

## Sean C. Mackey, M.D., Ph.D.

Chief, Division of Pain Medicine  
 Redlich Professor, Anesthesiology, Perioperative & Pain Medicine  
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### CURRENT APPOINTMENTS

11/2012 – present	Redlich Professor	Stanford University School of Medicine, Department of Anesthesiology, Perioperative and Pain Medicine, Division of Pain Medicine, Neurosciences and (by courtesy) Neurology
09/2007 – present	Chief	Stanford University School of Medicine, Division of Pain Medicine
01/2002 – present	Director & Founder	Stanford University School of Medicine, Systems Neuroscience and Pain Laboratory

### PREVIOUS APPOINTMENTS

09/2007 – 09/2019	Fellowship Program Director	Stanford University School of Medicine, Division of Pain Medicine
10/2015 – 12/2017	Clinic Chief (Interim)	Stanford Pain Management Center
11/2007 – 11/2012	Associate Professor	Stanford University School of Medicine, Department of Anesthesiology, Perioperative and Pain Medicine, Division of Pain Medicine, Neurosciences and (by courtesy) Neurology
03/2004 – 08/2007	Associate Director	Stanford University School of Medicine, Division of Pain Medicine
02/2000 – 07/2006	Director & Co-Founder	Stanford University School of Medicine, Department of Anesthesiology, Perioperative and Pain Medicine, Regional Anesthesia Services
07/1999 – 11/2007	Assistant Professor	Stanford University School of Medicine, Department of Anesthesiology, Perioperative and Pain Medicine, Division of Pain Medicine

**EDUCATION AND TRAINING**

07/1998 - 07/1999	Fellowship	Stanford University Medical Center, Division of Pain Medicine
07/1997 – 07/1998	Chief Resident	Stanford University Medical Center, Department of Anesthesiology, Perioperative and Pain Medicine
07/1996 - 07/1998	Residency	Stanford University Medical Center, Department of Anesthesiology, Perioperative and Pain Medicine
07/1995 – 07/1996	Internship	Tucson Hospitals Medical Education Program
12/1994	Ph.D.	University of Arizona (Electrical and Computer Engineering)  <u>PhD Dissertation:</u> Mackey, Sean. A Thermodynamic Model of Radiofrequency Catheter Ablation for the Treatment of Cardiac Arrhythmias. N.p.: Pacing and Clinical Electrophysiology, 1996. Print.
05/1994	M.D.	University of Arizona
12/1986	M.S.E.	University of Pennsylvania (Bioengineering)
05/1986	B.S.E.	University of Pennsylvania (Bioengineering)

**RESEARCH SUPPORT**

09/2018 – 08/2023	NIH NINDS R01 NS109450 PI: Sean Mackey	Characterization of central pain mechanisms using simultaneous spinal cord-brain functional imaging
08/2018 – 07/2023	NIH NIDA R01 DA045027 PI: Jennifer Hah CO-Investigator: Sean Mackey	Psychological Risk Factors for Persistent Opioid Use and Prevention of Chronic Opioid Use and Misuse After Surgery: Postoperative Motivational Interviewing and Guided Opioid Weaning
07/2018 – 06/2023	T32 DA035165 PD: Sean Mackey	Interdisciplinary Research Training in Pain and Substance Use Disorders

02/2018 – 03/2024	PCORI OPD-1610-37007 PI: Beth Darnall CO-Investigator: Sean Mackey	Comparative Effectiveness of Pain Cognitive Behavioral Therapy and Chronic Pain Self-Management within the Context of Opioid Reduction
02/2020 – 02/2021	180206 Wu Tsai Neurosciences Institute	CPStim: Optimized Non-Invasive Brain Stimulation Treatment for Chronic Pain
02/2019 – 01/2021	NIH R03 HD094577 Regis University PI: Alex Smith CO-Investigator: Sean Mackey	MRI and machine learning to improve early prognosis and clinical management after spinal cord injury
09/2019 – 08/2020	UCSF-Stanford CERSI PI: Sean Mackey	Characterizing Risk-Benefit Tradeoff in Opioid-based Chronic Pain Treatment
08/2015 – 06/2020	NIH R01 HD082200 The Oregon Health Sciences University PI: Beth Darnall CO-Investigator: Sean Mackey	Maternal Chronic Pain: Risk for Pain and Poor Outcomes in Children
09/2015 – 05/2020	NIH R01 AT008561 Co-PI: Sean Mackey Co-PI: Beth Darnall	Single Session Pain Catastrophizing Treatment: Comparative Efficacy & Mechanisms
05/2010 – 03/2021	NIH K24 DA029262 PI: Sean Mackey	Neuroimaging and Mentoring in Translational Pain Research
09/2015 – 8/2020	K23 AT008477 PI: Jiang-Ti Kong Mentor: Mackey	Predicting Analgesic Response to Acupuncture - A Practical Approach
07/2015 – 6/2020	K99/R00 DA040154 PI: Katie Martucci Mentor: Mackey	The Impact of Opioids on Chronic Pain: Clinical Research and Career Training in Spinal Cord fMRI and Brain Reward Systems
09/2013-09/2018	K23 DA035302 PI: Jennifer Hah Mentor: Mackey	Psychological Factors Contributing to Persistent Opioid Use After Surgery
09/2013-10/2016	P01 AT006651S1 PI: Sean Mackey	Sex/Gender-Specific Brain Risks for Prescription Opioids in Chronic Low Back Pain

09/2013-08/2014	NIH: 562197 PI: Sean Mackey	Limited Competition of MAPP DCC
08/2013-03/2018	R01 DA035484 PI: Tor Wager Co-Investigator: Sean Mackey	fMRI-Based Biomarkers for Multiple Components of Pain
07/2013-06/2018	T32 DA035165 PI: Sean Mackey	Interdisciplinary Research Training in Pain and Substance Use Disorders
03/2013-02/2016	P01 AT006651S2 PI: Sean Mackey	The Psychobiological and Neural Mechanisms of Pain Catastrophizing
09/2012-09/2015	HHSN 2712011200728P PI: Sean Mackey	Development of an Open-Source National Pain Registry
09/2012-08/2013	Stanford CME Grant PI: Sean Mackey	Safe Opioid Prescribing and Risk Evaluation and Mitigation Strategies (REMS)
2012-2014	Stanford BioX NeuroVentures Co-PI: Sean Mackey	Understanding and Preventing Neuropathic Pain
09/2011-05/2016	P01 At006651S1 PI: Sean Mackey	Stanford CAM Center for Chronic Back Pain Supplement
09/2011-02/2018	P01 AT006651 PI: Sean Mackey	Stanford CAM Center for Chronic Back Pain
07/2011-05/2016	K23 DA031808 PI: Kevin Johnson Mentor: Sean Mackey	Research Training Using TMS to Study Pain Processing in Long- Term Opioid Use
07/2011-06/2013	T32 Stanford Department of Anesthesia PI: Jiang-Ti Kong Mentor: Sean Mackey	Anesthesia Training Program in Biomedical Research
07/2011-06/2013	T32 Stanford Department of Anesthesia PI: Jennifer Hah Mentor: Sean Mackey	Anesthesia Training Program in Biomedical Research
2011	Pfizer Visiting Pain Professorship PI: Sean Mackey	Grant to support a Visiting Professorship for Dr. Michael Cousins
2010-2015	K24 DA029262 PI: Sean Mackey	Neuroimaging and Mentoring in Translational Pain Research

2010-2013	Stanford Institute for Neuro-Innovation and Translational Neurosciences Pilot Grant PI: Ian Carroll Co-Investigator: Sean Mackey	Determinants of Time to Pain Resolution Following Surgery: Complimentary Clinical & Preclinical Models
2010-2013	Stanford Institute for Neuro-Innovation and Translational Neurosciences Pilot Grant PI: Jarred Younger Co-Investigator: Sean Mackey	The Role of Pro-inflammatory Factors in Mediating the Negative Consequences of Chronic Opioid Use
09/2009-Forever	Chris Redlich Endowed Professorship PI: Sean Mackey	Endowed Funds for use by Division of Pain for research, teaching, related expenses
2009-2011	Rocky Mountain CRPS Foundation PI: Sean Mackey	Funds to support research related to Complex Regional Pain Syndrome
05/2009-04/2012	R21 DA026092 PI: Sean Mackey	Learned Control of Frontal and Limbic Systems via Real-Time fMRI
2008-2014	K23 DA25152 PI: Ian Carroll Mentor and Co-Investigator: Sean Mackey	Prescription Opioid Use, Misuse, and Pain in Post-Surgical Patients
2008-2014	U01 DK082316 Consortium PI: Sean Mackey	Central Mechanisms of Urological Pelvic Pain: Functional and Structural Analysis by MRI
2008-2011	Stanford BioX Grant PI: Sean Mackey	Development and Applications of Real-Time fMRI Technology
2008-2011	American Academy of Neurology Research Training Fellowship PI: Meredith Barad Mentor: Sean Mackey	Learned Control of Brain Activity in Chronic Pain Patients Using Real-Time fMRI
2008-2009	American Fibromyalgia Syndrome Association PI: Sean Mackey	Low-Dose Naltrexone in the Treatment of Fibromyalgia
2007-2009	K99/R00 DA023609 PI: Jarred Younger Mentor and Co-Investigator: Sean Mackey	Mechanisms of Opioid-Induced Hyperalgesia in Pain Patients: Examination via fMRI
2007-2008	Foundation for Anesthesia Education and Research-	Mechanisms of Analgesic Response During IV Lidocaine

	Mentored Research Training Grant PI: Ian Carroll Mentor: Sean Mackey	Infusion in Neuropathic Pain Patients
01/2006-12/2012	R01 NS 053961 NIH NINDS PI: Sean Mackey	fMRI of Pain in the Human Spinal Cord
2006-2008	Eli Lilly Investigator Initiated Grant PI: Sean Mackey	Duloxetine: Functional MRI Neural Correlates of Efficacy in Patients with Chronic Low Back Pain
2006-2007	Arthritis Foundation-Fellowship Grant PI: Younger Mentor: Sean Mackey	Scientific Projects to achieve faster cure for types of arthritis
2005-2007	SBIR Phase II Fast Track Contract: Virtual Reality and Real Time fMRI PI: Christopher deCharms Consortium PI: Sean Mackey	Major goal of project to use combination of virtual reality and real time fMRI to significantly enhance patient's ability to control activation in brain areas related to pain regulation
2004-2007	5 R44 NS050642-04 NIH NINDS PI: Christopher deCharms Consortium PI: Sean Mackey	Applications of Real Time fMRI-Phase II
2004-2006	Foundation for Anesthesia Education and Research-Research Starter Grant PI: Sean Mackey	Imaging Neural Systems in Complex Regional Pain Syndrome
2002-2004	5 R43 MH067290 NIMH PI: Christopher deCharms Co-Investigator: Sean Mackey	Applications of Real Time fMRI
2001-Forever	Dodie and John Rosekrans Pain Research Endowment Fund Director: Sean Mackey	This endowment used to support projects related to pain research
2001-2004	Oxnard Foundation Grant PI: Sean Mackey	Use of NMDA-Antagonists and Opiates in the Treatment of Fibromyalgia Using Validated Outcome Measurements and Functional Magnetic Resonance Imaging
2001-2004	Stanford Office of Technology Licensing Grant	Processing of Pain in the Human Central Nervous System: Analysis

	PI: Sean Mackey	through Functional Magnetic Resonance Imaging
2000-2002	Cognitive Neurosciences Grant-Clark Center for Bioengineering PI: Sean Mackey	Advanced Imaging Techniques Applied to Pain Research- Functional Magnetic Imaging Of Human Spinal Cord and Brain
1999-2007	Department of Anesthesiology Research Grant PI: Sean Mackey	Development of a Human Neuropathic Pain Model and Determination of Effects of Intravenous Lidocaine on the Sensory and Affective Components of Pain
1999-2003	Department of Anesthesiology Research Grant PI: Sean Mackey	Interventional Magnetic Resonance Imaging Applied to Regional Anesthesia and Pain Medicine
1994	American College of Cardiology Research Grant PI: Sean Mackey	Electrical and Thermal Characterization of Radiofrequency Catheter Ablation
1991-1992	Alpha Omega Alpha Honor Society Research Fellowship PI: Sean Mackey	Transvenous Catheter Delivery of Electrical Energy to Ablate Arrhythmogenic Tissue in Patients with Arrhythmias
1990-1991	American Heart Association Fellowship PI: Sean Mackey	Characterization and Optimization of Radiofrequency Catheter Ablation for the Treatment of Cardiac Arrhythmias
1989-1994	NIH Short-Term Research Fellowship PI: Sean Mackey	Optimal Control of Transvenous Catheter Ablation in the Treatment of Tachyarrhythmias
	NIH Loan Repayment Program PI: Jarred Younger Mentor: Sean Mackey	

## ADDITIONAL FUNDING

2010	Bill Cohen Gift	Gift to Support Research into Fibromyalgia Treatment
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2008	Allergen Gift	Gift to Support Research in Botulinum Toxin for Chronic Pain
2006	Stanford Med Scholars Grant	Grant to Support Stanford Medical Student: Andrea Crowell, to Perform Research at SNAPL
2005	American Heart Association Medical Student Fellowship	AHA Grant to Foster Research for David Ludlow in the area of: The Effects of Botulinum Toxin in Lumbar Sympathetic Blocks for the Treatment of Peripheral Arterial Disease
2005	Allergen Educational Grant	Major Goal to Develop Web Based Pain Management Educational Materials for Community Physicians
2002-2003, 2006	VPUE Stanford Faculty Grants for Undergraduate Research	Major Goal to Provide funding support for Stanford University Undergraduate Students to work in SNAPL Investigating Pain Processing Using Functional MRI Techniques
1999	Glaxo Welcome Educational Grant	Major Goal to Develop Internet/Intranet Based Sources to Aid Medical Students, Residents, Faculty and Staff in Stanford University Department of Anesthesia
	RSDSA Foundation	
	Rainin Foundation	

## STUDY SECTION REVIEWER

2008-2012, 2016

National Institute on Drug Abuse, Career Award Scientific Review Committee

Canada Institutes of Health Research, Medical Research Council



**SCHOLARSHIPS/AWARDS**

2020	American Academy of Pain Medicine, Robert G. Addison, MD Award for creation of and work on CHOIR
2019	American Academy of Pain Medicine, Presidential Commendation, in Recognition & Appreciation of Support for AAPM Mission, Advocacy for Patients, Role in National Pain Strategy & Advisory Role in NIH
2019	American Academy of Pain Medicine, Pain Medicine Fellowship Excellence Award
2017	American Academy of Pain Medicine, Pain Medicine Fellowship Award
2017	American Academy of Pain Medicine, Distinguished Service Award, in Recognition of Commitment and Outstanding Contributions to AAPM
2016	Wilbert E. Fordyce Clinical Investigator Award for Excellence in Clinical Pain Scholarship, American Pain Society
2015	National Institute of Health, Director's Award for Leadership Role on National Pain Strategy
2008, 2012	American Pain Society, Clinical Center of Excellence Award
2002, 2004, 2006-2018	Top Doctors in America published in "Guide to Top Doctors"
2011-2012	Institute of Medicine Committee on Advancing Pain Research, Care, and Education
2012	American Academy of Pain Medicine Presidential Commendation, Recognizing Role in Institute of Medicine Committee on Relieving Pain in America
2012	Top 1% Pain Medicine Physicians in America, US News & World Report Guide to Top Doctors
2010	Ellis Cohen Achievement Award, Stanford Department of Anesthesia
2003	Stanford Department of Anesthesia, Teacher of the Month

1994	Yuma Friends of Arizona Health Sciences Center Young Investigator Award
1994	American Federation for Clinical Research Medical Student Award
1994	University of Arizona MD/PhD Academic Scholarship
1994	Van Winkle Award for Excellence in Surgical Research
1994	Upjohn Medical Student Research Superstar Award
1994	1 <sup>st</sup> Place Medical Student Research Competition, AHSC
1994	Honors and Awards Committee Research Award, AHSC
1992	Yuma Friends of Arizona Health Sciences Center Young Investigator Award
1987	GTE Electrical Engineering Scholarship
1981-1983	Mildred P. Coitner Academic Scholarship

## PATENTS

01/26/2004	US2005072433	Toxin Induced Sympathectomy: Mackey, S., Carroll, I., Clark, D.
11/17/1998	US05837001	Radio Frequency Energy Delivery System for Multipolar Electrode Catheters: Mackey, S.

