Name:

Introduction

This is the second BES summer school, we genuinely hope you enjoy your week with us and take away a solid action plan for how you would like to develop your career. We hope you leave the school with strong friendships that morph into stronger professional working relationships.

The BES has over the years developed excellent relationships with students, they come to us through one activity and stay to participate in other projects, develop their own ideas and we hope that we will get to know all of you for many years to come.

Without all the speakers, workshop leaders and mentors who have given up their time free of charge there would be no summer school and so I personally would be very grateful if you could take the time not to just to thank them but tell them *and us* why their contribution has made a difference to you. Please make the most of the time they have here by asking as many questions as you can as many of our speakers are unable to stay for the whole week.

Throughout the week you will get to hear about other societies, especially those that have sponsored speakers to attend and helped to recruit engaging speakers for the school. The BES isn't precious about which Society you join: Join all of them!

The PhD mentors have worked hard to put together a social programme that helps you feel at ease, is relaxing after a long day of talks and provides some light relief. Please ask if you have any questions, they were UG's making the transition into PhD students not that long ago.

This year we are proud to welcome a group of A-level students from In2Science, please help us make them feel welcome.

And finally, have fun while you're here and wherever you go after the school and after you graduate, the BES and all the societies wish you every success.

BRITISH ECOLOGICAL SOCIETY

Monday 19th July 2016

Times	Activity	
12.00	Registration Room allocations	
15.00	• Initial meeting with Mentors • Initial health and safety from FSC centre staff • Welcome from BES staff	
16.00 17.00	**Introductions & Cove Walk** **What to Expect:** You'll be meeting your mentor groups and your PhD mentor – the whole summer school will then be (weather depending) taking a walk to see Malham Cove **Lead Mentor(s):** All	
18.00	Dinner	
19.00 20.00	**Plenary session** **Pests, pathogens and unpredictable rainfall – how ecology can help us address global challenges in sustainable food production** **Prof Sue Hartley** University of York British Ecological Society Further details on page 22	
21.00 22.00	UG School: **Mentor Introductions** The mentors will be giving brief introductions of themselves, then playing a quick game of 'truth or lie' for you all to learn more about us. **Lead Mentor(s):** All	In2Science: **Getting to know each other** Staff will provide a brief introduction to themselves and answer any questions you have about the school **Lead Mentor:** Lucy O'Driscoll
23.00	Bar closes	

Monday Notes

BRITISH ECOLOGICAL SOCIETY

Tuesday 19th July 2016

Times	Activity	
06.30	**Behaviour or Bird Walk** For those who wish to, walks to see the local area focused on either birdwatching or animal behaviour **Lead Mentor(s):** Melanie & Cassie, Scott & Simon	
08.00	Breakfast **----Don't forget to prep lunch----**	
09.00 10.00 11.00 12.00	Group1: **Speleobiology and Cave Conservation.** **Andrew Hinde** *Reserve Manager/ Cave Conservation Adviser* *Ingleborough National Nature Reserve* Further details on page 22 Meet outside Whernside for the minibus	Group 2: **Limestone flora of Malham** **Dr Stephen Morley** *Wildlife & Countryside Adviser* *National Trust* Further details on page 23 Whernside
13.00	LUNCH:	
14.00 15.00 16.00 17.00	Group 1 **A brief introduction to entomology and sampling methods** **Prof Simon Leather/ Fran Sconce** Harper Adams University Linnean Society Further details on page 26 Whernside	Group 2 **How clean is my river?** **Dr Lesley Batty** *Birmingham University* *British Ecological Society* Further details on page 30 Meet outside Whernside for minibus
18.00	Dinner	
19.00 20.00	UG School **Developing your Career Strategy** Karen Devine	In2Science **Everything you need to know about A-level ecology** Simon Tarr
21.00 22.00	**Activity: Pub Quiz** Starting at 21.30 sharp, we have a quiz put together by your darling mentors, with insights into their senses of humour. Prizes offered. **Lead Mentor(s):** All	
23.00	**Activity: UV Invert Tracking** At 23.30, Simon Leather will be demonstrating how we can use UV powder to track movement and behaviour of invertebrates **Lead Mentor(s):** Lewis	

Tuesday Notes

BRITISH ECOLOGICAL SOCIETY

Wednesday 20th July 2016

Times	Activity		
06.30	**Moth Trap ID** For those who wish to, and weather permitting, we'll be checking out light boxes and doing some basic moth ID work. **Lead Mentor(s):** Lewis		
08.00	Breakfast **---Don't forget to prep lunch---**		
09.00 10.00 11.00	Group 1 **How clean is my river?** **Dr Lesley Batty** *Birmingham University* *British Ecological Society* Further details on page 30 Meet outside Whernside for minibus	Group 2 **A brief introduction to entomology and sampling methods** **Prof Simon Leather/ Fran Sconce** Harper Adams University Linnean Society Further details on page 26 Whernside	
13.00	LUNCH: **/optional Board Walk** Malham Tarn has some of the most biodiverse and impressive peat-bog with all sorts of exciting species – short walk to see and hear about it **Lead Mentor(s):** Scott & Cassie		
14.00 15.00 16.00 17.00	Group 1: **Limestone flora of Malham** **Dr Stephen Morley** *Wildlife & Countryside Adviser* *National Trust* Further details on page 23 Whernside	Group 2: **Speleobiology and Cave Conservation.** **Andrew Hinde** *Reserve Manager/ Cave Conservation Adviser* *Ingleborough National Nature Reserve* Further details on page 22 Meet outside Whernside for the minibus	
18.00	Dinner		
19.00 20.00	**Communicating your research** Jenny Meyer	**Communicating beyond academia** Karen Devine	**Choosing an UG course** Simon Tarr
21.00 22.00	**Activity: Careers and PhD Talk** All mentors will be on hand to provide insight on careers or degree questions. There'll be a half-hour sessions focussed on PhDs. **Lead Mentor(s):** All		
23.00	**Activity: Bat Walk** For those who wish, a foray into the night to get a taste of bat detecting (many a bat about). **Lead Mentor(s):** Scott, Melanie		

Wednesday Notes

BRITISH ECOLOGICAL SOCIETY

Thursday 21st July 2016

Times	Activity	
06.30	**Activity: Behaviour or Bird Walk** For those who wish to, walks to see the local area focused on either birdwatching or animal behaviour **Lead Mentor(s):** Melanie & Cassie, Scott & Simon	
08.00	Breakfast **---Don't forget to prep lunch---**	
09.00 10.00 11.00 12.00	Group 1 **Mapping microbial communities – a molecular approach** **Dr James Chong/ Thorunn Helgason** *University of York* *Microbiology Society* Further details on page 40 Whernside	Group 2 **Careers in Ecological Consultancy, Statutory and Voluntary Sectors** With Andrew Halcro Johnson, Alistair Headley, Kim Jennings, Dave Martin and Ryan Mellor **CIEEM** Further details on page 44 Whernside
13.00	LUNCH: **/optional Board Walk** Malham Tarn has some of the most biodiverse and impressive peat-bog with all sorts of exciting species – short walk to see and hear about it **Lead Mentor(s):** Scott & Cassie	
14.00	Group 1 **Careers in Ecological Consultancy, Statutory and Voluntary Sectors** With Andrew Halcro Johnson, Alistair Headley, Kim Jennings, Dave Martin and Ryan Mellor **CIEEM** Further details on page 44 Whernside	Group 2 **Mapping microbial communities – a molecular approach** **Dr James Chong/ Thorunn Helgason** *University of York* *Microbiology Society* Further details on page 40 Whernside
18.00 19.00 20.00	**Britain in a changing Europe** Put your questions to our panel of leading politicians, chaired by **Jonathan Dimbleby**. Confirmed panellists include: **George Eustice MP**,Conservatives; **Baroness Kate Parminter**, Liberal Democrats; **Natalie Bennett**, Green Party, Leader; **Kerry McCarthy MP**, Labour; **Stuart Agnew MEP**, UKIP,	
21.00 22.00	**Creature Creations** Following hysterical antics last year, we'll be setting the challenge of crafting unique creatures, and presenting them in your best Attenborough-parody fashion. Prizes for the most hilarious / inventive team! Probably featuring in the BES Bulletin and extensively on twitter. **Lead Mentor(s):** All	
23.00	Bar closes	

