Curriculum Vitae

Roger N. Gunn

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Personal Details

Gender: Male
Date of birth: 16th of December, 1970

Place of birth: Bristol, U.K.
Citizenship: British

Current Position

Assistant Professor of Neurology and Neurosurgery, Montreal Neurological Institute

I am currently employed at the McConnell Brain Imaging Center at the Montreal Neurological Institute working as a bio-mathematical modeler in the area of functional neuroimaging studies. This work is principally concerned with 4D spatio-temporal modelling of Positron Emission Tomography data. My current research interests include;

- Development of tracer kinetic modelling strategies for radiotracers
- Methods for the generation of quantitative parametric images
- Synaptic neurotransmission
- Functional segmentation
- Partial volume correction
- Statistical analysis of dynamic PET studies

Education

10/1989–09/1992	Undergraduate studies in Applied Mathematics at the University of Warwick, U.K.
10/1992–07/1996	Postgraduate studies in Positron Emission Tomography at the MRC Cyclotron Unit, Hammersmith Hospital, London, U.K. and the Department of Engineering, University of Warwick, U.K.
	Specialization: PET, Brain Imaging, and Bio-Mathematics
	Thesis: *Mathematical modelling and identifiability applied to positron emission tomography data*; Supervisors: Prof. V. J. Cunningham (London) and Dr M. J. Chappell (Warwick).
08/1996–07/1997	Post Doctoral Scientist at the MRC Cyclotron Unit, London, U.K.
08/1997–07/1999	Non Clinical Scientist (Band 4) at the MRC Cyclotron Unit, London, U.K.
08/1999–02/2001	Non Clinical Scientist (Band 3) at the MRC Cyclotron Unit, London, U.K.
03/2001–Present	Assistant Professor in Neurology and Neurosurgery at the Montreal Neurological Institute, Montreal, Canada

Qualifications

B.Sc.	Applied Mathematics, University of Warwick, U.K. (1992)
Ph.D.	Engineering, University of Warwick, U.K. (1996)

Thesis

The purpose of this research was to investigate the application of tracer kinetic modelling techniques to Positron Emission Tomography data. This included theory on reparameterisations of unidentifiable systems, correction of PET data for radiolabelled metabolites, analysis of novel tracers and the development of parametric imaging techniques.

Grants

1999-2002	**Medical Research Council, U.K., Bioinformatics Studentship**, *Statistical Analysis of Functional Imaging Data Sets*, R N Gunn, GBP£13 000/year. (Funded)
2002-2005	**Fonds de la Recherche en Santé du Québec, Chercheur-boursier Junior 1**, *Tracer Kinetic Modelling Strategies for Positron Emission Tomography: Application to Studies of Neurotransmission*, R N Gunn, CAD$ 42 000/year salary. (Funded)
2002-2006	**Natural Sciences and Engineering Research Council of Canada Operating Grant**, *Generic Tracer Kinetic Modeling Strategies For Dynamic Positron Emission Tomography*, R N Gunn, CAD$ 28 000/year operating base. (Funded)
2002-2005	**Whitaker Foundation**, *Positron Emission Tomography Imaging of Extra-Striatal Dopamine Release*, R N Gunn, CAD$ 320 000 operating base. (Pending)
2003-2007	**Canadian Foundation for Innovation**, *Research Facility for Neuroreceptor Imaging with Positron Emission Tomography*, R N Gunn, CAD$ 185 615 equipment. (Pending)
2003-2008	**Canadian Institute of Health Research**, *Spatio-Temporal Modelling for Positron Emission Tomography Studies of Synaptic Neurotransmission*, R N Gunn, CAD$ 50 000/year salary and operating. (Pending)

Students

John Aston	Ph.D. (1999-2002)
Sunil Kukreja	Postdoctoral Fellow (2002-)

Invited Lectures

2002	Human Brain Mapping, Sendai, Japan
2002	PET Pharmacokinetic Course, Amsterdam, Netherlands
2001	Stats 2001, Montreal, Canada
2001	Columbia University, New York, U.S.A.
2000	NIH, Washington D.C., U.S.A.
2000	Montreal Neurological Institute, Montreal, Canada.
1999	Human Brain Mapping, Dusseldorff, Germany
1999	NIRS, Ciba, Tokyo, Japan.
1998	Clarke Institute, Toronto, Canada.