## PEER REVIEWED PUBLICATIONS

1. Wilson, A., Stone, A., Poppert Cordts, K., Holley, A., Mackey, S., Darnall, B., Palermo, T. Baseline Characteristics of a Dyadic Cohort of Mothers with Chronic Pain and Their Children. *Clin J Pain*. 2020 Jul 21 Publish Ahead of Print. doi:10.1097/ajp.0000000000000864. PMID: 32701524
2. Clemens, J., Kutch, J., Mayer, E., Naliboff, B., Rodriguez, L., Klumpp, D., Schaeffer, A., Kreder, K., Clauw, D., Harte, S., Schrepf, A., Williams, D., Andriole, G., Lai, H., Buchwald, D., Lucia, M., van Bokhoven, A., Mackey, S., Moldwin, R., Pontari, M., Stephens-Shields, A., Mullins, C. The Multidisciplinary Approach to The Study of Chronic Pelvic Pain (MAPP) Research Network: Design and Implementation of the Symptom Patterns Study (SPS). *Neurology and Urodynamics*. Aug 2020, pgs. 1803-1814. doi: 10.1002/nau.24423. PMID: 32578257

3. Davis, K., Aghaeepour, N., Ahn, A., Angst, M., Borsook, D., Brenton, A., Burczynski, M., Crean, C., Edwards, R., Gaudilliere, B., Hergenroeder, G., Iadarola, M., Iyengar, S., Jiang, Y., Kong, J., Mackey, S., Saab, C., Sang, C., Scholz, J., Segerdahl, M., Tracey, I., Veasley, C., Wang, J., Wager, T., Wasan, A., Pellemounter, M. Discovery and validation of biomarkers to aid the development of safe and effective pain therapeutics: challenges and opportunities. 2020 Jun 15. *Nat Rev Neurol*. 2020;10.1038/s41582-020-0362-2, doi:10.1038/s41582-020-0362-2. PMID: 32541893
4. Ziadni, M., Chen, A., Winslow, T., Mackey, S., Darnall, B. Efficacy and mechanisms of a single-session behavioral medicine class among patients with chronic pain taking prescription opioids: study protocol for a randomized controlled trial. *Trials*. 2020;21(1):521. Published 2020 Jun 12, doi:10.1186/s13063-020-04415-x. PMID: 32532346
5. Ziadni, M., You, D., Sturgeon, J., Mackey, S., Darnall, B. Perceived Injustice Mediates the Relationship Between Perceived Childhood Neglect and Current Function in Patients with Chronic Pain: A Preliminary Pilot Study [published online ahead of print, 2020 May 7]. *J Clin Psychol Med Settings*. 2020;10.1007/s10880-020-09722-8, doi:10.1007/s10880-020-09722-8. PMID: 32382872
6. Weber, K., Chen, Y., Paliwal, M., Law, C., Hopkins, B., Mackey, S., Dhaher, Y., Parrish, T., Smith, Z. Assessing the spatial distribution of cervical spinal cord activity during tactile stimulation of the upper extremity in humans with functional magnetic resonance imaging [published online ahead of print, 2020 May 6]. *Neuroimage*. 2020; 217:116905, doi: 10.1016/j.neuroimage.2020.116905. PMID: 32387628
7. Sturgeon, J., Khan, J., Hah, J., Hilmo, H., Hong, J., Ware, M., Mackey, S. Clinical Profiles of Concurrent Cannabis Use in Chronic Pain: A CHOIR Study. *Pain Medicine*. 2020 March 31, doi: 10.1093/pm/pnaa060. PMID: 32232476
8. Taub, C., Sturgeon, J., Chahal, M., Kao, MC., Mackey, S., Darnall, B. Self-reported Traumatic Etiology of Pain and Psychological Function in Tertiary Care Pain Clinic Patients: A Collaborative Health Outcomes Information Registry (CHOIR) Study. *Scandinavian Association for the Study of Pain*. 2020 March, doi.org/10.1515/sjpain-2019-0154. PMID: 32191626
9. Kong, JT., Bagarinao, E., Olshen, R., Mackey, S. Novel Characterization Of Thermal Temporal Summation Response By Analysis Of Continuous Pain Vs Time Curves And Exploratory Modeling. *Journal of Pain Research*. 2019 Dec 2, 12:3231-3244. doi: 10.2147/JPR.S212137. PMID: 31819607
10. You, D., Ziadni, M., Gilam, G., Darnall, B., Mackey, S. Evaluation of Candidate Items for Severe PTSD Screening for Patients with Chronic Pain: Pilot Data Analysis with IRT Approach. *PAIN Practice*. 23 October 2019: 262-268. doi.org/10.1111/papr.12848. PMID: 31646748
11. Weber, K., Wager, T., Mackey, S., Elliott, J., Liu, W., Sparks, C. Evidence for Decreased Neurologic Pain Signature Activation Following Thoracic Spinal Manipulation in Healthy Volunteers and Participants with Neck Pain. *NeuroImage: Clinical*. 10/2019, doi.org/10.1016/j.nicl.2019.102042. PMID: 31670070
12. Khan, J., Hah, J., Mackey, S. Effects of smoking on patients with chronic pain: a propensity-weighted analysis on the Collaborative Health Outcomes Information Registry. *Pain*. 2019 Oct, 160(10): 2374-2379. Doi: 10.1097/j.pain.0000000000001631. PMID: 31149975
13. Gilam, G., Sturgeon, J., You, D., Wasan, A., Darnall, B., Mackey, S. Negative Affect–Related Factors Have the Strongest Association with Prescription Opioid Misuse in a Cross-Sectional Cohort of Patients with Chronic Pain. *Pain Medicine*. 16 October 2019: e127-e138. doi.org/10.1093/pm/pnz249. PMID: 31617916

14. Auguiniga, L., Yang, W., Yaggie, R., Schaeffer, A., Klumpp, D., MAPP Research Network Study Group. Acyloxyacyl hydrolase modulates depressive-like behaviors through aryl hydrocarbon receptor. *American Journal of Physiology. Regulatory, Integrative and Comparative Physiology*. Sep 06, 2019, Vol 317, Issue 2, pgs R289-R300. doi: 10.1152/ajpregu.00029.2019. PMID: 31017816
15. Swarm, R., Paice, J., Anghelescu, D., Are, M., Yang, J., Buga, S., Chwistek, M., Cleeland, C., Craig, D., Gafford, E., Greenlee, H., Hansen, E., Kamal, A., Kamdar, M., LeGrand, S., Mackey, S., McDowell, R., Moryl, N., Nabell, L., Nesbit, S., O'Connor, N., Rabow, M., Rickerson, E., Shatsky, R., Sindt, J., Urba, S., Youngwerth, J., Hammond, L., Gurski, L. Adult Cancer Pain, Version 3.2019, NCCN Clinical Practice Guidelines in Oncology. *Journal National Comprehensive Cancer Network (JNCCN)*. Aug 2019, Vol 17: Issue 8. Doi: 10.6004/jnccn.2019.0038. PMID: 31390582
16. Khan, J., Jibb, L., Busse, J., Gilron, I., Choi, S., Paul, J., McGillion, M., Mackey, S., Buckley, D., Lee, S., Devereaux, P. Electronic Versus Traditional Data Collection: A Multicenter Randomized Controlled Perioperative Pain Trial. *Canadian Journal of Pain*. 30 Jul 2019 Pages 16-25. doi: .org/10.1080/24740527.2019.1587584.
17. Martucci, K., MacNiven, K., Borg, N., Knutson, B., Mackey, S. Apparent Effects of Opioid Use on Neural Responses to Reward in Chronic Pain. *Scientific Reports*, 2019, 9(1), 9633. doi:10.1038/s41598-019-45961-y. PMID: 31270360
18. Mackey, S., Greely, H., Martucci, K. Neuroimaging-Based Pain Biomarkers: Definitions, Clinical and Research Applications, and Evaluation Frameworks to Achieve Personalized Pain Medicine. *PAIN Reports*. July/August 2019, p e762. DOI: 10.1097/PR9.0000000000000762. PMID: 31579854
19. Rosenberg, G., Shearer, E., Zion, S., Mackey, S., Morris, A., Spain, D., Weiser, T. Implementation Challenges Using a Novel Method for Collecting Patient-Reported Outcomes After Injury. *Journal of Surgical Research*. 2019 Sep, Volume 241, Pgs. 277-284. doi.org/10.1016/j.jss.2019.04.008. PMID: 31042606
20. Barad, M., Sturgeon, J., Fish, S., Dexter, F., Mackey, S., Flood, P. Response to BotulinumtoxinA in a Migraine Cohort with Multiple Comorbidities and Widespread Pain. *Regional Anesthesia & Pain Medicine*. 2019 Jun;44(6):660-668. doi: 10.1136/rapm-2018-100196. PMID: 31101743
21. Weber, K., Smith, A., Wasielewski, M., Eghtesad, K., Upadhyayula, P., Wintermark, M., Hastie, T., Parrish, T., Mackey, S., Elliott, J. Deep Learning Convolutional Neural Networks for the Automatic Quantification of Muscle Fat Infiltration Following Whiplash Injury. *Sci Rep* 9(1): 7973. 2019 May 28. doi: 10.1038/s41598-019-44416-8. PMID: 31138878
22. Ackerman, A., Anger, J., Khalique, M., Ackerman, J. E., Tang, J., Kim, J., Underhill, D. M., Freeman, M. R., NIH Multidisciplinary Approach to the Study of Chronic Pelvic Pain (MAPP). Optimization of DNA extraction from human urinary samples for mycobiome community profiling. *PLoS One*. April 25, 2019, 14(4):e0210306. doi: 10.1371/journal.pone.0210306. eCollection 2019. PMID: 31022216
23. Mackey, S., Kao, M. Managing twin crises in chronic pain and prescription opioids. *BMJ*. 06 March 2019 364: l917. doi: 10.1136/bmj.l917. PMID: 30842099
24. Karshikoff, B., Tadros, M., Mackey, S., Zouikr, I. Neuroimmune modulation of pain across the developmental spectrum. *ScienceDirect*, Volume 28, March 2019, Pgs 85-92. doi.org/10.1016/j.cobeha.2019.01.010. PMID:
25. You, D. S., Hah, J., Collins, S., Ziadni, M., Domingue, B., Cook, K., Mackey, S. Evaluation of the Preliminary Validity of Misuse of Prescription Pain Medication Items from the Patient-Reported Outcomes Measurement Information System (PROMIS)<sup>®</sup> *Pain Medicine*. 11 March 2019. Pages 1925-1933, doi.org/10.1093/pm/pnz001. PMID: 30856659

