

Issue No. 3 October 2013

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Legend!

College of SEFS Student Nominated Lecturer Award



Legend!

Carmel Shortiss, School of Microbiology, was joint Runner-Up in the 2013 College of SEFS Student Nominated Lecturer Award.

Award recipients were selected anonymously by the College of SEFS Teaching Learning & Student Experience (TLSE) Committee following a two stage process organised through the College of SEFS Office. Students across the College were initially invited to nominate lecturers they deemed worthy of the award from which an initial shortlist was drawn. This was followed by a second stage whereby (other) students taking modules of lecturers on the shortlist were randomly selected and invited to provide additional feedback.

What the students said: "Carmel is a fantastic lecturer and person, she is always willing to give up her time to help anyone with a problem and goes above and beyond for her students." and "Carmel has on more than one occasion gone beyond the call of duty to ensure that students will get the best out of their course. She is always at the end of an email ready to respond to whatever issue we may have, no matter how big or small."

Overall, the TLSE Committee was highly impressed by the incredibly high esteem in which shortlisted candidates were held by the students. The award attracted wide engagement from across the student body; over 90 lecturers were nominated for this award. The overall winner was Dr Olive McCarthy (above centre), Department of Food Business & Development, while Carmel's joint Runner-Up was Dr Eileen O'Leary (above right), Department of Chemistry/School of Pharmacy.



"Carmel is a truly outstanding lecturer. On top of an ability to break down the principles behind even the most complicated of concepts in simple, easy to understand chunks, her door (and inbox) is always open to the class, and we know we can always expect a swift, positive response whenever we go to her with anything, even when the question might seem slightly stupid!"



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Cover Picture: Dr Edmond Byrne, Chair SEFS TLSE Committee presenting Ms Carmel Shortiss, School of Microbiology, with her award.



New research

Signalling and virulence in bacterial pathogens

The regulation of virulence factors by pathogenic bacteria is tightly controlled in response to environmental and cellular signals or cues. Understanding these regulatory pathways may reveal potential targets for intervention in the disease process. New insights into these pathways and processes were published in the prestigious *The EMBO Journal* in August 2013 (doi:10.1038/emboj.2013.165).

The research, which was a collaborative effort involving Max Dow and Yvonne McCarthy at UCC together with the University of Dundee, UK, National Chung Hsing University, Taiwan and The Genome Analysis Centre, Norwich, UK, addressed the role of the second messenger cyclic GMP in control of bacterial virulence.

"A cyclic GMP-dependent signaling pathway regulates bacterial phytopathogenesis" Authors: Shi-Qi An, Melanie Febrer, Ko-Hsin Chin, Yvonne McCarthy, Jauo-Guey Yang, Chung-Liang Liu, David Swarbreck, Jane Rogers, J. Maxwell Dow, Shan-Ho Chou and Robert P. Ryan. A commentary on this work is also online in the same journal doi:10.1038/emboj.2013.193 and in Nature Reviews

Microbiology 11, 596 (2013) doi:10.1038/nrmicro3103.



The roles of cyclic nucleotides such as cyclic AMP and cyclic di-GMP in control of a variety of bacterial processes including virulence are now well established. Almost nothing is known about the role of cyclic GMP however. The work addressed this topic in the plant pathogen Xanthomonas campestris, an economically important pathogen and a model organism for the study of plant-microbe interactions. The findings demonstrate for the first time a role for cyclic GMP in bacterial virulence and biofilm formation and provide structural and mechanistic insights that may inform future work on cyclic GMP signalling in many other plant and human pathogens. The research, which was funded by Science Foundation Ireland, the Wellcome Trust and the National Science Foundation. Taiwan is a collaborative effort between the groups of Melanie Febrer and Jane Rogers at The Genome Analysis Centre, UK, Shan-Ho Chou at the National Chung Hsing University, Taiwan, Max Dow at UCC and Robert Ryan at the University of Dundee.

Pictured above: Yvonne McCarthy, School of Microbiology, UCC, Dr Robert Ryan, University of Dundee and Dr Max Dow, School of Microbiology, UCC.



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YEASTCELL project

Dr John Morrissey leads new International €3 million research project in biotechnology.



