ATLAS Outstanding Achievement Awards

June 20, 2024
Thessaloniki ATLAS Week

R. Gonçalo and S. Demers (co-chairs)
A. Andreazza, H. Bachacou, B. Kersevan, A. Kazarov
Maria Jose Costa and Lucia Di Ciaccio
& the Collaboration Board Advisory Group

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First awarded in 2014 to recognize work done to enable Run 1, these 2024 awards represent the 7th time the call has been made.

Nominations were accepted across ATLAS from fifteen areas for work done from February 2022 - October 2023:

Combined Performance, Computing & Software, Data Preparation, Forward Detectors, HGTD, Inner Detector, ITk, LAr, Muon Spectrometer, Outreach, Run Coordination, TDAQ, Technical Coordination, TileCal, Trigger

This recognized work required great **creativity** and **determination**. It enables the full spectrum of physics that we produce at ATLAS now and in the future.

Thank you to the 2024 team of expert reviewers!

Technical Coordination: Ludovico Pontecorvo

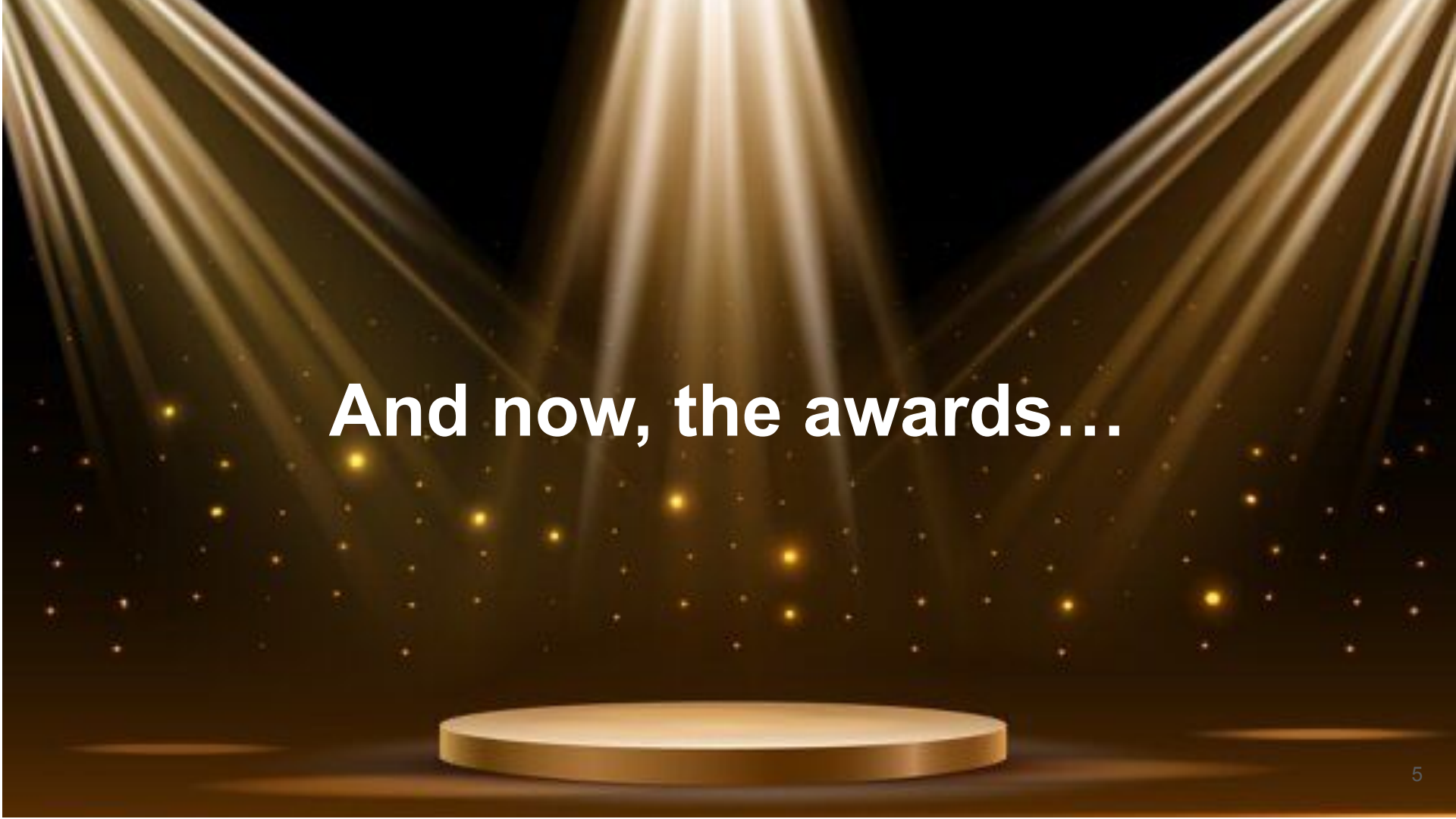
+ Institute Board Chairs

ITk:	Arnulf Quadt
HGTD:	Frank Filthaut
Inner Detector:	Serkant Cetin
Liquid Argon:	Pavol Strizenec
TileCal:	David Calvet
Muon Spectrometer:	Gregor Herten
Forward Detectors:	Marek Tasevsky
TDAQ:	Imma Riu

+ Former Activity Coordinators:

Physics Coordination (for the Combined Performance nominations):	Pamela Ferrari and Guillaume Unal
Run Coordination:	Joerg Stelzer
Computing and Software Coordination:	Alessandro di Girolamo
Trigger Coordination:	Tim Martin
Data Preparation Coordination:	James Ferrando
Outreach:	Rebeca Gonzalez

Thank you to Martine Desnyder-Ivesdal and Srini Rajagopalan for the plaques!


And now, the awards…

Database migration and maintenance

During the 2022-2023 period, the awardee was the main contributor in carrying out the technical steps to evolve the ATLAS database infrastructure from a Run 2 to Run 3 configuration. The objective: a simplified scheme for the Oracle database architecture, improved usage of database resources for distributed computing access and for data processing. This required execution of multiple procedures during the migration process **without causing any disruption to database usage**. Various use cases had to be reviewed, users were contacted and database usages were monitored in detail.

This was all in addition to the awardees “day job” of troubleshooting production issues and performance improvements, often in collaboration with ATLAS application developers, including the community for DCS, Tier 0, Conditions, Glance, Rucio, EventIndex, and PanDA.

Our expert reviewer, awarding this nomination the highest available rating, simply stated that things were running smoothly with the database, noting this remarkable fact as support.

Luca Canali (CERN)

For outstanding contributions to the ATLAS database infrastructure

Flavor Tagging

GN2 and you

