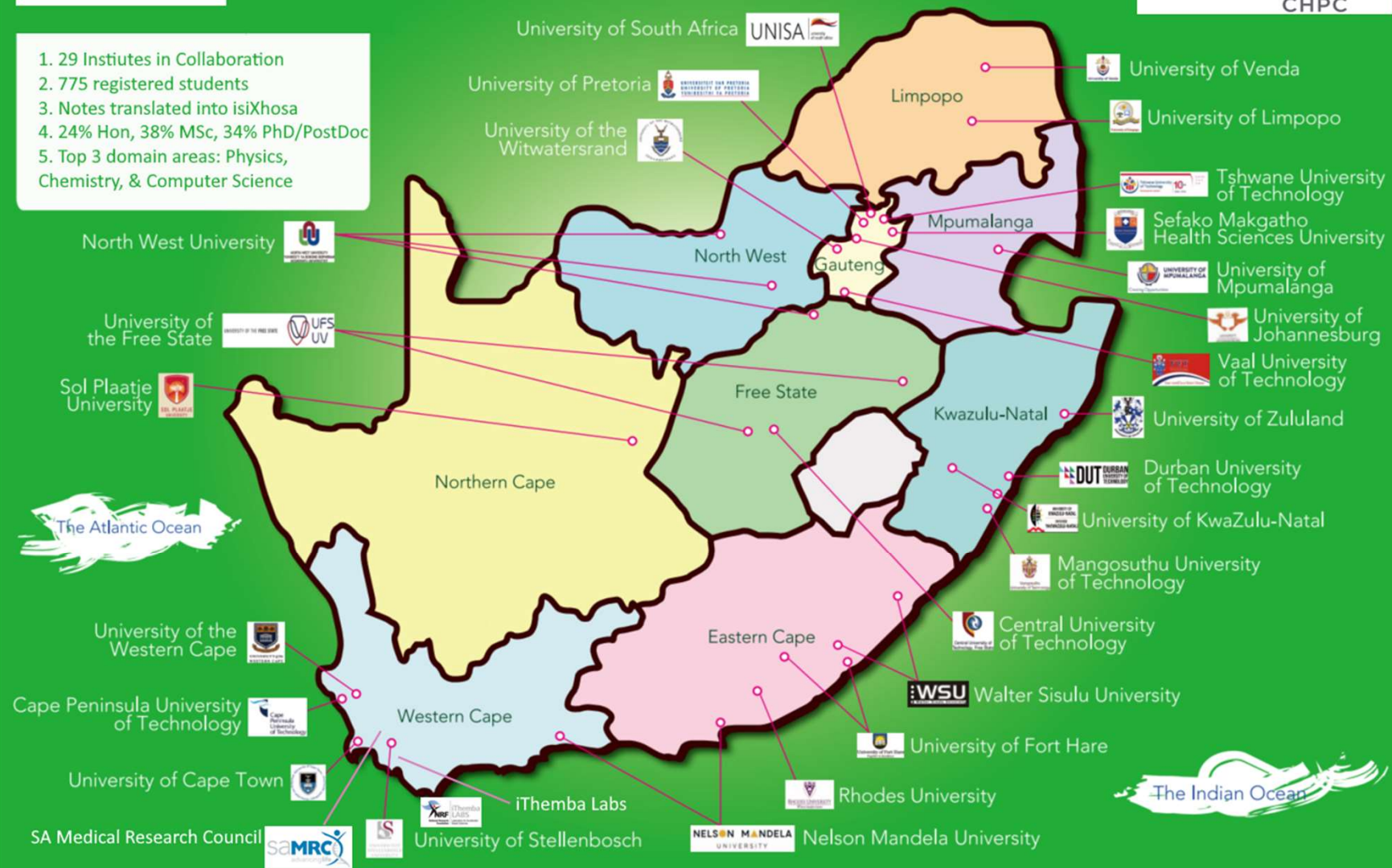


1. 29 Institutes in Collaboration
2. 775 registered students
3. Notes translated into isiXhosa
4. 24% Hon, 38% MSc, 34% PhD/PostDoc
5. Top 3 domain areas: Physics, Chemistry, & Computer Science



The Atlantic Ocean

The Indian Ocean

## Agenda

- History of CSS
- Redesigning the CSS
- A School of Firsts in SA
- Mini-School Lifecycle
- CHPC Team
- NITheCS Team
- Student Statistics
- Hybrid Learning Stack
- School Structure & Timetable
- Champions & Venue Logistics
- Automated Marking
- Automated Certification
- Prizes
- Feedback
- Monthly Coding Challenge

## History of CSS

- The Coding Summer School (CSS) is an annual event that is done in collaboration between Centre for High Performance Computing (CHPC) and the National Institute for Theoretical and Computational Sciences (NITheCS)
- Before covid – was in person at specific location with an average of 50 postgraduate students
- Aim was to teach postgraduate students python coding, data science, and computational skills

## Redesigning the CSS

- During Covid we were fully virtual and we had about 150 students participate
- Post Covid – to extend the reach we decided to make it hybrid and stream live content at university lecture halls around the country where students attend physically
- Our initial estimate was 350 students and 5 university venues participating
- ...we got 773 students and 29 universities and research institutes and participating!!!