Thursday Notes

BRITISH ECOLOGICAL SOCIETY

Friday 22nd July 2016

Times	Activity	
08.00	Breakfast- ----------**Don't forget to prep lunch**----------	
09.00	**Making the most of Society Memberships** How do you select which societies to join and how do you make them work for you? **Karen Devine**	
9.30	UG School **Final year project planning** This session gives you time to think about all you have seen and learned this week and start to develop ideas for your final year projects **Mentors**	In2Science **Writing personal statements** This session gives you time to think about all you have seen and learned this week and start to think about your personal statements **Lucy O'Driscoll**
10.30	**Closing Plenary Session** **Why should you become a conservation biologist?** **Dr Nathalie Pettorelli** Zoological Society of London Further details on page 51	
11.30	**Prize Giving** Prize giving for the photography competition and final farewells! **Lead Mentor(s):** All	
12.30	Depart	

Friday Notes

BRITISH ECOLOGICAL SOCIETY

Social Programme

Monday 18th	Tuesday 19th	Wednesday 20th	Thursday 21st	Friday 22nd
	Time: 6.30 + **Activity: Behaviour or Bird Walk** **What to Expect:** For those who wish to, walks to see the local area focused on either birdwatching or animal behaviour **Lead Mentor(s):** Melanie & Cassie, Scott & Simon	**Time:** 6.30 + **Activity: Moth Trap ID** **What to Expect:** For those who wish to, and weather permitting, we'll be checking out light boxes and doing some basic moth ID work. **Lead Mentor(s):** Lewis	**Time:** 6.30 + **Activity: Behaviour or Bird Walk** **What to Expect:** For those who wish to, walks to see the local area focused on either birdwatching or animal behaviour **Lead Mentor(s):** Melanie & Cassie, Scott & Simon	
Time: 14.30 – 17:00 **Activity: Introductions & Cove Walk** **What to Expect:** You'll be meeting your mentor groups and your PhD mentor – the whole summer school will then be (weather depending) taking a walk to see Malham Cove **Lead Mentor(s):** All		**Time:** 13.00 – 14.30 (*Lunchtime)* **Activity: Board Walk** **What to Expect:** Malham Tarn has some of the most biodiverse and impressive peat-bog with all sorts of exciting species – short walk to see and hear about it **Lead Mentor(s):** Scott & Cassie	**Time:** 13.00 – 14.30 (*Lunchtime)* **Activity: Board Walk** **What to Expect:** Malham Tarn has some of the most biodiverse and impressive peat-bog with all sorts of exciting species – short walk to see and hear about it **Lead Mentor(s):** Scott & Cassie	**Time:** 11.30+ **Activity: Prize Giving** **What to Expect:** Prize giving for the photography competition and final farewells! **Lead Mentor(s):** All

Time: 21.00 + **Activity: Mentor Introductions** **What to Expect:** The mentors will be giving brief introductions of themselves, then playing a quick game of 'truth or lie' for you all to learn more about us. **Lead Mentor(s):** All	**Time:** 21.30, 23.30 **Activity: Pub Quiz** **What to Expect:** Starting at 21.30 sharp, we have a quiz put together by your darling mentors, with insights into their senses of humour. Prizes offered. **Lead Mentor(s):** All **Activity: UV Invert Tracking** **What to Expect:** At 23.30, Simon Leather will be demonstrating how we can use UV powder to track movement and behaviour of invertebrates **Lead Mentor(s):** Lewis	**Time:** 21.30, 23.00 **Activity: Careers and PhD Talk** **What to Expect:** All mentors will be on hand to provide insight on careers or degree questions. There'll be a half-hour sessions focussed on PhDs. **Lead Mentor(s):** All **Activity: Bat Walk** **What to Expect:** For those who wish, a foray into the night to get a taste of bat detecting (many a bat about). **Lead Mentor(s):** Scott, Melanie	**Time:** 21.30 + **Activity: Creature Creations** **What to Expect:** Following hysterical antics last year, we'll be setting the challenge of crafting unique creatures, and presenting them in your best Attenborough-parody fashion. Prizes for the most hilarious / inventive team! Probably featuring in the BES Bulletin and extensively on twitter. **Lead Mentor(s):** All	

BRITISH ECOLOGICAL SOCIETY

PhD Mentors

The BES Summer School isn't just about developing your ecological knowledge; it's also about developing your career and building your professional networks.

Our 6 Mentors are here to answer your questions, help you make the most of the school and have put together an excellent social programme for the week.

Lewis Bartlett

Where I'm based:
UC Berkeley (California, USA) / University of Exeter (Cornwall Campus, UK)

What I do:
I'm almost two years into my PhD, where I study the evolution of infectious diseases and the role of management in honeybee declines – both as independent topics and where they intersect. I specialise on how spatial structuring of populations influences the diversity of pathogens, tackling this question using theoretical / mathematical approaches, a laboratory model system, and my field system of honeybees.
You'll hear more about my background and how I ended up here during the summer school – but in brief I studied Natural Sciences with eventual specialism in ecology, evolution and conservation. I've worked on paleoecology, theoretical macroecology, environmental monitoring, and zoo exhibit design, before returning to my first ever pieces of real research on bees and disease.
I also bake, beekeep, and spend phenomenal amounts of time reading trash on the internet.

Where to find me on online:
Twitter: @BeesAndBaking
LinkedIn: https://www.linkedin.com/in/lewis-bartlett-7675b686
ResearchGate: https://www.researchgate.net/profile/Lewis_Bartlett
Google Scholar: https://scholar.google.com/citations?user=PV5ca5UAAAAJ&hl=en
Web Pages: https://bootslab.org/people/
http://biosciences.exeter.ac.uk/staff/postgradresearch/index.php?web_id=Lewis_Bartlett

What inspires me:
How crucial ecology can be to people's lives and livelihoods – that research can and will make a real difference if properly communicated and scientists engage with the public. Visiting schools, speaking to beekeepers, watching my colleagues be called to arms as soon as the ebola outbreak hit – that's where my inspiration comes from.

What I wish I'd known as a 2nd year UG:
That you can never guess which bits of information you are picking up might eventually be to your advantage. Don't become disheartened at perceived mistakes – future you might well be thankful for them later.

My one top tip for anyone considering an ecological career:
Have a plan, but don't expect to stick to it. Stay absolutely flexible and open minded. Follow opportunities as they appear to you – if you're given a chance to do something, it's probably because someone with more experience than you can see you'd be right for it – and it for you.

Melanie Edgar

Where I'm based:
Faculty of Life Sciences, University of Manchester, Oxford Road, Manchester, M139PT
Natural England, Ingleborough National Nature Reserve, Colt Park Barn, Chapel-le-Dale, LA63JF
National Trust, Yorkshire Dales, Malham Tarn Estate, Settle, BD249PT

What I do:
My interest is in utilising research techniques to develop applicable land management strategies, for farmers at the individual farm-scale, to improve animal welfare and offset farming environmental impacts whilst maintaining economic viability within the agricultural industry. I am currently reading for a PhD Environmental Biology at the University of Manchester, funded as a BBSRC CASE student working alongside Natural England and the National Trust. My project aims to explore how grazing influences soil carbon and nitrogen storage, and greenhouse gas emissions in upland grasslands. The ultimate goal is to provide a mechanistic understanding of the effects of grazing that can be used to formulate land management strategies for climate mitigation in the uplands.

Where to find me on online:
Twitter: @agroecofarm
Instagram: @agroecofarm

What inspires me-
I am passionate about using ecological research methods to accurately inform and monitor changes in environmental management strategies in order to ensure that they achieve their aims once implemented. I also want to promote the use of research results in the "real-world" and the dissemination of research to people working in all disciplines rather than those with a scientific background only. I believe everyone should be able to locate the

research on which policies affecting their lives are based and that this research should be universally understandable and applicable.

