CURRICULUM VITAE

University of Pittsburgh, Pittsburgh, PA

BIOGRAPHICAL

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EDUCATION AND TRAINING

MEDICAL EDUCATION:

1995	Stanley Medical College Madras, India	MB., B.S. (MD Equivalent)	Medicine
2002	New York State Education Department	MD (Conferred)	Medicine

INTERNSHIP

1994-1995 Intern in Medicine
Government Stanley Hospital
Madras, India

1997-1998 Intern in Psychiatry
State University of New York at Buffalo (SUNYAB) Consortium Hospitals
Buffalo, New York

RESIDENCY

1998-2001 Resident in Psychiatry
SUNYAB Consortium Hospital
Buffalo, New York

FELLOWSHIPS

1996 - 1997 Research Fellow in Psychiatry
Bipolar and Psychotic Disorder Program
McLean Hospital
Belmont, Massachusetts

2001- 2004 Research Fellow in Psychiatry
Division of Functional Brain Mapping
New York State Psychiatric Institute
New York, New York

APPOINTMENTS AND POSITIONS

ACADEMIC:

1996 - 1997	Research Fellow in Psychiatry Consolidated Department of Psychiatry Harvard Medical School Boston, MA
1997 - 2001	Assistant Clinical Instructor in Psychiatry University at Buffalo School of Medicine and Biomedical Sciences, SUNYAB Buffalo, NY
2001 - 2004	Instructor in Psychiatry Columbia University College of Physicians and Surgeons New York, NY
2004 - 2006	Assistant Professor of Clinical Psychiatry Columbia University College of Physicians and Surgeons New York, NY
2006 - 2011	Assistant Professor of Radiology and Psychiatry University of Pittsburgh Pittsburgh, PA
2011- 2016	Associate Professor of Radiology and Psychiatry University of Pittsburgh Pittsburgh, PA
2016- 2018	Visiting Professor of Radiology University of Pittsburgh Pittsburgh, PA
2018 – Current	Professor of Radiology (with tenure) Professor of Psychiatry University of Pittsburgh Pittsburgh

HOSPITAL:

2000 - 2001	Junior Attending Psychiatrist Comprehensive Psychiatric Emergency Program Erie County Medical Center Buffalo, NY
2001 - 2004	Assistant Attending Psychiatrist New York- Presbyterian Hospital New York, NY
2002 - 2006	Attending Psychiatrist Our Lady of Mercy Medical Center Bronx, NY
2004 - 2006	Attending Psychiatrist New York- Presbyterian Hospital New York, NY

2006 - 2009	Attending Psychiatrist Psychiatric Emergency and Intervention Service Western Psychiatric Institute and Clinics UPMC Pittsburgh, PA
2009 – Present	Attending Psychiatrist Resolve Crisis Network Western Psychiatric Institute and Clinics UPMC Pittsburgh, PA
2018 - Present	Attending Psychiatrist Telepsychiatry service (outpatient coverage) Western Psychiatric Institute and Clinics UPMC Pittsburgh, PA

RESEARCH LAB:

2001- 2006	Lead Primate PET Imaging Program Co-lead Biological Imaging Core Division of Functional Brain Mapping (DFBM) New York State Psychiatric Institute (NYSPI) New York, NY
2006 - Present	Psychiatric Molecular Imaging Program (PMIP) University of Pittsburgh PET Facility University of Pittsburgh Pittsburgh, PA

BOARD CERTIFICATION

American Board of Psychiatry and Neurology 2003
(General Psychiatry)
Board Certified

MEMBERSHIPS IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

American Psychiatric Association 1997- Present

HONORS

The Excellence in Psychiatry Residency Award, 1998
151st Annual Meeting, American Psychiatric Association, Toronto, Canada.

Intern of the Year, Psychiatry Residency Training Program, SUNYAB, Buffalo, New York 1998

American Psychiatric Institute for Research and Education/Janssen Scholar in Research on 2000
Severe Mental Illness Award, 153rd Annual Meeting, American Psychiatric Association, Chicago, Illinois.

APA Research Colloquium for Junior Investigators Travel Award, 153rd Annual Meeting, 2000
American Psychiatric Association, Chicago, Illinois.

Resident Service Award, Psychiatry Residency Training Program, SUNYAB, Buffalo, New York 2000

Department of Psychiatry Grand Rounds 'The Treatment of Resistant Psychotic Disorders' at SUNYAB, Buffalo, New York. 2001

Young Investigator Award, Neuroscience Track, 51st Annual Meeting, Society of Nuclear Medicine, Philadelphia, PA. 2004

GSK Young Investigator Award, Neuroreceptor Mapping 2006, Copenhagen, Denmark 2006

Distinguished Investigator Award, The Academy for Radiology and Biomedical Imaging Research 2018 Chicago, IL

PUBLICATIONS

1. Refereed Articles

1. Zarate CA Jr, Narendran R, Tohen M, Greaney J, Berman A, Pike S, Madrid A. Clinical predictors of acute response with olanzapine in psychotic mood disorders. J Clin Psychiatry 1998; 59:24-28

2. Zarate CA Jr, Tohen M, Narendran R, Tomassini EC, McDonald J, Sederer M, Madrid A. The adverse effect profile and efficacy of divalproex sodium compared with valproic acid: a pharmacoepidemiology study. J Clin Psychiatry 1999; 60:232-236

3. Kim KY, Hwang W, **Narendran R**. Acute liver damage possibly related to sertraline and venlafaxine ingestion. [letter] Ann Pharmacother 1999; 33:381-382

4. Leo RJ, Narendran R, DeGuiseppe B. Methadone detoxification of tramadol dependence. [brief report] Journal of Substance Abuse Treatment 2000; 19: 297-299

5. **Narendran R**, Young CM, Pato M. Possible risperidone-induced tardive dystonia. [letter] Ann Pharmacother 2000; 34:1487-88

6**. Narendran** R, Young CM, Valenti AM, Pristach CA, Pato MT, Grace JG. Olanzapine therapy in treatment resistant psychotic mood disorders- a long term follow-up study. J Clin Psychiatry 2001; 62: 509-16

7. **Narendran R**, Young CM, Valenti AM, Nickolova MK, Pristach CA. Psychosis exacerbated by modafinil? [letter] Arch Gen Psychiatry 2002; 59(3): 292-3

8. Huang Y, Hwang D-R, Narendran R, Sudo Y, Chatterjee R, Bae S-A, Mawlawi O, Kegeles L, Wilson AA, Kung HF, Laruelle M. Comparative Evaluation of five positron emission tomography radiotracers for imaging serotonin transporters in vivo: [^{11}C] McN 5652, [^{11}C] ADAM, [^{11}C] DASB, [^{11}C] DAPA, and [^{11}C] AFM. J Cereb Blood Flow 2002; 22:1377-1398

9. **Narendran R**, Young CM, Pristach CA, Pato MT, Valenti AM, Fass AR. Efficacy of clozapine in the treatment of atypical antipsychotic refractory schizophrenia- a pilot study. J Clin Psychopharmacol. 2003; 23(1): 103-4

10. Valenti AM, Narendran R, Young CM, Pristach CA. Who are patients on conventional antipsychotics? Schizophrenia Bulletin 2003; 29 (2): 195-9

11. Hwang D-R, Narendran R, Huang Y, Slifstein M, Talbot PS, Sudo Y, Van Berckel BN, Kegeles LS, Martinez D, Laruelle M. Quantitative analysis of (-)-N-[^{11}C]-propyl-norapomorphine in vivo binding in nonhuman primates. J Nucl Med 2004 45: 338-346

12. **Narendran R**, Hwang D-R, Slifstein M, Talbot PS, Erritzoe D, Huang Y, Cooper T, Martinez D, Kegeles LS, Abi-Dargham A, Laruelle M. In vivo vulnerability to competition by endogenous dopamine: comparison of the D_2 receptor agonist radiotracer (-)-N-[^{11}C]propyl-norapomorphine ([^{11}C]NPA) with the D_2 receptor antagonist radiotracer [^{11}C]-raclopride. Synapse 2004 52 (3): 188-208.

