Welcome!

RRB H. Transient Classification

Tue Aug 11, 10:30am-11:30am **Chairs:** Emille Ishida and Márcio Catelan Slack: #day2-tue-slot2h-rrb-transient-classification

DAL

AURA

Rubin Observatory

Agenda (30 min)

DENERGY SLAC

Welcome, Introduction, and Reminders (5 min) Flash Talks (3 min each)

- 1. A spectroscopically-complete sample of bright ZTF transients, Daniel Perley
- 2. The ALeRCE light curve classifier, Paula Sánchez Sáez
- 3. Anomaly detection in ZTF DR3, Konstantin Malanchev

SS

4. SuperRAENN: A New Photometric Classifier, Ashley Villar Question & Answer (10 min)

Attendees: Please mute!

For the Q&A, ask questions via the Zoom chat or the Slack channel, and wait for the chair to invite you to unmute.

We apologize if there is not enough time for all questions; please continue discussions via Slack!

Friendly Reminders





You agreed to abide by the Code of Conduct at registration - it can be found here on the website

C 🍵 project.lsst.org/meetings/rubin2020/

Rubin Observatory

Project & Community Workshop 2020

Home	Program	Register	Resources	
			Code of Conduct	>
Welc	ome		For Attendees	
	Due to the Covid-19 pandemic, this year For Presenters Project & Commun virtual! The daily schedule will run from For Session Chairs			Project & Community Workshop (PCW) planned for August 10-14 is going
virtual! I				

The Science Organizing Committee, consisting of Project, Operations and Community members, has put together an engaging program for the meeting.

Registration is now open (no fee) here. Project members can use existing credentials to register; non-project members will need to create an account. You can get an idea of the content by visiting the Sessions page. We will be posting more information on the website as we have it.

We hope everyone stays safe. If you have any questions or ideas, please contact communications-team at lists dot lsst dot org.



☆ 뒤

Rubin adheres to the principles of Kindness, Trust, Respect, Diversity and Inclusion in order to provide a learning environment that produces rigor and excellence.



Any discriminatory behavior against colleagues on any basis, such as gender, gender identity, race, ethnic background, national origin, religion, political affiliation, age, marital status, sexual orientation, disabilities or any other reason will not be tolerated.



If I witness any form of bullying, harassment or aggression I will follow the reporting instructions in the Code of Conduct.



Friendly Reminders





All talks at this workshop will be recorded.

If you do not wish to be recorded, you are welcome to keep your camera off.



Videos are posted the next working day.

Each session will be posted on YouTube and embedded on the session's page.



together. You can send updates, share files, and organize conversations so that everyone is in the loop.

Ask questions through the Slack channel or the Zoom chat.



Give Slack questions a thumbs-up.

Questions with more thumbs up may get priority if time runs short.



Show your appreciation.

Feel free to applaud at any time but especially at the end - Slack has a clap emoji.

Wednesd		Tuesday		Monday		PT
Stor	Lightning	g Stories	Lightning			08.45
Plenary 3		Plenary 2		open (15)	09:00	
Science Collabo Report		Operations QA		ary 1 on QA (45)	09:15	
011	nep			on C2A (45)	Constructio	09:30
						09:45
K (3(BREA					10:00
						12.15
F	Evaluating Survey	p (contributed flash talks) Su		Algorithms Workshop	Intro to Rubin:	10:30
1	Strategies			Follow-up	Systems &	12,45
					Jargon	
						11.00
						11.15
K (3(BREA					11:90
						11.45
	Community	In-kind	Commiss.	External	Community	12:00
	Preparation	proposal	8	Synergies	Support for	12:15
	for Early	workshop	Validation	for Rubin	Science	12:00

You can access the presentation material on the session page.



