

Faculty of Life Sciences Newsletter

Issue 24, Welcome Week 2012

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Successive waves of cell proliferation within the hair follicle bulb - Nigel Hammond

Welcome to the Faculty

Welcome from the Dean



Welcome back to our returning students, and welcome to those of you who have just joined us. For both students and staff, one of the key aims of a university education is to make our students employable. So, what are the *values* of this Faculty, and what is the *value* of one of our degrees?

Our reputation for research excellence attracts students who aspire to a research career. We value the fact that all of our teaching is 'research-led', which means that, in the final year especially, we encourage staff to teach the subjects in which they are world-leading experts. Our curriculum incorporates training in laboratory skills, experimental design and scientific writing, and includes the opportunity to carry out a project in one of our research labs.

Many other students choose a life sciences degree simply out of interest, and they revel in the wide portfolio of topics available to them. We recognise the importance of developing the qualities required for these students to enter the wider jobs market. We do this by nurturing transferrable skills such as communication, organisation and teamwork through tutorials, group projects and presentations.

For many students, a highlight is the time they spend on field courses or placements in industry or research institutes, or undertaking enterprise or science media projects. This experience allows students to gain unusual insights into the world and to obtain vital skills that can lead to employment. We also offer roles within the Faculty as ambassadors, which teaches problem solving, initiative and communication, and gives a head start into jobs.

Our courses have obtained consistently very high scores in the National Student Survey (92% overall satisfaction last year), and our students succeed. The class of 2012 obtained the highest level of degree results ever, with a stunning 85% gaining a I or IIi degree. Applications for undergraduate places also bucked the national trend, and were actually up on last year. We are proud of our values, but even more proud of the achievements of our students and their contribution to the Faculty. We hope they continue to see their degree as value for money!

Professor Martin Humphries Vice-President & Dean, Faculty of Life Sciences

Jobs for the boys (and girls)



Christopher Crooks (better known as "CJ") missed the Graduation ceremony this summer – he was busy taking up his post as Assistant Manager at the Bimini Biological Field Station in the Bahamas.

CJ spent the placement year of his BSc Zoology with Industrial/Professional Experience studying lemon sharks at the field station. He returned to Manchester with a job offer from what is affectionately known as "Shark Lab", bagged a first class degree and jetted back to Bimini to what he describes as his dream job.

CJ's classmate **Becky Cliffe** is also returning to her placement organisation – the Sloth Sanctuary in Costa Rica, to work on her PhD. Becky's pioneering placement work saw her featured in a TV documentary which aired on Animal Planet and the Discovery Channel, and in a major article in BBC Wildlife magazine. She was treated to an all-expenses-paid trip back to Costa Rica in January this year to help out with a photography course based in the Sanctuary.

These graduates show the employability of the 'class of 2012'. So what can you do before you graduate to increase your chances of landing your dream job and how can we help? To answer the second question first; another of our 2012 graduates, **Hannah Mckean**, recently started a job within the Faculty as the Employability Intern. Over the coming



months Hannah will be developing resources to enhance the Faculty's materials that help make students aware of what employers are looking for and enable them develop or acquire the right skills. Hannah will be inviting you to comment on our resources and encouraging you to consider how you can become as employable as she is.

In the meantime, what can you do? If you're a first year, you should have already signed up for the first year programme of 'My Independent Study' on Blackboard. Within this area you will find the Personal and Professional Development section, which will lead you to your Employability Skills Record. Fill this in as soon as you can, and you will find out where your development needs lie. For example, if you have never held a position of responsibility why not consider joining a club or society where you can work your way towards committee membership, or volunteer to be the representative for your degree programme?

Keep your Employability Skills Record up-to-date as you progress through your programme. If you do, when you are approaching graduation you should not only have an impressive set of skills but also a detailed record of where and how you have used them that you can incorporate into an impressive CV. Good luck!

Words of advice from the Senior Advisor

As from the start of the new academic year I have taken over the role of Senior Advisor from Dr Liz Sheffield. My job is to provide overall academic guidance to the Student Support team and pastoral support to students in the Faculty of Life Sciences.

