

# Tutorial on Floating-Point Analysis and Reproducibility Tools for Scientific Software



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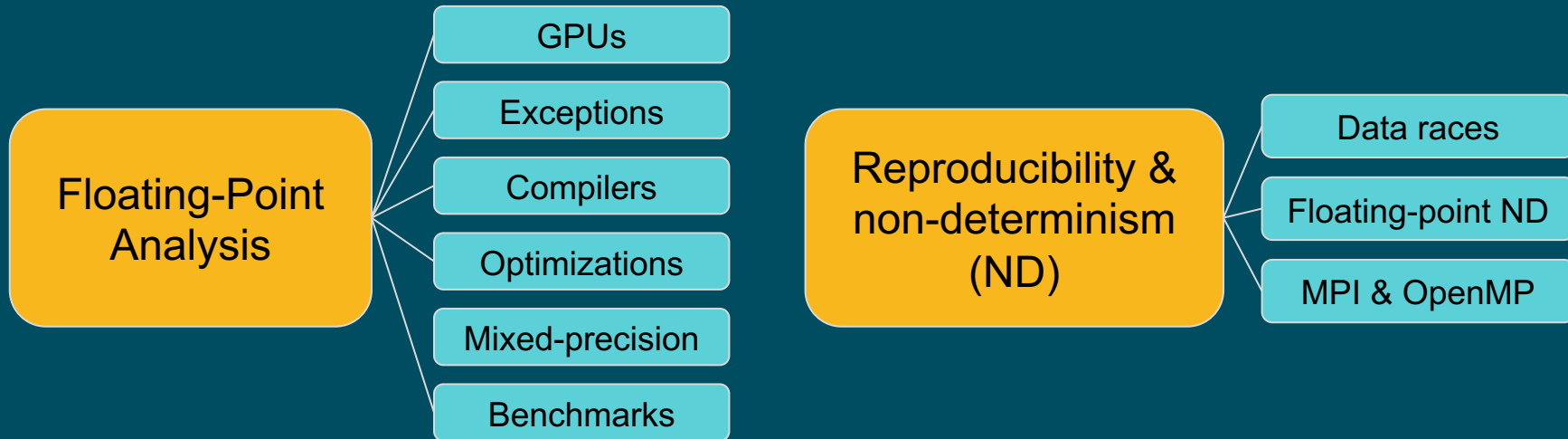
Michael Lam



# Objective of the Tutorial



Demonstrate tools can be used today





Everything is here:

[fpanalysistools.org](http://fpanalysistools.org)

Tutorial Material → SC19



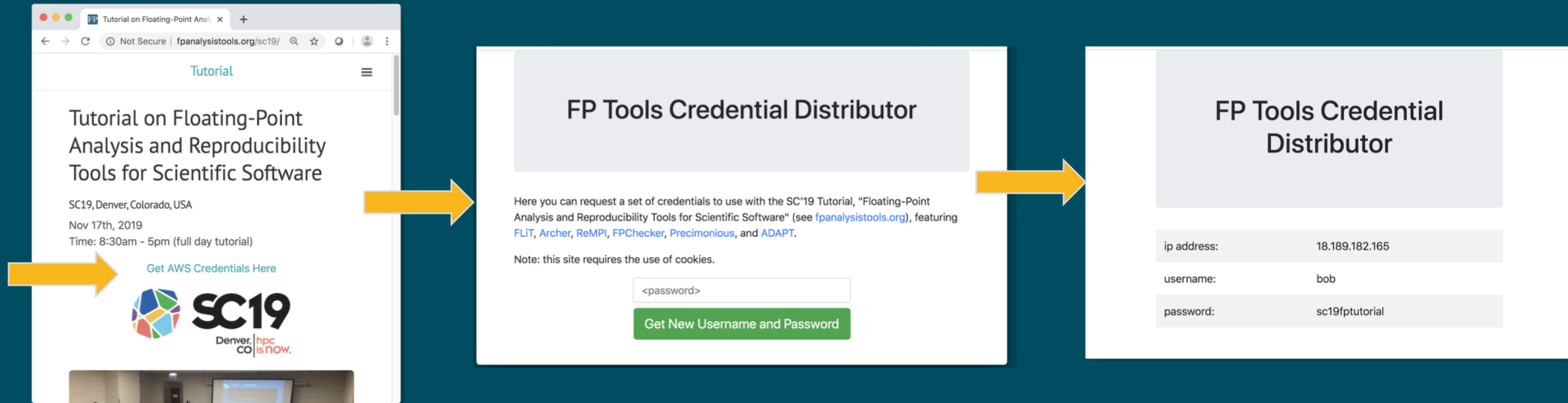
# AWS is Used to Run Exercises

- You will need:
  - Username, password, IP address
- Accessing the AWS instance via ssh:

```
ssh [USERNAME]@[IP ADDRESS]
```

# Getting Your Credentials for AWS

Password:





# Directory Structure

```
/home/user1/  
  |--Module-TOOL1  
    |--exercise-1  
    |--exercise-2  
    |--exercise-3  
  |--Module-TOOL2  
    |--exercise-1  
    |--exercise-2  
    |--exercise-3  
  ...
```



# Morning Agenda

| Time            | Module   |
|-----------------|--|
| 8:30 - 8:40am   | Introduction (housekeeping)                                      |
| 8:40 - 8:55am   | Floating-point background  |
| 8:55 - 9:35am   | <b>FPChecker</b> : floating-point exceptions, GPUs, CUDA         |
| 9:35 - 10:00am  | <b>ARCHER</b> : data races, OpenMP                               |
| 10:00 - 10:30am | <b>Break</b>   |
| 10:30 - 11:30am | <b>FLiT</b> : floating-point variability, compiler optimizations |
| 11:30 - 12:00pm | <b>ReMPI</b> : MPI, floating-point variability                   |
| 12:00 - 1:30pm  | <b>Lunch Break</b>   |





# Afternoon Agenda

| Time          | Module   |
|---------------|--|
| 1:30 - 1:35pm | Afternoon overview   |
| 1:35 - 2:45pm | <b>Precimonious &amp; HiFPTuner</b> : mixed-precision tuning   |
| 2:45 - 3:00pm | <b>FPBench</b> : benchmarks for floating-point                 |
| 3:00 - 3:30pm | <b>Break</b>   |
| 3:30 - 4:50pm | <b>ADAPT, FloatSmith</b> : algorithmic differentiation, tuning |
| 4:50 - 5:00pm | Questions & Answers  |