Membership of Societies

2002-   International Society for Cerebral Blood Flow and Metabolism

Committees

Scientific Advisory Board, Neuroreceptor Mapping, Oxford, U.K., 2002

Scientific Advisory Board, Brain 01 and BrainPET01, Taipei, Taiwan, 2001

Scientific Advisory Board, Neuroreceptor Mapping, New York, U.S.A, 2000

Scientific Advisory Board, Brain 99 and BrainPET99, Copenhagen, Denmark, 1999

Editorial Boards

2002-   The American Journal of Psychiatry

Reviewing

Reviewer for the following Journals;

- Journal of Cerebral Blood Flow and Metabolism
- NeuroImage
- The American Journal of Psychiatry
- Nuclear Medicine and Biology
- Journal of Nuclear Medicine
- European Journal of Nuclear Medicine

Conference Organizer

2003   PET Pharmacokinetic Modelling 2003, Montreal, Canada

Major Conferences Attended

2002   Neuroreceptor Mapping, Oxford, U.K.

2002   Human Brain Mapping, Sendai, Japan

2001   Stats 2001, Montreal, Canada

2001   Brain01 and BrainPET01 Taipei, Taiwan

2000   Neural Information Processing Systems, Denver, U.S.A.

2000   Neuroreceptor Mapping, New York, U.S.A.

1999   Serotonin 5-HT1A Receptor Imaging, Stockholm, Sweden

1999   Human Brain Mapping, Dusseldorff, Germany

1999   Brain99 and BrainPET99, Copenhagen, Denmark

1999	IFAC Symposium on Biomedical Systems, Warwick, U.K.
1998	Neuroreceptor Mapping, Ann Arbor, U.S.A.
1998	Human Brain Mapping, Montreal, Canada.
1997	BrainPET97, Washington, U.S.A.
1997	Society of Nuclear Medicine, San Antonio, U.S.A.
1997	Neuroreceptor Mapping, Aarhus, Denmark

COLLABORATIONS (CURRENT)

- *Columbia University, New York, U.S.A*
  Parametric Imaging of Neuroreceptor Studies
  Dr Mark Slifstein and Dr Marc Laruelle

- *Imaging Research Services Ltd., U.K.*
  Analysis of radioligand binding studies
  Prof Vincent Cunningham and Dr Federico Turkheimer

- *Institute of Nuclear Medicine, UCL, London, U.K.*
  Analysis of SPET ligand for the NMDA receptor ([123I]-CNS 1261)
  Dr Kjell Erlandsson and Dr Lyn Pilowsky

- *Dept Maths and Stats, McGill University, Montreal, Canada*
  Statistics of Brian imaging Studies
  Prof Keith Worsley

- *Southampton University, U.K.*
  Image Analysis and Intelligent Systems
  Dr Steve Gunn

COLLABORATIONS (PAST)

- *McMaster University, Hamilton, Canada*
  Estimation of noninvasive blood input functions and partial volume correction
  Ms Marie-Claude Asselin

- *Free University, Amsterdam, Netherlands*
  Reference tissue modelling and functional segmentation
  Prof Adriaan Lammertsma

- *University of Toronto, Canada*
  Irreversible reference tissue modelling
  Dr Sylvain Houle

- *Stockholm, Sweden*
  Modelling of DWAY (5-HT1A receptor ligand)
  Prof Lars Farde and Dr Bengt Andrée

- *Pittsburgh, U.S.A*
  Modelling of altanserin (5-HT2A receptor ligand)
  Dr Julie Price

- *Warwick University, U.K.*
  Identifiability Analysis
  Dr Mike Chappell

Software

RPM   Receptor Parametric Mapping: Tracer kinetic modelling software for the generation of parametric images.

Programming Languages

Matlab, Mathematica, HTML, C, C++, Fortran

Articles

[1] M. C. Asselin, V. J. Cunningham, S. Amano, R. N. Gunn, and C. Nahmias. Parametric definition of regions of interest in cerebral blood vessels as noninvasive blood input functions for brain PET studies. *Phys Med Biol*, submitted.

