Actionable Guidance for Junior HPC Researchers

Hang Liu
Stevens Institute of Technology

Chuhua Liao
Lawrence Livermore National Laboratory

Abstract—High Performance Computing (HPC) and, in general, Parallel and Distributed Computing (PDC) has become pervasive, so does the pertinent research. While a collection of research advice write-ups has surged in the community, very few of them are actionable and specific for HPC researchers. This lightning talk aims to provide such guidelines. As an early success, we have posted these guidelines on GitHub (https://github.com/asherliu/researchHOWTO), which draws around 30 stars and positive feedbacks. In addition, our graduate and undergraduate students find the advice to be constructive.

The need of this lightning talk starts from the fact that “we know more than we can tell” [4]. After surveying around several dozens of the undergraduate and graduate students who are doing HPC research at various universities, we have found that the majority of them regard how to express their ideas as the key hurdle that hampers their progress. This student body consists of both native and foreign students. Here, we use expressing to indicate either writing or presenting, or both.

The other fact that further strengthens our desire of providing this lightning talk is that a variety of existing research experience articles [2], [3], [1], [7], [5], [6] are more of helping researchers advance their expressing skills from a status that they already know how to express. In other words, they only cover discontinued bullets about principles. This lightning talk, in contrast, explains how to step-by-step express a research mainly for HPC researchers.

HPC research differs from other Computer and Information Science and Engineering (CISE) fields in three, if not more, ways. First, HPC research is inherently inter-disciplinary, that is, it often requires to build a fast computing system for important applications or algorithms. Second, HPC publications care more about the performance impacts of each proposed technique. Third, HPC research is more of accelerating existing applications and the systems, as well as advancing the state-of-the-art. At the very beginning, we encourage the fresh HPC researchers to simply imitate the leading researchers about expressing to indicate either writing or presenting, or both.

In summary, this lightning talk brings together two presenters of complementary experiences and backgrounds. With tremendous passion in promoting HPC research education, we are jointly hosting a forum about how to do research on GitHub (https://github.com/asherliu/researchHOWTO), hoping to benefit our community at large.

References
[3] Patterson, D. A. How to have a bad career in research/academia.