SEB+ ABSTRACTS

SEB+1 TEACHING BIOLOGY AT DIFFERENT SCALES: CHALLENGES, OPPORTUNITIES AND STRATEGIES

ORGANISED BY: KATHARINE HUBBARD (UNIVERSITY OF HULL, UK) AND LUCY TALLENTS (UNIVERSITY OF OXFORD, UK)

SEB+1.1 THE BIOFLEX APPROACH – SUPPORTING FIRST-YEAR STUDENT SUCCESS IN LARGE-CLASS BIOLOGY AND MORE

TUESDAY 3 JULY, 2018 **09:00**

SUNITA G CHOWRIRA (UNIVERSITY OF BRITISH COLUMBIA, CANADA), KAREN SMITH (UNIVERSITY OF BRITISH COLUMBIA, CANADA), PAM KALAS (UNIVERSITY OF BRITISH COLUMBIA, CANADA), GÃÜLNUR BIROL (UNIVERSITY OF BRITISH COLUMBIA, CANADA), SHONA ELLIS (UNIVERSITY OF BRITISH COLUMBIA, CANADA)

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The transition to the first year of university from high school is often quite challenging. The BioFlex approach, at the University of British Columbia, was designed to help students engage deliberately with their learning through a variety of strategies, such as, collaborative in-class work and exams; learning to fail productively in a safe learning environment; practising to become reflective learners; and learning to think about their well-being. Is this achievable in large-enrolment classes? Opportunities and challenges of such large-scale endeavours will be shared.

SEB+1.2 SMALL GROUP TEACHING THROUGHOUT THE IGEM COMPETITION

TUESDAY 3 JULY, 2018 **09:30**

CHLOE SINGLETON (UNIVERSITY OF EXETER, UNITED KINGDOM), PAUL B C JAMES (UNIVERSITY OF EXETER, UNITED KINGDOM), SARA BURTON (UNIVERSITY OF EXETER, UNITED KINGDOM), JOHN LOVE (UNIVERSITY OF EXETER, UNITED KINGDOM)

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The International Genetically Engineered Machine (iGEM) competition allows small (10-12), multidisciplinary teams of undergraduate students to design and implement their own Synthetic Biology research project to solve a real-world challenge. The competition is an excellent research-based learning platform wherein teaching and learning activities are reactive to the students' interests and needs and are dependent upon the breadth of the students' academic disciplines (Biological Sciences, Physics, Engineering, Mathematics, Social Sciences' etc.). The iGEM competition strongly emphasises responsible research and innovation (RRI) which ensures students are also trained to consider the social and ethical concerns around their research. Finally, iGEM students develop a number of important transferable skills including: communication, organisational and team working skills.

The University of Exeter's iGEM students experience a high intensity learning environment. The student: supervisor ratio is on average 2:1 and the students have daily interactions with the supervisory team. In addition, students receive one-to-one and small group support from leading academics in their chosen research field and support from RRI academics, industrial partners and non-government organisations (NGOs). Although this requires significant staff time and resources, the benefits can be evidenced by the sustained excellence of the teams. Since first entering the competition in 2012 we have achieved: one bronze, one silver and four gold medals and in 2017 the team won Best Environmental Project and Best Applied Design. This talk will focus on the lessons we can learn from such intense teaching and the wider benefits the iGEM competition gives to the students and University.

SEB+1.3 SIZE MATTERS, BUT WHAT YOU DO WITH IT ALSO COUNTS: STRATEGIES TO BREAK DOWN THE LARGE CLASS EXPERIENCE

TUESDAY 3 JULY, 2018 **09:45**

JOANNA M SMITH (BANGOR UNIVERSITY, UNITED KINGDOM), DANIEL G THORNHAM (BANGOR UNIVERSITY, UNITED KINGDOM), KATHERINE A JONES (BANGOR UNIVERSITY, UNITED KINGDOM)

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The significant increase in the proportion of people attending University in the UK over the past twenty years, from 15% of 17-30 year olds to 50%, has led to an inevitable and consequent increase

in class sizes in popular degrees at established Universities. Large classes are often presented as being an 'efficient' solution to teaching basic principles to undergraduate students but are also widely acknowledged to pose significant challenges for student retention, engagement and belonging as well as to administration and assessment design. Given that large classes are a feature of many undergraduate science degrees in the UK, we explore the relative successes of our attempts to reduce the effective class size, from physically splitting the class and more creative uses of virtual learning tools for assessment and support. For example, our work to increase engagement with feedback in the first year via reflective practice and peer-marking tools; and use of Blackboard quizzes in statistics teaching to allow a rapid, tailored response to the specific needs of a large, diverse class. However, measuring the success of any intervention or even of a module is fraught with difficulty. For instance, assessment success does not necessarily reflect student engagement or happiness (and vice versa). We hope, by highlighting examples in our own practice, to create discussion points for the session on the characteristics and challenges of teaching large classes in the biosciences.

