MoSMed CDT Newsletter

Edition 1—June 2020

A message from our Director, Mike Waring (Newcastle University)

Welcome to the first Molecular Sciences for Medicine (MoSMed) newsletter. These will be a vehicle for regular communication within the CDT community about activities we are all doing and those further afield that are relevant and of interest to us.

We have been really pleased with the way the CDT has started. The CDT researchers have all made good starts to their project and have come together very well as a cohort. This has been facilitated by the shared activities we have arranged but is mostly down to the attitude and approach of our fantastic group of Doctoral Researchers. Their contributions have been vital in the successful initiation of the Centre. We have now almost completed our recruitment for next year, with offers having been made and accepted for all but one of our advertised projects. We look forward to welcoming our second cohort in the autumn and we are sure that they will settle in well given the foundation that the first group has provided.

The COVID19 crisis has obviously had a detrimental effect on our activities, both with preventing laboratory work and hindering our ability to meet but the group has responded very positively. The engagement with the online weekly meetings has been excellent and these have provided an opportunity to discuss things that may not have happened under “normal” circumstances. We have been impressed with how the CDT members have responded to this difficult situation and have coped with things very well. We hope that it will be possible to relax the current restrictions soon and will look forward to getting back to our laboratories and restartng research as soon as it is safe to do so.

In the meantime, thank you for your continued support for MoSMed and we hope you enjoy reading about the things we have been doing.

A Note from the Editors (Emma Worden and Trudi Pemberton)

Our first academic year has been a busy and productive one and our Doctoral Researchers have so far enjoyed a variety of training and development opportunities on a range of diverse areas as well as interactions and collaborative specialist training with another CDT cohort. Our Inspirational Lecture Series has included talks by Dr David Rees (Astex) and by 2019 Tilden Prize winner Professor Jim Naismith (The Rosalind Franklin Institute & University of Oxford). Our cohort have also enjoyed talks by subject experts, recent graduates and scientists with expertise in the use of social media such as Nessa Carson (@SuperScienceGrl). At MoSMed, we are committed to developing our Doctoral Researchers as independent thinkers and our unique training programme is designed to enable this development. See pages 4 & 5 for further details of the opportunities that our Cohort have enjoyed so far this year.

We would like to thank our fantastic Doctoral Researchers and Academic staff who have contributed to this first edition and welcome any future contributions. We have no predetermined ideas about the type of content that can be included, so if you would like to contribute to a future edition, please contact us at mosmed.cdt@ncl.ac.uk.

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Recommended Reading

Ehmke Pohl, Co-Director of MoSMed (Durham University)

On being asked to recommend my favourite paper of the last couple of months this is the one that was my first choice:

Zhang L et al., Hilgenfeld R, (2020) "Crystal structure of SARS-CoV-2 main protease provides a basis for the design of improved α-ketoamide inhibitors" *Science* **369**:409-412**.**

The Covid19 outbreak has led to a frantic global search for any treatments and therapies. Currently, there are no effective drugs targeting any member of the Coronavirus family. However, based on more or less closely related viruses, a number of Coronovirus proteins are potential drug targets. The major protease from SARS-CoV-1 has been well studied since the first crystal structure was solved independently in 2003 by the Hilgenfeld and Harris groups. However, in spite of over 17 years of efforts no drug has so far been developed targeting this enzyme, and there is still no treatment for any disease caused by Coronaviruses

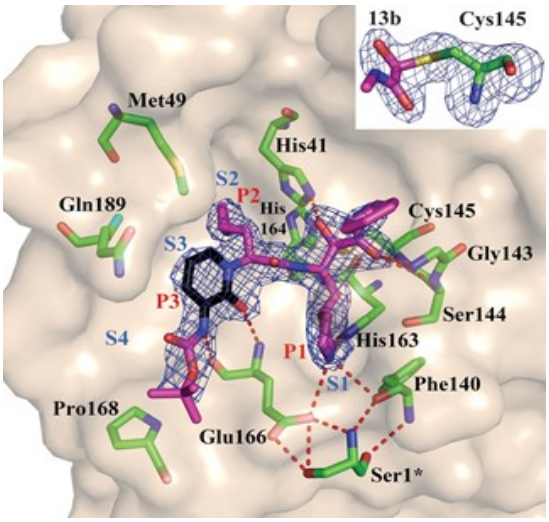
Nevertheless, due to the fact that the major protease of SARS-CoV-2 crystallises equally well, the first crystal structure with an inhibitor was deposited in January 2020 and published a few weeks later by Liu *et al*.. As they shared their work immediately, dozens of groups have joined the effort to design or identify inhibitors that could become drugs in the future.