The YEASTCELL project comprising 13 partners from 8 European countries, integrates researchers in academic institutions and in companies to design new yeast cell factories. These microbial factories are designed to make high value products from cheap raw materials. Some ambitious goals are set: for example, the production in yeast of advanced biofuels to replace diesel and jet fuel, of chemicals for use in the manufacture of nylon and other materials, and of new flavours for the food industry. The key innovative aspect of the project is that it combines the natural biodiversity of yeasts with the newest genomic techniques to design these new yeast strains and processes. This integrative approach is precisely what is needed to fuel the developing bioeconomy and is likely to lead to commercial as well as academic returns. Funding is provided by the European Union under the auspices of its Marie-Curie training programme. Eleven PhD students will be trained during the course of the project, with one of the most interesting aspects being that each student will spend 6 months in the research laboratory of one of the four partner companies. This ensures that all PhD graduates will already have industry experience when they graduate from University. In addition, all students will work on collaborative research with European partners and will receive additional training through courses and summer schools. This flexible approach to training takes advantage of the different expertise of partners across Europe and is made possible by the changes that have taken place in higher education under the Bologna Agreement. YEASTCELL is an example of a new type of PhD education where the scientific and entrepreneurship training received will ensure that a wide range of career options is available to researchers graduating from this programme.

Pictured Above, Back row I-r: Jurgen Bauer, Gotthard Kunze, Harald Heider, Eckhard Boles, Francesca Doonan, Project manager, UCC. 2nd from back I-r: Brian Gibson, Giovanni Salerno, John Morrissey, Project Coordinator, UCC, Jean-Marc Daran, Kevin Byrne. 2nd from front I-r: Margarida Casal, Verena Siewers, Laura Ruohonen, Paola Branduardi, Virginie Galeote, Sylvie Dequin. Front row I-r: Anne Ortiz-Julien, Rainer Figge, Jan-Maarten Geertman, Jack Pronk.



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Invisible Worlds

Professor Paul O'Toole featured in, "Invisible Worlds", the last of the series of Dara O'Briain's Science Club on BBC2 TV on 29 August, 2013.

In the programme journalist Alok Jha travels to Cork to meet researchers at the APC to shine a light on some of the more mysterious and usually hidden worlds that surround us and to investigate the new and incredible world of the microbiome. He discovers that he's not only playing host to an entire ecosystem of microbes in his gut but that it's responsible not just for his health but also for his mental well-being.

Paul O'Toole's research aims to understand bacterial associations with the human gut, and how this impacts on health and disease. Professor O'Toole led the Eldermet study which found that the composition of the gut microbiota can positively and negatively impact the health of older people in our population (see http://www.nature.com/nature/journal/v488/n7410/abs/nature11319.html Nature July 2012). He was able to apply these methods to determine the composition of Alok Jha's microbiota, and how that is a reflection of his normal diet. http://www.bbc.co.uk/programmes/b039c6b9 BBC Science Club "Invisible Worlds" Programme was broadcast on BBC2 TV at 8pm on Thursday 29 August.





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Skills development

Paddy O'Reilly completes CTCB-I Associate Certification cleanroom testing.

Paddy O'Reilly is the Chief Technical Officer in the School of Microbiology. He has worked in Microbiology for over 34 years. In addition to the provision of day-to-day technical support in teaching and research, Paddy has been providing a service and supporting research in the area of Lactic Acid Bacteria, Starter Culture Preparation, Hygiene Management and Food Quality and Safety for many years. He is highly skilled in all of these areas.

The School of Microbiology has been fortunate to receive funding under the PRTLI Food and Health programme to establish a GMP Manufacturing Facility for bioactive compounds of relevance to the food and pharmaceutical sectors. Operation of such a facility requires a very high level of technical competence.

The School of Microbiology was delighted to support Paddy in his quest to achieve high-level certification in aspects of the operation of our GMP Manufacturing Facility. Paddy successfully completed the course in London in June 2013 and is now the proud holder of the Associate Certificate in cleanroom testing.





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Appointments and Honours

Professor Gerald Fitzgerald Appointed to the Board of the Teagasc Authority.

Professor Gerald Fitzgerald, Head of School of Microbiology, was appointed to the Board of the Teagasc Authority by Mr Simon Coveney TD, Minister for Agriculture, Food & the Marine. Ger has over 30-years experience in basic and applied research which has been focused on food cultures, probiotics, food preservation and the application of novel food processing technologies. He has secured significant funding from Irish and EU funding agencies and also from Irish and international industry. Ger is looking forward to contributing to the work of the Teagasc Authority which encompasses Education, Research and Technology Transfer in the Agri-Food sector. The appointment is for a 5-year period.



