MCURRICULUM VITAE

NAME: GRAEME FINLAY MASON
TITLE: Professor
Birth date: March 16, 1963
Birth place: Glasgow, Scotland
Citizenship: U.S.A.

EDUCATION

Institution	Degree	Year	Field of Study
Yale University New Haven, CT	Ph.D.	1991	Molecular Biophysics &Biochemistry
The Pennsylvania State University State College, PA	B.S. Minor	1986	Nuclear Engineering with Honors Spanish

RESEARCH AND PROFESSIONAL EXPERIENCE

2012-Present Professor, Yale University School of Medicine, Departments of Radiology & Biomedical Imaging and Psychiatry, Biomedical Engineering (2019-present)
2023-Present Coordinator of YCCI/MRRC Joint Outpatient Bed unit
2006-2012 Associate Professor, Yale University School of Medicine, Departments of Diagnostic Radiology and Psychiatry, Division of Bioimaging Sciences
2003-2006 Associate Professor, Yale University School of Medicine, Departments of Psychiatry and Diagnostic Radiology, Division of Bioimaging Sciences
2002-Present Director of Metabolic Modeling, Director of Psychiatric MRS, Yale Magnetic Resonance Research Center, Yale University, School of Medicine
2006-Present Director, Neuroimaging Sciences Training Program, Yale University
1997-2003 Assistant Professor, Yale University School of Medicine, Dept. of Psychiatry
Director of the Psychiatric Magnetic Resonance Spectroscopy
Joint Appointment, Department of Bioimaging Sciences Program
New Haven, CT
1995-1997 Assistant Professor, University of Alabama at Birmingham, Dept. of Medicine, Div. of Cardiovascular Disease, Center for Nuclear Imaging Research, Birmingham, AL (joint appointment with Biomedical Engineering, 1997)
1994-1995 Instructor, University of Alabama at Birmingham, Dept. of Medicine
1993-1994 Postdoctoral Fellow, University of Alabama at Birmingham, Dept. of Medicine, Center for Nuclear Imaging Research, Birmingham, AL
Mentor: Dr. Hoby P. Hetherington
1991-1993 Postdoctoral Research Associate in the laboratory of Professor Robert G. Shulman
Department of Molecular Biophysics & Biochemistry, Yale University, New Haven, CT
1986-1991 Graduate Study, Department of Molecular Biophysics & Biochemistry
Yale University, New Haven, CT
Ph.D. Thesis Research Topic: Nuclear magnetic resonance studies of cerebral glucose transport and metabolism *in vivo*
Thesis Advisor: Professor Robert G. Shulman
1986 (summer) Research Assistant in Nuclear Magnetic Resonance, Hershey Medical Center
Supervisor: Dr. Richard Briggs
1985 and Co-op Engineer at Boiling Water Nuclear Reactor
1984 (summer) Susquehanna Steam Electric Station; Plant Engineering and Technical Compliance Groups; Pennsylvania Power & Light Company

HONORS

1986-1991 NIH Graduate Fellowship
1986 National Science Foundation Fellowship Honorable Mention
1984-1986 Institute of Nuclear Power Operations (INPO) Scholarship

1984-1986 John White Scholarship for Excellence in Spanish
1991 & 1992 Student Travel Awards, Society of Magnetic Resonance in Medicine
1997 Invited to Chair Session on ^{13}C Magnetic Resonance Spectroscopy at *Brain Energy Metabolism* satellite meeting to Society of Neurochemistry, Waterville Valley, NH
1998-2000 Stanley Foundation Young Investigator Award
2000-2002 NARSAD Young Investigator Award
2000 Honorable Mention – alternate for Memorial Travel Award for American College of Neuropsychopharmacology
2002-2004 NARSAD Young Investigator Award
2002 American College of Neuropsychopharmacology Memorial Travel Award
2003,2004 Editor's Recognition Award for Reviewing with Special Distinction, *Radiology*
2015 Elected Senior Fellow, *International Society of Magnetic Resonance in Medicine*
2015 Promoted to Fellow, *American College of Neuropsychopharmacology*
2007,2011, 2012,2014,2015, 2016,2017,2019, 2020 Editor's Recognition Award for Reviewing, *Biological Psychiatry*, Top 10 reviewers.
2018 Inducted into the Academy Distinguished Investigator Council of the Academy for Radiology & Biomedical Imaging Research
2022 Editor's Recognition Award for Reviewing, *Neuropsychopharmacology*, Top 10 reviewers.
2023 Top Reviewer for *Neuropsychopharmacology*
2024 Inducted into the Muncy High School Academic Hall of Fame

TEACHING

2026-present Teaching Peer Review module in the In-Person Faculty Responsible Conduct of Research Course, taught 1-2x/month through the year.
2023-present Created the course, *Establishing a Thriving Research Program*, and teach together with Rajita Sinha at the Office of Physician-Scientist Development, Yale School of Medicine. This course, offered twice each year, teaches postdoctoral trainees and junior faculty on practicalities of starting and running a research laboratory.
2022-2024 Co-organizer of Yale Conference for Alcohol Research & Education offered annually in the fall.
2022 Yale Janeway Society Lecture, joint with Todd Constable, "Practicalities of Getting Your First Funding and How to Write Your First R01", February 4, 2022.
2021 Yale Center for Clinical Investigation's Lecture, joint with Rajita Sinha, "How to run a research lab", July 19, 2021
2021 Organized the course, *Basic Statistical Methods in Psychiatry*, a 5-session course taught by Ralitza Gueorguieva over 5 weeks, for Radiology and Psychiatry faculty, fellows, postdocs, students, and staff. Over 150 registrants.
2001-present Created, organized, and team-taught *Physics of Magnetic Resonance* (Now listed as Yale Engineering and Applied Sciences 825). The lecture notes take advantage of the electronic media by using computer animations of dynamic processes such as radiofrequency pulse effects and isotopic tracer behavior during kinetic metabolic experiments.
2019 Created and organized *Establishing a Thriving Research Program,* a 4-day intensive course for postdocs and junior faculty on practical aspects of establishing and managing a lab. offered to postdoctoral trainees and junior faculty on how to run a research laboratory. The course covers management of personnel, finances, grants issues, negotiations for startup packages, and dissemination of ideas and results.
2009 Ph.D. Thesis Committee, Jie Wang, Lanzhou University (May 3)
1997-2000 Organized Psychiatric Biochemistry Seminar, a weekly meeting designed (1) to foster contacts and collaborations between the Yale Department of Psychiatry and laboratories equipped with particular expertise to study brain chemistry (2) to educate technique-based investigators and biochemists about current questions in psychiatry, and (3) to educate Psychiatry-based investigators about the abilities and limitations of investigative methods, particularly magnetic resonance spectroscopy and imaging. The series consists of members of Yale Psychiatry and members of collaborative or potentially collaborative laboratories.