In this paper the Hilgenfeld group describes how they were able to utilise their over 20 years of experience building on their extensive work on the major protease from SARS-CoV-1 and other closely related viruses to identify a sub-micromolar inhibitor.

Importantly, and in contrast to at least some of the other efforts, they used their medicinal chemistry skills to take ADME consideration into account. Furthermore, they were able to use biochemical, biophysical and even *in-vivo* experiments to bring a compound close to clinical trials.

Although the authors still describe the major protease as a drug target there is nevertheless plenty to recommend this paper:

- It has the highest level of technical expertise and interdisciplinarity.
- It displays an unbiased Fo-Fc map
- It shows the importance of basic medical research
- It exemplifies the many steps that are still required from lead to treatment
- It highlights the international efforts.



A day in the life of a MoSMed Researcher

Ruth Walker (Newcastle University)

A day in the life of any researcher can be varied with commitments such as meetings, training and assignments to research seminars, lab work and data analysis. Variety is one of the things that I enjoy the most about being a MoSMed researcher because it gives me the opportunity to learn about cutting edge research whilst conducting my own and developing new skills every day.

As a MoSMed researcher I work in the Newcastle Medical School in the Trost Mass Spectrometry Research Group. My research project involves looking at the differences between healthy and diseased cells using Matrix-assisted laser desorption/ionisation (MALDI) mass spectrometry which means that I use both biological and some chemistry (and some physics techniques) in my research. Therefore, my days often involve steps in many different experiments that I am concurrently undertaking.

At this time a normal day will involve arriving at the lab and checking on the various cells which I am growing and passaging, pelleting, lipid loading or staining them depending on the experiments that I am undertaking. Around this cellular upkeep, I may have our lab meeting which we have every Thursday morning, during which I may present either data or a journal club according to a rotating schedule, or I may have a seminar meeting which are run by various research themes within the medical school research community. In addition to this I prepare and analyse my cellular samples on the MALDI, at the moment I am optimising this process, so whilst the samples take ~1second/sample to analyse, the data analysis can take at least a couple of days depending upon the data complexity. MALDI data analysis especially in the area of my research is in its infancy so members of the lab are constantly developing and improving data analysis techniques. Any time not spent in the lab is spent processing data which takes at least 4 times the physical experiment time. After this I may have meetings to update my supervisor or to talk to colleagues about collaborations or how I can apply different techniques which they currently use for my research.

Around all of this I read papers so that I plan informed, novel and sensible experiments and keep up to date with breakthroughs in the field. As my PhD is funded by an industrial company based in Germany and I will be going on placement with them for a year, I am also learning German in my spare time and with weekly classes run by the university during term-time. After a stimulating day in the lab, I tend to go to the gym or an exercise class to maintain a regular healthy routine before attending various extracurricular activities or relaxing at the pub with my colleagues before going back the next day to continue my experiments.

At the moment, due to COVID-19 my routine has changed as we are no longer able to carry out laboratory research, so I am undertaking more reading, writing my first-year report and planning experiments for when we return. I am also trying to improve my bioinformatics and coding skills as strengthening these will be invaluable once we can all return to the lab. However, as a scientist, I have been fascinated by how research can help to provide a response to the global pandemic. I have also been attending some interesting seminars about how immunology and virology professors are applying their research. I find it inspiring to see how significant scientific research is, and hope that my PhD will help with scientific understanding in the future.

