SynthSys PIs recognised for their work on Impact

Submitted by synbio on Thu, 12/17/2015 - 15:10

Dr Louise Horsfall and Dr Sander Granneman have been recognised by colleagues in the School of Biological Sciences for their contributions to impact. The annual Recognising Excellence awards were presented by Head of School Professor David Gray at a special reception on Monday 14 December 2015. Louise won the award for public engagment and Sander for knowledge exchange and commercialisation

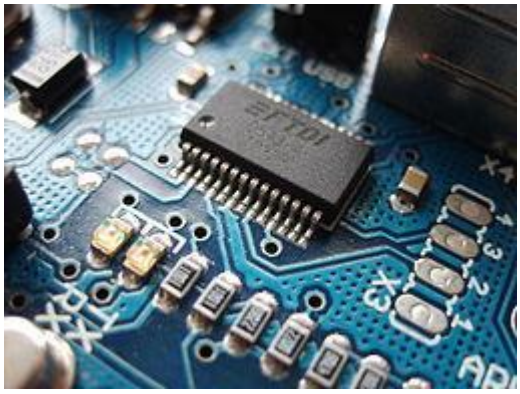
Louise has been prolific in her involvement with many different aspects of public engagement this year. To name just a few, she has led a very successful art-science collaboration that has been exhibited at the Victoria and Albert Museum in London; she has been a constant presence at scientific panels including debating 'Synthetic Life: How far could it go? How far should it go?' at the Royal Institution. As well as this Louise has given a TEDx Edinburgh talk and had her research featured in much of the Scottish press. Her research was used as an example by the Scottish Scientific Advisory Committee of how synthetic biology might benefit Scotland. She is also a STEM Ambassador, visiting schools to talk about science and synthetic biology, and encourages her lab to do the same.

Sander is being recognised for his efforts in supporting the generation of impact from his research. He developed a new UV-crosslinking approach called the "CRAC" method, a major improvement on previous methods which has been adopted by a number of labs. Sander then went on to write the pyCRAC software suite to enable other researchers with more limited programming skills to extract their CRAC data. To improve on the available hardware for his UV-crosslinking technique, Sander designed a new type of UV-crosslinking apparatus and developed the prototypes for this instrument in collaboration with a local company, UVO3. This instrument has proved to be very popular and more than 30 units of this type have now been sold. Sander is currently working on a new prototype that will allow us to enter a new era in understanding the dynamics of RNA metabolism.

Excellence with Impact

Building towards scalability and complexity in synthetic gene circuits

Submitted by synbio on Tue, 12/15/2015 - 17:17



December 16th 2015

Our ability to build large and complex gene circuits is hampered by a paucity of well-characterised orthogonal components. Dr Baojun Wang has been awarded a BBSRC grant to help address this challenge by developing an expanded library of versatile orthogonal genetic building blocks.

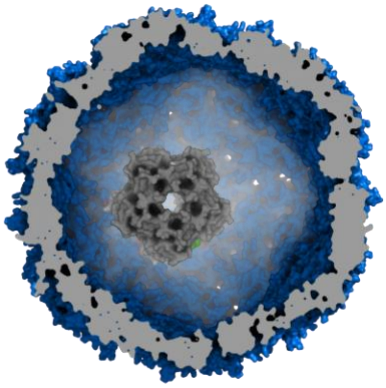
Synthetic biology requires the ability to design and implement gene circuits using standardised and interchangeable parts to program cellular behaviour in predictable ways. However, unlike electronic circuits, the components of a biological circuit are not insulated from one another. As a result, the same genetic/biological component may not be used twice in one integrated system or unintended interactions can result. Therefore, orthogonal parts and modules – those not already present in either the engineered cell or the native host cell – are necessary for scalable design of large gene circuits.

First, Baojun is planning to build a library of modular and orthogonal genetic NAND and NOR logic gates; these are universal logic gates and their combinations can be used to accomplish any operation. Second, he will create multi-layer genetic programs from different permutations of these engineered logic gates to demonstrate the potential for composing high-order signal processing and transcriptional control functions in a single cell. Finally, he will demonstrate that large complex transcriptional control programs can be implemented in a microbial cell factory to precisely and rapidly tune gene expression profiles within the biosynthesis pathway of a high value chemical (violacein).

The outputs of this project will increase the number of orthogonal control elements, gates and wires in synthetic biology's limited toolbox. It will enable us to build large-scale complex genetic controls that drive advanced behaviours in cells of value for both basic biology and biotechnology applications.