26. Khan, J., Hodgson, N., Choi, S., Reid, S., Paul, J., Look Hong, N., Holloway, C., Busse, J., Gilron, I., Buckley, D., McGillion, N., Clarke, H., Katz, J., Mackey, S., Avram, R., Pohl, K., Rao-Melacini, P., Devereaux, P. Perioperative pregabalin and intraoperative lidocaine infusion to reduce persistent neuropathic pain after breast cancer surgery: a multicenter, factorial, randomized controlled pilot trial. *Journal of Pain*. doi.org/10.1016/j.jpain.2019.02.010. PMID: 30844507
27. Hah, J., Cramer, E., Hilmoe, H., Schmidt, P., McCue, R., Trafton, J., Clay, D., Sharifzadeh, Y., Ruchelli, G., Goodman, S., Huddleston, J., Maloney, W., Dirbas, F., Shrager, J., Costouros, J., Curtin, C., Mackey, S., Carroll, I. Factors Associated With Acute Pain Estimation, Postoperative Pain Resolution, Opioid Cessation, and Recovery. Secondary Analysis of a Randomized Clinical Trial. 2019;2(3):e190168. doi:10.1001/jamanetworkopen.2019.0168. PMID: 30821824
28. Larach, M., Klumpner, T., Brandom, B., Vaughn, M., Belani, K., Herlich, A., Kim, T., Limoncelli, J., Riazi, S., Sivak, E., Capacchione, J., Mashman, D., Kheterpal, S., Kooij, F., Wilczak, J., Soto, R., Berris, J., Price, Z., Lins, S., Coles, P., Harris, J., Cummings, K., 3<sup>rd</sup>, Berman, M., Nanamori, M., Adelman, B., Wedeven, C., LaGorio, J., McCormick, P., Tom, S., Aziz, M., Coffman, T., Ellis, T., 2<sup>nd</sup>, Molina, S., Peterson, W., Mackey, S., van Klei, W., Ginde, A., Biggs, D., Neuman, M., Craft, R., Pace, N., Paganelli, W., Durieux, M., Nair, B., Wanderer, J., Miller, S., Helsten, D., Turnbull, Z., Schonberger, R. Succinylcholine Use and Dantrolene Availability for Malignant Hyperthermia Treatment: Database Analyses and Systematic Review. *Anesthesiology*, January 2019 130(1), 41-54. doi:10.1097/aln.0000000000002490. PMID: 30550426
29. Islam, H., Law, C. S. W., Weber, K. A., Mackey, S. C., & Glover, G. H. Dynamic per slice Shimming for Simultaneous Brain and Spinal Cord fMRI. *Magnetic Resonance in Medicine*, 0(0). 2019;81(2):825-838. doi:10.1002/mrm.27388. PMID: 30284730
30. Martucci, K. T., Weber, K. A., & Mackey, S. C. Altered Cervical Spinal Cord Resting State Activity in Fibromyalgia. *Arthritis & Rheumatology*, 0(ja). 2019;71(3):441-450 doi:10.1002/art.40746. PMID: 30281205
31. Kong, J. T., MacIsaac, B., Cogan, R., Ng, A., Law, C. S. W., Helms, J., Schnyer, R., Karayannis, N., Kao, M. C., Tian, L., Darnall, B., Gross, J., Mackey, S., Manber, R. Central mechanisms of real and sham electroacupuncture in the treatment of chronic low back pain: study protocol for a randomized, placebo-controlled clinical trial. *Trials*, December 2018 19(1), 685. doi:10.1186/s13063-018-3044-2. PMID: 30541586
32. Jarrahi B, Martucci KT, Nilakantan AS, Mackey S. Cold Water Pressor Test Differentially Modulates Functional Network Connectivity in Fibromyalgia Patients Compared with Healthy Controls. *Conf Proc IEEE Eng Med Biol Soc*. November 2018; 2018:578-582. doi:10.1109/EMBC.2018.8512350 PMID: 30440463
33. Hoang, N., Hwang, W., Katz, D., Mackey, S., Hofmann, L. Electronic Patient-Reported Outcomes: Semi-Automated Data Collection in the Interventional Radiology Clinic. *Journal of the American College of Radiology*. October 2018. ISSN 1546-1440, https://doi.org/10.1016/j.jacr.2018.08.033. PMID: 30297246
34. Hamilton, P., Sacchet, M., Hjørnevik, T., Chin, F., Shen, B., Kämpe, R., Park, J., Knutson, B., Williams, L., Borg, N., Zaharchuk, G., Camacho, M.C., Mackey, S., Heilig, M., Drevets, W., Glover, G., Gambhir, S., Gotlib, I. Striatal dopamine deficits predict reductions in striatal functional connectivity in major depression: A concurrent 11C-raclopride positron emission tomography and functional magnetic resonance imaging investigation. *Translational Psychiatry*. November 2018. doi.org/10.1038/s41398-018-0316-2. PMID: 30504860
35. Dahlhamer, J., Lucas, J., Zelaya, C., Nahin, R., Mackey, S., DeBar, L., Kerns, R., Von Korff, M., Porter, L., Helmick, C. Prevalence of Chronic Pain and High-Impact Pain Among Adults – United States, 2016. *Morbidity and Mortality Weekly Report (MMWR)*. September 14, 2018, doi:10.15585/mmwr.mm6736a2. PMID: 30212442

36. Heirich, M., Sinjary, L., Ziadni, M., Sacks, S., Buchanan, A., Mackey, S., Newmark, J. Use of Immersive Learning and Simulation Techniques to Teach and Research Opioid Prescribing Practices, *Pain Medicine*, September 2018 , pny171, doi.org/10.1093. PMID: 30215778
37. Weber, K.A., Sentis, A.I., Bernadel-Huey, O.N., Chen, Y., Wang, X., Parrish, T.B., Mackey, S. Thermal Stimulation Alters Cervical Spinal Cord Functional Connectivity in Humans. *Neuroscience*. 2018 Jan 15; 369:40-50. doi: 10.1016/j.neuroscience.2017.10.035. PMID: 29101078
38. Sutcliffe, S., Jemielita, T., Lai, H.H., Andriole, G.L., Bradley, C.S., Clemens, J.Q., Gallop, R., Hooton, T.M., Kreder, K.J., Krieger, J.N., Kusek, J.W., Labus, J., Lucia, M.S., Mackey, S., Naliboff, B.D., Robinson, N.A., Rodriguez, L.V., Stephens-Shields, A., van Bokhoven, A., Wolin, K.Y., Yan, Y., Yang, C.C., Landis, J.R., Colditz, G.A., Network, M.R. A Case-Crossover Study of Urological Chronic Pelvic Pain Syndrome Flare Triggers in the MAPP Research Network. *J Urol*. 2018 May; 199(5):1245-1251. doi: 10.1016/j.juro.2017.12.050. PMID: 29288643
39. Sturgeon, J.A., Hah, J.M., Sharifzadeh, Y., Middleton, S.K., Rico, T., Johnson, K.A., Mackey, S.C. Predictors of Daily Pain Medication Use in Individuals with Recurrent Back Pain. *Int J Behav Med*. 2018 Apr; 25(2):252-258. doi: 10.1007/s12529-017-9686-8. PMID: 28875436
40. Martucci, K.T., Mackey, S.C. Neuroimaging of Pain: Human Evidence and Clinical Relevance of Central Nervous System Processes and Modulation. *Anesthesiology*. 2018 Jun; 128(6):1241-1254. doi: 10.1097/ALN.0000000000002137. PMID: 29494401
41. Martucci, K.T., Borg, N., MacNiven, K.H., Knutson, B., Mackey, S.C. Altered prefrontal correlates of monetary anticipation and outcome in chronic pain. *Pain*. 2018 Aug; 159(8):1494-1507. doi: 10.1097/j.pain.0000000000001232. PMID: 29790868
42. Karayannis, N.V., Baumann, I., Sturgeon, J.A., Melloh, M., Mackey, S.C. The Impact of Social Isolation on Pain Interference: A Longitudinal Study. *Ann Behav Med*. 2018 Apr 12. doi: 10.1093/abm/kay017. PMID: 29668841
43. Hah, J., Mackey, S.C., Schmidt, P., McCue, R., Humphreys, K., Trafton, J., Efron, B., Clay, D., Sharifzadeh, Y., Ruchelli, G., Goodman, S., Huddleston, J., Maloney, W.J., Dirbas, F.M., Shrager, J., Costouros, J.G., Curtin, C., Carroll, I. Effect of Perioperative Gabapentin on Postoperative Pain Resolution and Opioid Cessation in a Mixed Surgical Cohort: A Randomized Clinical Trial. *JAMA Surg*. 2018 Apr 1; 153(4):303-311. doi: 10.1001/jamasurg.2017.4915. PMID: 29238824
44. Gaertner, M., Kong, J.T., Scherrer, K.H., Foote, A., Mackey, S., Johnson, K.A. Advancing Transcranial Magnetic Stimulation Methods for Complex Regional Pain Syndrome: An Open-Label Study of Paired Theta Burst and High-Frequency Stimulation. *Neuromodulation*. 2018 Jun; 21(4):409-416. doi: 10.1111/ner.12760. PMID: 29504190
45. Fishman, S.M., Carr, D.B., Hogans, B., Cheatle, M., Gallagher, R.M., Katzman, J., Mackey, S., Polomano, R., Popescu, A., Rathmell, J.P., Rosenquist, R.W., Tauben, D., Beckett, L., Li, Y., Mongoven, J.M., Young, H.M. Scope and Nature of Pain- and Analgesia-Related Content of the United States Medical Licensing Examination (USMLE). *Pain Med*. 2018 Mar 1; 19(3):449-459. doi: 10.1093/pm/pnx336. PMID: 29365160
46. Darnall, B.D., Ziadni, M.S., Roy, A., Kao, M.C., Sturgeon, J.A., Cook, K.F., Lorig, K., Burns, J.W., Mackey, S.C. Comparative Efficacy and Mechanisms of a Single-Session Pain Psychology Class in Chronic Low Back Pain: Study Protocol for a Randomized Controlled Trial. *Trials*. 2018 Mar 6; 19(1):165. doi: 10.1186/s13063-018-2537-3. PMID: 29510735
47. Carriere, J.S., Sturgeon, J.A., Yakobov, E., Kao, M.C., Mackey, S.C., Darnall, B.D. The Impact of Perceived Injustice on Pain-related Outcomes: A Combined Model Examining the Mediating Roles of Pain Acceptance and Anger in a Chronic Pain Sample. *Clin J Pain*. 2018 Aug; 34(8):739-747. doi: 10.1097/AJP.0000000000000602. PMID: 29485535

48. Tran, P., Sturgeon, J.A., Nilakantan, A., Foote, A., Mackey, S., Johnson, K. Pain catastrophizing mediates the relationship between trait happiness and depressive symptoms in individuals with current pain. *J Appl Biobehav Res.* 2017 Dec; 22(4). doi: 10.1111/jabr.12069. PMID: 29456448
49. Taub, C.J., Sturgeon, J.A., Johnson, K.A., Mackey, S.C., Darnall, B.D. Effects of a Pain Catastrophizing Induction on Sensory Testing in Women with Chronic Low Back Pain: A Pilot Study. *Pain Res Manag.* 2017 2017:7892494. doi: 10.1155/2017/7892494. PMID: 28348505
50. Sun, E.C., Dixit, A., Humphreys, K., Darnall, B.D., Baker, L.C., Mackey, S. Association between concurrent use of prescription opioids and benzodiazepines and overdose: retrospective analysis. *BMJ.* 2017 Mar 14; 356:j760. doi: 10.1136/bmj.j760. PMID: 28292769
51. Sturgeon, J.A., Ziadni, M.S., Trost, Z., Darnall, B.D., Mackey, S.C. Pain catastrophizing, perceived injustice, and pain intensity impair life satisfaction through differential patterns of physical and psychological disruption. *Scand J Pain.* 2017 Oct; 17:390-396. doi: 10.1016/j.sjpain.2017.09.020. PMID: 29074199
52. Sharifzadeh, Y., Kao, M.C., Sturgeon, J.A., Rico, T.J., Mackey, S., Darnall, B.D. Pain Catastrophizing Moderates Relationships between Pain Intensity and Opioid Prescription: Nonlinear Sex Differences Revealed Using a Learning Health System. *Anesthesiology.* 2017 Jul; 127(1):136-146. doi: 10.1097/ALN.0000000000001656. PMID: 28614083
53. Mueller, K.G., Memtsoudis, S.G., Mariano, E.R., Baker, L.C., Mackey, S., Sun, E.C. Lack of Association Between the Use of Nerve Blockade and the Risk of Persistent Opioid Use Among Patients Undergoing Shoulder Arthroplasty: Evidence From the MarketScan Database. *Anesth Analg.* 2017 Sep; 125(3):1014-1020. doi: 10.1213/ANE.0000000000002031. PMID: 28742777
54. Kutch, J.J., Labus, J.S., Harris, R.E., Martucci, K.T., Farmer, M.A., Fenske, S., Fling, C., Ichescio, E., Peltier, S., Petre, B., Guo, W., Hou, X., Stephens, A.J., Mullins, C., Clauw, D.J., Mackey, S.C., Apkarian, A.V., Landis, J.R., Mayer, E.A., Network, M.R. Resting-state functional connectivity predicts longitudinal pain symptom change in urologic chronic pelvic pain syndrome: a MAPP network study. *Pain.* 2017 Jun; 158(6):1069-1082. doi: 10.1097/j.pain.0000000000000886. PMID: 28328579
55. Kutch, J.J., Ichescio, E., Hampson, J.P., Labus, J.S., Farmer, M.A., Martucci, K.T., Ness, T.J., Deutsch, G., Apkarian, A.V., Mackey, S.C., Klumpp, D.J., Schaeffer, A.J., Rodriguez, L.V., Kreder, K.J., Buchwald, D., Andriole, G.L., Lai, H.H., Mullins, C., Kusek, J.W., Landis, J.R., Mayer, E.A., Clemens, J.Q., Clauw, D.J., Harris, R.E., Network, M.R. Brain signature and functional impact of centralized pain: a multidisciplinary approach to the study of chronic pelvic pain (MAPP) network study. *Pain.* 2017 Oct; 158(10):1979-1991. doi: 10.1097/j.pain.0000000000001001. PMID: 28692006
56. Kent, M.L., Tighe, P.J., Belfer, I., Brennan, T.J., Bruehl, S., Brummett, C.M., Buckenmaier, C.C., 3rd, Buvanendran, A., Cohen, R.I., Desjardins, P., Edwards, D., Fillingim, R., Gewandter, J., Gordon, D.B., Hurley, R.W., Kehlet, H., Loeser, J.D., Mackey, S., McLean, S.A., Polomano, R., Rahman, S., Raja, S., Rowbotham, M., Suresh, S., Schachtel, B., Schreiber, K., Schumacher, M., Stacey, B., Stanos, S., Todd, K., Turk, D.C., Weisman, S.J., Wu, C., Carr, D.B., Dworkin, R.H., Terman, G. The ACTION-APS-AAPM Pain Taxonomy (AAAPT) Multidimensional Approach to Classifying Acute Pain Conditions. *J Pain.* 2017 May; 18(5):479-489. doi: 10.1016/j.jpain.2017.02.421. PMID: 28495013
57. Karayannis, N.V., Sturgeon, J.A., Chih-Kao, M., Cooley, C., Mackey, S.C. Pain interference and physical function demonstrate poor longitudinal association in people living with pain: a PROMIS investigation. *Pain.* 2017 Jun; 158(6):1063-1068. doi: 10.1097/j.pain.0000000000000881. PMID: 28221284
58. Kao, M.C., Leong, M.S., Mackey, S. Radiofrequency Denervation for Chronic Low Back Pain. *JAMA.* 2017 Dec 12; 318(22):2256. doi: 10.1001/jama.2017.16382. PMID: 29234799

