

# High Performance Computing

An outlook on 2023 (and  
beyond) for the University of  
Bonn

**Dr. Dirk Barbi (HRZ Uni Bonn), ZKI AK Supercomputing, March 21, 2023**





# Happy Spring Equinox

(22:24 tonight)

# HPC – A central service offered by HRZ

The University of Bonn decided to implement High Performance Computing as a **central service to all scientists**:

- Extensive Hardware Resources
- In-depth Support on all Levels
- Teaching (Workshops and Courses)
- Performance Measurement and Optimization
- Counselling of HPC-related science projects
- Two teams to offer these services



# HPC – A central service offered by HRZ

## Aim:

- Accomodate for (most) needs by central installations
- Enable users to efficiently use these resources
- Support scientists with finding solutions to (technical) problems
- Possibly replace smaller, less efficient clusters, or join systems (e.g. HTC integration, extensions)

# BONN)

## HPC Operations team / Basic services



**Dr. Dirk Barbi**

Marvin Procurement, Project  
Management, Team Leader



**Jan Steiner**

Workshops and Courses,  
User Support



**Michael Kuckertz**

Bender Administration,  
Technician



**4 Open positions**



# The High Performance Computing / Analytics (HPC/A)-Lab



**Prof. Dr. Petra Mutzel**

Scientific  
director, computational  
analytics



**Dr. Sven Mallach**

Mathematics,  
computer science



**Dr. Michael Hübner**

Experimental  
high energy particle physics



**Dr. Malte Petersen**

Bioinformatics,  
computational genomics



**Dr. Bartosz Kostrzewa**

Extreme  
scale computing, lattice field  
theory



**Dr. Moritz Wolter**

Machine  
learning, artificial intelligence

**Central contact  
point for research  
projects involving  
HPC**

**Interdisciplinary  
Collaboration**

**Advanced advice  
and training**

# Three pillars of services

## Resources (Clusters)

- Now: Bonna, Bender
- April 2023: Marvin (huge)
- open to all scientists at the university

## User Support

First-Level Support for all basic (technical questions)

Advanced and scientific questions answered by HPC/A

## Teaching

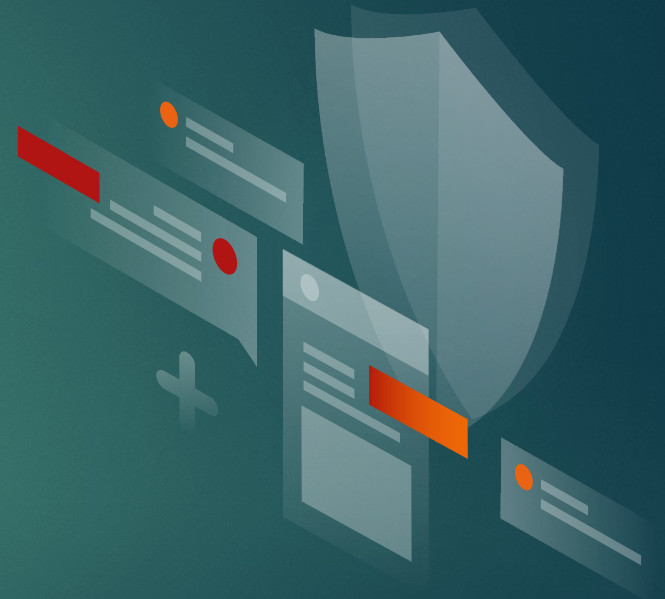
Basic Workshops / Courses by HPC@HRZ

More Advanced and in-depth trainings by HPC/A



# 1 (Hardware) Resources

Heavy Metal





# Bonna (since 2017)

## Small MPP Cluster

- Maintained by Fraunhofer SCAI
- 2240 cores total (70 nodes)
- 192GB RAM / node
- Application form on [hpc.uni-bonn.de](http://hpc.uni-bonn.de)



# Bender (since 2022)

Small GPU Cluster for students and teaching

- 16 Nvidia A40 GPUs (in 4 nodes)
- 16 Nvidia A100 GPUs (in 2 nodes)
- Application form on [hpc.uni-bonn.de](https://hpc.uni-bonn.de)





# Marvin (starting 2023)

- 18432 cores in total (192 nodes), Intel Sapphire Rapids
- 1024 GB RAM / node
- 24 Large Mem nodes, 2 Very Large Mem Nodes
- 128 GPUs Nvidia A100 80 GB (32 nodes)
- 192 GPUs Nvidia A40 48 GB (24 nodes)
- 5.6 PB Lustre Filesystem

