

April 13-14, 2023 HMTRC WORKSHOP

Hyperpolarized Carbon-13 MRI Technology Development

Hyperpolarized MRI Technology Resource Center
Department of Radiology & Biomedical Imaging
University of California, San Francisco



The Hyperpolarized MRI Technology Resource Center (HMTRC) is a National Center for Biomedical Imaging and Bioengineering (NCBIB) whose mission is to develop new advances in dissolution DNP techniques & instrumentation, specialized data acquisition methodology, and analysis software for biomedical research.

<https://hyperpolarizedmri.ucsf.edu/>

The April 2023 Hyperpolarized Carbon-13 MRI Technology Development Workshop includes academic & vendor lectures, hands-on training and discussions on dissolution DNP methodology, polarizer instrumentation, MR Sequence and Acquisitions, Pre-clinical HP Chemistry Preps, Human HP Investigational Dose Formulation & Production, Clinical Translation Methods, Clinical Trial Support, and Analysis & Display Software.

GOLD SPONSORS:



Workshop Schedule Day 1

Thursday, April 13th

- 7:30am Breakfast/Registration (Genentech Hall Auditorium)
- 8:00 Introduction: Chair Radiology & Biomedical Imaging, **Dr. Chris Hess MD PhD** & HMTRC Director, **Dr. Dan Vigneron PhD**, UCSF
Symposium Group Photo
- 8:15 HMTRC Medical Director Updates: **Dr. Jane Wang MD**, UCSF
- 8:30 Technology Development for Polarizer and Detector Instrumentation:
Dr. Jeremy Gordon PhD & Duy Dang PharmD, UCSF
- 8:45 Development of Novel Hyperpolarized MR Molecular Imaging Probes Tested in Realistic Preclinical Models and Correlative Science Studies: **Drs. John Kurhanewicz PhD & Renuka Sriram PhD**, UCSF
- 9:00 Acquisition and Analysis Methods for Hyperpolarized MR Data:
Duan Xu PhD & Peder Larson PhD, UCSF
- 9:15- 9:30 **Coffee Break**
- 9:30-11:30 **Plenary Talks:** (15 minute per talk)
- **Jae Mo Park PhD**, University of Texas Southwestern
- **Kayvan Keshari PhD**, Memorial Sloan Kettering Cancer Center, NY
- **Chris Laustsen PhD**, Aarhus University
- **Chuck Cunningham PhD**, University of Toronto
- **Gigin Lin MD PhD**, Chang Gung Memorial Hospital, Taiwan
- **Jan Ardenkjaer-Larsen PhD**, Technical University of Denmark
- **Robert Bok MD PhD**, UCSF
- 11:30-1:00 Hands-on Breakout Sessions Hands-on demos & discussions on dissolution DNP methodology, Polarizer instrumentation, MR Sequence and Acquisitions, Bioreactors, Chemistry & Pharmacy Preps, Clinical Translation and Radiologist discussions, will be held in the Surbeck Laboratory for Advanced Imaging and the Biomedical NMR Laboratory. Software hands-on training and discussions (Mission Bay, Byers Hall 209).
- 1:00-2:00 Lunch & Poster Session
- 2:00-3:30 Hands-on Breakout Session, with Coffee Break 3:30-3:45
- 3:45-4:45 **Plenary Talks continued:**
- **James Kempf PhD**, Bruker Scientist
- **Titus Lanz PhD**, RAPID Biomedical GmbH
- **Sella Brosh MD**, NVision Imaging Technologies

Keynote Lectures Sponsored by:



- 5:00 Keynote Lecture by **Dr. Donna Peehl PhD**, UC San Francisco
- 5:30 Keynote Lecture by **Dr. Ferdia Gallagher MD PhD**, U. of Cambridge

GOLD SPONSORS:



Workshop Schedule Day 2

Friday, April 14th

7:45am Breakfast/Registration & Poster Session Genentech Hall Auditorium

Plenary Talks in Genentech Hall Auditorium

- 8:00-9:15am
- **Arnaud Comment PhD, Albert Chen PhD**, GE Healthcare
 - **Chris Suszczyński**, Isotec Stable Isotopes Division, MilliporeSigma
 - **Shdema Epstein MD, Anna Parker PhD**, NVision Imaging Technologies