Every year there are students who experience personal difficulties, or periods of ill health which affect their academic studies and mean that they miss tutorials, practicals or exams. If you find yourself in this situation please don't bury your head in the sand. Contact your personal advisor or Student Support straight away. They will advise you what to do next and will make you an appointment to see me if you require further help.

Dr. Nicky High, Senior Advisor, International Postgraduate Tutor



Postgraduate study



September is always a time of great postgraduate activity in the Faculty – we welcome our new intake of postgraduate students, we see the current crop of first year students pass into their second year of research following successful completion of continuation reports, and we prepare to accept the written theses of our final year students for examination and the award of those precious letters: PhD.

This year we welcome around 90 new PhD registrants from the UK, EU and the far corners of the world. I encourage all our new PhD students to make the most of the opportunities offered by their research project, the Faculty and the University. Get into the lab and start finding your way around as soon as possible. Make sure that you understand how to operate your eProg record which will allow you to record your progress throughout your studies. Please join and actively participate in the FLS Postgraduate Society, which organises both scientific and social activities throughout the year.

Above all, if something is not clear, please ask for an explanation from the appropriate person, be it your supervisor, your advisor, a fellow lab member or another PhD student.

An essential part of science involves clear communication and a significant part of our generic research training programme involves improving and developing your communication skills. Indeed at the end of the induction week, our Faculty Research Symposium will display and communicate some of the best research done by our postgraduates.

May I take this opportunity to welcome all of our newly registered PhD students and wish all postgraduates in the Faculty a productive and enjoyable year ahead.

Ray Boot-Handford, Associate Dean for Postgraduate Research

Final year projects: alternatives to the lab

All Faculty of Life Science undergraduates undertake a final year project. Many decide upon traditional laboratory projects, but there are also an increasing number of alternative projects that students can do.

Education Projects

For over ten years, FLS students have been working in primary & secondary schools, colleges and in Manchester Museum to try and stimulate, engage and ultimately educate vounger students and members of the general public about current science topics. They have been able to do this by opting to take an Education project as part of their final year degree in any of our degree programmes. The main aims of the projects are to develop educationally useful learning resources covering topics relevant to the school curriculum, and then to evaluate how successful the resource has been. The projects allow students to engage in original research that is educationally relevant, and they also enable our students to motivate and inspire less advanced students to learn about biology.

Students have developed undergraduate laboratory practical classes; created novel board & card games; run 'after-school' workshops; run study days for A level and GCSE students in conjunction with Manchester Museum; inspired their pupils to make models of neurones using sponges; justified pharmaceutical spending in song and made 3-D posters to explain cell division.

Students acquire valuable transferable skills, becoming more efficient at time management and project planning, improve

FLS Postgrad Society

The Postgrad Society holds several annual events, including the Spring Ball, the Annual Guest Speaker Lecture and new this year, a PhD Student Conference. There are also many more events - socials, seminar series, movie nights, quizzes and charity fundraising events - that are held throughout the year. The Society's mentoring scheme also aims to help integrate new students into the Faculty academically, pastorally and socially.

Do you want to know if anyone has tried that complicated-looking assay you just read about? Are you looking to raise money with your sponsored run? Need to know how to organise travel funding for a conference? Keen on helping with a public engagement event? Or do you just need a trip to the pub on Friday to 'chill-out'? Join the 'FLS Postgrad Society' Facebook group! It currently has over 260 members and is open to all PhD and Master's students in the Faculty. The Society also has an announcements e-mail specifically for postgraduates – we send out e-mails reminding you when to buy Ball tickets, how to vote for your favourite movie to be shown,

www.ls.manchester.ac.uk/phdprogrammes/postgraduatesociety

their decision-making capabilities and gain good communication skills. Feedback from schools involved with the projects is invariably excellent, as the projects allow difficult or recent scientific advances to be communicated to their students in novel and interesting ways. The school is then left with a tried and tested educational resource that can be used in future years.

Science Media projects (SMPs)

In the SMPs, the student produces a literature review on a biological topic, and then compiles a portfolio of material based on that subject, suitable for different audiences. We provide experts in different fields (writing, film-making, podcasting etc) to help the student develop their material.

