Updated: September 29, 2023

**University of Texas at Austin**

# CURRICULUM VITAE


**Name:** Robert O. Messing, MD

**Position:** Chair and Professor of Neuroscience
Professor of Neurology
Director, Waggoner Center for Alcohol and Addiction Research

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## EDUCATION

| | | | |
|---|---|---|---|
| 1970 - 1974 | Stanford University | B.A. | History |
| 1975 - 1979 | Stanford University | M.D. | Medicine |
| 1979 - 1980 | University of Virginia | Intern | Internal Medicine |
| 1980 - 1981 | University of Virginia | Resident | Internal Medicine |
| 1981 - 1983 | Univ. CA, San Francisco | Resident | Neurology |
| 1983 - 1984 | Univ. CA, San Francisco | Chief Resident | Neurology |
| 1984 - 1986 | Univ. CA, San Francisco | Research Fellow | Neuroscience |

## LICENSES, CERTIFICATION

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| 1980 | National Board of Medical Examiners |
| 1981-now | Medical license, California G046801 |
| 1986 | American Board of Psychiatry and Neurology (Neurology) |
| 2013-now | Medical license, Texas P5685 |

## PRINCIPAL POSITIONS HELD

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|---|---|---|---|
| 1984 - 1986 | University of California, San Francisco | Clinical Instructor | Neurology |
| 1986 - 1994 | University of California, San Francisco | Assistant Professor | Neurology |

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| 1986 - 2013 | Ernest Gallo Clinic and Research Center, UCSF | Principal Investigator | Neurology |
| 1994 - 2000 | University of California, San Francisco | Associate Professor | Neurology |
| 1994 - 1995 | San Francisco General Hospital | Interim Chief of Service | Neurology |
| 1998 - 1999 | Ernest Gallo Clinic and Research Center, UCSF | Assistant Director | Neurology |
| 2000 - 2008 | Ernest Gallo Clinic and Research Center, UCSF | Associate Director | Neurology |
| 2000 - 2013 | University of California, San Francisco | Professor | Neurology |
| 2009 - 2011 | Ernest Gallo Clinic and Research Center, UCSF | Senior Associate Director | Neurology |
| 2012 - 2013 | Ernest Gallo Clinic and Research Center, UCSF | Vice President, Internal Affairs | Neurology |
| 2013 - 2015 | University of Texas at Austin | Vice Provost for Biomedical Sciences | Office of the Executive Vice President and Provost |
| 2015 - 2017 | University of Texas at Austin | Assoc. Dean for Research Development | Dell Medical School |
| 2013 - 2017 | University of Texas at Austin | Professor | Div. Pharmacol. & Toxicol., College of Pharmacy |
| 2017-now | University of Texas at Austin | Professor (0% appointment) | Div. Pharmacol. & Toxicol., College of Pharmacy |
| 2017 - now | University of Texas at Austin | Professor | Dept. of Neurology, Dell Medical School |
| 2017 - now | University of Texas at Austin | Professor | Dept. of Neuroscience, College of Natural Sciences |
| 2017 – now | University of Texas at Austin | Director | Waggoner Center for Alcohol and Addiction Research |
| 2020- now | University of Texas at Austin | Chair | Dept. of Neuroscience, College of Natural Sciences |

**OTHER POSITIONS HELD CONCURRENTLY**

| | | | |
|---|---|---|---|
| 1995 - 2000 | University of California, San Francisco | Faculty Member | Program in Biomedical Sciences |
| 1997 - 2013 | University of California, San Francisco | Faculty Member | Center for the Neurobiology of Addiction |
| 1997 - 1997 | Terrapin Technologies, South San Francisco, CA | Consultant | |

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|---|---|---|---|
| 1997 - 2013 | University of California, San Francisco | Faculty Member | Graduate Program in Neuroscience |
| 1997 - 2013 | University of California, San Francisco | Faculty Member | Program in Biological Sciences |
| 2007 - 2013 | University of California, San Francisco | Faculty Member | Graduate Group in Oral and Craniofacial Sciences |
| 2007 - 2010 | Ernest Gallo Clinic and Research Center, UCSF | Director | Translational Clinical Unit |
| 2008 - 2013 | National Institute on Alcohol Abuse and Alcoholism | Founding Director | Alcohol Center for Translational Genetics |
| 2008 - 2012 | Children's Hospital of Oakland Research Institute | Adjunct Scientist | |
| 2009 - 2013 | University of California, San Francisco | Faculty Member | Institute of Molecular Medicine |
| 2013 - present | University of California San Francisco | Professor Emeritus | Neurology |
| 2013 - 2017 | University of Texas at Austin | Associate Director | Waggoner Center for Alcohol and Addiction Reseach |
| 2014 - 2015 | University of Texas at Austin | Interim Director | Dell Pediatrics Research Institute |
| 2017 - 2020 | University of Texas at Austin | Senior Advisor to the Dean on Research Strategy | Dell Medical School |

**HONORS AND AWARDS**

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| 1972 | Phi Beta Kappa | Stanford University |
| 1974 | B.A. with Honors in History | Stanford University |
| 1984 | Sandoz Award for Outstanding Neurology Resident | UCSF Dept. of Neurology |
| 1984 | National Research Service Award | NIAAA |
| 1986 | Clinical Investigator Development Award | NINDS |
| 1988 | Basil O'Connor Starter Scholar Research Award | March of Dimes |
| 1995 | Robert B. Layzer "Golden Toe" Award for Outstanding Neurology Resident Teaching | UCSF Dept. of Neurology |
| 1999 | Visiting Professor, Dept. of Pharmacology | University of Texas, San Antonio, TX |
| 2000 | Visiting Professor, Dept. of Pharmacology | Univ. of Colorado Health Sciences Center, Denver, CO and Institute for Behavioral Genetics, Univ. of Colorado, Boulder, CO |

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| 2000 | Visiting Professor, Institute for Cellular and Molecular Biology | University of Texas, Austin, TX |
| 2002-2012 | Method to Extend Research in Time (MERIT) Award | NIAAA |
| 2002 | Visiting Professor, Dept. of Physiology and Neuroscience | Medical University of South Carolina, Charleston, SC |
| 2002 | Visiting Professor, Bowles Center for Alcohol Studies | University of North Carolina, Chapel Hill, NC |
| 2004 | Visiting Professor, Dept. of Neuroscience and Physiology | SUNY, Syracuse, NY |
| 2004 | Nominee, Kaiser Awards for Excellence in Teaching | University of California, San Francisco |
| 2004 | Endowed Chair in Neurology in Honor of the Gallo Family | University of California, San Francisco |
| 2007 | Alberta Heritage Foundation for Medical Research Visiting Lecturer Award | University of Calgary, Calgary, Canada |
| 2007 | UCSF Medical Student Nominee for AOA Faculty Membership | University of California, San Francisco |
| 2011 | Bowles Lectureship Award | University of North Carolina, Chapel Hill, NC |
| 2013-2017 | Henry M. Burlage Centennial Professor of Pharmacy | University of Texas, Austin, TX |
| 2016 | Boston University School of Medicine Sterling Drug Visiting Lecturer | Boston University School of Medicine, Boston, MA |
| 2017 | Distinguished Faculty Speaker, Louis C. Littlefield Research Excellence Day | College of Pharmacy, UT Austin |
| 2020 | M. June and J. Virgil Waggoner Chair in Molecular Biology | University of Texas, Austin, TX |
| 2021 | RSA Distinguished Investigator Award | Annual meeting, San Antonio, TX (virtual) |
| 2021 | James H. Tharp Award | Res. Society on Alcoholism |

### KEYWORDS/AREAS OF INTEREST

Addiction, ethanol, nicotine, anxiety disorders, pain, signal transduction, protein kinase, GABA, nicotinic receptor, neuropeptides

## PROFESSIONAL ACTIVITIES

### CLINICAL-UCSF

1984 - 2013: Attending Neurologist, University of California Hospitals, San Francisco General Hospital (SFGH), San Francisco VA Med. Center (SF VA).

SUMMARY OF CLINICAL ACTIVITIES

While at UCSF, from 1984 until 1999, I attended for 2 months each year on the SFGH Neurology service, usually for one month on the in-patient service and for one month on the consult service. I also attended a clinic at SFGH, one half day per week where I saw my own patients and supervised residents with theirs. I also had privileges at UCSF Moffitt Hospital and the SF VA Medical Center where I occasionally covered for other faculty. From 1994-1995 I served as interim Chief of the Neurology Service at SFGH. In 1999 with the move of the Gallo Center to Emeryville, I decreased my clinical activity to one month per year as Attending Physician on the SFGH inpatient service. I attended in the SFGH outpatient clinic during the month I was in-patient ward attending, for one-half day per week. With my move to UT Austin, I obtained a Texas Medical license but have not applied for hospital privileges in Texas.

## PROFESSIONAL ORGANIZATIONS

Memberships

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| 1981 - present | American Academy of Neurology |
| 1984 - present | American Association for the Advancement of Science |
| 1985 - present | Society for Neuroscience |
| 1989 - present | Research Society on Alcoholism |
| 1991 - present | International Society for Biomedical Research on Alcoholism |
| 1992 - present | American Society for Biochemistry and Molecular Biology |
| 1994 - 2000 | American Epilepsy Society |
| 1996 - present | American Neurological Association |
| 2004 - present | American Society for Pharmacology and Experimental Therapeutics |
| 2016 - present | American College of Neuropsychopharmacology |

Service to Professional Organizations

| | | |
|---|---|---|
| 1991 - 1993 | Research Society on Alcoholism, Publications Committee | Member |
| 1992 - 1992 | Research Society on Alcoholism Annual Meeting | Session Co-chair |
| 1992 - 1992 | Research Society on Alcoholism, Program Committee | Member |
| 1992 - 2002 | The Wellcome Trust | Grant Reviewer |
| 1993 - 1993 | Research Society on Alcoholism, symposium "Neurotrophic factors and cell adhesion molecules in alcohol neurotoxicity" | Organizer |
| 1995 - 1995 | Research Society on Alcoholism, symposium "Phosphorylation of Membrane Transporters and Channels" | Organizer |
| 1995 - 1996 | Research Society on Alcoholism, Program Committee | Member |
| 1997 - 1997 | Spinal Cord Research Foundation | Ad Hoc Reviewer |
| 1997 - 1999 | Research Society on Alcoholism, Program Committee | Co-Chair |

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| 1999 - 1999 | Ohio Cancer Research Associates | Grant Reviewer |
| 2000 - 2002 | Research Society on Alcoholism | Secretary |
| 2000 - 2004 | Alzheimer's Association, Initial Review Board of the Medical and Scientific Advisory Council | Member |
| 2001 - 2008 | Scientific Advisory Board, The Epilepsy Therapy Development Project | Member |
| 2002 - 2009 | Research Society on Alcoholism, Awards Committee | Member |
| 2002 - 2002 | Zaffaroni Innovation Fund for Addiction Research, Stanford University | Grant Reviewer |
| 2002 - 2002 | Waggoner Center for Alcohol and Addiction Research, Univ. of Texas at Austin | Grant Reviewer |
| 2003 - 2010 | Medical Advisory Council of the Alcoholic Beverage Medical Research Foundation; Chair, 2006-2009, ad hoc member 2010 | Chair<br>Ad Hoc Member |
| 2004 - 2006 | Research Society on Alcoholism, Priorities Committee | Member |
| 2005 - 2005 | U.K. Medical Research Council | Grant Reviewer |
| 2006 - 2009 | Research Society on Alcoholism, Board of Directors | Member |
| 2006 - 2009 | Research Society on Alcoholism, Nominations Committee | Member |
| 2007 - 2007 | Research Society on Alcoholism, symposium "PKC Pathways and Ethanol: From Cells to Behavior" | Co-organizer |
| 2007 - 2007 | Research Society on Alcoholism NIH Peer Review Task Force | Member |
| 2008-present | Scientific Advisory Committee: Alcoholism and Stress Conferences (triannual event in Volterra, Italy) | Member |
| 2009 - 2010 | Research Society on Alcoholism | Vice President |
| 2010 - 2011 | Research Society on Alcoholism | President |
| 2011 - 2012 | Research Society on Alcoholism | Past President |
| 2011 - 2014 | American Neurological Association's Scientific Program Advisory Committee | Member |
| 2012 | American Neurological Association symposium: “Advances in Headache and Pain Research and Treatment” | Organizer |
| 2016 | UT System: Texas Fresh Air: Grand Challenges in Neuroscience Conference | Co-organizer |
| 2018 | Research Society on Alcoholism, symposium "Medications to Treat Alcohol Use Disorder: From Computer to Bench to Bedside " | Organizer |
| 2022 | Scientific Advisory Board, Center for the Translational Neuroscience of Alcoholism at Yale | Chair |

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| 2022 | External Advisory Board: Univ. of Chicago T32 NIDA Training Grant | Member |
| 2023 | Research Society on Alcoholism, symposium "Next Generation Biomarkers for AUD Diagnosis, Prognosis, and Treatment" | Co-organizer |
| 2023 | American College of Neuropsychopharmacology: Membership Committee | Member |

## SERVICE TO PROFESSIONAL PUBLICATIONS

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|---|---|
| 1995 - 1999 | Editorial Board, Alcoholism: Clinical and Experimental Research |
| 1996 - 1998 | Associate Editor, Alcoholism: Clinical and Experimental Research |
| 2005 - 2013 | Associate Editor, Annals of Neurology |
| 2007 - 2012 | Editorial Board, Addiction Reviews |
| 2010 | Textbook review, Oxford University Press |
| 2011 - present | Advisory Council, Alcoholism: Clinical and Experimental Research |
| 2011 - present | Faculty of 1000: Section on Neuropharmacology & Psychopharmacology |
| 2015 - 2021 | Senior Editor for North America (Basic and Preclinical Studies), Addiction Biology |
| 1988 - present | Ad hoc referee to: Addiction Biology; Alcohol; Alcohol and Alcoholism; American Journal of Medicine; Annals of Neurology; Biochemical Pharmacology; Biological Psychiatry; Brain Research; Chemical Reviews; eNeuro; Epilepsia; Gene; Genes, Brain and Behavior; Journal of AIDS; Journal of Biological Chemistry; Journal of Clinical Investigation; Journal of Comparative Neurology; Journal of Neurochemistry; Journal of Neuroscience; Journal of Neuroscience Research; Journal of Pharmacology & Experimental Therapeutics; Molecular and Cellular Biology; Molecular Biology of the Cell; Molecular Pharmacology; Molecular Psychiatry; Nature; Nature Communications; Nature Medicine; Nature Neuroscience; Neurology; Neuron; Neuropsychopharmacology; Neuroscience and Biobehavioral Reviews; Pharmacology, Biochemistry and Behavior; Pharmacology and Therapeutics; Proc. Nat. Acad. Sci. USA; Psychopharmacology; Science Translational Medicine; Science Advances; Trends in Neurosciences; Western Journal of Medicine |

## INVITED PRESENTATIONS

INTERNATIONAL

| | | |
|---|---|---|
| 1988 | International Medical Advisory Group "Calcium Channels and Adaptation to Alcohol" | Speaker |
| 1992 | International Society for Biomedical Research on Alcoholism "Calcium Channels, PKC and Adaptation to Alcohol" | Speaker |
| 1992 | Lund University, Lund, Sweden, Symposium on Alcohol, Cell Membranes and Signal Transduction | Speaker |

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| 1993 | 86th Nobel Symposium of the Karolinska Institutet, Stockholm, Sweden, "Adaptive Responses to Ethanol Mediated by PKC Delta and Epsilon" | Speaker |
| 1993 | Tampere Brain Research Center, University of Tampere, Finland, "Adaptive Responses to Ethanol Mediated by PKC Delta and Epsilon" | Speaker |
| 1994 | International Society for Biomedical Research on Alcoholism, "Adaptive Responses to Ethanol Mediated by PKC Delta and Epsilon" | Speaker |
| 1998 | International Society for Biomedical Research on Alcoholism, "PKC Epsilon in Neuronal Function and Adaptation to Ethanol" | Speaker |
| 1998 | Imperial Cancer Research Fund, London, UK, "PKC Epsilon in Neuronal Function and Adaptation to Ethanol" | Speaker |
| 1998 | Department of Laboratory Medicine, University of Lund Hospital, Malmö, Sweden, "PKC Delta and Epsilon Regulate Multiple Responses to Alcohol In Vivo and In Vitro" | Speaker |
| 1998 | Satellite Meeting of the International Society for Biomedical Research on Alcoholism, Lund, Sweden "Ethanol and Intracellular Signaling: From Molecule to Behavior" | Speaker |
| 1998 | 10th International Conference on Second Messengers & Phosphorylation, Jerusalem, Israel, "Phenotypes in PKC Epsilon Null Mice" | Speaker |
| 1998 | Weizmann Institute, Rehovot, Israel, "Phenotypes in PKC Epsilon Null Mice" | Speaker |
| 2000 | International Society for Biomedical Research on Alcoholism, Yokohama, Japan, "PKC Epsilon-Regulates Sensitivity of GABA-A receptors to Allosteric Agonists" and "Strategies for Targeted and Regulated Knockouts" | Speaker |
| 2000 | Dept. of Molecular Biology, Yokohama University, Yokohama, Japan, "Protein Kinase C Epsilon in Neuronal Function" | Speaker |
| 2001 | Research Society on Alcoholism, Montreal, Canada, "Tetracycline-regulated Expression of PKC Epsilon Regulates Alcohol Consumption" | Speaker |
| 2003 | Institute of Genetics and Molecular and Cellular Biology, Strasbourg University, France, "PKC Epsilon in Anxiety and Addiction" | Speaker |
| 2004 | Molecular Advances in DAG Signaling, Juan March Foundation, Madrid, Spain, "CNS Phenotypes in PKC Delta Null Mice" | Speaker |
| 2004 | Research Society on Alcoholism, Vancouver, BC, Canada, "PKC Epsilon and Delta in the Regulation of GABA-A Receptors and Behavioral Responses to Ethanol" | Speaker |
| 2006 | Neuromed Technologies, Vancouver, BC, Canada, "PKC Epsilon as a Drug Target in Pain and Anxiety" | Speaker |
| 2007 | Dept. of Physiology and Biophysics, University of Calgary, Calgary, Alberta, Canada, "PKC Regulation of GABA-A Pharmacology and Behavior" | Speaker |
| 2008 | Central Institute of Mental Health, Dept. of Psychopharmacology, Mannheim, Germany "Protein Kinase C Isozymes as Targets for Anxiety and Alcohol Use Disorders" | Speaker |