What I wish I'd known as a 2nd year UG:-
It is okay to not know exactly what you want to study in future and where you want your career path to take you. Use your time as an undergraduate to explore as many aspects of science as possible otherwise you won't know what you're missing. There might be some areas of science that you suspect you'll love that you'll despise and others that you suspect you'll despite that you'll grow to love, but you don't know unless you try them all out for yourself. Specifically, look for internships, work experience placements, volunteering positions, and any other available opportunity. Don't be scared to write to academics about placements – I spent one summer working at Exeter University because I wrote to a lecturer whose scientific paper has interested me asking if she wanted summer assist. You'll be amazed how many people will be happy to train you and encourage you in their research field, and if you decide agricultural, environmental or soil biology are potentially your dream research field come chat with me about opportunities for placements both in field and in laboratories.

My one top tip for anyone considering an ecological career:
Unless there is a seriously good reason not to, say "yes" to every opportunity thrown at you and don't be afraid to tell your supervisor or tutor you want to tailor a project, such as your dissertation, to your own personal interests as much as possible. My PhD project has expanded greatly over the last two years so that, in addition to the research goals outlined in the original proposal, I have added those that are of specific interest to myself and my industrial partners. This does mean that I work long hours and collect huge volumes of data, but more importantly it means I have developed a large number of skills, learnt new experimental methods, and greatly expanded my own personal interests.

Scott Davidson

Where I'm based: University of Sheffield

What I do:
PhD title: Scaling CH_4 fluxes in spatially heterogeneous Arctic landscapes: the importance of vegetation
I am researching linkages between vegetation communities and methane (CH_4) emissions at multiple scales in Arctic tundra landscapes in North Alaska, USA. I am interested in i) identifying the key biotic and abiotic drivers of CH_4 fluxes across fine-scale

micro-topographic features and ii) combining vegetation community analyses with field spectroscopy and remote sensing to improve vegetation mapping and thus enable better understanding of scaling from chamber to eddy covariance tower measurements.

Where to find me on online:
Twitter: @scootjd
Web: sjdavidsonecology.com

What inspires me: I have always been inspired by the extremes of the plant, be it an arctic or desert ecosystem. This led me to pursue my chosen career in looking at the impact of climate change on high Arctic ecosystems. We were told on the first day of our PhD that by the end of it we would be one of the leading names in our field… I scoffed at that initially but using that notion has definitely motivated me! Now I am 9 months from finishing and it was a pretty accurate statement which is incredibly exciting!

What I wish I'd known as a 2nd year UG: I'd always encourage students to get into the field as much as possible and try as many different things. Even if it is not exactly you're chosen field – a small chance encounter in something may lead you on a different but just as exciting path!

My one top tip for anyone considering an ecological career: My one tip would be learn how to ID species correctly – if you want an ecological career and you have the ability to look at something and know what it is right away– you are quids in!

Catie Gutmann Roberts

Where I'm based: Bournemouth University and the River Teme, Worcestershire for field work

What I do: PhD in fish ecology:
Population ecology and behaviour of European barbel *Barbus barbus*, a recreationally important, translocated fish

Where to find me on online:
Twitter: @CatieGR
LinkedIn: - https://uk.linkedin.com/in/cgutmannroberts

What inspires me- Conservation of freshwater biodiversity and specifically fish. Using focal species to conserve complex ecosystems whilst maintaining the important functions of ecosystems for society.

What I wish I'd known as a 2nd year UG:- To join societies and networks outside of the University such as the British Ecological Society and Professional institutes so you can begin to learn who are the important people in your field and the different roles you can aspire to. Also, many years after you finish you undergraduate, it is not the sitting in the lecture hall that you will remember but the practical work and field work so take as many opportunities to get in the field and see the systems you study.

My one top tip for anyone considering an ecological career: Engage in social media discussions that are relevant to your topic, it could end up landing you a position or lead to someone asking about your research. Always continue your development and whilst your academic achievements are incredibly valuable, it is the experience that you have to compliment that which will bring you success. So take every opportunity to get work experience, even if it means occasionally sacrificing some free time or working unpaid.

Simon Tarr

Where I'm based: University of Nottingham

What I do: I am a PhD student in the school of geography at Nottingham University. I describe myself as a macroecologist who is interested in large-scale patterns of diversity. My current research is focussing on the use of species' traits to detect interspecific competition between lizard species across the Caribbean. Prior to starting my PhD I did my undergraduate and masters' degrees in Zoology, also at Nottingham Uni (but in the school of biology).

Cass Raby

Where I'm based: University of Liverpool; Institute of Zoology (ZSL)

What I do: I'm currently a PhD student in my second year, studying the disease ecology of gastrointestinal parasites in primates. To collect my data I managed a research station in remote Namibia where I followed two wild baboon troops, as part of the Tsaobis Baboon Project.

Prior to my PhD I have worked as a field assistant and lab technician: I discovered an interest in microbial ecology by working on testate amoeba at the University

of Leeds; assisted in the production of medical products; studied avian ecology across Europe; as well as working for the Tsaobis baboon project, which lead me to my PhD.

I gained an MSc from the Royal Veterinary College, and a BSc (Hons) Zoology from the University of Nottingham.

Where to find me on online:

Twitter: @Cassie_Raby
Webpage: https://www.zsl.org/users/cassandra-raby
Research Gate: https://www.researchgate.net/profile/Cassandra_Raby

What inspires me- My peers – being around people who are inspired by, and enthusiastic about, ecology are really important to me. They help keep the passion going even when it all seems like tough work.

What I wish I'd known as a 2nd year UG:- Appreciate the advice and wisdom that me lecturers had. I imagine I could have learnt a lot more from them about their research interests and information about career progression – they are a pretty useful resource!

My one top tip for anyone considering an ecological career: Stay open minded about research and job opportunities. Moving around in different specialisms and locations opened many doors and taught me more about the topic I'm truly passionate about.

Teaching Groups

During the week, you will split into two teaching groups so that you can do more small group work. These are your teaching groups:

	Group 1:	Group 2:
PhD Mentors	Lewis Bartlett	Scott Davidson
	Melanie Edgar	Cass Raby
	Catie Gutmann Roberts	Simon Tarr
UG Students	Chloe Andrews	Kim Ara
	Henry Bain	Sarah Callow
	Jack Beckwith	Matt Chaib
	Bryn Boothby	Lauren Clark
	Dean Claxton	Cecilia Derrick
	Hannah Corrigan	Rebecca Ellis
	Kostas Dagklis	Chris Fitzpatrick
	Rhiannon Dowling	Rhianna Goble
	Denisa Gambalova	Ali Gray
	Caroline Hall	Iona Haines
	Sam Hillman	Khalil Jauffur
	Anna Holliday	Rebecca McCerey
	Grace MacMillan	Emily Phynn
	Rebecca Marsh	Katie Pownall
	Amber Martin Smith	Sarah Raymond
	Amelia Newton	Ffion Roberts
	Charlotte Page	Hannah Shanks
	Charlotte Pink	Sophie Smith
	Bethany Roberts	Luke Sutton
	Max Robinson	Callum Sykes
	Louisa Smith	Nigel Tarrant
	Sarah Spotswood	Katie Tomsett
	Poppy Ann Taylor	Sophie Wakefield
	Iona Thelwall	Bea Walecki
	Gabriella White	Sophie Webster
I2S Students	Victor Aforo	Hamed Ali
	Isabella Eaves	Maisie Geobey
	Ming Hu	Joshua Iton
	Annabel Leonard	Patricia Vieira Parreirao
	Shnelle Owusu-Nfum	Phoebe Whitehead

Prof Sue Hartley

Sue is director of the Environmental Sustainability Institute, at the University of York. Previously she was Professor of Ecology at the University of Sussex, specialising in interactions between plants and animals. In December 2009 she delivered the Royal Institution Christmas Lectures on *The 300 Million Years War*, broadcast on All4 and currently available to view.
Sue is the President of the British Ecological Society.

