



## Hidden in plain sight

India is a key player in big international science projects in astronomy, nuclear and high-energy physics. However, raising the visibility of individual researchers and institutes remains a challenge.

Last year, in a [Viewpoint](#) article on the visibility challenges for Asian scientists published in our pages, Shравan Hanasoge commented on the underrepresentation of Indian scientists in international journals and review committees. He attributed this to “the geographical disadvantage that India faces, in that it is distant from the main centres of international scientific excellence”. Yet in many fields, a lot of work takes place in big, international collaborations, where India is an important contributor. In this issue, we explore the positive impact of big science projects in India through a [Viewpoint](#) and a [Comment](#), and ponder on the shadow big collaborations cast on individual contributions.

The benefits of joining an international big science project are numerous: training opportunities for young researchers, access to otherwise unaffordable equipment, and technological capacity building in the region, to name a few. In addition, one of the themes that emerged from the [Viewpoint](#), was the fact that the expertise and processes developed during such collaborations can be used to build big science projects locally, so such benefits are multiplied. For example, Rohini Godbole mentions the expertise developed from working at CERN was used in facilitating the Indian Neutrino Observatory. Similarly, as Shishir Deshpande writes, the knowledge produced at the nuclear fusion plant, ITER, is expected to boost ongoing and future Indian fusion projects.

While the high-energy physics and nuclear communities in India have capitalized on the expertise gained from international collaborations, the Indian space programme has been largely indigenous, and provided a platform for international collaboration. As Tirtha Das and colleagues write in the [Comment](#), the Indian space programme began in the 1960s, when the Thumba Equatorial Rocket Launching Station was founded.

Since 1968, all members of the United Nations are welcome to use it. Similarly, AstroSat, a multiwavelength observatory on a satellite launched in 2015, operates on a proposal basis, serving astronomers from 50 other countries.

It is clear that Indian scientists both contribute to and benefit from large-scale international projects. Yet the challenge of visibility remains. 100 years ago, one fabled international collaboration began when Satyendra Nath Bose wrote a letter to Albert Einstein and the physics community continues to commemorate their eponymous work on Bose–Einstein statistics. Today, when big collaborations publish papers, the author list can run to thousands of names, and institutional affiliations are eclipsed by the consortium name. Thus the contribution made by individual scientists, or by specific countries is hard to elucidate.

As the number, and size, of big science projects is growing, there are increasing efforts to better understand and analyse their underlying collaboration networks. Amongst these efforts are new visualization tools, as discussed in a [Perspective](#) in this issue. For example, geographically mapping the collaboration network of institutions can lead to insights about the type of contributions from different countries.

However, highlighting the work of individuals in such big consortia remains challenging. One solution may lie in focusing on the technical aspects of hardware or software used in the project, as these are often developed by individuals or smaller research groups (Y. P. Viyogi, *Curr. Sci.* **99**, 890–892; 2010). At *Nature Reviews Physics*, we publish Tools of the Trade articles, which invite early career researchers to describe experimental or computational tools they use, or have developed. We hope to find other ways to celebrate the contribution of individual researchers and raise their visibility.