59. Jarrahi, B., Martucci, K.T., Nilakantan, A.S., Mackey, S. Investigating the BOLD spectral power of the intrinsic connectivity networks in fibromyalgia patients: A resting-state fMRI study. *Conf Proc IEEE Eng Med Biol Soc.* 2017 Jul; 2017:497-500. doi: 10.1109/EMBC.2017.8036870. PMID: 29059918
60. Harden, R.N., Maihofner, C., Aboussaad, E., Vatine, J.J., Kirsling, A., Perez, R., Kuroda, M., Brunner, F., Stanton-Hicks, M., Marinus, J., van Hilten, J.J., Mackey, S., Birklein, F., Schlereth, T., Mailis-Gagnon, A., Graciosa, J., Connolly, S.B., Dayanim, D., Massey, M., Frank, H., Livshitz, A., Bruehl, S. A prospective, multisite, international validation of the Complex Regional Pain Syndrome Severity Score. *Pain.* 2017 Aug; 158(8):1430-1436. doi: 10.1097/j.pain.0000000000000927. PMID: 28715350
61. Hah, J.M., Sturgeon, J.A., Zocca, J., Sharifzadeh, Y., Mackey, S.C. Factors associated with prescription opioid misuse in a cross-sectional cohort of patients with chronic non-cancer pain. *J Pain Res.* 2017 10:979-987. doi: 10.2147/JPR.S131979. PMID: 28496354
62. Davis, K.D., Flor, H., Greely, H.T., Iannetti, G.D., Mackey, S., Ploner, M., Pustilnik, A., Tracey, I., Treede, R.D., Wager, T.D. Brain imaging tests for chronic pain: medical, legal and ethical issues and recommendations. *Nat Rev Neurol.* 2017 Oct; 13(10):624-638. doi: 10.1038/nrneurol.2017.122. PMID: 28884750
63. Darnall, B.D., Sturgeon, J.A., Cook, K.F., Taub, C.J., Roy, A., Burns, J.W., Sullivan, M., Mackey, S.C. Development and Validation of a Daily Pain Catastrophizing Scale. *J Pain.* 2017 Sep; 18(9):1139-1149. doi: 10.1016/j.jpain.2017.05.003. PMID: 28528981
64. Curtin, C.M., Kenney, D., Suarez, P., Hentz, V.R., Hernandez-Boussard, T., Mackey, S., Carroll, I.R. A Double-Blind Placebo Randomized Controlled Trial of Minocycline to Reduce Pain After Carpal Tunnel and Trigger Finger Release. *J Hand Surg Am.* 2017 Mar; 42(3):166-174. doi: 10.1016/j.jhssa.2016.12.011. PMID: 28259273
65. Von Korff, M., Scher, A.I., Helmick, C., Carter-Pokras, O., Dodick, D.W., Goulet, J., Hamill-Ruth, R., LeResche, L., Porter, L., Tait, R., Terman, G., Veasley, C., Mackey, S. United States National Pain Strategy for Population Research: Concepts, Definitions, and Pilot Data. *J Pain.* 2016 Oct; 17(10):1068-1080. doi: 10.1016/j.jpain.2016.06.009. PMID: 27377620
66. Sun, E.C., Darnall, B.D., Baker, L.C., Mackey, S. Incidence of and Risk Factors for Chronic Opioid Use Among Opioid-Naive Patients in the Postoperative Period. *JAMA Intern Med.* 2016 Sep 1; 176(9):1286-93. doi: 10.1001/jamainternmed.2016.3298. PMID: 27400458
67. Sturgeon, J.A., Carriere, J.S., Kao, M.J., Rico, T., Darnall, B.D., Mackey, S.C. Social Disruption Mediates the Relationship Between Perceived Injustice and Anger in Chronic Pain: a Collaborative Health Outcomes Information Registry Study. *Ann Behav Med.* 2016 Dec; 50(6):802-812. doi: 10.1007/s12160-016-9808-6. PMID: 27325314
68. Martucci, K.T., Mackey, S.C. Imaging Pain. *Anesthesiol Clin.* 2016 Jun; 34(2):255-69. doi: 10.1016/j.anclin.2016.01.001. PMID: 27208709
69. Mackey, S. Future Directions for Pain Management: Lessons from the Institute of Medicine Pain Report and the National Pain Strategy. *Hand Clin.* 2016 Feb; 32(1):91-8. doi: 10.1016/j.hcl.2015.08.012. PMID: 26611393
70. Jiang, Y., Oathes, D., Hush, J., Darnall, B., Charvat, M., Mackey, S., Etkin, A. Perturbed connectivity of the amygdala and its subregions with the central executive and default mode networks in chronic pain. *Pain.* 2016 Sep; 157(9):1970-8. doi: 10.1097/j.pain.0000000000000606. PMID: 27168362
71. Huang, L., Kutch, J.J., Ellingson, B.M., Martucci, K.T., Harris, R.E., Clauw, D.J., Mackey, S., Mayer, E.A., Schaeffer, A.J., Apkarian, A.V., Farmer, M.A. Brain white matter changes associated with urological chronic pelvic pain syndrome: multisite neuroimaging from a MAPP case-control study. *Pain.* 2016 Dec; 157(12):2782-2791. doi: 10.1097/j.pain.0000000000000703. PMID: 27842046



72. Harle, C.A., Listhaus, A., Covarrubias, C.M., Schmidt, S.O., Mackey, S., Carek, P.J., Fillingim, R.B., Hurley, R.W. Overcoming barriers to implementing patient-reported outcomes in an electronic health record: a case report. *J Am Med Inform Assoc.* 2016 Jan; 23(1):74-9. doi: 10.1093/jamia/ocv085. PMID: 26159464
73. Hamilton, J.P., Glover, G.H., Bagarinao, E., Chang, C., Mackey, S., Sacchet, M.D., Gotlib, I.H. Effects of salience-network-node neurofeedback training on affective biases in major depressive disorder. *Psychiatry Res Neuroimaging.* 2016 Mar 30; 249:91-6. doi: 10.1016/j.psychresns.2016.01.016. PMID: 26862057
74. Dixon, E.A., Benham, G., Sturgeon, J.A., Mackey, S., Johnson, K.A., Younger, J. Development of the Sensory Hypersensitivity Scale (SHS): a self-report tool for assessing sensitivity to sensory stimuli. *J Behav Med.* 2016 Jun; 39(3):537-50. doi: 10.1007/s10865-016-9720-3. PMID: 26873609
75. Darnall, B.D., Scheman, J., Davin, S., Burns, J.W., Murphy, J.L., Wilson, A.C., Kerns, R.D., Mackey, S.C. Pain Psychology: A Global Needs Assessment and National Call to Action. *Pain Med.* 2016 Feb; 17(2):250-63. doi: 10.1093/pm/pnv095. PMID: 26803844
76. Bruehl, S., Maihofner, C., Stanton-Hicks, M., Perez, R.S., Vatine, J.J., Brunner, F., Birklein, F., Schlereth, T., Mackey, S., Mailis-Gagnon, A., Livshitz, A., Harden, R.N. Complex regional pain syndrome: evidence for warm and cold subtypes in a large prospective clinical sample. *Pain.* 2016 Aug; 157(8):1674-81. doi: 10.1097/j.pain.0000000000000569. PMID: 27023422
77. Bhandari, R.P., Feinstein, A.B., Huestis, S.E., Krane, E.J., Dunn, A.L., Cohen, L.L., Kao, M.C., Darnall, B.D., Mackey, S.C. Pediatric-Collaborative Health Outcomes Information Registry (Peds-CHOIR): a learning health system to guide pediatric pain research and treatment. *Pain.* 2016 Sep; 157(9):2033-44. doi: 10.1097/j.pain.0000000000000609. PMID: 27280328
78. Alger, J.R., Ellingson, B.M., Ashe-McNalley, C., Woodworth, D.C., Labus, J.S., Farmer, M., Huang, L., Apkarian, A.V., Johnson, K.A., Mackey, S.C., Ness, T.J., Deutsch, G., Harris, R.E., Clauw, D.J., Glover, G.H., Parrish, T.B., Hollander, J., Kusek, J.W., Mullins, C., Mayer, E.A., Investigators, M.R.N. Multisite, multimodal neuroimaging of chronic urological pelvic pain: Methodology of the MAPP Research Network. *Neuroimage Clin.* 2016 12:65-77. doi: 10.1016/j.nicl.2015.12.009. PMID: 27408791
79. Woodworth, D., Mayer, E., Leu, K., Ashe-McNalley, C., Naliboff, B.D., Labus, J.S., Tillisch, K., Kutch, J.J., Farmer, M.A., Apkarian, A.V., Johnson, K.A., Mackey, S.C., Ness, T.J., Landis, J.R., Deutsch, G., Harris, R.E., Clauw, D.J., Mullins, C., Ellingson, B.M., Network, M.R. Unique Microstructural Changes in the Brain Associated with Urological Chronic Pelvic Pain Syndrome (UCPPS) Revealed by Diffusion Tensor MRI, Super-Resolution Track Density Imaging, and Statistical Parameter Mapping: A MAPP Network Neuroimaging Study. *PLoS One.* 2015 10(10):e0140250. doi: 10.1371/journal.pone.0140250. PMID: 26460744
80. Tighe, P., Buckenmaier, C.C., Boezaart, A.P., Carr, D.B., Clark, L.L., Herring, A.A., Kent, M., Mackey, S., Mariano, E.R., Polomano, R.C. Acute Pain Medicine in the United States: A Status Report. *Pain Medicine.* 2015 16(9):1806-1826. PMID: 26535424
81. Sutcliffe, S., Bradley, C.S., Clemens, J.Q., James, A.S., Konkle, K.S., Kreder, K.J., Lai, H.H.H., Mackey, S.C., Ashe-McNalley, C.P., Rodriguez, L.V. Urological chronic pelvic pain syndrome flares and their impact: qualitative analysis in the MAPP network. *International urogynecology journal.* 2015:1-14, DOI: 10.1007/s00192-015-2652-6, PMID: 25792349
82. Sturgeon, J.A., Tieu, M.M., Jastrzab, L.E., McCue, R., Gandhi, V., Mackey, S.C. Nonlinear Effects of Noxious Thermal Stimulation and Working Memory Demands on Subjective Pain Perception. *Pain Med.* 2015 Jul; 16(7):1301-10. doi: 10.1111/pme.12774. PMID: 25929747
83. Sturgeon, J.A., Dixon, E.A., Darnall, B.D., Mackey, S.C. Contributions of physical function and satisfaction with social roles to emotional distress in chronic pain: a Collaborative Health Outcomes

- Information Registry (CHOIR) study. *Pain*. 2015 Dec; 156(12):2627-33. doi: 10.1097/j.pain.0000000000000313. PMID: 26230739
84. Sturgeon, J.A., Darnall, B.D., Kao, M.-C.J., Mackey, S.C. Physical and Psychological Correlates of Fatigue and Physical Function: A Collaborative Health Outcomes Information Registry (CHOIR) Study. *The Journal of Pain*. 2015 16(3):291-298. e1. DOI: 10.1016/j.jpain.2014.12.004. PMID: 25536536
  85. Martucci, K.T., Shirer, W.R., Bagarinao, E., Johnson, K.A., Farmer, M.A., Labus, J.S., Apkarian, A.V., Deutsch, G., Harris, R.E., Mayer, E.A., Clauw, D.J., Greicius, M.D., Mackey, S.C. The posterior medial cortex in urologic chronic pelvic pain syndrome: detachment from default mode network—a resting-state study from the MAPP Research Network. *Pain*. 2015 Sep; 156(9):1755-64. doi: 10.1097/j.pain.0000000000000238. PMID: 26010458
  86. Kutch, J.J., Yani, M.S., Asavasopon, S., Kirages, D.J., Rana, M., Cosand, L., Labus, J.S., Kilpatrick, L.A., Ashe-McNalley, C., Farmer, M.A., Johnson, K.A., Ness, T.J., Deutsch, G., Harris, R.E., Apkarian, A.V., Clauw, D.J., Mackey, S.C., Mullins, C., Mayer, E.A. Altered resting state neuromotor connectivity in men with chronic prostatitis/chronic pelvic pain syndrome: A MAPP: Research Network Neuroimaging Study. *Neuroimage Clin*. 2015 8:493-502. doi: 10.1016/j.nicl.2015.05.013. PMID: 26106574
  87. Krieger, J.N., Stephens, A.J., Landis, J.R., Clemens, J.Q., Kreder, K., Lai, H.H., Afari, N., Rodríguez, L., Schaeffer, A., Mackey, S. Relationship between Chronic Nonurological Associated Somatic Syndromes and Symptom Severity in Urological Chronic Pelvic Pain Syndromes: Baseline Evaluation of the MAPP Study. *The Journal of urology*. 2015 193(4):1254-1262. DOI: 10.1016/j.juro.2014.10.086. PMID: 25444992
  88. Hah, J.M., Sharifzadeh, Y., Wang, B.M., Gillespie, M.J., Goodman, S.B., Mackey, S.C., Carroll, I.R. Factors Associated with Opioid Use in a Cohort of Patients Presenting for Surgery. *Pain Res Treat*. 2015 2015:829696. doi: 10.1155/2015/829696. PMID: 26881072
  89. Farmer, M.A., Huang, L., Martucci, K., Yang, C.C., Maravilla, K.R., Harris, R.E., Clauw, D.J., Mackey, S., Ellingson, B.M., Mayer, E.A., Schaeffer, A.J., Apkarian, A.V., Network, M.R. Brain White Matter Abnormalities in Female Interstitial Cystitis/Bladder Pain Syndrome: A MAPP Network Neuroimaging Study. *J Urol*. 2015 Jul; 194(1):118-26. doi: 10.1016/j.juro.2015.02.082. PMID: 25711200
  90. Deer, T.R., Levy, R.M., Verrills, P., Mackey, S., Abejon, D. Perspective: Peripheral Nerve Stimulation and Peripheral Nerve Field Stimulation Birds of a Different Feather. *Pain Medicine*. 2015 16(3):411-412. DOI: 10.1111/pme.12662. PMID: 25599816
  91. Carroll, I.R., Hah, J.M., Barelka, P.L., Wang, C.K., Wang, B.M., Gillespie, M.J., McCue, R., Younger, J.W., Trafton, J., Humphreys, K., Goodman, S.B., Dirbas, F.M., Mackey, S.C. Pain Duration and Resolution following Surgery: An Inception Cohort Study. *Pain Med*. 2015 Dec; 16(12):2386-96. doi: 10.1111/pme.12842. PMID: 26179223
  92. Sturgeon, J.A., Darnall, B.D., Zwickey, H.L., Wood, L.J., Hanes, D.A., Zava, D.T., Mackey, S.C. Proinflammatory cytokines and DHEA-S in women with fibromyalgia: impact of psychological distress and menopausal status. *Journal of pain research*. 2014 7:707. DOI: 10.2147/JPR.S71344. PMID: 25506243
  93. Sturgeon, J.A., Darnall, B.D., Kao, M.-C.J., Mackey, S.C. Physical and Psychological Correlates of Fatigue and Physical Function: A Stanford-NIH Open Source Pain Registry (CHOIR) Study. *The Journal of Pain*. 2014. DOI: 10.1016/j.jpain.2014.12.004. PMID: 25536536
  94. Stoeckel, L., Garrison, K.A., Ghosh, S.S., Wightton, P., Hanlon, C.A., Gilman, J.M., Greer, S., Turk-Browne, N.B., Scheinost, D., Craddock, C. Optimizing real time fMRI neurofeedback for therapeutic discovery and development. *NeuroImage: Clinical*. 2014 5:245-255