1997-2002 Organized the Neuroimaging Sciences Training Program Lecture Series, a bi-weekly series designed to educate fellows in the Yale Psychiatry's Neuroimaging Sciences Program in a variety of neuroimaging techniques, focusing when possible on multi-modality imaging. Speakers external to Yale were invited and hosted by members of Psychiatry, the Magnetic Resonance Center, and the Child Study Center. The speakers are asked to include in both didactic and research components in their Presentations.

PROFESSIONAL ACTIVITIES

Member, American College of Neuropsychopharmacology, Research Society on Alcohol, Society of Biological Psychiatry; International Society of Magnetic Resonance in Medicine; International Drug and Alcohol Research Society; Tau Beta Pi engineering national honor society; Alpha Nu Sigma nuclear engineering honor society (affil. American Nuclear Society)

Research Society on Alcohol: Program Committee (2006-2008), Research Priorities Committee (2008), Education Committee member (2011-2022), Chair of Gordis Awards subcommittee of Education Committee (2014-2018), Vice-Chair Education Committee (2017-2018), Chair Education Committee (2018-2020), Past-Chair Education Committee (2020-2022). (2020 - ongoing) Developed two video libraries for the *Research Society on Alcoholism*, one of long videos for alcohol researchers, the other of shorter introductory videos for recent entrants to the field of alcohol research, to teach about the full field of alcohol research, physiology, health disparities, public policy, treatments, and more. Board of Directors (2023-2027). Program Planning Committee (2025-2026).

Editorial Board of *Biological Psychiatry*, 2002-present

Editorial Board Member of *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, 2015-present

Field Editor, *Alcohol: Experimental and Clinical Research*, 2016-present

Editorial Board Member of *Neuropsychopharmacology*, 2018-present

Reviewer for *Alcoholism: Clinical and Experimental Research, American Journal of Physiology, Alcohol and Alcoholism, Annals of Biomedical Engineering, Archives of General Psychiatry, Biological Psychiatry, Bipolar Disorders, Biotechnology Progress, Brain, Brain Research, Cerebral Cortex, Drug and Alcohol Dependence, Epilepsia, International Journal of Imaging Systems and Technology, Journal of Applied Physiology, Journal of Alzheimer's Disease, Journal of Biological Chemistry*, *Journal of Cerebral Blood Flow & Metabolism*, *Journal of Clinical Investigation, Journal of Engineering in Medicine*, *Journal of Magnetic Resonance, Journal of Neurochemistry*, *Journal of Neuroscience*, *Journal of Neuroscience Methods*, *Journal of Psychiatry & Neuroscience*, *Magnetic Resonance Imaging*, *Magnetic Resonance in Medicine, Medical Image Analysis, Neuropsychopharmacology, Neuroscience Letters*, *Neuroscience Research, NMR in Biomedicine, Proceedings of the National Academy of Sciences USA, Psychiatry Research: Neuroimaging*, *Psychological Medicine*, *Psychopharmacology*, *Radiology, Schizophrenia Bulletin*

Member Neurotoxicity and Alcoholism (NAL) Study Section for NIH/NIAAA 2012; Member Neuropathology of Addiction and Sleep Disorders (NPAS) Study Section for NIH/CSR 2014-2016; Ad hoc grant reviewer for other NIH Review Sections; Alberta Heritage Foundation for Medical Research; Austrian Science Foundation; Center for Medicinal Cannabis Research; Children's Hospital of Michigan – Wayne State University; Chronic Fatigue and Immune Dysfunction Syndrome Foundation; HIV Neurobehavioral Research Center; Idaho State Board of Education; South Carolina EPSCoR Program; U.S.-Israel Binational Science Foundation; Gutenberg Chair Program, Strasbourg 2018; Clinical Translational Science Awards (NIH CTSA) 2013, 2017, 2018

Member Neuroscience & Behavior Study Section AA-4 for NIH/NIAAA, 2017-2023

Member Scientific Advisory Board for the Chronic Fatigue and Immune Dysfunction Syndrome (CFIDS) Association of America (2005-2009)

July 23, 1997 *Brain Energy Metabolism* satellite to *Neuroscience* meeting. Organized and chaired discussion session entitled "Metabolic Modeling of ^{13}C Labeling".

May 5, 2001 Organized and chaired the symposium "Cortical GABA in Disease and Function" at the annual meeting of the *Society of Biological Psychiatry*, New Orleans, LA.

Dec 12, 2001 Organizer and chair of study group entitled, "Use of the 13C-Labeled Tracers in MRS to Characterize Neuron-Glia Interactions in Glutamatergic and GABAergic Neurotransmission:

