**Michael L. Rohan**
**Curriculum Vitae**


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**Work FAX:** N/A

**Place of Birth:** Cleveland, OH


## Education

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|---|---|
| **1985** | S.B. (Mathematics), Massachusetts Institute Of Technology |
| **1986** | S.B. (Physics), Massachusetts Institute Of Technology |
| **1986** | S.M. (Physics), Massachusetts Institute Of Technology |
| **2009** | Ph.D. (Physics), Tufts University |

## Other Professional Positions

| | |
|---|---|
| 1986-1992 | Physicist, Advanced NMR Systems, Inc |
| 1992-1999 | Senior Physicist, Advanced NMR Systems, Inc / Caprius, Inc. |
| 1999-2018 | Imaging Physicist, McLean Hospital |
| 2018-2022 | Director of High Field MR Systems, McLean Hospital |
| 2022 | Chief Technology Officer/Director of MRI, Laureate Institute for Brain Research |

## Faculty Academic Appointments

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|---|---|
| 1999-2022 | Lecturer in Psychiatry, Department of Psychiatry, Harvard Medical School |

## Appointments at Hospitals/Affiliated Institutions

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|---|---|
| 1999-2018 | Imaging Physicist, McLean Hospital, Belmont, MA |
| 2018-2022 | Director of High Field MR Systems, McLean Hospital |
| 2022- | Chief Technology Officer / Director of MRI, Laureate Institute for Brain Research |

**Major Administrative Leadership Positions**

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|---|---|
| 2018-2022 | Director of High Field MR Systems, McLean Hospital |
| 2022 | Chief Technology Officer/Director of MRI, Laureate Institute for Brain Research |

**Committee Service**

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|---|---|
| 2008- | 9.4T Steering Committee, McLean Hospital |
| 2012 | EE Lab Steering Committee, McLean Hospital |

**Editorial Activities**

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|---|---|
| 2020- | *Ad hoc* Reviewer, IEEE Transactions on Biomedical Engineering |
| 2003- | *Ad hoc* Reviewer, Neuropsychopharmacology |
| 2003- | *Ad hoc* Reviewer, Biological Psychiatry |
| 2005- | *Ad hoc* Reviewer, Depression and Anxiety |
| 2006- | *Ad hoc* Reviewer, Progress in Neuro-Psychopharmacology & Biological Psychiatry |
| 2006- | *Ad hoc* Reviewer, International Journal of Radiation Biology |
| 2017 | *Ad hoc* Reviewer, Brain Stimulation |

**Honors and Prizes**

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|---|---|
| 2006 | Technology Investigation Award, Massachusetts Technology Transfer Center |
| 2014 | Innovation Development Grant Award, Partners HealthCare |
| 2014 | Featured in the McLean Hospital 2014 Annual Report |

# Report of Funded and Unfunded Projects

**Funding Information**

**Past**

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|---|---|
| 1999-2003 | High Field Magnetic Resonance Research to Define the Effects of and Improve the Treatment of Substance Abuse and Dependence (P.F. Renshaw M.D., Ph.D.)<br>RDABT63-99-CC (ONDCP)<br>Investigator<br>Development of fMRI techniques at 4.0T for the study of substance abuse. |
| 2001-2003 | MRI Methods Development at 4.0T<br>Varian Inc. (Sponsored research and development)<br>Principal investigator ($100,000)<br>The development of MRI acquisition and processing techniques at 4.0T |
| 2001-2006 | High Field MR Research in Drug Abuse: A Bioengineering Partnership (Perry F. Renshaw M.D., Ph.D.)<br>5R01DA014178-03 (NIH/NIDA)<br>Investigator<br>The development of a consortium of investigators with an interest in high-field MRI research in substance abuse |

**past continued**

2002-2006 Cocaine and Steroids: Brain Vascular and Behavioral Effects (Perry F. Renshaw M.D., Ph.D.)
5R01DA014674-03 (NIH)
Investigator
To determine whether estrogen, progesterone, and testosterone alter cocaine pharmacokinetics and cocaine's acute cerebral vaso-constrictive effects.

2003-2008 Effects of Emotional Maltreatment on Brain Function (Martin H. Teicher, M.D., Ph.D.)
5R01MH066222-02 (NIH)
Investigator
To test the hypothesis that adults who have been exposed to emotional maltreatment during childhood have abnormalities in brain regions that regulate emotion, aggression and cognition using MRI assessments.

