Adam J Taylor

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EDUCATION

2014	PhD	School of Pharmacy, University of Nottingham Thesis: Analytical and cellular investigations of cell-secreted matrices from cytokine challenged environments [PDF]
2009	MEng	Biochemical Engineering. Upper second class honours. University of Bath

PROFESSIONAL APPOINTMENTS

Nov 2019 - present	The Francis Crick Institute, London, UK Visiting Scientist Oncogenes and Tumour Metabolism Laboratory
Dec 2015 - present	National Physical Laboratory, Teddington, UK Higher Research Scientist National Centre of Excellence in Mass Spectrometry Imaging (NiCE-MSI)
Jan 2014 - Oct 2015	University of Washington, Seattle, WA, USA Research Associate NESAC/BIO, Department of Chemical Engineering

PUBLICATIONS

Dexter A, Steven RT, Patel A, Dailey LA, **Taylor AJ** et al. Imaging drugs, metabolites and biomarkers in rodent lung: A DESI MS strategy for the evaluation of drug-induced lipidosis. Anal Bioanal Chem. 2019. doi:10.1007/s00216-019-02151-z

Yan B, **Taylor AJ**, Bunch J. Cryo-LESA mass spectrometry: A step towards truly native surface sampling of proteins. JASMS. 2019. doi:10.1007/s13361-019-02178-7

Taylor AJ, Dexter A, Bunch J. Exploring ion suppression in mass spectrometry imaging of a heterogeneous tissue. *Analytical Chemistry*. 2018. doi:10.1021/acs.analchem.7b05005 [PDF].

Killian MS, **Taylor AJ**, Castner DG. Stabilization of dry protein coatings with compatible solutes. *Biointerphases*. 2018. doi:10.1116/1.5031189

White LJ, **Taylor AJ** (co-first author), Faulk DM, Keane TJ, Saldin LT, Reing JE, et al. The impact of detergents on the tissue decellularization process: A ToF-SIMS study. *Acta Biomaterialia*. 2016; 50: 207–219. doi:10.1016/j.actbio.2016.12.033 [PDF]

Taylor AJ, Graham DJ, Castner DG. Reconstructing accurate ToF-SIMS depth profiles for organic materials with differential sputter rates. *Analyst*. 2015;140: 6005–6014. doi:10.1039/c5an00860c [PDF]

Taylor AJ, Ratner BD, Buttery LDK, Alexander MR. Revealing cytokine-induced changes in the extracellular matrix with secondary ion mass spectrometry. *Acta Biomaterialia*; 2015;14: 70–83. doi:10.1016/j.actbio.2014.12.005 [PDF]

Sawkins MJ, Bowen W, Dhadda P, Markides H, Sidney LE, **Taylor AJ**, et al. Hydrogels derived from demineralized and decellularized bone extracellular matrix. *Acta Biomaterialia*; 2013;9: 7865–7873. doi:10.1016/j.actbio.2013.04.029 [PDF]

RESEARCH EXPERIENCE

CRUK Grand Challenge Rosetta Team | 2017–
Leading key studies within a large interdisciplinary consortium. Responsible for experimental design, data collection and analysis, reporting and dissemination, as well as the day-to-day strategy for multiple sub-teams. Current projects include multimodal MSI (DESI, MALDI, SIMS and IMC) of mouse models of breast cancer and assessment of metabolite sensitivity across multiple MSI techniques and partner sites. Collaborating at all levels with biologists, bioinformaticians, students and consortium PIs. Reporting and disseminating results internally and internationally. Leading work at NPL to obtain and hold a Human Tissue Licence. Working closely with PPI group to maximise patient and public understanding. Contributed to the development and writing of the initial proposal.

Measurement service provider | 2016–
Enabled over £150k of third-party commercial work for high-profile clients. Provided proactive action and leadership through initial engagement, technical discussion, contract negotiation, analysis and reporting of time- and commercially sensitive work. Techniques delivered include MALDI MSI, DESI MSI, LESA MS and ToF-SIMS.