Pictured above: Dr Noel Cawley, Chairman, Teagasc Authority, Alan Jagoe and Prof Gerald Fitzgerald.



Professor Alan Dobson Elected to Membership of the RIA.

Professor Alan Dobson was elected a Member of the Royal Irish Academy and was formally Admitted to the Academy in a ceremony which took place at Academy house in Dublin on 31 May 2013.

Election to membership is recognition of academic excellence and is the highest academic honour in Ireland. Professor Dobson was recognized by the academy for his work in the area of Environmental Microbiology and more recently in the area of Marine Biotechnology where his research group are currently isolating new marine bioactive compounds with antibiotic and anti-cancer activity. Alan is a previous recipient of the Royal Irish Academy Medal in Microbiology (1999) and was awarded a DSc (from NUI) in 2006.

Pictured left: Professor Alan Dobson, Microbiology and ERI, UCC and Professor Luke Drury, President of the Royal Irish Academy.

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Prizes and Awards

UCC Research Commercialisation Awards

Presented by Minister for Research and Innovation Sean Sherlock TD on 10 June 2013, **The Invention of the Year** competition is a key element of the **UCC Annual Research Commercialisation Awards**, sponsored by Ronan Daly Jermyn, at which pioneering new technologies are recognised.

The Invention of the Year (Bioscience) sponsored by Purdy Lucey, was awarded to Prof Catherine Stanton and her team for their discovery of a new probiotic bacterial strain that has cardio-protective properties and is proven to reduce cholesterol by 53% in mice within 12 weeks of consumption and could help consumers to avoid heart disease. The "Healthy Heart" probiotic research is a result of collaboration between Prof Stanton and Prof Paul Ross, both of Teagasc and UCC, Prof Gerald Fitzgerald, School of Microbiology and Prof Noel Caplice, Centre for Research in Vascular Biology at UCC, and it is likely that there will be strong commercial interest in this innovative research. The project has been awarded €400,000 by Enterprise Ireland to fund a human trial of the product. "We are continuously working with inventors to develop and commercialise such highly innovative research and to bring new technologies to the next level. I would expect a number of this year's entries for the Invention of the Year award to progress to spin out companies and to be licensed by companies to be brought to market," said Dr Tim Roche, Director of Technology Transfer at UCC.

Twelve new licences for cutting edge technology in the fields of biosciences and ICT were also announced. Indigenous organisations such as Kerry Group, Carbery, and Nualight as well as global organisations such as Intel were among the organisations licensing technologies from UCC.



Pictured above L-R: Prof Paul Ross, Prof Catherine Stanton, Mr Sean Sherlock TD, Minister for Research and Innovation, Prof Gerald Fitzgerald and Prof Anita Maguire.

"The calibre of entries for the Invention of the Year Award at UCC was incredible again this year, with a number of the entries attracting real interest from industry both nationally and internationally," Dr Tim Roche, Director of Technology Transfer at UCC.



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Prizes and Awards

APC Awards

Congratulations to Cormac Gahan and Susan Joyce who received APC Scientists of the Year awards and to Gerald Fitzgerald who received the APC Person of the Year Award and to Marc McCarthy, the recipient of the Education and Outreach Person of the Year award.

Marc is pictured (right) receiving his award from Mr Simon Coveney TD, Minister for Agriculture, Food and the Marine. Pictured below L-R: Cormac Gahan, Susan Joyce and Gerald Fitzgerald







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International Highlights

Professor Colin Hill Invited to speak at a conference in Wuxi, China

The 10th International Conference on Food Science and Technology (ICFST) was held in Wuxi, China on May 30 to 31, 2013. Wuxi is the top-ranked food science university in China, and there was a lot of interest in creating links with UCC. The ICFST was inaugurated in 1991 by Jiangnan University and University of California at Davis. It has since developed into a major international event with ever increasing participants from around the world.

The 10th ICFST theme of "Better Foods, Better Life", served as a platform for food scientists from academia and industry and facilitates the interactive exchange of information on the scientific progress and applications. The conference consisted of multiple symposia and technical sessions with papers being presented by international and domestic scientists. including prominent researchers in the field.

Pictured: Prof Colin Hill at the 10th International Conference on Food Science and Technology (ICFST) in Wuxi, China.





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Catch me if you can

Professor Paul O'Toole lectures around the world.