Opening the door on iron ‘megastores’

Submitted by synbio on Tue, 12/15/2015 - 09:00



December 15th 2015

Iron is an essential cofactor in nearly 10% of all enzymes because of its ability to participate in oxidoreduction reactions. However, this can be detrimental for cells when iron reacts with the products of aerobic metabolism to produce radicals that can damage proteins, lipids and DNA. Cells use a family of proteins called ferritins, which form nanocages to oxidise and safely store iron.

Dr Jon Marles-Wright has been awarded a BBSRC New Investigator grant to study a new class of ferritin proteins that are found inside a very stable virus-like structure called a nanocompartment. These nanocompartments are found in many species of bacteria and archaea and can hold up to ten times more iron than the classical ferritins. With Dr Dave Clarke of the School of Chemistry at the University of Edinburgh, Jon is going to examine how the new family of ferritins are encapsulated inside nanocompartments and why bacteria and archaea need them alongside the classical ferritins.

The project will not only shed light on these iron ‘megastores’ but also deliver impact for biotechnology and nanotechnology. The structural insights gained will allow the team to engineer nanocompartments containing different enzymes for use in advanced biocatalysis. Understanding the biochemistry of the new ferritin will allow the team to change the metal specificity from iron to rare-earth and noble metals for applications in nanotechnology.

Industrial Partnership Award for metal reclamation

Submitted by synbio on Tue, 12/15/2015 - 08:57

December 15th 2015

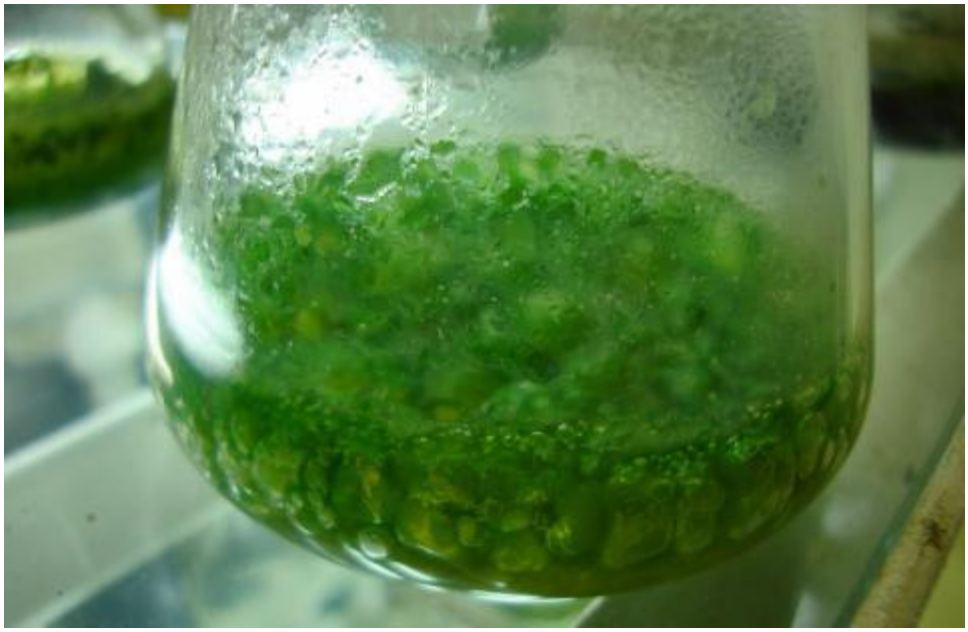
Dr Louise Horsfall was a recent recipient of a BBSRC Industrial Partnership Award (IPA) with Diageo – a global leading company in beverage alcohol – to use microbes to reclaim metals from industrial waste.

Metals have a finite supply, and therefore metal scarcity and supply security are a global threat. We need to move to a circular, more sustainable economy, where we use the earth's resources more wisely. One of the founding principles of a circular economy is that waste is an unused feedstock. The aim of the IPA research programme is to use the new tools and techniques provided by advances in biology to engineer a bacterium with the ability to recycle metals from waste streams. Certain bacteria have the ability to reduce metal cations and form precipitates of zero-valence, pure metals, as part of their survival mechanism to defend against toxic levels of metal cations. Louise will use a modular approach, commonly used in synthetic biology, to design, build and test methods to enhance the bioproduction of these high-value metal nanoparticles. She will also compare this method to a more traditional strain enhancement approach and use the data provided through proteomics to further inform design.