Fundamentals of MALDI and ambient mass spectrometry imaging | 2015–18
Developed novel methods for assessment and understanding of region-specific ion suppression in MALDI and DESI MSI (Taylor et al. *Anal Chem*. 2018). Led objective assessment of approaches for quantitation MALDI MSI, DESI MSI and LESA MS (OurCon IV).

Multimodal surface analysis of medical devices | 2015–17
ToF-SIMS and XPS analysis of real-world medical devices including metal implants, wound dressings and stents as part of the EMRP project Q-AIMDS: Chemical metrology tools to support the manufacture of advanced biomaterials in the medical device industry.

Argon sputtering behaviour at organic interfaces | 2014-15
Developed new theoretical and practical insights into Argon sputtering behaviour at organic interfaces during ToF-SIMS depth profiling (Taylor et al. *Analyst*. 2015).

ToF-SIMS analysis of decellularised materials reveals residual detergents | 2015
A collaborative project with Badylak Lab (University of Pittsburgh) to assess optimal protocols the production of porcine extracellular matrix (ECM) materials. ToF-SIMS analysis revealed previously unknown artefacts of selected methods including the retention of detergents used in processing, subsequently associated with adverse cell response (White, Taylor et al. *Acta Biomaterialia*. 2016).

Development and characterisation of cell-derived decellularized ECM surfaces | 2011-14
Optimised new methods for the decellularisation of primary osteoblasts cultured in vitro. Characterised decellularised ECM prepared in pro-inflammatory environments using biochemical and physical approaches including ToF-SIMS, ELISA and AFM. Characterised the response of primary osteoblasts and embryonic stem cells to decellularised ECM from healthy and inflamed environments by immunohistochemistry and cell-shape image analysis (Taylor et al. *Acta Biomaterialia* 2015).

EPSRC Doctoral Training Centre in Regenerative Medicine | 2010
Member of an interdisciplinary training programme. Lab rotations at Loughborough University (Optimising cryopreservation), University of Nottingham (Plasma polymers for osteogenic differentiation) and Keele University (Modelling fluid shear stress in a compressive bioreactor). Business plan competition winner.

Industrial placement with MSD UK Ltd. | 2008
Independently solved challenges relating to drug solubility and dosage form stability for multi-layer, controlled release & pH-modulating solid oral dosage forms. Worked to GLP and GMP guidelines.

RESEARCH INTERESTS

Development and deployment of mass spectrometry imaging techniques as robust tools for widespread use in fundamental health and life science research, pharmaceutical development and clinical diagnostics.

Use of multiple MSI modalities and complementary techniques to bridge gaps in speed, sensitivity, selectivity and spatial resolution.

Best practices in data visualisation, data management and machine learning of large MSI data.

PRESENTATIONS

Oral Presentations

2020 "Tracing heterogeneity and metabolism in MYC-driven mammary gland tumours with mass spectrometry imaging"
London Biological Mass Spectrometry Discussion Group, London, UK. 19th March 2020
**cancelled due to COVID-19 natural disaster*

2019 "Multi-Modal Mass Spectrometry Imaging of Tumors"
ASMS Asilomar Conference, Pacific Grove, CA, USA. 11-15 October 2019

2018 "Chemical analysis of medicinal products, medical devices and API distribution in ex-vivo models by mass spectrometry imaging." Making Pharmaceuticals. Coventry, UK. 25-26 April 2018

2018 "Multimodal mass spectrometry imaging for cancer at NPL and in the CRUK Grand Challenge Rosetta Team." Joint NKI & CRUK Beatson Institute Meeting, Amsterdam, Netherlands. 6 April 2018

2017 "Reviewing strategies for quantitative ambient mass spectrometry imaging."
BMSS Ambient Ionisation Special Interest Group. Keele, UK. 18 January 2017

2016 "Reviewing strategies for quantitative mass spectrometry imaging."
Ourcon IV. Ustron, Poland. 17-20 October 2016

2015 "Molecular-level surface analysis demonstrates the impact of detergent selection on decellularized tissues." AVS 62nd International Symposium. San Jose, CA. 18–23 October 2015

2015 "ToF-SIMS analysis reveals the impact of detergent selection on decellularized tissues."
SIMS XX. Seattle, WA. 13-18 September 2015