@ProfSueHartley

Pests, pathogens and unpredictable rainfall – how ecology can help us address global challenges in sustainable food production

Feeding a growing population in a warming world, whilst protecting biodiversity and the services it provides, will require innovative thinking, unprecedented cooperation between countries and academic communities, and a willingness to cross the boundaries between disciplines. Securing the production of sufficient, safe and nutritious food has been a challenge since the beginning of agriculture around 10,000 years ago. Food production is compromised by the pests and diseases which attack our crops and is increasingly threatened by unpredictable and extreme weather. Globally around one third of food production is lost to pests, even with the use of pesticides and other modern methods of crop protection. Given the projected increase in demand for food (up to a 70% increase by 2050 according to the UN) and the impacts of climate change on the spread and abundance of pest species, we urgently need new ways to protect our crops, preferably sustainable ones which are not dependant on scarce resources to produce and which do not harm the beneficial organisms in agricultural ecosystems. We also need to make our crops more resilient to climate change, particularly the increasing likelihood of drought and water scarcity as temperatures rise and weather patterns change.
This talk explores a number of inter-disciplinary approaches which may provide these new sustainable methods of crop protection and resilience, based on capitalising on the natural defences our crop plants have to these stresses. The ability of our crops to defend against pests and survive drought has been reduced because we have selected varieties with high yield at the expense of other beneficial traits, but it still exists in wild ancestors, offering us the possibility of restoring these capabilities to our crops in the future.

Dr Andrew Hinde

Speleobiology and Cave Conservation.

An investigation of plant and animal species using Scoska Cave and an exploration of the cave to consider the need for cave conservation.

Photo by Black Rose CC

Where I'm based: Ingleborough National Nature Reserve

What I do: I am the Reserve Manager at Ingleborough NNR

I am also the Cave Conservation Adviser at Natural England and the Conservation and Access Officer at the British Caving Association.

Where to find me on online:

Email: Andrew.hinde@naturalengland.org.uk

What inspires me- The timeless nature of the underground environment and the fact that caves are the last frontier for real explorers. (They are not on google earth!)

My one top tip for anyone considering an ecological career:

Volunteer for everything. Make yourself indespensible.

Dr Stephen Morley

Limestone flora of Malham

Learn about the richness of the limestone flora around Malham and how to ID some of the more common species and do some basic survey, with an opportunity to practice some more in-depth survey techniques for those with good botanical skills already.

Where I'm based: National Trust

What I do: I have a BSc Hons in botany, but I've worked as an ecologist for many years, currently for the National Trust throughout Yorkshire and the North East of England, advising the NT on land species management. Prior to this I worked for statutory nature conservation bodies in both England and Wales as a conservation officer and vegetation surveyor respectively.

Where to find me on online:

Twitter: @Ruefun
LinkedIn: Stephen Morley
Webpages: http://www.nationaltrust.org.uk/nature-and-wildlife

What inspires me. Experiencing relatively "wild" areas of the UK, and knowing that I am contributing to conservation (and improvement of!) these areas for future generations, as well as helping to revitalise large areas of the wider countryside with sustainable, long-term management.

What I wish I'd known as a 2nd year UG: I wish I'd known about the practical aspects of ecology, and how it can be applied in the real world and how that relates to the numerous potential careers in ecology; my ecology lecturer was not particularly inspiring, work was almost entirely theoretical, and careers guidance was virtually non-existent.... if I had known that there were careers in ecological monitoring and management I would have put more effort into gaining practical knowledge and experience of the areas that interested me.

My one top tip for anyone considering an ecological career:

Experience, experience, experience… get out there and learn your flora and fauna, either by yourself, or preferably with voluntary or naturalist groups or (paid or voluntary) work; it's very easy to develop your skills and keep them up to date these days, with lots of online guides and fora to keep you on the right track. At the end of the day it's the person with experience who gets the job…

BRITISH ECOLOGICAL SOCIETY

The LINNEAN SOCIETY of London

Prof Simon Leather

Sponsored by the Linnean Society

Entomology – the little things that run the world

The lecture will give an overview of entomology, the major groups and history of the science. The practical work will involve a demonstration of sampling methods and the opportunity to use them to collect different representative groups. We will then identify our catches to at least Order level, many to family and in some cases to species.

What I do:

In September 2012 I moved to Harper Adams University to become Professor of Entomology in the Department of Crop & Environment Sciences and to head up the newly launched Centre for Integrated Pest Management. I teach at undergraduate but mainly at MSc level, and still run the only Entomology degree in the UK (which moved with me from Imperial College). I currently supervise seven PhD students and have successfully supervised 48 through to completion. Thanks to their efforts I have been able to publish more than 200 refereed papers and write and edit eight books.

I was part of the first National Insect Week organising committee. I do have interests outside the Royal Entomological Society, I was Chair of the British Ecological Society's Publications Committee from 2002-2006 and an Associate Editor of the *Journal of Animal Ecology* from 2004-2014. I also served on the Editorial Board of the *Bulletin of Entomological Research* from 1993-2006. I have been a Senior Editor of the *Annals of Applied Biology* since 2005 and became Editor-in-Chief in 2015. I was also a member of the BBSRC's Training and Awards Committee from 2008-2011. I was a member of the Tree Health & Plant Biosecurity Expert Taskforce and chaired the UK Plant Science Federation's Training & Skills Working Group in 2014. I have been a Trustee of the Scottish Forestry

Trust since 2014 and am a member of the Entomological Club and have been the Verrall Supper Organiser since 2013.

Where to find me on online:

Twitter @Entoprof
Don't Forget the Roundabouts : https://simonleather.wordpress.com/
ResearchGate
My staff page http://www.harper-adams.ac.uk/staff/profile.cfm?id=201220

What inspires me:

The wondrous beauty and mystery of the insect world that is all around us and so little appreciated by most people? There is so much more to discover, a million species so far described and probably another eight million to find.

What I wish I'd known as a 2nd year UG:

That I could have started attending conferences and joining learned societies before I graduated

My one top tip for anyone considering an ecological career:

Being a good team worker never does anyone any harm

Fran Sconce

Where I'm based:

Harper Adams University (HAU) / Royal Entomological Society (RES)

What I do: e.g degree/ phd/ job title and short biography

PhD in soil biodiversity at HAU & part time outreach assistant at RES

Where to find me on online:

Twitter @franciscasconce LinkedIn /franciscasconce

What inspires me-

Diversity of insects, their importance within ecosystems and to humans, communicating this scientifically and with outreach to general public.

What I wish I'd known as a 2nd year UG:-

Skills are important for your CV, e.g. identifying invertebrates to certain taxonomic level or using a statistical package, take the time to develop these as you work through university assignments & projects.

My one top tip for anyone considering an ecological career:

Everyone you study with, work with, interview with or meet are potential future contacts wherever your career takes you, be sure to acknowledge and strengthen your relationships if you happen to cross paths.

Who we are:

The Linnean Society of London is the world's oldest active biological society. Founded in 1788, the Society takes its name from the Swedish naturalist Carl Linnaeus (1707–1778) whose botanical, zoological and library collections have been in its keeping since 1829. As it moves into its third century the Society continues to play a central role in the documentation of the world's flora and fauna – as Linnaeus himself did – recognising the continuing importance of such work to biodiversity conservation.

Members are drawn from all walks of life, and represent the full range of professional scientists and amateurs alike with an interest in natural history. The Fellowship is international and includes world leaders in each branch of biology who use the Society's premises and publications to communicate new advances in their fields.

BRITISH ECOLOGICAL SOCIETY

The LINNEAN SOCIETY of London

How we can help you:

We run an annual student lecture series, with A-level and UG students welcome to attend. This year we have Simon Watt giving his talk 'Why We Die' on Tuesday 4th October, and Helen Scales discussing her work in the field of marine biology on Tuesday 8th November. Previous lectures are also available through our Vimeo channel: https://vimeo.com/channels/studentlectures

Students are welcome to use our Library as a quiet study space, and the Library staff are very happy to help with research questions and sourcing material.