The portfolio output includes 'science writing' in the form of a New Scientist-type article or a competition piece (targeted at a general science audience) and a Biological Sciences Review article, (targeted at an A level biology audience and mapped to the A-level curriculum). The student also has to deliver an oral presentation to a science audience consisting of members of the supervisor's research group, PhD students, and other interested people from the Faculty (they can be a hard crowd to please!). The student's own creative interests and talents determine the last piece for the portfolio.

As long as the medium chosen is a valid way to educate or entertain an audience in science matters, and the piece is evaluated appropriately, there is no barrier as to what can be offered for the creative piece.

or how you can get involved with upcoming events.

Look out for our posters and announcements on the TV screens in the foyers of the FLS buildings, and go to the FLS intranet pages for the latest news and information. There is also a link to the Skills Training Essentials for PGR Students (STEPS) webpage about postgrad life across the University. The FLS intranet has links to the Faculty podcasts, newsletters and Twitter newsfeed – offering you quick updates on everything life sciences.

Every postgrad is welcome to join the FLS Postgrad Society; and the Committee is always looking for more members to help make postgrad's lives even better. If you'd like to get involved please email Pete Mills at pgr.ls@manchester.ac.uk.

For all FLS students there is the Faculty of Life Science Society Facebook group or 'FOLSS' for short. The group is a great starting point to find out about events, obtain discounts or to simply network with other FLS students.

"I wish I had known..."

Luminita Horga is a second year student studying for a BSc. in Biotechnology. She shares some of her experiences and thoughts about life as a first year in the Faculty of Life Sciences.



Is there anything you discovered during the first year that would have been useful to know at the beginning of your course? I would advise everybody to finish the learning modules in good time and to not to skip any of them. Even if you only read the relevant lectures, it will be worth it when it comes to revising for exams.

Persevere! If you don't understand some of the lectures at first, do not give up but keep reading and ask for help. I found the PASS sessions really useful, especially the drop-in sessions. I was able to ask anything, from an overview explanation on some theoretical concepts to the structures of a lab report, I could also discuss my concerns with other students who have more experience than me.

Think before writing an essay! Plan well and half of the work is already done. Think about the structure, what to write, how to link the ideas in a logical order and where to find the best information. Also consider what can make your essay stand out from all the others! Away from studying, join societies, at least one or two. Take advantage of all the sporting opportunities. The hall's sports programme is a good option if you live in University accommodation. Have fun and be creative!

Finally, go to lectures! Even if you have the lecture notes, textbooks and podcasts, it's still not the same! Going to lectures saves a lot of time in the long run, especially before exams.

What would you have found useful to know about this time last year?

Register as soon as possible, become familiar with your surroundings, University facilities, the library and shops. Learn how to cook, be friendly and open minded and don't be afraid to be yourself!

Where would you advise students to go for further help?

I would suggest e-mailing the FLS Student Support Office with any academic concern you have. Join the Facebook groups, such as the accommodation and FLS groups, they helped me a lot when I had questions and queries. I realised there were other people that had the same questions as me and we were able to share answers and ideas.

What has been the highlight of your first year?

There isn't any one highlight, it's the overall experience - not only the academic knowledge that I have gained, but also the development of my interpersonal skills and the worlds that I have been able to discover through the people I have met here. It is true to say that if you come to Manchester, you meet the world!

Studying life sciences modules has been exciting and amazing. In such a short space of time I feel that I am capable of participating in cutting edge research that I can contribute to the science world. This is what I have enjoyed the most!

Hugh Mead is a second year Cell Biology student. He tells us a few things he wishes he'd know this time last year when he was starting out on his degree course.

Firstly, I wish someone had told me just how useful it is that lab work overlaps with lecture modules. Some of the things you are taught in lectures overlap with labs and vice versa — you will use some of the organisms you learn about in lectures in the labs, so paying attention pays double dividends!

Secondly, the lab report. This is the main exercise in second semester, written up in the style of a scientific research paper. This requires a lot of detail, and when writing it can be hard to remember all of what you did at the time. So I recommend noting down or asking what everything is and what you're doing while you are in the labs — you will thank yourself later.