# CSS Lifecycle

- For this scale of logistics, we needed a lot of planning
- End-to-end
  - Needs Assessment and Design
  - Planning
  - Marketing & Recruitment
  - Execution
  - Monitoring & Evaluation



## CHPC Team

- Mr. Binyamin Barsch (*Lead Coordinator/Lecturer*)
- Dr. Werner Janse van Rensburg (*Co-Coordinator*)
- Mr. Mthetho Sovara (*Core Team: Lecturer*)
- Dr. Kevin Colville (*Senior Advisor*)
- Ms. Lara Timm (*Core Team: Logistics + Teaching*)
- Mr. Bryan Johnston (*Canvas Team: Infrastructure*)
- Mr. Eugene de Beste (*Canvas Team: API + Marking*)
- Ms. Nomlie Mfuphi (*Core Team: Translation*)
- Mr. Sam Mathekga (*Core Team: Certificates*)

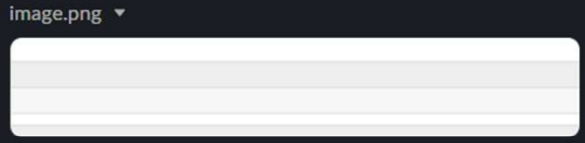
# NITheCS Team

- Prof. Francesco Petruccione (*Coordinator/Lecturer*)
- Mrs. Rene Kotze (*Logistics Coordinator + Marketing*)
- Mr. Aluwani Guga (*Core Team: Venue + Champions*)
- Ms. Thuthukile Khumalo (*Core Team: Venue + Champions*)
- Prof. Uwe Jaekel (*Lecturer*)
- Dr. Graeme Pleasance (*Lecturer*)
- Prof. Ilya Sinayskiy (*Lecturer*)

- Coding Summer S...
- Upgrade Plan
- Threads
- Direct messages
- Mentions & reactions
- Drafts & sent
- Slack Connect
- More
- Channels
  - champions
  - general
  - help**
  - introduce\_yourself
  - isixhosa-chat
  - ithemba-labs
  - mangosuthu-university-of-t...
  - mcc
  - online-students-non-rsa
  - sefako-makgatho-health-sci...
  - sol-plaatje-university
  - staff
  - stellenbosch-university
  - tutors
  - university-of-cape-town

## # help

I have been unable to run anything... The ipykernel stays busy forever. Monday, February 6th issue?



5 replies Last reply 2 months ago

**Mukhtar Yahaya (Stellenbosch University)** 12:09 PM

```
n=5
exp=0
for k in range(n+1):
    exp=exp+sp.binomial(n,k)*x**(n-k)*y**(k)
exp
```

**Masego Malatji** 12:14 PM  
how does one express an angle in python

1 reply 2 months ago

**Damilola Ayeni (Su)** 12:17 PM  
sp.l output i?

1 reply 2 months ago

**Damilola Ayeni (Su)** 12:18 PM  
how do i get sqrt -1

**Mark Brand (NMU)** 12:19 PM  
Would you mind showing your "Help About" version info?

Message #help



## School Structure

- *Started: 30 Jan 2023, Time: 9:00 – 16:00 PM, Ended: 10 Feb 2023*
- *Students sent login details for slack and how to access the content on the 23 Jan 2023 (1 week before classes start). During this time, they should familiarize themselves with Canvas and install necessary software.*
- *Champions got access to Canvas and all notes on 23 Jan, students got day 1 notes on the 29 Jan*
- *Each institute had their own slack channel*
- *Students expected to be on campus/institute locations – unless affected by loadshedding*

# School Structure

- All students expected to be on zoom during the live 30/40min lesson period during the day
- During tutorial sessions – students ask questions, do quizzes and can interact with tutors & students
- Students can ask questions on slack for
- Students expected to install software on their own laptops/PCs – if not browser options can be used