We are currently looking to expand our student Fellowship offering, so please get in touch with any suggestions of things we could do to help you!

Our online resources:

Student lecture information: https://www.linnean.org/education-resources/student-events-and-resources/student-lecture-series

Fellowship information: https://www.linnean.org/our-fellows/become-a-fellow

Library information: https://www.linnean.org/library-and-archives

Library catalogue: http://linnlibrarycat.cirqahosting.com/

Online collections: http://linnean-online.org/

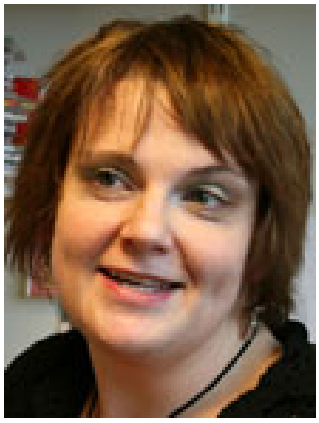
Our social media:

https://www.facebook.com/linneansociety/

@LinneanSociety

How to get in touch with us:

education@linnean.org



Dr Lesley Batty

How clean is my river?

In this session we will be exploring how we can use macroinvertebrates within rivers to monitor water quality. We will use chemical and physical measurements to determine the 'typology' of the river before sampling invertebrates from within the river to identify both abundance and diversity within the systems. Biological indices will be used to assess whether the rivers meet the definition of 'good ecological status' and we will discuss what threats there might be to water quality in the area.

Where I'm based: University of Birmingham

What I do: I am a Senior Lecturer in Environmental Science at Birmingham and my expertise is in the ecology of pollution. I not only look at how pollutants such as heavy metals, oils and nanoparticles affect organisms, but I also look at how ecological systems can be used to restore and remediate contaminated sites. I am deputy chair of the British Ecological Society's Education, Training and Careers Committee.

Where to find me on online: I am on Linkedin as Dr Lesley Batty and you can follow myself and my colleagues on twitter @EVS_bham

What inspires me

Nature inspires me and it's as simple as that. The sheer diversity and beauty of our natural systems makes me get up every morning, to explore it and, most importantly, share it with other people

What I wish I'd known as a 2nd year UG:

I wish I had known how important it is to make connections. Being confident in talking to other people, and in particular those that are further up the ladder is a key skill, and I definitely wish I had learnt how to do this early on

My one top tip for anyone considering an ecological career:

Don't be afraid to speak up. Talking to other people is absolutely essential to getting on and having confidence in your ability will take you a long way.

BRITISH ECOLOGICAL SOCIETY

Functional Ecology

The Functional Ecology Short Guide to Scientific Writing

Emma Sayer

A research paper is not only about presenting information - it's about communicating that research to others. We've collected tips on science writing from various sources to provide a quick-reference on good practice for presenting and structuring the information in manuscripts (and other forms of science writing). The advice uses the basic principles of good communication to get key messages across and make it easier for others to see the importance and novelty of a piece of research.

1) Know your audience

The central principle for scientific writing is exactly the same as for any other type of communication: ***know your audience***. When we start preparing a manuscript, we need to think about who will read it. In the first instance, this is probably a busy editor or reviewer, so we should make sure that we get our key messages across without making our readers work too hard. Ideally, we would like the reader to follow a clear line of reasoning and come to the 'right' conclusion - we want our readers to accurately see what we, the authors, had in mind.

There are a few general principles of how to get a message across and to make it stick in people's minds. These can be adapted to any form of communication, including science writing, and remembered with the acronym SUCCES (Heath & Heath 2007):

- **S**imple — keep it simple by finding the core or the main message and sticking to it.
- **U**nexpected - use the unexpected to grab the reader's attention e.g. a knowledge gap, unforeseen consequences, an unusual feedback, etc.
- **C**oncrete —the central concept should be easily grasped and remembered
- **C**redible — it must support interpretation and discussion with evidence
- **E**motional — the readers should *care* about the research by stimulating interest and highlighting the importance or relevance of the study.
- **S**tory — people enjoy and remember stories, so a good manuscript is a narrative about the research, with a logical train of thought.

Although we're constrained by scientific convention and the fixed format of most journals, we can still tell a simple, concrete and credible 'story' (non-fiction) about our

research. We can use elements of the unexpected to show the novelty of the research and help the reader remember our paper by tapping into emotion (e.g. curiosity, amazement).

2) A different take on the main sections of a paper

The title gets people reading the paper.

The title should be brief and clear, summarising the main finding of the paper (think of a headline). It's wise to avoid questions, convoluted sentences, and too much detail. The title should be simple and concrete, and it can also incorporate something unexpected. The most important part of your title should come first (the second half may not appear in a list of search results).

The abstract determines whether they read on

The abstract should get the main messages across without drowning the reader in detail. It can be the hardest section to write because it needs to contain all the key information in an easily digestible form within a very strict word limit. The BES journal convention of numbering sections in the abstract or summary is useful for ensuring that it includes a brief background or justification, a broad description of the approach used, key findings, and a final statement (the *synthesis*) about the relevance of the study.

The introduction sets the scene

The introduction presents the background for the paper and shows the reader *why* they should be interested in the study. It should be a logical train of thought leading the reader to the conclusion that the study is novel, exciting and worth doing. It is tempting to do a mini-literature review but it is actually better to keep it simple and concrete by including only the information relevant to the immediate study subject and the reasons for doing the research. The introduction usually concludes with clear research aims or hypotheses to be addressed in the paper. At the end of the introduction, the reader should *want* to know what the outcome is.

Methods: it's all about the detail

It can be hard to get the level of detail right. The methods should provide enough information for the reader to 1) understand how the design of the study addresses the

research aims or hypotheses and 2) judge whether the methodology and data analyses are appropriate. Details such as the number of plots, experimental treatments, frequency of data collection etc. are crucial, but we can usually omit details that have no influence on the measurements, results, or the way the data is collected. We may need to include more detail if we're writing a methods paper but even then, it's probably irrelevant whether the data were collected on a Tuesday rather than a Wednesday. We usually use a lot of conventions and jargon to keep the methods section concise but it should still be clear and comprehensible.

Presenting the results: Logical vs. interesting

Determining the order in which to report findings in the results and discussion sections is tricky. The 'logical order' gives basic results first, whereas the 'interesting order' highlights the novelty of the study by reporting the most exciting results first. The solution usually lies somewhere between the two. It is useful to refer back to the research aims or hypotheses (given in the introduction) to show how the results address them; this also helps get the most important findings across clearly.

A good way of thinking about this section is to decide which results are 'key results' and which ones are 'supporting results'. The key results are the novel findings that will be discussed, the 'supporting results' are there to lend weight or provide evidence for the interpretation of results and to support the conclusions.

The discussion is our playground

Of course the discussion should focus on the most interesting results but it is also the section where we are less constrained by convention and there is room for interpretation. There are at least four common types of discussion that really let an otherwise good paper down:

1. *The Saga*, where each result (no matter how trivial) is discussed separately in turn. This can produce a very long and unexciting discussion of peripheral results and bury the most interesting findings of the paper.
   We can avoid writing a saga by focusing the discussion on the most exciting or novel findings and using the other results to interpret them and draw conclusions. It may sometimes be necessary (or wise) to reorder the results section to achieve this.
2. *The Whodunit*, where the reader is presented with various lines of evidence and the conclusion is drawn at the end. This leaves the reader guessing about the important facts while they wade through details.

We can avoid a whodunit by giving the main finding upfront (topical sentences, see below) and subsequently explaining the line of reasoning with reference to 'supporting' results or other published studies. A concluding statement to round up the paragraph can emphasize the key message.

3. *The Report*, where the results are presented only in comparison to other studies, with little or no interpretation. This not only distracts from the study and highlights other people's work instead, but it is also a missed opportunity to show the relevance of the study and present new ideas.
4. *The Fairy Tale*, in which the discussion is sidetracked into lengthy sections on things that could have been important but were not measured or in which interpretation crosses the line into pure speculation that is not supported by the results.