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| 2008 | Alcoholism and Stress: A Framework for Future Treatment Strategies, Volterra, Italy, "Opposing Roles of Amygdala PKC delta and epsilon on Neuropeptide Expression, Anxiety, and Alcohol Consumption" | Speaker |
| 2008 | International Symposium on Drug Addiction: Mechanisms and Therapeutic Approaches, Kunming, Yunnan, P. R. China, "Molecular Targets for Substance Abuse in the Amygdala" | Speaker |
| 2010 | Dept. of Neuroscience and Pharmacology, Rudolf Magnus Institute of Neuroscience, University Medical Center Utrecht, The Netherlands, "Sibling Rivalry: Opposing Regulation of Anxiety and Alcohol Responses by PKC Delta and Epsilon" | Speaker |
| 2010 | International Society on Biomedical Research on Alcoholism, Annual Meeting, Paris France, "Regulation of Neuropeptide Signaling by PKC Isozymes in the Amygdala" | Speaker |
| 2011 | Alcoholism and Stress: A Framework for Future Treatment Strategies, Volterra, Italy, "Alcoholic Polyneuropathy is Worsened by Binge Drinking and is PKC epsilon-dependent" | Speaker |
| 2011 | European Society for Biomedical Research on Alcoholism, Vienna, Austria, "Protein Kinase C Regulation of Ethanol Actions at GABA-A Receptors" | Speaker |
| 2017 | Alcoholism and Stress: A Framework for Future Treatment Strategies, Volterra, Italy, “A Distributed CRF Network in Extended Amygdala Regulates Anxiety and Alcohol Drinking” | Speaker |
| 2019 | Life Science PhD Meeting**,** Medical University of Innsbruck: “Targeted and Genomic Approaches to Drug Discovery for Alcohol Use Disorder”, April 26, 2019 | Keynote speaker |
| 2022 | Center for Social and Affective Neuroscience (CSAN), Linköping University, Sweden. “Amygdala PKC delta”, (via Zoom) October 20, 2022 | Speaker |

NATIONAL

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| 1988 | University of Utah, Neurology Grand Rounds, "Neurocysticercosis" | Speaker |
| 1988 | University of Utah, Neurology Research Seminar, "Calcium Channels and Adaptation to Alcohol" | Speaker |
| 1989 | Winter Conference on Brain Research, Snowbird, UT, "Calcium Channels and Adaptation to Alcohol" | Speaker |
| 1990 | NIAAA Conference on Pharmacologic Aspects of Ion Channel Function, Annapolis, MD, "Calcium Channels and Adaptation to Alcohol" | Speaker |
| 1992 | University of Colorado Neurology Grand Rounds, Denver, CO, "Regulation of Calcium Channels by Alcohol" | Speaker |
| 1992 | University of Colorado, Department of Pharmacology Seminar, Denver, CO, "Adaptive Responses to Ethanol Mediated by PKC Delta and Epsilon" | Speaker |

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| 1993 | Amgen, Inc., Thousand Oaks, CA, "Adaptive Responses to Ethanol Mediated by PKC Delta and Epsilon" | Speaker |
| 1996 | Research Society on Alcoholism, Washington, DC, "Regulation of N-type Calcium Channels by Ethanol" | Speaker |
| 1997 | Neurology Grand Rounds, Stanford University, Stanford, CA, "Adaptive Responses to Ethanol Mediated by PKC Delta and Epsilon" | Speaker |
| 1997 | Research Society on Alcoholism, San Francisco, CA, "PKC Epsilon-dependent Enhancement of NGF Signaling by Ethanol" | Speaker |
| 1997 | Research Society on Alcoholism Satellite Meeting, San Francisco, CA, "Ethanol and Intracellular Signal Transduction" | Speaker |
| 1998 | Scripps Research Institute, La Jolla, CA, "PKC Epsilon in Neuronal Function and Adaptation to Ethanol" | Speaker |
| 1998 | Research Society on Alcoholism, Hilton Head, SC, "PKC Epsilon in Neuronal Function and Adaptation to Ethanol" | Speaker |
| 1998 | FASEB Conference on Protein Kinase C, Tahoe City, CA, "The Role of PKC Epsilon in Nociception" | Speaker |
| 1998 | Society for Neuroscience Satellite Symposium: "Applications of Gene Knockout Techniques to Alcohol Research", Los Angeles, CA, "Knockout Mice to Study the Role of PKC Epsilon in Responses to Alcohol" | Speaker |
| 1999 | Fetal Alcohol Study Group, Research Society on Alcoholism, Santa Barbara, CA, "PKC Epsilon in Responses to Alcohol" | Speaker |
| 1999 | ASBMB Fall Symposium: "Ethanol and Cell Signaling", Tahoe City, CA, "Decreased Anxiety and Down-regulated HPA Axis in PKC Epsilon Null Mice" | Speaker |
| 1999 | Department of Pharmacology, University of Texas, San Antonio, TX, "PKC Epsilon Regulation of GABA-A Receptors" | Speaker |
| 1999 | NIEHS Symposium: "Calcium Channels: Critical Targets of Toxicants and Diseases", Durham, NC, "Calcium Channels and Alcohol" | Speaker |
| 2000 | Eili Lilly, Indianapolis, IN, "Protein Kinase C in Pain and Anxiety" | Speaker |
| 2000 | Keystone Symposium: "Protein Kinase C", Taos, NM, "Protein Kinase C Epsilon in Nervous System Function" | Speaker |
| 2000 | Experimental Biology 2000, San Diego, CA, "PKC Isozymes: Lessons from Knockout Mice" | Speaker |
| 2000 | Institute for Behavioral Genetics, University of Colorado, Boulder, CO, "PKC Epsilon and the Nervous System" | Speaker |
| 2000 | Department of Pharmacology, University of Colorado Health Sciences Center, Denver, CO, "PKC Epsilon in Neuronal Function" | Speaker |
| 2000 | NIAAA Intramural Program, Bethesda, MD, "Regulation of Alcohol Consumption, Anxiety and Pain by PKC Epsilon" | Speaker |
| 2000 | Institute for Cellular and Molecular Biology, University of Texas, Austin, TX, "Protein Kinase C Epsilon in Neuronal Function" | Speaker |

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| 2001 | NIAAA Intramural Program, Bethesda, MD, "Regulataion of Alcohol Consumption, Anxiety and Pain by PKC Epsilon" | Speaker |
| 2001 | Molecular Mechanisms of Alcohol and Anesthetic Action, Philadelphia, PA, "Regulation of GABA-A Receptors and Related Behaviors by Protein Kinase C" | Speaker |
| 2001 | California Society of Addiction Medicine, Los Angeles, CA, "Transgenic Mouse Models in Discovering Drugs to Treat Addiction" | Speaker |
| 2001 | Society for Neuroscience, Satellite Symposium: "Neurogenetics of Alcoholism", San Diego, CA, "Genetic Manipulations in Mice to Identify Proteins that Regulate Responses to Alcohol" | Speaker |
| 2001 | American College of Neuropsychopharmacology, Waikaloa, HI, "PKC Epsilon Regulates Alcohol Consumption and Anxiety" | Speaker |
| 2002 | American Society of Addiction Medicine 33rd Annual Meeting, Atlanta, GA, "Identification of Possible Therapeutic Targets by Gene Targeting in Mice" | Speaker |
| 2002 | The Scripps Research Institute, La Jolla, CA, "Behavioral Responses to Alcohol in PKC Epsilon and ENT1 Null Mice" | Speaker |
| 2002 | Department of Physiology and Neuroscience, Medical University of South Carolina, Charleston, SC, "Responses to Alcohol and Opiates in PKC Epsilon and ENT1 Knockout Mice" | Speaker |
| 2002 | University of Arizona, Department of Neurology Grand Rounds, Tucson, AZ, "PKC Epsilon Regulation of GABA-A Receptors in Anxiety and Addiction" | Speaker |
| 2002 | NIAAA Workshop: "Presynaptic Substrates of Alcohol Action", Bethesda, MD, "PKC Epsilon Regulation of GABA-ergic Synapses on VTA Dopaminergic Neurons Moodulates Alcohol and Opiate Reward" | Speaker |
| 2002 | Bowles Center for Alcohol Studies, University of North Carolina, Chapel Hill, NC, "Drugs of Abuse in Mice with Altered Expression of PKC Epsilon, PKC Delta or ENT1" | Speaker |
| 2003 | Department of Neurology and Vollum Institute, Oregon Health Science University, Portland, OR, "PKC Epsilon in Anxiety and Addiction" | Speaker |
| 2003 | Department of Neurology, VA Health Care System, Harvard University, Boston, MA, "N-type Calcium Channels Modulate Acute Responses to Alcohol and Alcohol Consumption in Mice" | Speaker |
| 2003 | Wyeth Pharmaceuticals, Cambridge, MA, "PKC Epsilon in Pain, Anxiety and Addiction" | Speaker |
| 2004 | Department of Neuroscience and Physiology, SUNY, Syracuse, NY, "Protein Kinase C Epsilon Regulates GABA-A Receptors and Responses to Drugs of Abuse" | Speaker |
| 2005 | Eli Lilly, Indianapolis, IN, "PKC Epsilon as a Drug Target in Neurology and Psychiatry" | Speaker |
| 2005 | NIAAA, Rockville, MD, "Regulation of Alcohol Responses and GABA-A Receptors by PKC Epsilon and PKC Delta" | Speaker |

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| 2005 | NIDA, Baltimore, MD, "PKC Epsilon and PKC Delta in Responses to Alcohol, Opiates, and Cannabinoids" | Speaker |
| 2006 | Department of Neuroscience, University of New Mexico, Albuquerque, NM, "PKC Epsilon and PKC Delta in Anxiety and Alcoholism" | Speaker |
| 2006 | Department of Molecular and Medical Pharmacology, UCLA, "PKC Epsilon and PKC Delta Regulate GABA-A Receptors, Anxiety and Behavioral Responses to Alcohol" | Speaker |
| 2006 | Research Society on Alcoholism, Baltimore, MD, "Amygdala PKC Epsilon Regulates CRF, Anxiety-like Behavior and Alcohol Consumption" | Speaker |
| 2007 | American Psychiatric Association, San Diego, CA, "Amygdala Protein Kinase C Epsilon Regulates Corticotropin Releasing Factor, Anxiety and Alcohol Self-administration" | Speaker |
| 2007 | Department of Psychiatry, Yale University School of Medicine, New Haven, CT, "Protein Kinase C Regulation of GABA-A Receptor Pharmacology and Behavior" | Speaker |
| 2007 | Department of Physiology, Northwestern University Feinberg School of Medicine, Chicago, IL, "Protein Kinase C Regulation of GABA-A Receptor Pharmacology and Behavior" | Speaker |
| 2007 | Research Society on Alcoholism, Chicago, IL, "PKC Delta Regulates GABA-mediated Tonic Inhibition and Motor Responses to Ethanol" | Speaker |
| 2007 | Department of Neurology, Grand Rounds, Stanford University, Stanford, CA, "Current and Novel Therapeutics for Alcohol Use Disorders" | Speaker |
| 2008 | Department of Molecular Pharmacology and Experimental Therapeutics, Mayo Clinic College of Medicine, Rochester, NY, "Sibling Rivalry in the Amygdala: PKC Delta and PKC Epsilon Compete to Control Anxiety and Alcohol Use" | Speaker |
| 2008 | Waggoner Center for Alcohol and Addiction Research, University of Texas, Austin, TX, "PKC Delta and PKC Epsilon in Anxiety and Alcohol Self-administration" | Speaker |
| 2009 | Department of Cellular and Molecular Pharmacology, Rosalind Franklin University of Medicine and Science, North Chicago, IL, "The Dark Side of Protein Kinase C Epsilon" | Speaker |
| 2009 | American Psychiatric Association Annual Meeting, San Francisco, CA, "N-type Calcium Channel Blockers for Alcohol Use Disorders: From Cells to People" | Speaker |
| 2009 | Department of Psychiatry, University of Chicago, Chicago, IL, "Sibling Rivalry: PKC Delta and PKC Epsilon in Anxiety and Alcohol Self-administration" | Speaker |
| 2009 | Department of Behavioral Neuroscience, Oregon Health and Science University, Portland, OR, "Sibling Rivalry: PKC Delta and PKC Epsilon in Anxiety and Binge Drinking" | Speaker |
| 2009 | Department of Pharmacology and Toxicology, Virginia Commonwealth University, Richmond, VA, "Protein Kinase C Regulation of GABA-A Receptor Function and Trafficking" | Speaker |

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| 2009 | Department of Pharmacology, University of Colorado at Denver, Denver, CO, "PKC Epsilon in Pain, Anxiety and Alcoholism: From Mouse Towards the Bedside" | Speaker |
| 2010 | Abbott Neuroscience, Abbott Park, IL, "Protein Kinase C Epsilon as a Drug Target for Pain, Anxiety and Alcoholism" | Speaker |
| 2010 | Department of Pharmacology, Rush University, Chicago, IL, "Sibling Rivalry, PKC Delta and Epsilon in Anxiety and Binge Drinking" | Speaker |
| 2010 | Department of Cellular and Molecular Pharmacology, Rosalind Franklin University of Medicine and Science, North Chicago, IL, "PKC Epsilon Regulation of GABA-A Receptor Trafficking and Function" | Speaker |
| 2010 | Department of Physiology and Biophysics, University of Chicago, Chicago, IL, "Rival Siblings: Protein Kinase Delta and Epsilon in Anxiety and Responses to Ethanol" | Speaker |
| 2010 | Department of Anesthesiology, Washington University, St. Louis, MO, "Peripheral and Central Substrates of Protein Kinase C Epsilon in Pain" | Speaker |
| 2011 | Department of Pharmacology, University of Michigan, Ann Arbor, MI, "PKC Regulation of Cys-loop Receptors Modifies Behavioral Responses to Alcohol and Nicotine" | Speaker |
| 2011 | Bowles Center for Alcohol Studies, University of North Carolina, Chapel Hill, NC, "PKC Regulation of Cys-loop Receptors in Alcohol and Nicotine Addiction" | Speaker |
| 2011 | Great Lakes Chapter of ASPET, Chicago, IL, Plenary Lecture: "PKC Regulation of Cys-loop Receptors in Models of Alcohol and Nicotine Addiction" | Speaker |
| 2011 | Research Society on Alcoholism 34th Annual Meeting, Atlanta, GA. Symposium: "Fyn Kinase, NMDA Receptor Function, and Alcohol Response: A Translational Neuroscience Perspective" | Discussant |
| 2011 | School of Pharmacy, Univ. of Texas at Austin, "PKC Epsilon Regulation of Cys-Loop Receptors in Alcohol and Nicotine Addiction" | Speaker |
| 2011 | Dept. of Neuroscience, University of Wisconsin, Madison, WI, "PKC Epsilon Regulation of Cys-Loop Receptors in Alcohol and Nicotine Addiction" | Speaker |
| 2012 | Dept. of Neuroscience, Medical University of South Carolina, Charleston, SC, "PKC Epsilon Signaling in Addiction and Pain" | Speaker |
| 2012 | American Neurological Association Annual Meeting, Boston, MA "Mining Nociceptor Signaling for Pain Therapeutics" | Speaker |
| 2013 | American Neurological Association, New Orleans, LA. “Addiction” | Speaker |
| 2014 | Gordon Research Conference: Alcohol and the Nervous System, Galveston TX, “Molecular Signaling and Crosstalk | Speaker & Moderator |
| 2014 | Research Society on Alcoholism, Bellevue, WA, “Protein kinase C phosphorylation of GABA-A receptors in responses to ethanol”, | Speaker |

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| 2015 | Research Society on Alcoholism, San Antonio, TX, "Calcium Signaling Toolkit- Integrators and Targets of Alcohol: Introduction" | Speaker & Moderator |
| 2016 | ACTG Retreat, San Francisco, CA: "Atypical PKM zeta in Models of Binge Drinking and Relapse", April 28, 2016 | Speaker |
| 2016 | Gordon Research Conference: Alcohol and the Nervous System, Galveston TX, "A *Crh*-Cre Rat for Studying the Anatomy and Physiology of CRF Neurons", Feb 8, 2016 | Speaker |
| 2016 | Dept. of Psychiatry, UT Southwestern, Dallas, TX, "PKC Epsilon as a Target for Treatment of Addiction and Pain", March 8, 2016 | Speaker |
| 2016 | Boston University Department of Pharmacology, Boston MA, BUSM Sterling Drug Visiting Lecture, "Developing Protein Kinase C Epsilon Inhibitors to Treat Alcohol Dependence and Pain", May 18, 2016 | Speaker |
| 2016 | NIAAA Scientific Advisory Council, Rockville MD, "Developing PKC Epsilon Inhibitors to Treat Alcohol Use Disorder", June 9, 2016 | Speaker |
| 2016 | Center for Innovative Drug Discovery Symposium, UT San Antonio "Targeting Protein Kinase C Epsilon to Develop Novel Therapeutics Against Pain and Addiction", June 10, 2016 | Speaker |
| 2016 | Alcohol Abuse Co-morbidities & Triggers for Addiction RSA Satellite Symposium, Louisiana State University Health Science Center, New Orleans, LA "The *Crh*-Cre Rat as a Pre-Clinical Tool for Studying Alcohol Use Disorder", June 25, 2016 | Speaker |
| 2016 | Research Society on Alcoholism, New Orleans, LA, "Designer Receptor Manipulations Show Recruitment of CRF Neurons in the CeA with Intermittent Drinking" June 28, 2016 | Speaker |
| 2016 | University of Minnesota, Department of Neuroscience, Minneapolis MN, "Molecular Targets for Treating Alcohol and Nicotine Addiction" July 15, 2016 | Speaker |
| 2016 | Department of Pharmacology and Neuroscience Retreat, Texas Tech University Health Sciences Center, Santa Fe, NM, "CRF Neurons of the Extended Amygdala in Anxiety, Fear, and Alcohol Dependence" Oct. 28, 2016 | Keynote Speaker |
| 2018 | Science of Addiction Symposium, University of Missouri, Columbia MO, "New Compounds for Treating Alcohol Use Disorder" December 6, 2018 | Keynote Speaker |
| 2020 | Gordon Research Conference: Alcohol and the Nervous System, Galveston TX, "Identifying Functional Roles for Specific Neuropeptides and GABA Expressed in CRF Neurons of the Central Amygdala" March 4, 2020 | Speaker |
| 2021 | Tufts University Dept. of Neuroscience, Boston MA (online via Zoom). "Targeted and Genomic Approaches to Drug Discovery for Alcohol Use Disorder" March 24, 2021 | Speaker |
| 2021 | RSA Distinguished Investigator Award: "Targeted and Genomic Approaches to Medication Discovery for Alcohol Use Disorder" June 19, 2021 | Keynote Speaker |
| 2021 | University of Iowa Department of Neuroscience and Pharmacology (via Zoom). "Targeted and Genomic Approaches to Drug Discovery for Alcohol Use Disorder" November 9, 2021 | Speaker |

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| 2023 | National Institute on Alcohol Abuse and Alcoholism (via Zoom), “Approaches to Medication Discovery for Alcohol Use Disorder” January 31, 2023 | Speaker |
| 2023 | Tufts University Dept. of Neuroscience, Boston MA: “Genomics Nominates Drug Targets for Alcohol Use Disorder: PDE4 and Na+/K+ ATPase”, March 22, 2023. | Speaker |
| 2023 | Research Society on Alcohol Annual Meeting, Bellevue WA: “Next Generation Biomarkers for AUD Diagnosis, Prognosis, and Treatment: Introduction, June 27, 2023. | Speaker & Moderator |

