Astronomy education research: impact and future directions
Paulo S. Bretones
DME/UFSCar

The goal of this talk is to reflect about the achievements and challenges Astronomy Education Research (AER) up to the moment. Initially the answers given to simple questions asked for members of IAU CCI and WG on Theory and Methods in Astronomy Education are discussed. The answers are briefly given as follows: about the achievements and impacts of AER in the last decades, effective techniques for teaching astronomy; construction of a variety of concept knowledge inventories; strategies for alternative conceptions assessment and development of classroom techniques to overcome them; development and evaluation of active learning, creation of journals, publications of theses dissertations, conference proceedings and journal articles are addressed. About the challenges of AER for the next decades, deeper treatments dealing with epistemological questions; increasing the methodological rigor; development of models to connect new technologies in a variety of contexts and instruments to probe student attitudes; astronomy to improve science education and to know links with other branches of culture; investigate the roots of astronomy in each nation because of the multiculturalism are discussed to improve the situation of AER. Next, the goals of astronomy teaching are discussed considering contents, methods, levels, resources and purposes. Given the demands and complexity of education today and the role of astronomy in this context, the potential of education research is also evaluated, taking into account knowledge, practices, policies and the training of teachers. Finally, graduate studies are encouraged, new lines of research, and surveys to identify and advertise the dispersed AE literature seeking to raise the visibility of authors and institutions suggested. Much of the work already performed remains unknown by astronomers, because the latter may belong to a different area of theoretical and methodological framework, and because it occurs in specific different contexts of production, culture, curriculum, materials and application. Moreover, advertising AER in universities and schools to professors and teachers should consolidate this community and establish links between astronomers and educators in general, allowing future collaborations.

Travelling butterflies
Néstor Camino
Complejo Plaza del Cielo– CONICET-FHCS UNPSJB Esquel, Patagonia, Argentina

An speculation is presented about life span of different species, here on Earth and in the galaxy as well, and the possibility for each one to travel in spacetime, with the natural and artificial resources at their disposal at present (not science fiction). At least two important questions arise: Why should it be possible for human species to travel through astronomical distances and times?, Wouldn’t it be another anthropocentric way of worldview, this time for the whole universe and living beings in it? Some comments about reactions of children and general public to this speculation will be discussed.