## Week 1 - CHPC - Python & Linux Introduction

	Monday - 30 Jan	Tuesday - 31 Jan	Wednesday - 1 Feb	Thursday 2 Feb	Friday - 3 Feb
9:00	Welcoming	Python - Review	Python - Review	Python - Review	Linux - Review
9:30	Overview of course	Python 5 - Data storage	Python 9 - Data Visualization	Linux 1 - Getting started	Linux 5 - Flags, wildcards & Files Tutorial
10:00	Introduction to programing	Python 5 - Data storage Tutorial	Python 9 - Data Visualization Tutorial	Linux 1 - Getting started	Linux 6 - Searching, updating & piping
10:30	Break	Break	Break	Break	Break
11:00	Python 1 - Introduction	Python 6 - Text & Strings	Python 10 - Scientific Computing	Linux 2- Terminal & Debugging	Linux 6 - Searching, updating & piping Tutorial
11:30	Python 2 - Setting Up	Python 6 - Text & Strings Tutorial	Python 10 - Scientific Computing Tutorial	Linux 2- Terminal & Debugging Tutorial	Linux 7 - Variables, loops & conditionals
12:00	Python 3 - Basics	Python 7 - Loops & Conditionals	Python 11 - Data Science	Linux 3 - CRUD	Linux 7 - Variables, loops & conditionals Tutorial
12:30	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break
13:00	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break
13:30	Special Topic - Dr Krishna Govender	Special Topic - Dr Andrew Gill	Special Topic - Dr Kevin Colville	Special Topic - Prof. Thinus Booysen	Special Topic
14:00	Python 3 - Basics Tutorial	Python 7 - Loops & Conditionals	Python 11 - Data Science Tutorial	Linux 3 - CRUD Tutorial	Linux 8 - Script Files
14:30	Python 4 - Scripts & Variables	Python 7 - Loops & Conditionals Tutorial	Python 11 - Data Science	Linux 4 - Text editors	Linux 8 - Script Files
15:00	Break	Break	Break	Break	Break
15:10	Python 4 - Scripts & Variables	Python 8 - Modules & Functions	Python 11 - Data Science	Linux 4 - Text editors Tutorial	Linux 8 - Script Files Tutorial
15:30	Python 4 - Scripts & Variables Tutorial	Python 8 - Modules & Functions Tutorial	Python 11 - Data Science Tutorial	Linux 5 - Flags, wildcards & Files	Linux 9 - HPC Intro
16:00					

## Week 2 - NITheCS - Python Advanced Applications



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	Monday - 6 Feb	Tuesday - 7 Feb	Wednesday - 8 Feb	Thursday - 9 Feb	Friday - 10 Feb
9:00	Introduction to SymPy (1)	Probability Theory and Statistics	Ordinary Differential equations	Partial Differential Equations (1)	Machine Learning (1)
9:30	Introduction to SymPy (2)	Probability Theory and Statistics	Ordinary Differential equations	Partial Differential Equations (1)	Machine Learning (1)
10:00	Introduction to SymPy (3)	Probability Theory and Statistics	Ordinary Differential equations	Partial Differential Equations (1)	Machine Learning (1)
10:30	Break	Break	Break	Break	Break
11:00	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
11:30	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
12:00	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
12:30	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break
13:00	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch Break
13:30	Special Topic	Special Topic	Special Topic	Special Topic	Special Topic
14:00	Linear Algebra with SymPy	Random numbers and Monte Carlo Methods	Differential Equations	Partial Differential Equations (2)	Machine Learning (2)
14:30	Linear Algebra with SymPy	Random numbers and Monte Carlo Methods	Differential Equations	Partial Differential Equations (2)	Machine Learning (2)
15:00	Break	Break	Break	Break	Break
15:10	Tutorial	Tutorial	Tutorial	Tutorial	Tutorial
15:30	Tutorial	Tutorial	Tutorial	Tutorial	Closing
16:00					