13. Slifstein M, Hwang D-R, Huang Y, Guo N, Sudo Y, Narendran R, Talbot PS, Laruelle M. In vivo affinity of [^{18}F]fallypride for striatal and extrastriatal dopamine D2 receptors in nonhuman primates. Psychopharmacology (Berl) 2004 175 (3):274-86.

14. Huang Y, Hwang D-R, Bae SA, Sudo Y, Guo N, Zhu Z, Narendran R, Laruelle M. A new positron emission tomography imaging agent for the serotonin transporter: synthesis, pharmacological characterization and pharmacokinetic analysis of [^{11}C]2-[2-(Dimethylaminomethyl)phenylthio]-5-fluoromethylphenylamine ([^{11}C]AFM). Nuclear Medicine and Biology 2004 :31 (5):543-56.

15. Huang Y, Narendran R, SA Bae, Erritzoe D, Guo N, Zhu Z, Hwang D-R, Laruelle M. A PET Imaging Agent with Fast Kinetics: Synthesis and In Vivo Evaluation of the Serotonin Transporter Ligand [^{11}C]2-[2-(Dimethylaminomethylphenylthio)]-5-fluorophenylamine ([^{11}C]AFA). Nuclear Medicine and Biology 2004; 31 (6):727-38

16. Slifstein M, Narendran R, Hwang D-R, Sudo Y, Talbot PS, Huang Y, Laruelle M. Effect of amphetamine of [^{18}F]fallypride in vivo binding to D2 receptors in striatal and extrastriatal regions of primate brain: Single bolus and bolus plus constant infusion studies. Synapse. 2004 54 (1):46-63

17. Zhu Z, Guo N, Narendran R, Erritzoe D, Ekelund J, Hwang DR, Bae SA, Laruelle M, Huang Y. The new PET imaging agent [^{11}C]AFE is a selective serotonin transporter ligand with fast brain uptake kinetics. Nucl Med Biol. 2004 31(8):983-94.

18. Talbot PS, Narendran R, Butelman ER, Huang Y, Ngo K, Slifstein M, Martinez D, Laruelle M, Hwang DR.[^{11}C]-GR103545, a Radiotracer for Imaging{kappa}-Opioid Receptors In Vivo with PET: Synthesis and Evaluation in Baboons. J Nucl Med. 2005 46 (3):484-94.

19. Frankle WG. Narendran R. Huang Y, Hwang D-R, Lombardo I, Cangiano C, Gil R, Laruelle M, Abi-Dargham A. Serotonin Transporter Availability in Patients with Schizophrenia: A Positron Emission Tomography Imaging Study with [(11)C]DASB. Biol Psychiatry. 2005 57(12):1510-6.

20. **Narendran R**, Frankle G, Keefe R, Gill R, Martinez D, Kegeles LS, Talbot PS, Huang Y, Hwang D-R, Khenissi L, Cooper T, Laruelle M, Abi-Dargham A. Dopaminergic alterations in a group of chronic recreational ketamine users. Am J Psych 2005: 162 (12):2352-9

21. Huang Y, Narendran R, Bischoff F, Guo N, Bae S-A, Lesage AS, Laruelle M. A Positron Emission Tomography Radioligand for the *in vivo* Labeling of Metabotropic Glutamate 1 Receptor: (3-Ethyl-2-[11C]methyl-6-quinolinyl)(*cis*-4-methoxycyclohexyl)methanone. J Med Chemistry 2005 11; 48 (16):5096-9

22. **Narendran R**, Hwang D-R, Slifstein M, Hwang Y, Huang Y, Ekelund J, Guillin O, Scher E, Martinez D, Laruelle M. Measurement of the proportion of D2 receptors configured in state of high affinity for agonists in vivo: a Positron Emission Tomography study using [^{11}C]N-propyl-norapomorphine and [^{11}C]raclopride in baboons. J PET. 2005 315(1): 80-90.

23. van Berckel BN, Kegeles LS, Waterhouse R, Guo N, Hwang D-R, Huang Y, Narendran R, Van Heertum R, Laruelle M. Modulation of amphetamine induced dopamine release by group II metabotropic glutamate receptor agonist LY354740 in non human primates studied with positron emission tomography. Neurospsychopharmacology 2006: 31 (5): 967-77

24. **Narendran R**, Slifstein M, Guillin O, Hwang Y, Hwang DR, Scher E, Reeder S, Rabiner E, Laruelle M. Dopamine (D2/3) receptor agonist positron emission tomography radiotracer [^{11}C]-(+)-PHNO is a D3 receptor preferring agonist in vivo. Synapse. 2006; 60(7):485-95.

25. Frankle WG, Slifstein M, Gunn RN, Huang Y, Hwang DR, Darr EA, Narendran R, Abi-Dargham A, Laruelle M. Estimation of serotonin transporter parameters with [^{11}C]-DASB in healthy humans: reproducibility and comparison of methods. J Nucl Med. 2006; 47(5):815-26.

26. **Narendran R**, Slifstein M, Hwang D-R, Hwang Y, Scher E, Reeder S, Martinez D, Laruelle M. Amphetamine-induced dopamine release: duration of action as assessed with the D2/3 agonist radiotracer (-)-N [^{11}C]propyl-norapomorphine in an anesthetized nonhuman primate. Synapse 2007 61(2): 106-109

27. Martinez D, Narendran R, Foltin RW, Slifstein M, Hwang D-R, Broft A, Huang Y, Cooper TB,. Fischman MW, Kleber HD, and Laruelle M. Amphetamine-induced dopamine release is markedly blunted in cocaine dependence and predictive of the choice to self administer cocaine. Am J Psychiatry 2007; 164 (4): 622-9

28. Ekelund J, Slifstein M, Narendran R, Guillin O, Belani H, Guo NN, Hwang Y, Hwang DR, Abi-Dargham A, Laruelle M. In vivo DA D_1 receptor selectivity of NNC 112 and SCH 23390. Mol Imaging Biol. 2007; 9(3):117-25

29. **Narendran R**, Martinez D. Cocaine abuse and striatal dopamine transmission: a critical review of the preclinical and clinical imaging literature. Synapse 2008 62(11): 851-69

30. Frankle WG, Cho RY, Narendran R, Mason NS, Vora S, Litschge M, Price JC, Lewis DA, Mathis CA. Tiagabine Increases [^{11}C]flumazenil Binding in Cortical Brain Regions in Healthy Control Subjects. Neuropsychopharmacology. 2009; 34(3):624-33

31. **Narendran R**, Frankle WG, Mason NS, Laymon CM, Lopresti B, Price CJ, Kendro S, Vora S, Litschge M, Mountz JM, Mathis C.. PET Imaging of D2/3 agonist binding in healthy human subjects with the radiotracer [^{11}C]-N-propyl-nor-apomorphine (NPA): preliminary evaluation and reproducibility studies. Synapse 2009 63(7):574-84

32. **Narendran R**, Frankle WG, Mason NS, Rabiner EA, Gunn R, Searle GE, Vora S, Litschge M, Kendro S, Cooper TB, Mathis C, Laruelle M. Positron Emission Tomography Imaging of Amphetamine-Induced Dopamine Release in the Human Cortex: A comparative evaluation of the high affinity dopamine D2/3 radiotracers [^{11}C]FLB 457 and [^{11}C]fallypride. Synapse 2009 63(6):447-61.