9:15-9:30am Coffee Break

9:30am-10:30am **Plenary Talks (Continued) in Genentech Hall Auditorium**

Moderator: Dan Vigneron PhD (15 min minute per talk)

- **Stephen Lai MD PhD**, UT MD Anderson Cancer Center
- **Aaron Grant PhD**, Harvard University
- **Ivan De Kouchkovsky MD – Rahul Aggarwal MD**, UCSF

10:30-10:45am Coffee Break

10:45-12:15pm Hands-on Breakout Sessions

Hands-on demos & discussions on dissolution DNP methodology, Polarizer instrumentation, MR Sequence and Acquisitions, Bioreactors, Chemistry & Pharmacy Preps, Clinical Translation will be held in the Surbeck Laboratory for Advanced Imaging and the Biomedical NMR Laboratory. Software hands-on training and discussions (Mission Bay, Genentech Hall N-114).

12:30-1:30pm Lunch Reception & Poster Sessions

1:30-5:30pm **Plenary Talks (Continued) in Genentech Hall Auditorium**

Moderator: Jeremy Gordon PhD (15 min minute per talk)

- **Myriam Chaumeil PhD**, UCSF
- **Vlad Zaha MD PhD**, University of Texas Southwestern
- **Yaewon Kim PhD**, UCSF
- **Shonit Punwani MD**, University College London
- **Yan Li MD PhD**, UCSF
- **Dan Crooks MS, PhD**, NIH/NCI

3:30-3:45pm Coffee Break

- **Matthew Merritt PhD**, University of Florida
- **Pavithra Viswanath PhD**, UCSF
- **Alba Herrero Gomez**, Institute for BioEngineering Catalonia, Barcelona
- **Xiaoxi Liu PhD**, UCSF
- **Jan-Bernd Hoevener PhD**, University of Kiel
- **Hsin-Yu Chen PhD**, UCSF

5:30-6:00pm Wrap-Up

HMTRC Workshop Faculty & Staff

Daniel B. Vigneron PhD, HMTRC Director & TR&D1 Leader, is a Professor in the Departments of Radiology & Biomedical Imaging, Bioengineering & Therapeutic Sciences and Neurological Surgery at UCSF and is a member of the UCSF Cancer Center and the UCSF/UCB Bioengineering Graduate Group. He is the Director of the NIH-funded Hyperpolarized MRI Technology Resource Center (HMTRC) and TR&D1 project leader (with Dr. Gordon) for the development of specialized dissolution Dynamic Nuclear Polarization (DNP) methodology & HP ^{13}C MR techniques. His research focuses on the development and translation of new MR techniques and has extensive experience in HP ^{13}C MR providing administrative and technical oversight for the polarizer instrumentation and MR technique development at UCSF for the translation for patient clinical trials and human volunteer studies of HP C-13 MR.

Jane Zhen Wang MD, Medical Director of the HMTRC, is a Professor in the Department of Radiology & Biomedical Imaging at UCSF, Associate Chair of Strategic Planning, New Section Chief of Abdominal Imaging & Ultrasound, Co-Director for the T32 Physician Scientist Training Program, and a member of the HP Radiologist Leadership Committee. She has extensive expertise in conducting advanced imaging research with 140+ publications to date. Prof. Wang leads a major research program focused on the identification and translation of novel HP ^{13}C MR biomarkers for characterizing abdominal diseases and response to therapy, including HP ^{13}C MR to assess renal tumor aggressiveness & diffuse renal disease (nephropathy), as well as quantitative imaging in pancreatic and prostate cancer.

Jeremy Gordon PhD, TR&D1 Leader, is an Assistant Professor in the Department of Radiology & Biomedical Imaging at UCSF. His research program focuses on the bioengineering development of new HP ^{13}C MR instrumentation & metabolic imaging techniques, with a focus on their translation from pre-clinical research into human patient studies to provide unique metabolic characterization of organ function, disease staging, and response to therapy. He has extensive experience in operating and improving HP ^{13}C methods, instrumentation, and in the development of clinical specialized HP ^{13}C MR techniques. At UCSF he leads the technical aspects of the DNP polarization and EPI sequence developments for HP ^{13}C MR human studies.