[2] R. N. Gunn, S. R. Gunn, F. E. Turkheimer, J. A. D. Aston, and V. J. Cunningham. Positron emission tomography compartmental models: A basis pursuit strategy for kinetic modelling. *J Cereb Blood Flow Metab*, (in press) 2002.

[3] E. A. Rabiner, R. N. Gunn, M. R. Wilkins, E. Sedman, and P. M. Grasby. Evaluation of EMD 128 130 occupancy of the 5-HT1A and the D2 receptor: a human PET study with [11C]WAY-100635 and [11C]raclopride. *J Psychopharmacol*, 16(3):195–199, 2002.

[4] J. A. Aston, V. J. Cunningham, M. C. Asselin, A. Hammers, A. C. Evans, and R. N. Gunn. Positron emission tomography partial volume correction: estimation and algorithms. *J Cereb Blood Flow Metab*, 22(8):1019–34, 2002.

[5] E. A. Rabiner, M. R. Wilkins, F. Turkheimer, R. N. Gunn, J. U. de Haes, M. de Vries, and P. M. Grasby. 5-hydroxytryptamine1a receptor occupancy by novel full antagonist 2-[4- [4-(7-chloro-2,3-dihydro-1,4-benzdioxyn-5-yl)-1-piperazinyl]butyl]-1,2- benzisothiazol-3-(2h)-one-1,1-dioxide: a[11c][o-methyl-3h]-n-(2-(4-(2- methoxyphenyl)-1-piperazinyl)ethyl)-n-(2- pyridinyl)cyclohexanecarboxamide trihydrochloride (way-100635) positron emission tomography study in humans. *J Pharmacol Exp Ther*, 301(3):1144–50, 2002.

[6] B. Andree, C. Halldin, V. W. Pike, R. N. Gunn, H. Olsson, and L. Farde. The PET radioligand [carbonyl-(11)C]Desmethyl-WAY-100635 binds to 5-HT(1A) receptors and provides a higher radioactive signal than [carbonyl-(11)C]WAY-100635 in the human brain. *J Nucl Med*, 43(3):292–303, 2002.

[7] E. A. Rabiner, C. Messa, P. A. Sargent, K. Husted-Kjaer, A. Montgomery, A. D. Lawrence, C. J. Bench, R. N. Gunn, P. Cowen, and P. M. Grasby. A database of [(11)C]WAY-100635 binding to 5-HT(1A) receptors in normal male volunteers: Normative data and relationship to methodological, demographic, physiological, and behavioral variables. *Neuroimage*, 15(3):620–632, 2002.

[8] R. B. Banati, A. Cagnin, D. J. Brooks, R. N. Gunn, R. Myers, T. Jones, R. Birch, and P. Anand. Long-term trans-synaptic glial responses in the human thalamus after peripheral nerve injury. *Neuroreport*, 12(16):3439–42, 2001.

[9] E. A. Rabiner, Z. Bhagwagar, R. N. Gunn, P. A. Sargent, C. J. Bench, P. J. Cowen, and P. M. Grasby. Pindolol augmentation of selective serotonin reuptake inhibitors: Pet evidence that the dose used in clinical trials is too low. *Am J Psychiatry*, 158(12):2080–2, 2001.

[10] A. J. Montgomery, C. J. Bench, A. H. Young, A. Hammers, R. N. Gunn, Z. Bhagwagar, and P. M. Grasby. PET measurement of the influence of corticosteroids on serotonin-1A receptor number. *Biological Psychiatry*, 50:668–676, 2001.

[11] A. Cagnin, R. Myers, R. N. Gunn, A. D. Lawrence, T. Stevens, G. W. Kreutzberg, T. Jones, and R. B. Banati. In vivo visualization of activated glia by [C-11] (R)-PK11195-PET following herpes encephalitis reveals projected neuroanl damage beyond the primary focal lesion. *Brain*, 124(Pt 10):2014–2027, 2001.

[12] A. Dagher, C. Bleicher, J. A. D. Aston, R. N. Gunn, P. B. S. Clarke, and P. Cumming. Reduced dopamine D1 receptor binding in the ventral striatum of cigarette smokers. *Synapse*, 42(1):48–53, 2001.