Prof O'Toole has had a busy schedule of conferences and talks around the world in the last 6 months, visiting 9 countries in 3 continents. In addition to his teaching commitments and managing one of the largest research labs in Microbiology, Paul is also preparing for the 2013 Dublin City Marathon on 28 October – catch him if you can!

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Class of 2013

A total of 10 PhD students and 1 MSc Research student graduated at the Summer 2013 graduations.



Photo Above: Summer 2013 Conferring Ceremony
L-R: Deirdre Crowley MSc, Mary McCullagh PhD, Stephen
Jackson PhD, Claire Flaherty PhD, Aileen O'Connell PhD,
Ciorsdan Campion PhD, Lekha Margassery PhD, Burkhardt
Flemer PhD, Anne Neville PhD, Hao Tan PhD. Also
graduating was: Brian Forde PhD.



Above: BSc Microbiology 2013 Class photo

Below: BSc Genetics 2013 Class Photo



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Postcards

Michelle O'Donnell in Australia

Michelle graduated in 2011 with an Honours Degree in Microbiology from UCC. For her final year project she investigated the role of a gene in the pathogenesis of the bacterium Pseudomonas aeruginosa, with Prof Fergal O'Gara and Dr Jerry Reen at the Biomerit Research Centre. "Although I loved my final year project, I knew I was not ready to continue on to a postgraduate research project. I knew I wanted to gain some laboratory experience and then travel." says Michelle who, after spending a year working for ALS, a commercial food laboratory in Ireland, travelled to Adelaide in South Australia to work for Zerella Fresh. Michelle has since earned the title of Quality Manager. Zerella Fresh is Australia's leading provider of fresh produce and is a sister company of Parilla Premium Potatoes.

Michelle's job is to upgrade and maintain all quality systems, train staff, ensure quality of produce and manage overall quality of the processing facility. She also works with the growers where she says that her Environmental and Chemistry modules have proved very helpful. Although, Michelle can only stay six months with the company, they have been very keen to offer sponsorship and it has opened many doors for employment as she has had the privilege of working with many of Australia's premier fresh food industries. G'day From Australia

> "My degree in Microbiology has greatly enhanced my job opportunities worldwide and has equipped me with many skills that make me highly employable. It has also given me a strong foundation to work in many sectors of the scientific world. This has made my travel much more enjoyable as I have been able to secure employment that will benefit me. When or if I return home I would hope to stay in a quality role or perhaps move into research & development within a company." Michelle O' Donnell, BSc Microbiology 2011





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Welcoming New Staff

Dr John Mac Sharry joins Microbiology as affiliate Lecturer in Medical Microbiology.

John is a graduate of the School of Microbiology here in UCC. John completed his BSc (Hons) in Microbiology and subsequently completed his PhD on the study of M cells and Mucosal Immunology with Dr John Morgan. Following his PhD he worked with Alimentary Health Ltd as Molecular Biology Section Head collaborating with several multinational research partners. John's research focus was understanding probiotic mechanism of action.

In 2008 he joined the APC Host Response core as a Post-Doctoral researcher and collaborated on research with GlaxoSmithKline. John was a guest researcher of Professor James Martin at the Meakins-Christie Laboratories, McGill University in Montreal, Canada as part of an SFI fellowship in 2009 and 2010. John has also lectured and supervised on a part-time basis in the CIT.



John was recently appointed as a Lecturer in Molecular Medical Microbiology and Deputy director of the GEM programme with the School of Medicine and with an affiliation to the School of Microbiology. His research interests are in host-microbe interactions with particular focus on mucosal immune sampling and response in the gut and the lungs.

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Welcoming New Staff

Dr John O'Callaghan joins Microbiology as Technical Officer in Molecular Microbiology.

John is a graduate of the School of Microbiology, BSc (Hons) Microbiology (1993) and PhD (1998). His PhD investigated osmotic stress tolerance mechanisms in *Lactococcus lactis* under the supervision of Prof Seamus Condon. On completion of his PhD John continued to work in Prof Condon's group investigating interactions between lactobacilli and propionibacteria in Swiss cheese, in collaboration with Teagasc Moorepark. In 2000 he joined the research group of Prof Alan Dobson working initially on the heterologous expression of lignolytic enzymes from the fungi *Pleurotus sajor-caju* and *Trametes versicolor* before moving to the field of mycotoxigenic fungi using functional genomics to investigate the production of ochratoxin A (OTA) by *Penicillium* and *Aspergillus* species. This research led to the identification of biosynthetic genes for OTA in *Aspergillus ochraceus* and *Penicillium*



verrucosum and a patent was granted covering applications of the research in molecular detection of OTA producing fungi. In 2006 John moved to Teagasc, Moorepark to work on a project with the objective of mining the recently sequenced genome of *Lactobacillus helveticus* DPC4571 for enzymes with applications in accelerated cheese ripening.