Statistics and Experimental Design

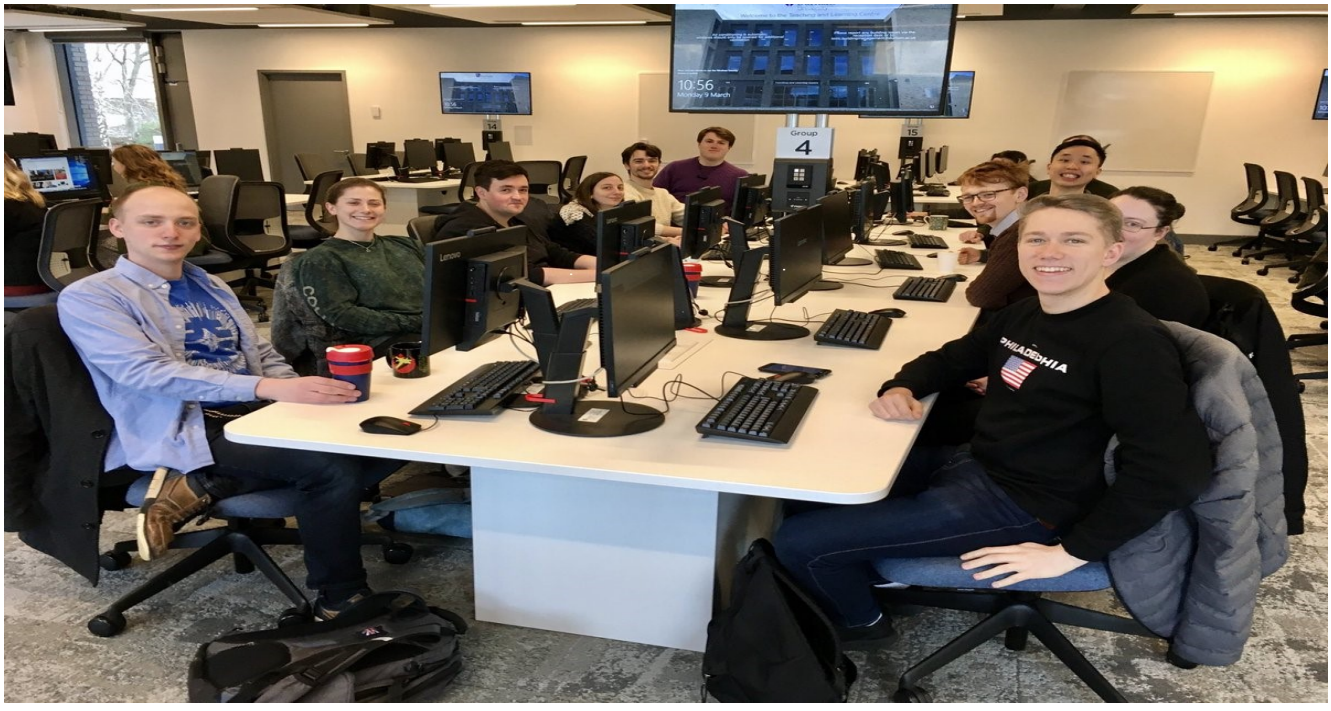
Matthew Smith (Durham University)

Recently, myself and several of the MoSMed cohort attended a 2-day training module in combination with the SOFI (Soft matter and functional interfaces) CDT relating to statistics and experimental design. The training was run by Nats Esquejo and Paul Davidson from Procter and Gamble, meaning that there was lots of discussion of how this training would relate to challenges faced within industry – this was a really insightful and helpful part of the module that particularly sparked my interest. Overall, the training highlighted a new area of study within my own project that I hope to undertake within the future.

The module was held early March at Durham University, starting with an introduction to JMP (John's Macintosh Program). I had never used the software before and was pleasantly surprised to see the level of thought in its design – the graphing tools were of particular interest for how straightforward and flexible they were. We then moved onto DOE (design of experiment) using JMP, where we were introduced to the terminology, expected outcomes and good practices of DOE. This discussion was thought-provoking, making me think about the practices and problems in data collection in a way I had never done before. The case studies also aided all the explanations and it was satisfying to replicate the outcomes on software I had never really heard of before that morning. The rest of day 1 was spent introducing us to full factorial and screening designs, with lots of hands-on time with the software to solidify our understanding. I went home looking forward to learning more on that second day, thinking of how I could use what I'd just learned within my own work.