Diageo is seeking to invest in research that may provide new ways to remove contaminating copper ions from its co-products (produced in the whisky distillation process), allowing their use as animal feed and fertilizer, while recovering valuable copper.

Team to create a molecular toolbox to boost cyanobacterial pigment production

Submitted by synbio on Mon, 12/07/2015 - 13:39



December 7th 2015

SynthSys PIs Dr Alistair McCormick and Br Baojun Wang are joining forces with Scottish SME Scottish Bioenergy to develop a toolkit to boost the production of commercially valuable pigments from cyanobacteria.

Cyanobacteria (a simple form of microalgae) are the source of many natural pigments used for a diverse range of products from food colouring to nutritional supplements and cosmetics. Pigments such as phycobiliprotein C-phycocyanin (C-PC) are also promising candidates for drug discovery, with applications in liver repair, heart disease, immune therapy, neurodegenerative diseases and antibiotics. There is a large and growing market for cyanobacterial-based pigments, projected to reach £1 billion by 2019. However, commercial culture of cyanobacteria is fraught with the problem of controlling growth and metabolism, leading to large and unpredictable fluctuations in yield. The researchers plan to address this by using synthetic biology to engineer robust strains of cyanobacteria that can produce significantly increased and sustainable yields of C-PC.

The researchers are working with Scottish Bioenergy, a Scottish SME that designs, installs and operates microalgal photobioreactor systems. Together the team will design dynamic cellular gene control circuits in new strains that can sense and respond to the surrounding environment so as to co-ordinate cellular metabolism with C-PC production. This is a game-changing approach as normally bioproduction processes rely on powerful promoters that are permanently switched on with little consideration of the impact on the cell itself.

Together Scottish Bioenergy and the researchers will be able to demonstrate proof that the concept can work in a 'real world' setting by testing the new cyanobacterial strains in industrially relevant – up to 1,000 litre – photobioreactor conditions.

The project was supported by a grant from PHYCONET is a Biotechnology and Biological Sciences Research Council Network in Industrial Biotechnology and Bioenergy (BBSRC NIBB), a UK-based network enabling biologists, engineers and industrial partners to consolidate their knowledge and expertise to unlock the IB potential of microalgae.

Photo credit: Cyanobacteria cultured in specific media by Joydeep, Licensed under CC-BY-SA (3.0)

Scottish synbio takes off

Submitted by admin on Fri, 10/30/2015 - 14:36

SynthSys has been keen to promote synthetic biology in Scotland and have been working with Scottish Enteprise's Life and Chemical Sciences team and the Industrial Biotechnology Innovation Centre to do this.
With support from EPSRC IAA funding and Scottish Enterprise, we were able to bring the leading international synthetic biology SynBioBeta (http://synbiobeta.com/) to host their very first in Scotland the evening of the launch event.

SynBioBeta is ***the*** leading international community of companies, entrepreneurs, investors and policymakers devoted to the responsible growth of the synthetic biology field. It runs two major international conferences every year (in San Francisco in November and London in April), which bring the entire synthetic biology community together to provide the opportunity to meet with those building and shaping the bioeconomy — from industry thought leaders and entrepreneurs to venture capitalists and angel investors. SynBioBeta is a well-recognized and rapidly growing brand with international recognition.

At what was an over-subscribed event, the delegates enjoyed short talks by international synthetic biology businesses including SynthSys partners Synpromics and Ingenza. There was then a panel discussion around what the barriers are for generating new products, services and business opportunities around synthetic biology.

Check out www.synbio.ed.ac.uk

Feel good hit of the summer: EdiGEM Giant Jamboree success

Submitted by admin on Fri, 10/30/2015 - 13:26

A summer spent toiling at the lab bench and interviewing drug policy experts has paid off for our iGEM team with their success at the iGEM Giant Jamboree in Boston this September.

The team presented their cell-free drug contaminant biosensor at the final of the iGEM competition and secured a gold medal for their project. Their thorough and sensitive approach to the controversial subject of harm reduction for recreational drug use impressed the judges and the team were nominated for the 'Best Health and Medicine Project' and 'Best Integrated Human Practices' awards in the undergraduate track of the competition. I wasn't able to go to Boston with the team, so I was watching the final presentations via twitter on my bus ride home. It was an emotional commute! When the judges announced the award winners I let out a cheer from my seat as the team won the 'Human Practices' award. This was a fantastic result for the team and in Louise Horsfall words: 'We are overwhelmingly proud of the team'. It is great to see the dedication and thoughtfulness of our team recognised in this award. The team were presented their trophy and real gold medals by Prof. Rosser and Prof. Yellowlees at the SynthSys Halloween Social (thanks for organising the medals Julie, they look amazing!).
We're already preparing for iGEM 2016, and are recruiting team members now if you know any undergraduates who might be interested in joining the team. We are running our iGEM Sandpit again during Innovative Learning Week, so please encourage your tutees to come along if they want a summer project. We're also looking for an EastBio PIPs intern to manage the team after Liz Bayne's student Elliott Chapman did such a good job wrangling the team this year.