2003-2007 Early Stress and Neural Substrates Relevant to Addiction (Martin H. Teicher, M.D., Ph.D.)
5R01DA016934-02 (NIH)
Investigator
To test the hypothesis that exposure to chronic repeated stressors during childhood produces a cascade of molecular and cellular events that exert enduring effects on structural and functional brain development, and that these changes are responsible for the enhanced vulnerability to substance use, addiction or relapse.

2004-2006 MRI Methods Development
Siemens Inc (Sponsored research and development)
Principal investigator ($57,500)
Development of MRI methods at 3.0T

2004-2009 Early Stress, PTSD, and the Neurobiology of Addiction (Martin H. Teicher, M.D., Ph.D.)
1R01DA017846-01 (NIH)
Investigator
To provide new insights into the neurobiological effects of chronic childhood traumatic stress and new understandings of the potential for PTSD and depression to mediate, and MAO-A levels to moderate, the association between early stress and drug abuse.

2007-2009 Low Field Magnetic Stimulation (LFMS) Treatment for Depression in Bipolar Disorder
Stanley Medical research Foundation (07TGS-1045) (Private foundation)
Principal Investigator ($294,508)
This study was the first investigation of the LFMS device, an electromagnetic treatment for depression that was developed at McLean Hospital. This study used a single treatment visit in bipolar disorder and major depressive disorder patients.

2008-2010 Low Field Magnetic Stimulation in a Rodent Model of Depression
1R21 MH085217-01 (NIH)
Principal Investigator ($275,000)
To investigate the dose-response effect of LFMS in a rodent model of depression, the forced swim test.

**past continued**

2009-2010 MRI/MRS Studies of Bipolar Treatment Response (Perry F. Renshaw M.D., Ph.D.)
2R01MH058681-04A2 (NIH)
Investigator
The role of mitochondrial dysfunction in bipolar disorder.

2010-2015 Sex/Gender And Nicotine Addiction: Hormones, Behavior And Neuroimaging (Scott E. Lukas, Ph.D.)
5R01DA025065-02 (NIH)
Co-Investigator
We propose to study how sex and phase of the menstrual cycle may influence the hormonal, neuroimaging and abuse-related effects of nicotine (the main addictive component of tobacco) in nicotine- dependent men and women.

2010-2015 Sensitive Periods, Brain Development And Depression (Martin H. Teicher, M.D., Ph.D.)
2013-2017 1R01MH091391-01 (NIH)
Co-Investigator
We will test the hypothesis that the psychiatric consequences of exposure to early abuse and loss depend on the timing of the stressor in relation to neurodevelopmental sensitive periods, which are influenced in amplitude and timing by hereditary factors and modulated by protective factors.

2011-2015 Sensitive Periods Development and Substance Abuse (Susan H. Andersen, Ph.D.)
1R01DA026485-01A2 (NIH)
Co-Investigator
The goal of the proposed research is to determine whether elevated expression of the D1 dopamine receptor in the prefrontal cortex contributes to vulnerability to substance use in developing animals and can serve as a biomarker for early detection.

2013-2015 Treatment of Bipolar Depression in a Three Visit Protocol with Low Field Magnetic Stimulation
The Depressive and Bipolar Disorders Alternative Treatment Foundation
Principal Investigator ($327,433)
This study will test the LFMS electromagnetic treatment for depression in a population of depressed BPD patients in a three-treatment protocol.

2010-2015 LFMS Biomarkers
The Shervert Frazier Institute (internal project funding)
Principal Investigator ($100,000)
This project seeks to observe physiologic or metabolic biomarkers associated with the LFMS device. Near Infrared Spectroscopy is used.

2016-2016 LFMS-NIRS Data Analysis Project
Tal Medical, Inc.
Principal Investigator ($69,000)
This project provides the initial analysis of NIRS observations made of the effects of LFMS.

**past continued**

2016-2016 LFMS System controller design
Sheppard-Pratt Hospital
Principal Investigator ($51,000)
This project provides partial support for the design of a next generation LFMS system.

2016-2016 LFMS Bipolar Data Access
Tal Medical, Inc.
Principal Investigator ($56,000)
This project provided access to the data from the completed DBDAT foundation study.