95. Schmidt, P.C., Ruchinelli, G., Mackey, S.C., Carroll, I.R. Perioperative Gabapentinoids: Choice of Agent, Dose, Timing, and Effects on Chronic Postsurgical Pain. *Survey of Anesthesiology*. 2014 58(2):96-97
96. Nilakantan, A., Younger, J., Aron, A., Mackey, S. Preoccupation in an Early-Romantic Relationship Predicts Experimental Pain Relief. *Pain Medicine*. 2014 15(6):947-953
97. Martucci, K.T., Ng, P., Mackey, S. Neuroimaging chronic pain: what have we learned and where are we going? *Future Neurology*. 2014 9(6):615-626
98. Landis, J.R., Williams, D.A., Lucia, M.S., Clauw, D.J., Naliboff, B.D., Robinson, N.A., van Bokhoven, A., Sutcliffe, S., Schaeffer, A.J., Rodriguez, L.V. The MAPP research network: design, patient characterization and operations. *BMC urology*. 2014 14(1):58
99. Kilpatrick, L.A., Kutch, J.J., Tillisch, K., Naliboff, B.D., Labus, J.S., Jiang, Z., Farmer, M.A., Apkarian, A.V., Mackey, S., Martucci, K.T. Alterations in resting state oscillations and connectivity in sensory and motor networks in women with interstitial cystitis/painful bladder syndrome. *The Journal of urology*. 2014 192(3):947-955
100. Hah, J.M., Mackey, S., Barelka, P.L., Wang, C.K., Wang, B.M., Gillespie, M.J., McCue, R., Younger, J.W., Trafton, J., Humphreys, K. Self-Loathing Aspects of Depression Reduce Postoperative Opioid Cessation Rate. *Pain Medicine*. 2014 15(6):954-964
101. Deer, T.R., Mekhail, N., Provenzano, D., Pope, J., Krames, E., Leong, M., Levy, R.M., Abejon, D., Buchser, E., Burton, A. The appropriate use of neurostimulation of the spinal cord and peripheral nervous system for the treatment of chronic pain and ischemic diseases: the Neuromodulation Appropriateness Consensus Committee. *Neuromodulation: Technology at the Neural Interface*. 2014 17(6):515-550
102. Darnall, B.D., Sturgeon, J.A., Kao, M.-C., Hah, J.M., Mackey, S.C. From Catastrophizing to Recovery: a pilot study of a single-session treatment for pain catastrophizing. *Journal of pain research*. 2014 7:219
103. Chapin, H.L., Darnall, B.D., Seppala, E.M., Doty, J.R., Hah, J.M., Mackey, S.C. Pilot study of a compassion meditation intervention in chronic pain. *Journal of Compassionate Health Care*. 2014 1(1):1-12
104. Bernaba, M., Johnson, K.A., Kong, J.-T., Mackey, S. Conditioned pain modulation is minimally influenced by cognitive evaluation or imagery of the conditioning stimulus. *Journal of pain research*. 2014 7:689
105. Barad, M.J., Ueno, T., Younger, J., Chatterjee, N., Mackey, S. Complex regional pain syndrome is associated with structural abnormalities in pain-related regions of the human brain. *The Journal of Pain*. 2014 15(2):197-203
106. Bagarinao, E., Johnson, K.A., Martucci, K.T., Ichesco, E., Farmer, M.A., Labus, J., Ness, T.J., Harris, R., Deutsch, G., Apkarian, A.V. Preliminary structural MRI based brain classification of chronic pelvic pain: A MAPP network study. *PAIN®*. 2014 155(12):2502-2509
107. Younger, J., Noor, N., McCue, R., Mackey, S. Low-dose naltrexone for the treatment of fibromyalgia: Findings of a small, randomized, double-blind, placebo-controlled, counterbalanced, crossover trial assessing daily pain levels. *Arthritis & Rheumatism*. 2013 65(2):529-538
108. Schmidt, P.C., Ruchelli, G., Mackey, S.C., Carroll, I.R., EPI, M. Perioperative gabapentinoids: choice of agent, dose, timing, and effects on chronic postsurgical pain. *Anesthesiology*. 2013 119(5):1215-1221
109. Nash, P., Wiley, K., Brown, J., Shinaman, R., Ludlow, D., Sawyer, A.-M., Glover, G., Mackey, S. Functional magnetic resonance imaging identifies somatotopic organization of nociception in the human spinal cord. *PAIN®*. 2013 154(6):776-781

110. Mackey, S.C. Central neuroimaging of pain. *The journal of pain: official journal of the American Pain Society*. 2013 14(4):328
111. Kong, J.-T., Schnyer, R.N., Johnson, K.A., Mackey, S. Understanding central mechanisms of acupuncture analgesia using dynamic quantitative sensory testing: a review. *Evidence-Based Complementary and Alternative Medicine*. 2013 2013
112. Kong, J.-T., Johnson, K.A., Balise, R.R., Mackey, S. Test-retest reliability of thermal temporal summation using an individualized protocol. *The Journal of Pain*. 2013 14(1):79-88
113. Dworkin, R.H., O'Connor, A.B., Kent, J., Mackey, S.C., Raja, S.N., Stacey, B.R., Levy, R.M., Backonja, M., Baron, R., Harke, H. Interventional management of neuropathic pain: NeuPSIG recommendations. *PAIN®*. 2013 154(11):2249-2261
114. Carroll, I., Hah, J., Mackey, S., Ottestad, E., Kong, J.T., Lahidji, S., Tawfik, V., Younger, J., Curtin, C. Perioperative interventions to reduce chronic postsurgical pain. *Journal of reconstructive microsurgery*. 2013 29(4):213-222
115. Younger, J., Gandhi, V., Hubbard, E., Mackey, S. Development of the Stanford Expectations of Treatment Scale (SETS): a tool for measuring patient outcome expectancy in clinical trials. *Clinical Trials*. 2012:1740774512465064
116. Ung, H., Brown, J.E., Johnson, K.A., Younger, J., Hush, J., Mackey, S. Multivariate classification of structural MRI data detects chronic low back pain. *Cerebral cortex*. 2012:bhs378
117. Mackey, S., Carroll, I., Emir, B., Murphy, T.K., Whalen, E., Dumenci, L. Sensory pain qualities in neuropathic pain. *The Journal of Pain*. 2012 13(1):58-63
118. Chapin, H., Bagarinao, E., Mackey, S. Real-time fMRI applied to pain management. *Neuroscience letters*. 2012 520(2):174-181
119. Younger, J.W., Chu, L.F., D'Arcy, N.T., Trott, K.E., Jastrzab, L.E., Mackey, S.C. Prescription opioid analgesics rapidly change the human brain. *PAIN®*. 2011 152(8):1803-1810
120. Lawrence, J.M., Hoeft, F., Sheau, K.E., Mackey, S.C. Strategy-dependant Dissociation of the Neural Correlates Involved In Pain Modulation. *Anesthesiology*. 2011 115(4):844
121. Carroll, I., Fischbein, N., Barad, M., Mackey, S. Human response to unintended intrathecal injection of botulinum toxin. *Pain Medicine*. 2011 12(7):1094-1097
122. Brown, J.E., Chatterjee, N., Younger, J., Mackey, S. Towards a physiology-based measure of pain: patterns of human brain activity distinguish painful from non-painful thermal stimulation. *PLoS One*. 2011 6(9):e24124
123. Younger, J.W., Shen, Y.F., Goddard, G., Mackey, S.C. Chronic myofascial temporomandibular pain is associated with neural abnormalities in the trigeminal and limbic systems. *PAIN®*. 2010 149(2):222-228
124. Younger, J., Aron, A., Parke, S., Chatterjee, N., Mackey, S. Viewing pictures of a romantic partner reduces experimental pain: Involvement of neural reward systems. *PLoS One*. 2010 5(10):e13309
125. Xiao, L., Mackey, S., Hui, H., Xong, D., Zhang, Q., Zhang, D. Subcutaneous injection of botulinum toxin a is beneficial in postherpetic neuralgia. *Pain Medicine*. 2010 11(12):1827-1833
126. Turk, D.C., Audette, J., Levy, R.M., Mackey, S.C., Stanos, S., editors. Assessment and treatment of psychosocial comorbidities in patients with neuropathic pain. Mayo Clinic Proceedings; 2010: Elsevier.
127. Parris, D., Fischbein, N., Mackey, S., Carroll, I. A Novel CT-Guided Transpsoas Approach to Diagnostic Genitofemoral Nerve Block and Ablation. *Pain Medicine*. 2010 11(5):785-789

- 128.Harden, R.N., Bruehl, S., Perez, R.S., Birklein, F., Marinus, J., Maihofner, C., Lubenow, T., Buvanendran, A., Mackey, S., Graciosa, J. Development of a severity score for CRPS. *PAIN®*. 2010 151(3):870-876
- 129.Harden, R.N., Bruehl, S., Perez, R.S., Birklein, F., Marinus, J., Maihofner, C., Lubenow, T., Buvanendran, A., Mackey, S., Graciosa, J. Validation of proposed diagnostic criteria (the “Budapest Criteria”) for complex regional pain syndrome. *Pain*. 2010 150(2):268-274
- 130.Fredericks, C.A., Drabant, E.M., Edge, M.D., Tillie, J.M., Hallmayer, J., Ramel, W., Kuo, J.R., Mackey, S., Gross, J.J., Dhabhar, F.S. Healthy young women with serotonin transporter SS polymorphism show a pro-inflammatory bias under resting and stress conditions. *Brain, behavior, and immunity*. 2010 24(3):350-357
- 131.Dworkin, R.H., O'Connor, A.B., Audette, J., Baron, R., Gourlay, G.K., Haanpää, M.L., Kent, J.L., Krane, E.J., LeBel, A.A., Levy, R.M., editors. Recommendations for the pharmacological management of neuropathic pain: an overview and literature update. Mayo Clinic Proceedings; 2010: Elsevier.
- 132.Carroll, I.R., Younger, J.W., Mackey, S.C. Pain quality predicts lidocaine analgesia among patients with suspected neuropathic pain. *Pain Medicine*. 2010 11(4):617-621
- 133.Barad, M.J., Brown, J., Sherman, E., Chatterjee, N., Mackey, S., editors. Functional Connectivity in Patients with Chronic Neuropathic Pain. *NEUROLOGY*; 2010: LIPPINCOTT WILLIAMS & WILKINS 530 WALNUT ST, PHILADELPHIA, PA 19106-3621 USA.
- 134.Younger, J., McCue, R., Mackey, S. Pain outcomes: a brief review of instruments and techniques. *Current pain and headache reports*. 2009 13(1):39-43
- 135.Younger, J., Mackey, S. Fibromyalgia Symptoms Are Reduced by Low-Dose Naltrexone: A Pilot Study. *Pain medicine*. 2009 10(4):663-672
- 136.Wang, C.K., Gowda, A., Barad, M., Mackey, S.C., Carroll, I.R. Serratus muscle stimulation effectively treats notalgia paresthetica caused by long thoracic nerve dysfunction: a case series. *Journal of brachial plexus and peripheral nerve injury*. 2009 4(1):17
- 137.Shen, Y.F., Younger, J., Goddard, G., Mackey, S. Randomized clinical trial of acupuncture for myofascial pain of the jaw muscles. *Journal of orofacial pain*. 2009 23(4):353
- 138.Neugebauer, V., Galhardo, V., Maione, S., Mackey, S.C. Forebrain pain mechanisms. *Brain research reviews*. 2009 60(1):226-242
- 139.Coleman, S.D., Mackey, S. Spinal cord stimulation compared with medical management for failed back surgery syndrome. *Current pain and headache reports*. 2009 13(1):1-2
- 140.Carroll, I., Clark, J.D., Mackey, S. Sympathetic block with botulinum toxin to treat complex regional pain syndrome. *Annals of neurology*. 2009 65(3):348-351
- 141.Barad, M., Greicius, M.D., Mackey, S. Imaging the CNS correlates of neuropathic pain. *CONTINUUM: Lifelong Learning in Neurology*. 2009 15(5, Neuropathic Pain):30-46
- 142.Younger, J., Barelka, P., Carroll, I., Kaplan, K., Chu, L., Prasad, R., Gaeta, R., Mackey, S. Reduced cold pain tolerance in chronic pain patients following opioid detoxification. *Pain Medicine*. 2008 9(8):1158-1163
- 143.Ochsner, K.N., Zaki, J., Hanelin, J., Ludlow, D.H., Knierim, K., Ramachandran, T., Glover, G.H., Mackey, S.C. Your pain or mine? Common and distinct neural systems supporting the perception of pain in self and other. *Social Cognitive and Affective Neuroscience*. 2008 3(2):144-160
- 144.Lawrence, J., Mackey, S.C. Role of neuroimaging in analgesic drug development. *Drugs in R & D*. 2008 9(5):323-334