Finally, most lecturers provide additional resources to supplement their units. Use these, they are all related to the course and wouldn't be recommended if they weren't helpful.

If you are looking for help, there are a number of good options. I would start off with your personal advisor. She or he should be easy to get hold of via email, or you can visit their office. Advisors tend to have a good understanding of what's going on



in the Faculty. I would also recommend using PASS leaders. These guys are second and third years so they were in your position not too long ago. They can give advice on all sorts of things in addition to the academic questions.

Overall, I would just like to say work hard and enjoy yourself – the first year is the best time to discover Manchester and meet people!

Writing tips from an expert



Crime author Chris Simms, will be joining the Faculty as a Writing Fellow, supported by the Royal Literary Fund, with the aim of supporting students with their written work. Chris will be available to students to offer tips and advice on all aspects of their writing. Chris can be contacted via the Tutorial pages of Blackboard, or at writer@ manchester.ac.uk. He can also be found in room 2.532 in the Stopford Building on Tuesdays and Thursdays.

Chris tells us a little about himself: "I've worked in airports, nightclubs and telesales centres. After travelling throughout the world I settled in a village just outside Manchester – where I now live with my wife and four kids. Along with nominations for the Theakston's Crime Novel of the Year award and Crime Writer's Association Dagger awards (for my novels and short stories), I was selected by Waterstone's as one of their 25 Authors For The Future.

Books that give insights into unusual minds are the ones that interest me. The twisted desires of Frederick in *The Collector* by John Fowles, the tormented thoughts of Scobie in Graham Greene's Heart of the Matter, the violent urges of Francie in Patrick McCabe's Butcher *Boy*: these are all characters and novels that shaped me as a writer. I'm massively looking forward to using everything that I've learned through my own writing to help students in the Faculty of Life Sciences with theirs - be it essays, assignments, job applications or anything else that crops up.

Good writing is simple writing. I believe many of the difficulties people experience when putting pen to paper arise when they forget this rule. Hopefully, I can show anyone who is interested how easy and enjoyable writing should be." A degree in life sciences can lead to a wide variety of careers. Recent graduates Melissa and Vicki tell us what attracted them to their chosen careers and give some advice about choosing a career path.



Melissa Surgey graduated in Anatomical Sciences in 2012 and secured a position as a Management Trainee on the NHS Graduate Management Training Scheme

Q: What attracted you to this career?

A: Although I really enjoyed my Anatomical Sciences degree in the Faculty of Life Sciences, I had little interest in going into research and wanted to work in a sector that would allow me to directly experience the impact of medical advances on the general public. Given the leadership, project management and communication skills I developed through participating in extra-curricular activities whilst at the University, the Training Scheme was the ideal opportunity to pursue a career that I was both good at and interested in.

Could you tell us a bit about the recruitment process?

The recruitment process for most national graduate schemes is lengthy and competitive and the NHS's is no different. I submitted my initial application form in the autumn of my final year, almost an entire year before I started on the scheme! I subsequently had to pass numerical and verbal reasoning exams and an interview before being recalled to the national assessment centre in spring. At the assessment centre I took part in a

wide range of activities designed to simulate the average working environment as an NHS Manager. It was only after passing this stage that I was offered a place on the scheme. Overall, the scheme receives around 15,000 applications for 150 places each year.

How do you think the knowledge and skills you gained as part of your degree helped you in securing this job?

My degree has been invaluable both in terms of specific knowledge and transferrable skills. Coming from a human sciences-based background gave me an advantage over other candidates who studied more businessrelated degrees as I fully understand the clinical aspects of what I'm managing and have gained more credibility with the medical staff as a result. Undoubtedly most important however were skills such as working with others, critical analysis and presenting (both oral and written) developed through lab work and tutorials. I was able to use examples from these classes at my interview and at the assessment centre to demonstrate that I could fulfil the demands of the scheme.

What does the job entail?