## Special Topics / STEM Talks

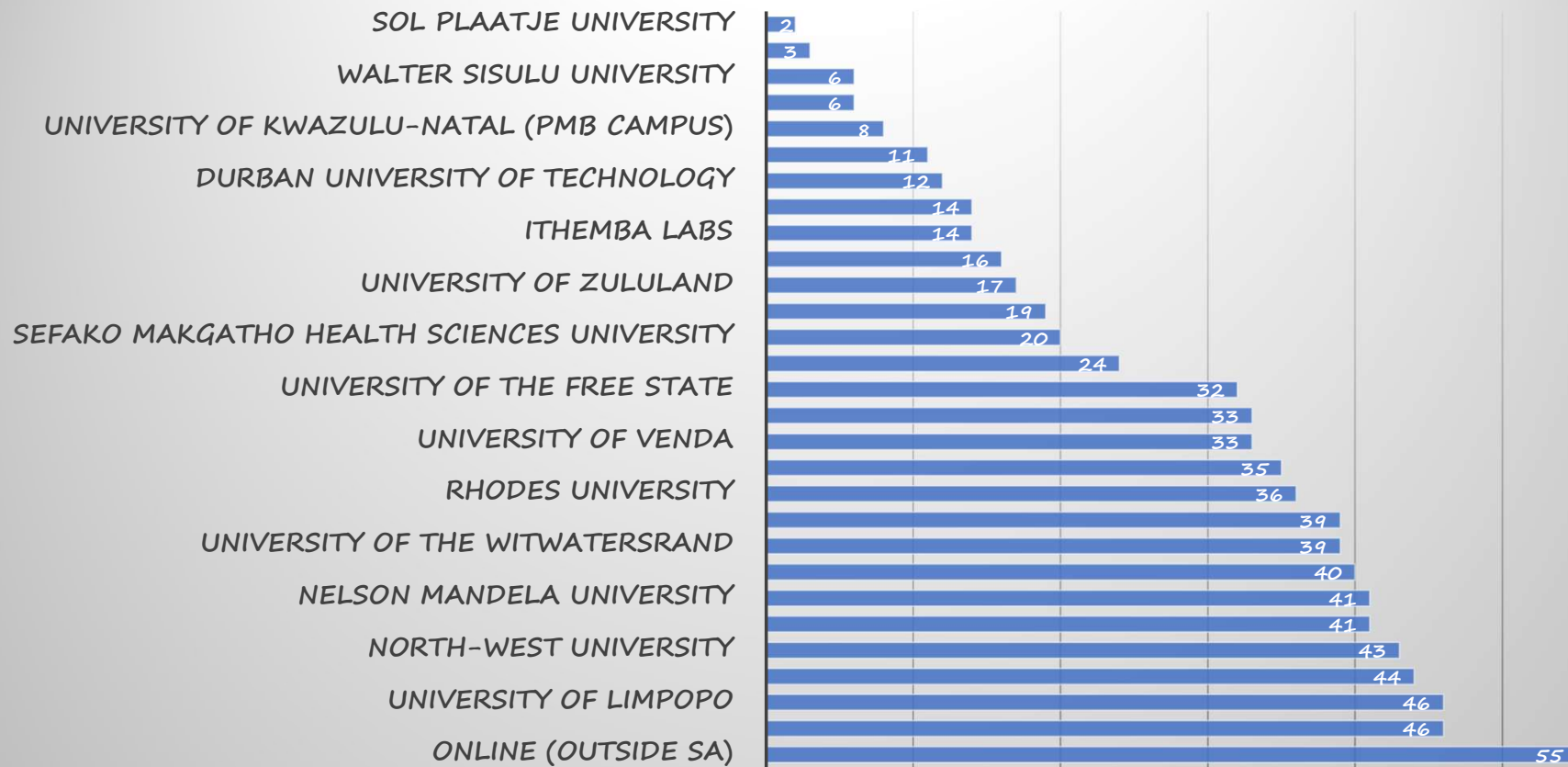
- A break from normal lessons from 13:30 – 14:00
- Senior researchers to discuss their research domains of HPC, STEM, and related fields.

13:30	STEM Talk - Dr Krishna Govender	STEM Talk - Dr Andrew Gill	STEM Talk - Dr Kevin Colville	STEM Talk - Prof. Thinus Booysen	STEM Talk - Dr Charles Crosby