145. Godfrey, J.R., Mackey, S. Toward optimal health: A discussion on sex, gender, and pain. *Journal of Women's Health*. 2008 17(6):917-920
146. Carroll, I.R., Kaplan, K.M., Mackey, S.C. Mexiletine therapy for chronic pain: survival analysis identifies factors predicting clinical success. *Journal of pain and symptom management*. 2008 35(3):321-326
147. Byrd, D., Mackey, S. Pulsed radiofrequency for chronic pain. *Current pain and headache reports*. 2008 12(1):37-41
148. Zaki, J., Ochsner, K.N., Hanelin, J., Wager, T.D., Mackey, S.C. Different circuits for different pain: patterns of functional connectivity reveal distinct networks for processing pain in self and others. *Social neuroscience*. 2007 2(3-4):276-291
149. Muramoto, D., Younger, J., Ueno, T., Kirschen, M., Mackey, S. (670): Working memory load attenuates moderate pain, but not high pain, in healthy individuals. *The Journal of Pain*. 2007 8(4):S18
150. Mitra, R., Zeighami, A., Mackey, S. Pulsed radiofrequency for the treatment of chronic ilioinguinal neuropathy. *Hernia*. 2007 11(4):369-371
151. Mackey, S., Feinberg, S. Pharmacologic therapies for complex regional pain syndrome. *Current pain and headache reports*. 2007 11(1):38-43
152. Kornelsen, J., Mackey, S. Potential clinical applications for spinal functional MRI. *Current pain and headache reports*. 2007 11(3):165-170
153. Carroll, I., Mackey, S., Gaeta, R., editors. The role of adrenergic receptors and pain: The good, the bad, and the unknown. *Seminars in Anesthesia, Perioperative Medicine and Pain*; 2007: Elsevier.
154. Carroll, I., Gaeta, R., Mackey, S. Multivariate analysis of chronic pain patients undergoing lidocaine infusions: increasing pain severity and advancing age predict likelihood of clinically meaningful analgesia. *The Clinical journal of pain*. 2007 23(8):702
155. Ochsner, K.N., Ludlow, D.H., Knierim, K., Hanelin, J., Ramachandran, T., Glover, G.C., Mackey, S.C. Neural correlates of individual differences in pain-related fear and anxiety. *Pain*. 2006 120(1):69-77
156. Shinaman, R.C., Mackey, S. Continuous peripheral nerve blocks. *Current pain and headache reports*. 2005 9(1):24-29
157. Christopher deCharms, R., Maeda, F., Glover, G.H., Ludlow, D., Pauly, J.M., Soneji, D., Gabrieli, J.D., Mackey, S.C. Control over brain activation and pain learned by using real-time functional MRI. *Proceedings of the National Academy of Sciences of the United States of America*. 2005 102(51):18626-18631
158. Ochsner, K.N., Knierim, K., Ludlow, D.H., Hanelin, J., Ramachandran, T., Glover, G.H., Mackey, S.C. Reflecting upon feelings: an fMRI study of neural systems supporting the attribution of emotion to self and other. *Cognitive Neuroscience, Journal of*. 2004 16(10):1746-1772
159. Mackey, S.C., Maeda, F. Functional imaging and the neural systems of chronic pain. *Neurosurgery Clinics of North America*. 2004 15(3):269-288
160. Mackey, S. Mechanisms of inflammatory pain: therapeutic implications. *JCR: Journal of Clinical Rheumatology*. 2004 10(3):S5-S11
161. Sze, D.Y., Mackey, S.C. MR Guidance of Sympathetic Nerve Blockade: Measurement of Vasomotor Response—Initial Experience in Seven Patients 1. *Radiology*. 2002 223(2):574-580
162. Leong, M.S., Mackey, S. Delayed subdural block after a stellate ganglion block. *Anesthesiology*. 2001 94(2):358
163. Mackey, S., Brodsky, J.B., Alcantara, T.M., Monje, J., Nuevo, F.R. Selection and placement of double-lumen tubes in Asian patients. *Asian Cardiovascular and Thoracic Annals*. 1998 6(3):199-202

164. Macario, A., Mackey, S., Terris, D. Bilateral vocal cord paralysis after radical cystectomy in a patient with a history of bulbar polio. *Anesthesia & Analgesia*. 1997 85(5):1171-1172
165. Habibi, A., Mackey, S., Brodsky, J.B. Selecting a double-lumen tube after lung transplantation. *Anesthesia & Analgesia*. 1997 84(4):940
166. Brodsky, J.B., Mackey, S., Cannon, W.B. Selecting the correct size left double-lumen tube. *Journal of cardiothoracic and vascular anesthesia*. 1997 11(7):924-925
167. Brodsky, J.B., Mackey, S., editors. Isolation Techniques. Seminars in Cardiothoracic and Vascular Anesthesia; 1997: Sage Publications.
168. Angst, M.S., Mackey, S.C., Zupfer, G.H., Tataru, C.D., Brock-Utne, J.G. Reduction of propofol injection pain with a double lumen iv set. *Journal of clinical anesthesia*. 1997 9(6):462-466
169. Simmons, W.N., Mackey, S., He, D.S., Marcus, F.I. Comparison of gold versus platinum electrodes on myocardial lesion size using radiofrequency energy. *Pacing and Clinical Electrophysiology*. 1996 19(4):398-402
170. Mackey, S., Thornton, L., He, D.S., Marcus, F.I., LAMPE, L.F. Simultaneous multipolar radiofrequency ablation in the monopolar mode increases lesion size. *Pacing and clinical electrophysiology*. 1996 19(7):1042-1048

## NON-PEER REVIEWED PUBLICATIONS

1. Mackey, S. (2016). Future Directions for Pain Management: Lessons from the Institute of Medicine Pain Report and the National Pain Strategy. *Hand Clin*, 32(1), 91-98. doi:10.1016/j.hcl.2015.08.012
2. Mackey, S. (2015). The “Continuum of Pain” and the American Academy of Pain Medicine. *Pain Medicine*, 16(3), 413-415.
3. Hah, J., Mackey, S. A Review of Chronic Noncancer Pain: Epidemiology, Assessment, Treatment, and Future Needs. *FOCUS*. 2015.
4. Mackey S., The IOM Pain Report Revisited: Setting the Stage for What's Next in Transforming Pain Care, Education and Research, *Pain Med*. 2014 Jun;15(6):885-6.
5. Mackey, S., National Pain Strategy Task Force: The Strategic Plan for the IOM Pain Report. *Pain Medicine*, 2014. 15(7): p. 1070-1.
6. Mackey, S., AAPM Shared Interest Groups (SIGs): Bringing Together Members with Shared Interests. *Pain Medicine*, 2014.
7. Mackey, S., Carr, DB, National Pain Strategy Task Force: Strategic Plan for a Cultural Transformation in Pain Prevention, Care and Education, *ASA Newsletter*, August, 2014
8. Mackey S, President’s Message, *Pain Med*. 2014 May; 15(5):730-1.
9. Chapin, H., & Mackey, S. (2013). A Transparent, Trainable Brain. *Scientific American Mind*, 24(1), 50-57.
10. Malhotra, A., & Mackey, S. (2012). Outcomes in Pain Medicine: A Brief Review. *Pain and therapy*, 1(1), 1-10.
11. Fine, P.G., P. Saigh, L. Webster, S. Mackey, S. Fishman, A.D. Wasan, and A. Cahana, Our academy, our mission, our work! *Pain Medicine*, 2011. 12(9): p. 1299-302.
12. Mogil, J. S., Rice, F. L., Brennan, T. J., Fine, P. G., Apkarian, A. V., Staud, R., Zimmerman, M. E., Mackey, S., & Mao, J. (2011). Secure Sign In. *Curr Pharm Biotechnol*.

13. Mackey S, Pain and the Brain – What We Have Learned from Functional Neuroimaging, American Association of Neuromuscular and Electrodiagnostic Medicine, October 2010.
14. Barad, M. J., Brown, J., Sherman, E., Chatterjee, N., & Mackey, S. (2010). *Functional Connectivity in Patients with Chronic Neuropathic Pain*. Paper presented at the NEUROLOGY.
15. Mackey, S, Evaluating Pain Management Outcomes – ASA Refresher Course (October, 2009).
16. Mackey S, When Acute Pain Becomes Chronic – What Do We Know and How Can We Prevent It? - ASA Refresher Course (October, 2009).
17. Mackey, S, Evaluating Pain Management Outcomes – ASA Refresher Course (October, 2008).
18. Mackey, S, Pain Management Outcomes – ASA Refresher Course (October, 2007).
19. Younger, J, Mackey, S, Evaluating Outcomes in Pain Medicine, Current Reviews in Clinical Anesthesia Lesson 11, Vol. 28, December 2007.
20. Mackey, S, Pain Management Outcomes – ASA Refresher Course (October, 2006)
21. Kuritzky L, Samraj G, Mackey S, Pain Medicine News, New Treatments in the Management of Diabetic Peripheral Neuropathic Pain, September, 2006.
22. Mackey S, Pathways: Perspectives in Modern Neurology and Pain Management – Pain and the Brain: Neuroimaging of Pain, Vol 3, November 2006.
23. Feinberg, S, Mackey, S, The Current Opioid Controversy – What is Appropriate Use for Chronic Pain? (California Workers Compensation Enquirer, 2003)
24. Mackey, S, Perioperative Pain: Novel Approaches to Management in Rethinking the Paradigms of Perioperative Pain Management, Special Report in Anesthesiology News (Anesthesiology News, 2003)
25. Feinberg, S, Mackey, S, Kirz, J, Symptom Magnification and Waddell's Behavioral Signs, California Workers Compensation Enquirer, June 2001

## LETTERS TO THE EDITOR

1. Darnall, B., Juurlink, D., Kerns, R., Mackey, S., Van Dorsten, B., Humphreys, K., Gonzalez-Sotomayor, J., Furlan, A... (96 additional authors), International Stakeholder Community of Pain Experts and Leaders Call for an Urgent Action on Forced Opioid Tapering. *Pain Medicine*. 11/2018; pny228, doi.org/10.1093/pm/pny228. PMID: 30496540
2. Kao, M., Leong, M., Mackey, S. Radiofrequency Denervation for Chronic Low Back Pain. *JAMA*. 2017; 318(22):2256-2256. doi: 10.1001/jama.2017.16382.
3. Dworkin, R.H., A.B. O'Connor, J. Kent, Mackey, S., S.N. Raja, B.R. Stacey, R.M. Levy, M. Backonja, R. Baron, H. Harke, J.D. Loeser, R.D. Treede, D.C. Turk, and C.D. Wells, Response to letter to the editor. *Pain*, 2014. 155(5): p. 1045-6.
4. Schmidt, P.C., G. Ruchelli, Mackey, S., and I.R. Carroll, In reply. *Anesthesiology*, 2014. 121(2): p. 424-6.
5. Nash, P., Glover, G., Mackey, S., Response to: Letter from Paul Eugene Summers, Federico Giove, and Carlo Adolfo Porro, *Pain*. 2013;154(11).
6. Mackey S, et al., Response to letter to the editor. *Journal of Pain*. 2014 May;155(5):1045-6.
7. Carroll I, Gaeta R, MackeySC, A Vaccine to Prevent Herpes Zoster and Postherpetic Neuralgia in Older Adults, *New England Journal of Medicine*. September 2005, 353:13;1414-15



8. Habibi A, Mackey S, Brodsky J, Selecting a Double-Lumen Tube after Lung Transplantation, *Anesthesia and Analgesia* 1997;84:1
9. Brodsky JB, Mackey S, Cannon WB, Selecting the Correct Size Left Double-Lumen Tube, *J. Card. Anesth.* December 1997, 12:46;44

### **PEER REVIEWED CONFERENCE PROCEEDINGS**

1. Jarrahi, B., Martucci, K., Nilakantan, A., Mackey, S. Investigating the BOLD Spectral Power of the Intrinsic Connectivity Networks in Fibromyalgia Patients: A Resting-state fMRI Study. *Conf Proc IEEE Eng Med Biol Soc*, author manuscript available in PMC 2018 May 23. Doi: 10.1109/EMBC.2017.8036870.

### **BOOK CHAPTERS and OTHERS**

1. Longnecker D, Mackey S, Newman M, Sandberg W, Zapol W, *Anesthesiology*, Third Edition, McGraw Hill Education, 2017
2. Barrows D, Mackey S, *Spinal Cord Stimulation for Refractory Angina and Peripheral Vascular Disease in Interventional and Neuromodulatory Techniques for Pain Management*, Deer Ed, 2012
3. Matchett G, Mackey S, *Cervical Plexus Blockade in AAPM Textbook of Pain*, 2012
4. Mackey S, et al., eds. *Anesthesiology Continuing Education (ACE) Program*. Park Ridge, IL: American Society of Anesthesiologists; 2011
5. Mackey S, et al., eds. *Anesthesiology Continuing Education (ACE) Program*. Park Ridge, IL: American Society of Anesthesiologists; 2010.
6. Mackey S, et al., eds. *Anesthesiology Continuing Education (ACE) Program*. Park Ridge, IL: American Society of Anesthesiologists; 2009.
7. Mackey, S., *Perioperative Pain Management in Anesthesiologist's Manual of Surgical Procedures*, Jaffe and Samuels (Eds) 4th Edition 2009 (Book Chapter)
8. Barad, Greicius, Mackey S, *Continuum: Lifelong Learning in Neurology*; "Functional Imaging in Neuropathic Pain" October 2009 (Book Chapter)
9. Feinberg S, Mackey S, *American Chronic Pain Association Chronic Pain Medications Supplement 2008*. Rocklin, CA: American Chronic Pain Association; 2008.
10. Younger J, Watcha D, Mackey S, Pain. In Yawei Zhang (Ed.). *The Encyclopedia of Global Health*. Sage, 2008.
11. Younger J, Mackey S, The use of neuroimaging tools in investigating neuropathic pain. In Scott Chambers (Ed.). *US Neurological Diseases*, Issue II.2007
12. Mackey S, et al., eds. *Anesthesiology Continuing Education (ACE) Program*. Park Ridge, IL: American Society of Anesthesiologists; 2007
13. Mackey S, et al., eds. *Anesthesiology Continuing Education (ACE) Program*. Park Ridge, IL: American Society of Anesthesiologists; 2006
14. Carroll, I., Clark, D., & Mackey, S. (2005). *Toxin Induced Sympathectomy: Google Patents*.
15. Mackey S, et al., eds. *Anesthesiology Continuing Education (ACE) Program*. Park Ridge, IL: American Society of Anesthesiologists; 2005
16. Amador, ER, Mackey, S. *Peripheral Nerve Blocks and Continuous Catheters in Pain Management*, Just the Facts, Wallace and Staats Eds. May 2004 (Book Chapter)

17. Mackey, S.– Low Back Pain: Management Across a Spectrum of Presentations in Current Issues In Pain Management for the Primary Care Physician Carr and Reuben Eds. December 2004 (<http://www.tuftspainmanagement.org>)
18. Mackey, S. Gaeta, R, Perioperative Pain Management in Anesthesiologist's Manual of Surgical Procedures, Jaffe and Samuels (Eds) 3rd Edition 2003 (Book Chapter)

### **EDITORIAL BOARD**

1. Pain Medicine, Senior Editor, 2007 to present
2. American Society of Anesthesiologists, Anesthesiology Continuing Education, Pain Editor, 2005-present
3. Section Editor, Pain and Local Anesthetics, Current Pain and Headache Reports, 2005-2008
4. Neuromodulation Editorial Board, 2010 to present
5. Journal of Applied Biobehavioral Research, 2011 to present

### **JOURNAL REVIEWER**

1. Anesthesia and Analgesia
2. Anesthesiology
3. Pain
4. Regional Anesthesia and Pain Medicine
5. Behavioral Neuroscience
6. European Journal of Pain
7. Journal of Neuroscience
8. PLOS Biology
9. Science Translational Medicine
10. Brain Research
11. Pain Medicine
12. Gastroenterology
13. Cerebral Cortex

### **POPULAR PRESS**

1. Multidisciplinary Treatment Approaches for Neuropathic Pain. Monthly Prescribing Reference, September 2013
2. Objective Neuroimaging-Based Brain Biomarkers of Pain Needed. Monthly Prescribing Reference September 2013
3. Top 10 facts you need to know about clinical trials. Huffington Post January 2013
4. New method to catch Medicare cheats. Examiner December 2012
5. A Biomarker for Chronic Back Pain? Medscape December 2012
6. Pain Research: Possible way to measure suffering. SF Gate December 2012