REGIONAL AND OTHER INVITED PRESENTATIONS

| | | |
|---|---|---|
| 1988 | Children's Hospital of San Francisco, San Francisco, CA, "Lyme Disease" | Speaker |
| 1988 | Neurology Grand Rounds, Kaiser-Permanente Hospital, Oakland, CA, "Lyme Disease" | Speaker |
| 1989 | San Francisco Neurological Society, San Francisco, CA, "Lyme Disease" | Speaker |
| 1989 | Grand Rounds, St. Mary's Hospital, San Francisco, CA, "Lyme Disease" | Speaker |
| 1990 | Neurology Rounds, Kaiser-Permanente Hospital, Oakland, CA, "Lyme Disease" | Speaker |
| 1991 | Sutter Neuroscience Center Annual Symposium, Sacramento, CA, "Coma: An Update" | Speaker |
| 1994 | SFGH Cardiology Division Seminar, San Francisco, CA, "Calcium Channels, PKC and Adaptation to Alcohol" | Speaker |
| 1996 | Terrapin Technologies, Inc., South San Francisco, CA, "Adaptive Responses to Ethanol Mediated by PKC Delta and Epsilon" | Speaker |
| 1997 | UCSF Program in Neurosciences Seminar, San Francisco, CA, "PKC Delta and PKC Epsilon Mediate Adaptive Responses to Ethanol in PC12 Cells" | Speaker |
| 1999 | UCSF Pain Research Group Seminar, San Francisco, CA, "PKC Epsilon Modulates Nociceptor Sensitization" | Speaker |
| 2001 | UCSF Frontiers in Neurology and Neuroscience, San Francisco, CA, "Neurology of Addiction" | Speaker |
| 2001 | UCSF/Gallo Center Symposium: Neurobiology of Alcoholism and Addiction, San Francisco, CA, "Regulation of GABA-A Receptors and Alcohol Consumption by Protein Kinase C Epsilon" | Speaker |
| 2001 | Elan Pharmaceuticals, South San Francisco, CA, "PKC Epsilon Modulates Pain, Anxiety, and Alcohol Self-administration" | Speaker |
| 2002 | The Buck Institute, Novato, CA, "PKC Epsilon in the Nervous System: A Tale of Pain, Anxiety, and Addiction" | Speaker |
| 2002 | Theravance, South San Francisco, CA, "Pain, Addiction and Anxiety: Studies with PKC Epsilon Null Mice" | Speaker |

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| 2003 | UCSF Neuroscience of Disease Seminar, San Francisco, CA, "Neurology of Addiction" | Speaker |
| 2003 | Wheeler Center Fall Retreat, San Francisco, CA, "ENT1 in Alcohol Intoxication, Consumption, and Relapse" | Speaker |
| 2003 | Roche Pharmaceuticals, Palo Alto, CA, "PKC Epsilon in Pain, Anxiety and Addiction" | Speaker |
| 2004 | UCSF Department of Psychiatry Grand Rounds, San Francisco, CA, "PKC Epsilon in Anxiety and Addiction" | Speaker |
| 2004 | UCSF Child Neurology Research Laboratory, San Francisco, CA, "PKC Delta in Stroke and Responses to Alcohol" | Speaker |
| 2004 | Plexxikon, Inc., Berkeley, CA, "PKC Epsilon as a Drug Target in Neurology and Psychiatry" | Speaker |
| 2005 | Kai Pharmaceuticals, South San Francisco, CA, "PKC Epsilon and PKC Delta as Drug Targets in Neurology and Psychiatry" | Speaker |
| 2006 | Amgen Neuroscience Meeting, Mission Bay Campus, UCSF, San Francisco, CA, "PKC Epsilon Regulates Nociception and A-beta Clearance" | Speaker |
| 2006 | Frontiers in Neurology and Neuroscience, UCSF, San Francisco, CA, "PKC Epsilon as a Drug Target in Pain: Bench to Bedside" | Speaker |
| 2006 | Renovis, South San Francisco, CA, "PKC Epsilon as a Drug Target in Pain and Anxiety" | Speaker |
| 2006 | Roche, Palo Alto, CA, "PKC Epsilon as a Drug Target in Pain and Anxiety" | Speaker |
| 2012 | UCSF Dept. of Neurology Grand Rounds, "Neurobiology and Treatment of Addiction" | Speaker |
| 2012 | UCSF Office of Innovation, Technologies & Alliances, "PKC Epsilon is a Drug Target for Pain" | Speaker |
| 2013 | UT Austin Waggoner Center ADVANCE, “Drinking Despite Aversive Consequences: Circuits and Receptors” | Keynote Speaker |
| 2013 | Institute for Computational Engineering and Sciences, UT Austin: “Dell Medical School: Update and Research Perspective” | Speaker |
| 2014 | UT Austin Sage Enrichment Lecture: “Dell Medical School Update” | Speaker |
| 2014 | UT Austin Behavioral Neuroscience Seminar: “Neuroadaptations that Promote Alcohol Drinking Despite Adverse Circumstances” | Speaker |
| 2015 | UT Austin Waggoner Center ADVANCE, “Protein Kinase C Epsilon Inhibitors to Treat Alcohol Dependence and Pain” | Speaker |
| 2015 | UT Austin Biomedical Engineering External Advisory Committee, “Dell Medical School Update” | Speaker |
| 2016 | Dell Medical School Research Connect, “Research Connect Series Introduction”, May 5, 2016 | Speaker |

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| 2016 | Dell Medical School Orientation "Dell Medical School Research", June 30, 2016 | Speaker |
| 2016 | UT Austin Institute for Neuroscience Retreat "Of Men and Mice: Perspectives of an MD Neuroscientist" October 8, 2016 | Keynote Speaker |
| 2017 | UT Austin College of Pharmacy Faculty Retreat, "Dell Medical School Research Opportunities" January 11, 2017 | Speaker |
| 2017 | UT Austin College of Pharmacy Research Day, "New Lead Compounds for Treating Alcohol and Nicotine Addiction" April 11, 2017 | Keynote Speaker |
| 2017 | Dell Medical School Dept. of Neurology Resident Research Evening, "Why Would a Neurologist Study Addiction?" November 8, 2017 | Speaker |
| 2018 | Dept. of Neuroscience, UT Brainstorms Series: "The Addicted Brain" January 27, 2018 | Speaker |
| 2019 | Texas Neurological Society, Austin, TX, "Neurology of Addiction" February 3, 2019 | Speaker |
| 2019 | UT Austin Waggoner Center ADVANCE "Two birds with one stone: Inhibiting PKCε to treat chronic pain and opioid addiction" March 29, 2019 | Speaker |
| 2019 | UT Austin Neurology Grand Rounds "Discovering New Treatments for Alcohol Use Disorder", Oct 29, 2019 | Speaker |

**GOVERNMENT AND OTHER PROFESSIONAL SERVICE**

| | | |
|---|---|---|
| 1986 - 1986 | Air Force Office of Scientific Research | Grant Reviewer |
| 1989 - 1989 | Veterans Administration | Grant Reviewer |
| 1990 - 1990 | Veterans Administration, Site Visit Team | Member |
| 1993 - 1993 | NIAAA, Center Grant Site Visit Team | Member |
| 1995 - 1995 | NIAAA, Special Grant Review Committee | Member |
| 1996 - 1996 | NIAAA, Special Grant Review Committee | Member |
| 1997 - 1997 | NIAAA, Center Grant Review Committee | Member |
| 1997 - 1997 | DRG AL/TX 3 Study Section | Ad Hoc Member |
| 1998 - 1998 | Special Emphasis Panel (ZAA1-EE-1) | Member |
| 1998 - 2002 | DRG AL/TX 3 Study Section | Regular Member |
| 2002 - 2008 | Board of Scientific Counselors, NIAAA Intramural Program | Member |
| 2003 - 2003 | CSR IFCN1 Study Section | Member |
| 2003 - 2016 | Scientific Advisory Board, Integrative Neuroscience Initiative on Alcoholism-West, NIAAA | Member |
| 2003 - 2019 | Scientific Advisory Board, NIAAA Portland Alcohol Research Center, Oregon Health and Science University, Portland, OR | Member |

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| 2004 - 2004 | Special Emphasis Panel CSR ZRG1 IFCN-A (06) (M) | Member |
| 2004 - 2005 | Scientific Advisory Board, Integrative Neuroscience Initiative on Alcoholism and Stress, NIAAA | Member |
| 2010 - 2012 | Scientific Advisory Board, NIAAA Center for the Individualized Treatment of Alcohol Dependence, Mayo Clinic Medical School, Rochester, MN | Chair |
| 2011 - 2011 | Board of Scientific Counselors, NIAAA Intramural Program | Ad Hoc Member |
| 2012 - 2012 | Molecular Neurogenetics (MNG) Study Section | Member |
| 2012 - 2016 | NIAAA Advisory Council | Member |
| 2021 - now | Scientific Advisory Board, Center for the Translational Neuroscience of Alcoholism, Yale University, New Haven, CT | Chair |
| 2023 - now | Membership Committee, American College of Neuropsychopharmacology | Member |

# UNIVERSITY AND PUBLIC SERVICE

## UNIVERSITY SERVICE-UNIVERSITY OF TEXAS

UT SYSTEM

| | | |
|---|---|---|
| 2014 - 2015 | Neuroscience Council | Member |
| 2014 | UT System Institute of Neuroscience and Neurotechnology: Steering Committee | Member |
| 2022 | UT System Brain Research Symposium: Pain Research | Co-moderator |

UT AUSTIN CAMPUS-WIDE

| | | |
|---|---|---|
| 2013 - 2014 | Executive Compliance Committee | Member |
| 2013 - 2014 | UT-Seton Affiliation Working Group | Member |
| 2013 - 2014 | Search Committee for Dean of Dell Medical School | Chair |
| 2015 | Research Capabilities Task Force | Member |
| 2015 | Vice President for Research Search Committee | Member |
| 2016 - 2017 | VPR Research Cores Strategic Committee | Chair |
| 2019 – now | Mouse Genetic Engineering Facility Advisory Committee | Member |
| 2020 | Lab-Intensive Research Restart Committee | Member |
| 2020 | COVID-19 Dashboard Committee | Member |
| 2021-2022 | Search Committee for Dean of Dell Medical School | Member |
| 2021-2023 | HDB Space Governance Committee | Chair→Member |

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|---|---|---|
| 2023 | Research Integrity Committee | Member |

UT AUSTIN – DELL MEDICAL SCHOOL

| | | |
|---|---|---|
| 2013 - 2014 | Medical School Steering Committee | Co-chair |
| 2013 - 2014 | Research Working Group | Chair |
| 2013 - 2014 | Facilities and Space Working Group | Co-chair |
| 2013 - 2014 | Curriculum Working Group | Member |
| 2014 | Clinical Neurosciences Mechanisms of Disease Block | Leader |
| 2014 - 2016 | Internal Medicine Chair Search Committee | Chair |
| 2014 - 2015 | Neurology Chair Search Committee | Chair |
| 2014 - 2015 | Pediatrics Chair Search Committee | Member |
| 2014 - 2016 | Psychiatry Chair Search Committee | Chair |
| 2014 - 2016 | LIVESTRONG Cancer Institutes Director Search Advisory Committee | Co-chair |
| 2015 - 2016 | Search Committee for Clinical Neurologists | Chair |
| 2015-2016 | Search Committee for the Associate Chair of Investigation and Discovery for the Department of Women's Health | Member |
| 2016 - 2018 | Dell Medical School Appointment Promotion and Tenure Committee | Member |
| 2016 - 2017 | Research Strategic Planing Committee | Co-chair |
| 2017 - 2020 | Search Committee for Director of the Mulva Neurosciences Clinics | Chair |
| 2017 - 2019 | Search Committee for Faculty for Waggoner Center for Alcohol and Addiction Research | Chair |
| 2017 - now | Dept. of Neurology Academic Afairs Committee | Member |
| 2017 - now | Mulva Neurosciences Executive Committee | Member |
| 2019 - 2020 | Associate Chairs of Research Committee | Member |
| 2020 | Search Committee for Chair of Diagnostic Medicine | Member |
| 2023 | Search Committee for Assoc. Dean of Medical Education | member |

UT AUSTIN – COLLEGE OF PHARMACY

| | | |
|---|---|---|
| 2015 - 2017 | Research Infrastructure & Lab Safety Committee | Member |

UT AUSTIN – INSTITUTE FOR NEUROSCIENCE

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| 2015 - 2017 | Executive Committee | Member |

UT AUSTIN – DEPARTMENT OF NEUROSCIENCE

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|---|---|---|
| 2020 - now | Deparment Chair | Chair |
| 2022 | Committee to Update Governance Policies | Chair |

**UNIVERSITY SERVICE-UCSF**

UCSF CAMPUS-WIDE

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|---|---|---|
| 1991 - 1995 | SFGH Utilization Review Committee | Member |
| 1992 - 1998 | SFGH Clinical Research Center Advisory Committee | Member |
| 1993 - 1995 | Search Committee for Associate Director of SFGH Clinical Research Center | Member |
| 1997 - 1998 | SFGH Clinical Research Center Advisory Committee | Chair |
| 1997 - 1999 | SFGH Research Committee | Member |
| 1997 - 1999 | SFGH Animal Care Facility Subcommittee | Member |
| 2009 - 2013 | UCSF Resource Allocation Program Neurosciences Review Committee | Member |

UCSF SCHOOL OF MEDICINE

| | | |
|---|---|---|
| 1985 - 1985 | Third Year Medical Student Comprehensive Examination | Examiner |
| 1993 - 1993 | Committee on Curriculum & Educational Policy Course Directors Retreat | Member |
| 1993 - 1994 | Search Committee for Faculty, Gladstone Inst. of Cardiovascular Disease and Division of Endocrinology, SFGH | Member |
| 1993 - 1994 | Search Committee: Clinical Neurologist interested in Alcoholic Neurological Disease | Chair |
| 1994 - 1995 | Search Committee: Chief of Neurology Service, SFGH | Member |
| 1994 - 1995 | Search Committee: Research Neurologist, SFGH | Member |
| 1994 - 1995 | Search Committee: AIDS Neurologist, SFGH | Member |
| 1994 - 1995 | Search Committee: Neuroscientist, Gladstone Institute of Cardiovascular Disease and Dept. of Neurology, UCSF | Member |
| 1994 - 1996 | Alpha Omega Alpha Selection Committee | Member |
| 1995 - 1995 | Working Group on Faculty Composition and Evaluation | Member |
| 1995 - 1996 | Search Committee: Associate Professor, Pulmonary Division, SFGH | Member |
| 1996 - 1998 | Clinical Courses Operating Committee | Member |
| 1996 - 1998 | Committee on Curriculum and Educational Policy | Member |

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|---|---|---|
| 1998 - 1998 | Search Committee: Neurologist/Neuroscientist, Dept. of Neurology, UCSF and Gladstone Foundation | Member |
| 1998 - 1998 | Working Group: Educational Mission and Objectives of UCSF School of Medicine | Member |
| 1998 - 1998 | Search Committee: Neuroscience Program Representative, Neuroscience-Neurosurgery Regeneration Research, UCSF | Member |
| 1999 - 2000 | UCSF Committee on Animal Research IACUC | Member |
| 1999 - 2000 | UCSF Neuroscience Annual Retreat | Organizer |
| 1999 - 1999 | Search Committee for Neurophysiologist, Gallo Center | Chair |
| 1999 - 1999 | Search Committee for Mouse Geneticist, Gallo Center | Chair |
| 2000 - 2002 | Search Committee for Vice Chair of Neurology and Chief of Neurology Service SF VA Medical Center | Member |
| 2000 - 2002 | Search Committee for Director, Ernest Gallo Clinic & Research Center | Member |
| 2000 - 2002 | Search Committee for Behavioral Pharmacologist, Gallo Center | Member |
| 2001 - 2001 | Ad Hoc Promotion Review Committee | Chair |
| 2002 - 2005 | Steering Committee for Bay Area Screening Center | Member |
| 2004 - 2006 | Search Committee for Molecular Pharmacologist, Gallo Center | Member |
| 2005 - 2007 | Neuroscience Journal Club Screening Committee | Member |
| 2007 - 2008 | Search Committee for Clinical Research Scientist, Gallo Center | Chair |
| 2008 - 2009 | Search Committee for faculty member, Gladstone Institute for Neurological Disease | Member |
| 2009 - 2011 | UCSF Resource Allocation Program (RAP) Neurosciences Grant Review Committee | Member |
| 2011 | Search Committee for electrophysiologist, Ernest Gallo Clinic and Research Center | Member |
| 2011 - 2012 | Search Committee for translational neuroscientist, Ernest Gallo Clinic and Research Center | Chair |
| 2012 | Search committee for faculty member for the Glenn W. Johnson, Jr. Memorial Endowed Chair in Neurology | Chair |

UCSF NEUROLOGY DEPARTMENTAL SERVICE

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|---|---|---|
| 1986 - 1986 | Neurology In-service Examination | Examiner |
| 1988 - 1995 | SFGH Neurology Service: EEG reading | |
| 1988 - 1992 | SFGH Neurology Service: Morning Report | |
| 1989 - 1991 | UCSF Neurology Resident Selection Committee | Member |

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|---|---|---|
| 1993 - 1998 | Neurology 110 Core Clerkship | SFGH Site Director |
| 1994 - 2013 | Neurology Resident Faculty Advisor | |
| 1996 - 1998 | Neurology 110 Core Clerkship | Course Director |
| 1997 - 1998 | Gallo Center Web Site | Manager |
| 1999 - 2000 | Gallo Center IACUC | Chair |
| 1999 - 2000 | Gallo Center Animal User's Committee | Chair |
| 1999 - 2003 | Gallo Center Drug Discovery Program | Leader |
| 1999 - 2009 | Transgenic and Gene Targeting Core | Faculty Leader |
| 2000 - 2013 | Neurology Department Appointments and Promotions Committee | Member |
| 2000 - 2003 | Gallo Center IACUC | Vice Chair |
| 2000 - 2007 | Neurology Department Review Committee for non-peer reviewed research proposals | Chair |
| 2001 - 2013 | Gallo Center Histology Core | Faculty Leader |
| 2004 - 2013 | Neurology Department Executive Committee | Member |
| 2004 - 2013 | Gallo Center Executive Committee | Member |
| 2005 - 2013 | Gallo Center Medications Development Program Advisory Committee | Member |
| 2010 - 2013 | Gallo Center Clinical Research Group | Member |
| 2012 - 2013 | Gallo Center Executive Committee | Chair |
| 2014 | External Review of SFGH Neurology Service | Member |

SUMMARY OF SERVICE ACTIVITIES

Early service activities were at UCSF, where I was a member of the UCSF Resource Allocation Program Neuroscience Review Committee, which met three times each year to review intramural grants on topics in neuroscience. I served for several years on the Appointment and Promotions Committee for the UCSF Neurology Department. At the Gallo Center, I was Senior Associate Director and later Vice President for Internal Affairs, in charge of allocation of space, oversight of the histology and imaging core, the vivarium and IACUC (until 2005), and oversight of major shared equipment. I also chaired the Gallo Center Executive Committee, the Medications Development Program Advisory Committee, and I provided on-call MD coverage for the Gallo Center Clinical Research Group.