John Kurhanewicz PhD, TR&D2 Leader, is a Professor in the Departments of Radiology & Biomedical Imaging and Pharmaceutical Chemistry at UCSF and is a member of the California Institute for Quantitative Biology, the UCSF Cancer Center, and the UCSF/UCB Bioengineering Graduate Group. He is the co-director (with Dr. Sriram) of the UCSF Pre-clinical MR Imaging and Spectroscopy Core which serves as a pre-clinical resource for the HMTRC. He has extensive experience with multinuclear NMR spectroscopy & multiparametric ^1H MRI of prostate and other cancers and diseases. His research is currently focused on the development and application of new hyperpolarized (HP) ^{13}C MR metabolic imaging probes and techniques to answer important clinical questions. He leads (with Dr. Sriram) TR&D2 which is driven by the development of novel MR metabolic imaging probes and techniques that are tested in realistic preclinical models with appropriate correlative science studies with the goal of clinical translation.

Renuka Sriram PhD, TR&D2 Leader, is an Assistant Professor in the Department of Radiology & Biomedical Imaging at UCSF and the technical director of the UCSF Pre-clinical MR Imaging and Spectroscopy Core. She has extensive experience in using new MRI approaches to investigate cancer metabolism and the interplay between tumor metabolism and its microenvironment. Her work focuses on the application of HP ^{13}C MR to understand disease progression and therapeutic response for clinical translation. At UCSF she leads the HP ^{13}C studies which involve the cell and tissue culture bioreactor, in vivo murine as well as in vitro cell studies along with and correlative biochemical and metabolomics studies.

Duan Xu PhD, TR&D3 Leader, is a Professor in the Department of Radiology & Biomedical Imaging at UCSF and co-director of the UCSF/UCB Bioengineering Graduate Program. At UCSF, he leads Neonatal MRI Development Program and has over 20 years of experience in developing advanced MR techniques including preclinical HP ^{13}C MR methods for brain studies and clinical research projects studying pediatric patients with normal and abnormal maturation. At the center, he leads TR&D3 which is focused on the development, testing and disseminating of specialized acquisition and analysis methods for HP ^{13}C data and tools.

Peder Larson PhD, TR&D3 Leader, is a Professor in the Department of Radiology & Biomedical Imaging at UCSF and an expert in HP ^{13}C MR sequences. Dr. Larson's research focuses on developing novel HP ^{13}C MR metabolic MR imaging methods, which has clinical potential for applications such as heart disease, cancer staging and monitoring treatment response. He has experience primarily MR pulse sequence development, including MR physics, RF pulse design, acquisition strategies, and reconstruction techniques. At the center he leads TR&D3 in the development and translation of new acquisition and analysis methods for HP ^{13}C MR imaging with a focus on training and dissemination.

Robert Bok MD, PhD, Director of Preclinical-Clinical Translation, is a medical oncologist, with specialization in GU Oncology, and Professor in the Department of Radiology & Biomedical Imaging working in the UCSF Cancer Imaging Program. He received a Ph.D. in Biochemistry as well as an M.D. with specialized training in Internal Medicine and Hematology/Oncology. He has extensive experience in preclinical and clinical MR imaging research and oversees the animal facilities in the Surbeck Laboratory for Advanced Imaging and the Biomedical NMR Laboratory. Dr. Bok serves on the HMTRC Executive Committee overseeing the biological and animal care aspects for HMTRC preclinical research projects and the patient aspects for the human studies conducted in the center.

James Slater RPh, MS, PhD, Senior Research Pharmacist, is the former Director of UCSF Radiopharmaceutical Facility and the director of Education and Special Projects for Isotope Imaging. His education and work experience involves a broad range and diverse experience in pharmaceutical development. His experience in FDA regulations cGMP laboratories, has led him to writing several ANDAs and INDs. His research experience involved both academic and pharmaceutical industry. He has had extensive experience in the clinic working with patients and referring physicians as well as laboratory research projects. His expertise in radiopharmaceuticals has been used by several institutions and the pharmaceutical industry as a consultant. He has served on the faculty of a number of Schools of Pharmacy working on research projects and training students. He leads, with Dr. Dang, the pharmacy preparation, terminal sterilization and testing aspects of the HP stable-isotope carbon-13 clinical research & volunteer MR molecular imaging studies at UCSF.