	Psychiatric Applications", at the annual meeting of the *American College of Neuropsychopharmacology* (Waikoloa, Hawaii).
2001-2003	Conceived and organized Psychiatric Magnetic Resonance Study Group under the International Society of Magnetic Resonance in Medicine (ISMRM).
2003-2005	Chair of Psychiatric MR Study Group of the ISMRM
2005-2006	Past Chair of Psychiatric MR Study Group of the ISMRM
2003-2005	Member of the Study Group Review Committee, ISMRM
2002-2003	Member, organizing committee for the Symposium on Neuroimaging in Alcoholism, Jan 12-14, 2003, New Haven, CT, in collaboration with the Yale Center for Translational Neuroscience in Alcoholism.
2004-2008	Member, Education Committee of Center for Translational Neuroscience in Alcoholism
2004-2005	Co-Chair, organizing committee for the ISMRM Workshop on Magnetic Resonance Spectroscopy for Neuropsychiatric Disorders, October 14-17, 2005, Banff, Alberta, Canada
2006	External Examiner for Ph.D. defense of Atiyah Yayha, in the laboratory of Peter Allen, Ph.D., of the University of Alberta, Department of Biomedical Engineering
2005-2008	Chair, organizing committee for the ISMRM Workshop on Magnetic Resonance Imaging and Spectroscopy for Neuropsychiatric Disorders, November 7-10, 2008, Quebec, Canada
2007-2008	Member, organizing committee for the Symposium on Neuroimaging in Alcoholism, Jan 12-14, 2008, New Haven, CT, in collaboration with the Yale Center for Translational Neuroscience in Alcoholism.
2007-2008	Ad-Hoc Presidential Appointee to Study Group Review Committee, ISMRM
2007	Chair and Organizer, Panel entitled "Smoking and GABA: an Avenue to Quit?", *American College of Neuropsychopharmacology*, Boca Raton, Florida
2008	Co-chair of Educational Series, *Espectroscopia por Ressonância Magnética*, *Congresso IBRO/LARC de Neurociências da América Latina, Caribe, e Península Ibérica*, Sept 1-4, Búzios, Brazil
2009	Member, review group for ISMRM poster awards for Psychiatric MR Study Group
2009	Chair, Panel entitled "Efectos Neuroquímicos de Étanol y Nicotina", *16º Congreso Internacional de Psiquiatría*, Buenos Aires, Argentina
2011-2014	Member, Program Committee for the 2012 and 2013 annual meetings of the Society of Biological Psychiatry
2012-2014	Chair-Elect, then Chair Psychiatric MR Imaging and Spectroscopy Study Group, ISMRM
2012	Organized and chaired the symposium "Quantitative fMRI in neuropsychiatry - the importance of BOLD change" at the annual meeting of the *Society of Biological Psychiatry*, Philadelphia, Pennsylvania, May 3
2013	Co-Chair, organizing committee for the ISMRM Workshop on Magnetic Resonance Imaging and Spectroscopy for Neuropsychiatric Disorders, September 7-10, 2013, Lisbon, Portugal
2019	Co-Chair and organizer of Symposium at Research Society on Alcoholism, *Alcohol Metabolism and the role of Ketone Bodies to Alleviate Symptoms of Alcohol Withdrawal*
2014-2019	Member, Scientific Advisory Board for Alcohol Center, Medical University of South Carolina
2016-2020	Member, Education Committee, American College of Neuropsychopharmacology
2017-present	Member, Scientific Advisory Board for *Drug Abuse and Brain Imaging Training Program (DABITP)*, McLean Hospital, Boston, MA
2020-present	Organized, Recorded RSA Lecture Series (professional and public formats) on Alcohol for the Research Society on Alcoholism
2019-present	Member, Internal Advisory Board, University of Pennsylvania/Yale PET Addiction Center of Excellence (PACE)
2021	Organizer, Chair of symposium *How to Tell Your Story: Strategies for Trainees*, *Research Society on Alcoholism*, June 21
2023-2024	Communications manager for Yale Forum of Jewish Faculty and Friends
2024	Gordon Research Conference on Alcohol, Feb 11-16. Discussion Leader for *Cellular, Molecular and System Level Effects of Alcohol*, Galveston, TX
2024-	Member, Scientific Advisory Board for Alcohol Center, Medical University of South Carolina
2024-	Member, External Program Advisory Committee for Portland Alcohol Research Center, Oregon Health & Science University

2024 Organizer and Chair, Symposium, *Spirited Aging: What's new with alcohol and brain fluids?* Dec 10, Phoenix, Arizona.
2024-present Member Executive Committee for Yale Jewish Academics & Friends
2026 Reviewed for Bioimaging Sciences Internal Grant Review panel
2026-2027 Member, National Advisory Council on Alcohol Abuse and Alcoholism

DEPARTMENTAL, MEDICAL SCHOOL, AND UNIVERSITY COMMITTEES

Yale Human Investigation Committee (IRB) (member 2000-2004, consultant 2004-present)
2005-present Founder and Chair, Magnetic Resonance Research Center (MRRC) Protocol Review Committee
2026-2028 Member Term Appointments and Promotions Committee, Yale School of Medicine
2024-present Member Bioimaging Sciences Bridge Funding Committee

LANGUAGES

Fluent in English, Spanish, and Portuguese; functional in French

RESEARCH INTERESTS

1. ^{13}C and ^{2}H isotopic labeling studies of brain metabolism.

Since 1988, I have been developing experimental models and methods for studies of brain metabolism using ^{13}C NMR in conjunction with ^{13}C isotopic labeling *in vivo*. The work began during my graduate studies at Yale, with the experimental determination of brain glucose transport kinetics and substrate competition for oxidative brain metabolism in a rat model. The work continued through my training at the University of Alabama at Birmingham, where I guided the group's ^{13}C-labeling studies of the human brain *in vivo* in the 4.1T whole-body MR system. I continue studies of the metabolism and neurotransmission in the human and animal brain *in vivo*, studying healthy subjects and patients with neuropsychiatric disorders to investigate relationships among GABA, glutamate, and glutamine concentrations and their rates of synthesis and release in the brain.

2. Mathematical modeling analysis of biochemical pathways.

My major research interest has been the development and application of mathematical models for the determination of rates of metabolism and enzyme kinetics from ^{13}C NMR isotopic labeling experiments. The approach I have taken has been to integrate the modeling development into the design of experimental protocols by determination of the sensitivities of the calculated rates to the measured and assumed parameters of the system. The sensitivities are used to determine which parameters are critical to control or measure in particular experiments to obtain accurate results.

With the continuing development of improved NMR methods for isotopic analysis, I am extending the modeling through inclusion of additional pathways, as well as developing models for other metabolic systems, including liver, tumor cells, skeletal muscle, and pancreatic islet preparations. In addition, I plan to integrate the kinetic information with metabolic control analysis of the pathways for quantitative evaluation of metabolic regulation *in vivo*.

3. Neurotransmission in psychiatric diseases.

I develop and apply MRI and MRS methods together with mathematical analyses to understand the chemical bases of psychiatric disorders. My current focus is on alcoholism and its effects on brain metabolism and behavior.

A common path to understanding a system is to perturb it and measure its responses. Psychiatric disorders provide cases of perturbed brain function and chemistry that can be studied by MRS to provide quantitative input for the mathematical understanding of the regulation of brain metabolism. Another approach is to use pharmacologic challenges of brain metabolism and function with substances such as alcohol, simultaneously obtaining information that may be of use in understanding abuse and addiction to these substances.