33. Laymon CM, Mason NS, Frankle WG, Carney JP, Lopresti BJ, Litschge MY, Mathis CA, Mountz JM, **Narendran R**. Human Biodistribution and Dosimetry of the D2/3 Agonist 11C-N-Propylnorapomorphine (11C-NPA) Determined from PET. J Nucl Med. 2009: 50(5):814-7.

34. Martinez D, Slifstein M, Narendran R, Foltin RW, Broft A, Hwang DR, Perez A, Abi-Dargham A, Fischman MW, Kleber HD, Laruelle M. Dopamine D1 receptors in cocaine dependence measured with PET and the choice to self-administer cocaine. Neuropsychopharmacology. 2009; 34(7):1774-82

35. Martinez D, Greene K, Broft A, Kumar D, Liu F, Narendran R, Slifstein M, Van Huertum R, Kleber HD. Lower level of endogenous dopamine in patients with cocaine dependence: findings from PET imaging of D_2/D_3 receptors following acute dopamine depletion. Am J Psych 2009; 166(10):1170-7

36. Martinez D, Orlowska D, Narendran R, Slifstein M, Liu F, Kumar D, Broft A, Van Huertum R, Kleber HD, Dopamine type 2/3 receptor availability in the striatum and social status in healthy volunteers. Biol Psychiatry. 2010; 67 (3): 275-8

37. Guo N, Guo W, Kralikova M, Jiang M, Schieren I, Narendran R, Slifstein M, Abi-Dargham A, Laruelle M, Javitch JA, Rayport S. Impact of D_2 receptor internalization on binding affinity of neuroimaging radiotracers. Neuropsychopharmacology 2010; 35 (3): 806-17

38. **Narendran R**, Mason NS, Laymon CM, Lopresti BJ, Velasquez ND, May MA, Kendro S, Martinez D, Mathis CA, Frankle WG. A comparative evaluation of the dopamine D2/3 agonist radiotracer [^{11}C]NPA and antagonist [^{11}C]raclopride to measure amphetamine-induced dopamine release in the human striatum. JPET 2010 333: 533-39

39. Frankle WG, Mason NS, May MA, Asmonga D, Chen C-M, Kendro S, Cooper TB, Mathis CA, **Narendran R**. No effect of dopamine depletion on the binding of the high affinity $D_{2/3}$ radiotracer [^{11}C]FLB 457 in the human cortex. Synapse 2010; 64 (12)879-85

40. **Narendran R**, Mason NS, May MA, Chen C-M, Kendro S, Ridler K, Rabiner EA, Laruelle M, Mathis CA and Frankle WG. PET imaging of $D_{2/3}$ receptors in the human cortex with [^{11}C]FLB 457: reproducibility studies. Synapse 2011; 65 (1): 35-40

41. **Narendran R,** Mason NS, Chen CM, Himes M, Keating P, May MA, Rabiner EA, Laruelle M, Mathis CA, Frankle WG. Evaluation of dopamine $D_{2/3}$ specific binding in the cerebellum for the PET radiotracer [^{11}C]FLB 457: Implications for measuring cortical dopamine release. Synapse 2011; 65 (10): 991-7

42. **Narendran R**, Martinez D, Mason NS, Lopresti BJ, Himes M, Chen-Min C, May MA, Price JC, Mathis CA, Frankle WG. Imaging of $D_{2/3}$ agonist binding in cocaine dependence: A [^{11}C]NPA PET study. Synapse 2011; 65(12): 1344-9

43. **Narendran R**, Lopresti BJ, Martinez D, Mason NS, Himes M, May MA, Daley DC, Price JC, Mathis CA, Frankle WG. In vivo evidence for reduced striatal vesicular monoamine transporter (VMAT2) availability in cocaine abusers. Am J Psych 2012; 169 (1): 55-63

44. Laymon CM, Narendran R, Mason NS, Carney JP, Lopresti BJ, Mathis CA, Mountz JM, Sashin D, Frankle WG. Human biodistribution and dosimetry of the PET radioligand [^{11}C]flumazenil. Mol Imaging Biol 2012; 14 (1): 115-22

45. Abi-Dargham A, Xu X, Thompson JL, Gil R, Kegeles LS, Urban NB, Narendran R, Hwang DR, Laruelle M, Slifstein M. Increased prefrontal cortical D1 receptors in drug naïve patients with schizophrenia: a PET study with [^{11}C]NNC112. J Psychopharmacol: 26 (6): 794-805

46. Bailer UF, Narendran R, Frankle WG, Himes ML, Duvvuri V, Mathis CA, Kaye WH. Amphetamine-induced dopamine release increases anxiety in individuals recovered from anorexia nervosa. Int. J. Eat Disord 2012; 45 (2): 263-71

47. Frankle WG, Cho RY, Mason SN, Chen C-M, Himes M, Walker C, Lewis DA, Mathis CA, **Narendran R**. [11C]flumazenil binding is increased in a dose-dependent manner with tiagabine induced elevations in GABA levels. PLoS One 2012: 7 (2):e32443

48. Huang Y, Narendran R, Bischoff F, Guo N, Bae S-A, Hwang D-R, Lesage A, Laruelle M. Synthesis and characterization of two PET radioligands for the metabotropic glutamate 1 (mGLU1) receptor. Synapse 2012; 66 (12): 1002-14

49. **Narendran R**, Frankle WG, Mason NS, Muldoon MF, Moghaddam B. Improved working memory but no effect on striatal vesicular monoamine transporter type 2 after omega-3 polyunsaturated fatty acid supplementation. PLoS One 2012;7(10):e46832

50. **Narendran R**, Himes M, Mason NS. Reproducibility of post-amphetamine [^{11}C]FLB 457 binding potential to cortical $D_{2/3}$ receptors. PLoS One 2013; 8(9):e76905

51. **Narendran R**, Jedema HP, Lopresti B, Mason NS, Gurnsey K, Ruskiewicz J, Chen C-M, Deuitch L, Frankle WG, Bradberry CW. Imaging dopamine transmission in the frontal cortex: a simultaneous microdialysis and [^{11}C]FLB 457 PET study. Molecular Psychiatry 2014; 19 (3): 302-10

52. Forbes EE, Rodriguez EE, Musselman S, **Narendran R**. Prefrontal response and frontostriatal functional connectivity to monetary reward in abstinent alcohol-dependent young adults PLoS One 2014; 9(5):e94640

53. **Narendran R,** Mason NS, Paris J, Himes ML, Douaihy AB, Frankle WG. Prefrontal cortical dopamine transmission is decreased in alcoholism. Am J Psych 2014; 171:881-888

54. Jedema H, Narendran R and Bradberry CW. Amphetamine-induced release of dopamine in primate prefrontal cortex and striatum: striking differences in magnitude and time course. J Neurochem 2014; 130 (4): 490-7

55. **Narendran R**, Jedema H, Lopresti BJ, Mason NS, Himes M, Bradberry CW. Decreased vesicular monoamine transporter, type 2 availability in the striatum following chronic cocaine self-administration in non human primates. Biol Psychiatry 2015; 77 (5): 488-92