The scheme is a two-year intensive training course designed to prepare graduates for senior management roles upon completion. Trainees undertake three placements whilst also studying for a specially-designed Masters qualification. In my current placement I am working in Obstetrics & Gynaecology at the University Hospital of South Manchester. I am solely responsible for overseeing the efficient operation of the hospital's Early Pregnancy Assessment Unit, liaising with senior management, clinicians and patients to ensure the Unit meets NHS initiatives.

What have been the biggest highlights and challenges so far?

By far the biggest challenge has been getting up to speed with the organisation of the NHS, especially with the recent major changes. Many of the other trainees have worked in the NHS for many years (the Scheme has no upper age limit, as long as applicants have a degree) so as the youngest it can be intimidating and overwhelming at times. However the scheme offers many amazing opportunities, including being able to network with very senior figures in the organisation, which will be invaluable for my career. I'm looking forward to having the chance to meet our national Chief Executive (who was once a Trainee himself) at our dinner event in September.

Any advice for anyone wanting to follow in your footsteps?

No-one expects you to be an expert on the ins and outs of the NHS! The scheme is essentially a talent-scouting programme to find graduates with the potential to be future leaders. Don't worry too much about getting NHS-specific work experience; you can use any activities to demonstrate the key skills required. Stick with the recruitment process. The nine month process can be frustrating and stressful especially when combining it with final year degree commitments, especially at exam time. Try to be patient and give the refresh button on your emails a break!



Vicki Ellis graduated in 2012 with a BSc in Zoology. She is now working as a Science Communicator for Holdsworth Associates, a PR company that specialises in Science and Technology.

What attracted you to this job?

I found at the end of my second year that I was really interested in science communication and thought it might be a possible career. To improve my CV in this area I started writing a blog (victoriaellis. scienceblog.com) and decided to do a Science Media project as my final year project. When I was looking for jobs I found that PR involved a lot of communication and realised this was a sector I would love to work in. Working at a PR company that specialises in science was literally a best-case scenario for me!

Can you talk a bit about the recruitment process?

I initially found the vacancy by regular searching on the University's online CareersLink service. I sent my CV, a covering letter and some examples of my work. The company then contacted me by email and asked me to write a blog post (this will be one of my weekly tasks now I have the job). The company liked my blog so asked me to attend an interview. A week and a half later they offered me the job!

How do you think the knowledge and skills you gained as part of your degree helped you in securing this job?

I always say that my ability to communicate well and my organisational skills are my greatest strengths. I learnt this from having an incredibly busy lifestyle whilst at University.

What does the job involve?

Some of my day-to-day duties will involve: updating client's social media sites (blogs, Facebook, Twitter) and writing press releases.

Any advice for anyone wanting to follow in your footsteps?

For anyone applying for jobs I would say, do not give up! I must have sent 25-30 applications for jobs over nine months. About two thirds of them didn't bother to reply, and of those that did the majority were rejections. I had interviews with four companies and found it really hard to cope with the rejection. But now I have my dream job it was all worth it! If you are applying for jobs in science communication, be aware that it is VERY competitive. Saying you are a "good" or "excellent" communicator isn't good enough. You have to stand out from the crowd! So, start a blog, write some articles, maybe do a relevant placement somewhere? Anything that makes your CV interesting enough for a company to want to meet you. I would also recommend doing a Science Media Project as your final year project. For me it was excellent preparation for my new job!

Public engagement

Chemical ghosts haunt the Royal Society



In July, PhD Student Charlotte Brassey, attended the Royal Society Summer Science Exhibition as part of a multidisciplinary research group based in the University of Manchester. Every year, a select number of research teams from around the UK are offered the chance to peddle their wares in front of the great and the good of the Royal Society, as well as thousands of members of the general public, in the plush surroundings of the Royal Society's headquarters off the Mall in London.

The group Charlotte was helping was led by Dr Phil Manning and Dr Roy Wogelius from the University's School of Earth, Atmospheric

Worms at Jodrell Bank

In June, Sheena Cruickshank, Joanne Pennock, Emma Murphy, Joe Ainscough and Becky Hurst from the Manchester Immunology Group 'Worm Wagon' were at the *Live at Jodrell Bank* rock concert and festival, creating gigantic colourful art to illustrate the importance of parasitic worm infections.