2014 "Reconstructing accurate ToF-SIMS depth profiles for biological and organic materials."
AVS PNW chapter annual symposium. Richland, WA. 16-19 September 2014

2013 "Decellularized matrices from a pro-inflammatory environment: Surface analysis and cell response." TERMIS-AM chapter meeting. Atlanta, GA. 10-13 November 2013

2012 "Production and characterisation of primary calvarial cell-secreted decellularised matrices."
11th UK Society for Biomaterials conference. Nottingham, UK. 27-28 June 2012

Poster Presentations

2019 "Unravelling molecular and pathological heterogeneity in MYC induced breast cancer models"
BMSS Imaging Special Interest Group Meeting. Sheffield, 1 May 2019

2018 "Exploring metabolic deregulation in mouse models of breast cancer with multimodal mass spectrometry imaging." International Mass Spectrometry Conference.
Florence, Italy. 26-31 August 2018

2018 "Applying a multimodal mass spectrometry imaging pipeline to examine metabolic deregulation in mammary gland tumours." ELRIG Discovery Technologies. Alderley Park, UK. 22-23 May 2018

2017 "Assessing and advancing approaches for quantification in mass spectrometry imaging."

BMSS Imaging Special Interest Group Meeting. Sheffield, UK. 5 July 2017

2017 "Assessing tissue region-specific analyte suppression in MALDI and DESI mass spectrometry imaging Using novel segmentation based normalisation methods."
65th ASMS. Indianapolis, IN, USA. 4-8 June 2017

2016 "Analysis of medical devices in 2D and 3D by secondary ion mass spectrometry."
64th ASMS. San Antonio, TX, USA. 5-9 June 2016

2015 "Molecular-level surface analysis demonstrates that detergent selection impacts extracellular matrix proteins." TERMIS World Congress. Boston, MA, USA 8-11 September 2015

2012 "The development and characterisation of primary calvarial cell-secreted decellularised matrices to direct osteogenic differentiation of embryonic stem cells."
TERMIS World Congress. Vienna, Austria. 5-8 September 2012

2012 "Production and characterisation of primary calvarial cell-secreted decellularised matrices."
TCES. Liverpool, UK. 23-25 July 2012

2011 "Bone tissue engineering: using surfaces to direct function". TCES. Leeds, UK. 19-21 July 2011

SKILLS

Mass spectrometry imaging

Design, analysis and interpretation of multimodal mass spectrometry imaging studies. DESI and MALDI MSI using Waters Q-ToF and Thermo Orbitrap Instruments. Deployment and evaluation of modified DESI sprayer and heated inlet. LESA MS using Advion Triversa Nanomate. ToF-SIMS including imaging and depth profiling. Sample preparation for MSI including cryosectioning and matrix application (TM Sprayer and sublimation). Go-to person for troubleshooting, method development, maintenance and training.

Data science

Targeted and untargeted analysis of mass spectrometry imaging data including multivariate analysis and machine learning. Fluent in data mining, data wrangling and data visualisation using R, following *tidyverse* philosophy. Experienced MATLAB user. Deployment of Docker containers for reproducible research.

Other

Histological staining, immunohistochemistry and optical microscopy. Surface analysis techniques including XPS, ellipsometry and AFM. Mammalian cell culture, including cell lines, adult and embryonic stem cells and isolation of primary cells. Adult and neonatal mouse handling, euthanasia and dissection.

SERVICE

Peer reviewer

Scientific Reports, Applied Surface Science, Rapid Communications in Mass Spectrometry, International Journal of Mass Spectrometry, International Journal of Pharmaceutics

Postdoctoral representation

University of Washington Postdoctoral Association Co-chair (2015) and Secretary (2014)

Public engagement

Project lead for "Mapping Cancer's Secret Chemistry", Royal Society Summer Science Exhibition. 2017
Digital Content Lead for "Biology Builders", Royal Society Summer Science Exhibition. 2013
Competitively selected participant. Roche Continents: Youth! Arts! Science! Salzburg Festival. 2010

Mentorship

Informal mentor of graduate students in current and previous positions