[13] A. Cagnin, D. J. Brooks, A. M. Kennedy, R. N. Gunn, R. Myers, F. E. Turkheimer, T. Jones, and R. B. Banati. In-vivo measurement of activated microglia in dementia. *Lancet*, 358(9280):461–7, 2001.

[14] R. N. Gunn, S. R. Gunn, and V. J. Cunningham. Positron emission tomography compartmental models. *J Cereb Blood Flow Metab*, 21(6):635–652, 2001.

[15] J. C. Price, B. J. Lopresti, C. C. Meltzer, G. S. Smith, N. S. Mason, Y. Huang, D. P. Holt, R. N. Gunn, and C. A. Mathis. Analyses of [F-18]altanserin bolus injection PET data. II: Consideration of radiolabeled metabolites in humans. *Synapse*, 41(1):11–21, 2001.

[16] S. Pappata, M. Levasseur, R. N. Gunn, R. Myers, C. Crouzel, A. Syrota, T. Jones, G. W. Kreutzberg, and R. B. Banati. Thalamic microglial activation in ischemic stroke detected in vivo by PET and [C-11]PK11195. *Neurology*, 55(7):1052–1054, 2000.

[17] R. B. Banati, J. Newcombe, R. N. Gunn, A. Cagnin, F. Turkheimer, F. Heppner, G. Price, F. Wegner, G. Giovannoni, D. H. Miller, G. D. Perkin, T. Smith, A. K. Hewson, G. Bydder, G. W. Kreutzberg, T. Jones, M. L. Cuzner, and R. Myers. The peripheral benzodiazepine binding site in the brain in multiple sclerosis - quantitative in vivo imaging of microglia as a measure of disease activity. *Brain*, 123:2321–2337, 2000.

[18] E. A. Rabiner, R. N. Gunn, M. R. Wilkins, P. A. Sargent, E. Mocaer, E. Sedman, P. J. Cowen, and P. M. Grasby. Drug action at the 5-HT1A receptor in vivo: Autorecepror and postsynaptic receptor occupancy examined with PET and [carbonyl-C-11]WAY-100635. *Nuclear Medicine and Biology*, 27(5):509–513, 2000.

[19] R. N. Gunn, A. A. Lammertsma, and P. M. Grasby. Quantitative analysis of [carbonyl-(11)C]WAY-100635 PET studies. *Nucl Med Biol*, 27(5):477–482, 2000.

[20] J. A. Aston, R. N. Gunn, K. J. Worsley, Y. Ma, A. C. Evans, and A. Dagher. A statistical method for the analysis of positron emission tomography neuroreceptor ligand data. *Neuroimage*, 12(3):245–256, 2000.

[21] R. N. Gunn, J. T. Yap, P. Wells, S. Osman, P. Price, T. Jones, and V. J. Cunningham. A general method to correct PET data for tissue metabolites using a dual-scan approach. *J Nucl Med*, 41(4):706–11, 2000.

[22] E. Hirani, J. Opacka-Juffry, R. N. Gunn, I. A. Khan, and S. P. Hume. Pindolol occupancy of 5-HT1A receptors measured in vivo using small animal positron emission tomography with carbon-11 labelled WAY 100635. *Synapse*, 36:330–341, 2000.

[23] F. E. Turkheimer, R. B. Banati, D. Visvikis, J. A. Aston, R. N. Gunn, and V. J. Cunningham. Modeling dynamic PET-SPECT studies in the wavelet domain. *J Cereb Blood Flow Metab*, 20(5):879–93, 2000.

[24] R. N. Gunn, A. Ranicar, J. T. Yap, P. Wells, S. Osman, T. Jones, and V. J. Cunningham. On-line measurement of exhaled [11C]CO2 during PET. *J Nucl Med*, 41(4):605–11, 2000.

[25] P. A. Sargent, K. H. Kjaer, C. J. Bench, E. A. Rabiner, C. Messa, J. Meyer, R. N. Gunn, P. M. Grasby, and P. J. Cowen. Brain serotonin1A receptor binding measured by positron emission tomography with [11C]WAY-100635: effects of depression and antidepressant treatment. *Arch Gen Psychiatry*, 57(2):174–80, 2000.

