9th (biennial) Western Sydney University & Inaugural Asian Symposium on NMR, MRI & Diffusion 2020

Contents

Poster Prizes

- $200 Cash - Courtesy of Bruker
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- $200 Cash - Courtesy of John Morris Group
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Program

9th (biennial) Western Sydney University & Inaugural Asian Symposium on NMR, MRI & Diffusion 2020			
2nd December 2020; 16:45 (EADT) Session 1 - Chair: Professor William S. Price • *Acknowledgment of country and opening address*			
Zoom link for Session 1 will be available from 16:30 – 19:00 pm AEDT			
17:00	Bernhard Blümich	RWTH Aachen University, Germany	*Advances and Adventures with Mobile NMR*
18:00 - 18:30	Vivian Chen	Academia Sinica, Taiwan	*pH Mapping of the Skeletal Muscle by Chemical Exchange Saturation Transfer (CEST) Imaging*
3rd December 2020; 09:00 (EADT) Session 2 - Chair: Professor Eileen McLaughlin • *Acknowledgment of country and opening address*			
Zoom link for Sessions 2, 3 & 4 will be available from 08:30 am – 16:30 pm AEDT			
09:15	Nirbhay Yadav	Johns Hopkins University, USA	*Magnetic Resonance Imaging of Glycogen Using its Magnetic Coupling with Water*
10:05		**Poster Competition**	*Student presentations and judging*
10:35	Johnny Chen	SoSc, Western Sydney University	*Development of Novel Chemical Exchange Saturation Transfer Techniques for MRI*
11:00	Noriko Kanai	Yokohama National University, Japan	*Spent Coffee Grounds as a New Source of Cellulose Nanofibers*
11:05 - 12:00	Australian and New Zealand Society for Magnetic Resonance (ANZMAG) Annual General Meeting (Zoom link has been provided to ANZMAG members)		
3rd December 2020; 12:00 (EADT) Session 3 - Chair: Dr Abhishek Gupta			
12:00	Virtual Tour of the Biomedical Magnetic Resonance Facility – Facility Manager – Dr Scott A. Willis		
12:15	Carolyn Mountford	University of Technology, Queensland	*Neurochemical Dysregulation Changes How We Feel and Function*
13:05	Dennis Hwang	Academia Sinica, Taiwan	*The Study of Glucose Metabolism in Mice Brain by Dynamical Glucose Enhanced imaging*
13:40	Izuru Kawamura	Yokohama National University, Japan	*Solid-state NMR of Seven-transmembrane Proteins*
14:00 - 14:15	Graham Galloway	National Imaging Facility	
3rd December 2020; 14:30 (EADT) Session 4 - Chair: Dr Dennis Hwang			
14:30	Stuart Crozier	University of Queensland	*A Flexible Transceive Array for 7T Musculoskeletal and Prostate Imaging*
15:10	Tsai-Chen Chen	Academia Sinica, Taiwan	*Intrinsically disordered regions of RNA-binding proteins*
15:15	István Furó	KTH, Stockholm	*Strong and Weak Ion Binding to Polymers and Biopolymers as Seen by Electrophoretic NMR*
16:00	Dr Dennis Hwang • *Closing Address*		

Thank you to our Sponsors & Supporters

Bernhard Blümich

Advances and Adventures with Mobile NMR

Bernhard Blümich,

Institut für Technische und Makromolekulare Chemie,

RWTH Aachen University

Abstract

Mobile NMR enables a variety of studies which are out of range when relying on conventional NMR instruments. For the most part, mobile NMR instruments are stray-field sensors, that characterize material properties by investigating relaxation and diffusion of nuclear magnetization. This contribution reviews the principles of portable stray-field NMR and selected recent applications to non-destructive materials testing and to tangible cultural heritage in- and outside the laboratory.

