

# PDP Newcomer's View

or: what I've been up to

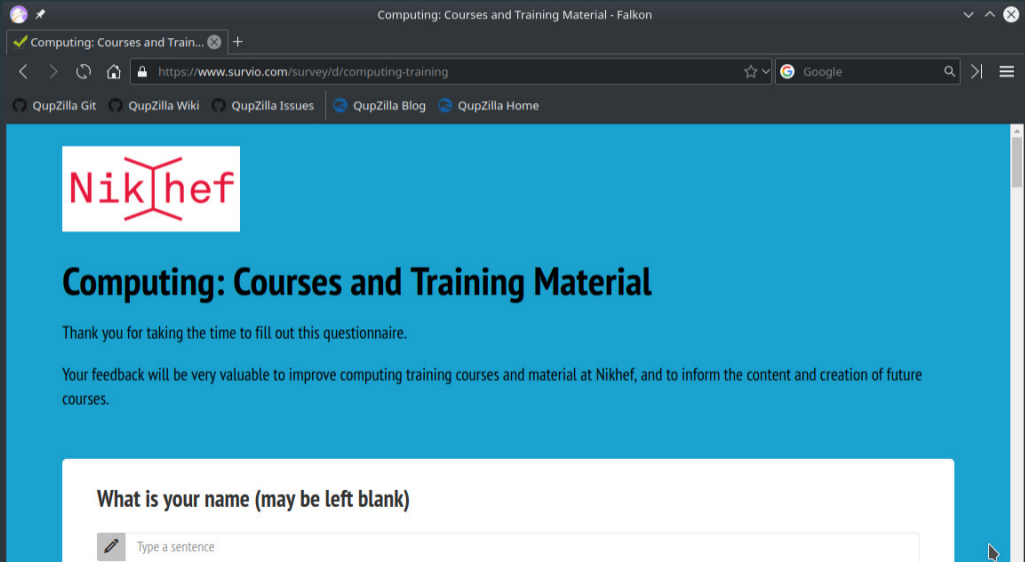
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Roel Aaij

December 18th 2018

Nikhef Jamboree





The image shows a web browser window with the following details:

- Browser Title:** Computing: Courses and Training Material - Falkon
- Address Bar:** <https://www.surveio.com/survey/d/computing-training>
- Navigation:** Back, Forward, Refresh, Home icons.
- Search:** Google search engine.
- Bookmarks:** QupZilla Git, QupZilla Wiki, QupZilla Issues, QupZilla Blog, QupZilla Home.
- Page Content:**
  - Logo:** Nikhef (red text with a stylized red structure above the 'i' and 'h').
  - Section Header:**

## Computing: Courses and Training Material
  - Text:**

Thank you for taking the time to fill out this questionnaire.

Your feedback will be very valuable to improve computing training courses and material at Nikhef, and to inform the content and creation of future courses.
  - Form:** A white box containing the question "What is your name (may be left blank)" and a text input field with a placeholder "Type a sentence".

The screenshot shows a web browser window with the following details:

- Browser Title:** Notebooks, Python, PyROOT — Nikhef Computing Documentation documentation - Falkon
- Address Bar:** <https://www.nikhef.nl/grid/computing-course/work/notebook.html>
- Navigation:** Back, Forward, Refresh, Home icons.
- Search:** Google search bar.
- Bookmarks:** QupZilla Git, QupZilla Wiki, QupZilla Issues, QupZilla Blog, QupZilla Home.
- Page Header:** Nikhef Computing Documentation documentation (left), previous next index (right).
- Table of Contents:**
  - Using SSH
  - Stoomboot
  - Where to Get Software
  - Where to Get GPU Software
  - Notebooks, Python, PyROOT
  - Contributing
- Sections:**
  - Notebooks, Python, PyROOT
    - Create a Virtual Environment
    - Activate the Virtual Environment
    - Install JupyterLab
    - Start the Notebook
    - SSH Port Forwarding
    - Work with the Notebook
    - Few Handy Things
- Main Content:**

## Notebooks, Python, PyROOT

Notebooks can be a very nice tool to work interactively and share your interactive work with others. You can run the notebook server yourself to work with them.

