



## The Radio Camera Initiative Image Contest and Radio Interferometry Kaggle

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There is an ever growing number of calibration and imaging algorithms in astronomical radio interferometry, however standardised comparison between them are rare or entirely absent. Incredible amounts of research capital go into conceiving and implementing these algorithms, and like any investment it is worthwhile, if not imperative, that we understand what the relative value of each method is. There are several sources of difficulty when it comes to performing standardised comparison. The first is a political one. There are many “camps” of radio interferometry, each with their own radio arrays and calibration and imaging pipelines. Since each camp invests into their own methods, they wish to see return on their own efforts, and this causes a bias when it comes to standardised comparisons, namely, they just don’t happen often. The second difficulty is the lack of impartial common challenges on which to apply methods. If there were such challenges, then research groups could apply their method and publish their results on these challenges, and comparison would become more objective. In addition to these main difficulties, there are other matters to consider such as, determining the metrics on which to judge the algorithms, calculating compute resource usage, and being able to transparently share and deploy the algorithms.

The Radio Camera Initiative (RCI) [1] aims to revolutionise radio interferometry by completely rethinking the way we do calibration and imaging. Part of their goal is to definitively compare all methods of calibration and imaging, regardless of how exotic they are. This effort is encapsulated in the RCI Image Contest and is made possible by the associated Radio Interferometry Kaggle (RIK) project. The RCI Image Contest is formulated as a set of challenges on simulated datasets posed to the entire radio astronomy world. The RIK project, launched simultaneously with the RCI Image Contest, borrows the concept of centralised intra-field collaboration from Kaggle, which in turn is perhaps the single-most important framework that has propelled deep learning to the heights it is now soaring. The RIK is a growing community of radio astronomers who participate in calibration and imaging challenges, rank on leader boards, submit pipelines, engage in discussion, and teach via tutorials. In short, the RIK technologically enables the RCI Image Contest, and the RCI Image Contest is the first set of challenges posed on the RIK.

In this talk, I present the current status of the RCI Image Contest and RIK, two projects that are central in a new on-going revolution in radio interferometry. Topics covered include the simulation of challenge datasets, the selection of judging metrics, the cash rewards for winners, the industry funding, the various involved radio interferometry camps, and the technology backing the system.

### References

[1] <https://www.radiocamera.io>