

## GREAT TALKS 2017-18

### 1) Professor Paul Walton (<https://www.york.ac.uk/chemistry/staff/academic/tz/pwalton/>)



Professor Paul Walton is the professor of Chemistry at the University of York. Paul Walton obtained his PhD in 1990, followed by two years as a postdoctoral fellow at the University of California, Berkeley, USA. He joined the Department of Chemistry at York as a faculty member in 1993. Between 2004 and 2010 he was chair of department. He is the recipient of multiple awards, including: the Royal Society of Chemistry's Higher Education Teaching Award, the RSC's Joseph Chatt Award for *outstanding multidisciplinary research*, the IChemE's Global Award for energy research, and the Royal Society's inaugural Athena Prize for gender equality work (runner up). He has also been the editor of *Dalton Transactions* (2004-2008), chair of Heads of Chemistry UK, chair of the Royal Society of Chemistry's Diversity Committee and is one the RSC's 175 Faces of Chemistry. Paul is an internationally-known advocate of equality in sciences and lectures widely on the subject.

#### Lecture Titles:-

**Public Talk** - Equality for Women in Science: Why is it So Slow?

**Technical Talk** - The Discovery, Structures and Spectroscopy of Lytic Polysaccharide Monoxygenases: Enzymes to Change the Biofuel World

### 2) Professor Turi King (<https://www2.le.ac.uk/departments/genetics/people/king>)



Turi King is an Anglo-Canadian geneticist who started her academic career reading Archaeology and Anthropology at the University of Cambridge. It was here that she became interested in how genetics could be used to answer archaeological and historical questions and gained a scholarship to study for an MSc in Molecular Genetics at the University of Leicester, gaining a distinction. Turi went on to write an award-winning PhD in molecular genetics examining the link between British hereditary surnames and the Y chromosome. Since then, all of her work has combined genetics with history, archaeology,

geography, forensics and epidemiology. She is perhaps now best known for having carried out the genetic analysis which led to the identification of King Richard III.

## Talks

### **King Richard III: the resolution of a 500 year old cold case.**

When the University of Leicester Archaeology Service undertook the Grey Friars project, it was thought that the chances of finding the remains of Richard III were slim to none. Nevertheless, Turi King, with her background both in archaeology and genetics, was approached in the very early stages - should the skeletal remains of a 'good candidate' to be Richard III be found, would she be interested in overseeing the DNA analysis. Turi King will speak about the Grey Friars project, from the early stages of planning the dig, through to the excavation and the results of the various strands of analysis carried out on the remains.

### **What's in a Name?**

In Britain, the use of hereditary surnames was brought over by the Normans in 1066. Surnames are passed down through the generations down through the paternal line and this transmission of a name is mirrored by a segment of DNA known as the Y chromosome. The question to be answered then was, do all men with the same surname have the same Y chromosome type, having been passed down through the generations hand in hand. Turi will discuss how DNA fingerprinting has been used as a way to trace surnames down through the generations, to prove links between families who didn't know they were related or to show that a particular surname may have more than one origin. She will also talk about his genetic genealogy is now a booming business and some famous cases she's been involved in including her work on Sir David Attenborough's family and that of Thomas Jefferson, the third President of the United States.

### **3) Professor Monica Mary Grady**

([https://en.wikipedia.org/wiki/Monica\\_Grady](https://en.wikipedia.org/wiki/Monica_Grady))

and Professor Ian Wright <http://www.open.ac.uk/people/ipw2> (They are couple and will travel together)



Monica Grady is Professor of Planetary and Space Sciences in the School of Physical Sciences at the Open University (OU) in Milton Keynes. She is a stable isotope geochemist and her research focuses on attempting to understand the origin and evolution of the Solar System through study of meteorites, asteroids and comets. Monica Grady's biography can be found at: [https://en.wikipedia.org/wiki/Monica\\_Grady](https://en.wikipedia.org/wiki/Monica_Grady)

(Monica Mary Grady, CBE is a leading British space scientist, primarily known for her work on meteorites. Asteroid (4731) was named Monica Grady in her honour. She is one of the members of Euro-Cares an EU-funded Horizon2020 project which has the aim of developing a roadmap

for a European Sample Curation Facility, designed to curate precious samples returned from Solar System exploration missions to asteroids, Mars, the Moon and comets. She was awarded the Coke Medal of the Geological Society of London in 2016, for her work in science communication.)

The following four talks can be adapted for different audiences, at a higher level for specialists, or a more general level for an audience of children or lay people.

#### **1. Collisions and Catastrophes**

The Earth is bombarded constantly by material from space – almost as much as 60,000 tonnes each year. Fortunately, most falls as small grains of dust, practically invisible to the naked eye – but there have been times when enormous collisions have changed the path of history. In her talk, Monica

Grady will explore the hazards of cosmic collisions, and explain why it is important – and fascinating – to study the material that arrives, uninvited, on our planet every day.