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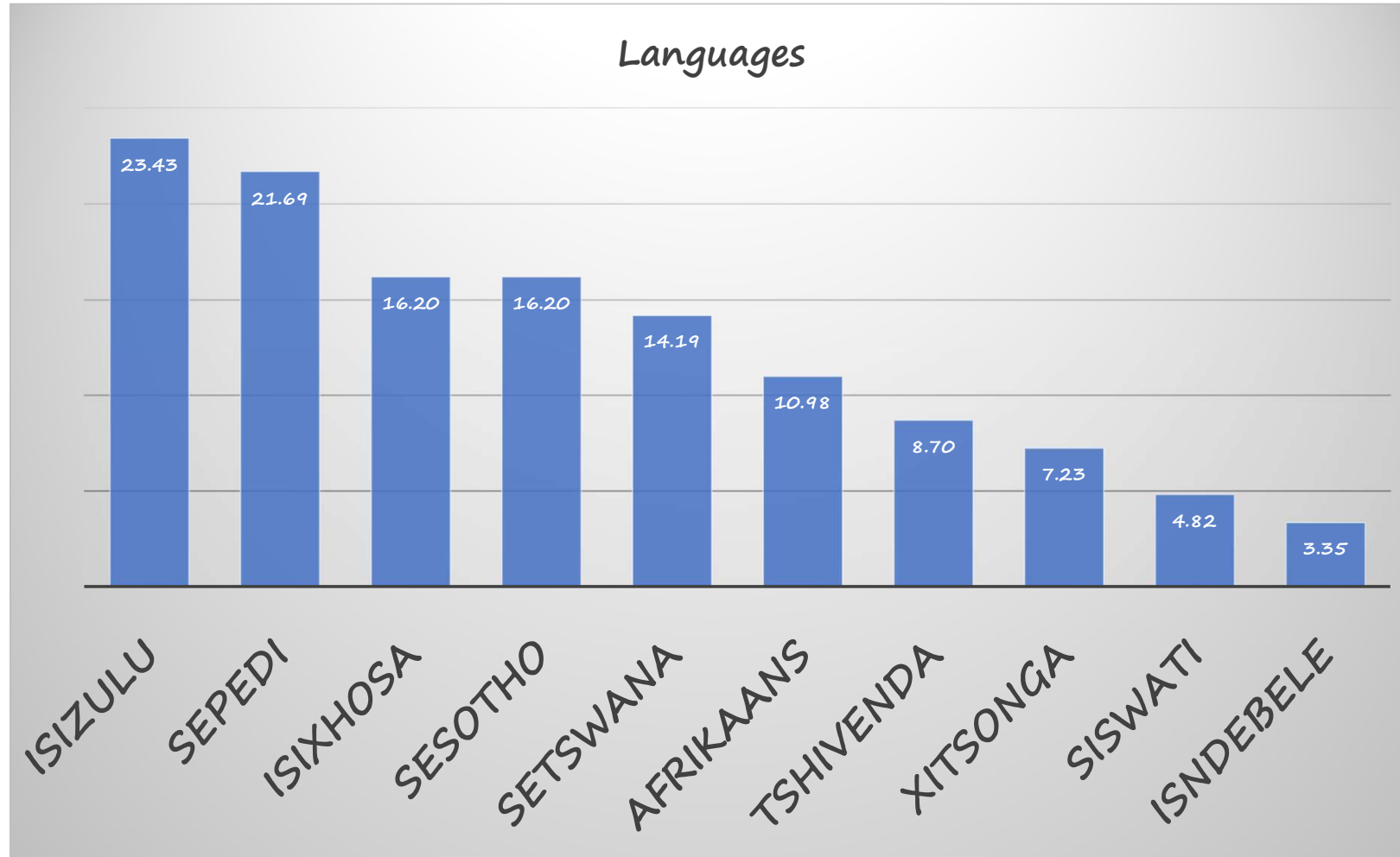
13:30	STEM Talk - Mr Bryan Johnston - HPC Ecosystems In Africa + SA	STEM Talk - Prof F. Petruccione: Introduction to Quantum Computing	STEM Talk - SAMRC - Dr Pritika Ramharack	STEM Talk - Ian David, Introduction to Qiskit	STEM Talk - Prof Zurab Janelidze, Mathematical Proofs with Python
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# Student Statistics