[26] E. A. Rabiner, R. N. Gunn, M. E. Castro, P. A. Sargent, P. J. Cowen, M. J. Koepp, J. H. Meyer, C. J. Bench, P. J. Harrison, A. Pazos, T. Sharp, and P. M. Grasby. beta-blocker binding to human 5-HT(1A) receptors in vivo and in vitro. implications for antidepressant therapy. *Neuropsychopharmacology*, 23(3):285–293, 2000.

[27] E. A. Rabiner, R. N. Gunn, M. R. Wilkins, P. A. Sargent, E. Mocaer, E. Sedman, P. J. Cowen, and P. M. Grasby. Drug action at the 5-HT(1A) receptor in vivo: autoreceptor and postsynaptic receptor occupancy examined with PET and [carbonyl-(11)C]WAY-100635. *Nucl Med Biol*, 27(5):509–513, 2000.

[28] S. P. Hume, E. Hirani, J. Opacka-Juffry, S. Osman, R. Myers, R. N. Gunn, J. A. McCarron, R. D. Clark, J. Melichar, D. J. Nutt, and V. W. Pike. Evaluation of [o-methyl-11C]RS-15385-197 as a positron emission tomography radioligand for central alpha2-adrenoceptors. *Eur J Nucl Med*, 27(5):475–84, 2000.

[29] R. B. Banati, G. W. Goerres, R. Myers, R. N. Gunn, F. E. Turkheimer, G. W. Kreutzberg, D. J. Brooks, T. Jones, and J. S. Duncan. [11C](R)-PK11195 positron emission tomography imaging of activated microglia in vivo in rasmussen's encephalitis. *Neurology*, 53(9):2199–203, 1999.

[30] J. H. Meyer, R. N. Gunn, R. Myers, and P. M. Grasby. Assessment of spatial normalization of PET ligand images using ligand-specific templates. *Neuroimage*, 9(5):545–53, 1999.

[31] A. Lawrence, M. J. Koepp, R. N. Gunn, V. J. Cunningham, and P. M. Grasby. Steps to a neurochemistry of personality. *Behav Brain Sci*, 3(22):528–529, 1999.

[32] T. C. Andrews, R. A. Weeks, N. Turjanski, R. N. Gunn, L. H. Watkins, B. Sahakian, J. R. Hodges, A. E. Rosser, N. W. Wood, and D. J. Brooks. Huntington's disease progression. PET and clinical observations. *Brain*, 122(Pt 12):2353–63, 1999.

[33] P. Piccini, D. J. Brooks, A. Bjorklund, R. N. Gunn, P. M. Grasby, O. Rimoldi, P. Brundin, P. Hagell, S. Rehncrona, H. Widner, and O. Lindvall. Dopamine release from nigral transplants visualized in vivo in a parkinson's patient [see comments]. *Nat Neurosci*, 2(12):1137–40, 1999.

[34] M. J. Chappell and R. N. Gunn. A procedure for generating locally identifiable reparameterisations of unidentifiable non-linear systems by the similarity transformation approach. *Math Biosci*, 148(1):21–41, 1998.

[35] M. J. Koepp, R. N. Gunn, A. D. Lawrence, V. J. Cunningham, A. Dagher, T. Jones, D. J. Brooks, C. J. Bench, and P. M. Grasby. Evidence for striatal dopamine release during a video game. *Nature*, 393(6682):266–8, 1998.

[36] R. N. Gunn, P. A. Sargent, C. J. Bench, E. A. Rabiner, S. Osman, V. W. Pike, S. P. Hume, P. M. Grasby, and A. A. Lammertsma. Tracer kinetic modeling of the 5-HT1A receptor ligand [carbonyl-11C]WAY-100635 for PET. *Neuroimage*, 8(4):426–40, 1998.

[37] S. P. Hume, R. N. Gunn, and T. Jones. Pharmacological constraints associated with positron emission tomographic scanning of small laboratory animals. *Eur J Nucl Med*, 25(2):173–6, 1998.