## **2. Astronomy by Microscope and Mass Spectrometer**

Astronomers use instruments on telescopes to study the origin and evolution of planets, stars and galaxies – and the universe. Planetary scientists use laboratory instruments to study meteorites, material from asteroids that has fallen to Earth. In her talk, Monica Grady will explain that although planetary scientists perhaps cannot see as far back in time as astronomers, they can use information from meteorites to explore the history of the Solar System and our Galaxy.

## **3. Landing on a Comet**

The Rosetta mission was a flagship mission of the European Space Agency. It was launched in 2004 to catch up and rendezvous with comet Comet 67P/Churyumov-Gerasimenko between January and August 2014. In November 2014, the Philae lander dropped slowly onto the surface of Comet 67P. This event was a landmark in Solar System exploration – the first time that a spacecraft had landed on the surface of a comet. One of the instruments on-board Philae was Ptolemy, an instrument designed and built at the Open University to measure the composition of gases released from the comets' surface. Monica Grady was a scientific advisor to the Ptolemy instrument team. She will share her experiences of what it was like to be part of the Rosetta mission, considering why comets are such important objects to explore, and summarising the most significant results from the Rosetta mission.

## **4. Life beyond Earth: Prospects and Possibilities?**

One dictionary definition of 'Life' is 'the period between birth and death'. Whilst this is unarguably true, it is not terribly useful when trying to assess the probability of living beings existing beyond Earth. The talk will consider how life is defined, what is required for it to arise, and the range of habitats in which life can exist on Earth. Knowing where life survives on Earth then gives clues to where else in the Solar System it might be possible for life to arise and evolve.

**Ian Wright** is a Professor of Planetary Sciences at the Open University, where he has worked for the last 34 years. He completed his PhD at the University of Cambridge and, following his move to the Open University, he eventually joined the staff in 1988. He has subsequently held a number of posts, including Head of Department and many others related to research

He spent his formative years designing and building laboratory instruments as part of a quest to tackle



some unanswered questions in “cosmochemistry” and “meteoritics” (respectively, the chemistry of the cosmos, and the study of meteorites). His latest interests include the production of an instrument destined for the surface of the Moon in 2022, to study the volatiles present in the south polar region. This is a fascinating venture that interweaves issues of scientific enquiry with technological developments aimed at resource utilization. This he believes, along with all the other interests across the world in lunar exploration, mean that youngsters growing up today have an unprecedented opportunity to get involved with an emerging industry that will be dedicated to space travel. This will

need, in addition to scientists and engineers, people with skills in logistics, support services, space law, computer coding, tourism, catering, off-Earth mining, and so on.

I will offer two talks on

**Talk Titles: What is the chemical composition of a comet?**

**And how would you measure it?**

One will be at the level of general interest (intended for the public, youngsters, non-specialists etc.) and the other will be for a more academic audience. I will describe the challenge of having to develop instrumentation that is not only able to survive a rocket launch and a 10-year journey through space, but which would subsequently have to conduct scientific investigations on a body whose properties and features were effectively unknown at the time of launch. And all of this after the perils of a landing manoeuvre, the likes of which had never been attempted previously.

#### **4) Sue Nelson <http://boffinmedia.co.uk/about/>**



Sue Nelson is an award winning British journalist and broadcaster. As part of Boffin Media, she produces documentaries for BBC Radio, co-presents the Space Boffins podcast and makes short films on science and space. Her ESA TV films for the European Space Agency helped explain the Rosetta and ExoMars missions to a worldwide audience, while her radio documentary 'Songs from Space' supported the film director Richard Curtis's Project Everyone, for raising awareness of the United Nations' global goals for sustainability. A former BBC science correspondent, Sue studied space science on a prestigious Knight Wallace Journalism Fellowship at the University of Michigan in 2002 and has also won a BT Technology Award, an Association of British Science Writers award, and a 2017 New York Festival's International Radio Programme bronze award for Women with the Right Stuff - a history of women in space. Sue is currently writing Wally Funk's Race for Space, which will be published in October 2018, and has just done her first Zero G flight.

**Lectures:**

**Women in Space-**

Women all over the world have played important roles in our global space programme for decades - it's just that these women have not always been visible. British space journalist and former BBC science correspondent Sue Nelson discusses some of the 'hidden figures' in space history as well as celebrating some of the women breaking barriers today. She covers the Mercury 13 and America's early astronaut selection process, the sexism that women from space-faring nations had to overcome in order to succeed, pioneers within the space industry and the future for women in both the commercial and government sectors. Plans to return to the Moon, for instance, will result in the first woman on the lunar surface. The opportunities for women within space have never better.

## Going Back to the Moon - A Journalist's Perspective

British science journalist and former BBC science correspondent Sue Nelson discusses the renewed race to get back to the Moon. Sue has made several BBC radio documentaries about the Moon and covers some of the key players involved, why they want to go there, and how one entrepreneur has a genuine property claim for a part of the lunar surface. Lawyers in London are working hard on updating the Outer Space Treaty to accommodate renewed interest and commercial companies and space agencies have put the Moon back on the agenda. As the European Space Agency experiments on building the components for its planned 'Moon Village', will the Moon become a home or science laboratory for the next generation? Or will it be simply a 'gas station in the sky' - yet another resource for life on Earth.