2017-2022 Effects of Litebook
Litebook Ltd (Teicher)
Investigator
This is an fMRI evaluation of the cognitive effects of LiteBook in students.

2016-2018 A noninvasive optical monitoring device system for diagnosis and quantitative monitoring of peripheral artery dysfunction
Partners Innovation Discovery Grant (Frederick)
Investigator
This is an evaluation of a NIRS based peripheral vascular delay algorithm for the diagnosis of PAD

2015-2020 Neurobiology of Mothering and infant stress
5R01HD079484-03 (Teicher)
Investigator
This is an investigation into the neurobiological changes in mothering, observed clinically and with fMRI

2017-2019 LFMS in geriatric depression
Rogers Family Foundation (Forester)
Investigation of the behavioral effects of LFMS in geriatric depression
Investigation of the imaging effects of LFMS in geriatric depression

2018-2020 Open fMRI Study of the Neurobiological Effects of Intranasal Ketamine in Children and Adults with Bipolar Disorder – Fear of Harm Phenotype
Juvenile Bipolar Research Foundation (Teicher)
Resting state fMRI at 3.0T

2018 Nielsen Trust Fund for Spirituality
Nielsen Foundation (Rosmarin)
fMRI study of spirituality and depression in geriatric subjects.

2018-2020 Translational models of brain
5K01DA039306-05
NIH K Award (Kohut)

2020-2024 Synthetic Psychoactive "Bath Salt" Effects on Brain Activity and Behavior
5R01DA048150-02 (Kohut)
9.4T fMRI studies of cathinone in squirrel monkeys

2018-2023 Delineating The Role Of Serotonin 5-Ht2 Receptors In Opioid Use Disorders
5R01DA047130-02 (Booth, Kohut)
Investigator
Pharmacologic and resting state fMRI study of opioid treatments in squirrel monkeys at 9.4T

**Current**

2018-present 9.4T Program (Lukas, Pizzagalli)
Scientific development and administration of the 9.4T program

2019-2024 Neural, Cognitive and Abuse-Related Consequences of Chronic THC Exposure
1R01DA047575-01A1 (Bergman)
Investigator
Resting fMRI, DTI and VBM studies of chronic and developmental THC exposure in squirrel monkeys at 9.4T

2016-2021 Mechanisms of Cerebrovascular Reactivity in Health and Disease
5R01NS097512-02 (Frederick)
Investigator
This is an fMRI and ASL investigation of cerebral blood flow and hemodynamics

2019-2021 Geriatric depression
Rogers Family Foundation (Forester)
Investigation of the imaging effects of LFMS in geriatric depression
An investigation of changes to resting state fMRI behavior in geriatric depression

2020-2025 Early Stress and the Neurobiology of Susceptibility and Resilience to Substance Use Disorders
2R01DA017846-11A1 (Teicher)
The first comprehensive test of the ecophenotype hypothesis that there are unique maltreated and non-maltreated substance use disorder subtypes with distinctly different molecular and neurobiological signatures.

Current Unfunded Projects

2015-present Sensitive Periods Development and Substance Abuse
with Susan H. Andersen, Ph.D.
Analysis of fMRI data acquired at 9.4T, observations of response to cocaine-cued odor stimulation in virally modified rats. The goal of the proposed research is to determine whether elevated expression of the D1 dopamine receptor in the prefrontal cortex contributes to vulnerability to substance use in developing animals and can serve as a biomarker for early detection.

2015-present Sex/Gender And Nicotine Addiction: Hormones, Behavior And Neuroimaging
Continued analysis of fMRI data of clinical response to IV nicotine injections

2004-present Low Field Magnetic Stimulation Technology
This effort pursues the further development of the LFMS device and the mechanism of its effect on depression through collaboration, clinical and preclinical studies, and system design.

2014-present Functional Imaging of the effects of LFMS
Unfunded
Principal Investigator
Preliminary observations of the effects of LFMS in subjects using fMRI, EEG, and fNIRS.