At UT Austin I played a major role in the creation of the new Dell Medical School as Vice Provost for Biomedical Sciences, co-chairing the Steering Committee that initiated the process. I chaired the search committees for the inaugural dean and for chairs of psychiatry, medicine, and neurology. I was also a member of the search committee for the chair of pediatrics and co-chair for the search for director of the Livestrong Cancer Institutes. I was the lead person representing the medical school in the construction of the Health Discovery Building which opened in 2017 to provide research space for approximately 90 investigators plus a vivarium, state-of-the-art imaging facility, and core laboratories. I participated in weekly meetings with Seton Healthcare Family to craft the UT-Seton affiliation agreement, which was

completed in October 2014. From 2015-2017, I assumed the position of Associate Dean for Research Development for Dell Medical School to lead recruitment efforts for attracting stellar investigators in partnership with other UT Austin colleges. From September 2017, until September 2020, I served as Senior Advisor to the Dean of Dell Medical School for Research Strategy, managing wet lab space and associated shared equipment allocation, policies and procedures for the Dell Medical School.

Upon arriving at UT Austin, I also served as Associate Director of the Waggoner Center for Alcohol and Addiction Research (WCAAR), an internationally recognized organized research center founded in 1999 in the College of Natural Sciences that is focused on basic research in the neurobiology of addiction. On September 1, 2017, I became WCAAR director. I recruited four new research faculty (including two women and one Latinx man) and expanded the WCAAR mission to include clinical research and care. The goal is to build a clinical program that will provide much needed substance abuse care in Travis Country and perform cutting-edge clinical research, in collaboration with the Department of Psychiatry and Behavioral Sciences and the Department of Neurology of Dell Medical School, and other colleges on the UT Austin campus. We received provisional approval in February 2020 from the ACGME for creation of an Addiction Psychiatry Fellowship Program, which is now fully approved.

For UT System I participated as one of three UT Austin representatives on the Neuroscience Council, which was formed in response to President Obama's BRAIN Initiative announced in 2013. I also helped plan the UT System Institute of Neuroscience and Neurotechnology which provided seed funding in 2015 for neuroscience research projects alligned with the NIH BRAIN initiative to UT investigators. Finally, I speakeaded the creation of a Nikon Center of Excellence at UT Austin which opened in 2019.

In 2020 I served as the representative for Dell Medical School on the Lab-intensive Research Restart Committee of Associate Deans of Research, appointed by the UT Austin Vice President for Research. The committee was tasked with planning and implementing procedures for phased restart of research during the COVID-19 pandemic. I wrote and put into operation policies and procedures for two wet lab research buildings (Dell Pediatrics Research Institute and Health Discovery Builiding), operated by the Dell Medical School.

In September 2020 I became Chair of the Department of Neuroscience in the College of Natural Sciences, while retaining an affiliated appointment in the Neurology Department of Dell Medical School. As chair, I recruited one MD/PhD assistant professor from Stanford jointly with the Department of Psychiatry and Behavioral Sciences. I helped recruit the department's first professional track instructor who is from an underrepresented group. I provide support for the Provost's Early Career Fellowship Program which is intended to increase the number of faculty who will further goals of diversity, equity, and inclusiveness by hiring candidates with outstanding scholarly records, as well as knowledge and experience in the issues and practices of DEI. Our department currently hosts two fellows from underrepresented backgrounds. I have also promised support for the UT Austin application for an NIH FIRST Award to promote an institutional culture of inclusion and diversity. This award would provide funds to support recruitment of three tenure track and one senior hire in neuroscience. I continue to serve on the Executive Committee of the Mulva Clinic for the Neurosciences to plan joint programs and recruitment with clinical colleagues in Dell Medical School. I am currently working to update the Neuroscience Department's Governance Policies (originally written in 2008) and seek philanthropic support for two centers administratively based in the Department, the Center for Learning and Memory and the Center for Theoretical and Computational Neuroscience.

# TEACHING AND MENTORING

## TEACHING

### FORMAL SCHEDULED CLASSES FOR UCSF STUDENTS

| Qtr | Academic Yr | Course Number and Title | Teaching Contribution | Units | Class Size |
|---|---|---|---|---|---|
| varies | 1986 - 2013 | Neuro 110: Neurology Core Clerkship | Attending Physician (1-2 months/year) | 6 | 3-5 |
| All | 1996 - 1998 | Neuro 110: Neurology Core Clerkship | Course Director | 6 | 9-15 |
| Spring | 1999 - 2002 | Medicine 132B: Introduction to Clinical Medicine | Preceptor, 1 lecture | 3 | 150-175 |
| Winter | 2003 - 2003 | NS225: Neurobiology of Disease | Course Director | 3 | 25-40 |
| Winter | 2007 - 2007 | NS225: Neurobiology of Disease | Course Director | 3 | 25-40 |
| Spring | 2008 - 2008 | NS219: Topics in Basic or Translational Neuroscience: Neurobiology of Addiction | Course Director | 3 | 5-8 |
| Spring | 2009 - 2009 | NS219: Topics in Basic or Translational Neuroscience: Neurobiology of Addiction | Course Director | 3 | 5-8 |
| Spring | 2011 - 2013 | Neuroscience Nights | Discussion group leader | 0 | 6 |
| Spring | 2012 - 2012 | NS219: Topics in Basic or Translational Neuroscience: Neurobiology of Addiction | Course Director | 3 | 5-8 |

### FORMAL SCHEDULED CLASSES FOR UT AUSTIN STUDENTS

| Session | Academic Yr | Course Number and Title | Teaching Contribution | Class Size |
|---|---|---|---|---|
| Spring | 2013-18 | NEU 394P: CAREER DEVELOPMENT FOR NEUROSCIENTISTS | Lecturer: 1h per year | 5-6 |
| Spring | 2015-17 | PGS 388K and NEU 385L: PHARMACOLOGICAL MECHANISMS OF ADDICTION | Discussion leader: 30h | 4-6 |
| Spring | 2019 | NEU 385L: ADDICTION NEUROSCIENCE | Discussion leader 30h | 5 |
| Spring | 2020 | NEU 365W: NEUROBIOLOGY OF ADDICTION | Course director and lecturer: 90h | 123 |

### POSTGRADUATE AND OTHER COURSES

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|---|---|---|
| 1990 - 1990 | UCSF Recent Advances in Neurology Course: "Lyme Disease" | Lecture and Syllabus |
| 1992 - 1992 | UCSF Recent Advances in Neurology Course: "AIDS Update: AIDS Dementia" | Lecture and Syllabus |
| 1997 - 1998 | UCSF CME Course "Neurology for the Primary Care Practitioner: Geriatric Neurology" | 2 Lectures and Syllabus |
| 2005 - 2005 | Bay Area General Counsel Group Continuing Legal Education Course "Substance Abuse" | 1 Lecture |

### INFORMAL TEACHING

1986 - present I mentor students (graduate and undergraduate) and postdoctoral fellows in my laboratory daily. I also regularly provide informal advice and support to junior faculty in the Dell

Medical School and College of Natural Sciences at UT Austin. Those for whom I provide formal mentorship are listed below.

## MENTORING

PREDOCTORAL STUDENTS

AT UCSF

| Dates | Name | Program or School | Role | Last Known Position |
|---|---|---|---|---|
| 1998-2000 | Charles Howe | UCSF Neurosci. | Thesis Advisor | Assoc Prof. Neuroscience, Mayo Clinic |
| 1998-1998 | Nicholas Justice | UCSF Neurosci. | Qual. Committee | Assoc. Prof. UT Houston, Inst. Of Molec. Med. |
| 1988-1988 | Elizabeth Kiyasu | Yale University | Mentor | MD, Private Practice |
| 1994-1994 | Kamaljit Hundle | U. of Westminster, UK | Mentor | unknown |
| 1998-1998 | Reid Andersen | MIT | Mentor | Microsoft Research |
| 1999-1999 | Linus Tsai | UCSF Neurosci. | Qual. Committee | Asst. Professor Harvard Med School |
| 2001-2001 | Nam-Hee Kim | Yonsei U., Korea | Mentor | unknown |
| 2002-2002 | Jennifer Gray | UCSF PSPG | Qual Committee | unknown |
| 2002-2007 | Cory Blaiss | UCSF Neurosci. | Thesis Committee | Teva Pharmaceuticals |
| 2003-2007 | Siddhartha Mitra | UCSF BMS | Thesis Committee | Director, Clin Res Gilead Sciences |
| 2003-2007 | Marian Logrip | UCSF Neurosci. | Thesis Committee | Fellow, Scripps |
| 2003-2006 | Ryan Owen | UCSF Biopharm Sci. | Thesis Committee | Senior Scientist Genentech |
| 2004-2009 | Gerard Honig | UCSF Neurosci. | Thesis Committee | Res. Manager Crohn's & Colitis Foundation |
| 2005-2005 | Jasmina Allen | UCSF Chem. Bio. | Qual. Committee | Fellow, UC Berkely |
| 2005-2006 | Judith Wong | UCSF Med. | Mentor | MD Private Practice |
| 2006-2008 | Lilly Zeng | UC Berkeley | Mentor | MD Private Practice |
| 2006-2008 | Sarah Paredes | UC Berkeley | Mentor | Mental Health NP, New Haven, CT |
| 2006-2008 | Victoria Wang | UC Berkeley | Mentor | DVM student, UC Davis |
| 2007-2009 | Terrance Chiang | UC Berkeley | Mentor | UCSF EH&S |
| 2007-2012 | S. Ahmadiantehrani | UCSF PSPG | Thesis Committee | Postdoc. Fellow, Univ. of Chicago |
| 2007-2012 | Anita Devineni | UCSF Neurosci. | Thesis Committee | Dept. Anatomy UCSF |
| 2010-2011 | Chichen Qiu | UC Berkeley | Mentor | Student, UC Berkeley |
| 2012-2012 | Dmitri Nathan Yousef Yengej | Rudolf Magnus Institute, Univ. of Utrecht | Mentor | Ph.D. candidate U. Amsterdam |
| 2012-2012 | Adam Weinstein | UC Berkeley | Mentor | Student, UC Berkeley |

UT AUSTIN

| Dates | Name | Program or School | Role | Last Known Position |
|---|---|---|---|---|
| 2013 | Joel Shillinglaw | College of Pharmacy | Lab Rotation mentor | Neuroscientist at PsychoGenics |
| 2013-2015 | Dev Gandhi | Neuroscience | Lab mentor | Medical Student UTSW |
| 2013-2015 | Viktoria Topper | UT Austin/UTMB joint program | Mentorship team member | MD Private Practice |
| 2013-2015 | Holly Chapman | Psychology | Lab mentor | Research Assistant, UTMB |
| 2013-2014 | Kuen-Woo Lee | Neuroscience | Lab mentor | Unknown |
| 2013-2014 | Brittany Li | Neuroscience | Lab mentor | Unknown |
| 2014-2019 | Matt Pomrenze | Institute for Neuroscience | Thesis Advisor | Postdoctoral Fellow, Stanford Univ. |
| 2014-2016 | Dana Most | Institute for Neuroscience | Thesis Committee | Neurology Resident, UCSD |
| 2014-present | Laura Ferguson | Institute for Neuroscience | Thesis Committee | Postdoc, UT Austin |
| 2014 | Omar Hariah | Neuroscience | Lab mentor | Undergraduate UT Austin |
| 2015 | Adam Gordon | Institute for Neuroscience | Lab Rotation Mentor | Postdoc, Univ. Wash. |
| 2015-2018 | David Giles | College of Pharmacy | Thesis Committee | Consultant at L.E.K. Consulting |
| 2015-present | Juliana Taliaferro | College of Pharmacy | Thesis Committee | Research Assistant, UT Austin |
| 2016-present | Anna Warden | Institute for Neuroscience | Qualifying and Thesis Committees | Research Scientist, UT Austin |
| 2016-2018 | Charles Zogzas | College of Pharmacy | Thesis Committee | Support, Nikon Instruments |
| 2016-2018 | Yesha Shah | Biology & Business Honors | Lab mentor | Medical Student, Johns Hopkins |
| 2017 | Wanjie Yang | Cell and Molecular Biology Graduate Program | Lab roatation mentor | Unknown |
| 2017 | Philip Lambeth | Institute for Neuroscience | Qualifying Committee | Postdoctoral Fellow, UCSF |
| 2018-2021 | Andre DeGroot | Biomedical Engineering Grad. Student | Thesis Committee | Scientist at Sana Biotechnology, Boston MA |
| 2018-2022 | Cherish Taylor | Institute for Neuroscience | Thesis Committee | Postdoctoral Fellow, Harvard |
| 2018-2022 | Blaine Caslin | Institute for Neuroscience | Thesis Committee | Postdoctoral Fellow, UT Austin |
| 2018-2019 | Cheaseequa Blevins | Institute for Neuroscience | Thesis Committee | Postdoc, Mathematical Biosciences Institute, Columus OH |
| 2018-present | Geoff Dilly | Institute for Neuroscience | Thesis Advisor | PhD Candidate UT Austin |
| 2018-2022 | Emily Grantham | Institute for Neuroscience | Thesis Committee | Postdocotroal Fellow, UT Austin |
| 2018-2021 | Victor Liaw | Biochemistry | Lab mentor | Medical Student UTSouthwestern |
| 2018-2020 | Thi Tran | Biochemistry | Lab mentor | Medical Student, McGovern Med School |
| 2019 | Kenji Nishimura | Institute for Neuroscience | Lab roatation mentor | PhD Candidate UT Austin |
| 2019-present | Michael Dugan | Institute for Neuroscience | Thesis Advisor | PhD Candidate UT Austin |

| Dates | Name | Program or School | Role | Last Known Position |
|---|---|---|---|---|
| 2019 | Bailey Moskowitz | Univ. of VA, Biology | Summer mentor | Research Assistant Univ. of Wisconson |
| 2019-2022 | Cory Kittleman | Neuroscience | Lab mentor | Medical student UT San Antonio HSC |
| 2019-2021 | Atharva Railkar | Neuroscience | Lab mentor | Associate Health Business Analyst at Florida Blue |
| 2019-2020 | Angus Brooks | Biology | Lab mentor | Medical student at UT McGovern |
| 2019-2021 | Sathvik Srinivasan | Neuroscience | Lab mentor | High School tutor |
| 2020-2021 | Shruti Patil | Neuroscience/ English | Lab mentor | Texas Criminal Justice Coalition Intern |
| 2020-2022 | Adriana Gregory Flores | Institute for Neuroscience | Thesis Co-Advisor | Unknown |
| 2020-present | Sam Bazzi | Institute for Neuroscience | Thesis Committee | PhD Candidate UT Austin |
| 2021-present | Amanda Essoh | Dept. Neuroscience & Exp. Ther. | Thesis committee | PhD candidate Texas A&M |
| 2021-2022 | Dylan Kirsch | Institute for Neuroscience | Thesis committee | Postdoctoal Fellow UCLA |
| 2021-2022 | Sandra Cong | Biology | Lab mentor | Undergraduate UT Austin |
| 2022-present | Kanako Matsumura | Institute for Neuroscience | Thesis committee | PhD Candidate UT Austin |
| 2022-present | Stephanie Grant | Pharmaceutical Sciences | Thesis Committee | PhD Candidate UT Austin |
| 2022-present | Alexa-Rae Wheeler | Institute for Neuroscience | Thesis committee | PhD Candidate UT Austin |
| 2022 | Catherine Choi | Neuroscience | Thesis committee | PhD Candidate Tufts Univ. |
| 2022-present | Ashwin Koduri | Biology | Lab mentor | Undergraduate UT Austin |
| 2022-present | Elise Seidenstein | Neuroscience | Lab mentor | Undergraduate UT Austin |
| 2023-present | Will Baltazar | Biochemistry | Lab mentor | Undergraduate UT Austin |
| 2023-present | Ethan Liu | Biology | Lab mentor | Undergraduate UT Austin |
| 2023-present | Ai Ni Wu | Neuroscience | Lab mentor | Undergraduate UT Austin |
| 2023-present | Seo Yun Kim | Biochemistry | Lab mentor | Undergraduate UT Austin |

## POSTDOCTORAL FELLOWS & RESIDENTS

### UCSF

| Dates | Name | Fellow | Faculty Role | Last Known Position |
|---|---|---|---|---|
| 1991-1993 | Reina Roivainen, M.D., Ph.D. | Fellow | Mentor | Neurologist, Helsinki Univ. Central Hospital Helsinki, Finland |
| 1992-1997 | Bhupinder Hundle, Ph.D. | Fellow | Mentor | Director Distribution Sales at Oxford Nanopore Technologies, Oxford, UK |
| 1993-1995 | Michele Solem, Ph.D. | Fellow | Mentor | Assoc Prof, T Jefferson U |
| 1995-1997 | Edward Gerstin Jr., Ph.D. | Fellow | Mentor | Science teacher, San Diego |
| 1996-1998 | Effie Lin, Ph.D. | Fellow | Mentor | Scientist, Gentastic Corp. |
| 1997-2000 | Karen Zhu, Ph.D. | Fellow | Mentor | Senior Scientist, BioRad |
| 1997-2001 | Annick Martin Ph.D. | Fellow | Mentor | Project Leader, Francaise Contre les Mypopathies |
| 1998-2002 | Helen Walter, Ph.D. | Fellow | Mentor | Teacher, Peralta College |
| 1998-2001 | Asa Abeliovich M.D., Ph.D. | Resident | Advisor | CEO and Founder, Prevail Therapeutics |

| Dates | Name | Fellow | Faculty Role | Last Known Position |
|---|---|---|---|---|
| 1999-2005 | Doo-Sup Choi, Ph.D. | Fellow | Mentor | Prof. Pharmacology & Psychiatry, Mayo Clinic |
| 2001-2004 | Anita Koshy, M.D. | Resident | Advisor | Assoc. Prof of Neurology, Univ. of Arizona |
| 2001-2009 | Phillip Newton, Ph.D. | Fellow | Mentor | Prof. of Medicine, Swansea Univ. Med. School, UK |
| 2001-2004 | Maengseok Song, Ph.D. | Fellow | Mentor | Senior Scientist, Applied Biosystems, Foster City, CA |
| 2003-2009 | Melissa Wallace, Ph.D. | Fellow | Mentor | Professor of Pharmacology and Medical Sciences Education, Swansea Univ. UK |
| 2003-2006 | Miho Oyasu, Ph.D. | Fellow | Mentor | Scientist, Bristol Myers Squibb, Redwood City, CA |
| 2004-2006 | Heidi Lesscher, Ph.D. | Fellow | Mentor | Assoc. Professor of Vet Med, Univ. of Utrecht, Netherlands |
| 2004-2006 | Anthony Kim, M.D. | Resident | Advisor | Assoc. Prof. of Neurology UCSF |
| 2005-2008 | Emily Ho, M.D., Ph.D. | Resident | Advisor | Neurologist, Swedish Neurosci. Inst., Seattle WA |
| 2007-2009 | Dev Chandra, DDS, Ph.D. | Fellow | Mentor | Postdoctoral Fellow, UCSF School of Dentistry |
| 2007-2014 | Anna Lee, Ph.D. | Fellow | Mentor | Assoc. Prof. of Pharmacology, Univ. of MN |
| 2008-2011 | Amy Gelfand, M.D. | Resident | Advisor | Assoc. Prof. of Neurology UCSF |
| 2008-2010 | Nurith Amitai, Ph.D. | Fellow | Mentor | Scientific Writer, Absorption Systems, San Diego CA |
| 2009-2014 | Daifei Wu, Ph.D. | Fellow | Mentor | Senior Research Scientist, Jiangsu SR-Biopharma Co., Ltd, China |
| 2010-2013 | Taban Seif, Ph.D. | Fellow | Mentor | Instructor, Cal. State Univ., East Bay |
| 2011-2013 | James Orengo, M.D., Ph.D. | Resident | Advisor | Asst. Prof. of Neurology, Baylor College of Medicine UCSF |
| 2011-2013 | Richard van Rijn, Ph.D. | Fellow | Co-Mentor for K99 award | Assoc. Prof. of Pharmacology, Purdue University; Principal Scientist, Disease Biology, Septerna, South San Francisco, CA |
| 2012-2013 | Rajani Maiya, Ph.D. | Fellow | Mentor | Asst. Prof. of Physiology, LSU School of Medicine |