The usage of graph neural network tagging algorithms within ATLAS CP groups is a game changer, in particular the implementation of the GN2 - a new ATLAS jet flavour tagging paradigm. Not only is the **expected performance gain significantly improved** with respect to previous FTAG tagging algorithms, but the nominated team has managed to implement the GNN in the most general way. This means that it **provides a well-established framework for other uses**: vertexing, long-lived particle reconstruction, tau-lepton reconstruction, non-prompt lepton identification and event classification.

A wonderful presentation at a recent Exotics Plenary shows this versatility of the GN2: https://indico.cern.ch/event/1349206/contributions/5679382/attachments/2769102/4824257/2023-12-11-Exotics-GN2andYou.pdf

Jackson Barr: ATLAS Authorship qualification included this project, and contribution extended past the qualification period
Alexander Froch: maintainer of the pre-processing suite, providing continuous support throughout the project
Philipp Gadow: algorithm convener who offered significant coordination and documentation efforts
Dan Guest: continuous and generous support on Athena implementation/intervade, and the creator of the flexible FTAG ML training workflow. Involved in the full pipeline from pre-processing samples for training to deployment in Athena
Nilotpal Kakati: one of the main developers of the GNN software stack who started the task and pushed it forward with daily scrutiny of merge requests
Dmitrii Kobylianskii: ATLAS Authorship qualification included this project, and contribution extended past the qualification period
Nikita Ivvan Pond: ATLAS Authorship qualification included this project, and contribution extended past the qualification period
Samuel Van Stroud: one of the main developers of the GNN software stack who started the task and pushed it forward with daily scrutiny of merge requests

Jackson Barr (University College London)
Alexander Froch (Albert-Ludwigs-Universität Freiburg)
Philipp Gadow (CERN)
Dan Guest (Humboldt-Universität zu Berlin)
Nilotpal Kakati (Weizmann Institute of Science)
Dmitrii Kobylianskii (Weizmann Institute of Science)
Nikita Ivvan Pond (University College London)
Samuel Van Stroud (University College London)

For outstanding contributions to heavy flavour tagging algorithms based on graph neural networks

Dropping E-links

Here is the story: The NSW had problems running due to dropping E-links unexpectedly and repeatedly. We would drop over a run, up to 30 different e-links. We couldn't stop data taking every time this happened, so we instituted a manager that dropped links under certain circumstances and then tried to recover them during the run without stopping. The problem with this is that you have data which is hard to deal with because bits of the detector are dropping out and coming back every few minutes.