SEB+1.4 DO YOU LIKE YOUR TA? STUDENT PERCEPTIONS OF INSTRUCTOR ABILITY AND AUTHORITY INFLUENCE THEIR ACADEMIC PERFORMANCE

TUESDAY 3 JULY, 2018 **10:15**

JANET GENZ (UNIVERSITY OF WEST GEORGIA, UNITED STATES)

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Often in large, introductory science courses which include a laboratory component, the lecture is taught by faculty, but the laboratory instruction relies on student teaching assistants. In order to examine whether this model is underserving students enrolled in an introductory biology course for majors, data was collected on student perceptions and performance to laboratory instruction. We compared three types of laboratory instructor: 1) an undergraduate teaching assistant (TA) who had taken the course previously, 2) a supplemental instructor who was the TA for both the lab and lecture components of the course, and 3) the faculty instructor. Surveys were used to assess students' perception of their instructor's authority and content knowledge. Metrics of academic performance in both components of the course were analysed to examine any differences associated with instructor type, and to determine whether differences in laboratory instruction influenced the connections in understanding made by students between lecture and lab content. Results indicated: 1) the ability of students to make connections between laboratory and lecture content may be influenced by the visibility of the lab instructor in relation to the lecture component, 2) establishment of a trusting relationship between the instructor and student is important to overall learning success, but can be successful under either authority-based or peer-based structures, 3) student persistence and engagement may be influenced by instructor type. These results highlight aspects of instructional mode that can be adjusted to influence the efficacy of laboratory instruction in other lab-enhanced courses across STEM fields.

SEB+1.5 THINKING LIKE A SCIENTIST: STRUCTURING LARGE CLASS LABORATORY EXPERIENCES TO DEVELOP A QUESTIONING APPROACH

TUESDAY 3 JULY, 2018 **10:30**

SUSAN M HOWITT (AUSTRALIAN NATIONAL UNIVERSITY, AUSTRALIA), DENISE HIGGINS (AUSTRALIAN NATIONAL UNIVERSITY, AUSTRALIA), ADELAIDE DENNIS (AUSTRALIAN NATIONAL UNIVERSITY, AUSTRALIA), ANGELA STODDARD (AUSTRALIAN NATIONAL UNIVERSITY, AUSTRALIA), ALEXANDER G MAIER (AUSTRALIAN NATIONAL UNIVERSITY, AUSTRALIA)

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Research skills and experience are desirable outcomes from an undergraduate degree but scaling up authentic research experiences for large classes remains a challenge. We describe learning outcomes from a semester-long research project developed as the laboratory component of a second year course with 200-300 students. Students mutagenise *E. coli*, screen for lactose utilization mutants and then analyse their mutants to identify which component of the *lac* operon is defective. Throughout the course, we aim to foster the view that students need to think like scientists, to develop their own questions and to understand the process of scientific discovery. We use a threefold strategy to support this. First, since the outcome of the project is unknown, students must apply logic and link different strands of inquiry with lecture material to identify the mutations, mimicking real research. Since we found many students needed support to critically assess data and conclusions, our second strategy is to foster peer-assisted learning where trained peer mentors develop and run activities addressing the use of evidence and experimental design. The sessions provide a supportive environment in which students can discuss results, experimental strategy and their concerns. Third, we engage students in the process of designing and appraising assessment questions, to shift their focus from acquiring knowledge to evaluating and using it. Course-specific and institutional feedback surveys show that many students moved from a focus on technical skills and rote learning to a more sophisticated understanding of the nature of scientific research with its inherent uncertainty.