Duy Dang PharmD is the Hyperpolarized Research Pharmacist at the center. He is a board-certified pharmacotherapy specialist. He gained his clinical pharmaceutical knowledge and skills through his work at various hospitals including a Level 2 Trauma Center. He obtained his radiopharmaceutical experience through his work and training at SOFIE, a radiopharmaceutical drug company that manufactures PET (Positron Emission Tomography) drugs. His work at the center focuses on the clinical translation of novel HP ^{13}C MR probes and their preparations. At the center, he oversees the production and manufacturing processes for human research.

Donna Peehl PhD joined UCSF as an Adjunct Professor in 2017 after becoming Professor Emerita at Stanford U. following 35 years in the Department of Urology. She is widely recognized for her work in developing realistic and representative patient-derived models of prostate and kidney cancer. In collaboration with investigators at Stanford & UCLA, she currently studies the role of Trop2 in mediating lineage plasticity of prostate cancer and the mechanism of synthetic lethality of the RNA demethylase FTO with VHL in kidney cancer. At UCSF, Dr. Peehl is a co-investigator of TR&D2 and she works closely with Drs. Sriram and Kurhanewicz to use preclinical models to investigate the potential of HP ^{13}C MRI to diagnose, stage, or predict response to therapy of genitourinary malignancies.

Michael Ohliger MD, PhD, TR&D1; Robert Flavell MD, PhD, TR&D2; Javier Villanueva-Meyer MD, TR&D3 & David Wilson MD, PhD, Clinical Translation Leads, are Radiologists at UCSF leading HP ^{13}C MR projects and members of the HP Radiologist Leadership Committee. Dr. Ohliger's research focuses on the development and clinical translation of new MRI techniques for the abdomen and pelvis, with a focus on molecular imaging with HP carbon-13 compounds. Dr. Flavell's research focuses on novel probe development to create new molecular imaging tools for better understanding of disease progression in patients with prostate and other cancers. Dr. Villanueva-Meyer's interests focus on advanced MR imaging and imaging based tools to better delineate and characterize brain tumors. His research also involved molecular imaging where he works with collaborators within and outside of our department to develop and implement the use of PET radiotracer in both brain tumors and spinal infection. Dr. Wilson is involved in the development of new HP ^{13}C probes and the integration of HP ^{13}C MR and PET.

Lucas Carvajal MS, Senior Development Engineer, is a highly experienced MRI and RF Engineer at UCSF. He has extensive experience in coil construction, computer modeling of coil reception profiles, and MRI/MRSI data analysis. He has overseen the construction and optimization of specialized coils for a wide variety of HP ^{13}C MR applications.

Hsin-Yu Chen PhD, Senior Bioengineer, works with Drs. Vigneron and Gordon at UCSF on developing new ^{13}C MR molecular imaging tools and techniques in TR&D1. He is an expert in clinical HP ^{13}C MR, focusing on the bioengineering developments for HP MRI molecular imaging. He oversees the DNP instrumentation improvements and operation. He is an outstanding resource for understanding DNP instrumentation and in training users in advanced DNP techniques.

Lynn Delos Santos, Pathology/Molecular Biology Specialist, has extensive experience in HP agent preparation, pathology research, immunohistochemistry and biochemical arrays. She oversees Dr. Kurhanewicz's pathology and molecular biology lab and prepares samples for hyperpolarization for both preclinical and clinical research studies.

Evelyn Escobar & Stacy Danner, Pharmacy Technicians, have extensive experience in aseptic processing and compounding of sterile preparations for human studies. They work on the production of sterile HP ^{13}C -pyruvate preparations for human HP ^{13}C studies under the oversight of Drs. Dang and Slater.

Louise Magat & Calista Chiu, Clinical Research Coordinators for HP ^{13}C studies oversee the patient management & regulatory aspects for HP ^{13}C Human Research. **Bella Whalen**, assists in the submission of FDA IND applications.

Yaewon Kim, is a postdoctoral scholar and **Danny Gebrezgiabhier & Tanner Nickles** are UCSF/UCB Bioengineering Graduate Students on HP ^{13}C research focusing on new technology for human studies in Prof. Vigneron's group. **Adam Autry** is a postdoctoral scholar in Dr. Yan Li's group and conducts HP ^{13}C research focusing on gliomas

Will Byrne is a Staff Scientist Assistant and **Xiao Ji** is the NMR Core Manager. They support studies involving pre-clinical cell, tissue, culture, animal studies, & metabolomics. **Rosie Nolley, Ivina Mali & Jennifer Lewis** are staff and postdoctoral scholars part of the TR&D2 team who researches development of HP MR probes, models & methods.