[38] S. Osman, C. Lundkvist, V. W. Pike, C. Halldin, J. A. McCarron, C. G. Swahn, L. Farde, N. Ginovart, S. K. Luthra, R. N. Gunn, C. J. Bench, P. A. Sargent, and P. M. Grasby. Characterisation of the appearance of radioactive metabolites in monkey and human plasma from the 5-HT1A receptor radioligand, [carbonyl- 11C]WAY-100635–explanation of high signal contrast in PET and an aid to biomathematical modelling. *Nucl Med Biol*, 25(3):215–23, 1998.

[39] R. N. Gunn, A. A. Lammertsma, S. P. Hume, and V. J. Cunningham. Parametric imaging of ligand-receptor binding in PET using a simplified reference region model. *Neuroimage*, 6(4):279–287, 1997.

[40] A. L. Malizia, J. M. Melichar, D. J. Brown, R. N. Gunn, A. Reynolds, T. Jones, and D. J. Nutt. Demonstration of clomipramine and venlafaxine occupation at serotonin reuptake sites in man in vivo. *J Psychopharmacol*, 11(3):279–81, 1997.

[41] V. J. Cunningham, S. D. Rosen, H. Boyd, S. Osman, R. J. Davenport, R. N. Gunn, V. W. Pike, and P. G. Camici. Uptake of [N-methyl-11C]propionyl-L-carnitine (PLC) in human myocardium. *J Pharmacol Exp Ther*, 277(1):511–7, 1996.

[42] H. L. Boyd, R. N. Gunn, N. V. Marinho, S. P. Karwatowski, D. L. Bailey, D. C. Costa, and P. G. Camici. Non-invasive measurement of left ventricular volumes and function by gated positron emission tomography. *Eur J Nucl Med*, 23(12):1594–602, 1996.

[43] A. L. Malizia, R. N. Gunn, S. J. Wilson, S. H. Waters, P. M. Bloomfield, V. J. Cunningham, and D. J. Nutt. Benzodiazepine site pharmacokinetic/pharmacodynamic quantification in man: direct measurement of drug occupancy and effects on the human brain in vivo. *Neuropharmacology*, 35(9-10):1483–91, 1996.

[44] A. L. Malizia, G. Forse, A. Haida, R. N. Gunn, J. Melichar, K. Poole, D. Bateman, D. Fahy, L. Schnorr, D. Brown, C. Rhodes, D. J. Nutt, and T. Jones. A new human (psycho)pharmacology tool - the multiple organs coincidence counter (MOCC). *J. Psychopharm.*, 9:528–529, 1996.

Chapters

[45] M. C. Asselin, V. J. Cunningham, S. Amano, R. N. Gunn, and C. Nahmias. *Brain Imaging Using PET*, chapter Parametric definition of ROIs to recover the calibe of cerebral blood vessels directly from PET images. Academic Press, (in press).

[46] R. N. Gunn, S. R. Gunn, F. E. Turkheimer, J. A. D. Aston, and V. J. Cunningham. *Brain Imaging Using PET*, chapter Tracer kinetic modeling via basis pursuit. Academic Press, (in press).

[47] V. J. Cunningham, J. A. D. Aston, Gunn R. N., and F. E. Turkheimer. *Brain Imaging Using PET*, chapter Wavelet methods for the mathematical and statistical modeling of PET images. Academic Press, (in press).

[48] R. N. Gunn, S. P. Hume, E. Hirani, I. Khan, and J. Opacka-Juffry. *Physiological Imaging of the Brain with PET*, chapter 27: Small animal PET enables parametric mapping of saturation kinetics at the 5-HT1A receptor. Academic Press, 2001.

[49] R. N. Gunn, J. Ashburner, J. Aston, and V. J. Cunningham. *Physiological Imaging of the Brain with PET*, chapter 8: Analysis of functional imaging data sets via functional segmentation. Academic Press, 2001.

[50] M. C. Asselin, V. J. Cunningham, N. Turjanski, L. M. Wahl, P. M. Bloomfield, R. N. Gunn, and C. Nahmias. *Physiological Imaging of the Brain with PET*, chapter 12: Venous sinuses vs on-line arterial sampling as input functions for PET. Academic Press, 2001.

[51] A. Cagnin, R. Myeres, R. N. Gunn, F. E. Turkheimer, V. J. Cunningham, D. J Brooks, T. Jones, and R. B. Banati. *Physiological Imaging of the Brain with PET*, chapter 53: Imaging activated microglia in the ageing human brain. Academic Press, 2001.