UT AUSTIN

| Dates | Name | Position | Faculty Role | Last Known Position |
|---|---|---|---|---|
| 2014-2016 | Angelo Blasio. PhD | Postdoctoral Fellow | Mentor | Research Scientist II, Vertex Pharmaceuticals, Boston, MA |
| 2013-2020 | Rajani Maiya, PhD | Assistant Res. Scientist, | Supervisor | Asst. Prof. Physiology , LSU School of Medicine |
| 2013-2014 | Daifei Wu, Ph.D. | Assistant Res. Scientist, UT Austin | Mentor | Senior Scientist and Vice General Manager, Jiangsu SR-Biopharma Co, Taizhou City, China |
| 2015-2018 | Jingyi Wang, PhD | Postdoctoral Fellow | Mentor | Manager GLG, Austin TX |
| 2018-present | Laura Ferguson, PhD | Postdoctoral Fellow | Mentor | Postdoctoral Fellow |
| 2019-2020 | Lauren Smith, PhD | Postdoctoral Fellow | Co-Mentor | Manager, Educational Development at NACCME an HMP Company |

| | | | | |
|---|---|---|---|---|
| 2021-present | Lubov Ezerskiy, PhD | Postdoctoral Fellow | Mentor | Postdoctoral Fellow |

FACULTY MENTORING

UCSF

| Dates | Name | Position While Mentored | Mentoring Role | Current Position |
|---|---|---|---|---|
| 2001-2003 | Janice Williams, Ph.D. | Staff Scientist | Supervisor | Sen. Scientist, Presidio Pharma. |
| 2001-2010 | Wen-Hai Chou, Ph.D. | Adj. Asst. Prof. | Supervisor | Assist. Investigator, Ctr. for Neuropsychiatric Res., National Health Research Institutes, Taiwan |
| 2002-present | Viktor Kharazia, Ph.D. | Histology Dir. | Supervisor | Histology and Imaging Specialist, UCSF |
| 2003-2007 | Vineeta Singh, M.D. | Asst. Clin. Prof. | Mentor | Prof. of Neurology, UCSF |
| 2008-2008 | Gil Rabinovici, M.D. | Clin. Fellow | Mentor | Prof. of Neurology, UCSF |
| 2011-2013 | Lea Grinberg, M.D., Ph.D. | Asst. Prof. | Mentor | Assoc. Prof., Neurology, UCSF |

UT AUSTIN

| Dates | Name | Position While Mentored | Mentoring Role | Current Position |
|---|---|---|---|---|
| 2013-2014 | Anna Lee, Ph.D. | Res. Asst. Prof. of Pharmacology-Toxicology | Advisor | Assoc. Prof. of Pharmacology, University of Minnesota |
| 2013-2019 | Somshuvra Mukhopadhyay Ph.D. | Asst. Prof. of Pharmacology-Toxicology | Advisor | Assoc. Prof. of Pharmacology/Toxicology UT Austin |
| 2014-2018 | Boris Zemelman, Ph.D. | Asst. Prof. of Neuroscience | Advisor | Assoc. Prof. of Neuroscience UT Austin |
| 2017-present | Esther Melamed, M.D., Ph.D. | Asst. Prof. of Neurology | Advisor | Asst. Prof. of Neurology, UT Austin |

TEACHING AND MENTORING NARRATIVE

At UCSF I taught medical students and neurology residents on the in-patient service at San Francisco General Hospital for one month per year for many years, and mentored students and residents in the outpatient neurology clinic. I also taught neuroscience graduate students by directing a two-week minicourse on Addiction (NS219) approximately every other year and by directing the Neurobiology of Disease course (NS225) every four to six years. I informally taught postdoctoral fellows in my laboratory daily and I assisted graduate students in the UCSF Neuroscience program 6-10 hours per year each by participating on their thesis committees. I also mentored six neurology residents and three junior faculty members in Neurology between 1998-2013.

At UT Austin I continued to mentor two senior scientists and one research Assistant Professor who came with me from UCSF. The research assistant professor, Dr. Anna Lee, obtained a tenure-track faculty position at University of Minnesota in the Department of Pharmacology in 2015 and the other, Rajani Maiya, obtained a tenure-track faculty position in 2020 at Louisiana State University (New Orleans)

School of Medicine in the Department of Physiology. I mentored several more (see above), and there are now two postdoctoral fellows and two neuroscience graduate students doing thesis projects in my lab. I am on thesis committees for several other Neuroscience graduate students. I also organize weekly conferences of the Waggoner Center and attend Neuroscience Department conferences in the College of Natural Sciences. In 2019, I directed the graduate course NEU 385L Addiction Neuroscience and in spring 2020 directed the undergraduate course NEU 365W Neurobiology of Addiction. Since I became Chair of Neuroscience in 2020, I have been relieved of formal course teaching.

**OTHER**

**PRE- and POST-DOCTORAL EDUCATION**

| | |
|---|---|
| 1991-1995 | Faculty Member, Molecular Medicine Program, UCSF |
| 1991-2000 | Faculty Member, Program in Cellular and Molecular Medicine, SFGH |
| 1996-2000 | Faculty Member, Program in Biomedical Sciences, UCSF |
| 1997-2013 | Faculty Member, Graduate Program in Neurosciences, UCSF |
| 1997-2013 | Faculty Member, Program in Biological Sciences, UCSF |
| 1999-2013 | Faculty Member, Institute for Neurodegenerative Diseases, UCSF |
| 2003-2013 | Faculty Member, Wheeler Center for Neurobiology of Addiction |
| 2008-2013 | Faculty Member, UCSF Graduate Group in Oral and Craniofacial Sciences |
| 2009-2013 | Faculty Member, UCSF Institute of Molecular Medicine |
| 2013-now | Faculty Member, UT Institute for Neuroscience Graduate Program |
| 2013-now | Faculty Member, UT Interdisciplinary Life Sciences Graduate Programs (formerly Cell and Molecular Biology Graduate Program) |

**TEACHING AND MENTORING AWARDS AND NOMINATIONS**

| | |
|---|---|
| 1995 | Robert B. Layzer "Golden Toe" Award for Outstanding Neurology Resident Teaching |
| 2004 | Nominee, Kaiser Awards for Excellence in Teaching |

## RESEARCH AND CREATIVE ACTIVITIES

**RESEARCH AWARDS**

CURRENT

NIH, R01AA026075 07/20/2017 to 06/30/2024 (NCE)
"CRF Neurons of the Extended Amygdala and Alcohol Drinking"
To test the hypothesis that as animals develop ethanol dependence, CRF neurons in the central amygdala and bed nucleus of the stria terminalis promote ethanol consumption through the coordinated release of GABA, CRF, and other neuropeptides.

Total Direct Costs: $1,125,000
Role: PI (5%)

NIH, U01AA013520-21 02/01/2022 to 01/31/2027
"Biomedical and Genetic Determinants of Alcohol Consumption"
To examine the role of interferon-1 (IFN-1) signaling in behavioral responses to alcohol and identify and validate potential drug targets within IFN-1signaling pathways to reduce alcohol consumption.
Total Direct Costs: $1,499,117
Role: MPI (10%) with Blednov

NIH, U24 AA025479 02/01/2022 to 01/31/2027
"Integrative Neuroscience Initiative on Alcoholism"
Administrative Core for INIA-Neuroimmune, a multi-disciplinary, highly collaborative research consortium that studies immune and inflammatory pathways in the brain, combining novel genomic and systems-level analyses to identify potential treatments for alcohol use disorder.
Total Direct Costs: $1,616,223
Role: PI (15%)

NIH, R01AA028807 09/12/2022 to 08/31/2027
"PDE4 regulation of GABA-A receptors in alcohol tolerance and consumption"
These studies will investigate the role of phosphodiesterase 4 (PDE4) enzymes and GABAA receptor beta subunits in alcohol tolerance and alcohol consumption. These studies hope to identify a specific PDE4 and a specific subunit of GABAA receptors as drug targets for treatment of alcohol use disorder
Total Direct Costs: $2,162,710

Role: PI (10%)

<u>COMPLETED</u>

DoD/CDMRP, W81XWH1810389 08/31/2018 to 09/01/2022 (NCE)
"Protein Kinase C Epsilon Inhibitors to Treat Pain"
Role: PI (5%)

NIH, U01AA013520 02/01/2017 to 01/31/2022
"Biomedical and Genetic Determinants of Alcohol Consumption"
Role: MPI (5%) with Blednov

Harrington Discovery Institute, HDI2018-SI-3044 01/01/2018 to 12/31/2020 (NCE)
"Protein Kinase C Epsilon Inhibitors"
Role: PI.

NIH, R21AA025244 07/15/2016 to 06/30/2019 (NCE)
"The Transcriptional Co-Factor LMO4 and Ethanol Drinking"
Role: PI (10%)

NIH, P50AA017072 07/01/2013 to 06/30/2018
"Alcohol Center for Translational Genetics: Component 5 - Atypical PKM zeta in Models of Binge

Drinking and Relapse"
Role: PI

NIH, R01AA013588 05/01/2002 to 07/31/2018
"Regulation of GABA-A Receptors by PKC epsilon"
Role: PI

NIH, R21AA023223, Hopf, Frederic 09/01/2015 to 08/31/2016
"Opto/Chemo-genetic Analysis of Locus Coeruleus CRF and Compulsive Ethanol Intake"
Role: Co-I

Univ of TX System, Brain Seed Grant 365094, Ben-Yakar, Adela 09/01/2015 to 08/31/2016
"Single Cell Capture for Transcriptome Analysis of Ensembles that Encode Emotional Valence"
Role: Co-I

US Army, 803-07W81XWH-11-2-0145, Messing, Robert 07/06/2012 to 04/30/2013
"N-Type Calcium Channel Blockers for PTSD and Alcohol Use Disorders"
Role: PI

NIH, P50AA017072, Messing, Robert 05/20/2010 to 04/30/2013
"Alcohol Center for Translational Genetics (ACTG): Component 6: Nucleus Accumbens Atypical PKCs and Pathological Ethanol Drinking"
Role: Co-PI

NIH, R01AA018316, Messing, Robert 09/20/2009 to 06/30/2015
"PKC Delta in Ethanol Regulation of GABA-A Receptors and Behavior"
Role: PI

US Army, W81XWH-08-1-0620, Messing, Robert 0 9/01/2008 to 08/31/2011
"PKC-epsilon in the Amygdala-Prefrontal Cortex Circuit Regulates the Extinction of Conditioned Fear"
Role: PI

NIH, P50AA017072, Messing, Robert 05/20/2008 to 06/30/2013
"Alcohol Center for Translational Genetics (ACTG) "
Role: Director

NIH, P01NS53709, Levine, Jon 09/01/2007 to 06/30/2013
"Receptors and Second Messengers for Pain and Analgesia, Project 2: Mechanisms Downstream from PKC Epsilon in Inflammatory Hyperalgesia"
Role: PI

US Army, W81XWH-07-1-0078, Messing, Robert 05/15/2007 to 01/14/2010
"PKC Delta Regulation of Response to Ethanol"
Role: PI

US Army, WB1XWH-06-1-0159, Messing, Robert 01/02/2006 to 01/01/2009
"Responses to Ethanol in Mice Lacking DGK zeta, DGK iota, or PDK1"
Role: PI

US Army, W81XWH-05-1-0215, Messing, Robert 01/15/2005 to 01/14/2010
"Implementation of a Clinical Translational Research Unit at the Ernest Gallo Clinic and Research Center"
Role: PI

NIH, R01AA013875, Levine, Jon 08/01/2004 to 05/31/2009
"Ethanol-induced Symptomatic Peripheral Neuropathy"
Role: Co-I

US Army, DAMD 03143005, Messing, Robert 10/01/2003 to 09/30/2005
"Identification of alleles of PKCε as risk factors in alcohol use disorders"
Role: PI

US Army, DAMD17-03-1-0058, Messing, Robert 01/15/2003 to 01/31/2007
"Amygdala CRF in reduced anxiety and alcohol consumption in PKCε"
Role: PI

NIH, R37AA013588, Messing, Robert 05/01/2002 to 04/30/2013
"Regulation of GABA-A Receptors by PKC Epsilon"
Role: PI

NIH, R01AA010036, Messing, Robert 04/01/1995 to 03/31/2001
"Ethanol, Neural Differentiation, and Protein Kinase C"
Role: PI

NIH, R01AA008117, Messing, Robert 12/01/1989 to 06/30/2004
"Ethanol, Calcium Channels, and Protein Kinase C"
Role: PI

NIH, F32AA005223, Messing, Robert 07/20/1985 to 07/19/1986
"Modulation of Calcium Dependent Neurotransmitter Release"
Role: PI

NIH, K08NS001151, Messing, Robert 07/01/1985 to 06/30/1991
"Regulation of Calcium Channels by Protein Kinase C"
Role: PI

## PUBLICATIONS

Total citations and *h*-index as of August 4, 2023:
Google Scholar: 14,716 citations; *h*-index = 69
Scopus: 10,508 citations; *h*-index = 58
Web of Science: *9,720* citations; *h*-index = 56

iCite for 164 publications 1984-2023: Mean RCR = 1.81; weighted RCR = 282.56

A complete list of published work can be found at:
https://www.ncbi.nlm.nih.gov/myncbi/robert.messing.1/bibliography/public/

### Manuscripts

1. Hill R, Robbins AW, **Messing RO**, Arora NS. Sleep apnea syndrome after poliomyelitis. Am. Rev. Res. Dis. 127:129-131. 1983.

2. Schmidley JW, **Messing RO**. Agitated confusional states in patients with right hemisphere infarctions. Stroke 15:883-885, 1984.

3. **Messing RO**, Closson R, Simon R. Drug-induced seizures: A 10-year experience. Neurology 34:1582-1586, 1984.

4. Panitch HS, Francis GS, Hooper CJ, **Messing RO**, Lipkin WI. Immunological studies in patients with acquired immune deficiency syndrome. Ann. NY Acad. Sci. 437:513-517, 1984.

5. Edwards R, **Messing RO**, McKendall RR. Cytomegalovirus meningoencephalitis in a homosexual man with Kaposi's sarcoma: Isolation of CMV from CSF cells. Neurology 35:560-562, 1985.

6. **Messing RO**, Carpenter CL, Greenberg D. Mechanism of calcium channel inhibition by phenytoin: Comparison with classical calcium channel antagonists. J. Pharmacol. Exp. Ther. 235:407-411, 1985.

7. Greenberg DA, Carpenter CL, **Messing RO**: Inactivation of $^{45}Ca^{2+}$ uptake by prior depolarization of PC12 cells. Neurosci. Lett. 62:377-381, 1985.

8. **Messing RO**, Carpenter CL, Greenberg DA. Inhibition of calcium flux and calcium channel antagonist binding in the PC12 neural cell line by phorbol esters and protein kinase C. Biochem. Biophys. Res. Commun. 136:1049-1056, 1986.

9. **Messing RO**, Carpenter CL, Diamond I, Greenberg DA. Ethanol regulates calcium channels in clonal neural cells. Proc. Natl. Acad. Sci. USA 83:6213-6215, 1986.

10. Greenberg DA, Carpenter CL, **Messing RO**. Depolarization-dependent binding of the calcium channel antagonist (+)-[3H]PN200-110 to intact cultured neural cells. J. Pharmacol. Exp. Ther. 238:1021-1027, 1986.

11. Greenberg DA, Carpenter CL, **Messing RO**. Calcium channel antagonist properties of the antineoplastic antiestrogen, tamoxifen, in the PC12 neurosecretory cell line. Cancer Res. 47:70-74, 1987.

12. Greenberg DA, Carpenter CL, **Messing RO**. Interaction of calmodulin inhibitors and protein kinase C inhibitors with voltage-dependent calcium channels. Brain Res. 404:401-404, 1987.

13. Greenberg DA, Carpenter CL, **Messing RO**. Lectin-induced enhancement of voltage-dependent calcium flux and calcium channel antagonist binding. J. Neurochem. 48:888-894, 1987.

14. Greenberg DA, Carpenter CL, **Messing RO**. Ethanol-induced component of 45Ca2+ uptake in PC12 cells is sensitive to Ca2+ channel modulating drugs. Brain Res. 410:143-146, 1987.

15. **Messing RO**, Stevens AM, Kiyasu E. Nicotinic and muscarinic agonists stimulate rapid protein kinase C translocation in PC12 cells. J. Neurosci. 9:507-512, 1989.

16. Marks SS, Watson DL, Carpenter CL, **Messing RO**, Greenberg DA. Calcium channel antagonist receptors in cerebral cortex from alcoholic patients. Brain Res. 478:196-198, 1989.

17. Marks SS, Watson DL, Carpenter CL, **Messing RO**, Greenberg DA. Comparative effects of chronic exposure to ethanol and calcium channel antagonists on calcium channel antagonist receptors in cultured neural (PC12) cells. J. Neurochem. 53:168-172, 1989.

18. Rawlings D, Ferriero DM, **Messing RO**. Early CT reevaluation after empiric praziquantel therapy in neurocysticercosis. Neurology 39:739-741, 1989.

19. **Messing RO**, Sneade AB, Savidge B. Protein kinase C participates in up-regulation of dihydropyridine-sensitive calcium channels by ethanol. J. Neurochem. 55:1383-1389, 1990.

20. **Messing RO**, Henteleff M, Park JJ. Ethanol enhances growth factor-induced neurite formation in PC12 cells. Brain Res. 565:301-311, 1991.

21. **Messing RO**, Petersen PL, Henrich CJ. Chronic ethanol exposure increases levels of protein kinase C delta and epsilon and protein kinase C-mediated phosphorylation in cultured neural cells. J. Biol. Chem. 266:23428-23432, 1991.

22. Roivainen R and **Messing RO**. The phorbol derivatives thymeleatoxin and 12-deoxyphorbol-13-O-phenylacetate-10-acetate cause translocation and down-regulation of multiple protein kinase C isozymes. FEBS Lett. 319:31-34, 1993.

23. Smith WS and **Messing RO**. Cerebral aneurysm presenting as cough headache. Headache 33:203-204, 1993.

24. Roivainen R, McMahon T, **Messing RO**. Protein kinase C isozymes that mediate enhancement of neurite outgrowth by ethanol and phorbol esters in PC12 cells. Brain Res. 624:85-93, 1993.