SEB+1.6 USING THE TRADITIONAL TAS2R38 STUDENT GENOTYPING LABORATORY AS AN INTRODUCTION TO STATISTICS AND R

TUESDAY 3 JULY, 2018 **10:45**

PAM SCOTT (UNIVERSITY OF GLASGOW, UNITED KINGDOM), DR DONALD REID (UNIVERSITY OF GLASGOW, UNITED KINGDOM)

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Fostering engagement in quantitative topics is a challenging aspect of teaching statistics and research methods in life sciences. Competency in data analysis is an essential skill for life science students whether continuing in research or beyond, with R the industry standard. However, approaches to the teaching of statistics differ greatly in quality, level and focus, which can reduce student engagement and their perceptions of its relevance. Incorporating

realistic data and research examples into quantitative sessions has been widely recommended for enhancing student engagement and comprehension. Here we present how utilising a traditional laboratory practical, TAS2R38 genotyping, students can learn how to use R as an applied tool to analyse their own data. This was introduced as part of a compulsory Level 2 undergraduate course known as 'Fundamental Topics in Biology' (FTB). This course was recently introduced (in 2017-18) as part of a restructuring of degree courses at the University of Glasgow and was designed to enable students to learn core molecular knowledge and core skills, including statistics. It was delivered to ~650 students of varying degree interests and experience in using R. We will present in detail how the reception from students to this integrated approach was very positive and translated into excellent analysis in assessment. Framing the use of data analysis using R as a tool to help answer research questions is an effective strategy in successful teaching.

SEB+1.7 TEACHING LARGE AND DIVERSE CLASSES: A VERY PRACTICAL APPROACH

TUESDAY 3 JULY, 2018 **14:00**

KATJA STROHFELDT-VENABLES (UNIVERSITY OF READING, UNITED KINGDOM)

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Teaching of large cohort sizes is becoming more and more prominent at Universities. Many colleagues will have experienced this and also faced the challenges, which come with teaching large class sizes especially in STEM subjects. The aim of this session is to introduce you to real-life tips and tricks to improve teaching and learning in large class sizes of STEM subjects – often using very creative approaches.

You will:

– Get further insight about our research on student perception of large class teaching, especially in increasingly diverse cohorts. We have asked the typical questions such as "How large is large?" and "Does size matter?", but also looked into diversity and inclusion-related questions.

– be introduced to our **"Large Class Education Toolkit"** – a very practical guide, containing from around 40 real-life case studies from colleagues in STEM or related subjects.

The Large Class Education Toolkit:
The aim of this toolkit is to provide real-life ideas around teaching large classes at HE level in an easily accessible manner. The toolkit consist of approximately 40 case studies from colleagues at the University of Reading. We have divided the toolkit into three sections – illustrating how much time you need to approximately spend to include these ideas into your teaching session.

Have a look at the Toolkit here:
https://www.reading.ac.uk/web/files/cqsd/V4_Interactive_Education_Toolkit.pdf

SEB+1.8 PRACTICAL STRATEGIES FOR TEACHING ACROSS SCALES: AN INTERACTIVE WORKSHOP

TUESDAY 3 JULY, 2018 **14:30**

KATHARINE E HUBBARD (UNIVERSITY OF HULL, UNITED KINGDOM), LUCY TALLENTS (UNIVERSITY OF OXFORD, UNITED KINGDOM)

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Are you facing challenges in teaching associated with scale? Perhaps your class sizes have increased and your teaching methods aren't working as well as they were? Are you dealing with large classes for the first time in your career and aren't sure what teaching strategies will be most effective? Maybe you are teaching via an online platform and are struggling to manage teaching across geographical boundaries and time zones? Or perhaps you just want some practical hints for making your teaching more engaging and efficient. The session organisers alongside our key note speakers and experienced educators invite you to an interactive workshop to discuss the challenges of teaching at scale, and to provide some practical solutions to enhance your teaching practice. This will be an informal, hands-on session aimed at anyone who teaches biology either in person or online, and may be particularly relevant to early career researchers who are teaching at any scale for the first time. You will be invited to discuss issues you currently face in your teaching, and we will suggest pedagogical and technical solutions for teaching at scale, and provide tips and tricks for developing your teaching practice. Ultimately this session aims to build a supportive network of educators to help all attendees feel more confident in delivering high quality biology teaching.