### 5) Dr Jen Gupta (<https://jen Gupta.com/>)



Dr Jen Gupta is an astrophysicist, science communicator and podcaster who is passionate about sharing her love of astronomy and science. She is the SEPnet/Ogden Public Engagement and Outreach Manager for the Institute of Cosmology and Gravitation at the University of Portsmouth in the UK, where she works to share the department's cutting-edge astrophysics and cosmology research with the wider world. She also works as a freelance science communicator, performing astronomy-themed comedy and presenting planetarium shows. Jen is the founder and host of Seldom Sirius, a seldom serious podcast that tackles topics within astronomy and space in a light-hearted manner. Jen's work in science communication and engagement was recognised in 2015 when she was highly commended in the Young Achiever category at the Asian Women of Achievement Awards, and in 2016 when she was selected by the Royal Astronomical Society as one of their 21 leading women fellows in the 21st century. Jen has a PhD in astronomy and astrophysics from the Jodrell Bank Centre for Astrophysics at the University of Manchester, where she used data from telescopes around the world to study active galaxies – galaxies that are giving off huge amounts of energy powered by a supermassive black hole in the centre.

#### **Technical Talk 1 Title:** Engaging Schools and the Public with Astrophysics Research

Abstract: In this talk, she will discuss this strategy, and outline the schools outreach and public engagement activities that we are running as part of this strategy. She will also describe her personal journey within science engagement and communication starting from when she was a PhD student, and offer some practical advice on how to get started in this area.

#### **Technical Talk 2 Title:** The Tactile Universe: accessible astrophysics for the vision impaired community

Abstract: In this talk she will provide an overview of the project (including the opportunity to interact with the props that were developed) and summarise the lessons learnt to date about how to engage with this traditionally hard-to-reach audience.

**Public Talk Title:** The Invisible Universe

Abstract: In this talk she will show you the Universe at other wavelengths, from familiar objects like our Sun to weird and wonderful distant quasars, and explain some of the physics behind them. Along the way she will touch on the stories of some of the pioneers in these areas of astronomy and astrophysics, who dedicated their careers to furthering our understanding of the invisible Universe.

**6) Professor Paul Smith**

([http://www.oum.ox.ac.uk/research/paul\\_smith.htm](http://www.oum.ox.ac.uk/research/paul_smith.htm))



Professor Paul Smith is director of Oxford University Museum of Natural History. Prior to taking up the post at OUMNH he was head of the School of Geography, Earth & Environmental Sciences at the University of Birmingham but has worked in university museums for most of his career, starting at the Sedgwick Museum in Cambridge before moving to the Geological Museum in Copenhagen. At the University of Birmingham, Paul was curator, then director, of the Lapworth Museum of Geology before moving to Oxford in 2012.

**Lecture title 1 The co-evolution of life and Earth – Snowball Earth, the Cambrian Explosion and the origin of animals**

Multicellular animals first appear in the fossil record around 545 million years ago, after 3 billion years of unicellularity. Within 20 million years, virtually every animal body plan that we see at the modern day had also appeared in the fossil record. This remarkable and, by geological standards, rapid phase of evolutionary history is known as the Cambrian Explosion. Intensive research over the last 20 years has focused on the causes and mechanisms of this event, with most hypotheses to date based on a single causal mechanism. These have included ideas as diverse as the evolution of homeobox genes, sunspot activity, sea-level rise, global glaciation, plate tectonic activity and ocean chemistry. Recent work, however, suggests that the underlying mechanism is in reality a complex feedback system and this lecture will explore the biological and geological processes at play in this major evolutionary event, and their interactions.

**Lecture title 2 Science as culture – contemporary science engagement in the museum environment**

Science museums have a history that extends back in time to the European Renaissance and the accumulation of Wunderkammer or 'cabinets of curiosity'. Many of them have a history that at least roots into the remarkable phase of collecting and intellectual growth in the nineteenth century and, to a large degree, their collections continue to reflect this philosophy. This presents a challenge for many institutions. On the one hand, they have a proven capacity to inspire curiosity and extend learning in people of all ages and backgrounds, particularly through the use of object-based learning and multisensory methodologies. But on the other hand they are often trapped within nineteenth century buildings and collections. The challenge for museums is how to make themselves relevant to contemporary science and societal debate around the issues raised. This has never been important. In a post-truth, alternative fact world how do citizens make informed decisions about current societal

issues that are centred on science? This lecture will investigate the role of the museum in encouraging and supporting evidence-led decision making and in creating the next generation of scientists.

**7) Beth Healey ([https://en.wikipedia.org/wiki/Beth\\_Healey](https://en.wikipedia.org/wiki/Beth_Healey))**