Day two began by finishing off discussions on experimental designs, covering response surface designs (discussion of numerous continuous variables with non-linear relationships to the outcome) and definitive screening designs (used for modelling variables in low cost pilot programs); the numerous design types were made clear for their advantages and disadvantages by Nats and Paul by discussing how they would be used in real-life examples. After all this training, I could not believe the amount of knowledge I had developed in an area of science I had previously never put much thought into. I got the chance to put all this knowledge to practice in the afternoon session, where we worked as teams to suggest formulations for water purification sachets – the teams were a mix of MoSMed and SOFI CDT researchers so it was a great chance to work alongside individuals outside of the CDT and who had differing research interests. We all presented our findings, and my team were determined to have produced the best formulation based on work from our modelling.

My research project involves significant amounts of chemical synthesis and tissue culture, so this training will be of use for developing simplistic models that mathematically describe the relationship between chemical structure and potency in biological systems. It was overall a great experience where I learnt a lot about DOE and the JMP software alongside collaboration with new Doctoral Researchers in other CDTs.



The First Annual MoSMed Conference

Jessica Graham (Newcastle University)

In January, Newcastle University hosted the inaugural MoSMed conference. This was the first of what will be an annual conference to showcase the CDT and gave the Doctoral Researchers an opportunity to meet with and present our research to fellow colleagues, CDT partners and collaborators. There was an excellent turnout with approximately 80 people turning up ranging from industrial partners to academics within the institute.

The event began with an introduction from Executive Committee members Prof. Mike Waring (Director), Dr Ehmke Pohl (Co-Director) and Prof. Simi Ali (Co-Director). Their talks outlined the purpose of the CDT, some of the key people involved and MoSMed's key research themes.

Following this, the conference proceeded with 5-minute flash presentations delivered by the cohort. For this we were given the task of giving an introduction to our projects, our project plans and work done to date. This was a great opportunity to not only learn more about what our colleagues have been getting up to, but also to give the industrial partners a flavour of the broad range of research topics that we cover between us.

After this, a selection of the representatives of the industrial partners gave presentations on the company's work and research activities. Talks were given by Lucy Foley from the Centre for Process Innovation, Robert Rambo from Diamond, Neil Sim from HighForce research and Andrew Brown from GSK. As a MoSMed researcher, this session gave an interesting insight into the different industrial partners that are involved with the CDT. This was a great opportunity to hear about their research opportunities, as well as challenges that they have faced.

During the lunch break, the cohort had the opportunity to undertake a poster display alongside an informal networking session. This was a great opportunity to discuss our projects in more detail with industrial partners who took a keen interest in this session. Some of the partners had some interesting questions raised during the presentation session that could be addressed during this display.

The afternoon session began with the first keynote speaker Prof. Matthias Trost, an academic at Newcastle University and a Principal Supervisor to one of the MoSMed doctoral researchers. Prof. Trost gave an excellent talk on High-throughput Mass Spectrometry approaches to drug discovery, where he discussed the use of MALDI for this approach. Our second keynote lecture was given by Prof. Malcom Walkinshaw, from the University of Edinburgh, who gave an insightful talk on drug discovery, allostery and evolution in trypanosomatid parasites.

The day finished with the optional tours for the external partners. This gave the partners the opportunity to look around the crystallography facilities, bioimaging facility and the mass spectrometry laboratory. Overall, the first MoSMed conference was a great success, with plenty of opportunities to present our research work to date and meet some of the industrial partners involved with the CDT.

Recent MoSMed Publications

While in future issues we look forward to including publications from our MoSMed Doctoral Researchers in this first issue we are looking at publications from our Academic team that relate to current or upcoming MoSMed projects.