Jodrell Bank is the site of the University's world famous radio telescope

The festival-style event attracted over 10,000 visitors and was designed to bring together science and music and reach out to the general public, many of whom would not otherwise attend science workshops. The visitors were able to get close to real parasitic worms and learnt about their global significance. They also joined in making three giant pieces of floor art, all on a wormy and immune cell based theme!

The activities were extremely popular, with visitors even queueing in the rain to take part. The event received excellent feedback including: "Worm-tastic information! Great research! Keep it up"; "Unexpected learning, fascinating stuff"; "Really interesting stuff, thanks for informing us and making us aware."

and Environmental Sciences (SEAES), accompanied by FLS colleagues Bill Sellers and Matthew Cobb. Their job was to educate the public about the chemical composition of fossils, and to show how we can learn something about the colours of dinosaurs and early birds.

Charlotte told us all about it:

"The stall highlighted the recent work of SEAES PhD students Holly Barden and Nick Edwards, in which they used synchrotronbased X-ray imaging to map the distribution of elements within fossilized skin, feathers and leaves. Presented with the challenge of designing an exhibit of interest to senior

It wasn't just about fun. The key messages we were communicating are sombre: around three billion people on the planet have gut worm infections. Worst affected are children and pregnant women, and this has an enormous impact on education as infected children sometimes only attend half as much school as their healthy peers. Not only does worm infection cause illhealth, it has a major impact on farming, causing livestock to fall sick, massively affecting productivity.

Although there are cheap, effective medicines that can kill gut worms, these drugs encourage resistance and do not prevent re-infection. Importantly, these medicines are not always available to those that need them. However, worms aren't all bad, and research suggests that a few worms may help protect against diseases like asthma, allergy and inflammatory bowel disease!

The Manchester Immunology Group works to raise awareness of this important group of diseases. Our research aims to define how worms affect immune function, as better understanding will lead not only to new drugs to combat worm infection but also therapies that can be used for allergies and autoimmune diseases. particle physicists and school groups alike, the centrepiece of our stall consisted of a genuine 125 million year old fossil of Confuciusornis sanctus (an early bird from the Cretaceous). We also offered up more interactive (less fragile!) items, including the ambitious creation of a scale model synchrotron complete with flying electrons (bouncy balls), and the appropriate amount of freebies.

The public turnout was phenomenal, and the breadth of age groups and backgrounds proved to be a great challenge for our public engagement skills. Imagine trying to explain the finer points of copper chemistry to a Royal Society fellow, whilst also holding the attention of their granddaughter who has come along for the day! The black-tie 'soiree' in the evening was a great highlight, which saw once-familiar scientists shed their traditional garb of knitted dinosaur jumpers and baggy jeans in favour of tuxedos and cocktail dresses.

The response we had during and after the event exceeded all our expectations – it was a terrific experience for all concerned. Hopefully we've convinced the next generation of palaeontologists to swap their fossil brushes for particle accelerators, and take a closer look at what real biochemistry remains behind in these exceptional specimens which have been imprisoned in rock for hundreds of millions of years. Now, does anyone know what to do with several thousand spare posters of T.rex?



Faculty research

New stroke treatments becoming a reality



Scientists led by Professor Dame Nancy Rothwell, President and Vice-Chancellor of The University of Manchester, have shown that a drug can dramatically limit the amount of brain damage in stroke patients.

Professor Rothwell, Professor Stuart Allan and their team have spent the last 20 years investigating how to reduce damage to the brain following a stroke. They have been testing the effectiveness Anakinra (IL-1Ra), a drug that is already used to treat the unrelated condition of rheumatoid arthritis. Researchers induced a stroke in rats that had stroke risk factors such as obesity, insulin resistance and atherosclerosis and then injected the animals either with IL-1Ra, or a placebo. The results were startling. MRI scans revealed that the rats that were given IL-1Ra up to three hours after the stroke had only about half the brain damage of the placebo group.

Professor Rothwell said: "This is the first time that a potential new treatment for stroke has been tested on animals that are suffering from the same sort of diseases and risk factors that most patients have. The results are very promising and we hope to undertake further clinical studies in stroke patients soon."