I'd like to thank my iGEM co-lead Louise Horsfall and all of our team Instructors and Advisors who volunteered their time, lab space and resources over the summer: Dave Clarke, Elliott Chapman, Chris French, Alistair Elfick, Jane Calvert, Baojun Wang, Valentin Zulkower, Fatai Bello and Laura Tuck. None of this would have been possible without the generous sponsorship we received from the Schools of Biological Sciences and Chemistry, SULSA, the MSD fund, BBSRC, Microbiology Society, Society for Applied Microbiology, the Biochemical Society, IDT, Amazon, JP Morgan, and Blackwell's Bookshop.

Report: Provision of Biological Data Management systems

Submitted by synbio on Fri, 10/30/2015 - 11:40

Practical evaluation of SEEK and OpenBIS for biological data management in SynthSys; first report.
http://hdl.handle.net/1842/12236

Opening Doors on SynthSys

Submitted by admin on Tue, 10/27/2015 - 17:59

On September 26th, SynthSys opened the Waddington Building to the public for the first time during the Doors Open event. Over the course of the day we had 75 visitors come to explore about our multidisciplinary research that brings biology together with engineering.

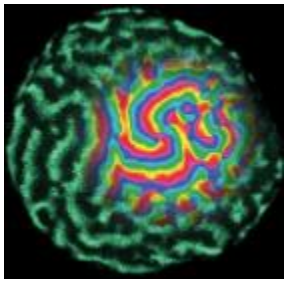
We had exhibits from the lab of Dr Timm Krueger who offered hands-on interactive on a novel method for sorting cells, useful potentially in medicine. The lab of Prof Chris French explained how cells can be engineered to detect arsenic in drinking water, a project that may help the 100 million people at risk in developing countries. Members from the lab of Dr Patrick Cai offered a fun demonstration of the value of high-throughput and automated technology for printing cells (see photos). Dr Louise Horsfall's lab treated guests to the wonders of fluorescent bacteria and how bugs can be designed to clean up contaminated soil. Finally, visitors could actually check for themselves how climate change impacts on plant growth by playing with parameters of a model generated in the lab of Professor Andrew Millar.

Encouraged by the level of participation, SynthSys will be planning an even bigger event for 2016.

Edinburgh Doors Open Day is organised by the Cockburn Association (Edinburgh's Civic Trust). Now in its 25th year, the event has become one of the capital's most popular free days out. For the day Edinburgh's most architecturally, culturally and socially significant buildings are opened to the public. More here

Collaborative research reveals new view of cell division

Submitted by admin on Tue, 10/27/2015 - 11:26



Congratulations to Marcin Leda and Andrew Goryachev whose paper “Activator-inhibitor coupling between Rho signalling and actin assembly makes the cell cortex an excitable medium” is featured on the front page of Nature Cell Biology.

This paper reports the discovery of cortical excitability in the large embryonic cells of frogs and echinoderms, where it takes the form of stunning waves (see figure) that sweep the cell cortex in preparation for cytokinesis, the final separation stage of the cell cycle.

The Edinburgh team collaborated with the leading US experimentalists, Professors William Bement, U of Wisconsin, Madison, and George von Dassow, U of Oregon, to quantitatively characterize this phenomenon and provide its first heuristic model.

This visually captivating phenomenon is, perhaps, the most dramatic among the known to date manifestations of intracellular pattern formation based on the dynamics of small GTPases. Activator-inhibitor systems have been frequently alluded to in computational models, yet rarely found in experiments. This study, featured both in the BBSRC (http://www.bbsrc.ac.uk/news/fundamental-bioscience/2015/151019-n-surface-waves-influence-how-a-cell-divides/) and the University of Edinburgh news (http://www.ed.ac.uk/news/2015/cells-221015) takes a step further to understanding the molecular mechanisms that orchestrate division of eukaryotic cells.