Applications of novel bioreactor technology to enhance the viability and function of cultured cells and tissues

Co-authored by Stefan Przyborski (Durham University) this paper relates to a new MoSMed project starting in October 2020 supervised by Professor Przyborski and entitled 'Platform Technology to Enhance the Growth of Human Tissues In Vitro for Use in Biomedical Research and the Assessment of New Molecular Entities'

In this paper, the authors describe the preliminary design and use of a novel benchtop bioreactor system in order to increase the physiological relevance of three-dimensional cell culture. The system uses a porous, polystyrene scaffold in the bioreactor for a number of cell culture applications, initial examples include culture of hepatocytes and pluripotent stem cells and the maintenance of ex vivo tissue slices. These preliminary examples have shown improvements in cell and tissue structure, formation and viability. The system is highly flexible, allowing for a wide variety of potential applications, and paves the way for more sophisticated bioreactor development and dedicated applications.

This article is available to view at the following link: https://research.ncl.ac.uk/mosmed/impact/publications

High Fidelity Suzuki–Miyaura Coupling for the Synthesis of DNA Encoded Libraries Enabled by Micelle Forming Surfactants

This paper co-authored by our CDT Director Mike Waring (Newcastle University) describes the use of micelle forming surfactants to carry out Suzuki couplings for the synthesis of DNA-encoded libraries. This shows the more efficient on-DNA reactions reported to date. It is currently being used to synthesise libraries and represents an initial finding that underpins the projects of Jessica Graham, Isaline Castan and Catherine Salvini who are looking to build on this initial finding to develop new reactions using surfactants and to exploit this reaction in drug discovery.https://pubs.acs.org/doi/abs/10.1021/acs.bioconjchem.9b00838

Kinetics of electrophilic fluorination of steroids and epimerisation of fluorosteroids

Chem.Eur. J. 2020 https://chemistry-europe.onlinelibrary.wiley.com/doi/abs/10.1002/chem.202001120?af=R. (Full citation is not yet available).

This paper co-authored by David Hodgson (Durham University) follows on from two previous papers on the kinetics of C-fluorination, which is relevant to the preparation and manufacture of pharmaceutical leads.

The links for these two papers are:

Chem. Sci., 2019,**10**, 10318-10330. https://pubs.rsc.org/en/content/articlelanding/2019/SC/C9SC04185K#!divAbstract

Chem. Sci., 2018,**9**, 8692-8702. https://pubs.rsc.org/en/content/articlelanding/2018/sc/

Modelling Flexible Protein-Ligand Binding in p38α MAP Kinase using the QUBE Force Field.

Co-authored by Daniel Cole (Newcastle University) *Chemical Communications 2020, **56**, 932-935.*

The quantum mechanical bespoke (QUBE) force field is used to retrospectively calculate the relative binding free energies of a series of 17 flexible inhibitors of p38α MAP kinase. The size and flexibility of the chosen molecules represent a stringent test of the derivation of force field parameters from quantum mechanics, and enhanced sampling is required to reduce the dependence of the results on the starting structure. Competitive accuracy with a widely-used biological force field is achieved, indicating that quantum mechanics derived force fields are approaching the accuracy required to provide guidance in prospective drug discovery campaigns.https://pubs.rsc.org/en/content/articlelanding/2020/CC/C9CC08574B#!divAbstract

Recent MoSMed Publications

N-Terminal speciation for native chemical ligation

Co-authored by two of our MoSMed supervisors Steven Cobb and AnnMarie O'Donaghue (Durham University) this paper was published in 'Chemical Communications in April 2020. Native chemical ligation (NCL) has made a major impact on peptide science through its ability to couple peptide fragments under mild conditions without additional coupling agents or side chain protection. The pharmaceutical industry relies on bioconjugation strategies, including NCL, for peptide-based therapeutic applications. C-terminal controlled NCL reactions are well established. As a first step towards N-terminal kinetically controlled ligations, we demonstrate quantitatively how thiol speciation at N-terminal cysteines and analogues varies significantly depending upon structure at typical pH values used in NCL. demonstrate quantitatively how thiol speciation at N-terminal cysteines and analogues varies significantly depending upon structure at typical pH values used in NCL. https://pubs.rsc.org/en/content/articlehtml/2020/cc/d0cc01604g

Profiling Embryonic Stem Cell Differentiation by MALDI TOF Mass Spectrometry:
Development of a Reproducible and Robust Sample Preparation Workflow

Co-authored by Matthias Trost (Newcastle University) this paper is relevant to the research being undertaken by Ruth Walker.