SEB+1.13 EFFECTIVE E-LEARNING STRATEGIES IN A DIGITAL AGE

TUESDAY 3 JULY, 2018 **16:00**

NICOLA VEITCH (UNIVERSITY OF GLASGOW, UNITED KINGDOM), PAMELA SCOTT (UNIVERSITY OF GLASGOW, UNITED KINGDOM)

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Distinct and tailored teaching methods to engage large student cohorts are paramount to enhancing the student experience. Teaching and learning strategies have been developed in order to accommodate a variety of student academic backgrounds, essential when working with large class sizes in Higher Education. Experience of using e-learning methods to enhance student engagement will be described, including digital support resources, lecture capture and in class voting systems.

A case study will be discussed where interactive lectures and bespoke digital resources were developed and integrated into a challenging biology course. This approach was designed to encourage inquiry-based learning, enhancing theoretical understanding of practical biology skills. Digital resources were developed in collaboration with undergraduate students and graduate teaching assistants in order to ensure the material available was focused on areas that students found most challenging. A Molecular Methods App was developed as a mobile, any-time, anywhere resource to support student learning at home and in the lab. The app houses bespoke online resources, including YouTube

videos with linked revision quizzes, explanations of many commonly used techniques, illustrated with images and flow charts. Integration of these strategies improved the student experience and attainment. The App is now being accessed by students internationally, with 15,000 downloads to date. The benefits and drawbacks of using this approach will be discussed in a wider context of designing apps in Higher Education.

SEB+1.14 USING ONLINE LEARNING TO SUPPORT ACTIVE LEARNING IN LARGE GROUPS

TUESDAY 3 JULY, 2018 **16:30**

ANNE M TIERNEY (EDINBURGH NAPIER UNIVERSITY, UNITED KINGDOM)

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Massification of higher education over the past two decades has resulted in larger classes, which can sometimes seem impersonal, which can lead to isolation and impacts on retention (Wilcox, Winn, & Fyvie-Gauld, 2005). Provision of online learning can be seen as a means to transmit knowledge to large groups; however, students may be strategic in their engagement with online provision, and become disillusioned.

In this presentation, I look at how we can make online learning more attractive to students, by making it more inclusive and giving students a sense of ownership. Using the Community of Inquiry model (Garrison, Anderson, & Archer, 2010), elements of gamification (JISC, 2016) and my own experience of teaching online at undergraduate and postgraduate level, I will demonstrate how online learning can be made more interesting for students.

Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. The Internet and Higher Education, 13(1–2), 5–9.

JISC. (2016). Gamification and Game-Based Learning. Retrieved from https://www.jisc.ac.uk/guides/curriculum-design-and-support-for-online-learning/gamification

Wilcox, P., Winn, S., & Fyvie-Gauld, M. (2005). 'It was nothing to do with the university, it was just the people': the role of social support in the first-year experience of higher education. Studies in Higher Education, 30(6), 707–722. https://doi.org/10.1080/03075070500340036

SEB+1.15 DOING LESS TO ACHIEVE MORE: WORKING WITH LARGER GROUPS IN THE FIELD

TUESDAY 3 JULY, 2018 **16:45**

GRAHAM SCOTT (UNIVERSITY OF HULL, UNITED KINGDOM)

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In response to increasing class sizes there is often a tendency to reduce the quality and/or volume of field based teaching, or to remove it from the curriculum completely. It is possible however to have meaningful field based learning with larger groups if tutors and students are prepared to change the way they work. In this presentation I will use two biology (field botany) case studies to illustrate this possibility. I will show that by allowing students to manage aspects of their own field based learning it is possible to enhance student engagement and have a positive impact upon the learning that takes place.

SEB+1.16 USING VIRTUAL REALITY LABORATORIES TO IMPROVE ENGAGEMENT AND UNDERSTANDING FOR WET LABORATORY PRACTICAL SESSIONS

TUESDAY 3 JULY, 2018 **17:00**

SARAH K COLEMAN (UNIVERSITY OF WESTMINSTER, UNITED KINGDOM), CAROLINE SMITH (UNIVERSITY OF WESTMINSTER, UNITED KINGDOM), CHRYSTALLA FERRIER (UNIVERSITY OF WESTMINSTER, UNITED KINGDOM)

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University of Westminster has a large entry intake into its various Bioscience degree pathways. Incoming students have a wide range of entry qualifications and laboratory experience. Practical sessions are expensive and take time and often require students to work in groups. Further, many current cutting edge biological techniques are often too time consuming or too expensive to run as a large scale taught practical session. To try to improve student confidence and engagement in actual practical classes we have made a range of virtual laboratory simulations available to the students. Thus, the virtual laboratory is used to provide context and as an alternative learning experience to the theory taught in class.