[52] R. N. Gunn, A. A. Lammertsma, and V. J. Cunningham. *Quantitative functional brain imaging with positron emission tomography (Eds Carson RE, Daube-Witherspoon ME, Herscovitch P)*, chapter 60: Parametric imaging of ligand-receptor interactions using a reference tissue model and cluster analysis, pages 401–406. Academic Press, 1998.

[53] V. J. Cunningham, R. N. Gunn, H. Byrne, and J. C. Matthews. *Quantitative functional brain imaging with positron emission tomography (Eds Carson RE, Daube-Witherspoon ME, Herscovitch P)*, chapter 49: Suppression of noise artefacts in spectral analysis of dynamic PET data, pages 329–337. Academic Press, 1998.

[54] A. Dagher, R. N. Gunn, G. Lockwood, V. J. Cunningham, P. M. Grasby, and D. J. Brooks. *Quantitative functional brain imaging with positron emission tomography (Eds Carson RE, Daube-Witherspoon ME, Herscovitch P)*, chapter 67: Measuring neurotransmitter release with PET: methodological issues, pages 449–454. Academic Press, 1998.

[55] A. L. Malizia, K. J. Friston, R. N. Gunn, V. J. Cunningham, S. Wilson, T. Jones, and D. Nutt. *Quantification of brain function using PET (Eds Myers R, Cunningham VJ, Bailey D, Jones T)*, chapter 52: The analysis of brain PET radioligand displacement studies, pages 266–270. Academic Press, 1995.

[56] A. L. Malizia, G. Forse, R. N. Gunn, A. Haida, L. Schnorr, S. Rajeswaran, K. Poole, D. Nutt, and T. Jones. *Quantification of brain function using PET (Eds Myers R, Cunningham VJ, Bailey D, Jones T)*, chapter 5: The MOC counter: A pharamcological tool for the in vivo measurement of ligand occupancy indices in the human brain, pages 20–25. Academic Press, 1995.

Proceedings

[57] J. L. Chen, S. R. Gunn, M. S. Nixon, and R. N. Gunn. Markov random field models for segmentation of PET images. In Michael F. Insana and Richard M. Leahy, editors, *Information Processing in Medical Imaging*, volume 2082 of *Lecture Notes in Computer Science*, pages 468–474. Springer, 2001.

[58] J. L. Chen, S. R. Gunn, M. S. Nixon, R. P. Myers, and R. N. Gunn. A supervised method for PET reference region extraction. In *Proc. Medical Image Understanding and Analysis*, pages 179–182, London, U.K., 2000.

[59] R. N. Gunn, M. J. Chappell, and V. J. Cunningham. Reparameterisation of unidentifiable systems using the taylor series approach. In *Third IFAC Symposium on Modelling and Control in Biomedical Systems*. University of Warwick, 1997.

Teaching Material

[60] R.N. Gunn. *PET Pharmacokinetic course manual (Eds Maguire, R.P. and Leenders, K.L.)*, chapter 10: Data-driven Methods, pages 90–102. University of Groningen, Groningen, The Netherlands, 2002.

Abstracts

[61] J. A. D. Aston, F. E. Turkheimer, V. J. Cunningham, and R. N. Gunn. Image space variance from wavelet transforms. *NeuroImage*, 16(3(2)):S75, 2002.

[62] J. A. D. Aston, A. Hammers, V. J. Cunningham, and R. N. Gunn. Partial volume correction: A recipe. *NeuroImage*, 16(3(2)):S74, 2002.

[63] E. Rabiner, Z. Bhagwagar, R. N. Gunn, Bench C., Cowen P., and Grasby P. Attenuation of preferential occupancy of 5-HT1A autoreceptors by pindolol in depressed patients: eefect of SSRIs or an endophenotype of the depressed state ? *NeuroImage*, 16(3(2)):S67, 2002.

[64] R. N. Gunn, S. R. Gunn, J. A. D. Aston, F. E. Turkheimer, and V. J. Cunningham. DEPICT: Data-driven estimation of parametric images based on compartmental theory. *NeuroImage*, 16(3(2)):S59, 2002.

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