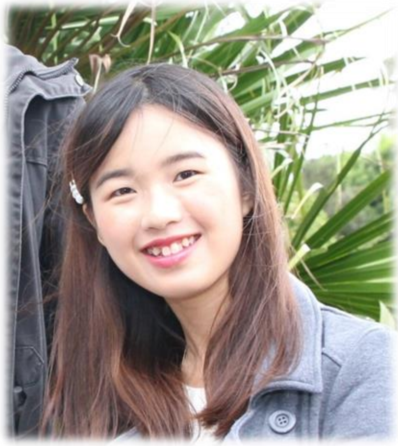
Biography

Bernhard Blümich gained his Ph.D. in physical chemistry from the Technical University of Berlin, Germany, in 1981. He spent a year as a NATO postdoctoral fellow at the University of New Brunswick, Canada, before joining the University of Bayreuth, Germany, as a staff scientist working on macromolecular chemistry. From 1984–1992, Blümich was a staff scientist at the Max Planck Institute for Polymer Research, Mainz, Germany, during which time he completed his Habilitation in physical chemistry. He took up his current position at the RWTH Aachen in 1993.

Blümich's research focuses on the use of solid-state NMR spectroscopy for determining the structure of, and molecular interactions with, materials such as naphtha reforming catalysts, nylon carpet tiles, block copolymers, ionic liquids, and nanocomposites. He also develops portable NMR equipment for bench-top analysis, including the NMR-MOUSE which has been used to analyze paintings, rubber tires, and archeological specimens.

Vivian Chen

pH Mapping of the Skeletal Muscle by Chemical Exchange Saturation Transfer (CEST) Imaging



Vivian Chen

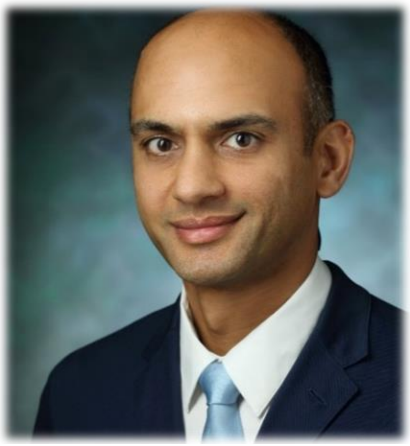
Academia Sinica, Taiwan

Abstract

Magnetic resonance imaging (MRI) is extensively used in clinical and basic biomedical research. However, MRI detection of pH changes still poses a technical challenge. Chemical exchange saturation transfer (CEST) imaging is a possible solution to this problem. Using saturation transfer, alterations in the exchange rates between the solute and water protons because of small pH changes can be detected with greater sensitivity. In this study, we examined a fatigued skeletal muscle model in electrically stimulated mice. The measured CEST signal ratio was between 1.96 ppm and 2.6 ppm in the z-spectrum, and this was associated with pH values based on the ratio between the creatine (Cr) and the phosphocreatine (PCr). The CEST results demonstrated a significant contrast change at the electrical stimulation site. Moreover, the pH value was observed to decrease from 7.23 to 7.15 within 20 hours after electrical stimulation. This pH decrease was verified by 31P magnetic resonance spectroscopy and behavioral tests, which showed a consistent variation over time.

Nirbhay Yadav

Magnetic Resonance Imaging of Glycogen Using its Magnetic Coupling with Water



Nirbhay Yadav

Assistant Professor of Radiology and Radiological Science

The Johns Hopkins School of Medicine and The Kennedy Krieger Institute

Abstract

Glycogen is the primary form of glucose storage in mammals and plays a vital role in cellular energy homeostasis. Mapping glycogen in vivo is useful in the diagnosis and assessment of diseases where glucose metabolism is altered, such as diabetes, tumors, and liver diseases. Currently, imaging glycogen in the clinic is not feasible due to the lack of a practical approach. This talk will describe how the magnetic coupling between glycogen and water can be used for the high resolution imaging of glycogen in vivo. This approach can be implemented on standard human MRI scanners and has the potential to assess disease where glycogen metabolism is altered.