MALDI TOF mass spectrometry (MS) is widely used to characterise and biotype bacterial samples, but a complementary method for profiling of mammalian cells is still underdeveloped. Current approaches vary dramatically in their sample preparation methods and are not suitable for high-throughput studies. In this work, we present a universal workflow for mammalian cell MALDI TOF MS analysis and apply it to distinguish ground-state naïve and differentiating mouse embryonic stem cells (mESCs), which can be used as a model for drug discovery. We employed a systematic approach testing many parameters to evaluate how efficiently and reproducibly each method extracted unique mass features from four different human cell lines. These data enabled us to develop a unique mammalian cell MALDI TOF workflow involving a freeze–thaw cycle, methanol fixing and a CHCA matrix to generate spectra that robustly phenotype different cell lines and are highly reproducible in peak identification across replicate spectra. We applied our optimised workflow to distinguish naïve and differentiating populations using multivariate analysis and reproducibly identify unique features. We were also able to demonstrate the compatibility of our optimised method for current automated liquid handling technologies. Consequently, our MALDI TOF MS profiling method enables identification of unique features and robust phenotyping of mESC differentiation in under 1 hour from culture to analysis, which is significantly faster and cheaper when compared with conventional methods such as qPCR. This method has the potential to be automated and can in the future be applied to profile other cell types and expanded towards cellular MALDI TOF MS screening assays

Analyst 2019 Oct 22;144(21):6371-6381. doi: 10.1039/c9an00771g.

PMID: 31566633

Coming Soon:

Activation of the Carbohydrate Response Element Binding Protein by acute and chronic exposure to a Glucokinase Activator in C57BL/6J mice,

· B. E. Ford, S.S. Chachra, A. Alshawi, A. Brennan, S. Harnor, C. Cano, D. J. Baker, D. M. Smith, R. J. Fairclough, L. Agius, *Diabetes, Obesity and Metabolism., 2020, submitted.*

This paper which has just been submitted relates to the research being done by Alex Hallatt on non-alcoholic fatty liver disease and is co-authored by Alex's supervisor, Celine Cano: c8sc03596b#!divAbstract

10 online biology and chemistry focused learning materials available during lock-down

Olivia Gittins (Newcastle University)

Meet our MoSMed Doctoral Researchers 2019 / 2020

- **Matthew Boutflower** completed an MRes in Molecular Microbiology at Newcastle University.
- **Laura Filipe** completed a Master of Biology in Biosciences at Durham University.
- **Olivia Gittins** completed a Master of Research in Cancer at Newcastle University.
- **Jessica Graham** completed an MChem with Medicinal Chemistry at Newcastle University.
- **Alex Hallatt** completed an MChem Hons Chemistry with Industrial Training degree at Newcastle University.
- **Chong Yun Pang** completed **a** BSc in Biomedical Sciences at Newcastle University.
- **Matthew Smith** completed a Master of Chemistry with Meicinal Chemistry degree at Newcastle University.
- **Ruth Walker** completed an MSci Biochemistry with Professional Placement at University of Birmingham.
- **Sam Went** completed an MSc in Industrial and Commercial Biotechnology at Newcastle University.
- **Izzy Zawadzki** completed a Master of Chemistry degree at Southampton University.

These 10 online learning resources offer a range of material across the fields of biology and chemistry, which may be useful to aid your research project or simply broaden your knowledge. Several of these courses come recommended by members of the MoSMed cohort so hopefully there'll be something for everyone to sink their teeth into (that isn't packed full of sugar – the struggles of lock-down snacking)! Enjoy.