We did not know why we were dropping e-links. By talking to people at ALICE we found that we were not monitoring the error codes from the GBT-x. **Aaron White**, who had become expert in the GBT-x through calibrating its phases, took on the task of monitoring the error codes and doing tests to varying parameters of running to see how the rate of errors progressed. He was helped in these tests by sTGC expert **Liang Guan**, L1DDC expert, **Ioannis Mesolongitis**, and **Michelle Solis** who was tracking the elink drops over time.

Aaron realized, by noting that the rate of errors went down as the digital traffic went up, that we could mitigate the problem by sending junk data at a high enough rate. This was tested by the group, and found to work. This meant that ATLAS could run the NSW without dropping e-links constantly and that the data would be much more understandable.

Finding this problem with the GBT-x's and fixing it in the next iteration, for all the experiments is a big deal and also a wonderful example of how groups at CERN work together to solve technical problems that have big effects.

Liang Guan (University of Michigan)

Ioannis Mesolongitis (University of West Attica)

Michelle Solis (University of Arizona)

Aaron White (Harvard University)

For understanding the problem of randomly dropping E-links in the NSW and for finding a very effective mitigation for this problem

Heavy Ions Operation and Heavy Ion Triggers

Involved in many aspects of HI running since as early as 2010, **the ATLAS HI program without Martin Rybar is unthinkable**. When ATLAS moves to HI data taking, he moves his center of life to the ATLAS Control Room. He provided fast data quality feedback, suggestions to investigate and improve the trigger strategy, and consultation on detector configurations.

In terms of the trigger, the outstanding contributions of **Agnieszka Ogrodnik** and **Jakub Kremer** lie in the work of defining and implementing the HI trigger menu and trigger algorithms for the run in 2023, the first HI data taking since the 2018 pB-pB run. The complexity of trigger strategies and changing & sub-optimal LHC conditions made the task even more challenging. **Delivering good data that ATLAS could analyze required full dedication.**

Jakub Kremer (DESY)

Agnieszka Ogrodnik (Charles University, Prague)

Martin Rybar (Charles University, Prague)

For outstanding contributions to the Heavy Ions operation and trigger

ITk pixel sensors

Three ATLAS members are recognized for their leading roles in the production of pixel sensor wafers, the development of the module assembly process, the outer barrel wire bond protection, the development of hybridization, and the production of bare pixel modules with a commercial vendor.

Manabu Togawa served as the leader responsible for organizing ITk activities within the Japan group. With primary focus on module assembly, he was pivotal in implementing parylene coating to safeguard the sensor-ASIC interface from electrical discharges and spearheading investigations into wire bond protection for the Outer Barrel module.

Koji Nakamura played a key role in designing p-type high-performance HPK pixel sensors, meticulous testing of bias network structures, and mitigating efficiency drop. He helped develop a hybridization process involving flip-chip bump bonding of readout ASIC and sensor, removing the need for flux and support wafers.

Hideyuki Oide made significant contributions to QC testing systems, the development of dedicated database software tools for site operations. He designed an electrical testing system capable of supporting QC for multiple module types and collaborated on the development of thermal cycling, visual inspection, and the metrology processes. He enabled participation of masters students and technicians.

Koji Nakamura (KEK)

Hideyuki Oide (KEK)

Manabu Togawa (KEK)

For outstanding contributions to the ITk Pixel project in sensor production, hybridisation and module assembly

Run 3 Muon Software

With the installation of the New Small Wheel a critical challenge became implementing the NSW into the ATLAS software. There was tremendous time pressure and need from the collaboration in this area.

Johannes Junggeburth concentrated mainly on the general muon software and computing aspects. He sped up muon reconstruction by more than a factor of two while also improving efficiency and reducing the fake rates. At the time of nomination, GitLab showed that he was rapidly approaching 1000 merge requests.

On the NSW performance and reconstruction in Athena, **Patrick Scholer** made huge contributions, including new segment reconstruction and an improved hit recovery and developing necessary infrastructure for the NSW trigger infrastructure.

Both Johannes and Patrick reacted swiftly on several occasions where high NSW occupancies stalled Tier-0 operations, deploying solutions often on the same day that problems were discovered. They additionally are the key drivers of the general muon software effort.