Biography

Nirbhay N. Yadav, PhD is an Assistant Professor of Radiology at The Johns Hopkins University School of Medicine and The Kennedy Krieger Institute, USA. Dr Yadav completed his PhD at the University of Western Sydney, Australia working on NMR studies of molecular diffusion under the supervision of Prof. William S. Price. In 2010, he moved to Johns Hopkins to take up a Post-Doctoral Fellowship under the supervision of Prof. Peter van Zijl. Dr Yadav has published over 50 reviewed articles and serves as the principle investigator for an ongoing National Institutes of Health (NIH)-funded study. His current research interests include the development of MRI-based molecular imaging methods and the application of these methods in animal models and human patients with cancer, stroke, and neurodegenerative diseases.

Johnny Chen

Development of Novel Chemical Exchange Saturation Transfer Techniques for MRI

Johnny Chen

Western Sydney University

Abstract

Chemical exchange saturation transfer (CEST) is an exciting contrast enhancement mechanism which improves the molecular imaging capability of magnetic resonance imaging (MRI). CEST typically involves labelling (i.e., saturating with radiofrequency pulses) the protons of biologically-relevant functional groups (i.e., hydroxyls, amides, or amines), which undergo proton exchange with the detectable free water to induce specific MRI contrast. My PhD study investigates the feasibility of another biologically-relevant functional group, the thiol group, to induce CEST contrast and explores some potential applications. In this talk, I will not only show that thiol-based CEST MRI is indeed feasible but how it can also be used for in vivo MRI detection of a common pharmaceutical drug, N-acetylcysteine, possibly leading to theragnostic applications.

Biography

Johnny Chen completed his PhD studies in 2020 at Western Sydney University (WSU), where he also received a Bachelor of Medical Science (Honours) in 2016. His PhD research primarily focussed on exploring the feasibility and potential applications of thiol-water proton exchange from metabolites and pharmaceutical drugs as a contrast mechanism in magnetic resonance imaging. His PhD was completed under the supervision of Dr Gang Zheng (primary), Dr Timothy Stait-Gardner, and Prof. William Price from the Nanoscale Organisation and Dynamics Group at WSU, and Dr Nirbhay Yadav from The Johns Hopkins University and The Kennedy Krieger Institute in the USA. Johnny has published five peer-reviewed papers during his candidature.

Carolyn Mountford

Neurochemical Dysregulation Changes How We Feel and Function

Professor Carolyn Mountford DPhil(Oxon)

Professor of Radiology, Queensland University of Technology

Professor of Radiology and Neuroglycobiology, Griffith University

Neuroscientist, Athinoula A. Martinos Center for Biomedical Imaging, Harvard Medical School

Abstract

Modern data mining of in vivo one-dimensional neuro MR spectroscopy of the human brain identifies markers that determine the presence or risk of developing diseases/disorders not previously assessable. Two-dimensional in vivo neuro MR spectroscopy provides unambiguous assignment of those biochemical pathways that are dysregulated due to anxiety, pain or exposure to traumatic events or blast. MR technology is now able to shed light by predicting early stage disease or by monitoring progression or response therapy. It also provides insight as to why people feel and function differently with conditions such as pain and PTSD.

Biography

Professor Mountford and her team are currently working to improve MR spectroscopy technology and broaden its medical application. This work has already resulted in techniques used by research centres and hospitals for patients with cancer, brain tumours, and neurologic and psychological disorders.
The USA and Australian military have contracted her team to further develop the new MR in vivo approach that diagnoses changes to brain chemistry associated with brain injury and post-traumatic stress disorder. These in turn promise new therapeutic approaches.

One of Prof Mountford's programs has developed a way to monitor women at high risk for breast cancer identifying metabolic deregulations in their breast tissue that precede tumor growth.
Professor Mountford comes to TRI from the University of Newcastle where she was the Professor of Radiology and Director of the Centre for MR in Health since 2011. Other roles include full Professor of Radiology at Harvard Medical School since 2007, and Director of the Centre for Clinical Spectroscopy at the Brigham and Women's Hospital in Boston since 2006.

