

IRISH ASTRONOMICAL ASSOCIATION 47th AGM 18th AUGUST 2021

SECRETARY'S REPORT:



Dear IAA Member,

I hope everyone is keeping well amidst these unusual times. When the COVID-19 outbreak started last year and we had to move online, it could have never predicted that it would have still impacted us a year and a half later. However, despite everything, the informative and engaging lectures were able to have been continued online on Zoom and also streamed on YouTube. Thank you to Danny for his role as President and for chairing the lectures along with Paul who is to be commended as Webmaster for the excellent new modernised IAA website, organising and setting up the Zoom meetings and YouTube broadcasts and for presenting his 'The Sky' talks online each month throughout the pandemic. Credit to Terry for arranging the online lecture programme for this season and for producing his email bulletins. Praise to Vice President Andy for producing the excellent 'Stardust' Magazine despite lockdown and to everyone who has contributed, which is quarterly posted to over 200 of our members. Applause to Pat for continuing his Treasurer position and to Vice President Brian and for his role also as Membership Secretary. A big thank you to QUB for (usually) accommodating the lectures and for their support. Finally, thank you to all our members, old and new, for your support which makes the association what it is today. I would also like to say that this is my last Secretary's report as I am passing the post to council member Gerry Davidson after eight years. Thank you all for the support as Secretary and hopefully with the restrictions easing, I will see you all at in-person lectures again soon.

Clear skies & best wishes.
 Tony Kempston.
 16th August 2021.

IAA Lecture Programme Summary 2020-21:

<p>01. "Observing the Radio Universe from Birr, Co. Offaly" 23/09/20 <i>Prof Peter Gallagher, DIAS</i> The first of the IAA public Zoom lectures, this impressive lecture started with Peter giving an overview of the telescopes that have given us the foundations of the universe. The I-LOFAR (Irish Low Frequency Array), installed in 2017 in Birr, Co. Offaly, allows us to explore the radio universe. It has given us scientific insights, such as the first pulsar found using the telescope, PSR B0950+08. It has also given us insights into solar flares, black holes and galaxies.</p>	<p>02. "How do you solve a problem like Debris...ahh?" 07/10/20 <i>Nick Howes</i> Debris causes huge problems, both on Earth and in space. Currently, there are over 130 million pieces of debris orbit the Earth, ranging from microscopic pieces to ones the size of a bus. Nick Howes, in this captivating lecture, discussed possible consequences of this debris. A piece of debris the size of a pea travelling at 17,000 mph could have devastating consequences, like damaging a spacecraft or killing an astronaut, creating a knock-on effect, creating more debris. This is known as Kessler Syndrome. He also discussed possible fixes, although most have issues or aren't recommended. The bottom line was – until someone dies, no-one will take interest.</p>
<p>03. "The Hunt for Supermassive Black Holes: A Short History" 21/10/20 <i>Dr Marc Sarzi, AOP</i> In this interesting lecture Dr Marc Sarzi gave both the theoretical and observational milestones that established the existence of supermassive black holes. In 1783, John Mitchell and Pierre-Simon Laplace, first theorised the existence of black holes. Since then, there has been a lot of discoveries and work that has led to a greater understanding of super massive black holes. This has led to the 2020 Nobel Prize in Physics being awarded jointly for the discovery that black hole formation is a robust prediction of the general theory of relativity.</p>	<p>04. "What makes a comet great?" 04/11/20 <i>Prof Alan Fitzsimmons, QUB</i> Prof Alan Fitzsimmons started his engaging lecture by giving a brief description of what a comet is, but what is a great comet? A great comet is described as one that is "as bright as the brightest stars, has a visually long tail and is seen in twilight and dark skies." Although there is no official definition, the term "great comet" is usually given to comets like Halley's Comet and, most recently, Comet Hale-Bopp. There are also factors that can make a comet great, such as the size, composition, orbit, and the position of the Earth.</p>

