12. Contributors

David Barlex, studied chemistry at Leicester University where he received his PhD and PGCE. He taught in comprehensive schools in England first as a science teacher and then as a technology teacher for 14 years. He was the head of the faculty for Science and then Science and Design at Stantonbury Campus Milton Keynes. He then moved into teacher training first at Goldsmiths College and then at Brunel University. He was appointed Director of the Nuffield Design and Technology Project in 1990. In 2002 he was given the Outstanding Contribution to Design and Technology Education Award by the Design and Technology Association. He directed the highly successful and influential Nuffield Design and Technology Projects (primary and secondary) from 1990 – 2010. Most recently he has become the curriculum adviser for the Design and Technology Association with a special responsibility for STEM. His research interests include pedagogy that develops conceptual understanding, design ability and creativity and the professional development of teachers. He has presented work regularly at international conferences and published in the Journal of Design and Technology an International Journal and the International Journal of Technology and Design Education Research.

Poonam Batra, is a professor of Elementary Education at the University of Delhi's Maulana Azad Centre for Elementary and Social Education, Central Institute of Education. She has over 30 years of teaching, research, training, management and consultancy experience in Elementary Education. Her major areas of professional focus are – public policy in education; elementary education curriculum and pedagogy; teacher education; developmental and social psychology of education and gender studies. Her publications cover a range of issues in elementary education and teacher education.

She has been instrumental in developing the framework for the Bachelor of Elementary Education (BElEd), India's first four-year professional elementary teacher education program since 1992. She has co-drafted the section on Education and Women's Equality in the national review of

the New Policy on Education (NPE, 1986) entitled *'Towards an Enlightened and Humane Society'*, 1990; the XI Plan Working Group Report on Teacher Education, 2006; *the National Curriculum Framework for Teacher Education: Towards Preparing Professional and Humane Teachers*, 2009 and recently led the development of a model framework for a syllabus of a two-year elementary teacher education programme for the NCTE. At present, she is engaged in coordinating professional activities for teacher development at the Regional Resource Centre for Elementary Education at Delhi University as part of the University-School Resource Network. She has edited a volume on *Social Science Learning in Schools: Perspective and Challenges*, published by Sage in 2010. Currently. She is pursuing research in *Teacher Education and Social Change* as Jawaharlal Nehru Fellow.

Shashikumar M. Chitre, earned his Ph.D. from the Department of Applied Mathematics and Theoretical Physics, Cambridge (1963). He served as a Lecturer in Applied Mathematics at the University of Leeds (1963-66) and later was a Research Fellow at the California Institute of Technology, Pasadena before joining the Tata Institute of Fundamental Research (TIFR), Mumbai (1967) from where he retired in 2001. He is currently a Distinguished faculty at the Centre of Excellence for Basic Sciences, an INSA Honorary Scientist at the University of Mumbai, Honorary Executive Director of the Homi Bhabha Fellowships Council and a Member of the Board of Trustees of the JN Tata Endowment.

Shashikumar Chitre's research interests are mainly in the area of Solar Physics, Physics and Astrophysics of condensed objects and gravitational lensing. Chitre has taught a number of lecture-courses both at TIFR and at the University of Mumbai and has guided a number of doctoral students.

Sugra Chunawala, has a Ph.D. in science education from the Homi Bhabha Centre for Science Education. Her research has been in the areas of students' and teachers' ideas about science, scientists and technology. She has been involved in teacher education and distance education. She has developed an illustrated exhibition on *Gender and Science,* aimed at presenting the contributions of women scientists and showcasing the historical disjunction between women, science and technology. She was part of the National Focus Group on *Gender Issues in Education* as part of the National Curriculum Framework 2005. She has written a book titled *Conflicts* as part of co-curricular material of the activity based foundation course on science, technology and society. Currently, she is working on an European Union project titled *Science Education for Diversity*. The aim of the project is to understand how the partner countries (England, India, Lebanon, Malaysia, the Netherlands and Turkey) are addressing the issue of gender and cultural diversity in regard to engaging young people in science education. She is also a collaborator in the Design and Technology research at the Homi Bhabha Centre for Science Education and was the convenor of epiSTEME 4.

Susantha Goonatilake, was first trained in electrical engineering in Sri Lanka, Germany and Britain and later in sociology in Sri Lanka and Britain. He has taught or researched among others at the University of Exeter, University of Sussex, UK; Columbia University; New York; New School for Social Research, New York; Institute of Developing Economies, Tokyo; University of Philippines, Manila; University of Trondheim, Norway; University of Linkoping, Sweden and the Institute of Social Studies, The Hague, University of Malaya. He has worked at the UN and has been a senior consultant for all the UN organs dealing with knowledge and science and technology issues

(such as UNU, UNESCO, UNDP, ILO, FAO, ESCAP, APDA, etc). He is a Fellow of the World Academy of Arts and Sciences. He is a former General President of the Sri Lanka Association for the Advancement of Science and is now the President of the country's oldest academic body, the 166 year old Royal Asiatic Society, Sri Lanka.

Pratibha Jolly, is Principal of Miranda House, the premiere college for women at University of Delhi. She gained Ph.D. for theoretical work in Chemical Physics from University of Delhi and taught in Miranda House for eight years before joining Department of Physics at the University of Delhi as Research Scientist where she began work in the area of Physics Education Research and Curriculum Development at the tertiary level. Her research interests include computational physics; electronic instrumentation; use of computer-based technologies in education; development of locally produced low-cost equipment; teacher training; cognitive aspects of students' learning and diverse student populations. A major thrust has been to engage undergraduate students in development of a package called *Science Online* consisting of an indigenous low-cost data-acquisition system and comprehensive set of sensor circuits for real-time measurements in multidisciplinary contexts. She is currently Chair of the International Commission on Physics Education (ICPE), Commission 14 of the International Union for Pure and Applied Physics (IUPAP). She is the National Point of Contact for the Asian Physics Education Network (ASPEN), promoted by UNESCO.