2019-present Image Processing and Analysis Systems
Internal Funding
Principal Investigator

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|---|---|---|
| 2019-present | Design of High Field RF Coils<br>Unfunded<br>Principal Investigator | |

# Report of Local Teaching and Training

**Teaching of Students in Courses**

| | | |
|---|---|---|
| 1994 | Diffusion Effects in MRI | Lecture |
| | RST Seminar Series, MIT | Guest lecture |
| 2014-2017 | Math 7203 Numerical Analysis | Instructor |
| | Northeastern University | (course founder) |

**Laboratory and Other Research Supervisory and Training Responsibilities**

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|---|---|---|
| 1999 | MRI Basics for Research Staff | Lecture |
| | Laboratory training lecture series | Yearly |

**Formally Supervised Trainees**

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|---|---|
| 2000-2005 | Justin Eskesen B.A. / Software Engineer<br>Wrote a MRI processing and database system for fMRI at the McLean Imaging Center and maintained image analysis tools for the MIC. |
| 2000-2001 | Ilya Lipovsky / B.U. undergraduate. Supervised programming in C for image analysis. |
| 2003-2004 | Lucinda Kussmaul B.S. / Research Assistant<br>Instructed in the analysis of DTI MRI data |
| 2005-2006 | Charlotte Haws B.A. / Research Assistant Instructed in the analysis of MRI data |
| 2006-2007 | Megan Shanahan B.S. / Research Assistant Instructed in the analysis of fMRI data |
| 2004-2012 | Kenroy Cayetano M.S.E.E. / Electrical Engineer, McLean Hospital<br>Fabricated the LFMS Device, an electromagnetic medical device and designed and fabricated the RF coil and animal handling system for the 9.4T MRI at McLean Hospital |
| 2008 | Christopher Lo B.S. Supervised as EE Lab assistant in summer job. |
| 2008 | Bora Kim M.D. / visitor Instructed in the analysis of DTI data. |
| 2008-2016 | Rinah Yamamoto Ph.D. / Instructor, HMS and McLean Hospital<br>Mentored in the analysis of fMRI data (1 publication) and supervised in conduct of clinical trials of LFMS (1 publication); “Basic Science” award at SOBP conference 2010. |
| 2009-2012 | Kyoko Ohashi Ph.D. / Instructor, HMS and McLean Hospital<br>Supervised in the conduct of pre-clinical behavioral experiments and mentored in the analysis of fMRI data. |
| 2012-2016 | Clara Wellons B.A. / Research Assistant Instructed in data analysis, GMP, image analysis, and EEG. |
| 2013-2016 | Sierra Fuller B.A. / Research Assistant Supervised in the coordination of a clinical study |

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| 2014-2015 | Matthew Murphy B.A. / Research Assistant, McLean Hospital<br>Supervised in the analysis of fMRI data. |
| 2015 | Jinghan Yang, Graduate Mathematics Student, Northeastern Univ.<br>"Linear algebra in RF Coil Design" within the McLean-NEU research affiliation program |
| 2015 | Xu Sun Yang, Graduate Mathematics Student, Northeastern Univ.<br>"Boundary Condition Solutions in LFMS" within the McLean-NEU research affiliation program |
| 2015-2016 | Roaa Alsharif, Graduate Bioengineering Student, UMass Lowell<br>"Differential Response to Presentation of Facial Affect in Subjects with a History of Abuse" Ph.D. thesis" within the McLean-UML research affiliation program for 2015, and outside of that program during 2016. |
| 2016 | Ruo Yang, Graduate Mathematics Student, Northeastern Univ.<br>"Boundary Condition Solutions in LFMS" within the McLean-NEU research affiliation program |
| 2016 | Lihao Ye, Graduate Mathematics Student, Northeastern Univ.<br>"Boundary Condition Solutions in LFMS" within the McLean-NEU research affiliation program |
| 2017- | Steven Kohut Ph.D., mentoring as part of his NIDA K01 Award |
| 2018 | Pin Huang, Northeastern Univ. Coop student |
| 2019 | Shengwen Wang, Northeastern Univ. Coop student |
| 2019 | Yucong Chen, Northeastern Univ. Coop student |
| 2019 | Fernando Moura, NIH T32 fellow |
| 2020 | Vy Nguyen, Northeastern Univ. Coop student |
| 2021 | Sebastian Ardila, Northeastern Univ. Coop Student |
| 2021 | Thane Gallo, Northeastern Univ. Coop Student |
| 2022 | Jose Barbosa Hurtado, Northeastern Univ. Coop Student |

**Formal Teaching of Peers (e.g., CME and other continuing education courses)**

No presentations below were sponsored by outside entities

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|---|---|---|
| 2011 | "Optimization of fMRI Acquisition and Minimization of Artifacts"<br>A 'Short Course in Functional Magnetic Resonance Imaging'<br>Martinos Center, Massachusetts General Hospital | Lecture |