<p>05. “Thirty Years of Hubble: Opening the Treasure Chest” 18/11/20 <i>Dr Jorick Vink, AOP</i> Hubble was first launched in 1990, with an incorrect mirror, but is now over 30 years old. In this impressive lecture, Dr Jorick Vink gave us an overview of the ground-breaking work that the Hubble Space Telescope has given us. The HST has given us insight into 3 key areas; star formation, age of the universe and the Hubble constant. It has also given us insights into the doppler effect massive blue stars, the expanding universe and massive stars.</p>	<p>06. “Adventures in the Outer Solar System” 02/12/20 <i>Dr Caitriona Jackman, DIAS</i> Dr Caitriona Jackman started this exciting lecture by giving a history of observation of each planet, beginning with Saturn, with the different missions launched including the Cassini division which discovered the gap between Saturn and its rings. Cassini has spent 13 years exploring the Saturn system. There is also a history of observation of Jupiter given, with the highlights being observations of Jupiter’s moons. Jupiter is currently being observed by NASA’s Juno which is currently in orbit around Jupiter. However, Uranus and Neptune have not been visited by orbiters....yet.</p>
<p>07. “Gravitational Wave Optical Transient Observer” 16/12/20 <i>Dr Gavin Ramsay, AOP</i> This impressive lecture, given by Dr Gavin Ramsey, focused on the Gravitational-wave Optical Transient Observer, which is a project based on the island of La Palma. Its goal is to detect the optical counterparts of gravitational wave events. The direct direction of gravitational waves from merging black holes and neutron stars is able to be detected using the LIGO (<i>Laser Interferometer Gravitational-Wave Observatory</i>) and VIRGO detectors, however the exact position is often out by hundreds or more square meters. It was predicted however that for merging neutron stars, there would be an electromagnetic counterpart that is visible which could identify the location of the merging event. This is the work that the GOTO carries out, with a second array being built with two more nodes being planned to further carry out this work.</p>	<p>08. “Searching for Kilonovae in the Nearby Universe” 06/01/21 <i>Prof Stephen Smartt, QUB</i> The first impressive lecture of the new year, Prof Stephen Smartt discussed the third observing run of the LIGO-Virgo gravitational wave detectors during 2019-2020. This detected black hole merger, along with one confident binary neutron star merger and a possible black hole – neutron star system. In 2017, a pair of merging neutron stars produced a kilonova, detected by the LIGO-Virgo detector. The Pan-STARRS project is now on the search for more kilonova.</p>
<p>09. “Gamma-ray Bursts and the Gravitational Wave Connection” 20/01/21 <i>Prof Lorraine Hanlon, UCD</i> <i>Prof Lorraine Hanlon</i> started this engaging lecture with the high energy universe discussing the electro-magnetic spectrum (gamma, X-rays, ultraviolet, visible, infrared, microwave & radio) and continued with the GRB timeline from the 1970’s-2020’s and associated GRB discoveries. Other explained topics were neutron star mergers, cosmological beacons, short and long GRB’s and first direct evidence. Various GRB detection satellites were discussed including Ireland’s first satellite – EIRSAT1 with a detector developed in UCD to measure bursts of gamma-rays from the most violent explosions in the Universe.</p>	<p>10. “Remote telescopes for Public and Educational Access” 03/02/21 <i>Pete Williamson, FRAS</i> This unique lecture discussed what is available in access to remote observatories and how you can get involved with educational networks. There are a lot of options with remote observatories, including visual astronomy, home astronomy and remote telescope control. There are also positives with remote observatories, to include no light pollution, disabled access, and better weather. We are also able to use RAW data from missions like Hubble, Horizons, NASA and ESA. There are also projects for kids that they can engage with, like galaxies and exoplanets.</p>
<p>11. “Investigating the Atmospheres of Alien Worlds” 17/02/21 <i>Dr Ernst de Mooij, QUB</i> This engaging lecture discussed the study of exoplanets and their atmospheres. Dr Ernst de Mooij began the lecture by exploring how exoplanets are discovered, by looking at images of planets around stars, stellar wobble, where the sun wobbles when a planet is revolving and the spectrum of the sun. The closest exoplanet to us is Proxima Centauri b. Further analysis of the atmosphere of an exoplanet can be told from the spectrum of the exoplanet.</p>	<p>12. “Mars, the Search for Origins” 03/03/21 <i>Dr Kevin Nolan, TU Dublin</i> Dr Kevin Nolan’s exciting lecture focused on the history of our engagement with Mars and examines the present-day robotic exploration campaign to characterise the planet and what it has to reveal about the life origin processes. Mars was quite similar to Earth in the beginning and has also been observed for hundreds of years with increasingly better telescopes. There has also been quite a few missions on Mars, including one of the most notable - the Curiosity mission.</p>