The aim of this study is to evaluate if such virtual simulations promote student learning; and whether the rationale for academic staff deployment of such resources align with student reasons for utilizing.

Virtual laboratory simulations have been embedded into a number of foundation, undergraduate and post-graduate modules, for both formative and summative assessment. Students self-reported that the simulations improved understanding through survey responses. We report how this questionnaire data is enriched with qualitative data from small group interviews from students, these have focused on student engagement and whether these virtual laboratory simulations have enhanced learning. Moreover, we examine the student reasons for engaging with, or not, such resources.

SEB+1.17 ELEMENTS OF INNOVATION ABOUT NEUROBIOLOGY FOR HIGH SCHOOL: HISTORY AND EVOLUTION OF PATCH CLAMP TECHNIQUE

TUESDAY 3 JULY, 2018 **17:15**

MARINA MINOLI (NATIONAL BIOLOGISTS ORDER ROYAL SOCIETY OF BIOLOGY, ITALY)

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Electrophysiology embraces several different experimental techniques with the main goal to collect electrical signals from living organisms. Today electrophysiological techniques are widespread and used in a vast variety of different modern research fields from interpretation of neuronal networks, neurodegenerative process, cancer pharmacology up to investigation in different disorders. Together with other powerful experimental procedures like

molecular biology, dynamic microscopy, electrophysiology is an essential technique to investigate in both physiological as well as pathological mechanism. The aim of these projects was to realise innovative didactic research activities about neuroscience, interdisciplinary itinerary for High School involving in active way researchers - teachers and students as scientific community, analysing Patch Clamp technique: from history to modern multidisciplinary applications.

SEB+1.18 TO FLIP OR NOT TO FLIP, THAT IS THE QUESTION

TUESDAY 3 JULY, 2018 **17:30**

ROS GLEADOW (MONASH UNIVERSITY, AUSTRALIA)

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Challenges in teaching large classes include engaging students in meaningful learning, inspiring students about the subject matter and developing their sense of belonging. Administrative challenges including timetabling, physical space, and marking assignments in a fair and timely manner. Balancing these is almost impossible. The premise is that students retain more knowledge from active learning than didactic lectures. Reducing face to face time with academics can make it harder to inspire students and may place an over emphasis on knowledge and assessment tasks. It also limits the opportunities for academics to develop 'oratory'. The lack of exposure to passionate plant scientists is particularly important for plant biology where there is a greater need to enthuse student to ensure good retention from first to second year. We have recently reviewed our teaching practice for first year biology, with 1300+ students per semester, primarily to address the issue of space. We are in the processes of completely flipping the classes, replacing all lectures with one active learning in workshops of 150 students per week held in beautiful architecturally designed, flexible teaching spaces. I will discuss how we are making the change, how online learning spaces can be used to increase engagement and some honesty about what is working and what is not.

SEB+1.9 FOSTERING PEDAGOGIC AND DISCIPLINARY EXPERTISE: THE ROLE OF THE HEAD OF DEPARTMENT IN CREATING MICROCULTURES OF EXCELLENCE

WEDNESDAY 4 JULY, 2018 **POSTER SESSION**

ANNE M TIERNEY (EDINBURGH NAPIER UNIVERSITY, UNITED KINGDOM)

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This paper is a follow up study to the paper I presented at SEB 2017 in Gothenburg. I have previously identified an anxiety felt by teaching-focused academics who were concerned that by taking a teaching career path in Higher Education, their disciplinary expertise, at some point, would lose currency.

This study, carried out by interviews with twenty-three life sciences academics in eight UK universities, identifies the variety of strategies that academics employ to keep their disciplinary expertise current. However, vital to this is the role of the Head of Department in fostering a culture which allows individual academics the opportunities to keep their expertise up to date.

The Head of Department is identified as being the person in a leadership role who sets the culture of the department in terms of teaching, learning and research. I have identified three distinct types of Head of Department: The Visionary, The Facilitator/Supervisor and The Manager. Roxå & Mårtensson (2011) identify "microcultures of excellence" within higher education which rely on effective leadership, a sense of history and future direction, and clear role definitions. I explore the extent to which each type of Head of Department fulfils the potential of "microcultures of excellence" and what steps can be taken to improve practices which foster support.

Roxå, T., & Mårtensson, K. (2011). Understanding strong academic microcultures - An exploratory study. University of Lund.