# Report of Regional, National and International Invited Teaching and Presentations

No presentations below were sponsored by outside entities

**Regional**

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|---|---|
| 2005 | "Low Field Magnetic Stimulation: Mood Effects in Bipolar Subjects and Rodents,"<br>"Learning and the Brain" Conference, Hyatt Regency Hotel Cambridge |

**National**

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| 1991 | "Stimulation by Time-Varying Magnetic Fields"<br>Conference: "Biological Effects and Safety Aspects of Nuclear Magnetic Resonance Imaging and Spectroscopy"<br>New York Academy of Sciences, Bethesda, MD |
| 2004 | "Low Field Magnetic Stimulation: Anti-Depressant Effects With MRI Strength Fields." The Bioelectromagnetics Society<br>Washington DC |
| 2011 | "Antidepressant Effects of Low Field Magnetic Stimulation"<br>Department of Psychiatry, Cornell-Weill School of Medicine, Columbia University, New York NY |
| 2012 | "Low Field Magnetic Stimulation: Rapid Effects on Mood"<br>American Society of Clinical Psychopharmacology (NCDEU), Phoenix, AR. |
| 2016 | "Low Field Magnetic Stimulation: A Fast-Acting Treatment for Depression" The Clinical TMS Society, Atlanta, GA. |
| 2016 | "Low Field Magnetic Stimulation: A Fast-Acting Treatment for Depression" CooperRiis Healing Community, Asheville, NC. |
| 2016 | "Low Field Magnetic Stimulation: A Fast-Acting Treatment for Depression" The Carolinas HealthCare System, Charlotte, NC. |

**International**

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| 1995 | "MRI Safety and Bioeffects"<br>Society for Magnetic Resonance in Medicine, New York |
| 2003 | "Diffusion Imaging in MRI" / Week-long seminar and workshop<br>Khon Kaen University, Thailand |
| 2004 | Workshop on superconducting materials in MRI / Week-long Seminar and workshop<br>Hong Kong University, Hong Kong |
| 2006 | "Antidepressant-like Effects of Low Field Magnetic Stimulation"<br>Society of Biological Psychiatry, Toronto CA |
| 2012 | "fMRI Principles and Applications"<br>Hyogo University, Kobe, Japan |
| 2015 | "Low Field Magnetic Stimulation in the Treatment of Depression"<br>Invited Symposium<br>Society of Biological Psychiatry 70th Meeting May 2015, Toronto CA |
| 2017 | The Science of Consciousness conference June 2017, LaJolla California "The Effects of Low Field Magnetic Stimulation on Mood and Brain Function"<br>Invited Plenary |
| 2017 | The Science of Consciousness conference June 2017, LaJolla California<br>Brain stimulation effects on consciousness<br>Invited workshop |

# Report of Technological and Other Scientific Innovations

# (Patents)

1. Rohan ML, Evans R; Advanced NMR Systems, Inc. Gradient Coil Power Supply and Imaging Method. US 5,521,507. 1996 May 28.
2. Rohan ML, Evans R; Advanced NMR Systems, Inc. Gradient Coil Power Supply and Imaging Method. US 5,684,402. 1997 Nov 4.
3. Rohan ML, Parow A, Renshaw PF; McLean Hospital. Magnetic Field Stimulation Techniques. US patent US 6,572,528. 2003 Jun 3.
4. Frederick BdeB, Rohan ML; McLean Hospital. Generation of synthetic nuclear magnetic resonance signals. US 6,861,840. 2005 Mar 1.
5. Rohan, Michael L; Parow, Aimee; Renshaw, Perry F; McLean Hospital. Magnetic Stimulation Techniques. US 7,033,312. 2006 Apr 25.
6. Rohan, Michael L; Parow, Aimee; Renshaw, Perry F; McLean Hospital. Magnetic Stimulation Techniques. US 7,282,021. 2007 Oct 16.
7. Michael L. Rohan, Perry F. Renshaw, Aimee Parow; McLean Hospital. Magnetic Field Treatment Techniques. US 8,047,979. 2011 Nov 1.
8. Rohan; Michael L., Renshaw; Perry, Parow; Aimee; McLean Hospital. Magnetic Field Treatment Techniques. US 8,303,480. 2012 Nov 6.
9. Rohan, Michael, L.; Parow, Aimee; Renshaw, Perry, F. Magnetic Field Stimulation Generator. EP1390096B1. 2012 Nov 28.
10. Rohan, Michael L.; Renshaw, Perry; Parow, Aimee; McLean Hospital. Magnetic Field Treatment Techniques. 8,702,582. 2014 Apr 22.
11. Rohan, Michael L.; McLean Hospital. Magnetic Field Stimulation US 9,737,726. 2017 Aug 22
12. Rohan, Michael L.; McLean Hospital. Magnetic Field Stimulation. JP 619809 (2014-533317)
13. Rohan, Michael L.; McLean Hospital. Magnetic Field Stimulation. US 10,426,969. 2019 Oct 1.
14. Rohan, Michael L.; McLean Hospital. Magnetic Field Stimulation. CA 2887370. 2021 March 23
15. Rohan, Michael L.; McLean Hospital. Magnetic coil with two layers or comprising part of a spherical surface. EP2760542A2. 2022 June 8.