UK Centre for Mammalian Synthetic Biology Launched

Submitted by admin on Sun, 10/11/2015 - 14:18

The UK Centre for Mammalian Synthetic Biology, funded by the BBSRC, EPSRC and MRC, was formally opened on October 7th by Caroline Strain, Head of Chemical Sciences, Scottish Enterprise.

At a packed event, delegates enjoyed an inspiring keynote address by Professor Martin Fussenegger, Biotechnology and Bioengineering, ETH Zurich, who is one of the leaders in the field of mammalian synthetic biology. Martin's fascinating research on light-controlled gene expression *in situ* to address a range of healthcare challenges provided an apt opening to the day's agenda.

Professor Susan Rosser, Chair in Synthetic Biology at the Schools of Biology and Engineering, and the Director of the new Centre, provided an overview of the research programme for the Centre. Susan was delighted to be presented with an unexpected celebratory gift from our distinguished guest from China, Prof Professor Yingjin Yuan, Vice President for Research in Tianjin University, with whom Edinburgh has a partnership.

The Centre's vision is to pioneer the development of the tools and technologies needed to realize the full potential of synthetic biology to gain new insights into human biology and to generate solutions to many healthcare challenges. The Centre marries synthetic biology with two areas of research excellence at Edinburgh – stem cell biology and epigenetics – for improved understanding of diseases such as multiple sclerosis and cancer, and for *de novo* tissue generation, the creation of biosensors, and tools for drug discovery. Key members of the Centre delved into the detail of the many themes of research that the Centre will pursue, including all-important research on the social, ethical and regulatory aspects of this emerging and game-changing technology.

The UK has been particularly well funded in synthetic biology, one of the UK Government's 'Eight Great' technologies thanks to the 2012 Synthetic Biology Road Map. Lionel Clarke, the co-chair of the Synthetic Biology Leadership Council, prepared the ground for the launch of the refreshed roadmap which will be published early 2016. Roger Kilburn, CEO of the Industrial Biotechnology Innovation Centre, reiterated synthetic biology's central role in the bioeconomy. Industrial biotechnology is a key driver of growth for the Scottish economy and having a local centre of excellence in Edinburgh will be an important attraction for future inward investment.

John Cumbers, founder of the global hub for the synthetic biology community SynBioBeta, reflected on the current appetite among investors for companies with synthetic biology products and services. This year almost $600 million has been raised for such businesses from a baseline of <$100 million in 2009. On the evening before the Centre launch, Edinburgh hosted a sell-out SynBioBeta Activate! Event in the capital attracting close to 100 delegates interested in the potential in synthetic biology.

The Launch event finished with the formal opening of the Roger Land Building, which was refurbished in part to house Edinburgh's growing community of synthetic biologists, with generous funding from the BBSRC and the University of Edinburgh. The opening was performed by Dr Rowan McKibbin, Head of Strategy for Genomics, Data and Technologies, BBSRC.

Launch of the UK Centre for Mammalian Synthetic Biology

Submitted by admin on Tue, 10/06/2015 - 10:34

On October 7th we will formally launch the UK Centre for Mammalian Synthetic Biology, funded by the BBSRC, EPSRC and MRC. The Centre is being opened by Caroline Strain, Head of Chemical Sciences, Scottish Enterprise and starts with a keynote talk by Professor Martin Fussenegger, ETH Zurich, one of the leaders in the field. Alongside overviews of the Centre's research activities, there are national and international perspectives of the opportunities afforded by synthetic biology for industry and society from guest speakers.

The launch event will finish with the opening of the Roger Land Building, which was refurbished in part to house Edinburgh's growing community of synthetic biologists, with generous funding from the BBSRC and the University of Edinburgh. The Head of College, Professor Lesley Yellowlees will oversee the building's opening, which will be performed by Dr Rowan McKibbin, Head of Strategy for Genomics, Data and Technologies, BBSRC.

Edinburgh hosts SynBioBeta Activate! Event

Submitted by admin on Tue, 10/06/2015 - 10:05

synbiobeta

October 6th

Tonight the University of Edinburgh in partnership with Scottish Enterprise hosts the first SynBioBeta event in Scotland. In what was a rapidly sold out event, companies and key opinion leaders will discuss the opportunities and challenges around the new tools and technologies that promise to drive the synthetic biology revolution. The event is followed by a networking opportunity in true Scottish style at the historic Scotsman Hotel overlooking the Capital.

