An Invitation to the bioinformatics community to participate in the HUBzero® open source release

Michael Zentner[1], Ishwar Chandramouliswaran[2], Richard Zink[3]

[1] Purdue University, West Lafayette, IN. Email: mzentner@purdue.edu

[2] National Cancer Institute, Bethesda, MD.

[3] Purdue University, West Lafayette, IN.

Project Website: http://www.hubzero.org
Source Code: https://github.com/hubzero
License: GNU General Public License

The HUBzero® platform enables online scientific communities to collaborate and explore science by sharing information and computational resources. HUBzero HUBs facilitate collaboration using shared projects, groups, and resource collections. HUBzero HUBs also allow easy deployment of simulation and modeling tools. Members can put a simple user interface on their tools in a matter of weeks, and deploy those tools over the web, enabling others to run them in their browser without downloading or installing any code. Today over 60 scientific communities use HUBzero, with 2 million visitors annually. HUBzero is sustainable as a funded component of more than 20 grants, service contracts, and its own foundation from a variety of agencies / entities including the NSF, NIH, AFRL, non-profit societies, and corporations, and lately has been receiving interest from the bioinformatics community. HUBzero has been adopted by the National Cancer Institute (NCI), U.S. Army Medical and Materiel Command (MRMC), the Regenstrief Foundation (RF), and the Regenstrief Center for Healthcare Engineering (RCHE) to form the HUBs NCIP Hub, cceHUB, CitSciBio hub, and CatalyzeCare. A goal of the National Cancer Informatics Program's NCIP Hub is to create community driven, adaptive, and collaborative environments to promote exchange of research ideas and resources, such as software tools, data, standards, or other relevant digital assets in this open access resource that includes nearly 400 public resources about imaging, pathology, informatics, and more. MRMC and RF sponsor cceHUB, where many special interest communities share data and use data search and exploration interfaces to apply systems engineering principles to the treatment of cancer, for both prospective and retrospective clinical research. NCI sponsors CitSciBio hub as an online space for the growing and virtually dispersed biomedical citizen science resources, projects, references, methods, and communities to be discovered. RCHE has formed a community on their CatalyzeCare hub where hospitals voluntarily contribute the alert streams emanating from smart IV pumps to the community, benchmark themselves against each other, and collectively improve overall patient safety by creating a set of best practices regarding infusions. HUBzero provides common infrastructural components to these communities, including compute environments like Purdue's community cluster, Open Science Grid, and parallel Matlab computing from Cornell's Red Cloud environment. It also provides support for R tool development, assembly of complex workflows with Pegasus, and collaborative development capability for bioinformatics tools using linux workspaces available in a web browser interface. As these communities interact with their HUBs, we expect to contribute to the creation of a 'community impact score' based on data sharing, software sharing, discoverability, annotation, and use and reuse. Individuals engaged in cancer research or medical device informatics can become members by visiting www.nciphub.org, www.ccehub.org, www.citscibio.org, and www.catalyzecare.org. We invite members of the biomedical informatics field to join the HUBzero community and contribute to their open source development efforts as applications or core capabilities in the HUBzero open source release to better meet the needs and use cases of the field.