IAU Symposium 339, *Southern Horizons in Time-Domain Astronomy*, which the WGTDA of Commission B2 supported strongly, was held in the Wallenborg Conference Centre of the University of Stellenbosch, near Cape Town, South Africa, from 2017 November 13–17. Morning plenary sessions addressed different aspects of time-domain astronomy (TDA) in turn: (a) new developments in the last five years, (b) explosive transients, (c) long-term and stellar variability, (d) high energy, and (e) the future: can our techniques meet the challenges? Each was broached from widely-ranging angles, the objective being to examine the similarities, if any, of the underlying physics rather than to rehearse the characteristics of a particular group of objects. Of the talks, 18 were formally invited; 33 were contributed. Each afternoon except Wednesday was dedicated to Workshops that targeted a particular area, topic or concern in the realm of TDA, ranging from a hands-on tutorial to use the software of a specific mission, to matters concerning data management and preservation, and many topics in between. A total of 14 Workshops was held, each being proposed in advance and organized by participants. About 50 posters were also displayed for the duration of the conference. Some 160 participants attended, their scientific status ranging from retired professor to Master's student, and representing in all 33 countries.

In 2011, IAU Symposium 285 (*New Horizons in Time-Domain Astronomy*) tackled the subject of variability by focusing on different manifestations, such as periodic, explosive, recurrent or transient, and sought explanations through commonalities that could be identified across the cosmos rather than through studying groups of like objects. The first meeting of its kind in this sense, it brought together as diverse a cross-section of participants as an IAU symposium must ever have seen. The scheme injected a novel and potentially fruitful introduction into the understanding of variability by comparing occurrences of similar phenomena regardless of site, and it also introduced the novelty of Workshops. Symposium 339 followed a similar pattern. Again, the participants (between them) represented a very broad cross-section of astrophysics. But there were important differences. Not only did S339 see considerably more input from the radio astronomy community compared to S285, but the entire programme of plenary talks on Day 1 was given over to recent new developments, and it was necessarily only a representative selection at that. TDA is clearly expanding in interesting and fruitful ways.

One of the major new advances in the world of TDA is the efficient management of data, both "big" and "real-time". Transit detections need to be announced and followed up as speedily as possible – and by instruments primed and ready to pounce – while massive amounts of data also need to be combed and sorted quickly in order that false positives are eliminated confidently and true oddities are recognized correctly and efficiently. New methods of sorting, analyzing and pinpointing the events which many of the new but very voluminous data will almost certainly contain are now needed. Parallel to the science of TDA must therefore be energetic developments of semi-automatic, efficient tools, neural nets, etc., that we do not have at present, or do not know how to use to maximum advantage. Accordingly, one topic that was scarcely a recognized feature six years ago, the science of *Astroinformatics*, this time occupied a double Workshop slot, illustrating its undisputed importance, not to say its indispensability. It was very rewarding to see how many of the younger generation of astronomers are becoming engaged in these new directions for data management.

Yet another novelty introduced by S285 was the topic of data *sonification*, or *listening* to your data, as featured by a blind graduate, Wanda Merced Diaz. Now stationed at the IAU's Office of Astronomy for Development in Cape Town, Wanda paid our Symposium a return visit in order to organize a Workshop (WS 9) featuring sonification. Even more: a *second* blind researcher attended S339 the meeting, and assisted with Wanda's Workshop.

Many of the scientific topics described in S339 were not new: searches for elusive objects such as supernovæ, classical novæ, cataclysmic variables, flare stars, extrasolar planets and the many ramifications thereof have been key research areas for several – sometimes a great many – years. What was new was the means, the aspect, the scope, the scale and (of course) the technology which is now being enlisted to revolutionize the research. What was also new to everyone were the recent echoes of Gravity Wave GW170817, whose detection and its offshoots gained prominence in several talks.

A strong accent was also placed on automated surveys, the majority carried out with new instruments in space. Explosive events are showing up in both targeted and triggered observations, and classical concepts are being enriched by programmes to detect radio transients too. Aspects of long-term variability are being stretched and enhanced through new and novel technologies, and even objects once believed to be rather quiescent are proving to harbour variabilities previously unimagined and certainly undetected; some are challenging core theories about aspects such as stellar pulsations. Many high-energy projects are particularly gaining expansion and promotion through new developments involving *inter alia* X-ray missions, and revealing new populations of high-energy transients. And in addition to the topics just sketched were many others, some deeply associated with the core TDA topics, others more peripheral, that were discussed in the Workshops. But – as the final day showed vividly – each of these new programmes rests heavily on adequate and appropriate software techniques, now being promoted efficiently through "astroinformatics".