The SynBioBeta Activate! event has been organised in celebration of the official launch of the UK Centre for Mammalian Synthetic Biology on October 7th at the University of Edinburgh. This BBSRC, EPSRC and MRC funded synthetic biology research centre – one of only six in the UK – has a vision to bring the benefits of synthetic biology for health. Synthetic biology is a key strategic research theme for the University of Edinburgh, which has committed over £15M in support in the past few years.

SynBioBeta is the leading community of entrepreneurs, investors, policymakers and enthusiasts devoted to the responsible growth of the synthetic biology field. We're dedicated to telling the stories of the field and companies involved, building their networks, and helping them grow.

Edinburgh becomes first academic member of international biosecurity consortium

Submitted by admin on Tue, 08/04/2015 - 10:59

The University of Edinburgh's Genome Foundry has become the first academic member of the International Gene Synthesis Consortium (IGSC), an association of the world's leading gene synthesis companies working to safeguard the rapidly-emerging field of gene synthesis.

Dr Patrick Cai, Co-Director of the Edinburgh Genome Foundry, says: "*We were keen to make a clear statement that we take biosecurity seriously and are thrilled to be taken on as the first academic member of this Consortium. We are looking forward to contributing to this important initiative to help ensure safe and responsible use of gene synthesis technologies."*

Rapid strides are being made towards reducing the cost and scaling of gene synthesis, rendering the emerging area of synthetic biology more widely accessible to researchers. This may also raise concerns over potential misuse and threats to biosecurity. Leading gene-synthesis companies formed the IGSC to establish procedures and best practices for comprehensive screening of sequences of gene/DNA orders and vetting of customers, effectively safeguard the growing research community they serve.

The IGSC recently incorporated as a not-for-profit corporation to facilitate the joining of new members, including small companies, not-for-profit research organisations and academic institutions, so that they may leverage the biosecurity expertise of the IGSC.

Todd Peterson, current Board Chair of the IGSC and Chief Technology Officer of Synthetic Genomics Incorporated, explains, "*We hope to encourage organisations involved in gene synthesis across the globe to benefit from the biosecurity screening processes and expertise of our membership. The IGSC is pleased to have the University of Edinburgh's Genome Foundry as its first academic member and we look forward to on-boarding other new members under our current charter and by-laws."*

About the IGSC

The IGSC was founded in 2009 by the world's leading gene synthesis companies to advance biosecurity across the industry. In April 2015, the IGSC became a California not-for-profit 501(c)(3) corporation under charter and by laws developed to facilitate broader membership and community participation. The IGSC's goals are (a) to educate gene synthesis companies and the public regarding sequence and customer screening of synthetic gene orders; (b) to identify and prevent the unauthorized synthesis and sale of inappropriate sequences; and (c) to coordinate development of ongoing best practices. For more information about membership or the IGSC screening process, please visit www.genesynthesisconsortium.org.

Award to apply evolutionary game theory to study stem cells in engineered tissues

Submitted by admin on Tue, 05/12/2015 - 18:32

SynthSys Research Associate Dr Matteo Cavaliere at the School of Informatics, University of Edinburgh has won one of thirteen $100,000 awards from the National Academies Keck Futures Initiative to use evolutionary game theory to create models of how stem cells may behave in engineered tissues.

The success of stem cell based therapies requires control of heterogeneous stem cell differentiation. In collaboration with Blanka Sharma and Glyn Palmer, University of Florida, Dr Cavaliere will use a combination of evolutionary game theory, experiments, and *in silico* models to understand how interactions/conflicts between stem cells that respond positively and negatively to exogenous cues impact the overall tissue repair process.

National Academies Keck Futures Initiative offers competitive seed grants aim to fill a critical gap in funding for research on new ideas. Established through a $40 million grant from the W.M. Keck Foundation in 2003, the National Academies Keck *Futures Initiative* – a program of the National Academy of Sciences, National Academy of Engineering, and Institute of Medicine – is a 15-year effort to enhance communication among researchers, funding agencies, universities, and the general public -- with the objective of stimulating interdisciplinary research at the most exciting frontiers.