A spectroscopically-complete sample of bright ZTF transients (Daniel Perley, LJMU)

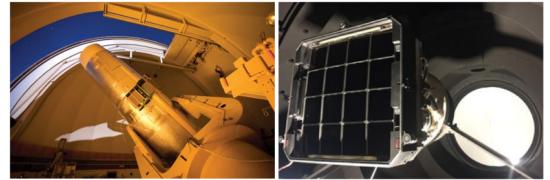
The Zwicky Transient Facility:

1.2m telescope
47 deg² camera
m_{lim} ~ 20.5
Dedicated follow-up spectrograph (SEDM)

ZTF Northern Sky Survey:

~18000 deg² in g/r filters, at 3d cadence Difference alerts (avro) sent to public brokers









A spectroscopically-complete sample of bright ZTF transients (Daniel Perley, LJMU)

The ZTF bright transient survey:

Catalog all transients with m<19.0 Classify all transients with m<18.5 June 2018 - present

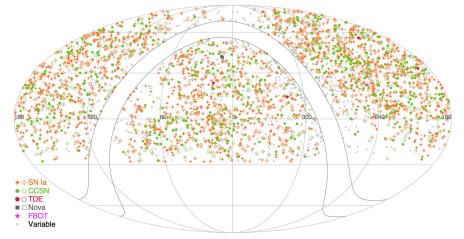
Ac of voctordovy

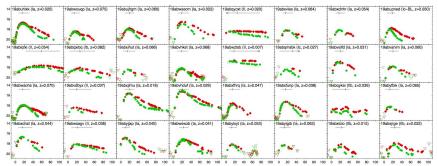
As of yesterday:

3275 SNe (2360 Ia, 915 CC) 14 TDE, 11 "gap", 10 novae 93% complete at m<18.5*

Light curves and full alert histories also available via brokers; classification spectra via TNS

*for "quality" subset (~half of sample)







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FF A spectroscopically-complete sample of bright ZTF transients (Daniel Perley, LJMU)

High-quality light curves: easy to calculate luminosities, timescales, etc.

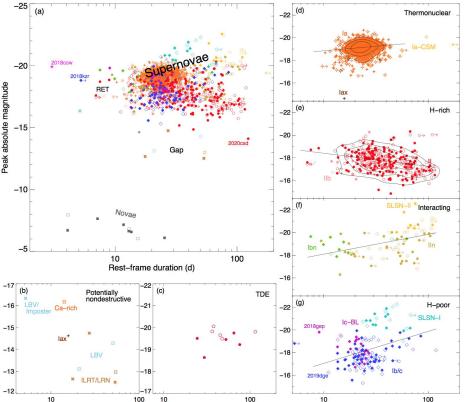
The interactive catalog is online and updated in real time:

https://www.astro.caltech.edu/ztf/bts/b

<u>ts.php</u>

<u>https://www.astro.caltech.edu/ztf/bts/e</u> xplorer.php

BTS Paper I: Fremling et al., ApJ 895:32 (Add'l papers coming soon)