SEB+1.10 INCREASING FEEDBACK, REDUCING MARKING: THE CHALLENGES OF SCALING UP HIGH-QUALITY FEEDBACK

THURSDAY 5 JULY, 2018 **POSTER SESSION**

LESLEY J MORRELL (UNIVERSITY OF HULL, UNITED KINGDOM)

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I describe a research-led module that combines reduced academic marking loads with increased feedback to students. The module is based around eight seminar-style presentations, on which the students write 500-word 'news & views' style articles (one per seminar). Students receive feedback on a limited number of their own submissions, but have access to feedback on their peers' reports. Students read and apply the feedback to their own subsequent work (using it as feed-forward), and at the end of the module, students self-assess their eight submissions and select their two best for summative assessment. Analysis of student marks revealed that attainment increased throughout the module, with students achieving higher marks for the two chosen reports than for their first submission and those selected by the module team for feedback. Students selecting previously unmarked work showed a greater increase in their mark for the module than students selecting reports that had previously received a mark. Marks also indicate that ability to choose work for summative assessment is particularly beneficial for students achieving poorer marks for their first assignments. A challenge, however, is to develop a strategy to provide this type of feedback to increasing class sizes.

SEB+1.11 DO IT YOURSELF GAIT ANALYSIS: A LOW COST PRESSURE MAT SYSTEM FOR THE HOME OR CLASSROOM

WEDNESDAY 4 JULY, 2018 **POSTER SESSION**

BENJAMIN J H SMITH (ROYAL VETERINARY COLLEGE, UNITED KINGDOM), JAMES R USHERWOOD (ROYAL VETERINARY COLLEGE, UNITED KINGDOM)

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Human locomotion biomechanics is a field that has great potential for citizen science projects; its applications in sport and exercise make it of interest to the public, while collaborating with amateur scientists for data collection can enable researchers to conduct studies across ranges of age and physical ability which might not be feasible within the time and cost constraints of traditional research. Since studying locomotion is multidisciplinary, incorporating aspects of anatomy, physics and engineering, it can also be a valuable source of theoretical and practical examples in the classroom. We present a system to measure gait parameters using toy 'floor pianos' – large mats printed to look like keyboards, comprising an array of force sensors. By standing on different keys of the piano, the user activates different force sensors, allowing them to play a tune. We have used low cost, easily available components to build a circuit which processes the raw piano output, and a Raspberry Pi microcomputer to control sampling and calculate variables such as stance time and stride frequency. This means that our design can be reproduced and used by amateurs and school groups with limited resources. To facilitate this, we have also produced a worksheet with a step by step guide to building and using the system, and which explains the operation of the various sub-components. The system can therefore be used for teaching electronics and programming as well as producing gait data, either for analysis in the classroom or as part of a citizen science project.

SEB+1.12 CLASS SIZE FOR BIOLOGY EDUCATION DEPENDS ON THE AIMS

THURSDAY 5 JULY, 2018 **POSTER SESSION**

IRINA STRIZH (M.V. LOMONOSOV MOSCOW STATE UNIVERSITY, RUSSIA)

Class size is the important factor for the teaching and communication between the teacher and the students. It is boring for the teacher or reader, and for the students also if there are two or three people in the class including you. This is not an effective education for lectures or for practical courses. The point is that students must communicate and collaborate during the teaching, but it is harder to do it in a small group. Another problem for the teaching process is the large (up to the 120) group of students. It is very hard for the reader to talk because of the noise from some students who are not interested in the discipline but only in the certificate. Such point of the behaviour is hard for the interested students also. Big class could be interesting for the reader due to the per capita payment, but it is also not effective for the whole students. Effective workers make at least one fifth of the class. So, if we have group number of 1-3 students we have no effective education. If we have 100 students, only about 20 clever people will be working in this field of science. The minimum class size for work discussions during seminars is 6 students, for practical classes - the maximum of the class size is up to 12 students because of the dependence on the facilities, for lectures - not less than 18 students should be involved.

SEB+2 EMBRACING YOUR ANIMAL CARE, WELFARE AND USE COMMITTEE – A WIN-WIN SITUATION

ORGANISED BY: PENNY HAWKINS (RSPCA, UK)

SEB+2.1 THE ROLE THAT THE EU ANIMAL WELFARE BODY PLAYS IN FACILITATING BETTER SCIENCE, AND HOW RESEARCHERS CAN CONTRIBUTE

WEDNESDAY 4 JULY, 2018 **10:30**

SUSANNA LOUHIMIES (EUROPEAN COMMISSION, BELGIUM)

Animal Welfare Bodies have a central role as a driving force for improved animal welfare and robust, high quality science. However, this is only achieved with a Culture of Challenge that stimulates its members to actively contribute, participate and learn from one another.

