

Preface

In the second year of my graduate studies in 1971 at the University of Texas, there was great excitement in the Department of Astronomy at the upcoming occultation of the bright star β Scorpii by Jupiter. Such occultations of very bright stars are rare and the refractive deformation of the star's brightness as it is occulted gives important information on the atmospheric structure of Jupiter. For such occultations you have to be in the right place at the right time — the path of the occultation on the ground is narrow.

A young research scientist who had only joined the staff at Texas a year before I came as a graduate student, Ed Nather, was packing up to make an expedition with his high-speed photometer to an exotic observatory on the far side of the planet to Texas, a place I first heard of then with the romantic name, *Nainital*. For reasons that remain a mystery, the name Nainital struck a chord and I knew that one day I, too, would go there. I could not know then that it would be 26 years before I did.

Over the decades since its founding in 1954 in Varanasi, then moving in 1955 to Nainital and finally to Manora Peak in 1961, the Uttar Pradesh State Observatory evolved into the State Observatory at Manora Peak, and then, in 2004, into the Aryabhata Research Institute in Observational Sciences (ARIES). ARIES has contributed significantly to the development of astronomy over its five decades and maintains a wide range of close collaboration with the rest of the Indian institutions as well as with the rest of the world. In 2004, this institute completed 50 years of scientific research, discovery and training. As part of its Golden Jubilee year celebrations we organised the **ARIES International Workshop on Asteroseismology**.

During its 50 years the diverse research interests of ARIES have been in the fields of photometric study of galaxies, stellar variability, stellar energy distribution, star clusters, planetary physics, solar activity and studies related to molecular lines in the sun. A particular research strength stemmed from that visit of Ed Nather all those years ago, since when ARIES has done high-speed photometry on many kinds of objects, with emphasis on asteroseismology — the observational study of stellar structure using surface pulsations. The clear skies and high transparency make the Nainital site excellent for this purpose, and the ARIES 1-m telescope is in high demand for asteroseismic studies.

This is particularly true for multi-site campaigns on pulsating stars from across the HR diagram: planetary nebulae nuclei, white dwarfs, subdwarf B stars, and main sequence B, A and F pulsators are some examples. For such campaigns it is critical to have continuous coverage of the observations without gaps because of the day–night cycle; for this observatories spread around the world in longitude are needed, and Nainital is sought by all, just as it was for the Jupiter occultation, because of its staff, facilities, observing conditions, and because it is in the right place. There are few observatories in good sites at the ARIES longitude. ARIES has been an

important leader and participant in many Whole Earth Telescope (WET) multi-site photometric campaigns on asteroseismic targets, and has been the leader of other such campaigns.

My own path to Nainital was circuitous. I left the US for South Africa in 1977 where I spent 24 years, and from there I made several trips to India. The first was to the International Astronomical Union (IAU) General Assembly in Delhi in 1985, when I got as close to Nainital as Corbett Park. Finally, in 1997 Ram Sagar and I, along with S. Seetha of the Indian Space Research Organisation (ISRO) and Peter Martinez of the South African Astronomical Observatory (SAAO), initiated the Nainital–Cape Survey for rapidly oscillating Ap star in the northern hemisphere. With that I began my regular trips to observe and work at ARIES.

Thus in early 2004 when Ram Sagar proposed the **ARIES International Workshop on Asteroseismology** and began assembling a Scientific Organising Committee (SOC), he asked me to act as co-chair, with the particularly pleasant duty of inviting the overseas participants. With the invaluable advice of our SOC we put together the outstanding group of scientists from India and elsewhere whose papers you will find in these proceedings. Our SOC was comprised of U. S. Chaubey (ARIES), Peter Martinez (SAAO), S. Seetha (ISRO), N. M. Ashok (Physical Research Laboratory, Ahmedabad – PRL), A. V. Raveendran (Indian Institute of Astrophysics – IIA) and K. P. Singh (Tata Institute for Fundamental Research – TIFR). We tried to limit the participation to 50 attendees, but were not completely successful, given the popularity of the meeting!

There were 48 participants from many institutions in India and 16 overseas participants from Austria, Canada, France, Japan, Korea, Portugal, Ukraine, UK, USA and Uzbekistan. Intentionally, we had a significant contingent of graduate students, giving the workshop a strong training component. The three days of the workshop were intensely packed with formal talks and informal discussions. With the meeting being held at the peaceful Uttaranchal Academy of Administration in upper Nainital, and with all participants staying there and taking all meals together, the scientific discussions and social interactions continued from morning until late into the night — in fact, for some participants until *very* late into the night!

The papers in these proceedings show the excitement and active research in asteroseismology from researchers from India and around the world. They emphasise the important role that ARIES plays in this research and they emphasise the impact that an ARIES 3-m telescope on Devastal will have, with ARIES as the leader of many international collaborations, and for the training of new generations of astronomers. During my stay at ARIES prior to this workshop I was impressed with the knowledge and unbounded enthusiasm of the graduate students there.

Socially, there were two highlights to the meeting. The most important one was the Inaugural Ceremony with the keynote speech by Prof. R. C. Pant, the Chancellor of the Kumaun University, Nainital. The Uttaranchal Song and Drama Division, Dept. of Information & Broadcasting, Govt. of India, Nainital performed regional songs and dances from the rich variety of all of India, to the great delight of the participants.

The second highlight was the Director's dinner at the Boat House Club. It was that evening standing with a group of students out on the deck of the Boat House Club looking at the magical lights and night-time stars reflected in the lake itself that I thought to myself, after so many visits to Nainital, and decades after leaving graduate school where I first heard its name, for me now it is *Texas* that is the exotic name of a faraway place on the other side of the world. That is the great pleasure of being an astronomer: we are truly a global village without borders and a global culture without barriers. The **ARIES International Workshop on Asteroseismology** expanded our scientific knowledge, our collaborations, and many new friendships were made. These proceedings record the exciting science that we discussed. The future of ARIES is bright.

Don W. Kurtz

Co-Chairman
Scientific Organizing Committee