A really interesting discussion brings together different lines of evidence based on the results of the study and other published work to make sound conclusions and/or propose new ideas and hypotheses to be tested in future.

Conclude your paper with your actual conclusions!

Your conclusions should be more than just a summary of the results (although some of the results can be given to support the conclusions). A good way to think about it is: What should the reader remember from the paper? What is the relevance of the results? Why should anyone care about this study? Are there any unanswered or new questions? ***The worst way to end a paper is to leave the reader thinking: "So what?"***

3) Structure within structure

When we read, our brain processes information in a certain way, and we can use this to our advantage by placing different types of information in 'strategic' locations within paragraphs and sentences to emphasize key messages. In general, the reader is most likely to remember the information at the end of sentences and in the first and last sentences of a paragraph.

'Topical sentences' guide the reader. The first sentence of each paragraph should make it instantly clear what the paragraph is about - this is a 'topical sentence'.

- In the methods section, this is often the reason for making a measurement (e.g. "To determine the influence of X, we measured...").
- In the results section, it is usually the main finding of each analysis. If possible, we should avoid very general statements about things being 'significantly

different' and instead describe the difference (e.g. "Parasite load in X was significantly reduced by 30%...").

The topical sentence is very important in the discussion because it highlights the main findings before discussing them in context. The main point(s) can be emphasized in the last sentence too, but the topical sentence will stop the paragraph from becoming a 'whodunit'.

A really good way to check for topical sentences is to write out or copy/paste the first sentence of each paragraph into a new document to see if it gives you a rough summary of the content.

Use the 'stress position' to emphasize information. Readers naturally emphasize the material at the end of a sentence; this is referred to as a 'stress position' and can be used to the writer's advantage. By placing information at the end of a sentence, it appears at the moment when the reader will naturally give it the greatest reading emphasis. As a result, the reader is more likely to see the statement as being important (e.g. "We observed no effects of drought on arthropod abundance but there was a significant decline in the number of earthworms.")

We often need to report information that is not particularly interesting and may even distract from our key messages (e.g. non-significant results). The best place for this type of information is in the middle of the paragraph. Some of these 'supporting results' can also help plug logic gaps (see below).

4) Improving the flow of information

Mind the logic gap! We can become so familiar with our research that we omit information that may seem unnecessary to us, but might not be obvious to others who are less familiar with the subject. Following a line of reasoning through to a conclusion is like climbing a ladder: each piece of information is a rung required to reach the next one; if there's a rung missing, the line of reasoning is broken and the reader will never reach the top. It's a good idea get feedback from someone who works outside the immediate research area before submitting your paper, as they are more likely to spot logic gaps. We are writing with the reader in mind, so if a reader or reviewer doesn't 'get it', then we probably haven't explained it clearly enough.

Get straight to the point! If there's a lot of repetition in a section of text, then it probably needs restructuring. We are often constrained by word limits, so it is important to cut down on unnecessary detail or jargon. We should only include information that is relevant to the study and the interpretation of the results and drop the rest - no matter how interesting it is or how much hard work it was. Good science writing is not about using clever-sounding words and sentences, it's about getting the point across in such a way that readers can understand the research and reach the right conclusion (i.e. the one we want them to reach).

Use figures and tables to your advantage. The best figures show the important result at a glance. They should also help cut down on lengthy explanations. Tables are useful for summary and 'auxiliary' data; as a general rule, if a text section reads like a list with lots of numbers, the information would probably be better off in a table. Unless the paper is actually about statistical methods, tables of statistics are best placed in an appendix.

Use terms consistently and avoid too many abbreviations. It is tempting to use different terms for the same objects or variables to make the text less repetitive, but this can confuse readers who have less in-depth knowledge of the study. The reader may not be familiar with some of the abbreviations, so non-standard abbreviations should be logical (e.g. N+ for nitrogen addition treatments) and we should only use as many different abbreviations as is absolutely necessary.

5) A little bit of grammar

Direct, active-voice sentences are clearer and more dynamic

- We observed an increase in growth in the high-diversity plots. ✓
- An increase in growth was observed in the high-diversity plots. ×

Limit prepositional phrases

- Arthropods accelerate decomposition by breaking down litter and providing greater surface area for microbial decomposers. ✓
- Arthropods are important for accelerating decomposition by breaking down the litter and providing greater surface area for microbial decomposers. ✗

Avoid the passive tense (we did, not "this was done")

Especially avoid: 'It has been shown to be', 'It has long been known', etc.

Limit noun strings (nouns that modify nouns)

- Governments should create effective mechanisms for scientists to explain how they spend taxpayers' money. ✓
- Community information feedback mechanisms are important if governments want scientists to explain how they spend taxpayers' money. ✗

Put new and important information at the end of sentences

- Although X had no effect, tree growth was significantly greater in Y. ✓
- Although tree growth was significantly greater in Y, X had no effect. ✗

Use 'because' instead of the present continuous

- Soil microbes are important because they are able to mineralise nutrients from organic matter ✓
- Soil microbes are important, being able to mineralise nutrients from organic matter. ✗

Avoid 'useless' nominalisations (noun forms of verbs) - especially after verbs, 'there is' and other nominalisations

- We investigated the effect of... ✓
- We conducted an investigation into the effect of... ✗
- The floods considerably eroded the land✓
- There was considerable erosion of the land from the floods. ✗

- As the ground was unstable, we were unable to complete the field study. ✓
  The instability of the ground precluded the completion of the field study. ✗

You can find other useful examples of nominalisations here: https://www.physics.ohio-state.edu/~wilkins/writing/Handouts/nominalization.html

Use the simple alternative for words and phrases ("Don't utilise 'utilise', use 'use' instead.")

- 'near' or 'nearby' instead of 'in close proximity to'
- 'except' instead of 'with the exception of'
- 'in terms of' and 'with regard to' are usually completely unnecessary

Finally, we can learn from the best by taking the time to analyse other people's writing style. We all read a lot of papers - some are a pleasure to read and others are confusing. It's worth trying to work out why one paper is so much easier to follow or so much more memorable than others. We may think that something sounds good or important because we like a particular phrase or buzzword, but we only notice it because the author wants us to...

Authorship and acknowledgements

Written by Emma Sayer on behalf of *Functional Ecology*. We've collated tips and tricks borrowed from the references below but much of this guide is based on constructive criticism from supervisors, colleagues, co-authors, reviewers, and editors. We've also learned lots of lessons by scrutinizing particularly good and bad examples of scientific writing.

References and further reading:

Heath & Heath (2007) *Made to Stick,* Random House.

Schimel (2011) *Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded.* Oxford University Press.

Gopen & Swan (1990) The Science of Scientific Writing. American Scientist, Nov-Dec 1990.

More useful examples of nominalisations: https://www.physics.ohio-state.edu/~wilkins/writing/Handouts/nominalization.html

Slim down wordiness with the Writer's Diet tool online: http://writersdiet.com/?page_id=4

Dr James Chong

Sponsored by the Microbiology Society

Mapping microbial communities – a molecular approach

Microbes are everywhere, but the "great plate count anomaly" suggests that we can only characterise a small proportion of this diversity using conventional culturing techniques. In this session we will explore the molecular methods that can be used to investigate the more elusive species and consider some of the latest technologies that can help us to understand the dynamics of microbial communities.

Where I'm based: Department of Biology, University of York

What I do: I studied Molecular Biology with a year in industry as an undergraduate at the University of Manchester. My PhD project at the Imperial Cancer Research Fund (now Cancer Research UK) used frog eggs to identify a key protein complex required for DNA replication using biochemical methods before I moved to Cold Spring Harbor Laboratory in New York as a post-doc, where I learned yeast genetics and became interested in methanogenic archaea. I started my own research group at the University of Bath in 2000. I have been at York since 2004 where my group is interested in understanding the dynamics of anaerobic microbial communities – in particular those responsible for the production of biogas from organic waste.