# Report of Education of Patients and Service to the Community

**Activities**

| | | |
|---|---|---|
| 2007- | Summer student sponsorship<br>2007 Russell Wolf, high school summer student intern<br>2009 Pierre Boucher, McLean Student Visitor Program<br>2010 Pierre Boucher, summer undergraduate student employee<br>2011 Tucker Smith, McLean Student Visitor Program<br>2012 Clara Wellons, McLean Student Visitor Program<br>2014 Matthew Murphy, McLean Student Visitor Program<br>2017 Jacob Van Almelo, McLean student visitor program<br>2018 Danielle Lobo, McLean student visitor program<br>2018 Cameron Costanza, McLean student visitor program | Yearly |
| 2015 | "Neuroscience and Development" (invited presentation)<br>SomaHouse, Kobe, Japan | |

# Report of Scholarship

**Peer reviewed publications in print or other media**

1. **Rohan ML**, Rzedzian RR. Stimulation by time-varying magnetic fields. Ann N Y Acad Sci. 1992;649:118-128.

2. **Rohan M**, Parow A, Stoll AL, Demopulos C, Friedman S, Dager S, Hennen J, Cohen BM, Renshaw PF. Low-field magnetic stimulation in bipolar depression using an MRI-based stimulator. Am J Psychiatry. 2004;161(1):93-98.

3. Schiffer F, Mottaghy FM, Pandey Vimal RL, Renshaw PF, Cowan R, Pascual-Leone A, Teicher M, Valente E, **Rohan M**. Lateral visual field stimulation reveals extrastriate cortical activation in the contralateral hemisphere: an fMRI study. Psychiatry Res. 2004;131(1):1-9.

4. Hirashima F, Parow AM, Stoll AL, Demopulos CM, Damico KE, **Rohan ML**, Eskesen JG, Zuo CS, Cohen BM, Renshaw PF. Omega-3 fatty acid treatment and T(2) whole brain relaxation times in bipolar disorder. Am J Psychiatry. 2004;161(10):1922-1924.

5. Carlezon WA Jr, **Rohan ML**, Mague SD, Meloni EG, Parsegian A, Cayetano K, Tomasiewicz HC, Rouse ED, Cohen BM, Renshaw PF. Antidepressant-like effects of cranial stimulation within a low-energy magnetic field in rats. Biol Psychiatry. 2005;57(6):571-576.

6. Anderson CM, Kaufman MJ, Lowen SB, **Rohan M**, Renshaw PF, Teicher MH. Brain T2 relaxation times correlate with regional cerebral blood volume. MAGMA. 2005;18(1):3-6.

7. Ongur D, Cullen TJ, Wolf DH, **Rohan M**, Barreira P, Zalesak M, Heckers S. The neural basis of relational memory deficits in schizophrenia. Arch Gen Psychiatry. 2006;63(4):356-365.

8. Silveri, MM, **Rohan, ML**, Pimentel, PJ, Gruber, SA, Rosso, IM, Yurgelun-Todd, DA. Sex differences in the relationship between frontal white matter microstructure and impulsivity in adolescents. Magn Reson Imaging. 2006;24(7):833-841.

9. Yuan J, **Rohan ML**, Shen GX. Investigation of Bi-2223 high temperature superconducting tape as the material for gradient coil in MRI. J Magn Reson, 2006;182(2):298-307.