<p>13. “Charles Messier: His Life and his Legacy” 17/03/21 <i>John Flannery</i></p> <p>This unique lecture focused on the life and legacy of Charles Messier, a French astronomer who published an astronomical catalogue 250 years ago that gave him his fame. He is described as the first real “comet hunter”, he discovered 13 personally and 7 co-discoveries. The final catalogue was published with 68 items in 1780, which changed to 103 entries a year later. The catalogue is important as comprises of spectacular examples of deep sky objects. Sadly, he passed away on the night of 11th April 1817, aged 87 but his legacy has lived on through astronomy.</p>	<p>14. “China: Moon, Mars and Space Station” 31/03/21 <i>Brian Harvey</i></p> <p>This captivating lecture looked at the past, present and future of China in space and its ambitions for human and solar system exploration. The first satellite was launched in 1970, which is still in orbit and since then China has proved to be a space superpower. The US has had sanctions on China since 1949 so NASA are not permitted to work with China. China has made multiple milestones in relation to becoming a space superpower, including Liu Yang being China’s first woman in space, their first space laboratory in 2011 and the third country to orbit an astronaut. Its probe Tianwen is now orbiting and preparing to land on Mars and China’s space station, Tianhe, was launched in April 2021.</p>
<p>15. “Meteorites – Revealing the History and Evolution of our Solar System 28/04/21 <i>Prof Alan Fitzsimmons, QUB</i></p> <p>This exciting lecture from Prof Alan Fitzsimmons started by giving definitions of what a meteor is and the differences between meteors and meteorites. Prof Fitzsimmons also discusses the main types of meteorites and how they allow us to date the origin of our solar system from its composition. He also talks about the recent fall of the Winchcombe meteorite earlier this year. Different meteorites are also discussed, such as lunar meteorites with unique mineral composition and Martian meteorites with a mineral composition and bubbles of gas.</p>	<p>16. “The Diverse Future of Solar Physics“ 23/06/21 <i>Dr Samuel Grant, QUB</i></p> <p>This engaging lecture discussed the advent of an exciting era in the study of our nearest star, due to the emerging signs of a new solar cycle, alongside a varied fleet of cutting-edge observing suites set to begin operations in the next decade. Dr Samuel Grant also discusses the implications of entering a new solar cycle, including the current conjecture on how this cycle will develop. There are also space and ground-based observatories being developed worldwide that will provide an unprecedented insight into the dynamic physics of the Sun. Finally, he presents some of the earthly applications of our developments in solar physics, focusing on the bio-medical science collaboration here at QUB.</p>
<p>17. “A Multi-wavelength View of Galaxies” 21/07/21 <i>Dr Maritza Lara-Lopez, AOP</i></p> <p>This fascinating lecture discussed the use of wavelengths and spectrums that allow us to understand galaxies in a deeper level. Different telescopes, such as radio and visible, allow us to see different things about galaxies. The analysis of different spectrums of galaxies allows us to understand the interplay between gas mass, star formation rate, and heavy elements which is important to understand galaxy evolution.</p>	<p>18. IAA 47th Annual General Meeting 18/08/21</p>

Remember to visit the IAA website ‘irishastro.org’ for any future updates.

IAA Online Events 20-2021:

<p>Online AOP / IAA Event: 26/05/21 Armagh Observatory & Planetarium / IAA ONLINE TELESCOPE CLINIC <i>Online Zoom Session</i></p>	
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Thank you to all our members and guests for participating in the online lectures.

Tony Kempston.
16th August 2021.