Where to find me on online:

Twitter: @insanity_one
Linkedin: James Chong
Blog: http://sevenweekssouth.blogspot.co.uk/
Web: https://sites.google.com/a/york.ac.uk/chonglab/home

My one top tip for anyone considering an ecological career: Learn to code!

Thorunn Helgason

What I do: I have a BSc in Ecology, and a PhD in the genetics of native Scots pine.

I'm senior lecturer in Ecology at the University of York, and teach in course on plants, microbes, and also DNA analysis of individuals and communities in field systems. My research is focussed on mycorrhizal fungi, a group of fungi that grow inside plant roots and help them to grow in return for carbon (energy), and soil microbes generally. My group includes PhD students and research staff, and they work variously on how soil fungi help crops to grow in wheat and grassland systems, how mycorrhizal fungi may drive tropical forest diversity, and how microbial communities change in saltmarshes and honeybee guts.

Where to find me on online:

@Luehea

What inspires me-I like knowing how living systems work. There are so many patterns around us – seasons, leaf shapes, how many animals a field can feed – and I like to know what processes and systems drive what we see. If I were interested in cars, I would be the person taking the engine to pieces. Since I am not interested in cars, I'll be the one working out where the boggy areas of ground are, because of the plants growing in them…

What I wish I'd known as a 2nd year UG: As an ecologist, I wish had been less specialised less early, and had done more biochemistry and/or chemistry (both of which I avoided strenuously as a student)

My one top tip for anyone considering an ecological career: longer term development as they progress through degrees and into career pathways

Two things are really important:

1) Be a field ecologist, and natural historian. Learn the animals and plants around you – they are there, in parks and gardens and streets and roofs, but it takes time and practice to get your eye in that a course on its own will not deliver. I'm a no more than reasonably competent botanist, and can make a guess at beetles, butterflies and moths. But I know where to go and who to ask for a better identification (twitter is totally amazing for this if you follow the right people!). But it is a really important skill for an ecologist to be able to visit a new site and to have some idea about what is there, and perhaps what that tells you about it.

Have another skill set as well. I classify ecologists roughly into 3 groups – "chefs" – who follow recipes in the laboratory and do wet lab molecule and chemist analyses; "engineers" who are involved with instrumentation, and build devices that go in to the field to measure things; and finally "typists" who are the mathematical modellers and theorists, who develop mathematical descriptions and ways of testing of how processes and/or individuals behave (in the broadest sense) in time and space. All of these are hugely useful job related skills – combined with field ecology, this opens up all sorts of doors, in research, ecological consultancy, the construction industry, education, tourism, etc.

Who are we: Microbiology Society

The Microbiology Society is a membership organisation for scientists who work in all areas of microbiology. It is the largest learned microbiological society in Europe with a worldwide membership based in universities, industry, hospitals, research institutes and schools.

The Society publishes key academic journals, organises international scientific conferences and provides an international forum for communication among microbiologists and supports their professional development. The Society promotes the understanding of microbiology and microbes to a diverse range of stakeholders, including policy-makers, students, teachers, journalists and the wider public, through a comprehensive framework of communication activities and resources.

How we can help you-

We have undergraduate membership available for just £10 a year, that give you access to a range of grants and free attendance at our annual conference and events. You will also receive hard copies of our quarterly magazine, *Microbiology Today*.

There is also a wide range of opportunities to volunteer with the society on education and outreach, policy work, or becoming a Society Champion.

Our online resources- The Society has a range of news stories, policy briefings, factfiles and blog posts relevant to current research and news in microbiology. We also publish a quarterly magazine, *Microbiology Today*, which is available to read online and several of our journals are now open access

Our social media- @microbiosoc www.facebook.com/microbiologysociety

How to get in touch with us- info@microbiologysociety.org

Careers in Ecological Consultancy, Statutory and Voluntary Sectors

Five members of the Chartered Institute will offer guidance on some of the main routes into the profession, with tips on how to get ahead in a competitive jobs market. The first part of the workshop will explore the role of the ecological consultant, followed by presentations from each of the speakers on their own career paths and roles within different kinds of organisation. This will be followed by an interactive group exercise, exploring the applications of ecology. There will be plenty of opportunity to talk to the speakers during question and answer sessions.

Andrew Halcro-Johnston

Where I'm based: Amey, York

What I do: I'm a professional ecologist with eight years of experience in environmental consultancy. Since 2015 I've worked for Amey as a Senior Ecologist, providing environmental support to upgrades of rail and highway infrastructure, which is challenging and interesting work! Prior to that I was an Ecologist with Golder Associates, where I was part of a small team undertaking ecological surveys, assessment and compliance services for a range of commercial and public sector clients. Outside of work I'm involved in a number of local wildlife groups and the CIEEM Yorkshire and Humber Section committee. I have a BSc (Hons) degree in Biology and an MSc in Conservation Ecology.

Where to find me on online:

uk.linkedin.com/pub/andrew-halcro-johnston/a0/755/605/

http://www.cieem.net/yorkshire-and-humber-committee-profiles

What inspires me- Working with nature and wildlife, being outdoors and always being challenged to develop my skills as an ecologist and environmental consultant.

What I wish I'd known as a 2nd year UG: The full range of careers available in ecology and how I could best develop my studies and voluntary interests to follow that path. Environmental consultancy is my second career, having retrained from a former life in scientific/educational publishing!

My one top tip for anyone considering an ecological career: Get stuck in volunteering for the local wildlife trust, university conservation group, etc and develop your interest in wildlife survey and ID – employers looks for motivated ecologists with good field skills.

Alistair Headley

Where I'm based: West Yorkshire but I will soon be moving to the Isle of Skye via County Durham – another post referendum English middle-class émigré!

Background: I was interested in wildlife (not having a wildlife) at an early age (6 years). I was not trying to save the planet (the planet will carry on quite happily without me). Botany undergraduate degree at the University of Manchester followed by a PhD (ecology of clubmosses) at the University of Manchester with summer work at a research station in the Arctic. I spent a year teaching at a field centre (Brathay Field Centre) in the Lake District and 3 years post-doctoral research (ecology of Wales' largest lowland wetland) at the University of Sheffield. Ecology Lecturer at the University of Bradford for 13 years before becoming an Independent ecological consultant for 13 years with a brief (1 year interlude) period as Principal Ecologist in a large engineering consultancy.

Where to find me on online: www.plantecol.co.uk

I do not use social media and I will not accept people on linkedin unless I know them well.

What inspires me - Curiosity about how the natural world works.

What I wish I'd known as a 2nd year UG:- Knowledge is power - therefore read around the subject as much as possible.

My one top tip for anyone considering an ecological career: Develop an expertise early on as it helps a lot, especially in an area where there are very few other experts. ***Success is often the result of serendipity and not necessarily achieved through planning, but planning can help.***

Kim Jennings

Where I'm based: JBA Consulting: Engineers and Scientists

What I do: I currently work as an Ecologist for an inter-disciplinary firm, which consists of professionals from a range of backgrounds including Ecology, Engineering, Geomorphology, Hydrology, Fisheries, Modellers, Landscape Architecture and Software Development.

I completed my studies at the University of Leeds where I undertook a Biology degree initially and continued on to gain a Masters in Biodiversity and Conservation.

Post-university, I gained initial survey experience on a range of short-term seasonal contracts and applied for a training scheme with the Yorkshire Wildlife Trust, where I was a Trainee Projects Officer. Following this, I moved into consultancy where I have begun to develop my skills further, especially regarding freshwater habitats and species.

Where to find me on online:

Blog Website: www.forceofnatureblog.com
Instagram: forceofnatureblog
Twitter: @ForceNatureSays

What inspires me- Initially what inspired me when I was younger was David Attenborough! #hero

Secondly, (and throughout my studies) was biodiversity in general. After all these years I still can't get my head around how much there is, how much there is still to learn and how much the natural world has to offer.

Now what inspires me the most, is being part of an active, diverse and proactive community which not only pushes scientific boundaries, but pushes for positive change at both national and international scales.