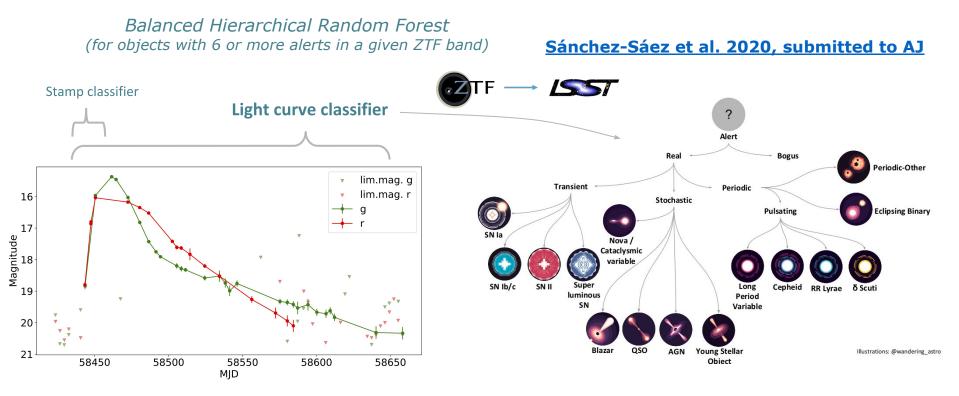




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eRCF

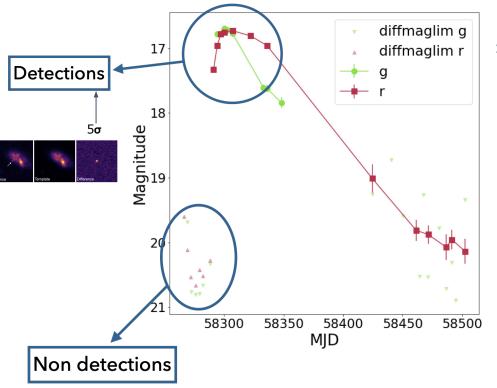
Automatic Learning for th

Rapid Classification of Events

Paula Sánchez Sáez

The ALeRCE Light curve classifier





Sánchez-Sáez et al. 2020, submitted to AJ

152 features in total:

- Detection features: g and r ZTF band variability features (124)
 - Supernova parametric model (SPM; adapted from Villar et al. 2019b)
 - Multiband period (adapted from Mondrik et al. 2015)
 - Irregular autoregressive model (IAR; Eyheramendy et al. 2018)
 - Mexican Hat Power Spectrum (MHPS; adapted from Arévalo et al. 2012)
- Non detection features: from g and r ZTF band magnitude limits (18)
- Other: WISE colors, morphology, etc. (10)







Automatic Learning for

Rapid Classification of Events

Paula Sánchez Sáez

The ALeRCE Light curve classifier



SNe

0.6

0.5

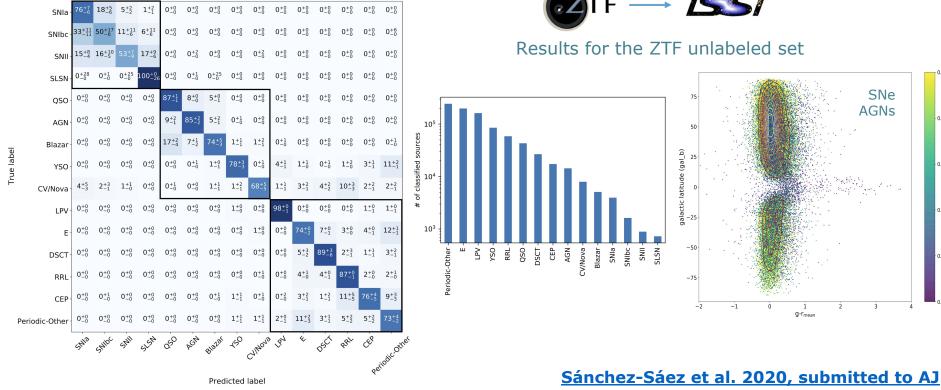
0.4

0.3

AGNs

#rubin2020





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Anomaly detection in ZTF DR3



Konstantin Malanchev^{MSU, UIUC}

on the behalf of the SNAD (https://snad.space) team:

Patrick Aleo, Emille Ishida, Matwey Kornilov, Vladimir Korolev, KM, Florian Mondon, Maria Pruzhinskaya, Sreevarsha Sreejith, Alina Volnova

Data

Three ZTF DR3 fields: one in the Galaxy plane, one outside it, one contains M31

2.25 million light curves with hundreds of observations in $\ensuremath{\textit{zr}}$ passband

Method

Anomaly detection algorithms yields 277 candidates which were manually examined

Results

New SNe, AGNs, YSOs, etc candidates; Pop II Ceph candidate; and a lot of artifacts

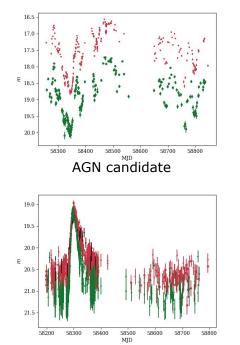
Conclusion

Anomaly detection provides some interesting objects without any prior information

Preliminary results are published in RNAAS (Aleo et al. 2020)

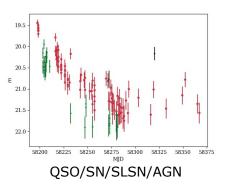
The work is supported by the RFBR grant 20-02-00779