56. **Narendran R**, Lopresti BJ, Mason NS, Deuitch L, Paris J, Himes M, Chowdari KV, Nimgaonkar VL. Cocaine abuse in humans is not associated with increased microglial activation: an 18-kDa translocator protein positron emission tomography imaging study with [^{11}C]PBR28. J Neurosci 2014; 34 (30)9945-50

57. Slifstein M, van de Giessen E, Snellenberg JV, Thompson JL, Narendran R**,** Gil R, Hackett E, Girgis R, Ojeil N, Moore H, D' Souza D, Malison RT, Huang Y, Lim K-P, Nabulsi N, Carson RE, Lieberman JA, Abi-Dargham A. Deficits in prefrontal cortical and extra-striatal dopamine release in schizophrenia: a PET fMRI study. JAMA Psychiatry 2015; 72 (4) 316-24

58. Frankle WG, Cho RY, Prasad KM, Mason NS, Paris J, Himes ML, Walker C, Lewis DA, **Narendran R**. In vivo measurement of GABA transmission in healthy comparison subjects and subjects with schizophrenia. Am J Psych 2015; 172 (11): 1148-59

59. Weidner LD, Paris A, Frankle WG, **Narendran R**. Safety of oral amphetamine administered during positron emission tomography scans in medically screened humans. PLoS ONE 2015; 10(12): e0140647. (doi:10.1371/journal.pone.0140647)

60. **Narendran R** and Frankle WG. Comment on the analyses and conclusions of, "Microglial activity in people at Ultra High Risk of Psychosis and in Schizophrenia: An [^{11}C]PBR28 PET Brain Imaging Study". Am J Psych 2016; 173(5):536-7.

61. **Narendran R**, Tumuluru D, May MA, Chowdari KV, Himes ML, Fasenmyer K, Frankle WG, Nimgaonkar VL. Cortical dopamine transmission as measured with the [^{11}C]FLB457 -amphetamine PET imaging paradigm is not influenced by COMT genotype. PLoS ONE 2016; 11(6):e0157867 (doi:10.1371/journal.pone.0157867)

62. Frankle WG, Narendran R, Wood AT, Suto F, Himes ML, Kobayashi M, Ohno T, Yamauchi A, Mitsui K, Duffy K, Bruce M. Brain translocator protein occupancy by ONO-2952 in healthy adults: A phase I PET study using [^{11}C]PBR28. Synapse 2017 Jul; 71(7) e21970

63. **Narendran R**, Ciccocioppo R, Lopresti B, Paris J, Himes ML, Mason NS. Nociceptin receptors in alcohol use disorders: a PET study using [^{11}C]NOP-1A. Biol Psychiatry 2018 Nov 15; 84(10): 708-14

64. Frankle WG, Paris JL, Himes ML, Mason NS, Mathis CA, **Narendran R.** Amphetamine-induced dopamine release measured with an agonist radiotracer in schizophrenia. Biol Psychiatry. 2018 Apr 15; 83(8):707-714

65. Frankle WG, Robertson B, Maier G, Paris J, Asmonga D, May MA, Himes ML, Mason NS, Mathis CA, **Narendran R**. An Open-Label Positron Emission Tomography (PET) Study to Evaluate Serotonin Transporter Occupancy Following Escalating Dosing Regimens of (R)-(-)-O-desmethylvenlafaxine and Racemic O-Desmethylvenlafaxine. Synapse. 2018 Mar; 72 (3) e22021

66. Gertler J, Tollefson S, Jordan R, Himes M, Mason NS, Frankle WG, **Narendran R**. Failure to detect amphetamine-induced dopamine release in the cortex with [^{11}C]FLB 457 positron emission tomography: methodological considerations. Synapse 2018 Jun 6:e22037

67. Tollefson S, Gertler J, Himes ML, Paris J, Kendro S, Mason NS, **Narendran R**. Imaging PDE10a availability in cocaine use disorders with [^{11}C]IMA107 and PET. Synapse 2019 Jan; 73 (1): e22070

68. **Narendran R**, Tollefson S, Fasenmyer K, Paris J, Himes ML, Lopresti B, Ciccocioppo R, Mason NS. Decreased nociceptin receptors are related to resilience and recovery in college women who have experienced sexual violence: therapeutic implications for PTSD. Bio Psychiatry 2019 Jun 15;85(12):1056-1064

69. **Narendran R**, Tollefson S, Himes ML, Paris J, Lopresti B, Ciccocioppo R, Mason NS. Nociceptin receptors are upregulated in cocaine use disorder: a positron emission tomography imaging study using [^{11}C]NOP-1A. Am J Psych 2019 Jun 1;176(6):468-476

70. Flanigan M, Tollefson S, Himes ML, Jordan R, Roach K, Stoughton C, Lopresti B, Mason NS, Ciccocioppo R, **Narendran R**. Acute Elevations in Cortisol Increase the In Vivo Binding of [^{11}C]NOP-1A to Nociceptin Receptors: A Novel Imaging Paradigm to Study the Interaction Between Stress- and Anti stress-Regulating Neuropeptides. Biol Psychiatry 2020: 87 (6): 570-76

71. Borruto AM, Fotio Y, Stopponi S, Brunori G, Petrella M, Caputi FF, Romualdi P, Candeletti S, Narendran R, Rorick-Kehn LM, Ubaldi M, Weiss F, Ciccocioppo R. NOP receptor antagonism reduces alcohol drinking in male and female rats through mechanisms involving the central amygdala and ventral tegmental area. Br J Pharmacol. 2020: 177(7):1525-1537

72. **Narendran R**, Mason NS, Himes ML, Frankle WG. Imaging cortical dopamine transmission in cocaine dependence: a [^{11}C]FLB 457-amphetamine positron emission tomography (PET) study. Biol Psychiatry 2020: 88(10):788-96

73. Flanigan MR, Royse SK, Cenkner DP, Kozinski KM, Stoughton CJ, Himes ML, Minhas DS, Lopresti B, Butters MA, **Narendran R**. Imaging beta-amyloid (Aβ) burden in the brains of middle-aged individuals with alcohol-use disorders: a [^{11}C]PIB PET study. Transl Psychiatry. 2021 May 1;11(1):257.

74. Tollefson S, Himes ML, Kozinski KM, Lopresti BJ, Mason NS, Hibbeln J, Muldoon M, **Narendran R.** Imaging the influence of red blood cell docosahexaenoic acid status on the expression of the 18 kDa translocator protein in the brain: a [11C]PBR28 positron emission tomography study in young healthy men. Biol Psychiatry Cogn Neurosci Neroimaging 2022 Oct; 7 (10): 998-1006

75. Frankle WG, Himes M, Mason NS, Mathis CA, Narendran R. Prefrontal and Striatal dopamine release are inversely correlated in schizophrenia. Biol Psych 2022 Nov 15; 92(10):791-799

76. Tollefson S, Stoughton C, Himes ML, McKinney, KE, Mason, NS, Cicoccioppo, R, and Narendran R. Imaging nociceptin opioid peptide receptors in alcohol use disorders with [11C]NOP-1A and PET: findings from a second cohort. Biol Psychiatry (in press)

2. Reviews, invited published papers, proceedings of conference and symposia, monographs, books and

book chapters

1. Leo RJ, **Narendran R**. Anticonvulsant use in the treatment of bipolar disorder: a primer for primary care physicians. Primary Care Companion- J Clin Psychiatry 1999; 1: 74-84

2. Hwang D-R, Narendran R, Laruelle M. Positron-labeled dopamine agonists for probing the high affinity states of dopamine subtype 2 receptors. Bioconjug Chem. 2005: 16(1):27-31.