SEB+2.2 EXPERIMENTAL BIOLOGY AND ANIMAL WELFARE: A MISFIT?

WEDNESDAY 4 JULY, 2018 **11:00**

TERESA G VALENCAK (UNIVERSITY OF VETERINARY MEDICINE VIENNA, AUSTRIA)

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A lot of changes have occurred in the disciplines of experimental biology and laboratory animal science over recent decades. While legal regulations are relatively similar across the European Union, the way in which local ethics committees are composed, and how they interact with animal technologists, veterinarians and scientists, may differ between both countries and universities. By providing a few case studies from the field of mammalian physiology, I am going to summarize my interactions and experiences with local committees from a student, postdoc and mid-career researcher perspective. Clearly, the intentions of the local committees are broadly similar, and they are indispensable for quality assessment and transparency regarding animal research. To maintain and improve standards in this area, it is necessary that expectations from all participants are openly discussed and that a consensus is found which serves a good culture of care.

SEB+2.3 WELFARE IN EXOTIC ANIMALS: HOW CAN RESEARCHERS ADVISE LEGISLATION?

WEDNESDAY 4 JULY, 2018 **11:15**

LAUREN E JAMES (AARHUS UNIVERSITY, DENMARK), CATHERINE J A WILLIAMS (AARHUS UNIVERSITY, DENMARK), MADS F BERTELSEN (COPENHAGEN ZOO, DENMARK), TOBIAS WANG (AARHUS UNIVERSITY, DENMARK)

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When applying the Krogh principle "for such a large number of problems there will be some animal of choice on which it can be most conveniently studied", the study of non-traditional animal models is encouraged. This, however, poses challenges for both researchers and governing bodies because appropriate protocols for anaesthesia and analgesia remain poorly defined, and the resulting extrapolation from the mammalian literature is of dubious value. Here, we discuss the use of reptiles in research, and how an open discussion with the animal experiments inspectorate began an important dialogue on 'best practice' in these under-studied taxa. Following a seminar for members of the board, other comparative physiologists and animal caretakers, research has been focussed on developing optimal anaesthesia, analgesia and post-surgical monitoring protocols in several reptile species. Over the last few years, we have used research methods employed by comparative physiologists and combined clinical studies to describe the central effects of anaesthesia and analgesic drugs. We have also developed tools for assessing stress under experimental conditions, using both physiological and behavioural measures. By monitoring physiological and clinical parameters, a holistic view on the protocols that minimally disturb an animal's resting state can be achieved, a common goal for welfare committees and researchers alike. Our findings demonstrate that the integration of clinical and physiological studies can inform legislation and promote high standards of animal welfare whilst ensuring researchers obtain results unhindered by physiological consequences associated with stress.

SEB+2.4 THE ETHICAL REVIEW PROCESS IN BERN – A CASE STUDY HIGHLIGHTING THE ADVANTAGES AND OPPORTUNITIES FOR IMPROVEMENT

WEDNESDAY 4 JULY, 2018 **11:30**

LUCA MELOTTI (UNIVERSITY OF MÜNSTER, GERMANY)

By providing key examples from a researcher standpoint, this talk will highlight how proactive sharing of knowledge and effective communication are essential for a successful ethical review process, and will point towards promising tools and strategies to obtain this.

SEB+2.5 WORKING WITH ANIMAL TECHNOLOGISTS – THE FOUNDATION OF YOUR SCIENCE

WEDNESDAY 4 JULY, 2018 **12:00**

TANIA BODEN (UCB, UNITED KINGDOM)

Many factors affect animal experiments. This talk gives a welfare officer's perspective on how technicians and scientists can interact positively to share expertise and knowledge, which improves animal welfare, strengthens the scientific data and builds a Culture of Care.

SEB+2.6 COMMUNICATING WITH COMMITTEES – WHAT DO THEY REALLY WANT TO KNOW?