Meena Kharatmal, has research interest in the area of concept mapping in biology education, students' perception of biology, use of language in biology text and textbook analysis. She has been instrumental in helping develop an illustrated exhibition depicting the history of science. The exhibition aims to illustrate the developmental view of science, multicultural origins of science, etc. She has also worked on creating a concept and relations repository for teaching-learning sequence in biology at school level and has developed concept maps on biology topics across school and college level texts. Currently she is working in the area of teacher education, developing activity based science experiments and developing resources for teacher educators at elementary education level.

Helen Longino, received her Ph.D. in Philosophy from The Johns Hopkins University. Her teaching and research interests are in philosophy of science, social epistemology, and feminist philosophy. She is particularly interested in the relations between scientific inquiry and its social, cultural, and economic contexts. Longino is the author of *Science As Social Knowledge* (Princeton University Press, 1990), *The Fate of Knowledge* (Princeton University Press, 2001), and has written numerous articles with reference to philosophy of science, feminist philosophy and epistemology. She is the co-editor of *Scientific Pluralism* (University of Minnesota Press, 2007). Her current work analyzes differences and commonalities in biologically oriented approaches in the sciences of human behavior. She is completing a book-length study of the relationship between logical, epistemological, and social aspects of this area of research. She has taught at UC San Diego, Mills College, Rice University, the University of Minnesota, and is currently Clarence Irving Lewis Professor of Philosophy and Department Chair at Stanford University.

Nora Newcombe, is Professor of Psychology and James H. Glackin Distinguished Faculty Fellow at Temple University. Her Ph.D. is from Harvard University. Her research focuses on spatial cognition and development, including the nature of gender differences in spatial ability. She is

also interested in the development of autobiographical and episodic memory. Her work has been recognized by several awards, including the George A. Miller Award and the G. Stanley Hall Award. She is a member of the American Academy of Arts and Sciences and of the Society of Experimental Psychologists. She has served as Editor of the *Journal of Experimental Psychology: General* and is Associate Editor of *Psychological Bulletin.* She is currently Principal Investigator of the NSF-funded Spatial Intelligence and Learning Center, whose mission is to understand human spatial cognition, with an emphasis on the idea that spatial knowledge and skills can be improved, and to apply the resulting knowledge to foster spatial learning, especially in STEM disciplines.

Masakata Ogawa, is Professor of Science Education and currently Dean of the Graduate School of Mathematics and Science Education, at Tokyo University of Science. After getting his Doctorate in plant physiology at Kyoto University, he taught science education courses at Ibaraki University, Hiroshima University and Kobe University. His research interests include cultural aspects in science education (especially in East-Asian regions), science education policy, and science teacher education. He was awarded an 'Award for Distinguished Contributions through Research' from Japan Society for Science Education in 2003. His research has appeared in numerous journals and he has been a member of the editorial board of *Science Education, Studies in Science Education, Canadian Journal of Science, Technology and Mathematics Education, International Journal of Science and Mathematics Education*, and *International Journal of Science Education.* He served as President of Japan Society for Science Education (JSSE) (2004-2008) and President of East Asian Association for Science Education (EASE) (2007-2009).

Jonathan Osborne, has a Ph.D. in Science Education from the King's College, University of London. His research interests are – Science Education, Classroom Dynamics, Curriculum and Instruction and Women in Science. His research focus is a mix of work on policy and pedagogy in the teaching and learning of science. In the policy domain, he is interested in exploring students' attitudes to science and how school science can be made more worthwhile and engaging - particularly for those who will not continue with the study of science. In pedagogy, his focus has been on making the case for the role of argumentation in science education both as a means of improving the use of a more dialogic approach to teaching science and improving student understanding of the nature of scientific inquiry. He has led one major project on 'Enhancing the Quality of Argument in School Science Education'. From this he developed the IDEAS (Ideas, Evidence and Argument in Science Education) materials to support teacher professional learning. Nevertheless, much science, if not more, is learned outside the classroom and how young people learn in that environment and what it has to offer formal education is another focus of his work and he was one of the partners in the NSF funded Centre for Informal Learning and Schools (2002-7). His current research interests are – Catalyzing Comprehension through Discussion and Debate, Learning Progressions in Middle School Science Instruction and Assessment. He has worked on a project of teaching to learn, learning to teach science (The T2L), exploring whether argumentation can be embedded into the teaching of science in 4 high schools and to examine what effects it has on student learning and engagement. He has worked on a 5 year longitudinal study of the development of student engagement with science (or not) and the factors influencing the formation of their attitudes.

K. Subramaniam, has a Ph.D. in Philosophy of Science. He is associate Professor of mathematics education at the Homi Bhabha Centre for Science Education. His main area of work for the last decade and a half is research on learning and teaching of school mathematics. His current research focus is on core topics in middle school mathematics such as fractions, ratio and proportion, algebra and geometric measurement. He conducts workshops for teachers on various aspects of mathematics teaching, and designs in-service programs for the professional development of mathematics teachers. He was instrumental in developing the Homi Bhabha Curriculum of primary mathematics. He has been a member of the National Focus Group for the teaching of mathematics and the syllabus committees of the National Curriculum Framework (2005), and has chaired the curriculum and syllabus committee for school mathematics in the state of Maharashtra.