Dennis Hwang

The Study of Glucose Metabolism in Mice Brain by Dynamical Glucose Enhanced imaging

Dennis Hwang

Assistant Research Fellow

Academia Sinica

Institute of Biomedical Sciences, Taiwan

Abstract

Yu-Wen Chen[1], Yu-Ying Tung[1], Hong-Qing Liu[2], Chi-Hsieh Chiu[2], Chia-Huei Lin[1], Dennis W. Hwang[1,2]

[1] Biomedical Translation Research Center, Academia Sinica, Taipei, Taiwan
[2] Institute of Biomedical Sciences, Academia Sinica, Taipei, TaiwanAuthor

The brain primarily relies on glucose as the energy source for its metabolism. Traditionally, FGD-PET was the imaging method for studying the glucose metabolism in the brain. In recent years, a chemical exchange saturation transfer (CEST) method using the proton exchange between glucose and water as a contrast mechanism has been proposed to investigate dynamic glucose enhancement (DGE). DGE can be used to understand the dynamic metabolism of glucose over time. However, the blood flow in the dynamic system can affect the saturation efficiency in the slice being investigated, resulting in a reduced DGE performance. In this study, the time-dependent DGE signal of tumor and Huntington disease were studied and analyzed by a theoretical model. The results indicate a notable correlation between DGE signal and diseases progress.

Biography

Dennis Hwang received his PhD in Chemistry from National Taiwan University in 2002. He has held post-doctoral positions at National Taiwan University and the University of California. In 2009 he became Assistant Professor and in 2015 an Associate Professor at the National Chung-Cheng University, Taiwan. In 2017 he became an assistant research fellow at the Institute of Biomedical Sciences, Academia Sinica, Taiwan.

His research focuses on new MRI methods such as frequency-locking suppression MRI, and the development of contrast agents using NMR relaxation theory, molecular and spin dynamics. The goal is to use these new techniques to reveal detailed properties of biological tissues including brain and tumours. In addition, such new techniques can also be applied to investigate metabolism (e.g., glucose in tumours and iron in tissues).

Izuru Kawamura

Solid-state NMR of Seven-transmembrane Proteins

Izuru Kawamura

Graduate School of Engineering Science, Yokohama

National University,

Japan

Abstract

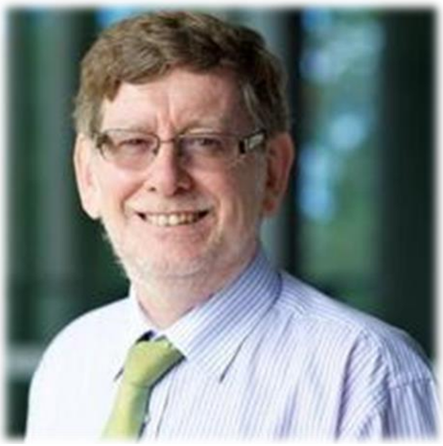
Microbial rhodopsins are photoreceptive proteins and vital for cell function. While a microbial rhodopsin basically consists of seven transmembrane helices with all-trans retinal chromophore, the function of the proteins is highly divergent. Solid-state NMR spectroscopy is a powerful tool to probe the structure and dynamics of proteins in biological membranes of increasing complexity. Here, we present our approach using solid-state magic angle spinning NMR to investigate the structure and dynamics of microbial rhodopsins embedded in a membrane environment. ^{15}N NMR assessments of protonated Schiff base of retinal chromophore among several microbial rhodopsins revealed the strength of the interaction between retinal and counter-ion. Site-specific detection of H/D exchange investigated light-induced conformational changes for new-type rhodopsin, heliorhodopsin. Chemical shift perturbation (changes in the chemical shifts) of light-driven sodium ion pumping rhodopsin when an alkali metal ion is added, revealed the affinity to Na^+ and Li^+.

Biography

Associate Professor Izuru Kawamura received his Ph.D. in 2007 from Yokohama National University under the supervision of Prof. Akira Naito. He worked at Yokohama National University (2007–2011) as a research fellow. From 2009 to 2010, he joined the biological solid-state NMR group of Prof. Vladimir Ladizhansky and Prof. Leonid Brown as a visiting researcher at University of Guelph in Canada. Then, he worked at Yokohama National University as an assistant professor from 2012 to 2014 and has been an associate professor since 2014. His research interests are solid-state NMR, membrane proteins, antimicrobial peptides, and self-assembly peptides.