10. Yurgelun-Todd DA, Silveri MM, Gruber SA, **Rohan ML**, Pimentel PJ. White matter abnormalities observed in bipolar disorder: a diffusion tensor imaging study. Bipolar Disord. 2007;9(1):504-512.

11. Frazier JA, Breeze JL, Papadimitriou G, Kennedy DN, Hodge SM, Moore CM, Howard JD, **Rohan MP**, Caviness VS, Makris N. White matter abnormalities in children with and at risk for bipolar disorder. Bipolar Disord. 2007;9(8):799-809.

12. Choi J, Jeong B, **Rohan ML**, Polcari, AM, Teicher MH. Preliminary evidence for white matter tract abnormalities in young adults exposed to parental verbal abuse. Biol Psychiatry. 2009;65(3):227-234.

13. Choi J, Jeong B, Polcari A, **Rohan ML**, Teicher MH. Reduced fractional anisotropy in the visual limbic pathway of young adults witnessing domestic violence in childhood. NeuroImage. 2012;59(2):1071-1079.

14. Yamamoto RT, **Rohan ML**, Goletiani N, Olson D, Peltier M, Renshaw PF, Mello NK. Nicotine related brain activity: the influence of smoking history and blood nicotine levels, an exploratory study. Drug Alcohol Depend. 2013;129(1-2):137-144.

15. **Rohan ML**, Yamamoto RT, Ravichandran CT, Cayetano KR, Morales OG, Olson DP, Vitaliano G, Paul SM, Cohen BM. Rapid Mood-Elevating Effects of Low Field Magnetic Stimulation in Depression. Biological Psychiatry 2014:76(3):186-193.

16. Lowen SB, **Rohan ML**, Gillis TE, Thompson BS, Wellons CB, Andersen SL. Cocaine-conditioned odor cues without chronic exposure: implications for the development of addiction vulnerability. NeuroImage: Clinical 2015:8:652-9.

17. Cohen-Gilbert JE, Nickerson LD, Sneider JT, Oot EN, Seraikas AM, **Rohan ML**, Silveri MM. College Binge Drinking Associated with Decreased Frontal Activation to Negative Emotional Distractors during Inhibitory Control.. Front Psychol. 2017 Sep 22;8:1650.

18. Teicher MH, Anderson CM, Ohashi K, Khan A, McGreenery CE, Bolger EA, **Rohan ML**, Vitaliano GD. Differential effects of childhood neglect and abuse during sensitive exposure periods on male and female hippocampus. Neuroimage. 2018 Apr 1;169:443-452

19. Sneider JT, Cohen-Gilbert JE, Hamilton DA, Stein ER, Golan N, Oot EN, Seraikas AM, **Rohan ML**, Harris SK, Nickerson LD, Silveri MM. Adolescent Hippocampal and Prefrontal Brain Activation During Performance of the Virtual Morris Water Task. Front Hum Neurosci. 2018 Jun 26;12:238.

20. Teicher MH, Anderson CM, Ohashi K, Khan A, McGreenery CE, Bolger EA, **Rohan ML**, Vitaliano GD. Differential effects of childhood neglect and abuse during sensitive exposure periods on male and female hippocampus. Neuroimage. 2018 Apr 1;169:443-452.

21. Maksimovskiy AL, Oot EN, Seraikas AM, Rieselbach M, Caine C, Sneider JT, Cohen-Gilbert JE, Harris SK, Nickerson LD, **Rohan ML**, Silveri MM. Morphometric Biomarkers of Adolescents With Familial Risk for Alcohol Use Disorder. Alcohol Clin Exp Res. 2019 Nov;43(11):2354-2366.

22. Stephen J Kohut, Dionyssios Mintzopoulos, Brian D Kangas, Hannah Shields, Kelly Brown, Timothy E Gillis, **Michael L Rohan**, Jack Bergman, Marc J Kaufman. Effects of long-term cocaine self-administration on brain resting-state functional connectivity in nonhuman primates**.** Transl Psychiatry. 2020 Dec 2;10(1):420.

23. **Michael L Rohan**, Steven B Lowen , Anna Rock , Susan L Andersen.. Novelty preferences and cocaine-associated cues influence regions associated with the salience network in juvenile female rats Pharmacol Biochem Behav. 2021 Apr;203:173117.