For further information http://bit.ly/1F3SJDm

YeastFab offers useful tools for industrial biotech

Submitted by admin on Tue, 05/12/2015 - 18:31

Dr Patrick Cai, SynthSys Principal Investigator and co-director of the Edinburgh Genome Foundry, along with collaborators from Tsinghua University have published their first paper on construction of YeastFab – a library of well characterized yeast genetic parts that will serve to expedite metabolic engineering of this industrial workhorse.
It is a routine task in metabolic engineering to introduce multicomponent pathways into a heterologous host for production of metabolites. However, this process sometimes may take weeks to months due to the lack of standardized genetic tools. Dr Cai's team now reveal a method for the design and construction of biological parts based on the native genes and regulatory elements in *Saccharomyces cerevisiae*. They developed highly efficient protocols (termed YeastFab Assembly) to synthesize these genetic elements as standardized biological parts, which can then be used to assemble entire metabolic pathways in simple steps. The team also systematically characterized these genetic parts under various stress conditions, which sheds light on the rational design of eukaryotic systems in the future.

The team proved that their strategy worked by reconstruct the metabolic pathway that produces carotene (Vitamin A) in matter of days (rather than weeks using more traditional methods), and even optimized the production through combinatorial assembly of a pathway using hundreds of regulatory biological parts.

The work is published online in *Nucleic Acids Research Advance Access* (May 8, 2015) http://bit.ly/1J9PEVu

SynthSys recognised at Sustainability Awards

Submitted by admin on Fri, 04/24/2015 - 17:04

SynthSys was presented with a Silver Lab Award for the second year in a row at this year's Ceremony.

More than 200 staff and students gathered at the Playfair Library Hall to celebrate the achievements of over 40 teams at the fifth annual Edinburgh Sustainability Awards.

Catherine Elliott, Registrar at the College of Medicine and Veterinary Medicine, presented awards to 10 laboratories for their efforts to make their workplaces safer and more sustainable."By entering the Sustainability Awards, our laboratories have committed to taking innovative measures to improve their environmental performance and share best practice with colleagues from across the University." said Catherine.

Congratulations to all those who participated and special thanks to Eliane Salvo-Chirnside and Katalin Kis for co-ordinating efforts. Going forward SynthSys will continue to recognise the importance of working together to help make our University more socially responsible and sustainable.

Further information and all winners
at http://www.ed.ac.uk/about/sustainability/news/sustainability-awards-2015

F1000 Recognizes Contribution of a SynthSys PI

Submitted by synbio on Tue, 04/07/2015 - 01:00

Congratulations to Dr. Andrew Goryachev who has been awarded “Faculty Member of the Year 2014” for Microbiology Faculty.

Faculty of 1000 emerged in 2000 as a UK web-based initiative to provide scientists with post-publications reviews of papers in biomedical journals. Members of Faculty, nominated on the basis of their research activity, recommend papers they found interesting and influential, regardless of the impact factor of the journal they were published in.

Nowadays, nearly 6,000 strong, this international organization comprises 32 Faculties that cover major areas of Biology and Medicine. Every year, one member of each Faculty is selected to recognize a “Faculty Member who has made the most significant contribution to the F1000 Recommendation service over the past year”. Andrew, who had been elected into F1000 at the end of 2013, has been actively using the web-based service to promote excellent systems biology research within and well beyond the scope of microbiology.

SynthSys PI wins Synbio Leader Fellowship

Submitted by synbio on Thu, 01/29/2015 - 20:11

Dr Jon Marles-Wright, Chancellor's Fellow in the School of Biological Sciences and member of SynthSys, has won a prestigious Synthetic Biology LEAP Fellowship for 2015.

The Synthetic Biology Leadership Excellence Accelerator Program (SynBio LEAP) awards fellowships to an outstanding group of next generation leaders selected for their vision and aspiration for shaping biotechnology for the public good. The Fellowship will begin on February 1st in Washington DC with a set of landscaping meetings exploring the social, economic, technical, and political state of the field.

Supported by a growing network of sponsors including the Alfred P. Sloan Foundation, the National Science Foundation, Synberc, and Imperial College SynbiCITE, LEAP is an incubator for emerging leaders across disciplines and sectors to develop strategies for advancing biotechnology in the public interest. The year-long, non-residential programs centers on two meetings: the 'landscaping meeting' and an immersive 'leadership workshop' where Fellows develop Strategic Action Plans that address key individual and community challenges. Fellows are mentored by a world-class network of leaders across sectors and disciplines, and the most promising action plan ideas are awarded Catalyst seed grants to accelerate their development.