Donghyun Hong is a postdoctoral scholar whose work focuses on the investigations of cancer biology using advanced NMR/MRI, and have developed custom reconstruction, analysis & visualization tools. **Xiaoxi Liu**, postdoctoral scholar, **Sule Sahin**, UCSF/UCB Bioengineering Graduate Student, **Avantika Sinha**, Assistant Specialist, and **Anna Bennett**, Assistant Specialist, on Data Acquisition and Analysis projects which support the centers goals of TR&D3, and additionally work on the application of HP ^{13}C to kidney and heart diseases.

Celine Taglang & Changhua Mu are postdoctoral scholars who research novel chemistry preps for HP ^{13}C research.

Posters

- 1. Improving Quantification of Hyperpolarized ^{13}C -Pyruvate Metabolism Using Pyruvate Metabolite Specific bSSFP and Variable Flip Angles.** Bennett A, Liu X, Sinha A, Sahin S, Larson PEZ, Wang C. Department of Radiology and Biomedical Imaging; UC Berkeley-UCSF Bioengineering, UCSF
- 2. Hyperpolarized ^{13}C NMR – A Potential Tool in Leukemia Cancer Diagnostics and Treatment Evaluation?** Christensen NV, Laustsen C, Bertelsen LB. Aarhus University, Department of Clinical Medicine, The MR Research Centre, Aarhus N, Denmark
- 3. A Method to follow Real-time Hyperpolarized $[1-^{13}\text{C}]$ -pyruvic acid Metabolism in Living Bacteria.** Ferrari A, Penate-Medina T, Haj Mohamad F, Anikeeva M, Pravdivtsev AN, Peters JP, Hövener JB. SBMI Rad. UKSH, Kiel, Germany
- 4. Therapeutic Response Assessment to IDH Inhibitor Treatment using Hyperpolarized $[5-^{12}\text{C}-1-^{13}\text{C}]\alpha$ -ketoglutarate MRSI in Rat Models of Low-grade Glioma.** Hong D (1), Kim Y (1), Mushti C (2), Minami N (1), Wu J (2), Cherukuri MK (2), Swenson RE (3), Vigneron DB (1), and Ronen SM (1,4). (1) Department of Radiology and Biomedical Imaging, UCSF(2) National Cancer Institute, NIH (3) National Heart, Lung, and Blood Institute, NIH (4) Brain Tumor Research Center, UCSF
- 5. Metabolic Impact of Diabetes on the Pathogenesis of Alzheimer's Disease.** Jue T (1),Graham J (2), Rehman U (1), Datta K(5), Liu SC (5), Chen Q (3), Borowsky A (3), Berman R (4), Spielman D (5). (1) Biochemistry and Molecular Biochemistry (2) Nutrition (3) Center for Genomic Pathology Laboratory (4) Neurology University of California Davis (5) Radiology, Stanford University
- 6. Hyperpolarized C-13 to Assess Brain Metabolism in AD Rats.** Keshav D (1). (1) Stanford University
- 7. Hyperpolarized $[1-^{13}\text{C}]$ Pyruvate Instrumentation and processing solutions for multiparametric, Cardiac MRI-based Longitudinal Investigations.** Khashami F (1)(2), Dimitrov IE (2)(3), Fuetterer M (4), Kozerke S (4), Buchanan E (2), Harrison CE (2), Huynh M (2), Afzal A (1), Lowrance D (2), Zhang B (2), Park JM (2), Kovacs Z (2), Malloy. CR (1)(2)(5), Henning A (2), Zaha VG (1)(2)(5). (1) Department of Internal Medicine, University of Texas Southwestern Medical Center (2) Advanced Imaging Research Center, University of Texas Southwestern Medical Center, Dallas, Texas, USA (3) Philips Healthcare (4) Institute for Biomedical Engineering, University and ETH Zurich (5) Dallas VA Medical Center (6) Harold C. Simmons Comprehensive Cancer Center
- 8. Co-Hyperpolarized $[^{13}\text{C}, ^{13}\text{N}_2]$ urea + $[1^{13}\text{C}]$ pyruvate for Perfusion and Metabolic Imaging of the Abdomen in Healthy Volunteers.** Kim Y (1),Chen HY (1), Nickles T (1), Gordon J (1), Larson PEZ (1), Liu X (1), Magat L (1), Lee P(1), Gebrezgiabhier D (1), von Morze C (2), Vigneron DB (1)(3), Ohliger M (1). (1) Department of Radiology and Biomedical Imaging, UCSF (2) Mallinckrodt Institute of Radiology, Washington University, St. Louis (3) Department of Neurological Surgery, UCSF
- 9. Metabolic Similarity of Prostate Cancer Patient-derived Xenografts Propagated in the Bone versus Liver.** Mali I (1), Upadhyay D (1), Agarwal S (1), Sun J (1), Bok RA (1), Aggarwal R (2), Peehl D (1), Kurhanewicz J (1), and Sriram R (1). Department of Radiology and Biomedical Imaging; Division of Hematology/Oncology, UCSF
- 10. Real-time Polarimetry of Hyperpolarized ^{13}C Nuclear Spins Using an Atomic Magnetometer.** Mouloudakis K (1), Bodenstedt S (1), Azagra M (2), Mitchell MW (1,3), Marco-Rius I (2), Tayler MCD (1). (1) Institute of Photonic Sciences, Barcelona Institute of Science & Technology (2) Bioengineering Institute of Catalonia, Barcelona Institute of Science & Technology (3) Catalan Center for Research & Advanced Study
- 11. Clinically Translatable Hyperpolarized ^{13}C Bicarbonate pH Imaging Method for Use in Prostate Cancer.** Mu C, Liu X, Kim Y, Riselli A, Korenchan DE, Bok RA, Delos Santos R, Sriram R, Qin H, Nguyen H, Gordon JW, Slater J, Larson PEZ, Vigneron DB, Kurhanewicz J, Wilson DW, and Flavell RR. Department of Radiology and Biomedical Imaging, UCSF
- 12. Data-constrained Determination of Applied Flip Angles to Improve Hyperpolarized ^{13}C MR Kinetic Modeling in the Presence of Large B_1 Variations Encountered in Abdominal Imaging.** Nickles T (1)(2), Kim Y(1), Lee PM (1)(2), Chen HY (1), Larson PEZ (1)(2), Wang ZJ (1)(2), Gordon JW (1)(2), Vigneron DB (1)(2), Ohliger MA (1). (1) Department of Radiology and Biomedical Imaging, UCSF (2) UC Berkeley-UCSF Bioengineering Program, UCSF

