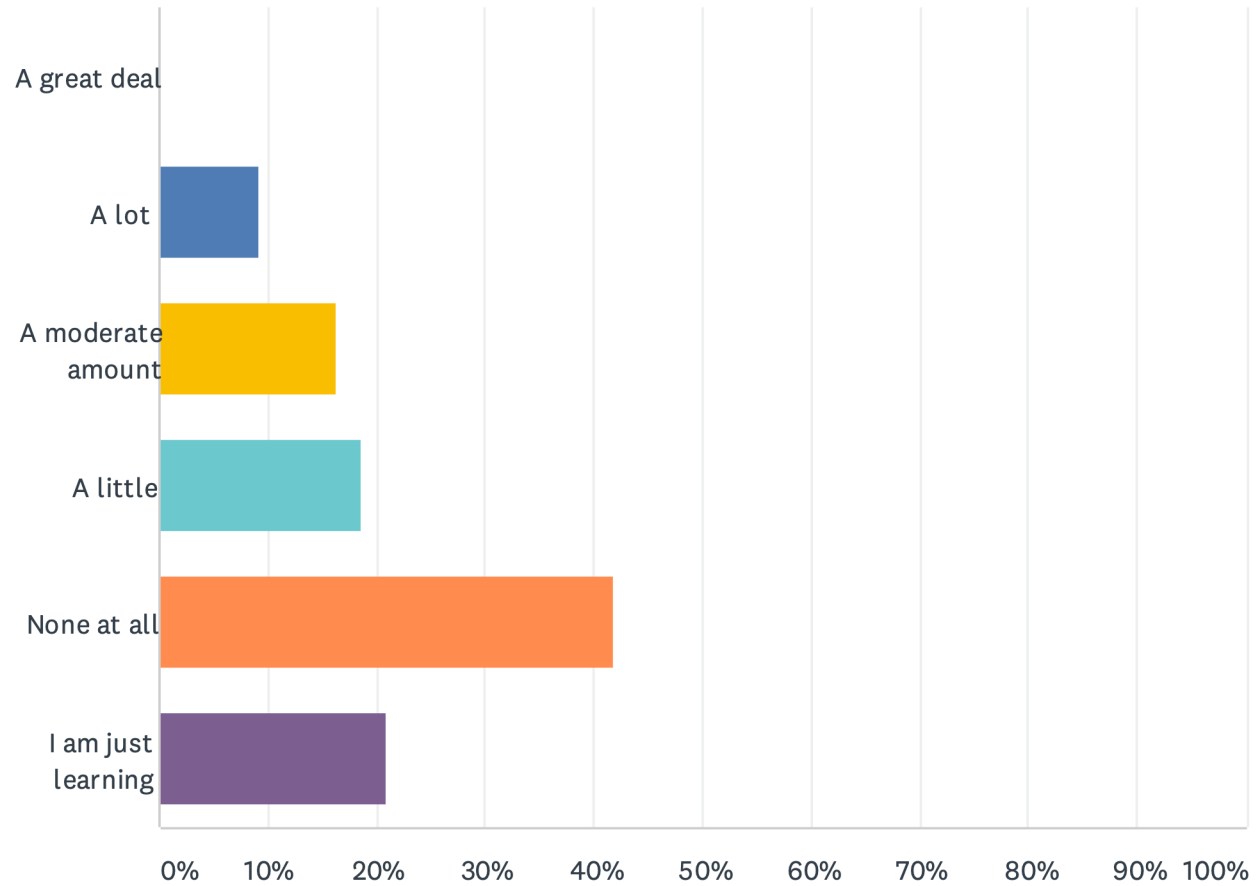
## Q10 Nuclear physics uses modern approaches and tools at an appropriate level.

Answered: 43 Skipped: 1



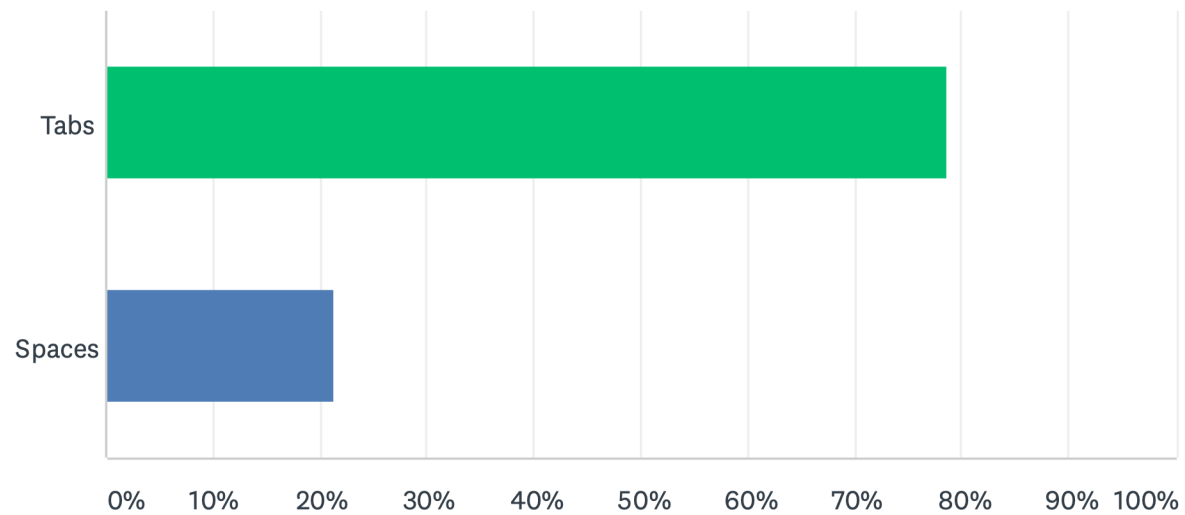
## Q11 To what extent do you use ML or AI in your research?

Answered: 43 Skipped: 1



## Q12 Let's settle this: What is the proper indentation character? Tabs or spaces?

Answered: 42 Skipped: 2



## Q13 What programming languages are important for your work?

C++.	42
Fortran	4
Java	5
CUDA	1
Python.	29
Other scripting languages.	10ish
Data base	2
Batch systems	3

## Q14 What data science tools do you use?

Root.	18
Python	9 + 4 (Jupyter)
Jupyter.	4

TensorFlow 1

Roofit mentioned

In house experiment specific 1

## Q15 What barriers do you encounter in your research that are software and computing related?

### Selected comments

1. Training: Need the fundamentals as well as advanced topics
2. Out of date or otherwise inadequate documentation
3. Resources are difficult to find or to use or quite time consuming
4. Computing resources, especially disk space
5. Lack of support for software and computing systems.
6. Some really specific comments that may have merit, but cannot be addressed.



**Q16 Anything we missed? Anything you would like to add? Please contribute here.**

## **Selected comments**

1. Career issues...
2. Changing the culture to respect S&C as a contribution and that one reason the training & document issues are so acute is a general lack of knowledge in the research group coupled with a lack of standardization of tool suites so the students have no place to turn.
3. Having “Research Software Engineers” available.