*Request for ZTF Collaborator Status - Daniel Perley*

To: The Physics of Supernovae SWG

From: S. R. Kulkarni

This memo serves to request collaborator status for Daniel Perley (LJMU) within two efforts: the "relativistic supernova" project and the bright transient survey. Dan Perley is a well-known expert in the field of long duration gamma-ray bursts and their host galaxies. Perley’s other interest in ZTF (e.g. EM/GW) are expected to be covered by other memos.

**Proposed contribution to ZTF key projects:**

*Relativistic supernovae:* The search for variants or even new types of relativistic stellar explosions (via afterglows; via Ic-BL SNe) and orphan afterglows of long duration GRBs is a holy grail of ZTF. This is one of the hardest projects that will be undertaken within ZTF (with no guarantees of return). Dan will assist Anna Ho in her thesis project which centers on these two topics. In addition, Perley will provide LT observations, which will be helpful to monitor fast-evolving objects during California daytime. Next, Perley, working with Kulkarni & Ho, has put in a VLA/Swift proposal (Jan 2018) in support of this program. Finally, Perley will assist in proposing for and triggering other facilities such as Keck or Gemini.

*Bright/nearby transient survey:* Dan will also help to identify and prioritize ZTF targets which satisfy the "bright" or "nearby" selection criteria within the public surveys. He will assist in prioritizing targets for SEDM classification and will specifically contribute LT and WHT observations from his own allocations (for those which were missed or not robustly classified by SEDM).

**Personnel:** D. Perley requests participation for himself with both projects. He also requests participation for his PhD student (Ms. Kirsty Taggart) for the bright transient survey only. Kirsty will help select and observe targets. Her thesis ("The Host Galaxies of Extreme Transients"; expected completion early 2020) is primarily archival and not dependent on this work, but her participation (as a side effort) will ensure efficient use of Liverpool/UK resources.

**Observing Resources: Data**

As faculty at LJMU Daniel has institutional access to the Liverpool Telescope (LT), a 2-m robotic telescope at an excellent site. The most important instrument for ZTF activities will be SPRAT, a low-resolution efficient optical spectrograph. SPRAT's acquisition procedure is fully automatic and it is capable of classifying a 19.5 magnitude transient in approximately 15 minutes (incl. overheads); the instrument is available on every clear night of the year and new observations can be requested almost immediately via a simple web-based interface. LT also has a basic imager (IO:O) that can reach R=23 in 10 minutes. For 2018A the LT TAC has allocated 10.5 hours of LT time for ZTF fast-transient follow-up and 15 hours for ZTF bright SN classification. Larger requests (perhaps 40-50 hrs/semester, equivalent to >100 classifications) may be possible in future semesters once ZTF has been demonstrated.

The bulk of LT time will be used to support the magnitude-limited supernova survey, which will provide spectroscopic classification of a uniform sample of bright transients discovered within the ZTF public data stream. The LT will also be used to conduct photometric follow-up of time-critical young transients (especially at phases when it is daytime in California) and of faint transients that have faded beyond detectability to P48/P60.

Daniel is also eligible for time at the WHT 4-meter telescope. He will be attending a 2-night run in July using the WHT's low-resolution spectrograph, during which some time (~5 hr) can be contributed to ZTF classification or follow-up work. Additional nights are likely to be available in future semesters.

**Observing Resource: Proposals & Triggering**

Daniel also coordinated the writing of the VLA/Swift proposal for follow-up of orphan afterglows, and has helped to mentor Anna Ho in the background science of relativistic explosions. He will help identify and react to candidate fast transients (including triggering of these facilities) in support of this work. He will also continue to assist with proposals to Gemini, LCOGT, and other optical facilities to obtain rapid spectroscopy and multicolor photometry of fast transients and young SNe found within the partnership survey. All data from these efforts will be fully shared within the ZTF collaboration.

Finally, Daniel will continue to maintain/upgrade the LRIS pipeline and update it in response to any future changes with the instrument. LRIS has been critical to a large number of iPTF papers and this is likely to continue with ZTF.

**Point of Contact:** The point of contact for these projects will be Shri Kulkarni.

**Proposed Publications:** If we discover any fast transients we expect one to three single-object papers (likely lead author Anna Ho) on the first few examples. We expect at least one fast-transient overview paper (also lead by Anna) after 1-2 years. A first-year paper on the results from the bright-transient/demographic survey is anticipated. Of course, we also hope for other papers based on serendipitous results from these efforts.

**Required Access to ZTF Data:** Access to preliminary light curves of rising bright transients (to vet them for inclusion in the demographic sample) for D. Perley and K. Taggart will be necessary; final light curves will be necessary at a later date to assess the completeness of our selection. They will also need to be able to request and view partnership SEDM data associated with this project.[[1]](#footnote-1) D. Perley will also need to receive alerts about fast transients and information (recent photometry and some historical information) to vet their properties (and trigger LT, if need be).

**Data Rights and Benefits:** All data collected on the projects above on ZTF transients will be made available to the collaboration. Standard co-authorship policies are expected to apply; i.e. data or significant intellectual contributions provided towards a publication are expected to result in offered co-authorship.

**Duration of the MOU:** The proposed MOU goes into effect upon approval and wil last through 2018A+B and expected to be renewed CY 2019 and CY 2020.

1. Perley is already a member of the Caltech RCF project and will have access to Caltech SEDM time set aside for the RCF project. [↑](#footnote-ref-1)