Notebooks are a front-end interface and can work with many different backends, usually called “kernels”:

  - Python 3
  - Python 2.7
  - C++ (through ROOT Cling)
  - R
  - Julia

## Create a Virtual Environment

A Python virtual environment is a sort of sandbox for running python software with specific versions. It can be used to keep your work together in one place and allows you to install additional Python packages, for example using the python package manager: `pip`.

We'll set one up using the

```
$> ssh -o "ProxyJump login.nikhef.nl" stbc-i6.nikhef.nl
```

# SIMD



# SIMD

```
void simd_gen(storage_t& stor) {
    Ranvec1 random{random_method};
    random.init(seed_0, seed_1);

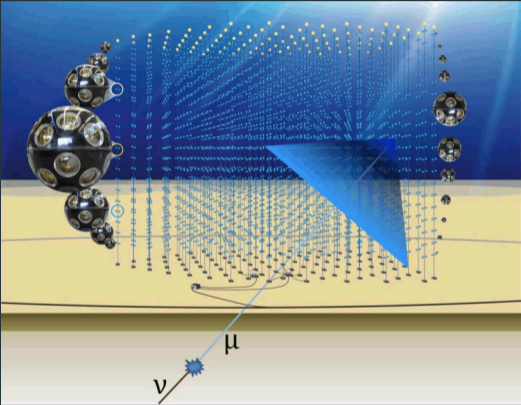
    float_v offset;
    for (int i = 0; i < stor.size() / float_v::size(); ++i) {
        float_v r{random.random8f()};

        r(r > f) = -tau * log(r);
        r(r < f) = a + b * r;

        auto out = prefix_sum(i);
        out += offset;

        out.store(&storage[i * float_v::size()]);
        offset = permute8<7, 7, 7, 7, 7, 7, 7, 7>(out);
    }
}
```

# GPUs



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https://gitlab.com/hcb-parallelization/Allen

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hcb-parallelization / Allen - Details

**Allen** Public No license All rights reserved

Project aiming to do a full HLT1 reconstruction sequence on GPU

Project ID: 38633

5 Star 6 Fork KRBS- https://gitlab.cern.ch

Readme Contribution guide Files (49.3 MB) Commits (1,283) Branches (101) Tags (3)

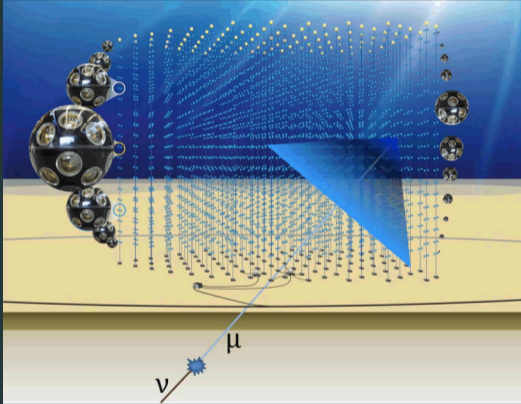
master Allen / +

History Find file Web IDE

Merge branch 'master' into cmake\_native\_cuda  
Dorothea Vom Bruch authored 3 days ago 93a85229

Name	Last commit	Last update
checker	Fix building with ROOT.	4 days ago
cmake	Read raw banks from MDF	1 month ago
configuration/sequences	Special kind of ALGORITHM for prefix sums.	2 weeks ago
cuda	Remove some unused variables.	4 days ago
input	resolve merge conflict	1 month ago

# GPUs



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In other projects

## Frances E. Allen

From Wikipedia, the free encyclopedia

For the early American nun, see *Fanny Allen*.

