Call for notice of intent for transient model inputs for PLAsTiCC: Photometric LSST Astronomical Time-series Classification Challenge

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Renée Hložek, Rick Kessler, Anita Bahmanyar, Federica Bianco, Rahul Biswas, Mi Dai, Seth Digel, Jason McEwen, Rob Firth, Dominique Fouchez, Lluís Galbany, Philippe Gris, Emille Ishida, Saurabh Jha, Michelle Lochner, Ashish Mahabal, Alex Malz, Bob Nichol, Johanna Pasquet, Tina Peters, Hiranya Peiris, Chad Schafer, Robert Schuhmann, Dan Scolnic, Mark Sullivan, Elizabeth Swann.

Classification of transients observed with the Large Synoptic Survey Telescope (LSST) is arguably one of the biggest challenges facing the collaboration, and the performance of classification has a major impact on LSST science capabilities. To prepare for this ambitious project, we are developing the Photometric LSST Astronomical Time-series Classification Challenge (PLAsTiCC): a realistic simulated data sample containing a wide variety of transients. This sample will be available to the public as a challenge to classify LSST-type data. To include the widest possible variety of transients in the challenge data, we need transient model inputs from the community. This document is a call for notices of intent (NOI) for those who want to contribute transient models to the challenge data simulation pipeline.

Photometric classification challenges

Classification of cosmological transients (supernovae) using only photometric data was the subject of an earlier classification challenge, called the 2010 Supernova Photometric Classification Challenge (SNPhotCC, Kessler et al. 2010).

SNPhotCC galvanised the community into thinking about the issues concerning future data, and provided a test classification data set that forms the basis for ongoing LSST DESC efforts to address the problem of photometric classification (e.g. Lochner et al. 2016). However, in the supernova context alone, much has changed since SNPhotCC and the time is ripe for another challenge. More importantly, we want to do more than just classify supernova candidates: the classification of transients in the context of LSST continues to grow as a research interest critical to the survey and a general classification challenge will sharpen our thinking and provide a test bed for different strategies.

In addition to merely the cosmological transients that have specific time variability, the PLAsTiCC data will focus on the problem of more general classification including faster and more slowly varying astrophysical transients.

Special care will also be taken to reach out to people in the broader community outside astronomy, who might be interested in classification problems. We will specifically reach out to the data specialists with previous expertise in similar data challenges but who might not be familiar with the particularities of astronomical data. This connection will be crucial not only to allow for new and innovative solutions within the transient classification problem, but also to exemplify how astronomical data can be a fertile ground for data related research.

In order to ensure a seamless introduction of these models into any challenge data simulation pipeline, we expect groups that have specific models (eg. a model of the Spectral Energy Distribution of the variable object) or light curves models in the LSST filter bands at $z = 0$) to work with us to incorporate these models into the pipeline.

Timeline for the data and the transient model NOI

The proposed timeline for generating the data is:

1 June 2017	Due date for submission of the transient model NOI
1 August 2017	Transient model contributions
1 September 2017	Transient model validation
1 October 2017	Public Distribution of PLAsTiCC

When submitting your Notice of Intent for a model to be included in PLAsTiCC, please answer the questions below, providing references to the literature wherever available. Each submission should contain one type of transient. In other words, if you would like to submit a specific type of SN Ib or Ic model, it would be a single variant of the (broader) class of type SN Ib. Multiple transient submissions by a person or group are allowed, even with significant overlapping content.

1. What **individual/group** is submitting this notice of intent?
2. What **transient type** is your NOI focused on?
3. What is the **volumetric rate** as a function of redshift at which these transients are expected? If you cannot answer this question, please provide whatever rate information you are aware of.
4. How is the **model characterized**, eg. via rest-frame or observer-frame, SED time series, light curves, model parameters or some other characterization?
5. What (if any) **computational resources** do you anticipate needing to create sample lightcurves?
6. Are there **validation tests** for lightcurves produced for this model? If not, please propose some starting points for developing null tests.

Note: if your input to the PLAsTiCC data is expected to be only light curve data (as opposed to an SED model incorporated into our data generation pipeline), we still require an NOI of your intention to include the data within the PLAsTiCC data set. Upon receiving your notice of intent, you will be contacted about how to submit the models themselves into the PLAsTiCC challenge data set.

The notice of intent containing the information above should be submitted to:

lsst.classification.challenge@gmail.com by 1 June 2017.