25. Garcia PA, Bredesen DE, Vinters HV, Graefin von Einsiedel R, Williams RL, Kahn JO, Byers VS, Levin AS, Waites LA, **Messing RO**. Neurological reactions in HIV-infected patients treated with trichosanthin. Neuropathol. Appl. Neurobiol. 19:402-405,1993.

26. Ferriero DM, Sheldon RA, **Messing RO**. Somatostatin enhances nerve growth factor induced neurite outgrowth in PC12 cells. Dev. Brain Res. 80:13-18, 1994.

27. Roivainen R, Hundle B, **Messing RO**. Ethanol enhances growth factor activation of mitogen-activated protein kinases by a protein kinase C-dependent mechanism. Proc. Nat. Acad. Sci. USA 92:1891-1895, 1995.

28. Solem M, McMahon T, **Messing RO**. Depolarization-induced neurite outgrowth in PC12 cells requires permissive, low level NGF receptor stimulation and activation of calcium/calmodulin-dependent protein kinase. J. Neurosci. 15:5966-5975, 1995.

29. Hundle B, McMahon T, Dadgar J, **Messing RO**. Overexpression of epsilon-protein kinase C enhances nerve growth factor-induced phosphorylation of mitogen-activated protein kinases and neurite outgrowth. J. Biol. Chem. 270:30134-30140, 1995.

30. Lai H-L, Yang T-H, **Messing RO**, Ching Y-H, Lin S-C, Chern Y. Protein kinase C inhibits adenylyl cyclase type VI activity during desensitization of the A2a-adenosine receptor-mediated cAMP response. J. Biol. Chem. 272:4970-4977, 1997.

31. Hundle B, McMahon T, Dadgar J, Chen C-H, Mochly-Rosen D, **Messing RO**. An inhibitory fragment derived from protein kinase C epsilon prevents enhancement of nerve growth factor responses by ethanol and phorbol esters. J. Biol. Chem. 272:15028-15035, 1997.

32. Solem M, McMahon T, **Messing RO**. Protein kinase A regulates inhibition of N- and P/Q-type calcium channels by ethanol in PC12 cells. J. Pharmacol. Exp. Ther. 282:1487-1495, 1997.

33. Gerstin E, McMahon T, Dadgar J, **Messing RO**. Protein kinase C delta mediates ethanol-induced up-regulation of L–type calcium channels. J. Biol. Chem. 273:16409-16414, 1998.

34. Liu J, Solway K, **Messing RO**, Sharp FR. Increased neurogenesis in the dentate gyrus after transient global ischemia in gerbils. J. Neurosci. 18:7768-7778, 1998.

35. Khasar SG, Lin Y-H, Martin A, Dadgar J, McMahon T, Hundle B, Aley KO, Isenberg W, Green PG, Hodge, CH, Levine JD, **Messing RO**. A novel nociceptive signaling pathway revealed in protein kinase C epsilon mutant mice. Neuron 24:253-260, 1999.

36. Hodge CW, Mehmert K, Kelley SP, McMahon T, Haywood A, Olive MF, Wang D, Sanchez-Perez AM, **Messing RO**. Supersensitivity to allosteric $GABA_A$ receptor modulators and alcohol in mice lacking PKC epsilon. Nat. Neurosci. 2:997-1002, 1999.

37. McMahon T, Andersen R, **Messing RO**. PKC epsilon mediates up-regulation of N-type calcium channels by ethanol. Mol. Pharmacol. 57:53-58, 2000.

38. Aley KO, **Messing RO**, Mochly-Rosen D, Levine JD. Chronic hypersensitivity for inflammatory nociceptor sensitization mediated by the epsilon isozyme of protein kinase. J. Neurosci. 20:4680-4685, 2000.

39. Walter H, McMahon T, Gerstin E, Dadgar J, Wang D, **Messing RO**. Ethanol regulates calcium channel subunits by protein kinase C delta-dependent and -independent mechanisms. J. Biol. Chem. 275: 25717-25722, 2000.

40. Olive MF, Mehmert KK, **Messing RO**, Hodge CW. Reduced operant ethanol self-administration and in vivo mesolimbic dopamine responses to ethanol in PKC epsilon-deficient mice. Eur. J. Neurosci. 12:4131-4140, 2000.

41. Choi D-S, Handa M, Young H, Gordon AS, Diamond I, **Messing RO**. Genomic organization and expression of the mouse equilibrative, nitrobenzylthioinosine-sensitive nucleoside transporter 1 (ENT1) gene. Biochem. Biophys. Res. Commun. 277:200-208, 2000.

42. Dina OA, Barletta J, Chen XJ, Mutero A, Martin A, **Messing RO**, Levine JD. Key role for the epsilon isoform of protein kinase C in painful alcoholic neuropathy in the rat. J. Neurosci. 20:8614-8619, 2000.

43. Handa M, Choi D-S, Caldeiro RM, **Messing RO**, Diamond I, Gordon AS. Cloning of a novel isoform of the NBMPR-sensitive equilibrative nucleoside transporter (ENT1) in mouse that lacks a putative phosphorylation site. Gene 262:301-307, 2001.

44. Huang NK, Lin YW, Huang CL, **Messing RO**, Chern Y. Activation of protein kinase A and atypical protein kinase C by $A_{2A}$ adenosine receptors antagonizes apoptosis due to serum deprivation in PC12 cells. J. Biol. Chem. 276:13838-13846, 2001.

45. Olive MF, Mehmert KK, Nannini MA, Camarini R, **Messing RO**, Hodge CW. Reduced ethanol withdrawal severity and altered withdrawal-induced c-fos expression in various brain regions of mice lacking protein kinase C-epsilon. Neuroscience 103:171-179, 2001.

46. Aley KO, Martin A, McMahon T, Levine JD, **Messing RO**. Nociceptor sensitization by extracellular signal-regulated kinases. J. Neurosci. 21:6933-6939, 2001.

47. Zhu G, Wang, D, Lin YW, Lim S, Dadgar J, Koo EH and **Messing RO**. Protein kinase C epsilon suppresses Aβ production and promotes activation of alpha-secretase. Biochem. Biophys. Res. Commun. 285:997-1006, 2001.

48. Dina OA, Aley KO, **Messing RO**, Levine JD. Sex hormone regulates the contribution of PKC epsilon and PKA signaling in inflammatory pain in the rat. Eur. J. Neurosci. 13:2227-2233, 2001.

49. Jin Z-Q, Zhou H-Z, Zhu P, Honbo N, Mochly-Rosen D, **Messing RO**, Goetzl E, Karliner JS, Gray MO. Cardioprotection mediated by sphingosine-1-phosphate and the ganglioside GM-1 in wild type and epsilon PKC knockout mouse hearts. J. Appl. Physiol. 282:H1970-H1977, 2002.

50. Hodge CW, RaberJ, Walter H, McMahon T, Sanchez-Perez AM, Olive MF, Mehmert K, Morrow AL, **Messing RO**. Decreased anxiety-like behavior, reduced stress hormones, and neurosteroid supersensitivity in mice lacking protein kinase C epsilon. J. Clin. Invest. 110:1003-1010, 2002.

51. Choi D-S, Wang D, Dadgar J, Chang WS, **Messing RO**. Conditional rescue of protein kinase C epsilon regulates ethanol preference and hypnotic sensitivity in adult mice. J. Neurosci. 22:9905-9911, 2002.

52. Littler CM, Morris KG Jr, Fagan KA, McMurry IF, **Messing RO**, Dempsey EC. Protein kinase C epsilon null mice have decreased hypoxic pulmonary vasoconstriction. Am. J. Physiol. Heart Circ. Physiol. 284:H1321-H1331, 2003.

53. Proctor WR, Poelchen W, Bowers BJ, Wehner JM, **Messing RO**, Dunwiddie TV. Ethanol differentially enhances hippocampal $GABA_A$ receptor-mediated responses in PKC gamma and PKC epsilon null mice. J. Pharmacol. Exp. Ther. 305:264-270, 2003.

54. Choi D-S, Young H, McMahon T, Wang D, **Messing RO**. The mouse RACK1 gene is regulated by NF-kappaB and contributes to cell survival. Mol. Pharmacol. 64:1541-1548, 2003.

55. Gray MO, Zhou H-Z, Schafhalter-Zoppoth I, Zhu P, Mochly-Rosen D, **Messing RO**. Preservation of baseline hemodynamic function and loss of inducible cardioprotection in adult mice lacking protein kinase C epsilon. J. Biol. Chem. 279:3596-3604, 2004.

56. Chou W-H, Choi D-S, Zhang H, Mu D, McMahon T, Kharazia VN, Lowell CA, Ferriero DM, **Messing RO**. Neutrophil protein kinase C delta as a mediator of stroke-reperfusion injury. J. Clin. Invest. 114:49-56, 2004.

57. Choi D-S, Cascini M-G, Mailliard W, Young H, Paredes P, McMahon T, Diamond I, Bonci A, **Messing RO**. The equilibrative nucleoside transporter type 1 modulates ethanol intoxication and preference in mice. Nat. Neurosci. 7:855-861, 2004.

58. Newton PM, Orr CJ. Wallace MJ, Shin H-S, **Messing RO**. Deletion of N-type calcium channels blocks ethanol reward and reduces ethanol consumption in mice. J. Neurosci. 24:9862-9869, 2004.

59. Newton PM, Tully K, McMahon T, Connolly J, Dadgar J, Treistman SM, **Messing RO**. Chronic ethanol exposure induces an N-type calcium channel splice variant with altered channel kinetics. FEBS Lett. 579:671-676, 2005.

60. Olive MF, McGeehan AJ, Kinder JR, McMahon T, Hodge CW, Janak PH, **Messing RO**. The mGluR5 antagonist 6-methyl-s-(phenylethynyl)pyridine decreases ethanol consumption via a protein kinase C epsilon-dependent mechanism. Mol. Pharmacol. 67:349-355, 2005.

61. Chen Y, Cantrell AR, **Messing RO**, Scheuer T, Catterall WA. Specific modulation of $Na^+$ channels in hippocampal neurons by protein kinase C epsilon. J. Neurosci. 25:507-513, 2005.

62. Littler C, Wehling C, Wick M, Fagan K, Cool C, **Messing RO**, Dempsey E. Divergent contractile and structural responses of the murine PKC-epsilon null pulmonary circulation to chronic hypoxia. Am. J. Physiol. Lung Cell. Mol. Physiol. 289:L1083-1093, 2005.

63. Xuan YT, Guo Y, Zhu Y, Wang OL, Rokosh G, **Messing RO**, Bolli R. Role of the protein kinase C-epsilon-Raf-1-MEK-1/2-p44/42 MAPK signaling cascade in the activation of signal transducers and activators of transcription 1 and 3 and induction of cyclooxygenase-2 after ischemic preconditioning. Circulation 112:1971-1978, 2005.

64. Littler CM, Wehling CA, Fagan KA, **Messing RO**, Dempsey EC. Divergent contractile and structural responses of the murine protein kinase C-epsilon null pulmonary circulation to chronic hypoxia. Chest 128(6 Suppl):620S-621S, 2005.

65. Choi D-S, Wang D, Yu G-Q, Zhu G, Kharazia VN, Paredes P, Chang WS, Mucke L, **Messing RO**. PKC epsilon increases endothelin converting enzyme activity and reduces amyloid plaque pathology in transgenic mice. Proc. Nat. Acad. Sci. USA, 103:8215-8220, 2006.

66. Dina OA, **Messing RO**, Levine JD. Ethanol withdrawal induces hyperalgesia mediated by PKC epsilon. Eur. J. Neurosci. 24:197-204, 2006.

67. Newton PM, Kim JA, McGeehan AM, Paredes P, Chu K, Wallace MJ, Roberts AJ, Hodge CW, **Messing RO**. Increased response to morphine in mice lacking protein kinase C epsilon. Genes Brain Behav. 6:329-338, 2007.

68. Wallace MJ, Newton PM, Oyasu M, McMahon T, Chou W-H, Connolly J, **Messing RO**. Acute functional tolerance to ethanol mediated by protein kinase C epsilon. Neuropsychopharmacology 32:127-136, 2007.

69. Dina OA, Gear RW, **Messing RO**, Levine JD. Severity of alcohol-induced painful peripheral neuropathy in female rats: Role of estrogen and protein kinase (A and C epsilon). Neuroscience 145:350-6 2007.

70. Newton PM, **Messing RO**. Increased sensitivity to the aversive effects of ethanol in PKC epsilon null mice revealed by place conditioning. Behav. Neurosci. 121:439-442, 2007.

71. Chen J, Rinaldo L, Lim S-J, Young H, **Messing RO**, Choi D-S. The type 1 equilibrative nucleoside transporter regulates anxiety-like behavior in mice. Genes Brain Behav. 6:776-783, 2007.

72. Allen JJ, Brinkworth CS, Paulson JL, Davis RJ, Wang D, Chou WH, **Messing RO**, Burlingame AL, Shokat KM. A semi-synthetic epitope for kinase substrates. Nat. Methods. 4, 511-516, 2007.

73. Ehre C, Zhu Y, Abdullah LH, Olsen JC, Nakayama KI, Nakayama K, **Messing RO**, Davis CW. nPKC epsilon, a P2Y2-R downstream effector in regulated mucin secretion from airway goblet cells. Am. J. Physiol. Cell Physiol. 293(5):C1445-1454, 2007.

74. Qi Z-H, Song M, Wallace MJ, Wang D, Newton PM, McMahon T, Zhang C, Shokat KM, **Messing RO**. Protein kinase C epsilon regulates gamma-aminobutyrate type A receptor sensitivity to ethanol and benzodiazepines through phosphorylation of gamma2 subunits. J. Biol. Chem. 282:33052-33063, 2007.

75. Lesscher HMB, Deitchman JK, Kharazia VN, **Messing RO**. Amygdala PKC epsilon regulates corticotropin releasing factor and anxiety-like behavior. Genes Brain Behav. 7:323-333, 2008.

76. Dina OA, Khasar SG, Alessandri-Haber N, Green PG, **Messing RO**, Levine JD. Neurotoxic catecholamine metabolite in nociceptors contributes to painful peripheral neuropathy. Eur. J. Neurosci. 28:1180-1190, 2008.

77. Dina OA, Khasar SG, Alessandri-Haber N, Green PG, **Messing RO**, Levine JD. Alcohol-induced stress in painful alcoholic neuropathy. Eur. J. Neurosci. 27:83-92, 2008.

78. Durgan J, Cameron AJ, Saurin AT, Hanrahan S, Totty N, **Messing RO**, Parker PJ. The identification and characterization of novel PKC epsilon phosphorylation sites provides evidence for functional cross-talk within the PKC superfamily. Biochem. J. 411:319-331, 2008.

79. Bajo M, Cruz MT, Siggins GR, **Messing R**, Roberto M. Protein kinase C epsilon mediation of CRF- and ethanol-induced GABA release in central amygdala. Proc. Nat. Acad. Sci. USA. 105:8410-8415, 2008.

80. Choi D-S, Wei W, Deitchman JK, Kharazia VN, Lesscher HMB, McMahon T, Wang D, Qi Z-H, Sieghart W, Zhang C, Shokat KM, Mody I, **Messing RO**. Protein kinase C delta regulates ethanol intoxication and enhancement of GABA-stimulated tonic current. J. Neurosci. 28:11890-11899, 2008.

81. Newton PM, Zeng L, Wang V, Connolly J, Wallace MJ, Kim CK, Shin HS, Belardetti F, Snutch TP, **Messing RO**. A blocker of N- and T-type voltage-gated calcium channels attenuates ethanol-induced

intoxication, place preference self-administration and reinstatement. J. Neurosci. 28:11712-11719, 2008. PMCID: PMC3045811.

82. Wallace MJ, Newton PM, McMahon T, Connolly J, **Messing RO**. PKCε regulates behavioral sensitivity, binding and tolerance to the CB1 receptor agonist WIN55,212-2. Neuropsychopharmacology, 34:1733-1742, 2009.

83. Endres CJ, Moss AM, Ke B, Govindarajan R, Choi DS, **Messing RO**, Unadkat JD. The role of the equilibrative nucleoside transporter 1 (ENT1) in transport and metabolism of ribavirin by human and wild-type or Ent1$^{-/-}$ mouse erythrocytes. J. Pharmacol. Exp. Ther. 329:387-398, 2009. PMCID: PMC2670593.

84. Newton PM and **Messing RO**. The N-type calcium channel is a novel target for treating alcohol use disorders. Channels. 3: 77-81, 2009.

85. Lesscher HMB, Wallace M, Zeng L, Wang V, Deitchman K, McMahon T, **Messing RO**, Newton PM. Amygdala protein kinase C epsilon controls alcohol consumption. Genes Brain Behav. 8:493-499, 2009.

86. Li X, Pabla N, Wei Q, Dong G, **Messing RO**, Wang C-Y, Dong Z. PKC-delta promotes renal tubular cell apoptosis associated with proteinuria, J. Amer. Soc. Nephrol. 21:1115-1124, 2010.

87. Chou WH, Wang D, McMahon T, Qi ZH, Song M, Zhang C, Shokat KM, **Messing RO**. $GABA_A$ receptor trafficking is regulated by PKC epsilon and the N-ethylmaleimide-sensitive factor. J. Neurosci. 30:13955-13965, 2010. PMCID: PMC2994917.

88. Chiang T, **Messing RO**, Chou WH. Mouse model of middle cerebral artery occlusion. J. Vis. Exp. 13: pii: 2761, 2011.

89. Pabla N, Dong G, Jiang M, Huang S, Kumar MV, **Messing RO**, Dong Z, PKC delta is a novel regulator of cisplatin nephrotoxicity and effective target for renoprotection during cancer therapy. J. Clin. Invest.121(7):2709-2722, 2011. PMCID: PMC3223835.

90. Lee AM and **Messing RO**. Protein kinase C epsilon modulates nicotine consumption and reward signals in the nucleus accumbens. Proc. Natl. Acad. Sci. USA 108(38):16080-16085, 2011. PMCID: PMC3179040.

91. Mitchell JM, Grossman LE, **Messing RO**. The anticonvulsant levetiracetam potentiates alcohol consumption in non-treatment seeking alcohol abusers. J. Clin. Psychopharmacol. 32(2):269-272, 2012.

92. Lim JP, Zou ME, Janak PJ, **Messing RO.** Responses to ethanol in C57BL/6 versus C57BL6 x 129 hybrid mice. Brain and Behavior 2(1):22-31, 2012 PMCID: PMC3343296.

93. Wu D-F, Chandra D, McMahon T, Wang D, Dadgar J, Kharazia VN, Liang Y-J, Waxman SG, Dib-Hajj SD, **Messing RO**. PKC epsilon phosphorylation of the sodium channel $Na_V1.8$ increases channel function and produces mechanical hyperalgesia in mice. J. Clin. Invest. 122(4):1306-1315, 2012. PMCID: PMC3315445.

94. Jee C, Lee J, Lim JP, Parry D, **Messing RO**, McIntire SL. SEB-3, a CRF receptor-like GPCR, regulates locomotor activity states, stress responses, and ethanol tolerance in *C. elegans*. Genes Brain. Behav. 12(2):250-262, 2013. PMCID: PMC3848202.

