

Mary R. M. Bishai

DUNE Spokesperson Candidate Statement, 2022

Dear Colleagues, I am honored and privileged to once again have been chosen to run for a major DUNE leadership position. My journey on DUNE has been a long one and started in 2004, the year I was hired at an entry level staff position to work on MINOS and future neutrino experiments at Brookhaven National Laboratory in Upton, NY. Starting in 2005/2006 an effort was initiated lead by Milind Diwan's team at BNL of which I was a junior member and a team at Fermilab lead by Gina Rameika that lead to the US Long-Baseline Neutrino Experiment Study (arXiv:0705.4396) in 2007 and a recommendation by the 2008 US Particle Physics Project Prioritization Panel (P5) to the DOE funding agency for "a world-class neutrino program as a core component of the US program, with the long-term vision of a large detector in the proposed DUSEL laboratory [now SURF] and a high-intensity neutrino source at Fermilab." The Long Baseline Neutrino Experiment (LBNE) was subsequently established and affirmed as a key component of the US program during the 2012-2013 Snowmass US Community planning effort. I served as the LBNE Project Scientist from 2012 through 2015 charged with co-ordinating between the project and scientific collaboration through the conceptual design phase. Simultaneously, as many of you well know the LBNO proposal was being developed in Europe and the two efforts combined into DUNE in 2014. I served as the Project Scientist during the critical year when both projects combined and until the approval of the DUNE Conceptual Design (CD1R) in 2015. My work on DUNE in the past few years has focused on two thrusts: the first thrust has been working quietly behind the scenes to envision the long term future of DUNE beyond the search for CP violation. To this end, I initiated the effort to develop plausible beam designs to enable DUNE to pursue the nutau appearance channel more than 5 years ago and I personally reached out and engaged the leading neutrino theorists and phenomenologists in the field to develop the scientific case. The last three years and especially during the Snowmass process have seen DUNE nutau appearance phenomenology now fully developed by the lead neutrino theorists in the field and there is strong advocacy and support in the wide neutrino community for this unique groundbreaking physics program for DUNE. The other thrust that has occupied me recently – starting in early 2022 - is reorganizing the internal LBNF/DUNE Review Office (RO) charged with overseeing all technical reviews for LBNF Beamline and the Near and Far detectors and updating the review plan to better serve LBNF/DUNE. The revamped RO has successfully carried out an extensive suite of successful reviews for the far and near detectors under the new review plan I developed. The revamped RO review procedures, clarified expectations and new technical tools developed have made it easier for the DUNE consortia and project management to engage with the review process and advance the technical designs of the DUNE detectors to meet the expectations of CD2/3 in July of 2023.

As spokesperson of DUNE the focus of my effort will be on three fronts that are critical path in the next few years:

1. **Guiding DUNE towards a successful DOE CD2/3 for the FD Systems followed by the CD2/3 for Beamline and ND projects:** This is a critical time for LBNF/DUNE Phase-I, over the last two years, all the key players and technical designs for Phase I DUNE – particularly ND and FD2 have coalesced. To bring DUNE Phase I over the finish line we need to help the collaboration and consortia solidify support with all the existing stakeholders and get through the DOE CD2/3 process. I am concerned about clear cases of extreme burn-out by consortia members and

leaders due to bureaucratic overburden + lack of technical resources. COVID-19 and the war in Europe are taking a big toll on our teams. As leaders, we need to intervene and work with project management to help provide the support needed and find ways to meet project deliverables without overburdening the consortia teams beyond their abilities to cope.

- 2. Developing a strong scientific and technical case for LBNF/DUNE Phase-II:** IMHO, one of the most positive outcomes of the Snowmass process has been a clear statement on the phasing of DUNE particularly from the DOE with DUNE Phase-I clearly on track and support for development of Phase-II . We now have a great opportunity to build an even stronger experiment with Phase-II – one that goes beyond what we envisioned originally for DUNE. The DUNE Module of Opportunity Workshop demonstrated that there is no lack of ideas for cool new detector technologies. What is missing is articulating a strong scientific case with a plausible and feasible detector. No funding agency in the US or anywhere is going to hand us 100's of millions of dollars more for Phase-II without a compelling scientific and technical case. And it cant be just “to complete DUNE”. In addition – we need to start an effort on beam design innovations for Phase-II – beyond the minimal needed to upgrade to 2.4MW which is still very technologically challenging.
- 3. Establishing concrete processes to establish a just and equitable working environment:** The recent incidence that came to light of harrasment by a DUNE collaborator of a fellow collaborator on another project has made clear the failure of both the collaboration and host lab organizations to provide a safe and equitable environment for our researchers. Collaborations as organizations have little authority over collaborator activity that is not in plain sight and certainly do not have the resources or proper training to assess or investigate code-of-conduct violations that are not overt egregious actions. We need a complete rethink of how we “police” ourselves. I have some suggestions: use the practice of “restorative justice” (<https://www.nytimes.com/2015/09/09/opinion/an-alternative-approach-to-campus-justice.html>) to resolve conflicts in the “gray zone” where most ethics/COC violatons occur. This may encourage more reporting and promote a more healthy collaborative climate and build thrust. I would also advocate a strong engagement with the host lab to leverage independent and external resources in the form of HR specialists in ethics and behavioral science to assess and investigate reported code-of-conduct violations. A transparent, independent and professional approach will build thrust and encourage more reporting and help foster best practices.

Finally, what matters to me most – as always - is not the title or role of Spokesperson, but that the issues that I identified above which I strongly believe are of vital importance to DUNE be addressed. It is a great privilege to stand for election alongside Josh Klein who has played a leading role for more than a decade to bring forth LBNE and now DUNE offering both outstanding scientific and technical leadership. Should I not be selected for spokesperson, I would be more than happy to work under Josh’s leadership in any capacity he sees fit to make sure our long journey with DUNE is a successful and satisfying one in the upcoming years.