GRANTS (P.I.)

Completed

1. **Intermediary Metabolism in Alzheimer's Disease**.
   Source: Pilot grant from the Alzheimer's Disease Center,
   University of Alabama at Birmingham
   Effective dates: 7/1/94-6/30/95
   Role: P.I.
   Total Amount: $20,000

2. **NMR Studies of GABA Metabolism and Regulation in vivo**
   Source: NIH/Yale University (KL Behar, P.I./G.F. Mason, P.I. at UAB)
   Effective dates: 4/1/96-9/13/97
   Role: Local P.I.
   Amount of Salary: 10%

3. **Clinical NMR Studies at 4.1T - A Research Resource**
   Source: NIH (HP Hetherington, P.D.) 1-P41-RR11811-01
   Effective dates: 3/01/97-2/29/00 (discontinued 9/13/97 due to move to Yale)
   Role: P.I. of Core V (Modeling and Experiment Design)
   Total Direct: $245,144
   Total Indirect: $107,863
   Total Cost: $353,007
   Amount of Salary: 44%

4. **Mechanism of the Reduction of Cortical GABA in Unipolar Depression and Bipolar Disorder**
   Source: The Stanley Foundation
   Effective dates: 7/1/98-6/30/00
   Role: P.I.
   Total Costs: $149,000
   Amount of Salary: 20%

5. **Mental Health Clinical Research Center**
   Source: NIH/NIMH
   Effective dates: 10/01/93 - 9/30/98
   Role: P.I. of MR Spectroscopy Core
   Total Costs: $120,000
   Amount of salary: 20%

6. **Cortical GABA in Unipolar and Bipolar Depression**
   Source: NARSAD Young Investigator Award
   Effective dates: 7/1/00 – 6/30/02
   Role: P.I.
   Total Costs: $60,000
   Amount of salary: 20%

7. **Thalamocortical Glutamatergic Function: Relationship to GABA Deficits in Depressed Patients**
   Source: NARSAD
   Effective dates: 7/1/02 – 6/30/05
   Role: P.I.
   Total Costs: $60,000

8. **Nicotine Effects on Human Cortical Glutamate and GABA**
   Source: CENTURY (Yale Nicotine Center Pilot Project)
   Effective dates: 9/30/03-8/31/05
   Role: P.I.

Total Costs: $25,000

9. **^{13}C MRS Studies of Prefrontal Cortical Glutamate Release (Project 3 of NIAAA Center)**
   Source: National Institutes of Health (NIAAA)
   Effective dates: 6/1/01 – 5/31/06
   Role: P.I. of Project 3
   Total Costs: $500,000 for Project 3

10. **Development of Non-Occipital, Multi-Volume GABA MRS at 4 Tesla**
    Source: Pfizer, Inc. (Graeme Mason)
    Effective dates: 1/1/05-12/31/06
    Role: P.I.
    Total Costs: $376,000

11. **Recovery of Cortical GABA Systems with Sobriety: a Multimodality Study: Alcoholism Research Center**
    Source: VA Healthcare Systems
    Effective dates: 1/1/00 – 12/31/05
    Role: P.I., Magnetic Resonance Imaging Division
    Total Costs: $1,600,000

12. **Quantitative MR Imaging and Spectroscopy in Alcoholism (**NIAAA 1K02AA13430)
    Source: National Institutes of Health (NIAAA)
    Effective dates: 5/1/02 – 10/31/07
    Role: P.I.
    Total Costs: $ 510,854

13. **Brain MRS of Healthy Subjects Family History Positive and Negative for Alcoholism**
    Source: National Institutes of Health (NIAAA), pilot project in CTNA-2 (Center for Translational Neuroscience of Alcoholism)
    Effective dates: 6/1/06 – 5/31/08
    Role: P.I. of project (J. Krystal PI of Center)
    Total Costs: $ 50,000

14. **Neurotransmitter Function, Psychiatric Disorders, & MRS** (NIMH R13 MH080581)
    Source: National Institutes of Health (NIMH)
    Effective dates: 9/1/07-3/15/09
    Role: P.I.
    Total Costs: $15,000

15. **Imaging Nicotinic & GABAergic Markers in Tobacco Smokers** (NIAAA P50-AA1532)
    Source: National Institutes of Health, Project 2 of the Yale Transdisciplinary Tobacco Use Research Center (TTURC)
    Effective dates: 1/1/05-12/31/10
    Role: co-P.I.
    Total Costs: $1,051,099

16. **GABA and Glutamate Impact of Genetic Vulnerability to Alcoholism**
    Source: Dana Foundation
    Effective dates; 9/1/05-8/31/10
    Role: P.I.
    Total Costs: $100,000

17. **Role of Acetate in Heavy Drinking** (NIAAA R21 AA018210)
    Source: National Institutes of Health (NIAAA)

Effective dates: 4/15/09-4/14/12
Role: P.I.
Total Costs: $742,500

18. **Ethanol as Fuel for the Brain in Rats** (NIAAA R21 AA019803)
Source: National Institutes of Health (NIAAA)
Effective dates: 7/10/10-6/30/13
Role: P.I.
Total Costs: $439,405

19. **GABA Effects of Nicotine in Men and Women** (NIDA R01 DA021785)
Source: National Institutes of Health (NIDA)
Effective dates: 1/15/09-11/30/13
Role: P.I.
Total Costs: $1,856,250

20. **Neuroimaging Sciences Training Program** (NIDA T32 DA022975)
Source: National Institutes of Health (NIDA)
Effective dates: 7/1/07 – 6/30/13
Role: P.I.
Total Costs: $1,214,000

21. **Neuroimaging Sciences Training Program** (NIDA T32 DA022975)
Source: National Institutes of Health (NIDA)
Effective dates: 7/1/14 – 6/30/19
Role: P.I.
Total Costs: $1,286,017

22. **Brain Acetate and Ethanol Metabolism in Alcohol Dependence and Abuse** (R01 AA021984)
Source: National Institutes of Health (NIAAA)
Effective dates: 7/15/13-6/30/19
Role: P.I.
Total Costs: $2,747,021

23. **Neuroimaging Sciences Training Program** (NIDA T32 DA022975)
Source: National Institutes of Health (NIDA)
Effective dates: 7/1/19 – 6/30/24
Role: P.I.
Total Costs: $1,853,358