BIOCHEMISTRY: BIOMOLECULES, METHODS, AND MECHANISMS

Professor Yaffe, an MIT professor and practicing surgeon, presents a series of lectures over 12 weeks covering a range of topics in biochemistry aimed at an 'intermediate' audience. There is also an option to pay to undertake a competency exam and receive a verified certificate of completion at the end of the course.

Available at: www.edx.org/course/biochemistry-biomolecules-methods-and-mechanisms

THE BASICS IN MASS SPECTROMETRY AND PROTEOMICS

"Professor Matthias Trost covers in a six-hour lecture series the absolute basics in mass spec and proteomics, including the newest methods developed in recent years and their application. This basic knowledge will help you design better experiments and understand the opportunities as well as limitations of proteomics".

Available at: www.ncl.ac.uk/fms/postgrad/skills/proteomics.htm

COMPUTATIONAL TOOLS FOR DRUG DISCOVERY

Free online webinars organised by SCI's Fine Chemicals Group and RSC's Chemical Information and Computer Applications Group, aimed at scientists working in drug discovery who would like to try out a range of software packages for applications such as data processing and visualisation, ligand and structure-based design and ADMET prediction.

6th May – 17th June (Wednesdays, 2 hours). Must register min 1 week prior to webinar.

Info at: www.soci.org/events/scirsc-workshop-on-computational-tools-for-drug-discovery

SCIENCE/AAAS WEBINARS

Science Magazine partners up with industry collaborators and academics from around the world to deliver webinars on a range of topics, with upcoming lectures including 'in-situ sequencing of tissue samples at single cell resolution' and 'linking lipids and disease'. Registration is easy and free!

Info at: www.sciencemag.org/custom-publishing/webinars#

AK LECTURES

Huge library of over 2,000 free chemistry, biology, medicine and physics short videos, delivering comprehensive coverage of a range of subject areas within each field. Perfect for revision or as an introduction to a new topic.

Available at: www.aklectures.com/

10 online biology and chemistry focused learning materials available during lock-down (continued)

Olivia Gittins (Newcastle University)

CRASH COURSE – CHEMISTRY AND BIOLOGY

Youtube channel providing crash course lecture series' in both biology and chemistry. These courses are based on A level teaching material so would be a great introduction to each subject. Videos are grouped into themes and broken down into 10-15 minute coverage of specific subjects, making it easy to fit a couple into your day or to cover a whole theme at a time, depending on your schedule.

Available at: www.youtube.com/playlist?list=PL8dPuuaLjXtPHzzYuWy6fYEaX9mQQ8oGr

AMERICAN CHEMICAL SOCIETY WEBINARS

ACS provide a webinar every Thursday at 6pm delivered by experts from around the world, with upcoming lectures including 'The 3D Printing Revolution: Advances in Material Design and Methods', and 'How Chemists and Engineers Will Make a Difference for a Healthy Planet'. Registration is free!

Info at: https://www.acs.org/content/acs/en/acs-webinars.html

SCIENCE MATTERS: LET'S TALK ABOUT COVID-19

Imperial College London have a free online course on the science behind the spread of COVID-19, consisting of videos and reading on the subject provided by world-class experts. It is pitched at beginner level and aims to outline the scientific principles underpinning the response to the pandemic, with experts in epidemiology and public health leading on the course.

Available here: https://www.coursera.org/learn/covid-19

Harvard University offer so many great courses, many of which are free, but here is just one which may be of interest…

USING PYTHON FOR RESEARCH

This free course from Harvard University would be great for those wanting to build on knowledge obtained through the MoSMed Computational Matters workshops, taking introductory knowledge of Python programming to the next level in order to learn how to use python for research. Available till 30th June 2020.

Available here: https://online-learning.harvard.edu/course/using-python-research?delta=0

MESTRALAB TRAINING SESSIONS

Mestrelab Research are offering free training on their chemistry software solutions and data analysis for techniques including NMR, Mass Spectrometry, LC-MS and GC-MS. Registration is required and they advise downloading their Mnova plugin in order to follow along on your own computer, so this could be a great option for those who prefer a more interactive learning format!