95. Shanmugasundararaj S, Das J, Sandberg WS, Zhou X, Wang D, **Messing RO**, Bruzik KS, Stehle T, Miller KW. Structural and functional characterization of an anesthetic binding site in the second cysteine-rich domain of protein kinase cδ. Biophys. J. 103(11):2331-2340, 2012. PMCID: PMC3514512.

96. Lee AM, Kanter BR, Wang D, Lim JP, Zou M, Qiu C, McMahon T, Dadgar J, Fischbach-Weiss S, **Messing RO**, *Prkcz* null mice show normal learning and memory. Nature, 493(7432):416-419, 2013. PMCID:PMC3548047.

97. Sparta DR, Hopf FW, Gibb SL, Cho SL, Stuber GD, **Messing RO**, Ron D, Bonci A. Binge ethanol-drinking potentiates corticotropin releasing factor R1 receptor activity in the ventral tegmental area. Alcohol. Clin. Exp. Res. 37(10):1680-1687, 2013. PMCID: PMC3985436.

98. Seif T, Chang SJ, Simms JA, Gibb SL, Dadgar J, Chen BT, Harvey BK, Ron D, **Messing RO**, Bonci A, Hopf FW. Cortical activation of accumbens hyperpolarization-active NMDARs mediates aversion-resistant alcohol intake. Nat. Neurosci. 16(8):1094-1100, 2013. PMCID: PMC3939030

99. Schuster DJ, Kitto KF, Overland AC, **Messing RO**, Stone LS, Fairbanks CA, Wilcox GL. Protein kinase Cε Is required for spinal analgesic synergy between delta opioid and alpha-2A adrenergic receptor agonist pairs. J. Neurosci. 33(33):13538-13546, 2013. PMCID: PMC3742937

100. Lee AM, Zou ME, Lim JP, Stecher J, McMahon T, **Messing RO**. Deletion of *Prkcz* increases intermittent ethanol consumption in mice. Alcohol. Clin. Exp. Res. 38(1):170-178, 2014. PMCID: PMC4002763.

101. Schuster DJ, Metcalf MD, Kitto KF, **Messing RO**, Fairbanks CA, Wilcox GL. Ligand requirements for involvement of PKCε in synergistic analgesic interactions between spinal μ and δ opioid receptors. Br. J. Pharmacol. 172(2):642-53, 2015. PMCID: PMC4292975.

102. Kumar V, Weng YC, Geldenhuys WJ, Wang D, Han X, **Messing RO**, Chou WH. Generation and characterization of ATP analog-specific protein kinase Cδ. J. Biol. Chem. 290(4):1936-51, 2015. PMCID: PMC4303651.

103. Seif T, Simms JA, Lei K, Wegner S, Bonci A, **Messing RO**, Hopf FW. D-Serine and D-cycloserine reduce compulsive alcohol Intake in rats. Neuropsychopharmacology. 40(10):2357-67, 2015, PMCID: PMC4538350.

104. Weng Y-C, Wang G, **Messing R O,** Chou W-H Identification of lipocalin-2 as a PKC delta phosphorylation substrate in neutrophils. J. Biomed. Sci. 2015 Mar 20;22:21. doi: 10.1186/s12929-015-0129-z. PMCID: PMC4396066.

105. Lee AM, Wu D-F, Dadgar J, Wang D, McMahon T, **Messing RO**. Protein kinase C epsilon phosphorylates $\alpha_4\beta_2$ nicotinic acetylcholine receptors and promotes recovery from desensitization. Brit. J. Pharmacol. 172(17):4430-41, 2015. PMCID: PMC4556479.

106. Maiya R, Mangieri RA, Morrisett RA, Heberlein U, **Messing RO**. A selective role for *Lmo4* in cue-reward learning. J. Neurosci. 35(26): 9638-9647, 2015. PMCID: PMC4589569.

107. Pomrenze MB, Millan EZ, Hopf FW, Keiflin R, Maiya R, Blasio A, Dadgar J, Kharazia V, De Guglielmo G, Crawford E, Janak PH, George O, Rice KC, **Messing RO**. A transgenic rat for investigating the anatomy and function of corticotrophin releasing factor circuits. Front. Neurosci. 2015. doi: 10.3389/fnins.2015.00487. PMCID: PMC4689854.

108. Maiya R, McMahon T, Wang D, Kanter B, Gandhi D, Chapman HL, Miller J, **Messing RO**. Selective chemical genetic inhibition of protein kinase C epsilon reduces ethanol consumption in mice. Neuropharmacology. 107:40-48, 2016. PMCID PMC4912951.

109. He Y, Wilkie DJ, Nazari J, Wang R, **Messing RO**, DeSimone J, Molokie RJ, and Wang ZJ, PKCδ-targeted intervention relieves chronic pain zin a murine sickle cell disease model, J. Clin. Invest. 126(8):3053-3057, 2016. PMCID: PMC4966317.

110. Pomrenze MB, Fetterly TL, Winder DG, **Messing RO**. The corticotropin releasing factor receptor 1 in alcohol use disorder: Still a valid drug target? Alcohol. Clin. Exp. Res. 41(12):1986-1999, 2017. PMCID: PMC5711524.

111. Blasio A, Wang J, Wang D, Varodayan FP, Pomrenze MB, Miller J, Lee AM, McMahon T, Gyawali S, Wang HY, Roberto M, McHardy S, Pleiss MA, **Messing RO**. Novel Small-Molecule Inhibitors of Protein Kinase C Epsilon Reduce Ethanol Consumption in Mice. Biol. Psychiatry. 84(3):193-201, 2018. PMCID: PMC5984071.

112. Blednov YA, Da Costa AJ, Harris RA, **Messing RO**. Apremilast Alters Behavioral Responses to Ethanol in Mice: II. Increased Sedation, Intoxication, and Reduced Acute Functional Tolerance. Alcohol. Clin. Exp. Res. 42(5):939-951, 2018. PMCID: PMC5916327.

113. Blednov YA, Da Costa AJ, Tarbox T, Ponomareva O, **Messing RO**, Harris RA. Apremilast Alters Behavioral Responses to Ethanol in Mice: I. Reduced Consumption and Preference. Alcohol. Clin. Exp. Res. 42(5):926-938, 2018. PMCID: PMC5915912.

114. Warden AS, Azzam M, DaCosta A, Mason S, Blednov YA, **Messing RO**, Mayfield RD, Harris RA. Toll-like receptor 3 dynamics in female C57BL/6J mice: Regulation of alcohol intake. Brain Behav. Immun. 77:66-76, 2019. PMCID: PMC6399033.

115. Warden AS, Azzam M, DaCosta A, Mason S, Blednov YA, **Messing RO**, Mayfield RD Harris RA. Toll-like receptor 3 activation increases voluntary alcohol intake inC57BL/6J male mice. Brain Behav. Immun. 77:55-65, 2019. PMCID: PMC6399060

116. Pomrenze MB, Tovar-Diaz J, Blasio A, Maiya R, Giovanetti SM, Lei K, Morikawa H, Hopf FW, **Messing RO**. A corticotropin releasing factor network in the extended amygdala for anxiety. J. Neurosci. 39 (6) 1030-1043, 2019. PMCID: PMC6363927.

117. de Guglielmo G, Kallupi M, Pomrenze MB, Crawford E, Simpson S, Schweitzer P, Koob GF, **Messing RO**, George O. Inactivation of a specific amygdalofugal pathway reverses addiction-like behavior in alcohol-dependent rats. Nat. Commun. 10:1238, 2019. PMCID: PMC6423296.

118. Pomrenze MP, Giovanetti SM, Maiya R, Gordon AG, Kreeger LJ, **Messing RO.** Dissecting the roles of GABA and neuropeptides from central amygdala CRF neurons in anxiety and fear learning. Cell Reports, 29(1):13-21.e4, 2019. PMCID: PMC6879108.

119. Ferguson LB, Patil S, Moskowitz BA, Ponomarev I, Harris RA, Mayfield RD, **Messing RO**. A Pathway-Based Genomic Approach to Identify Medications: Application to Alcohol Use Disorder. Brain Sci. 9(12). pii: E381, 2019. PMCID: PMC6956180.

120. Wang J, Blasio A, Chapman HL, Doebelin C, Liaw V, Kuryatov A, Giovanetti SM, Lindstrom J, Lin L, Cameron MD, Kamenecka, TM, Pomrenze MB and **Messing RO.** Promoting activity of (α4)3(β2)2 nicotinic cholinergic receptors reduces ethanol consumption. Neuropsychopharmacology, 45(2):301-308, 2020, PMCID: PMC6901472.

121. Maiya R, Matthew Pomrenze MB, Tran T, Beckham A, Tiwari GR, Mayfield RD, **Messing RO.** Differential regulation of alcohol consumption and reward by the transcriptional cofactor LMO4. Mol. Psychiatry, 2020 Mar 6. doi: 10.1038/s41380-020-0706-8. [Epub ahead of print]. NIHMS: 1629299. PMCID: PMC7558853.

122. Venniro M, Russell TI, Ramsey LA, Richie CT, Lesscher HMB, Giovanetti SM, **Messing RO**, Shaham Y. Abstinence-dependent dissociable central amygdala microcircuits control drug craving. Proc. Natl. Acad. Sci. U.S.A. 2020 117(14):8126-8134. PMCID: PMC7148559.

123. Blednov YA, Da Costa A, Mayfield J, Harris RA and **Messing RO**. Deletion of Tlr3 reduces acute tolerance to alcohol and alcohol consumption in the intermittent access procedure in male mice. Addiction Biol. 2021 26(2):e12932. doi: 10.1111/adb.12932. PMCID: PMC7772253.

124. Blednov YA, Borghese, CM, Dugan MP, Pradhan S, Thodati TM, Kichili NR, Harris RA, **Messing RO**. Apremilast regulates acute effects of ethanol and other GABAergic drugs *via* protein kinase A-dependent signaling. Neuropharmacology. 2020;178:108220. doi:10.1016/j.neuropharm.2020.108220. [Epub ahead of print]. PMCID: PMC7544627.

125. Wang Z, Yoo A, De La Torre R, Topham C, Hanifin J, Simpson E, **Messing RO**, Kulesz-Martin M, Liu Y Inverse correlation of TRIM32 and PKCζ in Th2 biased inflammation. J. Invest. Derm. 2020, Oct 21;S0022-202X(20)32186-2. PMCID: PMC8058116.

126. Borghese CM, Wang HL, McHardy SF, **Messing RO**, Trudell JR, Harris RA, Bertaccini EJ. Modulation of α1β3γ2 $GABA_A$ receptors expressed in *X. laevis* oocytes using a propofol photoswitch tethered to the transmembrane helix. Proc. Natl. Acad. Sci. USA. 2021 Feb 23;118(8):e2008178118. PMCID: PMC7923644.

127. He Y, Shi Z, Kashyap Y, **Messing RO**, Wang ZJ. Protein kinase C δ as a neuronal mechanism for headache in a chronic intermittent nitroglycerin model of migraine in mice. Pain. 2021. Epub 2021/06/11. doi: 10.1097/j.pain.0000000000002353. PMID: 34108435. PMCID: PMC8448952.

128. Domi E, Xu L, Toivainen S, Nordeman A, Gobbo F, Venniro M, Shaham Y, **Messing RO**, Visser E, van den Oever MC, Holm L, Barbier E, Augier E, Heilig M. A neural substrate of compulsive alcohol use. Sci Adv. 2021 Aug 18;7(34):eabg9045. doi: 10.1126/sciadv.abg9045. PMID: 34407947. PMCID: PMC8373126.

129. Ferguson LB, Roberts AJ, Mayfield RD, **Messing RO**. Blood and brain gene expression signature of chronic intermittent ethanol consumption in mice. 2022. PLoS Computational Biology. 18(2):e1009800. PMCID: PMC8853518.

130. Carmack SA, Vendruscolo JCM, Adrienne McGinn M, Miranda-Barrientos J, Repunte-Canonigo V, Bosse GD, Mercatelli D, Giorgi FM, Fu Y, Hinrich AJ, Jodelka FM, Ling K, **Messing RO**, Peterson RT, Rigo F, Edwards S, Sanna PP, Morales M, Hastings ML, Koob GF, Vendruscolo LF. Corticosteroid sensitization drives opioid addiction. Mol Psychiatry. 2022 May;27(5):2492-2501. doi:10.1038/s41380-022-01501-1. Epub 2022 Mar 16. PMID: 35296810.

131. Dilly GA, Kittleman CW, Kerr TM, **Messing RO**, Mayfield RD. Cell-type specific changes in PKC-delta neurons of the central amygdala during alcohol withdrawal. Translational Psychiatry. 2022 Jul 20;12(1):289. doi: 10.1038/s41398-022-02063-0. PMID:35859068; PMCID: PMC9300707.

132. Blednov YA, Da Costa A, Mason S, Mayfield J, Moss SJ, **Messing RO**. Apremilast-induced increases in acute ethanol intoxication and decreases in ethanol drinking in mice involve PKA phosphorylation of $GABA_A$ β3 subunits. Neuropharmacology. 2022 Sep 21:109255. doi: 10.1016/j.neuropharm.2022.109255. Epub ahead of print. PMID: 36152689; PMCID: PMC9810330.

133. Ferguson LB, Mayfield RD, **Messing RO**. RNA biomarkers for alcohol use disorder. Frontiers Mol. Neurosci. 2022 Nov 4;15:1032362. doi:10.3389/fnmol.2022.1032362. PMID: 36407766; PMCID: PMC9673015.

134. Zhao P, Mondal S, Martin C, DuPlissis A, Chizari S, Ma KY, Maiya R, **Messing RO**, Jiang N, Ben-Yakar A. Femtosecond laser microdissection for isolation of regenerating C. elegans neurons for single-cell RNA sequencing. Nat Methods. 2023 Apr;20(4):590-599. doi: 10.1038/s41592-023-01804-3. Epub 2023 Mar 16. PMID: 36928074.

135. Dugan MP, Ferguson LB, Hertz NT, Chalkley RJ, Burlingame AL, Shokat KM, Parker PJ, **Messing RO**. Chemical Genetic Identification of PKC Epsilon Substrates in Mouse Brain. Mol Cell Proteomics. 2023 Apr;22(4):100522. doi: 10.1016/j.mcpro.2023.100522. Epub 2023 Feb 28. PMID: 36863607; PMCID: PMC10105488.

136. Blednov YA, Da Costa A, Mason S, Mayfield J, **Messing RO.** Selective PDE4B and PDE4D inhibitors produce distinct behavioral responses to ethanol and GABAergic drugs in mice. Neuropharmacology. 2023 Jun 15;231:109508. doi:10.1016/j.neuropharm.2023.109508. Epub 2023 Mar 18. PMID: 36935006. MCID: PMC10127528.

137. Paliarin F, Duplantis C, Jones AF, Cucinello-Ragland J, Basavanhalli S, Blaze E, Doré E, Neel AI, Sun H, Chen R, Edwards S, Gilpin NW, **Messing RO**, Maiya R. A cre driver line for genetic targeting of kappa opioid receptor expressing cells. eNeuro. 2023 Jun 22:ENEURO.0043-23.2023. doi: .1523/ENEURO.0043-23.2023. Epub ahead of print. PMID: 37364995.

**Print server manuscripts**

138. Adriana Gregory-Flores, Ivan J. Magayewski Bonet, Stève Desaivre, Jon D. Levine, Stanton F. McHardy, Harmannus de Kraker, Nicholas Russell, Caleb Fleischer, **Robert O. Messing**, Michela Marinelli. A novel small molecule PKC epsilon inhibitor reduces hyperalgesia induced by paclitaxel or opioid withdrawal. bioRxiv 2023.06.01.543325; doi: https://doi.org/10.1101/2023.06.01.543325

**Reviews**

1. **Messing RO,** Simon RP. Seizures as a manifestation of systemic disease. Neurology Clinics 4:563-584, 1986.

2. **Messing RO**. Ethanol as an enhancer of neural differentiation. Alcohol Alcohol. Suppl. 2:289-293, 1993.

3. Diamond I, **Messing RO**. Neurologic effects of alcoholism. West. J. Med. 161:279-287, 1994.

4. Walter H, **Messing RO**. Regulation of neuronal voltage-gated calcium channels by ethanol. Neurochem. Int. 35:95-101, 1999.

5. Dempsey EC, Newton AC, Mochly-Rosen D, Fields AP, Reyland ME, Insel PA, **Messing RO**. Protein kinase C isozymes and the regulation of diverse cell responses. Am. J. Physiol. Lung Cell. Mol. Physiol. 279:L429-438, 2000.

6. Olive MF, **Messing RO**. PKC isozymes and addiction. Mol. Neurobiol. 29:139-154, 2004.

7. Song M, **Messing RO**. Protein kinase C regulation of GABA-A receptors. Cell. Mol. Life Sci. 62:119-127, 2005.

8. Chou WH, **Messing RO**. Protein kinase C isozymes in stroke. Trends Cardiovasc. Med. 15:47-51, 2005.

9. Newton P, **Messing RO**. Intracellular signaling pathways that regulate behavioral responses to ethanol. Pharmacol. Ther. 109:227-237, 2006.

10. Lee A, **Messing RO**. Protein kinases and addiction. Ann. N. Y. Acad. Sci. 1141:22-57, 2008. PMCID: PMC3050040.

11. Silberman Y, Bajo M, Chappell AM, Christian DT, Cruz M, Diaz MR, Kash T, Lack AK, **Messing RO**, Siggins GR, Winder D, Roberto M, McCool BA, Weiner JL. Neurobiological mechanisms contributing to alcohol-stress-anxiety interactions. Alcohol 43(7):509-519, 2009. PMCID: PMC2814297.

12. Newton PM, **Messing RO.** The substrates and binding partners of protein kinase C epsilon. Biochem. J. 427(2):189-196, 2010. PMCID: PMC2966297.

13. Ron D, **Messing RO**. Signaling Pathways Mediating Alcohol Effects. Curr. Top. Behav. Neurosci. 13:87-126, 2013. PMCID: PMC3684072.

14. Trudell JR, **Messing RO**, Mayfield J, Harris RA. Alcohol dependence: molecular and behavioral evidence. Trends. Pharmacol. Sci. 35(7):317-323, 2014. PMCID: PMC4089033.

15. Pomrenze MB, Fetterly TL, Winder DG, **Messing RO**. The corticotropin releasing factor receptor 1 in alcohol use disorder: Still a valid drug target? Alcohol. Exp. Clin. Res. 41(12):1986-1999, 2017. PMCID: PMC5711524

**Books (Chapters and Editor role)**

1. Greenberg DA, **Messing RO**, Marks SS, Carpenter CL, Watson DL. Alcohol, neurodegenerative disorders, and calcium channel antagonist receptors. In: The Calcium Channel: Structure, Function, and Implications, Morad, Nayler, Kazda, Schramm, eds. Springer-Verlag, Berlin Heidelberg, 1988, pp. 541-546.

2. **Messing RO**, Greenberg DA. Alcohol and the nervous system. In: Neurology and General Medicine, Aminoff M., ed. Churchill Livingstone, New York, 1989, pp. 533-548.