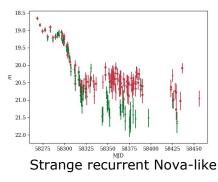
Examples: transients



SN Ia

candidate







Anomaly detection in ZTF DR3



Konstantin Malanchev^{MSU, UIUC}

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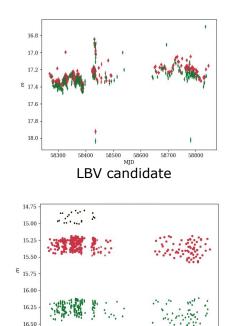
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Examples: stellar objects

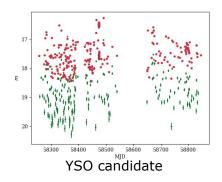


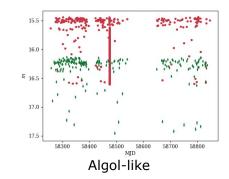
58300

58400

58500

58600 Pop II Ceph candidate







Anomaly detection in ZTF DR3



Konstantin Malanchev^{MSU, UIUC}

on the behalf of the <u>SNAD</u> (<u>https://snad.space</u>) team: Patrick Aleo, Emille Ishida, Matwey Kornilov, Vladimir Korolev, KM, Florian Mondon, Maria Pruzhinskaya, Sreevarsha Sreejith, Alina Volnova

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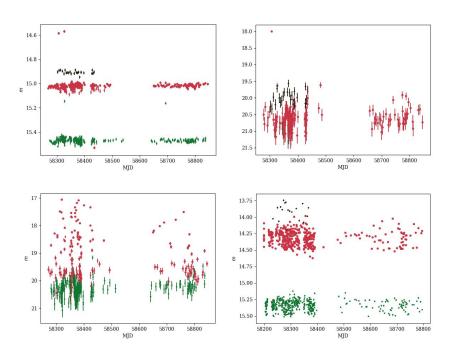
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Examples: unclassified objects





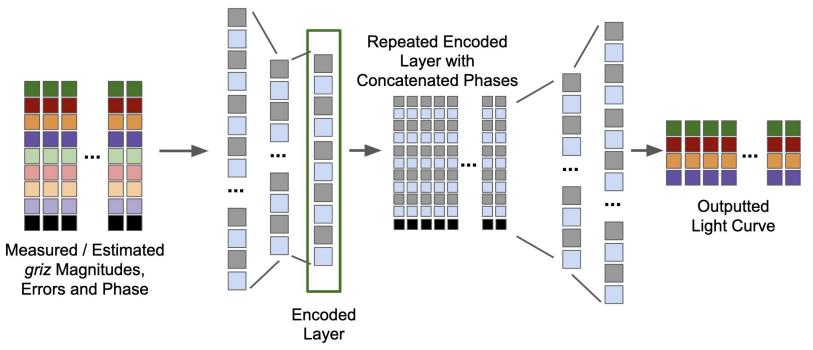




- Villar et al. (2020) and Hosseinzadeh et al. (2020) will present a sample of Pan-STARRS1 Medium Deep Survey SN-like transients and host spectra
- 5,243 SNe-like transients in PS1 MDS (Jones+2017)
- 2,885 events have reliable host redshift measurements
- **557 SNe** are spectroscopically classified with host redshift measurements



TYSSC V. Ashley Villar SuperRAENN: A new, semi-supervised classifier



SuperRAENN uses a novel recurrent autoencoder NN to extract light curve features, and is open source (https://pypi.org/project/superraenn/)

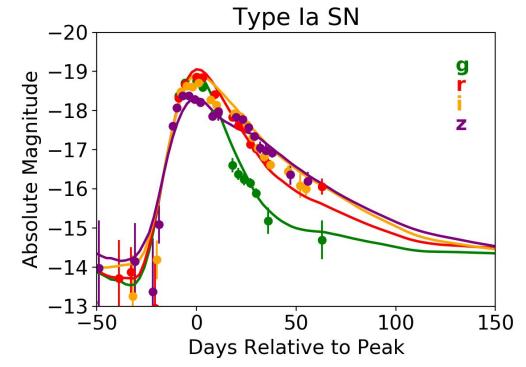


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EVENSE V. Ashley Villar Adapting SuperRAENN for live data streams

SuperRAENN is currently being adapted to work with live ZTF data streams...stay tuned!

Thanks!





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