To be delivered / installed in May, open to scientists from summer 2023



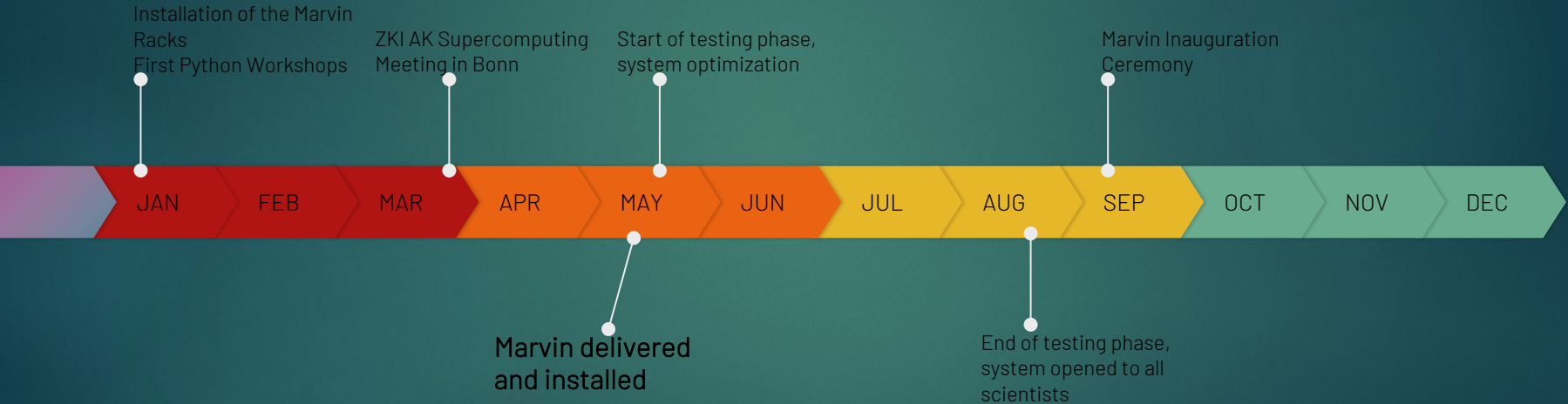
# Marvin's New Home

- Marvin will be installed into the INS server room
- Currently being upgraded by Abt. 4.5 to up to 600 kW max cooling / power consumption of the HPC cluster
- Racks already in place (among many other things)





# TIMELINE 2023



# 2 User Support

Problem solving and Consultation





# Ticket system based support, User forum

One contact point for support questions

Internally directed to the correct supporter (both teams)

Newsletter, MOTD, Regular Meetings (for Admins),...

Also: HPC Office at Wegelerstr. 6



# 3 Teaching

Making sure everyone knows what he/she's doing





# Introductory Workshops / Courses by HRZ

Either online, as recorded tutorial, in person, or combination, i.e.:

- Python
- Linux / Shell
- VCS (git)
- Introduction to HPC
- Raspberry Pi Cluster
- C / C++
- ...



# Advanced Workshops / Courses by HPC/A

More in-depth topics, advanced fields, like:

- Machine Learning
- Performance Analysis and Optimization
- Advanced Parallel Programming
- ...



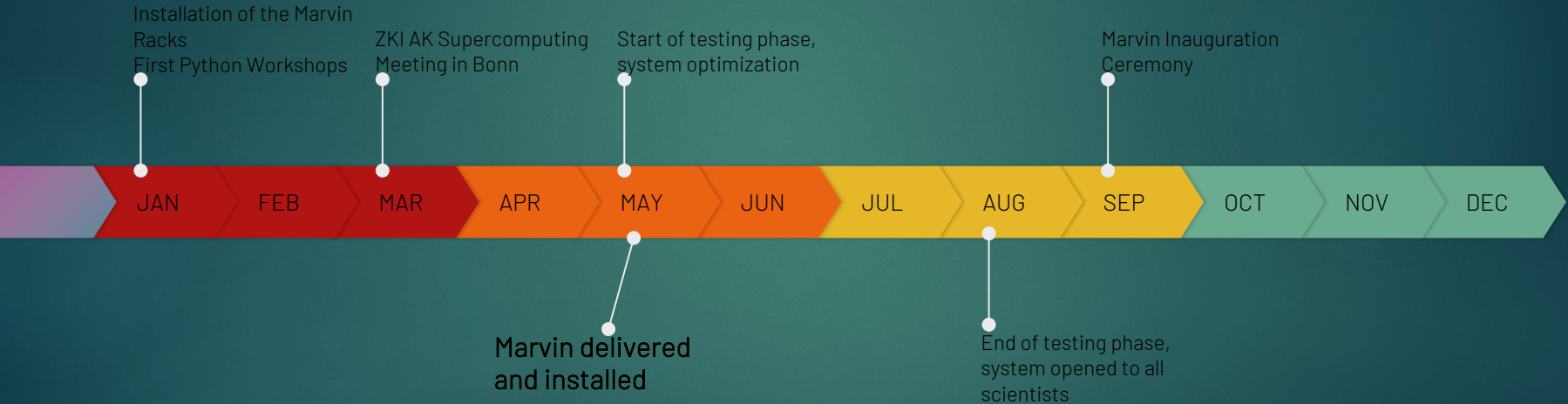


# 4 Last Remarks

(If you want to remember something, then this)



# TIMELINE 2023





# Resources

[hpc.uni-bonn.de](http://hpc.uni-bonn.de) is the shared website of both HPC-teams, containing

- Information on the hardware resources, scheduled downtimes, problems etc.
- Upcoming workshops, courses, events, meetings...
- Wiki
- Useful links
- ...





## Free templates for all your presentation needs



For PowerPoint and  
Google Slides



100% free for personal  
or commercial use



Ready to use,  
professional and  
customizable



Blow your audience  
away with attractive  
visuals