24. **Relationship of Brain Ethanol Oxidation with Behavior** (R21 AA028628)
Source: National Institutes of Health (NIAAA)
Effective dates: 9/1/20-6/30/22
Role: P.I.
Total Costs: $453,750

25. **Comprehensive, Cross-Platform Validated 13C Flux Measures of Intra- and Inter Tissue Metabolism** (R01 DK108283) (co-PI with R. Kibbey)
Source: National Institutes of Health (NIDDK)
Effective dates: 7/1/16-6/30/20
Role: P.I. (Co-P.I. with R. Kibbey)
Total Costs: $2,601,880

Active

1. **Chronic Alcohol, Dementia, and CNS Fluid Homeostasis** (R01AA030183)

Source: National Institutes of Health (NIAAA)
Effective dates: 9/1/2022 - 8/31/2027
Role: P.I. (co-P.I. with H. Benveniste)
Total Costs: $2,456,527

2. **Drinking, Brain Acetate, and Stress** (R01 AA031401)
   Source: National Institutes of Health (NIAAA)
   Effective dates: 3/15/2024 - 1/31//2029
   Role: P.I.
   Total Costs: $3,409,550

3. **Neuroimaging Sciences Training Program** (T32 DA022975)
   Source: National Institutes of Health (NIDA)
   Effective dates: 7/1/24 – 6/30/29
   Role: P.I.
   Total Costs: $3,209,874

4. **Neurochemical Effects of Acute Ethanol, via ECLIPSE & a novel MRI-compatible breathalyzer**
   Source: Yale Biomedical Imaging Institute
   Role: P.I.
   Total Costs: $29,695

PATENTS

Techniques of mass spectrometry for isotopomer analysis and related systems and methods (2020) US Patent 10,770,276) Richard Kibbey, Tiago Cardoso Alves, **Graeme F. Mason**

PUBLICATIONS

1. **Mason GF**, Rothman DL, Behar KL, Shulman RG (1992) NMR determination of TCA cycle rate and α-ketoglutarate/glutamate exchange rate in rat brain. *J Cereb Blood Flow Metab* 12: 434-447
2. **Mason GF**, Behar KL, Rothman DL, Shulman RG (1992) NMR determination of intracerebral glucose concentration and transport kinetics in rat brain in vivo. *J Cereb Blood Flow Metab* 12: 448-455
3. Gruetter R, Novotny EJ, Boulware SD, Rothman DL, **Mason GF**, Shulman GI, Shulman RG, Tamborlane WV (1992) Direct measurement of brain glucose concentrations in humans by ^{13}C NMR spectroscopy. *Proc Natl Acad Sci USA* 89: 9603-9606 PMCID: PMC48395
4. Rothman DL, Novotny EJ, Shulman GI, Howseman AM, Petroff OAC, **Mason GF**, Nixon T, Hanstock CC, Prichard JW, Shulman RG (1992) ^{1}H-[^{13}C] NMR measurements of [4-^{13}C]-glutamate turnover in human brain. *Proc Natl Acad Sci USA* 89: 9603-9606
5. **Mason GF**, Behar KL, Martin MA, Shulman RG (1993) Rat brain glucose concentration and transport kinetics determined with ^{13}C nuclear magnetic resonance spectroscopy, in *Frontiers in Cerebral Vascular Biology: Transport and its Regulation*, Plenum Press, New York (ed. Drewes LR and Betz AL), 331: 29-34
6. Gruetter R, Novotny EJ, Boulware SD, Rothman DL, **Mason GF**, Shulman GI, Tamborlane WV, Shulman RG (1993) Non-invasive measurements of the cerebral steady-state glucose concentration and transport in humans by ^{13}C nuclear magnetic resonance, in *Advances in Experimental Medicine and Biology*, Plenum Press, New York (ed., Drewes LR and Betz AL), 331: 35-40
7. Price TB, Taylor R, Shulman GI, **Mason GF**, Rothman DL, Shulman RG (1994) Turnover of human muscle glycogen during low intensity exercise. *Med Sci Sports and Exercise* 26: 983-991
8. Hetherington H, Pan JW, **Mason GF**, Ponder SL, Twieg DB, Deutsch G, Mountz J, Pohost GM (1994) 2D spectroscopic imaging of the human brain at 4.1T. *Magn Reson Med* 32: 530-534
9. Hetherington HP, **Mason GF**, Pan JW, Ponder SL, Vaughan JT, Twieg DB, Pohost GM (1994) Evaluation of cerebral gray and white matter metabolite differences by spectroscopic imaging at 4.1T. *Magn Reson Med* 32: 565-571
10. **Mason GF**, Pan JW, Ponder SL, Twieg DB, Pohost GM, Hetherington HP (1994) Detection of brain glutamate and glutamine in spectroscopic images at 4.1T. *Magn Reson Med* 32: 142-145
11. Gruetter R, Novotny EJ, Boulware SD, **Mason GF**, Rothman DL, Shulman GI, Prichard JW, Shulman RG (1994) Localized ^{13}C NMR spectroscopy in the human brain of amino acid labeling from [1-^{13}C]D-glucose. *J Neurochem* 63: 1377-1385
12. **Mason GF**, Gruetter R, Rothman DL, Behar KL, Shulman RG, Novotny EJ (1995) Simultaneous determination of the rates of the TCA cycle, glucose utilization, α-ketoglutarate/glutamate exchange, and glutamine synthesis in human brain by NMR. *J Cereb Blood Flow Metab* 15: 12-25
13. **Mason GF**, Pohost GM, Hetherington HP (1995) Numerically optimized experimental design for measurement of grey/white matter metabolite T_2 in high-resolution spectroscopic images of brain. *J Magn Reson, Series B* 107: 68-73
14. Hetherington H, Kuzniecky R, Pan J, **Mason G**, Morawetz R, Harris C, Faught E, Vaughan T, Pohost G (1995) ^{1}H NMR spectroscopic imaging of human temporal lobe epilepsy at 4.1 Tesla. *Ann Neurol* 38: 396-404
15. Hetherington HP, Pan JW, **Mason GF**, Adams D, Vaughn MJ, Twieg DB, Pohost GM (1996) Quantitative high-resolution spectroscopic imaging of human brain *in vivo* at 4.1T using image segmentation. *Magn Reson Med* 36: 21-29
16. Pan JW, **Mason GF**, Pohost GM, Hetherington HP (1996) Spectroscopic imaging of human cerebral glutamate by J-refocused spectroscopic imaging at 4.1T. *Magn Reson Med* 36: 7-12
17. Hyder F, Chase JR, Behar KL, **Mason GF**, Siddeek M, Rothman DL, Shulman RG (1996) Increased tricarboxylic acid cycle flux in rat brain during fore-paw stimulation detected by ^{1}H-[^{13}C] nuclear magnetic resonance spectroscopy. *Proc Natl Acad Sci USA* 93: 7612-7617 PMCID: PMC38794
18. Manor D, Rothman DL, **Mason GF**, Hyder F, Petroff OAC, Behar KL (1996) The rate of turnover of cortical GABA from [1-^{13}C]glucose is reduced in rats treated with the GABA-transaminase inhibitor vigabatrin (γ-vinyl GABA). *Neurochem Res* 21: 1031-1041
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BOOK CHAPTERS