Posters

13. Increased Astrocytic Calcium via DREADDs Results in Altered Hyperpolarized 1-¹³C Pyruvate Signals in a Mouse Brain. Ono M (1), Saito K (1), Takakusagi Y (1), Nagai (2), Takado Y (1). (1) Institute for Quantum Life Science, Quantum Life and Medical Science Directorate, National Institutes for Quantum Science and Technology (2) Laboratory for Glia-Neuron Circuit Dynamics, RIKEN Center for Brain Science

14. Hyperpolarized 1-¹⁵N-Nicotinamide using Dissolution Dynamic Nuclear Polarization. Peters JP (1), Brahms A (2), Janicaud V (1,3), Anikeeva M (1), Peschke E (1), Ellermann F (1), Ferrari A (1), Hellmold D (4), Held-Feindt J (4), Kim N (5), Aden K (5,6), Meiser J (7), Herges R (2), Hövener JB (1), Pravdivtsev AN (1). (1) Section Biomedical Imaging, Molecular Imaging North Competence Center (MOIN CC), University Medical Center Kiel (2) Otto Diels Institute for Organic Chemistry, Kiel University (3) Universität zu Lübeck (4) Department of Neurosurgery, University Medical Center, Campus Kiel (5) Institute of Clinical Molecular Biology, Christian-Albrecht-University of Kiel (6) Department of Internal Medicine I, University Medical Center Schleswig-Holstein Campus Kiel (7) Cancer Metabolism Group, Department of Cancer Research, Luxembourg Institute of Health