3. Abi-Dargham A, Guo N, Narendran R, Hwang D-R, Ekelund J, Guillin O, Martinez D, Frankle G, Laruelle M. S40 prefrontal dopamine transmission in schizophrenia: is d1 receptor a relevant biomarker? Behavioral Pharmacology 2005 Suppl 1: S13

4. Laruelle M, Frankle WG, Narendran R, Kegeles LS, Abi-Dargham A. Mechanism of action of antipsychotic drugs: from dopamine D(2) receptor antagonism to glutamate NMDA facilitation. Clin Ther. 2005;27 Suppl A:S16-24.

5. Price JC, Laymon CL, Narendran R, Lopresti BJ. Single Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET). In: Handbook of Neuroimaging Research in Geriatric Mental Health (Aizenstein HJ, Reynolds, CF, III, Ferandes M, eds). New York: Springer Publishing, 2010; 17-70.

6. Martinez D and **Narendran R**. Imaging neurotransmitter release by drugs of abuse. Curr Top Behav Neurosci. 2010; 3: 219-45

7. Deuitch L and **Narendran R.** Imaging of neurochemical transmission in the Central Nervous System. Imaging of the Human Brain in Health and Disease (Seeman P, Madras B, Johnson JE). E-book: neuroscience-net at neuroscience.com

8. Tollefson S, Himes M, **Narendran R**. Imaging corticotrophin releasing factor-nociceptin interactions in addiction and PTSD models. International Review of Psychiatry 2017; 29(6):567-579

9. Frankle WG, Narendran R. Distinguishing schizophrenia subtypes: can dopamine imaging improve the signal to noise ratio? Biol Psychiatry. 2020 Feb 1;87(3):197-199.

10. Philips ML and Narendran, R. Elucidating neurobiological mechanisms of mania: critical next steps. Eur Neuropsychopharmacol. 2022 Sep 19;65:1-3.

11. Lopresti BJ, Royse SK, Mathis CA, Tollefson SA, and Narendran R. Beyond monoamines: I. Novel targets and radiotracers for Positron emission tomography imaging in psychiatric disorders. J Neurochem 2022 (In press)

12. Royse SK, Lopresti BJ, Mathis CA, Tollefson SA, Narendran R. Beyond monoamines: II. Novel applications for PET imaging in psychiatric disorders. J Neurochem 2022 (In press)

3. Published abstracts (select list)

1. **Narendran R**, Young CM, Pato MT, Grace J. Olanzapine therapy in treatment-resistant psychotic mood disorders-a long term follow-up study. Proc 153rd Annual Meeting, American Psychiatric Association Research Colloquium for Junior Investigators, Chicago, IL 2000.

2. **Narendran R**, Young CM, Valenti AM, Yap D, Pristach CA. Treatment of atypical antipsychotic resistant schizophrenia. Proc 154th Annual Meeting, American Psychiatric Association, New Orleans, LA

3. **Narendran R**, Talbot PS, Slifstein M, Sudo Y, Guo N, Hackett E, Ali M, Huang Y, Hwang D-R, Laruelle M. Effects of d-amphetamine on the binding of ^{18}F-fallypride in striatal and extrastriatal regions in baboons: single bolus and bolus plus constant infusion studies. Proc 49th Annual Meeting, Society of Nuclear Medicine, Los Angeles CA 2002

4. **Narendran R**, Talbot PS, Slifstein M, Sudo Y, Guo N, Hackett E, Ali M, Huang Y, Hwang D-R, Abi-Dargham A, Laruelle M. Effects of d-amphetamine on [^{18}F]fallypride binding in striatal and extrastriatal regions. Program No. 404.17. 2002 Abstract Viewer/Itinerary Planner. Orlando, FL: Society for Neuroscience, 2002. Online.

5. **Narendran R,** Talbot PS, Kegeles LS, Ngo K, Hackett E, Martinez D, Huang Y, Abi-Dargham A, Laruelle M, Hwang D-R. Comparison of the invivo vulnerability of a dopamine-2-agonist tracer [^{11}C]-N-propylnorapomorphine (NPA), with a D2 antagonist tracer [11C]raclopride, on striatal binding following an amphetamine challenge. T-118 2002 Abstract Viewer/Itinerary Planner. Puerto Rico: ACNP, 2002.

6. **Narendran R,** Talbot PS, Slifstein M, Sudo Y, Hackett L, Huang Y, Abi-Dargham A, Laruelle M. Vulnerability of [18F]fallypride in vivo binding in striatal and extrastriatal regions following a d-amphetamine challenge in baboons: Single bolus and bolus plus constant infusion studies. Schizophrenia Research 2003; 60 (1): 244.

7. **Narendran R**, Talbot PS, Kegeles LS, Martinez D, Huang Y, Ngo K, Hackett E, Castrillon J, Abi-Dargham A, Laruelle M, Hwang D-R. In vivo vulnerability to endogenous dopamine: comparison of the D_2 agonist tracer [^{11}C]NPA with the D_2 antagonist tracer [^{11}C]raclopride. JNM supplement 2003; 44(5) 2003:5 [Abstract #226]

8. **Narendran R**, Huang Y, Talbot PS, Erritzoe D, Hwang D-R, Sokoloff P, Mann A, Thomas C, Laruelle M. Pharmacological evaluation of the benzamide [11C]nafadotride as a potential PET imaging agent for the dopamine D3 receptors. JNM supplement 2003; 44(5) 2003; 5: [Abstract #231]

9. **Narendran R**, Talbot PS, Kegeles LS, Martinez D, Huang Y, Ngo K, Abi-Dargham A, Laruelle M, Hwang D-R. In vivo vulnerability to endogenous dopamine: comparison of the D_2 agonist tracer [^{11}C]NPA with the D_2 antagonist tracer [^{11}C]raclopride. Program No. 21.8, 2003 Abstract Viewer/Itinerary Planner. New Orleans, LA: Society for Neuroscience, 2003. Online.

10. **Narendran R**, Frankle WG, Keefe R, Gil R, Martinez D, Kegeles LS, Huang Y, Hwang D-R, Khenissi L, Cooper TB, Laruelle M, Abi-Dargham A. Dopaminergic alterations in human ketamine abusers. Abstract #26. Abstract Viewer/Itinerary Planner. Philadelphia, PA: Society for Nuclear Medicine, 2004. Online

11. **Narendran R**, Hwang D-R, Slifstein M, Hwang YC, Huang Y, Guillin O, Ekelund J, Martinez D, Abi-Dargham A, Laruelle M. Measurement of the D2 high affinity site receptor density (Rhigh) in baboons using [^{11}C]raclopride and [^{11}C]NPA. Program 123.12, 2004 Abstract Viewer/Itinerary Planner. San Francisco, CA: Society for Neuroscience, 2004. Online.

12. **Narendran R**, Slifstien M, Guillin O, Hwang Y, Hwang D-R, Scher E, Reeder S, Rabiner E, Laruelle M. Pharmacological evaluation of the novel D2/3 agonist radiotracer [11C]PHNO in anesthetized non-human primates: A potential D3 receptor preferring agonist? Neuroreceptor Mapping 2006, Copenhagen, Denmark. Neuroimage Vol 31, Suppl 2. Page T 116

13. **Narendran R**, Frankle WG, Mason N, Lopresti BJ, Litschge M, Vora SN, Asmonga D, Mountz J, Mathis CA. Imaging D2 agonist binding sites in healthy humans with [11C]NPA: Preliminary validation and reproducibility studies. Neuroreceptor mapping 2008, Pittsburgh, PA. Neuroimage Vol 41. Suppl 2. Page T41.