The Proceedings of S339 are being published in two forms: not only in the traditional hard-back book, but also online. Since the latter does not suffer hard space restrictions, we could offer to reproduce posters *in extenso* in pdf format online, when the book could only reproduce a textual summary.

Elizabeth Griffin (co-Chair)
February 2018

Monday 13 November 2017

08:00 - 09:00	Registration [coffee on arrival]	
09:00 - 10:30	**New Developments in the last 5 years** - Auditorium 1+2 [Chair: Patrick Woudt]	
09:00 - 09:15	Welcome and Opening	
09:15 - 09:45	**Tara Murphy**	Transient science in era of gravitational wave astronomy [keynote]
09:45 - 10:15	**Tom Barclay**	The Space-Based Photometry Revolution [invited]
10:15 - 10:30	**Matt Burleigh**	The Next Generation Transit Survey
10:30 - 10:45	**Anais Möller**	First results from the SkyMapper transient survey
10:45 - 11:15	Coffee/tea break	
11:15 - 13:00	**New Developments in the last 5 years** - Auditorium 1+2 [Chair: David Buckley]	
11:15 - 11:45	**George Djorgovski**	Time domain Astroinformatics [invited]
11:45 - 12:15	**Barry Welsh**	The Berkeley Visible Image Tube on SALT: From flare stars to the search for ET [invited]
12:15 - 12:30	**Elmé Breedt**	Gaia alerts: the transient sky as seen by Gaia
12:30 - 12:45	**Lukasz Wyrzykowski**	OGLE survey in 25 years in service for time-domain astrophysics and study of its Galactic black holes with help of Gaia
12:45 - 13:00	**Manisha Caleb**	Fast Radio Bursts - From multi-beam receivers to interferometers
13:00 - 14:00	Lunch	
14:00 - 15:30	**Afternoon workshops** - 3 breakout venues WS1. Radio transients in the era of multi-messenger astrophysics - Auditorium 1+2 WS2. Stellar variability: from Citizen Science to Citizen Astronomy - Manor House WS3. Get ready for TESS: an on-hand software tutorial - Breakout Venue 1+2 Data to Dome - Iziko Planetarium, Cape Town (transport provided)	
15:30 - 16:00	Coffee/tea break	
16:00 - 17:30	**Afternoon workshops** - 3 breakout venues WS1. Radio transients in the era of multi-messenger astrophysics - Auditorium 1+2 WS4. 25 Years of the southern skies monitoring by OGLE - Manor House WS5. A-type stars as a unique challenge in time-domain studies - Breakout Venue 1+2 Data to Dome - Iziko Planetarium, Cape Town (transport provided)	
17:30 - 18:30	**Poster Session** - Auditorium 1+2 - wine and cheese	
19:00 - 20:30	**Public lecture** - Auditorium 1+2	
	Stella Kafka	Citizen Astronomy in the era of large surveys

Tuesday 14 November 2017

08:30 - 09:00	Coffee/tea on arrival	
09:00 - 10:45	**Explosive Transients** - Auditorium 1+2 [Chair: Tara Murphy]	
09:00 - 09:30	**Ben Stappers**	Fast radio transients: From Pulsars to Fast Radio Bursts [invited]
09:30 - 10:00	**Stephen Justham**	Forming the progenitors of explosive stellar transients [invited]
10:00 - 10:15	**Gemma Anderson**	Discovering radio transients using triggered and targeted observations
10:15 - 10:30	**Deanne Coppejans**	Multi-wavelength jet studies in Cataclysmic Variables and super luminous supernovae
10:30 - 10:45	**Griffin Hosseinzadeh**	Early blue excess from the type Ia supernova 2017cbv
10:45 - 11:15	Coffee/tea break + **conference photo**	
11:15 - 13:00	**Explosive Transients** - Auditorium 1+2 [Chair: Mark Sullivan]	
11:15 - 11:45	**Laurent Eyer**	Understanding the Galaxy in detail [invited]
11:45 - 12:15	**Janet Ting-Wan Chen**	The electromagnetic counterpart of the gravitational wave source GW170817 [invited]
12:15 - 12:30	**Seppo Matilla**	A dust-enshrouded tidal disruption event in a luminous infrared galaxy
12:30 - 12:45	**Francisco Förster**	The High Cadence Transient Survey (HiTS): early supernova light curves
12:45 - 13:00	**Luca Izzo**	Follow-up observations of Classical Novae: recent results and future strategies
13:00 - 14:00	Lunch	
14:00 - 15:30	**Afternoon workshops** - 3 breakout venues WS6. X-ray binary transients in the Magellanic Clouds and the Milky Way - Auditorium 1+2 WS7. Towards Science with LSST: Data Products and Communications - Manor house *Open slot* - Breakout venue 1+2	
15:30 - 16:00	Coffee/tea break	
16:00 - 17:30	**Afternoon workshops** - 3 breakout venues WS8. Supernovae - Auditorium 1+2 WS9. The multi-dimensional power of listening to your data - Manor House WS10. New Instrumentation for transient follow-up - Breakout Venue 1+2	