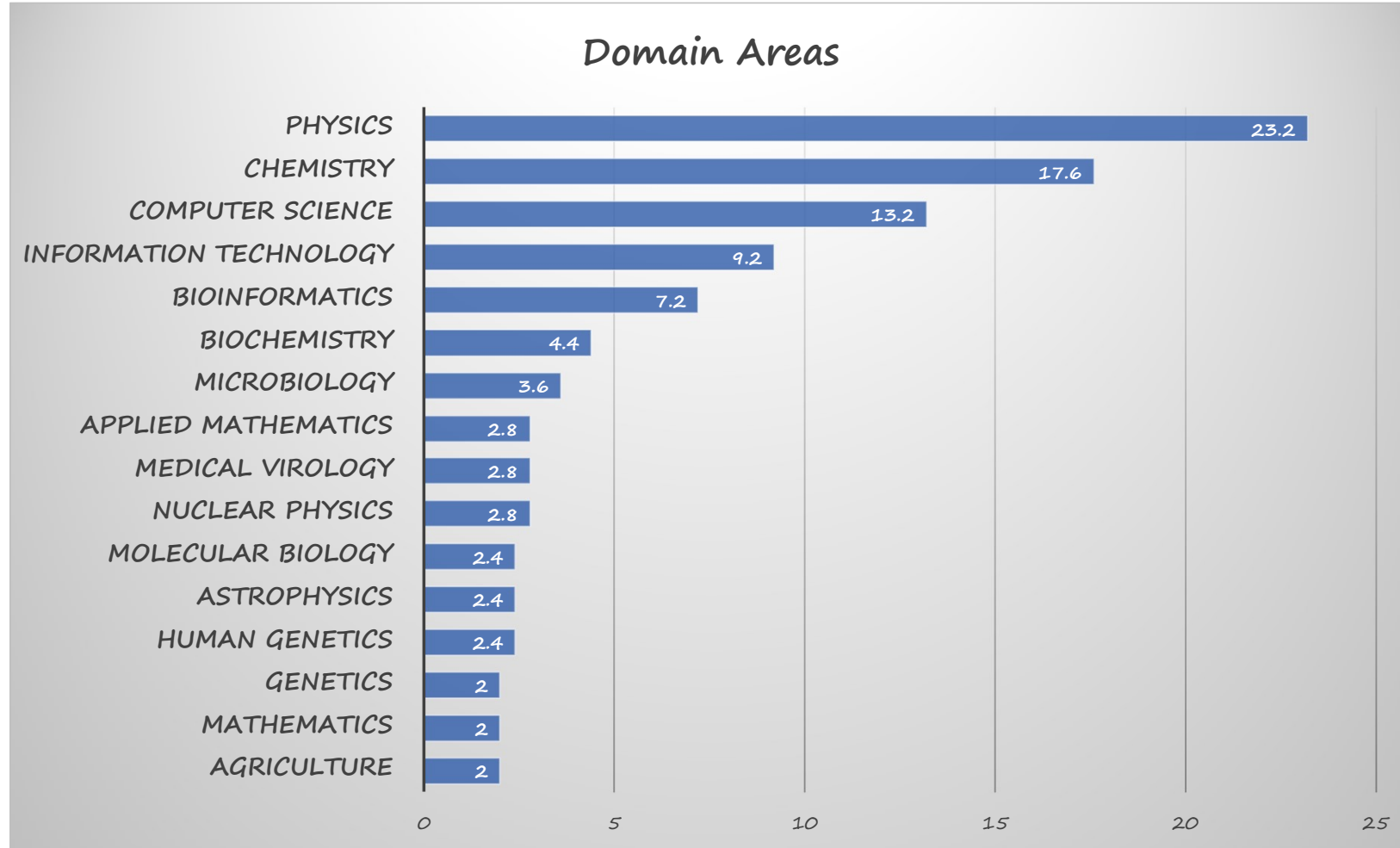
Location Count



## Student Statistics

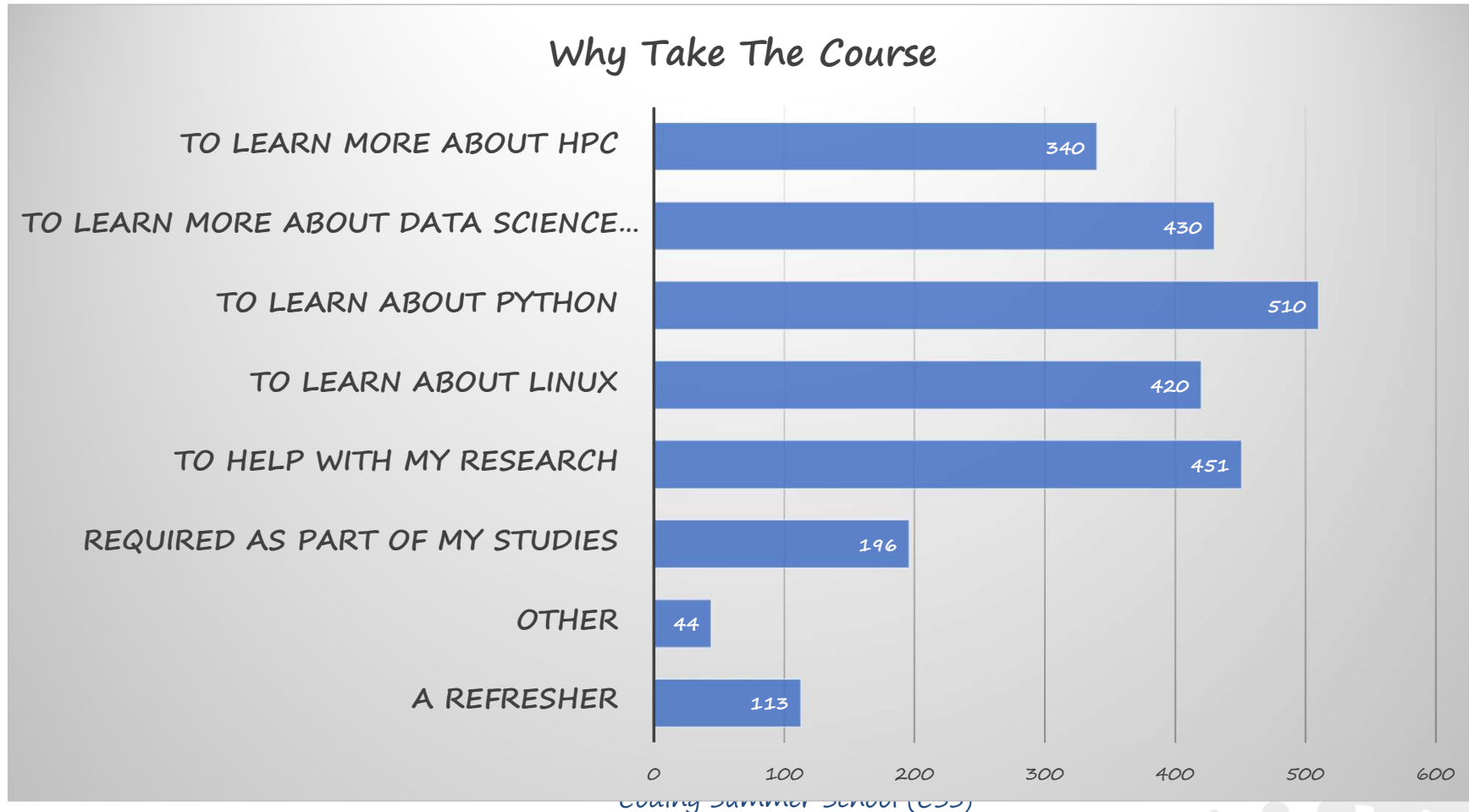


# Student Statistics

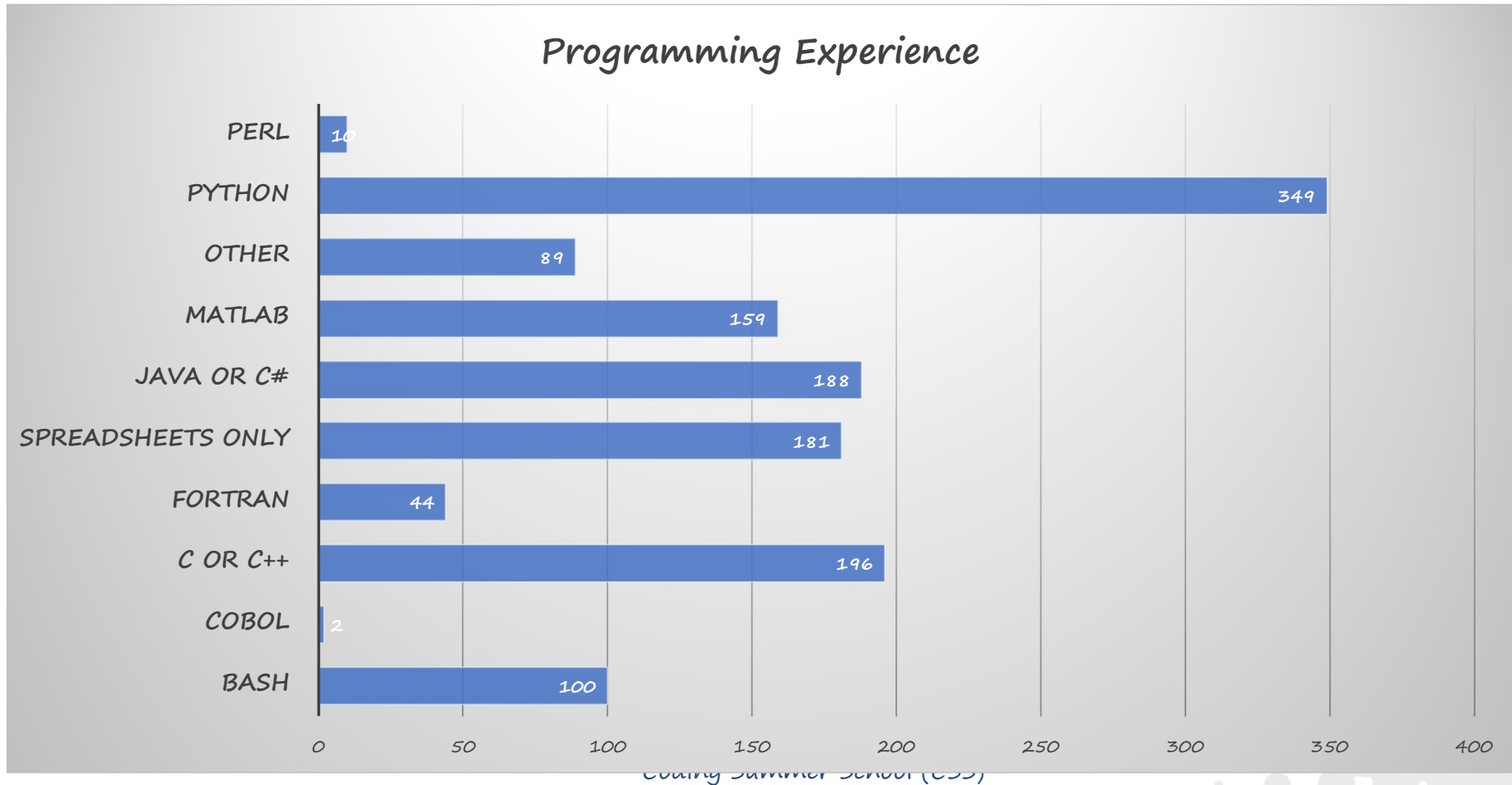




# Student Statistics

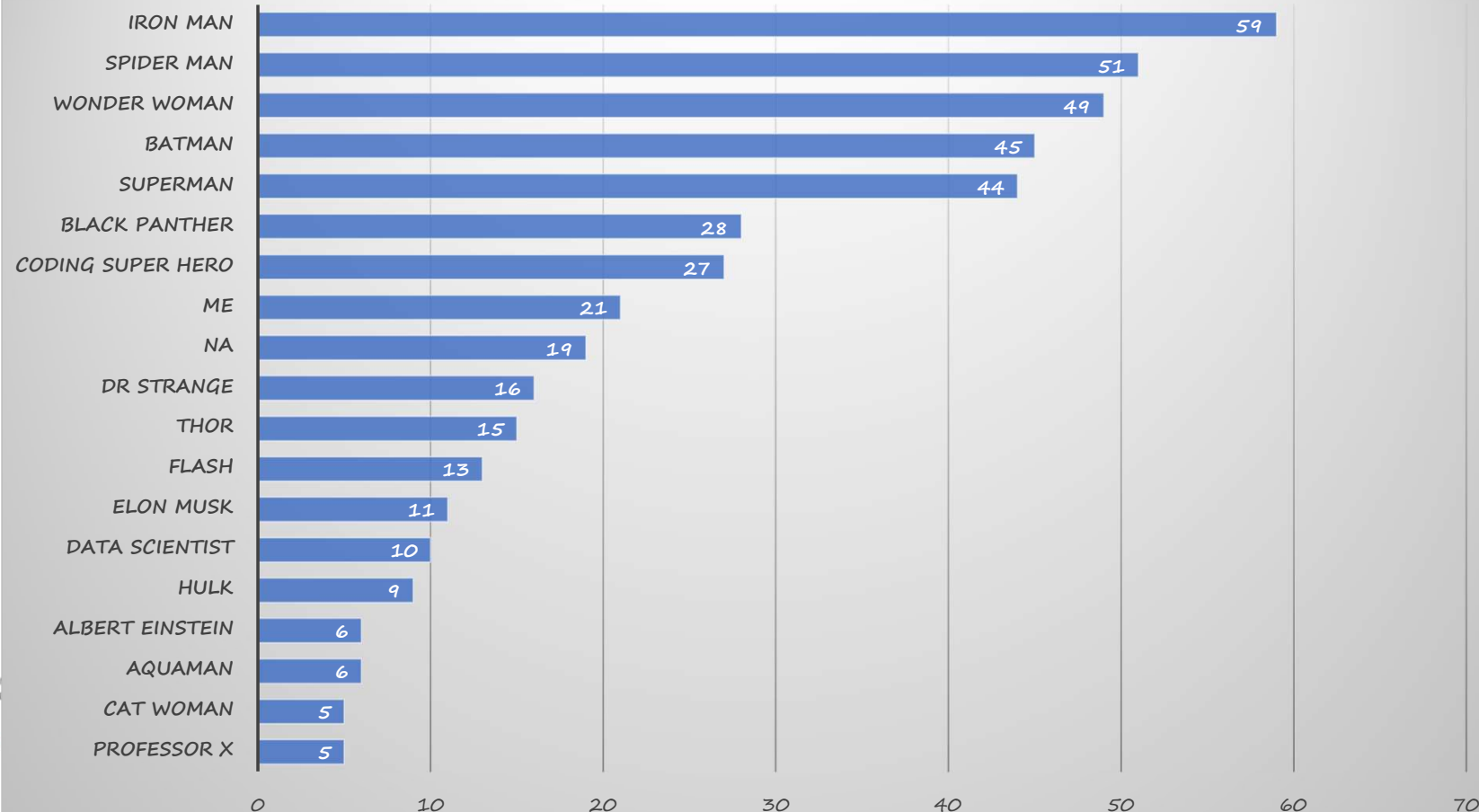


# Student Statistics



# Student Survey

## Superhero



- Arrange the venue location that has enough seating, stable internet and power during load shedding (if possible)
  - If capacity is exceeded, preference should be given to students who registered early and others should attend online
- Contact students and confirm their attendance at your specific location
- Arrange for meals for students. NITheCS and CHPC sponsored R50 per student per day
