

Statement for the CMS spokesperson election: Luca Malgeri

Our experiment is one of the most successful scientific endeavours ever. The discovery of the Higgs boson in 2012 was but a first milestone in the long journey we have undertaken; though we have already filled our chest with almost 1000 physics papers, more than any other previous experimental project in particle physics, our exploration will continue with a factor 20 more luminosity. As ever, our task will be more and more challenging and will require creativity and careful planning. Thanks to the visionary work of the original proponents of CMS we have a flexible scientific instrument tool that can adapt to the needs of our quest, and which, combined with our strong Collaboration that has withstood the test of time, constitutes the necessary basis to address successfully the future.

We just completed, on time and on budget, our Phase-1 upgrades, while we have already started the Phase-2 upgrades with the installation of the first batch of GEM chambers. Although our plans for the future are the most challenging among all LHC experiments, we passed with flying colours the LHCC approval of our major Phase-2 detector upgrades, which push the limit of detector technology with a solid R&D program that is changing the paradigm of HEP detectors for the future. We continue to be at the forefront of DAQ and trigger exploring techniques that were unimaginable until recently (full-rate track-based trigger, Particle Flow, fast machine learning inference on FPGA, etc.). We are leading the online and offline computing/software evolution exploiting dynamic computing resources and preparing ourselves for future heterogeneous architectures. I have had the good fortune to live through a period during which I was personally and intensively involved in the promotion of these concepts and designs. I have a deep sense of satisfaction that, despite significant external budgetary and schedule constraints we have a well-established plan with the right balance of R&D and production activities. What is needed now is to remain vigilant in following the established path, keeping the engagement of our member institutes and their funding agencies and preserving our internal resources, which were key elements during the original construction period of CMS.

Near future challenges: LHC Run3 is approaching and we will not double our luminosity with the same rate as in Run1/Run2. This does not make Run3 less interesting. On the contrary, it is a great opportunity to diversify our portfolio of experimental techniques and physics analyses and we need to push in this direction. We now know that BSM physics is not a low-hanging fruit, and that, if it exists at a scale accessible to the LHC, it is either weakly coupled, and thus requires a lot more luminosity, or it is hiding in difficult corners of phase space, swamped by huge backgrounds, and thus requires our inventiveness. We are already engaged in beating a pure \sqrt{L} statistical discovery power by empowering our analysis tools and triggers with innovative techniques. It might also be that the scale of BSM physics is beyond the direct reach of the LHC but we have demonstrated, despite initial skepticism, that we can perform high-precision physics measurements. Beyond their inherent power in probing the standard model to the greatest possible extent, precision measurements have significant power in probing new physics indirectly through high order corrections. And though precision physics is a hard and challenging task, this is the right moment to capitalize on the data we have already collected and refine our analyses in view of the new crops expected.

Both endeavours, namely direct searches and precision measurements, represent powerful training grounds for the new generation of physicists who will develop the new tools to address the upcoming challenges. We often wonder how to get the new generations engaged and how to preserve knowledge and skills in areas like POG and DPG that are historically shrinking. My experience has been that what really drives the interest and serves as an attractor for emerging talents are new challenges and innovation. If we manage to keep a healthy balance between R&D work and routine operations within the *same* community I am confident that we will build a solid base of experts who will ensure our future performance. Proper recognition of such Innovative work is necessary and adds tremendous value to the profile of our young colleagues and their careers. This is the best reward they can get, and it is our duty as senior scientists to provide them with ample such opportunities. Our upgrades, with the change of paradigm brought by the several new technologies we have selected, are an excellent opportunity to further enhance the involvement of new generations. And while investing in innovation is risky, the rewards, both in terms of science and in terms of providing opportunities to our younger colleagues to flourish, have consistently made the effort more than worthwhile.

Organization: the structure and organization of CMS have evolved through the years to cope with the different phases of our experiment and the LHC. When I joined the experiment we had a rather horizontal structure with many across-boundary groups. It was an agile organization aimed at fast development in a period of commissioning on all fronts: detector, software, and physics analyses. The transition to physics production and operation required more vertical integration of tasks and consolidation of structure/groups around well-defined deliverables. Since a few years now, we are facing the concurrent challenges of keeping a steady flow of physics results, preparing for the “next run” to come and for

the long term future, namely the HL-LHC. I have personally contributed to some of the structural changes, both as proponent and member of the management. In a period of diverse challenges the risk of creating parallel structure, and hence communities, is rather high. My opinion is that the existing structures have served us well and no major overhaul is needed. Clearly, we should still work on improving our efficiency, and on managing the parallelism of our current activities by rethinking, and perhaps slimming down, some of our internal structures.

