

# Establishing the International Post-Doc and Visiting Scholar Earth League Research Team:

International group of inter-disciplinary Post-Doc researchers and Visiting scholars advancing the next generation of social-ecological Earth system modelling and global sustainability analysis

## An Earth League Initiative

### Rationale

There is an urgent need to advance integrated whole earth system analyses that can inform potential outcomes and explore future pathways in the fully globalized and increasingly turbulent world of the Anthropocene. Of particular importance is the integration of the human dimensions - from human behavior and equity, to global economics, development needs, security and governance – with biogeophysical and biogeochemical dynamics of the Earth system – from global change processes to interactions, feedbacks and threshold behavior. Such integrated World-Earth [or social-ecological Earth system] modelling has been called for by the scientific community for more than a decade (e.g., Schellnhuber 1999; Amsterdam declaration 2000), and even though major advancements have been made in both Earth system modelling and integrated assessment modelling, the ability to incorporate social-ecological interactions and dynamics remains rudimentary and fragmented. There is now a rapidly rising recognition of the need for a deeper integration of Earth system analysis for global sustainability, e.g., the emergence of Future Earth, and there is a scientific maturity in our understanding and ability to represent social and biophysical processes, which now allows for a step-change towards building an integrated community-platform for whole Earth system analysis.

The urgency arises from the growing evidence that the world is approaching levels of human pressures on the planet that may trigger shifts in feedbacks resulting in tipping elements with irreversible outcomes for the stability and resilience of the Earth system (e.g., the tipping point for the Amazon tropical forest, e.g., Nobre et al., 2016). This scientific evidence collides with the realities and aspirations for world development. The Sustainable Development Goals (SDGs) that replaced the MDGs after 2015, will very likely set out to eradicate poverty and hunger in the world, and ensure stable economic growth for a world population reaching 9-10 billion in 2050. This is a formidable “going to scale” with every citizen’s right to development. The challenge is that nobody knows how to reconcile the twin objectives, which are tightly interdependent, of meeting world development aspirations while staying within the safe operating space of a stable planet. What we do know with certainty though, is that a global future that meets the needs of both people and planet, requires

rapid and deep transformations across all scales, sectors and cultures, which moreover need to add up to absolute global sustainability criteria (e.g., a global carbon budget). This calls for a new generation of not only integrated world-earth analyses, but also a novel approach to back-casting transition pathways that meet desired social and resilience outcomes.

This is nothing less than a “Moon lander” endeavor that will require major investments in scientific collaboration among the most advanced earth system research institutions in the world. The Earth League, an alliance of 20 of the internationally leading scientists and institutions on Earth system and global sustainability research, has agreed to take on this “Moon lander” challenge, of advancing the next generation of world-earth analyses to explore transformative pathways towards global sustainability and deepen our understanding of global risks and opportunities in the Anthropocene.

## Objective

As part of the Earth League endeavor to advance integrated whole earth system analyses and explore pathways to global sustainability, the Alliance has decided to recruit an international and interdisciplinary team of Post-Doc researchers and Visiting Scholars, “Earth Docs”, to form part of an international young science team working on the “Moon lander” project.

## Current Institutions joining the initiative

The initial group consists of Post-Doc researchers and Visiting Scholars offered by 6 Earth League member institutions:

Potsdam Institute for Climate Impact Research, Germany

Stockholm Resilience Center, Stockholm University, Sweden

Earth System Science Center, Tsinghua University, China

Earth System Science Center, National Institute for Space Research (INPE), Brazil

Scripps Institution of Oceanography, UC Davis, USA

HZG/Climate Service Center 2.0, Germany

For further information about the Earth League see [www.the-earth-league.org](http://www.the-earth-league.org)

## **Modus operandi**

All Earth docs will form part of one international team of young scientists carrying out their research within the same Earth league “Moon lander program”. Each Earth Doc research will be hosted by their host Earth League institution.

IIASA will function as a collaborative global hub for the Earth Doc team, gathering the team of young scientists 1-2 times per year for joint scientific work sessions.

Each Earth Doc will have at least 2 senior supervisors from the group of senior Earth League scientists leading the overall scientific program.