***A Living “Challenge” Paper for SGC Chemistry Networks Projects***

**Aim**: To incentivise and reward participation in Chemistry Networks Projects *via* an easy-to-understand project status.

**Success**: The creation, evolution and completion of a research paper that, at the end, resembles any high quality paper in chemical biology, but which has evolved over multiple versions during its lifetime and has acted as a stimulus to the research community.

**Context**: The Structural Genomics Consortium (SGC) has adopted "Target 2035" as its key scientific objective for the next 15 years, during which it aims to create a public domain chemical probe (selective, potent inhibitor) for every protein coded in the human genome. Achieving this goal will require coordination of open source chemical synthesis on a planetary scale. Despite early and notable successes in leveraging chemical inputs from the scientific community, several new initiatives are needed in order to allow for a scale-up of such activities. One of these is to improve the way in which new members of a research project can be brought up to speed with an open project, and to help them see how their research efforts will contribute to a major research publication. The "evolving” or “living challenge” paper is the solution to this need.

**Workflow**: Steps are outlined below. After the posting of the first version of the paper, there is an iterative cycle of updates as the project progresses. It is envisaged that each paper would require multiple versions over the course of a typical project lifecycle, but this will depend on the nature of the probe and the tractability of the target.

*Step 1.* At the launch of an open chemical probe project, a brief description of the status of the project will be placed on the main SGC website. This will include brief information about the target, the relevant assays that are available, the basic needs of the project and the identities of those already involved.

*Step 2.* The scientific starting point will include a description of the need for the project and all the preliminary data, which will often include the means by which the relevant protein can be expressed, the structures of any relevant compounds investigated and any other relevant data. This first version will contain the project requirements: these are the "challenges" for the community that will be modified for each subsequent version as progress is made. Version 1 may be peer-reviewed and published as a kind of “Challenge Paper” in a suitable open access journal, as well as as a preprint.

*Step 3.* The project’s research will proceed using other sites, mainly electronic laboratory notebooks and discussion forums. These, not the paper, will contain all the day-to-day collaborative work.

*Step 4.* As key advances are made, these will be added to the evolving paper, along with any new authors who have contributed. A “live” version of the paper will be maintained elsewhere, *e.g.* Google Docs, to allow for collaborative authorship, but this version will not be published, and will contain a link to the most recent preprint version. Through a communal process a decision will be made to post the next version of the work publicly, which will be posted as an updated preprint. The submitting author will be the project PI. These subsequent versions posted as preprints are not intended as final peer-reviewed publications. Each preprint will be a paper in its own right, with a unique DOI. The title of each preprint will need to show that it is an incremental version of the “Evolving Paper”. Each new pre-print will be an update of the previous one, where introduction, discussion, conclusion and references will be modified and/or supplemented in accordance with new results. Each preprint will need to include a statement to the effect that there may well be further, newer versions forthcoming.

*Step 5.* The cycle continues until the paper is deemed "complete" by the authorship team, at which point the final version is submitted as a peer-reviewed full research paper and posted as a preprint.