Wednesday 15 November 2017

08:30 - 09:00	Coffee/tea on arrival	
09:00 - 10:45	**Long-term and stellar variability** - Auditorium 1+2 [Chair: Elizabeth Griffin]	
09:00 - 09:30	**Zheng-Hong Tang**	TDA from the Chinese plate-digitizing project [invited]
09:30 - 10:00	**Luis Balona**	Stellar variability [invited]
10:00 - 10:15	**Robert Szabo**	The K2 RR Lyrae survey
10:15 - 10:30	**Gantcho Gantchev**	Photometric variability of luminous blue variable stars on different time scales
10:30 - 10:45	**Kirill Sokolovsky**	The Hubble Catalog of Variables
10:45 - 11:15	Coffee/tea break	
11:15 - 13:00	**Long-term and stellar variability** - Auditorium 1+2 [Chair: Shazrene Mohamed]	
11:15 - 11:45	**Susanne Höfner**	Stellar variability and pulsations [invited]
11:45 - 12:15	**Conny Aerts**	Measuring and decoding gravity-mode oscillations: rotation and chemical mixing inside stars [invited]
12:15 - 12:30	**Christoffer Karoff**	Strong shear and high-amplitude activity cycle in metal-rich solar analog
12:30 - 12:45	**Gautier Mathys**	Periodic variability on timescales of decades to centuries in magnetic Ap stars: challenges and strategies
12:45 - 13:00	**Zdenek Mikulasek**	Periodic variations of variable stars from precise photometric surveys
13:00 - 13:15	Lunch (collect packed lunch for free afternoon)	

Free afternoon

For detailed options, see the social program in the abstract booklet.

Thursday 16 November 2017

08:30 - 09:00	Coffee/tea on arrival	
09:00 - 10:45	**High Energy** - Auditorium 1+2 [Chair: Francisco Foster]	
09:00 - 09:30	**Daryl Haggard**	Discovery and opportunity in the X-ray time domain [invited]
09:30 - 10:00	**John Hutchings**	UV and X-ray variability from AstroSAT [invited]
10:00 - 10:15	**Nobuyuki Kawai**	X-ray transients observed with MAXI
10:15 - 10:30	**Arne Rau**	X-ray transients in the SRG/eROSITA All-Sky Survey
10:30 - 10:45	**Sergey Molkov**	LMC X-4: different types of long-term variability
10:45 - 11:15	Coffee/tea break	
11:15 - 12:00	**High Energy** - Auditorium 1+2 [Chair: Stella Kafka]	
11:15 - 11:45	**Duncan Galloway**	High-energy variability and transients [invited]
11:45 - 12:00	**Phil Charles**	Transient X-ray binaries in the Magellanic Clouds and the Milky Way observed with SALT
12:00 - 12:15	**Erkki Kankare**	A new population of highly energetic nuclear transients
12:15 - 12:30	**Matthew Graham**	The future of AGN variability studies
12:30 - 12:45	**Jeff Cooke**	The Deeper, Wider, Faster program: chasing the fastest bursts in the Universe
12:45 - 13:00	**Christiaan Sterken**	The problem of standardization in time domain photometry
13:00 - 14:00	Lunch	
14:00 - 15:30	**Afternoon workshops** - 3 breakout venues WS11. Nuclear Transients - Auditorium 1+2 WS12. Accessing data for long term variability - Manor House *Open slot* - Breakout Venue 1+2	
15:30 - 16:00	Coffee/tea break	
16:00 - 17:30	**Afternoon workshops** - 3 breakout venues WS11. Nuclear Transients - Auditorium 1+2 WS13. Astroinformatics and machine learning - Manor House WS14. Calibration and standardization - Breakout Venue 1+2	
19:30	**Conference Dinner - Gala dinner at STIAS**	