The 2015 LEAP Fellows come from world-class universities, large corporations, start-up companies, government agencies, non-governmental organizations, national laboratories and community labs. The LEAP Fellowship provides a unique opportunity for them to share knowledge, and develop new skills, for working effectively across diverse social and organizational contexts shaping biotechnology. More about the 2015 winners can be read here http://synbioleap.org/community/fellows/

Dr Marles-Wright says: "It is a real honour to be selected as one of the 2015 SynBio LEAP fellows. This year's cohort is full of really inspiring young synthetic biologists from academia, industry and policy. I'm looking forward to meeting the cohort in Washington DC in February at the landscaping workshop and making the most of this amazing opportunity."

Dr Louise Horsfall, Lecturer in Biotechnology in the School and also a PI in SynthSys, was a LEAP Fellow in 2014.

Medical advances accelerated by investment in synthetic biology at Edinburgh

Submitted by synbio on Wed, 01/28/2015 - 00:00

Advances in drug discovery and healthcare will be accelerated by a multimillion pound investment in synthetic biology research centre at the University of Edinburgh over the next five years.

Synthetic biology seeks to redesign biological systems so that they can better perform new functions and to model and construct biological 'parts' and processes that do not exist in Nature. The new funding will explore applications of synthetic biology to both understand fundamental mechanisms of health and disease and also to pioneer new tools to ultimately improve human health. For example, Edinburgh scientists will explore how to programme stem cells for use as personalized medicines, create tests that are better at testing the safety of new medicines, and build tools to help identify new types drugs to treat some devastating diseases.

Professor Susan Rosser, Chair in Synthetic Biology at the School of Biological Sciences and the lead on the successful bid, says: "This further strengthens Edinburgh's position as a leading Centre for synthetic biology in the UK. Applying this powerful technology for human medicine is still in its infancy but Edinburgh is well positioned to take a lead with its pioneering research in cell biology, stem cells and epigenetics."

The winning bid receives £11.4M in support from the BBSRC, EPSRC and MRC as part of the Research Council's Synthetic Biology for Growth. The Edinburgh application was supported by several local and international companies engaged in this fast-growing research arena.

The University of Edinburgh's Centre for Synthetic and Systems Biology (SynthSys) has carried out research in synthetic and systems biology for the past 7 years. Drawing together researchers from across the University, the Centre has over 40 active research groups including world-leading expertise in the ethical and social aspects of this powerful technology. The new Centre funding (called SynthSys Mammalian) will support 28 posts and ensure that Edinburgh remains at the forefront of this rapidly emerging field.

Professor Peter Swain, Director of SynthSys, comments: "The new funding recognizes Edinburgh's role as one of the leaders of synthetic biology in the UK. We are excited about the bringing together of two of the university's strengths: regenerative medicine with systems and synthetic biology."

Additional support for the Genome Foundry

The BBSRC also announced an additional £4.4M in support towards building DNA synthesis facilities in Edinburgh in partnership with Universities of Cambridge, Liverpool and The Genome Analysis Centre. Last year, Professor Susan Rosser was awarded >£2M to establish a unique facility to assemble and study long strands of DNA, up to chromosome size. These can be used to equip cells or organisms with new or improved functions generating new

products with applications in health, agriculture and biofuels. Professor Rosser and Dr Patrick Cai – co-directors of the Foundry – received additional funding to expand the facility, further develop platforms to support the highly automated DNA construction process, and to build a suite of assays that can assess the impact of the synthetic insert on the host cell.

Link:
Edinburgh Synthetic Biology Research Centre: Engineering Mammalian Systems

Genetic safety switches for synthetic biology

Submitted by synbio on Tue, 01/27/2015 - 00:00

Dr Patrick Cai of SynthSys and his collaborators have devised a method for containing synthetic biology products to help ensure that they work only as intended. They developed a set of genetic switches that can be built into engineered organisms, to control the function of genes they need to survive.

The genetic switches are controlled by the addition of a mixture of naturally occurring chemicals, which can be customised for a variety of products. These could prevent potential harm from either the theft or misuse of these substances, which are used in biofuels, food, and medicines.

In collaboration with Dr Jef Boeke at NYU Langone Medical Center (USA), Dr Cai and his team developed two types of molecular switch that work in yeast, a commonly used model organism. The team inserted a second set of on and off switches to target another vital gene, to mitigate the risk that changes in the live yeast might enable it to circumvent chemical control.

Dr Cai says: “Synthetic biology is a fast-developing field with huge potential to benefit society, but we need to be mindful about its potential risks and take active steps to limit them in our biological designs. With these genetic safety switches, we can contain engineered organisms with a special combination of small molecules.”

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The paper can be found here http://bit.ly/1CaNzXb