14. **Narendran R**, Mason N, Rabiner EA, Riddler K, May MA, Chen C-M, Kendro S, Mathis CA, Laruelle M, Frankle WG. Further validation of [11C]FLB 457 as a tool to measure prefrontal cortical DA release. Neuroreceptor mapping 2010, Glasgow, UK. Neuroimage Vol 52. Suppl 1. Page S40.

15. Forbes EE, Rodriguez E, Hariri A, Keating P, Himes M, **Narendran R**. Alcohol dependence: altered neural response to monetary reward? Biol Psychiatry 2011; 69: 1S: Page 272S

16. **Narendran R.** Validation of [C-11]FLB 457 as a tool to measure cortical dopamine release. Neuropsychopharmacology 2011; 36(S1): 20

17. Frankle WG, Robinson B, Maier G, Paris J, Asmonga D, Chen C-M, Maureen M, Mason NS, Mathis CA, **Narendran R.** An open label PET study to evaluate serotonin transporter (SERT) occupancy following escalating dose of desvenlafaxine. JCBFM 2012; 32: S59: P023

18. **Narendran R**, Jedema H, Lopresti B, Mason NS, Gurnsey K, Ruskiewicz J, Chen C-M, Mathis C, Frankle WG. Imaging dopamine transmission in the prefrontal cortex: a combined microdialysis and [11C]FLB 457 PET study. JCBFM 2012; 32: S157: P131

19. Deuitch L, Gurnsey K, Ruskiewicz J, Himes ML, Griswold K, Frankle WG, Jedema HP, Bradberry CW, **Narendran R.** Imaging of prefrontal cortical dopamine transmission with [11C]FLB 457 and amphetamine. Program No. 74.09.2012. Neuroscience Meeting Planner. New Orleans, LA, Society for Neuroscience, 2012, Online.

20. Himes ML, Pazehoski D, Riley M, Paris J, Deuitch L, Lopresti BJ, Muldoon MF, Moghaddam B, **Narendran R.** Omega-3 polyunsaturated fatty acid supplementation does not increase VMAT2 availability in humans. A [11C]DTBZ positron emission tomography study. Program No. 256.23.2012. Neuroscience Meeting Planner. New Orleans, LA, Society for Neuroscience, 2012, Online.

21. **Narendran R.** Imaging dopamine in prefrotal cortex. Page 436. Program/Abstracts. Dopamine 2013, Alghero, May 24-28, 2013, Online.

22. **Narendran R.** Imaging vesicular monoamine transporter, type2 in cociane dependence. Neuropsychopharmacology 2014; 40, SI-III: Panel Abstract 7.1

23. **Narendran R.,** Lopresti BJ, Paris J, Himes ML and Mason NS. Imaging nociceptive opioid peptide receptors in humans with alcohol use disorders. Biological Psychiatry May 15, 2017: 81: S277-S413

24. Tollefson S, Gertler J, Himes ML, Lopresti B, Mason NS, **Narendran R**. Cocaine abuse is not associated with an increase in medium spiny neurons: A phosphodiesterase 10a (PDE10a) PET study with [11C]IMA107. Biological Psychiatry May 15, 2018: 81: S277-S413

35. **Narendran R,** Tollefson S, Himes ML, Lopresti B, Mason NS. Imaging nociceptin receptors in cocaine use disorders with [11C]NOP-1A and PET. Neuroreceptor mapping 2018, authorea.com, Book of Abstracts NRM 2018 OP20

36. Flanigan MR, Tollefson S, Jordan R, Stoughton C, Himes ML, Lopresti B, Mason NS, **Narendran R**. Imaging corticotrophin releasing factor and nociceptin receptor interactions with [^{11}C]NOP-1A and PET. Brain PET 2019. JCBFM 39 (1_suppl):524-608, PP01-RO1.

37. Tollefson S, Stoughton C, Himes ML, Mason NS, **Narendran R**. Imaging nociceptive opioid peptide receptors in alcohol use disorders with [11C]NOP-1A and PET: findings from a second cohort. NRM 2021 Online. S-03-10

38. Tollefson S, Himes ML, Kozinski K, Lopresti B, Mason NS, **Narendran R**. Peripheral red blood cell docohexaenoic acid and serum triglyceride levels influence [11C]PBR28 binding in TSPO in the brain. NRM2021 Online P-TU-4-01

4. Other publications

None

5. Presentations:

None

PROFESSIONAL ACTIVITIES

TEACHING:

2006 - present Clinical supervision of PGY I to IV psychiatry residents at WPIC (elective rotation at resolve crisis)
Clinical preceptor for medical students at WPIC (elective rotation at resolve crisis)

2008- 2010 Mentor for PGY III and IV residents for research
(Natalie Velasquez, MD and Avinash Hosanagar, MD)

2011- 2015 'An introduction to human brain imaging techniques'
Guest lecture for undergraduate neuroscience students at the University of Pittsburgh for NROSCI 1042, "Neurochemical Basis of Behavior", Course Director: Dr. Bita Moghaddam

2013- 2015 'Neurobiology of addiction'
Lecture for the 'Introduction to Psychiatry Course' for UPSOM MS1
Course Director: Dr. Jason Rosenstock

2016 Guest faculty mentor for University of Pittsburgh Physician Scientist and Medical Scientis Training Program Journal Club (students: Audrey Kindsfather and Maryanna Owoc)

2016- 2017 Mentored undergraduate neuroscience students in PET research
(Savannah Tollefson and Joshua Gertler)

2017- 2021 Mentored medical student in PET Research
(Margaret Flanigan, MS4)

2020- current Mentored medical student in PET Research
(Savannah Tollefson, MS2)

RESEARCH:

Current Research Support:

R01 DA026472 Narendran (PI) 4/2009-6/2026
NIH/NIDA FY21 direct costs $444, 211; indirect costs $179, 008
PET Imaging of neurochemical transmission in cocaine use disorders
This study proposes to image corticotrophin releasing factor (CRF) and nociceptive opioid peptide receptor (NOP) interactions in cocaine use disorders with [^{11}C]NOP-1A and an intravenous hydrocortisone challenge. It also will characterize the relationship between midbrain NOP receptors and amphetamine-induced DA release in the striatum (as measured with [^{11}C]NPA and an oral amphetamine challenge) in CUD
Role: PI (45% effort)

Completed Research Support:

RO1AA025247 Narendran (PI) 7/2016 - 6/2020
NIH/NIAAA FY17 direct costs $336,117; indirect costs $186, 545
Imaging Nociceptin Receptors in Alcoholism
This study will use [^{11}C]NOP-1A and positron emission tomography to contrast the in vivo status of NOP receptors in human alcoholics with that measured in matched controls. In addition, it will also establish the relationship between NOP receptor availability and stress, anxiety and relapse to alcohol
Role: PI (37% effort)

RO1AA25247 S1 Narendran (PI) 2018
NIH/NIAAA FY18 direct costs $250, 000; indirect costs $86, 694
Imaging beta-amyloid in middle age alcoholics as a mechanism that increases risk for Alzheimer's disease
This study uses [^{11}C]PiB and PET to contrast the rate (%) of Ab positivity (+) in 40-65 year old alcoholics and controls. We hypothesize increased Ab+ in alcoholics will be increased compared to controls.
Role: PI (5% effort)

RO1 DA026472-08 S1 Narendran (PI) 2018
NIH/NIDA FY18 direct costs $99, 997; indirect costs $30, 558
PET Imaging of Cortical Dopamine Transmission in Cocaine Addiction
This study proposes to image [11]NOP-1A to image subjects with Opioid use disorders (OUD), and contrast the results with that in cocaine use disorders and healthy controls.