3. Greenberg DA, **Messing RO**, Marks SS, Carpenter CL. Calcium channel changes during alcohol withdrawal. In: Alcohol and Seizures: Basic Mechanisms and Clinical Concepts, Porter, Mattson, Cramer, Diamond, eds. F.A. Davis, Philadelphia, 1990, pp. 60-67.

4. **Messing RO**, Diamond I. Molecular biology of alcohol dependence. In: The Molecular and Genetic Basis of Neurological Disease, Rosenberg, Prusiner, DiMauro, Barchi, Kunkel, eds. Butterworth-Heinemann, Boston, 1993, pp. 129-142.

5. **Messing RO**. Mechanisms that mediate ethanol-induced increases in dihydropyridine-sensitive calcium channels. In: Alcohol, Cell Membranes, and Signal Transduction in Brain, Alling, Sun, eds. Plenum, New York, 1993, pp. 169-174.

6. Roivainen R, Hundle BH, **Messing RO**. Protein kinase C and adaptation to ethanol. In: Proceedings of the 86th Nobel Symposium: Toward a Molecular Basis of Alcohol Use and Abuse, Janson, Jörvall, Rydberg, Terenius, Vallee, eds. Birkhäuser Verlag, Basel, 1994, pp. 29-38.

7. **Messing RO**. Nervous system disorders. In: Pathophysiology of Disease: An Introduction to Clinical Medicine, McPhee, Lingappa, Ganong, Lange, eds. Appleton & Lange, Norwalk, CT, 1995, pp. 69-105.

8. **Messing RO**. Nutritional diseases of the nervous system. In: Cecil Textbook of Medicine, 20th edition, Bennett and Plum, eds. W.B. Saunders, Philadelphia, 1996, pp. 2039-2041.

9. **Messing RO**, Diamond I. Molecular biology of alcohol dependence. In: The Molecular and Genetic Basis of Neurological Disease, 2nd edition, Rosenberg, Prusiner, DiMauro, Barchi, Kunkel, eds. Butterworth-Heinemann, Boston, 1997, pp. 1109-1129.

10. **Messing RO**. Nervous system disorders. In: Pathophysiology of Disease: An Introduction to Clinical Medicine, 2nd edition, McPhee, Lingappa, Ganong, Lange, eds. Appleton & Lange, Norwalk, CT, 1997, pp. 124-164.

11. **Messing RO**. Nervous system disorders. In: Pathophysiology of Disease: An Introduction to Clinical Medicine, 3rd edition, McPhee, Lingappa, Ganong, Lange, eds. New York, Lange Medical Books/McGraw-Hill, 2000, pp. 124-165.

12. **Messing RO**. Protein kinase C delta and epsilon in neuronal responses to chronic ethanol exposure. In: Ethanol and Intracellular Signaling: From Molecules to Behavior. NIAAA Research Monograph 35, Public Health Service, National Institutes of Health, 2000, pp.173-183.

13. **Messing RO**. Biology of addiction. In: Harrison's Principles of Internal Medicine, 15th edition, Braunwald, Fauci, Kasper, Hauser, Longo, Jameson, eds. McGraw-Hill, New York, NY. 2001, pp. 2557-2560.

14. **Messing RO**. Alcohol and the nervous system. In: Neurology and General Medicine, Aminoff M., ed. 3rd Edition. Churchill Livingstone, New York, NY, 2001, pp. 617-630.

15. **Messing RO**. Genetic approaches to studying protein kinase C. In: Protein Kinase C Protocols. Methods in Mol. Biol. series. Newton, ed. Humana Press, Totowa, NJ, 2003, 233:453-474.

16. **Messing RO**, Choi D-S. Animal models to study the function of PKC isozymes. In: Protein Kinase C Protocols. Methods in Molecular Biology series. Newton, ed. Humana Press, Totowa, NJ, 2003, pp. 455-473.

17. **Messing RO**. "Nervous system disorders," Chapter 7 in Pathophysiology of Disease: An Introduction to Clinical Medicine, 4th edition, McPhee, Lingappa, Ganong, eds. McGraw-Hill, New York, NY, 2003, pp. 143-188.

18. **Messing RO**, Diamond I (2000, revised 2005) Alcoholism. In: Encyclopedia of Life Sciences, Nature Publishing Group: London, www.els.net.

19. **Messing RO**. Alcohol and the nervous system. In: Neurology and General Medicine, Aminoff MJ, ed. 4th Edition. Churchill Livingstone-Elsevier, Philadelphia, PA, 2007, pp. 721-734.

20. Lomen-Hoerth C,**Messing RO**. Nervous system disorders," in Pathophysiology of Disease: An Introduction to Clinical Medicine, 5th edition, McPhee, Lingappa, Ganong, eds. McGraw-Hill, New York, NY, 2009, pp. 141-182.

21. **Messing RO**, Rubenstein JH, Nestler EJ. Biology of psychiatric disorders. In: Harrison's Principles of Internal Medicine, 18th edition, Longo, Fauci, Kasper, Hauser, Jameson, Loscalzo, eds. McGraw-Hill, New York, NY, 2011, pp. 3522-3528.

22. Maiya RP, **Messing RO**. Peripheral systems: neuropathy. In: Handbook of Clinical Neurology; Alcohol and the Nervous System, E.V. Sullivan and A. Pfefferbaum, eds, ElsevierVol. 125 (3rd series), 2014, pp. 513-525.

23. **Messing RO**. Alcohol and the nervous system. In: Neurology and General Medicine, Aminoff MJ, ed. 5th Edition. Academic Press-Elsevier, Waltham, MA, 2014. pp. 715-724.

24. **Messing RO**, Nestler EJ. Biology of psychiatric disorders. In: Harrison's Principles of Internal Medicine, 19th edition, Kasper, Braunwald, Fauci, Hauser, Longo, Jameson, eds. McGraw-Hill, New York, NY. 2015.

25. **Messing RO**, Nestler EJ, State MW. Biology of Psychiatric Disorders. In: Jameson JL, Fauci AS, Kasper DL, Hauser SL, Longo DL, Loscalzo J, editors. Harrison's Principles of Internal Medicine, 20e. New York, NY: McGraw-Hill Education; 2018.

23. **Messing RO**. Alcohol and the nervous system. In: Aminoff's Neurology and General Medicine, Aminoff MJ, and Josephson SA eds. 6th Edition. Academic Press-Elsevier, Waltham, MA, 2020.

24. **Messing RO**, Nestler EJ, State MW. Chapter 451: Biology of Psychiatric Disorders. In: Loscalzo J, Fauci AS, Kasper DL, Hauser SL, Longo DL, Jameson JL, editors. Harrison's Principles of Internal Medicine, 21e. New York, NY: McGraw-Hill Education; 2022 pp. 3534-3539.

**Other Publications (editorials, commentaries, letters, conference proceedings)**

1. **Messing RO**. Ethanol as an enhancer of neural differentiation. Alcohol and Alcoholism Suppl. 2:289-293, 1993.

2. Ueno S, Harris RA, **Messing RO**, Sanchez-Perez AM, Hodge CW, McMahon T, Wang D, Mehmert KK, Kelley SP, Haywood A, Olive MF, Buck KJ, Hood HM, Blednov Y, Findlay G, Mascia MP. Alcohol actions on GABA-$_A$ receptors: from protein structure to mouse behavior. Alcohol. Clin. Exp. Res. 25 (5 Suppl. ISBRA):1S-6S, 2001.

3. Hoffman PL, Yagi T, Tabakoff B, Phillips TJ, Kono H, **Messing RO**, Choi DS. Transgenic and gene "knockout" models in alcohol research. Alcohol. Clin. Exp. Res. 25 (5 Suppl. ISBRA):60S-66S, 2001.

4. Johnston SC, Lowenstein DH, Ferriero DM, **Messing RO**, Oksenberg JR, Hauser SL. Early editorial manuscript screening versus obligate peer review: A randomized trial. (Editorial). Ann. Neurol. 61:A10-12, 2007.

5. Lowenstein DH, **Messing RO**. Epilepsy genetics: Yet more exciting news. (Editorial). Ann. Neurol. 2007 Oct 11 [Epub]; doi: 10.1002/ana.21275.

6. Chou W-H, **Messing RO**. Hypertensive encephalopathy and the blood-brain barrier: is deltaPKC a gatekeeper? (Commentary). J. Clin. Invest. 118:17-20, 2008.

7. Johnson BA, **Messing RO**, Charness ME, Crabbe JC, Goldman MS, Harris RA, Kranzler HR, Mitchell MC Jr, Nixon SJ, Riley EP, Schuckit MA, Sher KJ, Thomas JD. Should the reorganization of addiction-related research across all the national institutes of health be structural?-The devil is truly in the details. Alcohol. Clin. Exp. Res. 35:572-580, 2011. PMCID: 3068603

8. Johnson BA, **Messing RO**, Charness ME, Crabbe JC, Goldman MS, Harris RA, Kranzler HR, Mitchell MC Jr, Nixon SJ, Riley EP, Schuckit MA, Sher KJ, Thomas JD. How should addiction-related research at the National Institutes of Health be reorganized? Front. Psychiatry 2:2, 2011.

9. Stewart AF, Ferriero DM, Josephson SA, Lowenstein DH, **Messing RO**, Oksenberg JR, Johnston SC, Hauser SL. Fighting decision fatigue. (Editorial) Ann. Neurol. 71:A5-A15, 2012.

10. Johnston SC, Ferriero DM, Josephson SA, Lowenstein DH, **Messing RO**, Oksenberg J, Stewart A, Hauser SL. Have the Annals editors added value? (Editorial) Ann. Neurol. 74(5):A7-9, 2013.

11. Hauser SL, Johnston SC, Ferriero DM, Josephson SA, Lowenstein DH, **Messing RO**, Oksenberg JR. Quo vadis? Peering into the future. (Editorial) Ann. Neurol. 74(6):A5-7, 2013.

12. Blasio A, **Messing RO**. Binge drinking with protein kinase C epsilon: A role for mTORC2? Biol. Psych. (Invited commentary) Biol. Psychiatry 79(6):425-426, 2016.

13. Maiya R, **Messing RO**. Killing the Buζζ: accumbal PKMζ blunts cocaine seeking and reward. Neuropsychopharmacology. Feb;44(3):463-464, 2019. PMCID: PMC6333910.

Press releases and interviews

1. How Many is Too Many: When Drinking Becomes a Problem. NIH News in Health. October 2022.

**PATENTS ISSUED**

1. "Use of Inhibitors of Protein Kinase C Epsilon to Treat Pain"
US 6,376,467 granted April 23, 2002
US 6,686,334 granted February 3, 2004
EPO 1093379 granted January 7, 2003 (validated in Germany, Spain, France, Great Britain, Ireland, Italy, Sweden)
New Zealand 508767 granted March 29, 2004
South Africa 2000/7494 granted June 26, 2002

2. "Protein Kinase C Epsilon as Modulator of Anxiety, Alcohol Consumption and Self-Administration of Drugs of Abuse"
US 6,717,030 granted April 6, 2004
US 7,534,859 granted May 19, 2009
EPO 1095136 granted March 18, 2009 (validated in Germany, France, Great Britain)
South Africa 2000/7780 granted May 29, 2002

3. "Methods for Modulating a Drug-related Effect on Behavior"
US Patent 7,365,050 granted April 29, 2008.

4. "PKC-Epsilon Inhibitors"
US Patent No. 8,785,648; Issued on 7/22/2014
US Patent No. 9,376,423; Issued on 6/28/2016
WIPO|PCT No. WO 2016/003450 A1; Issued on 1/7/2016

**RESEARCH PROGRAM**

My interests are in translational neuroscience with a focus on molecular and circuit mechanisms that underlie addiction to alcohol and chronic pain. Much of my work has involved identifying and testing the role of candidate drug targets in models of nociceptor sensitization and addiction-related behavior. My laboratory has made several major contributions to the fields of pain and drug addiction, including determining that protein kinase C epsilon is a major mediator of nociceptor sensitization, and that protein kinase C epsilon and delta, N-type voltage-dependent calcium channels, the type 1 equilibrative nucleoside transporter, toll-like receptor 3, myeloid differentiation primary response 88 (MyD88), and phosphodiesterase 4 regulate ethanol intoxication and self-administration in rodents. The techniques we use include gene targeting and gene editing, RNA interference, chemical genetics with ATP analog specific kinases, and genomic analyses. This work has resulted in drug discovery projects involving protein kinase C epsilon and more recently phosphodiesterase 4 isoforms. I am also interested in the basic neurobiology of neuropeptides and how they interact with classical neurotransmitters within limbic circuits to influence emotion and motivation. Current projects are:

**PKC epsilon:** Over the past two decades, we have found that PKC epsilon promotes ethanol and nicotine consumption, increases anxiety-like behavior, and is an important mediator of inflammatory and neuropathic pain. Our work has focused on identifying the molecular mechanisms by which PKC epsilon contributes to these phenotypes. For example, we found that PKC epsilon reduces the effect of several drugs that activate $GABA_A$ receptors, promotes corticotropin releasing factor (CRF) signaling in the amygdala, and mediates sensitization of peripheral sensory neurons to inflammatory mediators and ethanol. Ongoing projects aim to: (1) identify PKC epsilon substrates that regulate drug reward, and (2) optimize a group of structurally related compounds that inhibit PKC epsilon to develop a non-opioid drug for treating chronic pain and alcohol use disorder. The latter project is a collaborative effort with Stanton McHardy, PhD at UT San Antonio.

**Neural circuits that regulate emotion**: I am interested in neural circuits that regulate anxiety, fear, and drug reward. While investigating aversion-resistant alcohol drinking in rats, we identified cortical inputs to the nucleus accumbens and GRIN2C-containing NMDA receptors in accumbens neurons as critical for this behavior. My recent work is focused on neuropeptides produced by central amygdala neurons that regulate anxiety, fear learning, and drug self-administration. To perform such studies, we developed a *Crh*-Cre rat and have used it to knockdown individual neuropeptides through Cre-dependent RNA interference. To examine the timing and location of CRF release from neurons, we are testing a novel fluorescent protein sensor designed by Lin Tian, Ph.D. at UC Davis to detect CRF. Finally, to understand neuroadaptive changes that the central amygdala undergoes as animals become alcohol-dependent, we are performing single-cell RNAseq studies of central amygdala neurons in alcohol-dependent rats. This project is being done in collaboration with R. Dayne Mayfield, Ph.D. at UT Austin.

**Neuroimmune signaling in regulation of alcohol consumption**. Over the past 15 years much evidence has accumulated indicating that chronic alcohol consumption activates signal transduction pathways in the brain that are traditionally associated with innate immunity. Yuri Blednov, Ph.D. at UT Austin and I have been investigating the role of innate neuroimmune signaling in alcohol consumption, focusing mainly on TRIF-dependent and more recently on type 1 interferon signaling. We have also examined the role of PDE4 inhibitors and have found that the FDA approved drug apremilast reduces alcohol consumption and tolerance in mice. Based on our work, Barbara Mason, Ph.D. at Scripps Research performed a pilot human study that found apremilast reduces alcohol consumption in non-treatment-seeking heavy drinkers. We hypothesize that this effect of apremilast results from PDE4 regulation of $GABA_A$ receptor phosphorylation. This neuroimmune signaling project has been funded through the NIAAA-sponsored

consortium entitled the Integrative Neuroscience Initiative on Alcoholism-Neuroimmune, of which I am currently the Director.

**Genomic profiling of blood for diagnosis and management of alcohol use disorder (AUD).** Brain gene expression profiles can identify alcohol-dependent human subjects and mice, and they can be used to repurpose drugs for reducing alcohol consumption in rodents. Although molecular profiles from brain might also guide management of AUD, it is not possible to obtain brain specimens from living patients. We recently compared blood and brain gene expression profiles from mice after chronic intermittent ethanol (CIE) exposure and found a high degree of correspondence between their transcriptional responses to alcohol. Blood profiles predicted that cardiac glycosides would reduce drinking and indeed digoxin reduced alcohol intake in mice. Also, predictive models built from blood profiles could distinguish between CIE and air-exposed mice. Currently we are examining: (1) whether there is an AUD genomic signature in human blood that can accurately classify subjects as having AUD; (2) if longitudinal blood gene expression profiles can be used for AUD diagnosis and to identify treatment targets; and (3) if there is a gene expression signature in blood that reflects treatment response. This project is being done in collaboration with Vijay Ramchandani, Ph.D. of the NIAAA intramural program.

**MENTORING AND OUTREACH ACTIVITIES**

I have mentored several undergraduate students, graduate students, postdoctoral fellows, and faculty members during my career. I have consistently promoted the recruitment and mentoring of women scientists. For example, at UCSF I mentored 12 women undergraduates, most from UC Berkeley, over the course of 27 years. At UT Austin I have mentored 20 women undergraduates in my lab. Among these, 5 were Latinx or Black. At UCSF I mentored 14 women as postdoctoral fellows and 5 women residents in neurology. At UT Austin I have had 5 women postdoctoral fellows train in my laboratory, one of whom was Native American. Six of these postdoctoral trainees hold university faculty positions. While at UCSF, I was career mentor for 3 women neurology residents and 3 women faculty members. At UT Austin, before becoming Chair of Neuroscience, I mentored 2 women faculty members. Now as chair I am responsible for mentorship of all in the neuroscience department, which has a total of 30 tenured or tenure-track faculty members, 7 of whom are women. One of my major goals is to recruit more women faculty members to the department.

I have experience in mentoring trainees from underrepresented backgrounds. Most recently, I have been a member of thesis committees for two Black women graduate students in the Institute for Neuroscience (INS) graduate program, one of whom just graduated and will be doing a fellowship at Harvard. In 2019 I informally mentored an exceptionally bright Black undergraduate woman who was in my course NEU365W; I remain in contact with her as she studies in a master's program at UT Houston. In 2020 I accepted a Latinx woman INS student into my lab to study neuronal signaling in opioid withdrawal-induced hyperalgesia, and she is well on her way to a first manuscript.

I think that recruitment is the key to cultural change that will establish diversity at all levels in the university. I am therefore a strong proponent of diversity in recruitment. I have successfully recruited 4 women to UT Austin. I attempted to recruit 2 more, both of Latinx background, who unfortunately decided to go elsewhere (Harvard and UIC). In 2020, I helped recruit a Latinx man to the College of Pharmacy as part of a Waggoner Center sponsored recruitment. In 2019 I tried to recruit another Latinx man who accepted a job instead at NIH. In 2021 I recruited another Latinx man as an Assistant Professor of Instruction to teach neuroscience courses to undergraduates and serve as a role model for the large numbers of Latinx students at UT Austin, which in 2020 was recognized as a leading Hispanic-Serving Institution of Higher Learning. I am keenly aware of the relative paucity of faculty members from under-represented groups at UT Austin, and as Chair of Neuroscience I actively seek to recruit role models from under-represented backgrounds.

In 2020 our department established a Diversity, Equity, and Inclusion committee and as department chair, I seek the committee's assistance in faculty and student recruitment and in establishing an open culture of acceptance and inclusion for all in activities of the Neuroscience Department. The Department also sponsors an outreach program founded in 2018 called Women in Neuroscience (WiN). The program provides stipends to help women students (high school and undergraduate) from under-represented or economically disadvantaged backgrounds pursue studies in neuroscience labs to foster their future careers in neuroscience.