7. Stanford algorithm eases ache of diagnosing chronic pain. Fierce Biotech IT December 2012
8. More progress in the quest for a “painometer”. Scope Blog December 2012
9. Researchers report progress in quest to create objective method of detecting pain. Medical Xpress December 2012
10. Gain in pain: Stanford researchers use brain scans, algorithms to ID chronic pain patients. San Francisco Business Times December 2012
11. Neuroscience mapping brain connections. LA Times September 2012
12. Advances Against Chronic Pain. US News & World Report September 2012
13. The Numbers Game: How Many Americans Have Chronic Pain? American New Report May 16 2012
14. 150 Pain Management Physicians to Know. Becker’s ASC Review May 1 2012
15. Stanford Docs: Turn in Your Old Pills. Palo Alto Patch April 26 2012
16. Pain Center Receives National Recognition. Stanford School of Medicine March 26 2012
17. Education a Cornerstone of Effective Opioid Management. Family Practice News March 16 2012
18. Death of Single Payer Health Plan Inspires Change of Thought. The Bay Citizen March 2 2012
19. Living With Pain. KVIE TV February 16 2012
20. Love and Pain, Stanford scientists will answer your questions. Scientific American February 14 2012
21. Ask Stanford Med: Neuroscientist taking questions on pain and love’s analgesic effects. Stanford Scope Blog February 13 2012
22. Valentine’s Day Special: Love & Health The Bay Citizen February 10 2012
23. PAINWeek 2012 to Address Diabetes & Pain Connection. Digital Journal December 14 2011
24. Reflections on Pain and Love. Blogcritics December 9 2011
25. How the Brain Interprets Pain and How to Get Relief. US News December 7 2011
26. Rewiring the Brain to Ease Pain. Wall Street Journal November 15 2011
27. Lessons Learned from the Neuroimaging of Pain. Prohealth November 9 2011
28. New treatment options for chronic pain. Healthy Imagination October 18 2011
29. Always look on the bright side of life. Express October 18 2011
30. Stanford researchers map pain. Stanford Daily October 4 2011
31. Quadriplegic's unending agony. Montreal Gazette October 4 2011
32. Pain Measurement Tool in Development. Outpatient Surgery Magazine October 4 2011
33. Stamping Out Skepticism. Vancouver Sun October 3 2011
34. Canadian research on cutting edge of efforts to validate chronic pain. Edmonton Journal October 2 2011
35. Imaging the brain predicts the pain. Visionsystems September 29 2011
36. The Ways We Talk About Pain. Scientific American September 27 2011
37. Breakthrough technology to detect pain. Marketplace September 26 2011

38. Objective Pain-Measuring Machine Means You'll Have to Stop Faking Injuries. Gizmodo September 22 2011
39. Brain-Scanning "Painometer" Is an Attempt to Measure Pain Objectively. Popular Science September 22 2011
40. Brain Scans Suggest a New, Objective Way to Measure Pain. Discover Magazine September 22 2011
41. A New, Objective Way to Study Pain. The Atlantic September 21 2011
42. How much does that hurt? Doctors train computers to measure if patients are in pain. Daily Mail September 15 2011
43. Researchers find out how to rate pain. Montreal Gazette September 15 2011
44. Device to Estimate Intensity of Patient's Pain. French Tribune September 15 2011
45. Pain Detecting Technology Developing: New Study. International Business Times September 15 2011
46. Tool That Measures Pain Objectively Under Way. Medical News Today September 15 2011
47. Pain Detector in Development: Researchers Hopeful for Medical Breakthrough. Medical Daily September 15 2011
48. Feeling pain? The computer can tell. Dawn.com September 14 2011
49. Does that hurt? Objective way to measure pain being developed at Stanford. Health Canal September 14 2011
50. Atlantic Wire September 14 2011
51. An Objective Way to Measure Pain. MIT Technology Review September 14 2011
52. Pain-Detecting Computers Can Be Created – Study. Social Barrel September 14 2011
53. Does that hurt? Objective way to measure pain being developed at Stanford. Stanford Press Release September 13 2011
54. Stanford scientists work towards developing a "painometer". Stanford Scope September 13 2011
55. OUCH! Developing a Machine that Measures Pain. Voice Of America September 13 2011
56. An objective way to measure pain? It's closer than you think. IO9 September 13 2011
57. Researchers closer to developing a 'pain-o-meter'. CNN September 13 2011  
The pain is all in your head (and researchers say that's OK). Portland Tribune August 11 2011
58. New IOM Report Lays Out Plan For Improving Pain Care. Pain Medicine News August 2011
59. Headache clinic to open at Stanford. Palo Alto Weekly July 22 2011
60. National Expert to Lead New Stanford Headache Clinic. Press Release July 20 2011
61. Giving Chronic Pain a Medical Platform of Its Own. New York Times July 18 2011
62. When Someone Says, "My Stomach Hurts," Stanford Listens. Press Release July 11 2011
63. The Daily Brief. Stanford Daily July 7 2011
64. Doctors' Challenge: How Real Is That Pain? Wall Street Journal July 5 2011
65. New Report Details Uphill Battle to Solve the U.S.'s Pain Problem. Scientific American July 1 2011
66. Chronic Pain Costs \$635 Billion A Year. Red Orbit June 30 2011
67. 100 Million Americans Suffer Pain - Many in Silence News-Medical June 30 2011

68. Long-term love may dull pain, study shows. Stanford Scope June 30 2011
69. Relieving Pain in America: A new report from the Institute of Medicine. Stanford Scope June 29 2011
70. Major Changes Needed to End Inadequate Pain Management for Millions. Health News Digest June 29 2011
71. Chronic pain affects 116 million Americans, says IOM report. LA Times June 29 2011
72. Report: More than 100 million suffer chronic pain. USA Today June 29 2011
73. Report: Chronic, Undertreated Pain Affects 116 Million Americans. TIME June 29 2011
74. US pain management falls short, UAB professor aided-study finds. AOL June 29 2011
75. Don't blame people for their pain, report says. CNN June 29 2011
76. Report: More than 100 million suffer lasting pain. Forbes June 29 2011
77. 100 Million Americans Have Chronic Pain. WebMD June 29 2011
78. Major report urges changes in chronic pain treatment. Kansas City Star June 28 2011
79. Challenges of Treating Chronic Pain in People with Opioid Dependence. Drugfree.org June 24 2011
80. Back pain is a complicated issue. Los Angeles Times April 4 2011
81. AAPM: State of Mind Can Turn Acute Pain to Chronic. MedPage Today March 28 2011
82. Love as pain relief. Gizmag March 1 2011
83. Healing the Hurt. Time February 24 2011
84. Study: In Pain? Love May Ease Suffering. Live Shots February 14 2011
85. Euphoria of romance can blunt intense pain, researchers find. San Jose Mercury News February 11 2011
86. All you need is love. Express February 8 2011
87. Pain be gone. New Scientist January 22 2011
88. FDA to Limit Acetaminophen in Pain Killers. New American January 18 2011
89. People in Love Less Sensitive to Pain. Topnews January 10 2011
90. People madly in love feel less pain - study. Themedguru January 10 2011
91. Study: Romantic Love Eases Physical Pain. Fox News January 10 2011
92. Love is a drug - a painkiller, to be exact, researchers say. Star-Telegram January 7 2011
93. Study shows people in love feel less pain. Santa Cruz Sentinel January 5 2011
94. Study shows people in love feel less pain. San Jose Mercury News January 5 2011
95. Love Can Alleviate Pain. Brain Blogger December 24 2010
96. Passionate love can relieve pain, researchers find. San Francisco Chronicle November 22 2010
97. Can Love Replace Advil? Your Tango November 22 2010
98. Curing pain with love. Today's HTV November 22 2010
99. Hurts less, when you're in love. Hindustan Times October 23 2010
100. Daily Dose: Love = Drugs? Woman's Day October 18 2010

- 101.Eye on Health: Love Drugs. WRCB October 18 2010
- 102.New Study Shows That Love Can Reduce Pain. CARE2 October 18 2010
- 103.Romantic Love: Nature's Painkiller? Newsmax October 18 2010
- 104.Image of the week: Your brain on love. Stanford Scope October 17 2010
- 105.Study: Love is kind of like cocaine. Seattle PI October 15 2010
- 106.Romance Works As A Painkiller, Claims Stanford University Research. UK Today News October 15 2010
- 107.Being in love eases the pain. New Scientist October 15 2010
- 108.Love: A natural painkiller? USA Today October 15 2010
- 109.Love may be as good as a pain reliever. UPI October 14 2010
- 110.Your love is my drug: How passion sparks the same painkilling pathways as drugs. Scientific American October 14 2010
- 111.Love Lessens Pain. Scientific American October 14 2010
- 112.Love Is the Drug: Staring at a Beloved's Face Lessens Pain. Discover October 14 2010
- 113.Pain Relief: Love Just as Potent as Morphine, Study Shows. AOL Health October 14 2010
- 114.Recent study suggests love is a painkiller. Stanford Daily October 14 2010
- 115.Love is like morphine for beating pain. The Mirror October 14 2010
- 116.Love really is a drug - and it can work a treat with pain relief. The Independent October 14 2010
- 117.Use love not drugs to kill pain. Hindustan Times October 14 2010
- 118.Passion acts as a powerful pain-relieve 'by activating reward regions in brain' Daily Mail October 14, 2010
- 119.Love A Potent Painkiller, Stanford Researchers Say. KCBS5 San Francisco. October 13 2010
- 120.Love is a drug as powerful as morphine and any painkiller. Telegraph October 13 201
- 121.Love or cocaine: Choose your pain killer. National Post October 13 2010
- 122.Love really is like a drug. The Guardian October 13 2010
- 123.Love hurts - but it may be a good painkiller. Globe And Mail October 13 2010
- 124.Love and Pain Relief. New York Times October 13 2010
- 125.Love is a powerful painkiller, study finds. Los Angeles Times October 13 2010
- 126.Love takes up where pain leaves off, brain study shows. Inside Stanford Medicine October 13 2010
- 127.Love Conquers All - Even Pain. Science October 12 2010
- 128.Oh what a pain. Stanford Scope October 8 2010
- 129.How the Mind Controls Pain MSN Health & Fitness June 2001
- 130.Pain Management: A Whole Body Experience Stanford Access Newsletter for Physicians, May/June 2010
- 131.For Prescription Opioid Dependence, Relapses Associated With Shorter Treatment Course
- 132.Medscape Medical News May 2010

133. Shooting Pain Nature (Profile) October 2009
134. Stimulus-funded university research addressing issues from climate change to cancer, creating jobs and training a new generation of scientists The Science Coalition September 2009
135. Your Brain, The Doctor Sacramento News & Review September 2009
136. Verbatim Time July 2009
137. Ban Is Advised on 2 Top Pills for Pain Relief New York Times July 2009
138. Heroin Addiction Drug May Relieve Symptoms of Fibromyalgia Scientific American April 2009
139. Addiction Drug May Relieve Fibromyalgia Symptoms Reuters April 2009
140. 'Life-Changing Benefits' for Patients Using Addiction Drug The Herald April 2009
141. Brain Scans of Pain Raise Questions for the Law Science January 2009
142. The Placebo Effect at its Simplest is an Effect Produced by Nothing Stanford Medicine Summer
143. 2008 Just Another Lab Rat Stanford Medicine Summer 2008
144. Taking Your Life Back from Pain's Control – with Mind, Body and New Medical Vision Palo Alto
145. Weekly July 23 2008
146. Son Finds Hope for Dying Father on Internet San Francisco Chronicle February 8 2008
147. A Growing Cadre of Doctors & Scientists Now Believes That Chronic Back Pain is a Disease of the Nervous System, Not the Spine Best Life Magazine January 21 2008
148. The Pain Problem Austin Fit Magazine September 2007
149. Mind Over Matter, With a Machine's Help New York Times August 26 2007
150. Natural Born Pain Killers Prevention July 2007
151. Turn Off Your Pain Switch MSN March 2007
152. Patients Learn to Use Brain to Beat Pain KGO-TV February 27 2007
153. Does Your Head Hurt? Times Online (UK) December 2 2006
154. New Findings on Pain Relief. Consumer Reports on Health September 2006
155. Placebo's Power Goes Beyond the Mind. MSNBC August 21 2006
156. Training Attention. MIT Technology Review July 17 2006
157. Seeing Your Pain. MIT Technology Review July 10 2006
158. My Pain, My Brain. New York Times Magazine May 14 2006
159. MRI Scans Could Help With Controlling Pain. WAVY 10 February 24 2006
160. Brain Controls Pain. BioX (China) February 27 2006
161. Brain Controls Pain. WNEP 16 February 17 2006
162. Findings. Harpers February 2006
163. Brain Over Pain. The Boston Globe January 23 2006
164. Less Brain Pain, Please. Times Herald-Record January 11 2006
165. Patients Can Now See Their Pain. NBC 11 January 6 2006
166. Doctor Treats Pain Without Pills. NBC Nightly News January 5 2006

- 167.Think Away the Pain. Wired December 21 2005
- 168.Feedback: Relief From Chronic Pain May Be a Thought Away. New York Times December 20 2005
- 169.Mind-Control Over Pain. MIT Technology Review December 19 2005
- 170.Viewing Own Brain Scans May Lessen Chronic Pain. IndyStar December 18 2005
- 171.Brain Training Puts Big Hurt on Intense Pain. Science News December 17 2005
- 172.People Can Decrease Pain by Observing Their Own Brain Activity. Seed December 16 2005
- 173.Relief From Pain is All in Your Brain! Asian News International December 14 2005
- 174.Brain Scans Help Think Away Pain. BBC News December 13 2005
- 175.Mind Over Matter for Pain? ABC News December 12 2005
- 176.Patients Reduce Pain by Thinking Like Mr. Spock. Telegraph December 13 2005
- 177.Interview. KCBS December 13 2005
- 178.Pain Sufferers Use Brain to Find Relief. Forbes December 12 2005
- 179.How to Think Your Pain Away. UK Times Online December 13 2005
- 180.Training the Brain to Reduce Pain. WebMD December 12 2005
- 181.Science in Action. BBC World Service December 16 2005
- 182.It's All in Your Head. Stanford Medicine Fall 2005
- 183.Tracking and Controlling Pain by Sight. National Public Radio Morning Edition July 6 2005
- 184.Pain & Women's Health. National Women's Health Report June 2005
- 185.Pain May Be in the Brain, But It's Still Real. ABC News May 23 2005
- 186.Pain Management. KQED Health Dialogues May 19 2005
- 187.The Fight Against Pain. Good Morning America May 9 2005
- 188.The Right (and Wrong) Way to Treat Pain. Time Magazine February 28 2005
- 189.The Pain is in the Brain. Stanford University Center Focus Spring 2005
- 190.A Closer Look at Pain. Stanford University Anesthesia News 2004
- 191.Anesthesiologists use groundbreaking technology to visualize pain transmission, ASA Annual Meeting News October 25 2004
- 192.Your Pain, My Brain. Psychology Today July 2003
- 193.The Pain Truth. Good Housekeeping May 2003
- 194.The hardwiring of empathy: When another's pain hurts. The Times of India March 30 2003
- 195.When You Hurt, My Brain Says I Hurt, Too: Study. Reuters Health March 25 2003
- 196.America's Riskiest Drugs: Morphine. Forbes February 24 2003
- 197.Fund Supports Studies of Pain. Stanford University Center Focus 2002
- 198.High tech method deals with chronic pain. WNDU July 30 2001
- 199.Pain-Preventing MRIs. Penthouse March 2000
- 200.Relieving Cancer Pain by Blocking the Flow of Pain Feelings to the Brain. Cancerpage.com 2000