Friday 17 November 2017

08:30 - 09:00	Coffee/tea on arrival	
09:00 - 10:45	**Can our techniques meet the challenges** - Auditorium 1+2 [Chair: Russ Taylor]	
09:00 - 09:30	**Michelle Lochner**	Unlocking the Universe with Astroinformatics [invited]
09:30 - 10:00	**Bruce Bassett**	Challenges and opportunities for machine learning in time domain astronomy [invited]
10:00 - 10:15	**Abhijit Saha**	Early recognition of rare and peculiar temporal phenomena from alert streams
10:15 - 10:30	**Monika Soraisam**	A novel method for transient detection in high-cadence optical surveys
10:30 - 10:45	**Kerry Paterson**	MeerLICHT: MeerKAT's optical eye
10:45 - 11:15	Coffee/tea break	
11:15 - 13:00	**Can our techniques meet the challenges** - Auditorium 1+2 [Chair: Kaz Sekiguchi]	
11:15 - 11:45	**Eric Bellm**	Life beyond PTF [invited]
11:45 - 12:00	**Ashish Mahabal**	Deep learning in the time domain
12:00 - 12:15	**Valentin Ivanov**	Time domain instrumentation at ESO
12:15 - 12:30	**David Buckley**	The SALT transients program
12:30 - 12:45	**Christina Thöne**	OCTOCAM: A new transient follow-up workhorse for Gemini-South
12:45 - 13:00	**Puji Irawati**	High Time resolution astrophysics using the Thai 2.4m telescope with ULTRASPEC
13:00 - 14:00	Lunch	
14:00 - 15:30	[**Future**] - Auditorium 1+2 [Chair: Lukasz Wyrzykowski]	
14:00 - 14:30	**Melissa Graham**	LSST: Data pipelines and products [invited]
14:30 - 14:45	**Matthew Lehner**	The Trans-neptunian Automated Occultation Survey (TAOS II)
14:45 - 15:00	**Jennifer Burt**	TESS science and follow up in the southern hemisphere
15:00 - 15:30	Closing remarks	

Workshop program

Workshop 1 ***Radio transients in the era of multi-messenger astrophysics***
Convenors: Gemma Anderson, Kirill Sokolovsky
Monday 13 November 2017 - 14:00 - 15:30 and Monday 16:00 - 17:30 - Auditorium 1+2

Workshop 2 ***Stellar variability: From citizen science to citizen astronomy***
Convenor: Stella Kafka
Monday 13 November 2017 - 14:00 - 15:30 - Manor House

Workshop 3 ***Get ready for TESS: an on-hand software tutorial***
Convenors: Jennifer Burt, Tom Barclay
Monday 13 November 2017 - 14:00 - 15:30 - Breakout venue 1+2

Workshop 4 ***25 Years of the southern skies monitoring by OGLE***
Convenor: Lukasz Wyrzykowski, Pawel Pietrukowicz
Monday 13 November 2017 - 16:00 - 17:30 - Manor House

Workshop 5 ***A-type stars as a unique challenge in time-domain studies***
Convenor: Gautier Mathys
Monday 13 November 2017 - 16:00 - 17:30 - Breakout venue 1+2

Workshop 6 ***X-ray binary transients in the Magellanic Clouds and the Milky Way***
Convenor: Phil Charles
Tuesday 14 November 2017 - 14:00 - 15:30 - Auditorium 1+2

Workshop 7 ***Towards Science with LSST: Data Products and Communications***
Convenor: Melissa Graham
Tuesday 14 November 2017 - 14:00 - 15:30 - Manor house

Workshop 8 ***Supernovae***
Convenor: Max Stritzinger, Takashi Moriya
Tuesday 14 November 2017 - 16:00 - 17:30 - Auditorium 1+2

Workshop 9 ***The multi-dimensional power of listening to your data***
Convenors: Jeffrey Cooke, Wanda Merced Diaz
Tuesday 14 November 2017 - 16:00 - 17:30 - Breakout venue 1+2

Workshop 10 ***New instrumentation for transient follow-up***
Convenors: Christina Thöne, Antonio de Ugarte Postigo
Tuesday 14 November 2017 - 16:00 - 17:30 - Breakout venue 1+2

Workshop 11 ***Nuclear transients***
Convenor: Seppo Matilla
Thursday 16 November 2017 - 14:00 - 15:30 and Thursday 16:00 - 17:30 - Auditorium 1+2

Workshop 12 ***Accessing data for long term variability***
Convenor: Elizabeth Griffin
Thursday 16 November 2017 - 14:00 - 15:30 - Manor House

Workshop 13 ***Astroinformatics and machine learning***
Convenors: Michelle Lochner, Bruce Bassett
Thursday 16 November 2017 - 16:00 - 17:30 - Manor House

Workshop 14 ***Calibration and standardization***
Convenor: Christiaan Sterken
Thursday 16 November 2017 - 16:00 - 17:30 - Breakout venue 1+2