- If possible, arrange for student tutors to help during tutorial sessions

# Automated Marking

- *Canvas API*
- *Python Assignment*
- *Bash Assignment*



# Automated Certification

*About 350 Certificates:*

- *G-label*
- *Outlook*
- *Python Script*



## Prizes

*One R500 Exclusive Books Gift Voucher per winner*

### *Categories:*

- 1. Top 3 most active students on slack*
- 2. Top 2 champion prizes for the most active venues on slack*
- 3. Top 3 quiz marks*




# Coding Summer School - Week 1 - Feedback Form

**239**  
Responses

**53:12**  
Average time to complete

**Active**  
Status

[View results](#)

 [Open in Excel](#) ...

1. Venue (Name of Institute or Online)

[More Details](#)

**239**  
Responses

Latest Responses  
"VUT"  
"University of Zululand"  
"University of zululand (online)"



## Feedback

- Intensive course
- Students are introduced to tools and concepts that can use for their research
- Not intended to be fully comprehensive, that's the job of the universities
- 2-week period cutoff
- Timing during the year
- 20 – 30 students per venue



# Monthly Coding Challenge

- *Continued Learning*
- *Python Data Science Challenges*



## *A School of Firsts in SA...*

- *Collaboration of 29 research institutes and centres in SA*
- *Institutes outside SA*
- *773 students at a hybrid event*
- *Coding content translated to isiXhosa*
- *Diverse group of domain areas*



Thank you – any questions ?