What I wish I'd known as a 2nd year UG: Never be afraid to ask. After all, if you don't ask you don't get!

My one top tip for anyone considering an ecological career: Work experience is essential, not only gain practical field skills, but more importantly to build up a network of key contacts. Having contacts early on in your career is an incredibly valuable resource as this sector is extremely small and personal recommendations go a long way.

Dave Martin

Where I'm based: Natural England, Lateral, 8 City Walk, Leeds

What I do: I am A Senior Environmental Specialist in the Terrestrial Biodiversity Team, a national team within Natural England. I provide advice on habitat and land management, particularly the impacts of livestock grazing on upland and grassland habitats. This includes the design and implementation of Land Management Schemes for farmers and land managers, and there role in delivering government wildlife conservation policy and objectives, including protection of designated sites, biodiversity targets and ecosystem service delivery. This is done through direct advice on difficult cases, design and management of monitoring and research and collating evidence form these and other sources to produce advice and guidance. I engage with a wide range of people including Defra policy makers, stakeholders such as NGOs and industry bodies, and consultants and contractors.

Where to find me on online:

Email address is david.martin@naturalengland.org.uk

Natural England website can be found at Natural England - GOV.UK

What inspires me The landscape of places I like to spend time – especially uplands and mountain areas, but also being able to enjoy wildlife around where I live and spend time with my family. I want to help people understand what is around them, including under their stewardship, and how they can look after it and help others enjoy it.

What I wish I'd known as a 2nd year UG: A greater appreciation of how what I was learning may be relevant to a job. I would have liked to have understood more of the methods and tools routinely used in (in my case) vegetation survey and assessment (I think many degrees have an applied aspect to them now that was perhaps lacking in mine). Possibly also a greater awareness of the statutory and regulatory framework.

My one top tip for anyone considering an ecological career: Take opportunities to develop a wide natural history knowledge outside of studies and work, but also consider how you might want to specialise, or compliment ecological skills with others e.g. business related. Gain practical experience through placements and voluntary work

Ryan Mellor

Where I'm based: Nottingham

What I do: After reading Biological Sciences (Zoology) at the University of Oxford and then an MSc in Environmental Science at Nottingham University (with a year at a drama school between), I joined a small, specialist ecology and soils consultancy. Following several corporate acquisitions and one job move, I currently lead a team of over 100 ecologists across the UK and Ireland for AECOM, a large company which provides engineering, environmental, architecture and management services worldwide. Much of our work is in the UK though our team has recently worked in east and west Africa, Asia and continental Europe, providing terrestrial, freshwater and marine ecology skills to public, private and third sector clients. My job involves responsibility not just for the technical aspects but also safety, financial performance and the future development of the team and the business. I work on projects assessing the ecological impact of development, sometimes acting as an expert witness. I also advise train and advice planners and clients how to meet legal and policy requirements for biodiversity and nature conservation, as well as how to manage land assets to benefit biodiversity.

Where to find me on online: Linkedin

What inspires me- My inspiration and motivation for my work comes from knowing we only have one earth, and that biodiversity underpins its health and the future of our own species: ecologists need to be right at the centre of understanding and communicating how to protect and restore it, and that feels a worthwhile thing to do. Day to day, I'm regularly inspired by the ability and enthusiasm of my team, and by seeing colleagues learn, develop and succeed**.** I'm also greatly encouraged when you go back and monitor what you've done and found it's actually worked**.**

What I wish I'd known as a 2nd year UG:-

1. That one day I would be a professional ecologist: I would have gone to more ecology lectures instead of playing hockey.
2. That there is no rush to decide and fix your sights on a career path; the job or career you may end up having and enjoy the most may not even exist yet.
3. That a little practical work experience often goes a long way in the eyes of a prospective employer.

My one top tip for anyone considering an ecological career: As well as all the usual stuff undergraduates and post-graduates are told to do, try to spend time (even if just a few days) with a range of industries/organisations, to see the variety of careers available and find out what the challenges and difficulties are. Then try and develop some thoughts and skills which help address those challenges. The areas of overlap between ecology and other disciplines is a great example of this, including interactions with socio-economics, health, air quality, noise, hydrology, and landscape design. People with good ecological skills who can also bridge these challenges and 'gaps' will usually be in demand.

BRITISH ECOLOGICAL SOCIETY

Britain in a Changing Europe

Join us for the first post-referendum public debate on the future of environmental policy in the UK following the vote to leave the European Union, chaired by Jonathan Dimbleby.

Co-organised by the Sibthorp Trust, the British Ecological Society and the Royal Geographical Society (with IBG), with support from the Society for the Environment and the Wellcome Trust.

The UK has voted to leave the European Union, launching the country into a period of uncertainty as a new relationship with Europe and the world is negotiated. The EU frameworks that have underpinned much of our environmental policy and legislation – from agriculture to protected areas – are no longer assured.

Yet the challenges of climate change and biodiversity loss will lose none of their urgency. What will environmental policy in the UK look like outside of the European Union? What threats and opportunities does 'Brexit' pose for the environment? How will we tackle international challenges under a new political agreement?

Put your questions to our panel of leading politicians, chaired by **Jonathan Dimbleby**.

George Eustice MP, Conservatives, Minister of State for Farming, Food and the Marine Environment

Baroness Kate Parminter, Liberal Democrats, Spokesperson for Environment and Rural Affairs

Natalie Bennett, Green Party, Leader

Kerry McCarthy MP, Labour

Stuart Agnew MEP, UKIP, Agriculture Spokesperson

Join the conversation on Twitter #PPPAnyQs

Dr Nathalie Pettorelli

Why should you become a conservation biologist?

This interactive session will be about busting the myths surrounding science and conservation science as a career option. Using rewilding as an example, it will illustrate how each individual scientist has to find its place on the gradients that exist between pure and applied sciences; advocacy and neutrality; interdisciplinarity and expertise; personal interest and societal interest.

Where I'm based: Institute of Zoology, Zoological Society of London

What I do: I'm a research fellow at the Institute of Zoology (IOZ), where I carry on interdisciplinary work aimed at improving our ability to predict the impacts of global environmental change on biodiversity and ecosystem services. I got my PhD in France in 2002; I then moved to Norway and Canada for various post-doc positions, before starting working at IOZ in 2006.

Where to find me on online:

Twitter: @Pettorelli

www.zsl.org/nathaliepettorelli

What inspires me- People inspire me, every day

What I wish I'd known as a 2nd year UG:- That I could do a PhD in conservation in the UK (something that was thoroughly impossible in France in the nineties)

My one top tip for anyone considering an ecological career: Never take criticisms on a personal level: most people are actually trying to help; they are just not all very gifted when it comes to communicating that intention to you

BRITISH ECOLOGICAL SOCIETY

Time:	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday										Welcome Cove Walk			Dinner	Plenary Pests, Pathogens and Rainfall		Meet the Mentors		
Tuesday		Bird Walk Behaviour Walk	Breakfast and lunch prep	G1: Speleobiology and Cave Conservation G2: Limestone Flora of Malham				Lunch	G1: Entomology – the little things that run the world G2: How clean is my river?					Developing a career strategy A-level Ecology		Break	Pub Quiz	Bugs
Wednesday		Moth Trap I.D.		G1: How clean is my river? G2: Entomology – the little things that run the world				Boardwalk	G1: Limestone Flora of Malham G2: Speleobiology and Cave Conservation.					Communicating research Beyond academia Choosing UG courses		Break	Careers and PhDs	Bats
Thursday		Bird Walk Behaviour Walk		G1: Careers in Ecological Consultancy, Statutory and Voluntary Sectors G2: Mapping microbial communities – a molecular approach					G1: Mapping microbial communities – a molecular approach G2: Careers in Ecological Consultancy, Statutory and Voluntary Sectors			Break	Britain in a Changing Europe		Late Dinner	Break	Creature creations	
Friday				Society Skills	3rd Yr Project I2S and UCAS	Why be a conservation biologist?	Prize Giving		Depart at 12.30									