IL-1Ra works by blocking the naturallyoccurring protein interleukin 1, which is a key cause of brain injury following a stroke. Interleukin 1 encourages inflammation in the area of the brain affected by stroke. This sends out signals to attract white blood cells and to switch on microglia cells in the brain. Because the barrier surrounding the brain has been weakened by the stroke the white blood cells find it easier to enter the brain. But instead of helping the inflamed area they actually kill nerve cells and worsen the injury. The increasing presence of these cells also explains why the damage in the brain gets worse over time following a stroke. Not only does IL-1Ra block interleukin 1, it also reduces the amount of damage to the blood-brain barrier so the harmful cells cannot enter the brain.

Professor Stuart Allan said: "This drug has real potential to save lives and stop hundreds of thousands of people being seriously disabled by stroke. This really could be the treatment for stroke that we've been looking for over the past two decades."

Already a "phase 2" trial with a small number of patients has yielded encouraging results. A much larger clinical trial may demonstrate the effectiveness of IL-1Ra in reducing brain damage in stroke patients and eventually this drug will become the standard treatment.

Maggots and mice show the way to combat neurodegenerative diseases

Writing in the Journal of Neuroscience, scientists at the Faculty of Life Sciences have recently uncovered how the internal mechanisms in nerve cells help wire up the brain. Their findings open up new avenues in the investigation of neurodegenerative diseases by analysing the cellular processes underlying these conditions.

Dr Andreas Prokop and his team have been studying the growth of axons, the thin cable-like extensions of nerve cells that wire the brain. If axons do not develop properly, the consequences can include birth disorders, mental and physical impairments and the gradual decay of brain capacity during aging.

Axon growth is directed by the hand-shaped 'growth cone' which sits in the tip of the axon. We know how growth cones detect signals from the outside to follow pathways to specific targets, but very little is known about the internal machinery that dictates their behaviour.

Dr Prokop studies the cytoskeleton, which drives the movement of the growth cone and maintains the cell's shape, and which is made up of protein filaments, actin and microtubules. Microtubules are the key driving force of axon growth whilst actin helps to regulate the direction the axon grows in. In a research project that lasted six years, Dr Prokop and his team used first fruit fly larvae then mice to analyse how actin and microtubule proteins combine in the cytoskeleton to coordinate axon growth.

They focussed on the multifunctional proteins called spectraplakins which are essential for axonal growth and have known roles in neurodegeneration and wound healing of the skin.

The team showed that spectraplakins link microtubules to actin to help them extend in the direction the axon is growing. If this link is missing, then microtubule networks show disorganised criss-crossed arrangements and axon growth is hampered. By understanding the molecular detail of these interactions the team made a second important finding: spectraplakins collect not only at the tip of microtubules but also along the shaft, which helps to stabilise the microtubule and ensure they act as a stable structure within the axon.

This additional function of spectraplakins relates them to a class of microtubulebinding proteins including Tau, which is involved in neurodegenerative diseases, such as Alzheimer's.

Dr Prokop said: "Understanding cytoskeletal machinery at the cell level is a holy grail of current cell research that will have powerful clinical applications. The cytoskeleton is crucially involved in virtually all aspects



of a cell's life, including shape changes, division, movement, contacts and signalling and dynamic transport events. As a result it also lies at the root of many brain disorders. Understanding the cytoskeletal machinery during axon growth will help research into the causes of a broad spectrum of diseases."

Dr Prokop continues: "Besides their roles during axon growth, spectraplakins of mice and humans are clinically important for a number of conditions and processes including skin blistering, neurodegeneration, wound healing, synapse formation and neuron migration during brain development. Understanding spectraplakins in one biological process will guide research in other clinically relevant roles of these proteins."

News in brief

Distinguished Achievement Awards

Dr Hilary Ashe and Professor Andrew Loudon from the Faculty of Life Sciences were recently presented with Distinguished Achievement Awards by Professor Dame Nancy Rothwell, the President and Vice-Chancellor of the University. Dr Ashe was commended for her research, Professor Loudon for his teaching.