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INVITED ORAL PRESENTATIONS

1. **Mason GF** (1992) ^{13}C NMR studies of brain metabolism *in vivo*. Center for Nuclear Imaging Research, Department of Medicine, University of Alabama at Birmingham, Birmingham, AL, Sept. 13

2. **Mason GF** (1995) Assessment of models and determination of metabolic rates with models for ^{13}C-labeling at 2.1 and 4.1T. *Proc Soc Magn Reson 3rd Annual Mtg* (August: Nice France)
3. **Mason GF** (1996) Understanding brain metabolism with ^{13}C labeling. Department of Biomedical Engineering, University of Alabama at Birmingham, Birmingham, AL, March 26
4. **Mason GF** (1997) Quantitative Magnetic Resonance Imaging and Spectroscopic Studies at 4.1T. Department of Psychiatry, Yale University School of Medicine, New Haven, CT, January 13
5. **Mason GF** (1997) Quantitative Magnetic Resonance Imaging and Spectroscopy at 4.1 T. Department of Anatomy and Neurobiology, University of Kentucky, Lexington, KY, January 22
6. **Mason GF** (1997) ^{13}C isotopic labeling studies of the brain. Course on "Cutting Edge Spectroscopy", *Intern Soc Magn Reson Med, 5th Mtg*, Vancouver, Canada, April 14
7. **Mason GF** (1998) [^{13}C]-MR Spectroscopy of Glutamate, Glutamine, and GABA Turnover: Implications for Psychiatry, *Society of Biological Psychiatry*, Toronto, Canada, May 28
8. **Mason GF**, Sibson N, Hyder F, Shen J, Behar K, Krystal J, Shulman R, Rothman D (1998) The relationship of amino acid neurotransmission, neuronal metabolism, and cerebral blood flow. *American College of Neuropsychopharmacology*, December 15, Croabas, Puerto Rico
9. **Mason GF** (2001) Methods of MRS and Neuropsychiatric Applications. In: Issues of fMRI in Psychiatry. *Brown University*, Hunter Psychology Laboratory, October 24, 2001
10. **Mason GF** (2001) Methods of 13C MRS Detection and Metabolic Modeling. *American College of Neuropsychopharmacology*, December, Kona, Hawaii
11. **Mason GF** (2002) MRS Methodology and Applications to Major Depressive Disorder. January 17, Indiana University and Purdue University, Department of Psychiatry
12. **Mason GF** (2003) Neuronal-Glial Interactions and Cellular Energetics. July 10th, Toronto, Canada, *International Society of Magnetic Resonance in Medicine*, Teaching Day
13. **Mason GF** (2003) Substrate Transport and Utilization by the Brain. July 12, Toronto, Canada, *International Society of Magnetic Resonance in Medicine, Dynamic Spectroscopy Study Group*
14. **Mason GF** (2004) Magnetic Resonance Spectroscopy: Methodology and Studies of Cortical GABA and Glutamate in Alcoholism and Nicotine Dependence. January 13, University of Connecticut Healthcare Center, Farmington, Connecticut, *General Clinical Research Center*
15. **Mason GF** (2004) Methodology of Magnetic Resonance Spectroscopy. January 17, New Haven, Connecticut, *International Conference on Applications of Neuroimaging to Alcoholism*
16. **Mason GF** (2004) Dynamic Measurements of Cortical GABA. May 15, Kyoto, Japan. *Psychiatry Study Group* of the *International Society of Magnetic Resonance in Medicine*
17. **Mason GF**, Behar KL, de Graaf RA, Patel AB, Sibson N, Shulman RG, Rothman DL (2004) Measuring cerebral energy and neurotransmitter metabolism in vivo with nuclear magnetic resonance. October 13. *Annual Meeting of the Biomedical Engineering Society*, abstract #421
18. **Mason GF** (2005) Psychiatric Applications of Magnetic Resonance Spectroscopy, May 7, Miami, Florida, *International Society of Magnetic Resonance in Medicine*
19. **Mason GF** (2005) MR Spectroscopic Studies of GABA and Glutamate in Psychiatry, August 22, Innsbruck, Austria, *International Society for Neurochemistry*, abstract #W3.C, p. 24 of the proceedings
20. **Mason GF** (2005) Metabolic Modeling and Experiment Design to Study Brain Metabolism. September 7, Cleveland, Ohio, *Case Western Reserve University Center for Modeling Integrated Metabolic Systems*
21. **Mason GF** (2005) GABA and Glutamate: Use in Neuropsychiatric Disorders, October 17, Banff, Alberta, Canada, *Neuropsychiatric Applications of MRS: Joint Educational Workshop of the Psychiatric MR and Dynamic Spectroscopy Study Groups*
22. **Mason GF** (2005) Studies of Neurotransmitters in Neuropsychiatric Disorders, November 4, Nashville, Tennessee, *Vanderbilt Brain Institute*
23. **Mason GF** (2006) MRS Studies of Neurotransmitter Metabolism, January 6, Edmonton, Alberta, Canada, *University of Alberta*
24. **Mason GF** (2007) Measurements of metabolic flow with multiple substrates, March 24, Louisville, Kentucky, University of Kentucky, *Second International Symposium on Metabolomics*
25. **Mason GF** (2007) Studies of brain glutamate and GABA with strategically selected labeling of isotopic substrates. Grand Rounds at University of Mississippi Medical Center, September 25, Jackson, Mississippi
26. **Mason GF** (2007) Effects of acute nicotine administration of brain GABA. *American College of Neuropsychopharmacology, Boca Raton, Florida*