In 2009 he returned to UCC to work in Prof Paul O'Toole's lab on an APC funded project investigating the transcriptional responses at the bacterial-intestinal epithelium interface, primarily through the use of microarrays to detect transcriptional changes in both the bacterial and epithelial cells. This was followed by a return to Moorepark in June 2012 to join the Glycobiology group led by Dr Rita Hickey where the focus of his work was the use of microarrays to determine the transcriptional responses of epithelial cells and probiotic bacteria (*Bifidobacterium*) following exposure to human and bovine milk oligosaccharides and he also contributed to the analysis of glycoarrays investigating interactions between lectins and milk glycoproteins.

John's main leisure activities are athletics and cycling. He is a member of Rising Sun athletic club and frequently competes in local road races and has completed the Dublin City Marathon on 5 occasions. He has been a member of the UCC staff athletics club for a number of years, and is part of the organising team for the UCC 10k road race held every April. John also participates in non-competitive cycling, endurance type events of up to 200km in length. He has completed several 200km events organised by Audax Ireland which is the national governing body for randonnee type endurance cycling events. **The School of Microbiology is delighted to welcome John to the staff.**



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Retirements

School of Microbiology celebrates retirements

On 31 May 2013 the School of Microbiology and the BioTransfer Unit (BTU) celebrated the retirement of Pat Higgins and Margaret Higgins. Pat and Margaret worked in the School of Microbiology and the BTU respectively, for 40 and 24 years.

A social gathering to mark the event with family and colleagues, past and present was held to wish them well. *Pictured below L-R: Pat Higgins, Maurice O'Donoghue, Margaret Higgins and Mary Hough.*





Every effort has been made to ensure that the information contained in this newsletter, which is of a condensed and general nature, is accurate at the time of publication. Microbiology cannot accept any liability for any errors or misstatements or for the contents of web links which are provided for convenience only. Microbiology would like to acknowledge and thank David Waldron of the School of Food and Nutritional Sciences, for his assistance with design and technical aspects of this newsletter.



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Lighter Notes

'Serial Diluters' Pedometer Challenge

Six Microbiology staff took part in the UCC Pedometer Challenge 2013, a workplace walking event, open to all partners of the Smarter Travel Workplaces Programme. It is run annually in partnership with the Irish Heart Foundation. The Pedometer Challenge 2013 ran from 11 September to 8 October. The aim is to encourage staff in partner workplaces to walk more for health. The 'Serial Diluters' team placed 205 out of 822 teams nationwide. They walked 2,332,768 steps in total which works out at 1,767 Kilometres, and saved €32.30 in petrol!!! They used as much energy as is in 458 bars of chocolate!!

Rob Phelan raises funds for Charity

Rob cycled the Annual Ring of Kerry Charity Cycle on 6 July and raised €220 for the 8 different charities nominated (<u>http://www.ringofkerrycycle.ie/charities.php</u>).

Rob sends a "Big Thank You" out to everyone for their contributions

Pictured below: Rob Phelan (in The Yellow Jersey) with friends on the cycle.





Pictured above L-R: Team Captain Marc McCarthy, Maire O'Dwyer, Dan Walsh, Aine Murphy, Bernie O'Connell (notice how pale and thin Bernie got from all the walking!!!) and Mary Cotter.

Ring of Kerry Cycle





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Lighter Notes

MicroSoc raise funds for Temple Street Hospital.

The Microbiology Society bake sale on Friday, 3 May was a great success, raising €513.63 in total! This money will be used to help renovate one of the oldest wards in Temple Street, home to many children suffering from Cystic Fibrosis (http://www.thegreatirishbake.ie/).

The Microbiology Society thanked everyone who baked for and bought cakes at the Micro Fundraising Bake sale and congratulated everyone in Microbiology for pitching in and helping such a great cause.

Pictured right: Bake Sale organisers Alan Barry, Alicia Campion and Karen McCarthy all of the Microbiology Society Organisation Committee.

Pictured below: Supporters of the event enjoying cake!













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