Collaboration: CMS is a large collaboration, which is growing quite rapidly with time in terms of institutes though less so in terms of members. Several new institutes, especially when they are small and not federated with other consolidated institutes, face difficulties. CMS is a complex machine and the learning curve for newcomers is often rather steep. One of our challenges is to promote the integration of our new colleagues from institutes that have joined in the last few years. The spokesperson team needs to work intensively with the corresponding funding agencies, the Collaboration Board (CB) team, and all relevant actors within CMS to identify viable scopes and help secure the necessary resources. We have already taken steps to guide new institutes through their initial phase in CMS. I am particularly worried about young Ph.D. students or post-docs who lack local guidance and are subscribed to essential CMS tasks. I look forward to re-enforcing the early guidance with a sustained mentoring effort around essential responsibilities in CMS, as also suggested recently by younger colleagues. There are many young talents who, with proper guidance, can become the software/trigger/detector experts of the future. We have also just started a transition towards institutional responsibilities. The major benefits I see in this scheme are the positive feedback loop in terms of task efficiency/motivation and the focus on deliverables rather than EPR tasks.

CMS is also a diverse collaboration. Diversity is a concept much larger than gender, sexual orientation, religion, nationality, age, etc. It is the ability to respect and value all viewpoints, on all matters, from scientific to organizational and management ones, regardless of origin. CMS has been evolving, increasing awareness of issues related to diversity; we have also developed some structures to help us keep these issues at the forefront of our work. At this point, I believe that we do not need any new structures or groups; instead, we need to use the established structures, always in close collaboration with the CB, to genuinely promote diversity as part of our modus operandi. We have to establish deeply within our culture that our adopted code-of-conduct should be respected by everybody in CMS, not because it is imposed, but because it is a moral imperative and makes CMS an enjoyable place to work in.

Spokesperson (SP) team role: the spokesperson is first and foremost the voice of the collaboration. (S)he has a representative role and (s)he should both lead and also express as much as possible the opinion of the collaboration. The CB is the place where the long term strategies and policies of the collaboration are decided. It is the duty of the SP team to execute such plans and lead the collaboration in daily operations. And this is a huge endeavour that requires a team and, most importantly, knowledge, expertise, experience and the careful consideration of different points of view on the detailed implementation of the plans. In carrying out my duties, I will seek wide consultation not only from the members of the formal organization structure but also from past spokespersons and senior members of the collaboration. As spokesperson I will also look forward to frequent and productive interactions with our young scientists, who, although should be given ownership of the future, are largely underrepresented in the decision-making process.

Personal considerations: I joined CMS in 2004 with past experience in UA2 at the SppS (diploma thesis on W and Z pt distribution), in L3 at LEP (PhD on Z lineshape and W physics), in ATLAS and the FAST experiment (measurement of G_F). In all my roles and positions I have sought and I have enjoyed making strong contributions to both physics enablers, namely detector, trigger, DAQ, software, computing and to physics analyses. The distinction between the two activities seems artificial to me. In CMS I first joined the ECAL calibration effort, which led me to the coordination of the Alignment and Calibration effort. I was the first DPG coordinator/deputy run Coordinator. In run coordination, I established the first prompt feedback groups. Over the years I have served as deputy Physics Coordinator, Physics coordinator, deputy Upgrade Coordinator and now deputy Spokesperson. I have led several task forces, among them the Physics and Validation Team that brought the definition of the PPD L1 area, the Global Event Description task force that pushed our reconstruction to be fully based on Particle Flow. As CERN senior scientist I am currently leading the EP-CMG group composed by circa 60 Ph.D. physicists. I believe I have a broad and extensive knowledge of the inner workings of CMS and CERN. My career and interests show how much I value and enjoy all aspects of experimental particle physics from detectors to analyses. This is the baggage I would bring to CMS if elected as spokesperson. I am extremely enthusiastic about the CMS program in the near and long term future and I would be highly honoured to serve CMS to the best of my abilities.