The award for **FLS Researcher of the Year** was presented to Dr Hilary Ashe, who has an outstanding record of research achievement in developmental biology. Her publications in leading journals such as *Nature* have revealed compelling new insights into the mechanisms that regulate development. Her recent groundbreaking discoveries, published in *Developmental Cell*, combined experimental analysis with mathematical modelling to establish key molecular mechanisms underlying stem cell differentiation. Exploiting the fruit fly as model organism, she determined how the fate of germline stem cells is directed by signals through Bone Morphogenetic Protein growth factors. Her findings have important implications for understanding human development and diseases such as cancer.

The award for **FLS Teacher of the Year** was presented to Professor Andrew Loudon. Professor Loudon is considered a great example of someone who combines a considerable research profile with a dedicated approach to teaching and inspiring students. His enthusiasm and love of teaching is evident to all. His lectures in animal physiology include personal stories of bear and reindeer research, complete with experimental details. His Hormones and Behaviour unit, which he delivers entirely himself, is one of the Faculty's most popular, scoring a perfect 2.0 for teaching excellence and attracting student comments such as "the best lecturer I have had the privilege to listen to in the past 3 years", and "I was strongly recommended this unit by previous students, and I am so glad I chose it".

Congratulations to Dr Ashe and Professor Loudon!

Listen up: How orang-utans build their nests and why 'Synthetic Biology' could change the world

The fortnightly Life Sciences Podcast brings listeners the latest research from within the Faculty of Life Sciences (FLS) and all the biggest news stories from the worlds of biology and medicine.

It is a great resource, whether you are looking to expand your scientific knowledge, find out more about the fascinating research going on here at Manchester, or you simply want to keep up to date with what is going on at the cutting edge of Life Sciences.

In its first series last year the podcast covered local stories such as how Manchester's infamous weather effects the plants and animals in the region, as well as discussing the big issues of the day such as climate change and medical research funding. The podcasts also featured interviews with some of the world's leading scientists, including FLS's Nobel Prize winner Sir John Sulston and the author and evolutionary biologist Professor Steve Jones.

The podcasts are produced by a small team of staff and students here in the Faculty, led by Professor Matthew Cobb, and are aimed at undergraduates or anyone with an interest in science. The podcast will take you behind the scenes and show you the kind of research being carried out by your tutors and lecturers.

So, if finding out how orang-utans build their nests or why synthetic biology could change the world sounds like your kind of thing, then tune in to the Life Sciences Podcast. There is no need to wait until the new series of podcasts; if you haven't already, why not listen to series 1.

If you would like to find out more, you can email the podcast team at podcast@manchester. ac.uk.

The Manchester Teaching Award



Congratulations to Dr Fred Cody whose hard work and creativity was recently recognised by Manchester students when he was named '**Best Teacher**', in one of the Student Union Awards run by the University Student's Union.

These awards are run jointly by Manchester Students' Union and the University, and offer students the opportunity to nominate their inspirational teachers and outstanding support staff. Winners are chosen by a panel of students and senior University staff, and all make a positive difference to the lives of students.

Students' comments gave testament to Fred's unique teaching style. Olivia Gillham said, "Fred Cody is a lecturer who is both approachable and extremely motivational. Lectures run by Dr Cody are so interactive, with props and demonstrations dispersed throughout the hour. It is so easy and enjoyable to learn when you have a lecturer who is so enthusiastic about the content and his teaching."

Anna Maehr added "He not only lectures in a way that is motivating, but also knows how to put difficult content into simple words. What makes him special is that he spares no effort to make the content understandable and put it an everyday context."

Fred, who was delighted and surprised to receive the award, said: "Such an endorsement from the students, whose views I really value, is lovely and means a great deal to me. Professor Martin Humphries provided some very kind words and the graduates at the ceremony were most generous in their applause. My thanks go to Mo Saqib (Academic Affairs Officer) and his colleagues at UMSU for coordinating the awards, to Professor Humphries for making the presentation and, of course, the students who nominated me and wrote some highly appreciative statements."

Editor's Note:

If you have any comments or contributions for future editions of the Newsletter, please contact the Faculty of Life Sciences:

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