Info at: https://mestrelab.com/free-practical-training-series/

Meet our Aligned Doctoral Researchers 2019 / 2020

- **Isaline Castan** completed a Master of Science in Medicinal Chemistry at University College of London.
- **Carissa Lloyd** competed a BSc in Chemistry at Newcastle University.
- **Jacob Murray** completed a Master of Chemistry—industrial route at Durham University.
- **Rachael Pirie** completed an MChem Chemistry with Computational Chemistry at Heriot-Watt University.
- **Toni Pringle** completed an MChem Chemistry with Medicinal Chemistry at Newcastle University.
- **Catherine Salvini** completed a Master of Science in Drug Chemistry at Newcastle University.
- **Frances Sidgwick** completed a BSc (Hons) in Chemistry with Forensic Chemistry at Northumbria University.
- **Kate Sowerby** completed an MSci (Hons) in Natural Sciences at Lancaster University.

For full details of our Doctoral Researchers' projects, please refer to our webpage:

https://research.ncl.ac.uk/mosmed/people/students/

Our Response to COVID-19

As is true for so many people and organisations, our lives have been affected by the arrival of Covid-19. We are, however, so impressed with how our Doctoral Researchers have adapted to life in lockdown outside of the laboratory. Many are spending the time writing their first year progress reports and are invited to join us weekly via video meeting for online seminars and presentations. So far we have enjoyed presentations on the career progression of Mike Waring, Ehmke Pohl, Simi Ali and Celine Cano as well as a talk by the first recipient of the CoSeC Impact Award, Natalie Tatum and presentations by some of our own Doctoral Researchers. In addition to this, our Doctoral Researchers are participating in online courses to further their knowledge and understanding (please see Olivia's top ten recommendations as collated by our cohort), supervisory interactions and research group seminars and problem solving activities.

Our amazing Academic supervisors make up an important part of our MoSMed team and we are so proud that some of these have been able to contribute directly to the fight against COVID-19. With particular mention to Matthias Trost, who has for the last few months been Newcastle University's lead in supporting the NHS's effort in COVID-19 screening. With a team of other professors, Matthias organised the donation of PCR machines to the National Screening Centre in Milton Keynes, identified volunteers to support the screening at the local NHS Trust and helped with the donation of consumables and thousands of items of PPE to NHS Trusts in the North-East.

This team is also validating other qPCR assays to enhance resilience for the Screening Teams which often struggle to receive the necessary consumables. In addition, they have organised a volunteer driving service for the Screening Team who are not allowed to use public transport anymore to reduce the risk of infection. Currently, Matthias' group is working with Professor Akane Kawamura and others in the MoSMed team to produce COVID-19 proteins for ELISA assays. In the near future, Matthias' lab will perform proteomics of relevant infection models for COVID-19 in a collaboration with clinical scientists.

At Durham University, a PCR machine has been made available and the Chemistry Department like many others has donated all available PPE from stocks to the NHS.

We continue to work remotely and can be contacted by email at mosmed.cdt@ncl.ac.uk

Baby News!

We were thrilled to hear that our Newcastle CDT Manager Selina McCarthy had a baby girl on 16th April weighing 8lbs 8oz. Mother and baby are doing well. Welcome to the world, Rose!

Save the Date

We are delighted to announce that our next MoSMed Annual Conference will be held on Tuesday 15th and Wednesday 16th December 2020 at Durham University's Chemistry Department. We hope that you will be able to join us and we will be in contact with further details nearer the time. As I'm sure you will appreciate, the current situation with COVID-19 means that there is some uncertainty surrounding the possibility of gatherings in the near future. Although we remain hopeful that we will be able to hold our Conference, should this prove impossible we will be committed to working towards delivering the Conference remotely to enable attendees to participate.

We also update our Twitter page regularly https://twitter.com/MosmedC so please check this for our latest news.

MoSMed Molecular Sciences for Medicine | Newcastle University | Durham University | UKRI Engineering and Physical Sciences Research Council