Graham Galloway

National Imaging Facility



Graham Galloway

Chief Executive Officer,

National Imaging Facility

Biography

Professor Graham Galloway is the Chief Executive Officer of the National Imaging Facility (NIF). He has been instrumental in establishing Imaging collaborative research infrastructure in Australia. In 2006, he led the collaborative team that developed the Investment plan for Imaging, within NCRIS (National Collaborative Research Infrastructure Strategy). This plan was accepted by Department of Industry, Innovation and Science, with $7M Commonwealth funding, plus $10M state and institutional funding and Galloway was nominated by the Imaging Community as the Inaugural Chief Executive Officer of the National Imaging Facility. In this role, he provides leadership to the NIF as it develops a strategic vision for imaging in Australia. Under his leadership, NIF has expanded through the Education Investment Fund and further capital investment through NCRIS. With state and institutional funding, this is a $130M project. He is passionate about providing open access to the imaging resources and enabling effective use of those resources.

Graham's research interests include the use of in vivo Magnetic Resonance to test the efficacy of pharmaceutical agents, novel applications for the use of Magnetic Resonance in physiological studies and material sciences, and in pushing the boundaries of the technology into new applications. His role in all projects is characterised by his multidisciplinary background, which ensures that he is able to draw together these apparently disparate threads.

National Imaging Facility https://anif.org.au/

NCRIS National Research Infrastructure for Australia An Australian Government Initiative

National Imaging Facility

Stuart Crozier

A Flexible Transceive Array for 7T Musculoskeletal and Prostate Imaging

Stuart Crozier

Associate Dean (Research) for the Faculty of Engineering, Architecture and Information Technology

University of Queensland

Abstract

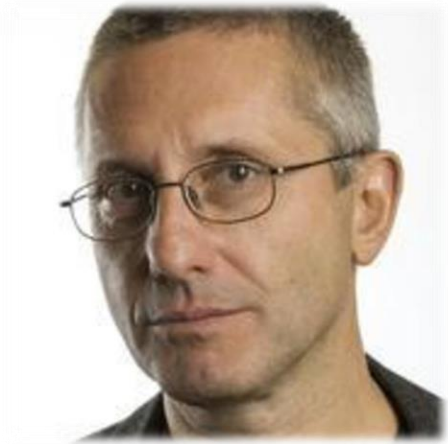
One of the main challenges in ultra-high field, whole body MRI relates to the uniformity and efficiency of the radiofrequency (RF) fields generated in tissue. Although recent advances in the design of RF coils have demonstrated that dipole antennas have a current distribution ideally suited to 7T MRI, they are limited by low isolation and poor robustness to loading changes. Multi-layered and self-decoupled loop coils have demonstrated improved RF performance in these areas at lower field MRI but have not been adapted to dipole designs. In this work, we introduce a novel type of RF antenna consisting of integrated multi-modal antenna with coupled radiating structures (I-MARS), which use layered conductors and dielectric substrates to allow dipole and transmission line modes to co-exist on the same compact dipole-shaped structure. A prototype parallel transmit coil array was built and tested on healthy volunteers at 7T. The articulated, modular construction of the I-MARS coil array allowed it to be readily conformed across multiple body regions (hip, knee, shoulder, lumbar spine and prostate), without requiring modification of the tuning and matching of the antennas.

Biography

Professor Stuart Crozier is the Associate Dean (Research) for the Faculty of Engineering, Architecture and Information Technology. His expertise lies in imaging technology and applications, instrumentation for physiological measurement and semi-automated diagnostics. The commercial and academic impact of the work in Magnetic Resonance Imaging has been significant, with about two thirds of all high-end, clinical MRI systems installed worldwide after 1997 containing patented technology co-invented and fully developed by him. In 2012 Professor Crozier received the Australian Academy of Technological Sciences (ATSE) Clunies Ross Award for his contributions to the field of Magnetic Resonance Imaging. The award recognises outstanding achievement in the application of science and technology for the benefit of the wider community.