**Frances Elizabeth "Fran" Allen** (born August 4, 1932) is an American computer scientist and pioneer in the field of optimizing compilers. Allen was the first female IBM Fellow and in 2006 became the first woman to win the Turing Award.<sup>[a]</sup> Her achievements include seminal work in compilers, program optimization, and parallelization.<sup>[b]</sup>

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### Career

Allen grew up on a farm in Penn, New York. She graduated from The New York State College for Teachers (now part of the State University of New York at Albany, SUNY) with a B.Sc. in mathematics in 1954 and began teaching school in Peru, New York.<sup>[c]</sup> After two years, she enrolled at the University of Michigan and earned an M.Sc. degree in mathematics in 1957.<sup>[d]</sup>

Deeply in debt, she joined IBM Research in Poughkeepsie, NY as a programmer in 1957, where she taught incoming employees the basics of Fortran. She planned to return to teaching once her student loans had been paid but ended up staying with IBM for her entire 45-year career. Allen was assigned to the Harvest project for code loading with the National Security Agency in 1959 and worked on a programming language called Alpha.<sup>[e]</sup> She managed the compiler-optimization team for both Harvest and the Stretch project. In the 1960s she contributed to the ACS-1 project and in the 1970s to PL/I. From 1970 to 1971 she spent a sabbatical at New

### Frances Elizabeth "Fran" Allen



**Born** August 4, 1932 (age 85)  
Peru, New York, United States

**Nationality** American

**Alma mater** State University of New York at Albany,  
University of Michigan

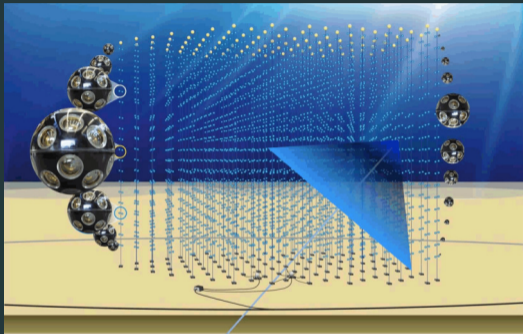
**Known for** High-performance computing, parallel computing, compiler optimization, compilation

**Awards** Turing Award (2006)  
Computer Pioneer Award (2004)  
Computer History Museum Fellow (2005)

**Scientific career**

**Fields** Computer science

# GPUs



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Frances E. Allen - Wikipedia

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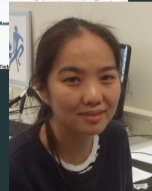


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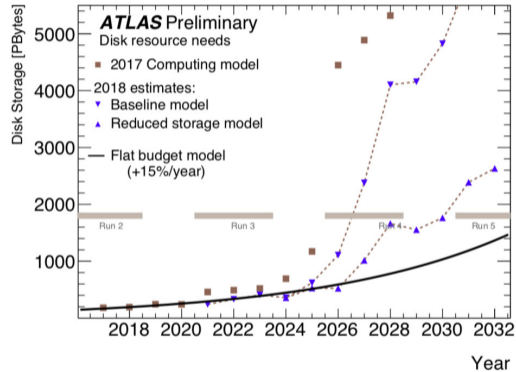
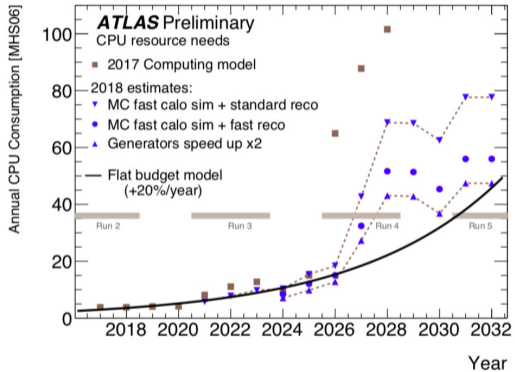
**Alma mater** State University of New York at Albany,  
University of Michigan

**Known for** High-performance computing.

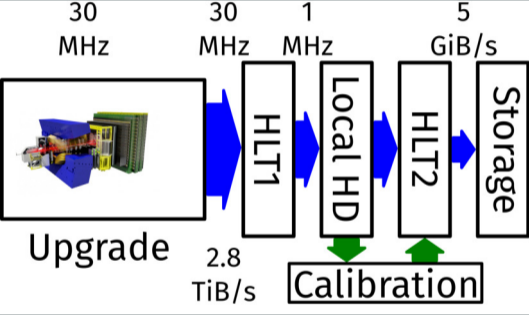




# Storage



# Compression



# Compression