Johannes Junggeburth (CERN and the University of Massachusetts, Amherst)

Patrick Scholer (Albert-Ludwigs-Universität Freiburg)

For outstanding contributions to the Run 3 muon software

Trigger Operations

The Run 3 trigger commissioning was extremely challenging, particularly given the long shutdown and complications of the pandemic. A working system needed to be recovered while integrating new systems, all while collecting good physics data. Operating the trigger in these difficult conditions fell on the shoulders of a limited number of dedicated individuals, of whom the awardees constitute the most critical contributors. **They went above and beyond to operate the trigger during standard and special data-taking conditions, found solutions to novel problems, and adjusted to the ever changing conditions of the LHC.**

Sara Alderweireldt: trigger HLT algorithm coordinator

Rafal Bielski: automated validation tools & tests coordinator, then HLT algorithm coordinator

Francesco Giuli: express stream coordinator

Ralf Gugel: L1 Calo Topo algorithm commissioning coordinator, then L1Calo run coordinator

Claudia Merlassino: trigger monitoring & DQ coordinator, then trigger ops & monitoring coordinator

Stefanie Morgenstern: NCB group trigger contact, trigger monitoring & DQ coordinator, then trigger operations & monitoring coordinator

Gabriel Palacino: trigger monitoring & DQ coordinator, trigger operations & monitoring coordinator

Aleksandra Poreba: trigger rates & cost monitoring coordinator

Antonia Strübig: trigger operations & monitoring coordinator, trigger menu & signature performance coordinator, trigger ops & monitoring coordinator

Daniele Zanzi: trigger menu & signature performance coordinator, trigger ops & monitoring coordinator

Sara Alderweireldt (University of Edinburgh)
Rafal Bielski (University of Oregon and CERN)
Francesco Giuli (CERN)
Ralf Gugel (Johannes Gutenberg-Universität Mainz)
Claudia Merlassino (Universita; di Udine and INFN Trieste)
Stefanie Morgenstern (CERN)
Gabriel Palacino (Indiana University)
Aleksandra Poreba (CERN and Ruprecht Karls Universität Heidelberg)
Antonia Strübig (Stockholm University)
Daniele Zanzi (Albert-Ludwigs-Universität Freiburg)

For outstanding contributions to the trigger operation

Prompt Processing Coordinator (The PROC)

For **recommissioning the software and workflows for Run-3 prompt processing at Tier 0** after the long LS2 shutdown when some knowledge in many areas of Data Preparation had been lost, and **successfully establishing them with the needed quality and robustness**, we recognize the PROC during the award time period. A lot of the functionality that had been present in release 21 had o be re-implemented for release 22. The PROC oversaw release building and deployment, monitored the software quality, validated new workflows, validated and deployed new output formats,

Our awardee is set apart not just for his technical skills, but also for his depth of knowledge and attention to detail. He possesses a profound understanding of the intricacies involved in data processing and has identified areas where improvements can be made. This was invaluable given new detectors that were commissioned, special run configurations that were managed, and a time-critical calibration loop that was restarted.

Julien Maurer (Horia Hulubei National Institute of Physics and Nuclear Engineering)

For outstanding contributions to
The ATLAS prompt reconstruction operation

Cold Noise Task Force

The cold noise has been at the center of investigation of the strip detector project for almost two years. The effect of clusters of noisy channels that is only observed when modules are operated cold has caused a halt to the module production program. A task force was established to investigate the causes and to work on possible mitigations. The task force:

- Investigated the origins of this previously never observed phenomenon in a silicon tracker
- Launched a multi-prong study to mitigate/remove cold noise in the modules
- Coordinated the study across many institutes
- Employed a multitude of measurement techniques that identified the source

Cold noise is caused by the vibration of capacitors on the strip power board mounted on top of the silicon sensor. The vibrations could only be identified using a special laser doppler interferometric measurement (vibrometer) that enabled detection of **2 MHz vibrations of the capacitors on the powerboard that propagates to the front-end via sub-nanometer vibrations of the silicon sensor**.

We are grateful to all of the 30+ individuals who participated in the work of the task force. We recognize the following ten individuals for the exceptional contributions.

Anthony Affolder (University of California Santa Cruz)
Ian Dyckes (Lawrence Berkeley National Laboratory)
Vitaliy Fadeyev (University of California Santa Cruz)
Cole Helling (University of British Columbia)
Jacob Wayne Johnson (University of California Santa Cruz)
Matthew Kurth (Institute of High Energy Physics, Chinese Academy of Sciences)
Masahiro Morii (Harvard University)
Peter Phillips (Rutherford Appleton Laboratory)
Luise Poley (TRIUMF)
Craig Sawyer (Rutherford Appleton Laboratory)

For outstanding contributions to the identification of the vibrational source of cold noise on ITk strip modules


ATLAS
EXPERIMENT
2024
Congratulations to
the 2024
AOAA Winners!