27. **Mason GF** (2008) Influences of acute nicotine and ethanol administration on brain metabolism. *Second International Conference on Applications of Neuroimaging to Alcoholism*, January 19, New Haven, Connecticut
28. **Mason GF** (2008) Espectroscopia Cerebral por Ressonância Magnética: Métodos, Limitacões e Perspectivas, August 29, Departamento da Radiologia Diagnóstica por Imagem, Universidade Federal de São Paulo, SP, Brazil
29. **Mason GF** (2008) Espectroscopia nos Transtornos Psiquiátricos, August 29, Departamento da Psiquiatria, Universidade Federal de São Paulo, SP, Brazil
30. **Mason GF** (2008) Emprego da espectroscopia de ressonância magnética nuclear para determinação do GABA, glutamato e outros metabólitos no sistema nervoso central, September 2, *Congresso IBRO/LARC de Neurociências da América Latina, Caribe, e Península Ibérica*, Búzios, RJ, Brazil
31. **Mason GF** (2008) Variações do GABA e glutamato no córtex occipital de pacientes não alcoolistas durante infusão contínua de etanol, September 3, *Congresso IBRO/LARC de Neurociências da América Latina, Caribe, e Península Ibérica*, Búzios, RJ, Brazil.
32. **Mason GF** (2008) MRS Methodology for Studies of Alcoholism. *Joint INSERM-NIAAA Meeting*, October 3, Paris, France
33. **Mason GF** (2008) Basics of Cerebral Energetic and Amino Acid Neurotransmitter Metabolism, *ISMRM Workshop on MRS and Neurotransmitter Function in Neuropsychiatric Disorders*, in basic education session, November 7, Québec City, Québec.
34. **Mason GF** (2008) GABA and Glutamate in Neuropsychiatric Disorders, *ISMRM Workshop on MRS and Neurotransmitter Function in Neuropsychiatric Disorders*, plenary lecture, November 8, Québec City, Québec.
35. **Mason GF** (2008) Acute Administration of Nicotine and Ethanol: Effects on Neurochemistry. *ISMRM Workshop on MRS and Neurotransmitter Function in Neuropsychiatric Disorders*, substance abuse session, November 10, Québec City, Québec.
36. **Mason GF** (2009) Magnetic Resonance Spectroscopy Applied to Study Neurochemistry. May 3, Lanzhou University, Lanzhou, China.
37. **Mason GF** (2009) Neurochemical Effects of Acute Nicotine and Alcohol. May 4, Lanzhou University, Lanzhou, China
38. **Mason GF** (2009) Magnetic Resonance Spectroscopy and Neurotransmitters in Psychiatric Disorders. May 6, Wuhan, China
39. **Mason GF** (2009) Métodos de espectrsocopia por resonancia magnética para estudos de neuroquímica psiquiátrica: ventajas e limitaciones. September 8, *16º Congreso Internacional de Psiquiatria*, Buenos Aires, Argentina
40. **Mason GF** (2009) Efectos agudos glutamatérgicos e GABAergicos de nicotina e álcool en seres humanos. September 9, *16º Congreso Internacional de Psiquiatria*, Buenos Aires, Argentina
41. **Mason GF** (2009) Acute effects of nicotine and ethanol on brain metabolism. October 16, University of Cincinnati, Ohio
42. **Mason GF** (2010) Effects of ethanol on brain metabolism. January 18, *International Conference on Alcoholism,* Yale University, New Haven, Connecticut.
43. **Mason GF** (2010) MRS studies of metabolism in awake animals. March 15, *Symposium on Quantitative Neuroscience with Magnetic Resonance (QNMR)*. Yale University, New Haven, Connecticut
44. **Mason GF** (2010) Acute effects of nicotine and alcohol on amino acid neurotransmitters. March 17, *Behavioral Health Grand Rounds*, Waterbury Hospital, Waterbury, Connecticut
45. **Mason GF** (2010) Acetate transport and utilization in the Brain: characterization and ability to change. September 15, *International Society of Biomedical Research on Alcoholism (ISBRA)*, Paris, France
46. **Mason GF** (2011) Efeitos neuroquímicos do álcool e da nicotina observados *in vivo* com ressonância magnética. April 26, *Instituto de Ciências Humanas, Universidade Federal de Juiz de Fora*, Juiz de Fora, Brazil
47. **Mason GF** (2011) Compartmental analysis and sensitivities of kinetic carbon-13 labeling studies. August 29, *International Society of Neurochemistry*, Athens, Greece
48. **Mason GF** (2011) Espectroscopia por ressonância magnética: teoria e aplicação ao estudo dos efeitos cerebrais de étanol em dose aguda. November 4, *Congresso Brasileiro de Psiquiatria*, Rio de Janeiro, Brazil
49. **Mason GF** (2011) Efeitos agudos de étanol no cérebro investigados pela técnica de espectroscopia de ressonância nuclear, November 3, Universidade Federal de Rio Grande do Sul, Porto Alegre, Brazil