WEDNESDAY 4 JULY, 2018 **12:30**

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Good communication is essential between scientists and their local animal welfare, care and use committees, such as Animal Welfare Bodies (AWBs) and ethics committees. However, communication and understanding between scientists and local committees can vary. Some researchers are very positive about discussions with their local committees and value their input, but others are less enthusiastic, especially if contact occurs only when their own projects are reviewed. Similarly, some committees have good working relations with scientists and feel they communicate well, whereas others are frustrated by what they view as a lack of relevant information to help them adequately understand the objectives, harms and benefits of a project, or how effectively replacement, reduction and refinement have been implemented. The type and level of information, and focus, required by local committees depends on their tasks and remit, and also differs from the applications that researchers prepare for funding bodies and the regulator – all of which can affect communications and relations. This presentation will give you a lay member's perspective on the level and nature of information required to facilitate mutual understanding and positive interactions with your own AWB, ethics committee or animal care and use committee.

SEB+2.7 REPRODUCTION IN SMALL MAMMALS: WHAT CAN BE DONE TO REFINE BREEDING UNDER LABORATORY CONDITIONS?

WEDNESDAY 4 JULY, 2018 **POSTER SESSION**

SARAH A OHRNBERGER (UNIVERSITY OF VETERINARY MEDICINE VIENNA, AUSTRIA), TERESA G VALENCAK (UNIVERSITY OF VETERINARY MEDICINE VIENNA, AUSTRIA)

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Undoubtedly, lactation is the most energy-demanding phase for females, where they easily reach up to eight times their basal metabolism. While the plastic gastrointestinal tract readily supports the several-fold food intake necessary to meet the female's energy demands, this high energy turnover rate heats up the body and brings about a consistently higher body temperature during lactation in several rodent species including mice, golden hamsters, and Mongolian gerbils. Interestingly, the times of hyperthermia, peak energy expenditure and milk production overlap, so several measures and approaches which aim to alleviate heat stress seem to benefit milk quantity and reduce female stress. Our poster will summarise a series of experiments done in the above-mentioned three rodent species. Four major refinements lead to an increase in milk production and reduce stress in females: i) the lowering of ambient temperatures, ii) dorsal removal of fur, iii) administration of chilled drinks and food and finally iv) the help of conspecifics, if not the male (the last being species-specific). Our research aims to raise awareness of optimal breeding conditions for laboratory rodents and breeding colonies.

SEB+2.8 BRINGING REPTILE WELFARE AND HIGH QUALITY PHYSIOLOGICAL RESEARCH TOGETHER

WEDNESDAY 4 JULY, 2018 **POSTER SESSION**

CATHERINE J A WILLIAMS (AARHUS UNIVERSITY, DENMARK), LAUREN E JAMES (AARHUS UNIVERSITY, DENMARK), AAGE KO ALSTRUP (AARHUS UNIVERSITY, DENMARK), CLEO A C LEITE (UNIVERSIDADE FEDERAL DE SÃO CARLOS, BRAZIL), MADS F BERTELSEN (AARHUS UNIVERSITY, DENMARK), TOBIAS WANG (AARHUS UNIVERSITY, DENMARK)

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Reptiles have lagged behind mammals and birds in research into analgesia and amelioration of surgical stress, despite EU legislation requiring equal emphasis on their welfare. To address this knowledge-gap, we initiated a collaboration between old-fashioned zoophysiologists and veterinary surgeons to i) lessen discomfort and metabolic disturbance during anaesthetic induction, ii) identify appropriate anaesthetics, dosage and application routes, iii) investigate the physiological basis for appropriate mechanical ventilation during anaesthesia, iv) investigate how atropine and the abolishment of right-to-left cardiac shunts may improve efficacy of inhalation anaesthesia, and v) develop appropriate analgesia during recovery from invasive surgeries. We have focussed on various reptilian species, but also studied fish, amphibians and invertebrates. Much of the scientific study has been performed in

continuous interaction with the national licensing body in Denmark, and we have developed courses in animal care and experimentation that are now part of Aarhus University's curriculum and have been taught in Brazil and Vietnam. In our experience, this fruitful interaction between scientists, vets and animal welfare committees can play a vital role in setting the balance point on these avenues of research, as well as being points for information dissemination on 'non-traditional' model species. It is clear that classical physiological and anatomical knowledge of the ectothermic vertebrates plays a pivotal role in developing better anaesthesia and analgesia, but it is equally clear that improved welfare provides for higher scientific quality of data obtained both during and after surgery, attesting to mutual benefit from our collaboration.