István Furó

Strong and Weak Ion Binding to Polymers and Biopolymers as Seen by Electrophoretic NMR



István Furó

KTH Royal Institute of Technology,

SE-10044 Stockholm, Sweden.

Abstract

In diffusion NMR, incoherent Brownian motion leads to a signal decay in suitable gradient-based pulse sequences. In contrast, coherent motion such as flow presents itself as a phase shift in the same pulse sequences. From that phase shift the flow velocity can be extracted. In case of electrophoretic NMR, the flow is not that of a bulk fluid but of the ions present in the solution and set drifting by an electric field in the sample volume. The parameter extracted is the electrophoretic mobility that, aided by the chemical selectivity and sensitive spatial encoding of NMR, is available by high accuracy and, in complex mixtures, separately for any individual component. The principles and the practical implementation of the method are introduced. The main application described will be studies of ion binding and, in particular, the ion specificity of it (often termed as the "Hofmeister series") in solutions of neutral polymers and biomolecules.

Biography

Professor István Furó's current basic research interests can be divided into two broad groups. One concerns developing new NMR methods and instrumentation such as that for electrophoretic NMR. To the second group belong applications of NMR experiments to association phenomena, porous materials, cellulose, chromatographic media and more. I am also interested in NMR microimaging (MRI) and its applications to, for example, swelling of various materials such as tablets and clays and the behavior of molecular components in energy devices like batteries and fuel cells. Through the Industrial NMR Centre, I have numerous industrial contacts and due immersion in applied projects.

Doctor of Philosophy Candidate's Presentations & other Short Stories

Poster Prizes;

- $200 Cash - Courtesy of Bruker
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- $200 Cash - Courtesy of John Morris Group
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Posters considered for poster prizes - a short abstract and two (2) slides for presentation during "Poster Competition"

PhD Candidate Presentations

Noriko Kanai	*"Spent Coffee Grounds as a New Source of Cellulose Nanofibers"* Noriko is a PhD student at Graduate school of Yokohama National University under the supervision of Dr. Izuru Kawamura. She completed masters at same university in the field of chemistry in September 2020. She was staying at NANO group at WSU led by Prof. Price as a Visiting Fellow for 7 months in 2019. Currently, Noriko was involved in research on the characterization of lipids and cellulose in coffee beans using solid-state NMR and PGSE NMR, and the production of cellulose nanofibers from "spent" coffee grounds. **Abstract:** Research on spent coffee grounds (SCGs) aimed at waste revalorization as well as upcycling has significantly increased over the last decade. Almost half of the dry weight of SCGs consists of polysaccharides in cell walls, mainly cellulose and hemicellulose. We focus on cellulose containing around 10 wt.% in SCGs and successfully isolated nano-sized cellulose fibers (i.e., cellulose nanofibers, CNF). Thus, we reported SCGs as a completely new non-wood source of CNF [1]. Catalytic oxidation using 2,2,6,6-tetramethylpiperidine-1-oxyl (TEMPO) was conducted to produce CNF from SCGs (CNF-SCGs) in accordance with the procedure detailed by A. Isogai [2]. We will present the detailed characterization of CNF-SCGs using solid-state NMR, field emission scanning electron microscopy, X-ray diffraction and thermogravimetric analysis in the symposium. [1] Kanai, N. et al, Cellulose, 27, 5017–5028 (2020) [2] Isogai, A. Proc. Jpn. Acad. B., 94, 161–179 (2018).
Tsai-Chen Chen	*"Intrinsically disordered regions of RNA-binding proteins"* Tsai-Chen is a PhD student at biochemistry and molecular biology of National Yang-Ming University under the supervisor of Dr. Jie-rong Huang study the protein biophysical properties by NMR. She completed a master in chemistry at National Chung-Cheng University with Dr. Dennis W. Hwang study of the phospholipid membrane dynamics by the fast-field-cycling NMR (FFC-NMR) relaxometry. Currently, she involves in the research of metabolism NMR and MRI at Academia Sinica led by Dr. Dennis W. Hwang. Institute of Biochemistry and Molecular Biology, National Yang-Ming University, Taipei, Taiwan Institute of Biomedical Sciences, Academia Sinica, Taipei, Taiwan

