

# HUBzero's Variations of Sustainability: From Simulation/Modeling Tools to Communities

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## ABSTRACT

Sustainability of science gateways and continuous funding for their developer teams is a major concern that many projects face. The HUBzero® project and its science gateway framework have evolved to be self-sustained via diversifying funding resources, extending outreach measures to further communities and targeting sustainability from different angles in concrete instances. nanoHUB, PURR and OneSciencePlace are examples of how the HUBzero® team and platform build science gateways and take their specific services into account to address sustainability beyond securing funding and outreach activities. They have been integrating additional procedures and concepts for sustainability: nanoHUB invests into reliability of the over 500 simulation tools and high quality lecture and tutorial content to keep the trust of the large community with over 1.5 million users; PURR developed policies and methods for preserving research output in a sensible and sustainable way and OneSciencePlace addresses the concern of projects that have a lack of continuous funding for maintaining a science gateway by offering a solution to keep science gateways available to their communities. The paper goes into detail for measures for sustainability for HUBzero® and especially for nanoHUB, PURR and OneSciencePlace.

The importance of sustainability of research software in general and thus of science gateways as subgroup has been recognized by

various researchers, funding bodies and organizations evident in funded projects such as the Science Gateways Community Institute (SGCI) [1] and the UK

**Keywords**—HUBzero®; nanoHUB; PURR; OneSciencePlace; science gateways; sustainability; research content; research frameworks

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