15. Investigating the Compartmentalized Metabolism in a Mouse Brain through Co-polarized HP [1-¹³C]pyruvate and [1-¹³C]dehydroascorbate and MRSI: a Preliminary Study. Porcari P (1), Patel S (1), Berishaj M (1), Coffee E (1), Kim N (1), Keshari KR (1). (1) Department of Radiology, Memorial Sloan Kettering Cancer Center

16. Estimating T₂ Relaxation Rates of Lactate with Hyperpolarized C-13 MRI using bSSFP and Pharmacokinetic Modeling. Sahin S (1,2), Liu X (2), Dwork N (2), Tang S (3), Wang ZJ (2), Larson PEZ (1,2). (1) UC Berkeley-UCSF Graduate Program in Bioengineering, UCSF (2) Department of Radiology and Biomedical Imaging, UCSF(3) Heartvista Inc

17. Analysis of Growth Characteristics of Adenocarcinoma and Small Cell Neuroendocrine Prostate Cancer Patient Derived Xenograft Models. Sinha A (1), Agarwal S (1), Sun J (1), Decavel-Bueff E (1), Diaz E (1), Bok RA (1), Delos Santos R (1), Van Criekinge M (1), Aggarwal R (2), Vigneron DB (1), Peehl D (1), Kurhanewicz J (1). (1) Department of Radiology and Biomedical Imaging, UCSF (2) Division of Hematology/Oncology, Department of Medicine, UCSF

18. Quantification of Abnormal Metabolism in Hypertrophic Cardiomyopathy Patients Using Hyperpolarized [1-¹³C]-Pyruvate MRI. Sinha A (1), Liu X (1), Tang S (1,2,3), Dwork N (1,4), Sivalokanathan S (5), Liu J (1), Bok R (1), Ordovas KG (6), Slater J (1), Gordon JW. (1), Abraham RM (7), and Larson PEZ (1,2). (1) Radiology and Biomedical Imaging, UCSF(2) UC Berkeley-UCSF Graduate Program in Bioengineering, University of California, Berkeley (3) HeartVista, Palo Alto (4) Departments of Bioinformatics and Radiology, University of Colorado School of Medicine (5) University of Pennsylvania (6) University of Washington, Seattle (7) Department of Medicine – Cardiology Division, UCSF

19. Production of Filled Pharmacy Kits and Terminal Sterilization For Human Studies. Slater JB, Gordon JW, van Criekinge M, Dang D, Escobar E, Danner S, Kurhanewicz J, Nelson S, Vigneron DB. Departments of Radiology and Biomedical Imaging & Clinical Pharmacy, UCSF

20. ¹³C NMR Quantification of Polyamine Syntheses in Rat Prostate. Vandergrift LA (1)*, Wang N (1,2)*, Zhu M (1)*, Li B(1), Chen S (1), Habel P (3), Nowak J (4), Mason R (5), Grant A (6), Wang Y (7), Malloy C (5), Cheng LL (1). (1) Massachusetts General Hospital and Harvard Medical School (2) The First Affiliated Hospital of Guangzhou University of Chinese Medicine (3) Charite - Universitätsmedizin Berlin (4) SRH Poliklinik Gera GmbH, Radiology Gotha (5) UT Southwestern Medical Center (6) Beth Israel Deaconess Medical Center and Harvard Medical School (7) Nanjing University

21. Characterization of [6,6'-²H₂] Fructose as a Novel Deuterium Metabolic Imaging Probe in Liver Cancer: a Comparative Study with Hyperpolarized U-2H-[2-¹³C]-fructose. Zhang G (1,2), Cullen Q (1,2,3), Berishaj M (1,2), Deh K (1,2), Kim N (1,2), Keshari KR (1,2,3). (1) Department of Radiology, Memorial Sloan Kettering Cancer Center (2) Molecular Pharmacology Program, Memorial Sloan Kettering Cancer Center (3) Weill Cornell Graduate School

University of California, San Francisco Mission Bay Campus 1700 4th St. (Cross Street 16th St.)



Location: The HMTRC Workshop will be held on Thursday, April 13 & Friday, April 14, 2023 on the UCSF Mission Bay Campus starting in the Genentech Hall Auditorium. Your name badge and workshop program will be available for pick up at the registration counter located outside the Genentech Hall Auditorium.

Registration desk is located in the East Corridor of Genentech Hall entrance, outside the Auditorium on the 1st Floor.