PR150716 Narendran (Partnering PI) 2016 – 2020
Department of Defense (DoD) Moghaddam (Partnering PI)
Total award (3 yrs) direct costs $959, 809; indirect costs $360, 332
Omega-3 Polyunsaturated Fatty Acid Status, Microglial Activation, Stress Resilience, and Cognitive Performance
The study will use parallel animal and human experiments to inform us of immunological mechanisms that underlie impaired stress resilience and cognitive performance in n-3 PUFA deficiency
Role: Partnering PI (10% effort)

R21 DA044555 Richardson (Multiple PI) 9/2017- 9/2019
NIH/NIDA Narendran (Multiple PI)
Exploration of mechanisms of effects of prenatal cocaine exposure in young adults
Role: Multiple PI

R21 DA042633 Narendran (PI) 7/2016-6/2018
NIH/NIDA
In vivo imaging of corticotropin releasing factor-nociceptin receptor interactions
This study will evaluate alterations in [^{11}C]NOP-1A binding following an acute intravenous hydrocortisone challenge in healthy humans
Role: PI

2015 NARSAD Independent Investigator Award Narendran (PI) 9/2015- 9/2017
Imaging nociceptin receptors (NOP) in post-traumatic stress disorder (PTSD) and resilience
This study proposes to evaluate nociceptin receptors in college women who have experienced sexual violence and difference in nociceptin receptors available between women who develop PTSD and those who did not.
Role: PI

1R01AA018330 Narendran (PI) 9/2009-8/2015
NIH/NIAAA
Imaging Cortical Dopamine Transmission in Alcohol Dependence
This study evaluates amphetamine-induced DA release with [^{11}C]FLB 457 in alcoholics
Role: PI

RO1 MH086523 Frankle (PI)/Narendran (PI) 11/2009-11/2015
NIH/NIMH
In vivo measurement of dopamine transmission in schizophrenia
To measure amphetamine-induced dopamine transmission in schizophrenia with [^{11}C]NPA and [^{11}C]FLB 457
Role: PI

Clinical Trials Agreement Narendran (PI) 2012- 2014
Ono Pharmaceutical Co., Ltd.
PET Imaging study to evaluate receptor occupancy of a novel ONO compound
Role: PI

RC1 MH088913 Phillips (PI) 10/2009-9/2012
NIH/NIMH/ARRA
Validation of Functional MRI-based Reward Processing Task as a Non-invasive Tool To Measure Dopamine Release
To validate a reward task with functional MRI and PET
Role: Co-Investigator

Clinical Trials Agreement Narendran (PI) 2008 – 2012
GlaxoSmithKline
Measurement of endogenous dopamine levels at baseline using [^{11}C]FLB 457
This study evaluates AMPT-induced DA depletion in the cortex
Role: PI

1R21DA023450 Narendran (PI) 03/15/2009 - 03/15/2012
NIH/NIDA
Imaging Dopamine D2 Agonist Binding Sites in Cocaine Dependence with [^{11}C]NPA
This study evaluates dopamine D_{2high} receptor sites in cocaine dependence
Role: PI

1R03DA024704-01A1 Narendran (PI) 05/15/2009 - 05/15/2011
NIH/NIDA/ARRA
Vesicular Monoamine Transporter 2 Imaging in Cocaine Abuse
This study evaluates [^{11}C]DTBZ binding sites in cocaine dependence
Role: PI

Clinical Trials Agreement Narendran (PI) 2006 – 2010
GlaxoSmithKline
Evaluation of cortical $D_{2/3}$ binding and amphetamine induced dopamine (DA) release with [^{11}C]fallypride and [^{11}C]FLB 457
This study contrasts [^{11}C]fallypride and [^{11}C]FLB 457 vulnerability to endogenous competition by dopamine following an acute amphetamine challenge.
Role: PI

5K08MH068762-04 Narendran (PI) 06/01/2005 - 06/01/2010
NIH/NIMH
Imaging of dopamine-2 (D2) receptor sites in schizophrenia.
This study evaluates dopamine D_{2high} receptor sites in schizophrenia
Role: PI

* Please refer to NIH Other Support for Co-I role on active grants

Seminars and invited lectureships:

UPMC Addiction Medicine / Addiction Psychiatry Lecture Series presentation June 23, 2021
Imaging nociceptive opioid peptide receptors in addictive disorders

CAMH Azrieli Centre for Neuro-Radiochemistry, Toronto, Canada, December 3, 2018
Imaging nociceptin receptors in addictive and stress disorders

Multimodal Translational Imaging Lab Talk, Stony Brook, NY, October 11, 2018
Imaging nociceptin receptors in stress and addictive disorders

Meet the PI Lecture, Department of Psychiatry, Pittsburgh, PA, Feb 23, 2018
Positron Emission Tomography Imaging in Addictive disorders

Brain PET 2017, Berlin, Germany, April 1-4, 2017
"Imaging nociceptive opioid peptide receptors in addictive disorders" in the symposium titled, 'PET Imaging in addictive disorders: Is there life beyond dopamine?'

Department of Radiology Research Seminar, Pittsburgh, PA, Sept 28, 2016
"PET Imaging of the brain in addictive disorders"

Research Society on Alcoholism, San Antonio, TX, June 23, 2015
"Neurochemical abnormalities in the prefrontal cortex in alcoholism" in the symposium titled, " Recent basic and clinical advances identifying mesocorticolimbic neurochemical, structural and synaptic neuroadaptations in ethanol dependence'

Yale PET Talks, New Haven, CT, Jun 16, 2014
"Imaging cortical dopamine transmission in alcoholism"

Colorado Translational Research Center Lecture, Denver, CO, Jul 19, 2013
"Dopamine transmission in cocaine addiction: linking the animal and human studies"

Dopamine 2013, Alghero, Italy, May 24-28
"Imaging dopamine in the prefrontal cortex' in the symposium titled, 'Imaging and the role of dopamine across addictions: differences and commonalities'

Lieber Center for Schizophrenia Research and Treatment, Columbia University, New York, NY, Apr 17, 2013
"Dopamine transmission in cocaine addiction: linking the animal and human studies"

10th International Symposium on Catecholamines, Pacific Grove, CA, Sept 11, 2012
" Dopamine transmission in cocaine addiction: linking the animal and human studies"

Departmental research conference, Department of Psychiatry, Johns Hopkins University School of Medicine, Baltimore, Mar 6, 2012
"Imaging dopamine transmission in addiction: moving beyond [11C]raclopride"

Grand Rounds, Department of Radiology, University of Pittsburgh, Pittsburgh, Oct 28, 2011
"Recent advances in imaging neurotransmitter release"

Guest Lecture, Sackler Institute, Weill Medical College of Cornell University, Center for Brain, Gene and Behavioral (CBGB) research across development and the Neuroscience Graduate Program, New York, NY, March 31, 2011
" Dopamine transmission in cocaine addiction"

Grand Rounds, Department of Psychiatry, University of Pittsburgh, Pittsburgh, Jan 28, 2011
"Recent advances in imaging neurochemical transmission"