	Abstract The human genome encodes more than 1500 RNA-binding proteins (RBPs) and regulates many cellular processes [1]. Most RBPs contain folded RNA-binding domains and intrinsically disordered regions (IDRs) whose biophysical properties have not yet been explored. Here I will use two examples, TDP-43 and Musashi-1, to demonstrate the roles of the IDRs in RBPs. The TAR DNA-binding protein of 43 kDa (TDP-43) C-terminal domain is an IDR has been identified as the main component of amyotrophic lateral sclerosis (ALS) cytoplasmic inclusions. It has an α-helical component in the center region relates to liquid-liquid phase separation (LLPS) of cellular membraneless organelles [2,3]. The Musashi-1 protein also has an ID C-terminal domain correlated with Alzheimer's disease (AD) that forms the oligomeric state and co-localizes with Tau contributing to the neurodegenerative pathogenesis. It has a transient α-helical region that promotes oligomerization progress and leads to nuclear instability [4]. [1] Gerstberger, S. et al. Nat. Rev. Genet. 2014, 15, 829-845. [2] Li, H.-R.; Chen, T.-C. (co-first author) et al. Biochim. Biophys. Acta. Proteins Proteom. 2018, 1866, 214-223. [3] Li, H.-R. et al. J. Biol. Chem. 2018, 293, 6090-6098. [4] Chen, T.-C. and Huang, J.-R. Int. J. Mol. Sci. 2020, 21, 2289.

Poster Presentations

Jun Cao	*Repeatability of Phase-based Magnetic Resonance Electric Properties Tomography and Effect of Compressed SENSE* Jun Cao, Iain Ball, Peter Humburg, Ryan Castillo, Socrates Dokos, Caroline Rae **Abstract** **Purpose:** Implementation of phase-based magnetic resonance electrical properties tomography in the clinic requires a repeatable method and a short scan time. These could be achieved with compressed SENSE. Here, we investigated the repeatability of conductivity measures obtained from two different phase-based MREPT sequences (TSE and bFFE), as well as the effect of increasing compressed SENSE factors. **Methods**: Five healthy subjects were scanned at 3T on two separate sessions (different days, similar time of day) using turbo spin echo (TSE) and balanced fast field echo (bFFE) with compressed SENSE (CS) factors from 1.3 to 12. Order of scanning was randomized. Conductivity maps were calculated from respective phase maps. ANOVA and two-sample equivalence tests were used to examine the repeatability of conductivity measurements from the same sequence, and compare conductivity measurements of TSE and bFFE with CS factors. Bland-Altman plot analysis was used to compare the repeatability of the two different sequences. **Results**: Conductivity measurements using TSE and bFFE with CS factors were repeatable. The mean and variance of the conductivity measurement using TSE

	phase were larger than those measured by bFFE. The conductivity measurements using bFFE showed minimal deviation with CS factors up to 8, with deviation increasing significantly at CS factors > 8. With higher CS factors, subcortical structures were more likely to produce less consistent measurements than cortical parcellations. **Conclusions:** bFFE is a more optimal sequence than TSE for phase-based MREPT in brain. Depending on the area of the brain being measured, the scan can be safely accelerated with compressed SENSE without sacrifice of precision, offering the potential to employ MREPT in clinical research and applications.
Lucy Fillbrook	*Following mobility in chemical reactions with paramagnetic ions.* Lucy L. Fillbrook, Jan-Philip Günter, Prof. Günter Majer, Prof. William S. Price, Prof. Peer Fischer, A/Prof. Jonathon E. Beeves. **Abstract** Enhanced diffusion of active enzymes and small molecule catalysts is a highly controversial area of research. In this work, time-resolved diffusion NMR techniques were used to monitor the kinetic data and diffusion coefficients of species during the copper-catalysed click reaction. We show no evidence of enhanced diffusion of the small molecule catalyst, or surrounding molecules, when the correct methodology is applied.