50. **Mason GF** (2011) Efeitos agudos de étanol no cérebro investigados pela técnica de espectroscopia de ressonância nuclear, November 3, Universidade Metodista de Porto Alegre, Porto Alegre, Brazil
51. **Mason GF** (2012) Alcohol, nicotine, and amino acid neurotransmitters, April 24th, *American Society of Neuroradiology*, New York
52. **Mason GF** (2013) Acute and Chronic Energetic Effects of Alcohol on the Brain, February 16, *3rd International Conference on Applications of Neuroimaging to Alcoholism*, Yale University, New Haven, Connecticut
53. **Mason GF** (2013) Ethanol, its Metabolism, and the Brain, March 5th, *Neuroscience Seminar*, McLean Hospital, Harvard University, Boston, Massachusetts
54. **Mason GF** (2013) Alcohol and the Brain: a Metabolic Perspective, June 23rd, in Symposium "Alcohol and Calories in Alcohol Use and Related Disorders" *Research Society on Alcoholism*, Orlando, Florida
55. **Mason GF** (2013) Metabolic Kinetics in Psychiatric Disease, September 10th, in workshop *Dynamic Imaging and Spectroscopy of Psychiatric Illness*, by Psychiatric MR Study Group in the *International Society of Magnetic Resonance in Medicine*, Lisbon, Portugal
56. **Mason GF** (2013) MR Spectroscopy and Imaging for Beginners – part 1/2, September 9th, in workshop *Dynamic Imaging and Spectroscopy of Psychiatric Illness*, by Psychiatric MR Study Group in the *International Society of Magnetic Resonance in Medicine*, Lisbon, Portugal
57. **Mason GF** (2013) MR Spectroscopy and Imaging for Beginners – part 2/2, September 10th, in workshop *Dynamic Imaging and Spectroscopy of Psychiatric Illness*, by Psychiatric MR Study Group in the *International Society of Magnetic Resonance in Medicine*, Lisbon, Portugal
58. **Mason GF** (2014) Measurement of Heterogeneous Metabolism by ^{13}C Magnetic Resonance Spectroscopy: Practicalities and Strategies. July 27, in *Stable Isotope Resolved Metabolomics Symposium*, University of Kentucky, Lexington, KY
59. **Mason GF** (2014) Alcohol and Brain Metabolism. November 6th. *Addiction Neuroscience Seminar*, Medical University of South Carolina, Charleston, SC
60. **Mason GF** (2015) Brain Oxidation of Ethanol and Acetate: Influence of Chronic Alcohol Exposure. April 14. Indiana University – Purdue University Indianapolis.
61. **Mason GF** (2015) ^{13}C MRS Studies of Brain Metabolism of Alcohol and Acetate. May 1. *Visual Brain Core Seminar Series*, University of Alabama at Birmingham, Birmingham, AL
62. **Mason GF** (2015) Magnetic Resonance Spectroscopy of Brain Metabolism of Glucose, Acetate, and Ethanol. December 3. *Distinguished Lecture for Neurosience and Imaging*, University of Georgia at Athens, Athens, GA
63. **Mason GF** (2016) Principles of Metabolic Modeling of Isotopic Labeling. February 27. The Fourth International Workshop on Hyperpolarized Carbon-13 and Its Applications in Metabolic Imaging, University of Pennsylvania, Philadelphia, PA
64. **Mason GF** (2016) Relationships of Glutamate Concentrations with Glutamatergic Firing, in symposium *Modulation of Glutamate in Task Active States in Humans: Applications to Psychiatry with Real-time Functional MRS*. May 12. *Society of Biological Psychiatry*, Atlanta, GA
65. **Mason GF** (2016) Practical Aspects of 13C MR Studies, August 14, in workshop *MR Spectroscopy: From Current Best Practice to Latest Frontiers*, by *International Society of Magnetic Resonance in Medicine*, Lake Constance, Germany.
66. **Mason GF** (2016) Alcohol-Related Disorders: A Metabolic Perspective. September 13. *Grand Rounds, Lincoln Hospital*, New York, NY.
67. **Mason GF** (2017) Basic NMR Theory. February 28. *Elucidata, Inc.*, Delhi, India.
68. **Mason GF** (2017) ^{13}C Studies of Metabolism In Vivo: Nuclear Magnetic Resonance (NMR) Spectroscopy and Mathematical Modeling. February 28. *Elucidata, Inc.*, Delhi, India.
69. **Mason GF** (2017) Grantcraft: The art of writing a successful grant proposal. *Berlin Institute of Health*, March 31, Berlin, Germany
70. **Mason GF** (2017) The first steps to getting your own money. April 1, *Society for Cerebral Blood Flow & Metabolism*, Berlin, Germany
71. **Mason GF** (2017) Effects of alcohol and nicotine on brain metabolism. April 4, *Neuroscience Seminar*, McLean Hospital, Harvard University, Boston, Massachusetts
72. **Mason GF** (2017) A metabolic perspective of alcohol dependence and withdrawal. April 28, *All India Institute of Medical Science*, Delhi, India

73. **Mason GF** (2017) Alcohol and Brain Metabolism. May 10, *Center for Comparative Neuroimaging*, University of Massachusetts, Worcester, Massachusetts
74. **Mason GF** (Early Life Stress and Glutamate Neurotransmission in Major Depressive Disorder) A Metabolic Perspective of Alcohol Use and Dependence. March 8, *Danish Society for Neuroscience*, University of Copenhagen, Denmark
75. **Mason GF** (2018) Potential for Ketone Bodies to Support Sobriety from Alcohol. March 9, *Psychiatric Centre Copenhagen*, Rigshospitalet, University of Copenhagen, Denmark
76. **Mason GF** (2018) Efeitos Neuroquímicos do Álcool Observados in vivo com Ressonância Magnética. August 31, *Programa de Pós-graduação em Saúde*, Faculdade de Medicina, Universidade Federal de Juiz de Fora, Juiz de Fora, Brazil
77. **Mason GF** (2018) Metabolic Modeling of ^{13}C Hyperpolarized Data for Studying Brain Metabolism and Neurotransmission. October 19, *The Fifth International Workshop on Metabolic Imaging*, University of Pennsylvania, Philadelphia, PA
78. **Mason GF** (2018) ^{13}C Labeling Studies and Challenges of Spectral and Kinetic Fitting. November 30, Second Annual INSPECTOR Workshop, Columbia University, New York, New York
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80. **Mason GF** (2019) Alcohol provides brain energy via oxidation of ethanol and hepatically derived acetate. Ketones can also meet those needs, in symposium *Alcohol Metabolism and the role of Ketone Bodies to Alleviate Symptoms of Alcohol Withdrawal*, Research Society on Alcoholism, June 24, Research Society on Alcoholism, Minneapolis, Minnesota
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82. **Mason GF**, Sinha R (2021) Establishing a thriving research laboratory. *Yale Center for Clinical Investigation Training Program*, July 19, Yale University
83. **Mason GF** (2021) Of Rats and People: Strategies for Compartmental Metabolic Analysis in the Brain. *Advanced Imaging Research Center Seminar Series*, November 16, University of Dallas, Texas.
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91. **Mason GF** (2024) Alcohol: Toxic Fuel for the Brain, plus a New Way to Think about Withdrawal. *Guynn Lecture*, University of Texas Health Science Center, February 21.
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