INCT-Acqua was established by the Brazilian Ministry of Science, Technology and Innovation (MCTI) in late 2008. The Institute comprises a network of academic researchers, in collaboration with industry, state agencies, and programs of regional development focused around a central question: “How to reconcile mineral production with the conservation of water resources, biodiversity, and local cultural heritage?” Research and outreach activities undertaken by the National Institute of Science and Technology on Minerals Resources, Water and Biodiversity (INCT-Acqua), are illustrated with some examples in three main areas of activities: (1) assessment of environmental quality in mining regions, (2) adding value and environmental performance to mineral-based processes, and (3) capacity building in mineral regions. Emphasis will be given to the assessment of environmental quality and arsenic stability in a gold mining region. It will be shown that a combination of microscopic techniques enabled quantitative, single-particle identification of nanostructured As-bearing phases in environmental and synthetic samples, in a pattern that explains the low bioaccessibility of arsenic in these samples. A mechanism for the long-term fixation of arsenic in iron (hydr-)oxides is proposed. Finally, some considerations on technological, social and political challenges for the sustainability of mining communities will be made. Initiatives to plan for the future are presented.

**BIO:** Virginia S. T. Ciminelli is a Professor in the Department of Metallurgical and Materials Engineering, Universidade Federal de Minas Gerais (UFMG) and Director of the National Institute of Science and Technology on Minerals, Water and Biodiversity (INCT-Acqua), Brazil. She holds a BS degree in Chemical Engineering (UFMG) and Ph.D. in Mineral Processing (Penn State). She is a member of the Brazilian Academy of Sciences and the Brazilian Academy of Engineering, as well as a foreign member of the National Academy of Engineering (USA) and the World Academy of Sciences. She is also a recipient of the GEMS alumni award of the College of Earth and Mineral Sciences. Prof. Ciminelli leads partnerships with a number of institutions in Brazil and abroad, and with industry. Her research work involves application of thermodynamics, chemical and electrochemical kinetics, combined with spectroscopic and microscopy techniques to develop a mechanistic understanding of solid-liquid reactions of relevance to hydrometallurgy, and to environmental remediation and protection. Current interests include arsenic fixation; electrochemical production of metals; urban mining (including recycling of electronic waste); rare earth extraction and metal sulfide oxidation.