Guest Lecture, Neuroscience Research Training Program (NRTP), Yale University, New Haven, CT, Sept 17, 2010
"Dopamine transmission in cocaine addiction-linking the animal and human studies"

Grand Rounds, State University of New York at Buffalo, Feb 12, 2010
"Recent advances in imaging neurochemical transmission in the brain with positron emission tomography"

IXth International Conf. on Quantification of Brain Function with PET (Brain PET), Chicago, IL, July 1, 2009,
Symposium, Measuring endogenous neurotransmitter release,
"Overview of imaging dopamine release with emission tomography methods"

Lieber Center for Schizophrenia Research and Treatment, Columbia University, New York, NY, Jan 7, 2009
"Imaging neurotransmitter release: moving beyond [C-11]raclopride"

Society for Nuclear Medicine Annual Meeting 2009, Brain Imaging Council, June 13, 2009
Course: A critical evaluation of molecular imaging in neuropsychiatry
"New paradigms in imaging transmitter release"

WFSBP Regional Symposium Marseille: South European Biological Psychiatry Associations Joint Meeting, Marseille, France, Nov 4
Symposium: Sensitization in schizophrenia and substance abuse: would the dopamine D_3 receptor have a key role?
"The role of dopamine in schizophrenia: evidences from PET imaging"

List of current research interests:
1. To develop and validate novel imaging paradigms to measure neurochemical transmission (e.g., cortical dopamine, GABA, nociception-CRH interactions, etc.) in humans
2. To use novel PET imaging paradigms to understand neurochemical abnormalities in addictive disorders
3. To characterize neuropeptides that regulate stress (corticotrophin releasing factor) and resilience (nociception, neuropeptide Y) in addiction.

Other activities (research service/administrative):
FDA Advisory Committee

6/2017- 6/2021	**Chair, Psychopharmacology Drug Advisory Committee (PDAC)**
2/2016 - 6/2021	**Permanent member (voting), Psychopharmacology Drug Advisory Committee**
4/2021	Chair and permanent member (voting) Psychopharmacologic Drug Advisory Committee (carbetocin nasal spray)
10/2020	Chair and permanent member (voting) Psychopharmacologic Drug Advisory Committee (AR19, amphetamine sulfate)
	Chair and permanent member (voting) Psychopharmacologic Drug Advisory Committee (olanzapine/samidorphan)
3/2019	Chair and permanent member (voting) Psychopharmacologic Drug Advisory Committee (esketamine)
11/2018	Chair and permanent member (voting) Psychopharmacologic Drug Advisory Committee (brexanolone)
	Chair and permanent member (voting) Psychopharmacologic Drug Advisory Committee (buprenorphine/samidorphan)
3/2018	Chair and permanent member (voting) Psychopharmacologic Drug Advisory Committee (lofexidine hydrochloride)
10/2017 & 11/2017	Chair and permanent member (voting) Joint Meeting Psychopharmacology Drug Advisory Committee and Drug Safety and Risk Management Advisory Committee (Buprenorphine subcutaneous injection, submitted by Indivior Pharmaceuticals & Braeburn Pharmaceuticals)
9/2016	Permanent member (voting), Joint Meeting Psychopharmacology Drug Advisory Committee and Drug Safety and Risk Management Advisory Committee (Varenicline)
3/2016	Temporary member (voting), Psychopharmacology Drug Advisory Committee (Pimavanserin)
2/2016	Temporary member (voting), Psychopharmacology Drug Advisory Committee (Vortioxetine)
1/2016	Temporary member (voting), Psychopharmacology Drug Advisory Committee (Probuphine)
12/2015	Temporary member (voting), Psychopharmacology Drug Advisory Committee (Gepirone ER)

NIH Study Sections

07/2020	Temporary member, 2020/10 ZMH1 ERB-N (02) R Special emphasis panel Early phase clinical trials, Pharma/Device
01/2019	Ad hoc reviewer, NIMH Board of Scientific Counselors Intramural program review
07/2017	Temporary member, ZRG1 BDCN-J (02) M, Member Conflict application review
08/2016	Temporary member, ZRG1BDCN-W (05), Member Conflict application review

04/2016 Temporary member, ZRG1 BDCN-W (05), Member Conflict application review
09/2015 Temporary member, ZRG1-IFCN-B (40), PAR13-259: P01 review Drug Addiction
06/2015 Temporary member, ZRG1-BDCN-A-02, Member Conflict applications review
03/2015 Temporary member, ZRG1-BDCN-C-02, Member Conflict applications review
03/2015 Temporary member, ZRG1-BDCN-A-02, Member Conflict applications review
02/2015 Temporary member, ZDA1-MXL-F-06 NIDA I/START Small grant review
10/2014 Temporary member, ZRG1-IFCN-B (50), PAR 13-259: P01 review Drug Addiction
2010-2014 **Permanent member, Neural Basis of Psychopathology, addictions and sleep disorders study section (NPAS)**
11/2013 Temporary member, ZAA1 DD (04) NIAAA Member Conflict applications review- Basic sciences
03/2013 Temporary member, ZAA1 DD (04) NIAAA Member Conflict applications review- Neuroscience
2012 Temporary member, ZRG1-BDCN-W (02) M Neuroimmunology, Multiple sclerosis, Alzheimer's Dementia, Sleep Apnea and Restless Legs Syndrome
2012 Temporary member, ZAA1 DD (01) NIAAA Member Conflict applications review- Biosciences
2010 Temporary member, ZRG1-BDCN-C (85) NIMH Special Emphasis Panel
2009-2010 Temporary member, Neural Basis of Psychopathology, addictions and sleep disorders study section (NPAS)

NIH Work Groups
2011 NIMH Research Domain Criteria (RDoC) Positive Valence System Workshop

VAMC Grant Study Sections
2011 Temporary member, Special Emphasis Panel (SPLD), Research on Gulf War Veterans' Illness

Canada Research Chairs Program
2020 Reviewer

Yale Diabetes Research Center, Pilot Project Application
2016 Reviewer

Rachel Upjohn Clinical Scholars Award, University of Michigan Comprehensive Depression Center
2015 Reviewer

WWTF Vienna Science and Technology Funds
2015 Reviewer, Cognitive Science Projects

University of Pittsburgh School of Medicine Committees
2011- 2014 Member, Standing committee for Non-Tenured Faculty Promotions and Appointments
2018- Current Member, Institutional Review Board

Departmental Committee
2010- 2015 Member, Committee for recruitment of faculty in mechanisms of addiction
Department of Psychiatry, University of Pittsburgh, Pittsburgh, PA
2011- 2015 Member, MR Research Center User Advisory Committee,
Department of Radiology, University of Pittsburgh, Pittsburgh, PA

Peer Review for Journals
JAMA Psychiatry
American Journal of Psychiatry (Associate Editor, 2017-2021)
Biological Psychiatry (Member, Editorial Board, 2013-Present)
Biological Psychiatry Cognitive neuroscience and neuroimaging (Member, Editorial Board, 2015- Present)
Bipolar Disorders
Journal of Cerebral Blood Flow and Metabolism
Journal of Neuroscience
Journal of Nuclear Medicine

Molecular Psychiatry
Neuropsychopharmacology
PLOS One (Academic Editor, Editorial Board, 2014-2018)
Proceedings of National Academy of Sciences
Psychopharmacology
Schizophrenia Bulletin
Synapse
Translational Psychiatry

Peer review for meetings

2008 -2012 Scientific Review Committee, Neuroreceptor Mapping
2008- 2014 Society for nuclear medicine abstract reviewer