24. Ohashi K, Anderson CM, Khan A, **Rohan ML**, Bolger EA, McGreenery CE, Teicher MH. Sex and sensitive period differences in potential effects of maltreatment on axial versus radial diffusivity in the corpus callosum. Neuropsychopharmacology. 2022 Jan 12. doi: 10.1038/s41386-021-01260-7. Online ahead of print.

25. Sarah L. Withey, Lei Cao, Fernando B. de Moura, Kenroy R. Cayetano, **Michael L. Rohan**, Jack Bergman, Stephen J. Kohut. Fentanyl-Induced Changes in Brain Activity in Awake Nonhuman Primates at 9.4 Tesla. In publication, *Brain Imaging and Behavior*

**Thesis**

1. Michael L. Rohan. "An X-ray Scattered Halo in M82?" Cambridge (MA): Massachusetts Institute of Technology; 1986.
2. Michael L Rohan. “Electromagnetic Fields in the Head During Low Field Magnetic Stimulation.” Medford MA: Tufts University; 2009.

**Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings**

1 M. Rohan, A. Sadun, P. Morrison. "Scattering Models for the X-Ray Halo in M82". In: American Astronomical Society, 168th Meeting; 1986; ;1986. p. .

2 C.M. Urry, C.R. Canizares, J.S. Kruper, M.L. Rohan, M.R. Oberhardt. "X-Ray Variability of Seyfert Galaxies Observed with the Einstein Observatory". In: American Astronomical Society, 169th Meeting; 1987; ;1987. p. .

3 Mark Cohen, Michael Rohan. "3D Volume Imaging with Instant Scan". In: Proc. SMRM, Eighth Annual Scientific Meeting; 1989; Amsterdam, The Netherlands. ;1989. p. .

4 Michael Rohan. "Practical Limits to Gradient Coil Design". In: Proc. SMRM, Eighth Annual Scientific Meeting; 1989; Amsterdam, The Netherlands. ;1989. p. .

5 M.L. Rohan, A.P. Crawley, R.M. Weisskoff. "2D RF Pulses: Their Design and Uses in Instant Imaging". In: Proc. SMRI, Annual Meeting; 1990; ;1990. p. .

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**Narrative Report**

I have recently joined the Laureate Institute for Brain Research in Tulsa, OK as the Chief Technology Officer/Director of MRI. This is a new opportunity and new direction, and will allow a wide range of collaboration in psychiatric MRI, the opportunity to pursue topics in MR physics in an independent fashion, and the opportunity to pursue development in brain stimulation. My direction will depend on the balance of opportunity and institutional need in the coming year.

Recently at McLean Hospital I re-established the high field (9.4T and 4.0T) imaging facility at McLean Hospital following the challenges of a magnet quench, building damage, and loss of staff. Work in

establishing the center as a hospital wide resource rather than a research lab has included work in standardizing basic imaging protocols, processing, and equipment. Data handling software, systems, and procedures have been implemented. The main gradient coil and the physiologic monitoring system have been upgraded. As a result, programs in 4 awake and 3 ex-vivo species are underway. Imaging performance and functionality are being improved with development in processing software and artifact handling, RF coil development, and advanced sequences.

My secondary area of research is in functional MRI imaging techniques and statistical processing. I actively support ongoing clinical studies in vascular effects, network effects in depression, and nicotine as well as in general fMRI methods development in the BIC. The specific fMRI methods include imaging in regions of high susceptibility-induced field gradients as a means of improving fMRI results in frontal and sub-orbital regions, and the development of statistical processing methods involving autoregressive analysis and the use of image phase in resolving noise and physiologic events.

An unfunded area of research is in the investigation of Low Field Magnetic Stimulation as a treatment for depression. This bio-electromagnetic effect was discovered serendipitously and requires research to assess its clinical effects using formal clinical trials and to understand the mechanisms underlying these clinical effects. I am pursuing research projects in human trials, pre-clinical behavioral trials, electromagnetic field calculations and the laboratory measurement of electric fields.

Before joining Harvard Medical School, I was employed in a research and development company, "Advanced NMR Systems Inc." As the senior physicist I participated in the development of the first fMRI capable systems in the early 1990s. This work included the design and development of shielded magnetic field gradient coils as well as acquisition and image processing techniques that made fMRI systems possible. Later projects included the top-level design of the first clinical 3T fMRI system and head-gradient systems.