201. New therapy simplifies pain management. *Biophotonics* January 2000

202. Novel MRI System Facilitates Regional Blockade. *ASA Annual Meeting News* October 9 1999

### **ABSTRACTS (Stopped tracking abstracts; Estimated at over 300)**

1. Darnall BD, Sturgeon JA, Cook KC, Taub CJ, Kao MC, Rico T, Mackey SC. Development and Validation of a Daily Pain Catastrophizing Scale (Daily PCS) Measure. (in press, *J Pain*)
2. O'Reilly-Shah V, Mackey S. *Survalytics: An Open-Source Cloud-Integrated Experience Sampling, Survey, and Analytics and Metadata Collection Module for Android Operating System Apps*. *JMIR*. 2016 March; 4 (2): e46. doi: 10.2196/mhealth.5397.
3. Darnall BD, Wheeler AJ, Taub CJ, Mackey IG, Rico T, Flood P. My Surgical Success: A randomized controlled trial of an internet-based perioperative pain psychology treatment program tested in women undergoing mastectomy. (FEB 2016, *Pain Med*)
4. Sun EC, Darnall BD, Baker LC, Mackey SC. Do Epidural Steroid Injections Reduce Health Care Spending for Patients with Low Back Pain? Evidence from the Marketscan® Database (FEB 2016, *Pain Med*)
5. Mackey IG, Kao MC, Darnall B. Increasing patient satisfaction in the pain clinic: The impact of an orientation video and its integration with the Collaborative Health Outcomes Registry (CHOIR). (FEB 2016, *Pain Med*).
6. Taub CJ, Chahal M, Darnall BD, Kao MC, Mackey SC. Effects of a Pain Catastrophizing Induction on Quantitatively Measured Pain Perception in Women with Chronic Low Back Pain. (FEB 2016 *Pain Med*)
7. Kao MC, Darnall BD, Prasad R, Leong M, Mackey SC. System to Enhance Patient Experience (STEPx): Machine-mediated classification of patient experience feedback using natural language processing. (FEB 2016, *Pain Med*)
8. Kao MC, Darnall BD, Leong M, Valenzuela E, Sugarman K, Meyers S, Walter M, Mackey IG, Mackey SC. Network of Coordinated Care: Collaborative Relationship of Pain Medicine with Primary Care for Complex Patients with Pain: A Large-Scale Network Study Using a Learning Health System Platform. (FEB 2016 *Pain Med*) (Won the AAPM Research Highlight Award; selected for podium presentation)
9. Mackey S, Kao MC, Cook K, Olson G, Pacht T, Darnall B, Weber S Collaborative Health Outcomes Information Registry (CHOIR): Open Source Platform for Learning Health Systems. (in press)
10. Alger JR, Ellingson BM, Ashe-McNalley C, Woodworth DC, Labus JS, Farmer M, Huang L, Apkarian AV, Johnson KA, Mackey SC, Ness TJ, Deutsch G, Harris RE, Clauw DJ, Glover GH, Parrish TB, Hollander Jd, Kusek JW, Mullins C, Mayer EA; MAPP Research Network Investigators. Multisite, multimodal neuroimaging of chronic urological pelvic pain: Methodology of the MAPP Research Network. *Neuroimage Clin*. 2016 Jan 6;12:65-77. doi: 10.1016/j.nicl.2015.12.009.
11. Sun EC, Darnall B, Baker LC, Mackey S. Incidence of and Risk Factors for Chronic Opioid Use Among Opioid-Native Patients in the Postoperative Period. *JAMA Intern Med*. 2016 Jul 11.
12. Von Korff M, Scher AI, Helmick C, Carter-Pokras O, Dodick D, Goulet J, Hamill-Ruth R, LeResche L, Porter L, Tait R, Terman G, Veasley C, Mackey S. United States National Pain Strategy for Population Research: Concepts, Definitions and Pilot Date. *J Pain*. 2016 Jul 1. pii: S1526-5900(16)30110-9.

13. Sturgeon JA, Carriere JS, Kao MJ, Rico T, Darnall BD, Mackey SC. Social Disruption Mediates the Relationship Between Perceived Injustice and Anger in Chronic Pain: a Collaborative Health Outcomes Information Registry Study. *Ann Behav Med.* 2016 Jun 20.
14. Bhandari RP, Feinstein AB, Huestis SE, Krane EJ, Dunn AL, Cohen LL, Kao MC, Darnall BD, Mackey SC. Pediatric-Collaborative Health Outcomes Information Registry (Peds-CHOIR): A Learning Health System to Guide Pediatric Pain Research and Treatment. *Pain.* 2016 May 9.
15. Martucci KT, Mackey SC. Imaging Pain. *Anesthesiol Clin.* 2016 Jun;34(2):255-69. doi: 10.1016/j.anclin.2016.01.001.
16. Jiang Y, Oathes D, Hush J, Darnall B, Charvat M, Mackey S, Etkin A. Perturbed connectivity of the amygdala and its subregions with the central executive and default mode networks in chronic pain. *Pain.* 2016 May 6.
17. Bruehl S, Maihöfner C, Stanton-Hicks M, Perez RS, Vatine JJ, Brunner F, Birklein F, Schlereth T, Mackey S, Mailis-Gagnon A, Livshitz A, Harden RN. Complex regional pain syndrome: evidence for warm and cold subtypes in a large prospective clinical sample. *Pain.* 2016 Aug;157(8):1674-81. doi: 10.1097/j.pain.0000000000000569.
18. Hah JM, Sharifzadeh Y, Wang BM, Gillespie MJ, Goodman SB, Mackey SC, Carroll IR. Factors Associated with Opioid Use in a Cohort of Patients Presenting for Surgery. *Pain Res Treat.* 2015;2015:829696. doi: 10.1155/2015/829696. Epub 2015 Dec 31.
19. Dixon EA, Benham G, Sturgeon JA, Mackey S, Johnson KA, Younger J. Development of the Sensory Hypersensitivity Scale (SHS): a self-report tool for assessing sensitivity to sensory stimuli. *J Behav Med.* 2016 Jun;39(3):537-50. doi: 10.1007/s10865-016-9720-3. Epub 2016 Feb 12.
20. Hamilton JP, Glover GH, Bagarinao E, Chang C, Mackey S, Sacchet MD, Gotlib IH. Effects of salience-network-node neurofeedback training on affective biases in major depressive disorder. *Psychiatry Res.* 2016 Mar 30;249:91-6. doi: 10.1016/j.psychres.2016.01.016. Epub 2016 Jan 19.
21. Darnall BD, Scheman J, Davin S, Burns JW, Murphy JL, Wilson AC, Kerns RD, Mackey SC. Pain Psychology: A Global Needs Assessment and National Call to Action. *Pain Med.* 2016 Feb;17(2):250-63. doi: 10.1093/pm/pnv095. Epub 2016 Jan 23.
22. Mackey S. Future Directions for Pain Management: Lessons from the Institute of Medicine Pain Report and the National Pain Strategy. *Hand Clin.* 2016 Feb;32(1):91-8. doi: 10.1016/j.hcl.2015.08.012.
23. Sturgeon JA, Dixon E, Darnall BD, Mackey SC. Contributions of Physical Function and Satisfaction with Social Roles in Chronic Pain: A Stanford-NIH CHOIR Study. *J Pain.* 2015; 16(4): S17.
24. Sturgeon J, Darnall B, Kao, M, Mackey S. Physical and psychological correlates of fatigue and physical function: A Stanford-NIH CHOIR Study. *J Pain.* 2015; 16(4): S18.
25. Kao M, Leon M, Prasad R, Cullen A, Pacht T, Wellisch O, Olson G, Darnall B, Weber S, Mackey S. Stanford Patient Experience Questionnaire (SPEQ): Network of patient experience touch points revealed by Bayesian network reconstruction suggests targets for intervention. *J Pain.* 2015; 16(4): S36.
26. Kao M, Leon M, Prasad R, Cullen A, Pacht T, Wellisch O, Olson G, Darnall B, Weber S, Mackey S. Stanford Patient Experience Questionnaire (SPEQ): Machine mediated classification of patient experience feedback using natural language processing. *J Pain.* 2015; 16(4): S37.
27. Taub C, Chahal M, Darnall BD, Kao MC, Mackey SC. Anger Mediates Relationship Between Trauma and Pain Catastrophizing in Chronic Pain. *J Pain.* 2015; 16(4): S99.
28. Sharifzadeh Y, Darnall B, Kao M, Mackey S. Sub-clinical range of pain catastrophizing moderates the effect of pain intensity on opioid prescription. *J Pain.* 2015; 16(4): S16.

29. Chahal M, Taub C, Darnall BD, Kao MC, Mackey SC. Assessment of Anxiety as Mediator of the Relationship Between Sleep Disturbance and Pain Catastrophizing in Chronic Pain. *J Pain*. 2015; 16(4): S5.
30. Sharifzadeh Y, Darnall BD, Kao MC, Mackey SC. Opioid prescription is predicted by novel sub-clinical range of pain catastrophizing: Discovery from resampling nonparametric modeling. *Pain Medicine*. 2015; 16(3):586.
31. Tighe P, Buckenmaier CC 3rd, Boezaart AP, Carr DB, Clark LL, Herring AA, Kent M, Mackey S, Mariano ER, Polomano RC, Reisfield GM. Acute Pain Medicine in the United States: A Status Report. *Pain Med*. 2015 Sep;16(9):1806-26. doi: 10.1111/pme.12760. Epub 2015 Jun 10.
32. Woodworth D, Mayer E, Leu K, Ashe-McNalley C, Naliboff BD, Labus JS, Tillisch K, Kutch JJ, Farmer MA, Apkarian AV, Johnson KA, Mackey SC, Ness TJ, Landis JR, Deutsch G, Harris RE, Clauw DJ, Mullins C, Ellingson BM; MAPP Research Network. Unique Microstructural Changes in the Brain Associated with Urological Chronic Pelvic Pain Syndrome (UCPPS) Revealed by Diffusion Tensor MRI, Super-Resolution Track Density Imaging, and Statistical Parameter Mapping: A MAPP Network Neuroimaging Study. *PLoS One*. 2015 Oct 13;10(10):e0140250. doi: 10.1371/journal.pone.0140250.
33. Carroll IR, Hah JM, Barelka PL, Wang CK, Wang BM, Gillespie MJ, McCue R, Younger JW, Trafton J, Humphreys K, Goodman SB, Dirbas FM, Mackey SC. Pain Duration and Resolution following Surgery: An Inception Cohort Study. *Pain Med*. 2015 Dec;16(12):2386-96. doi: 10.1111/pme.12842.
34. Harle CA, Listhaus A, Covarrubias CM, Schmidt SO, Mackey S, Carek PJ, Fillingim RB, Hurley RW. Overcoming barriers to implementing patient-reported outcomes in an electronic health record: a case report. *J Am Med Inform Assoc*. 2016 Jan;23(1):74-9. doi: 10.1093/jamia/ocv085.
35. Kutch JJ, Yani MS, Asavasopon S, Kirages DJ, Rana M, Cosand L, Labus JS, Kilpatrick LA, Ashe-McNalley C, Farmer MA, Johnson KA, Ness TJ, Deutsch G, Harris RE, Apkarian AV, Clauw DJ, Mackey SC, Mullins C, Mayer EA. Altered resting state neuromotor connectivity in men with chronic prostatitis/chronic pelvic pain syndrome: A MAPP: Research Network Neuroimaging Study. *Neuroimage Clin*. 2015 Jun 5;8:493-502. doi: 10.1016/j.nicl.2015.05.013.
36. Martucci KT, Shirer WR, Bagarinao E, Johnson KA, Farmer MA, Labus JS, Apkarian AV, Deutsch G, Harris RE, Mayer EA, Clauw DJ, Greicius MD, Mackey SC. The posterior medial cortex in urologic chronic pelvic pain syndrome: detachment from default mode network-a resting-state study from the MAPP Research Network. *Pain*. 2015 Sep;156(9):1755-64. doi: 10.1097/j.pain.000000000000238.
37. Sturgeon JA, Tieu MM, Jastrzab LE, McCue R, Gandhi V, Mackey SC. Nonlinear Effects of Noxious Thermal Stimulation and Working Memory Demands on Subjective Pain Perception. *Pain Med*. 2015 Jul;16(7):1301-10. doi: 10.1111/pme.12774.
38. Sutcliffe S, Bradley CS, Clemens JQ, James AS, Konkle KS, Kreder KJ, Lai HH, Mackey SC, Ashe-McNalley CP, Rodriguez LV, Barrell E, Hou X, Robinson NA, Mullins C, Berry SH. Urological chronic pelvic pain syndrome flares and their impact: qualitative analysis in the MAPP network. *Int Urogynecol J*. 2015 Jul;26(7):1047-60. doi: 10.1007/s00192-015-2652-6.
39. Sturgeon JA, Darnall BD, Kao MC, Mackey SC. Physical and psychological correlates of fatigue and physical function: a Collaborative Health Outcomes Information Registry (CHOIR) study. *J Pain*. 2015 Mar;16(3):291-8.e1. doi: 10.1016/j.jpain.2014.12.004.
40. Sturgeon JA, Darnall BD, Zwickey HL, Wood LJ, Hanes DA, Zava DT, Mackey SC. Proinflammatory cytokines and DHEA-S in women with fibromyalgia: impact of psychological distress and menopausal status. *J Pain Res*. 2014 Dec 4;7:707-16. doi: 10.2147/JPR.S71344.

41. Bernaba M, Johnson KA, Kong JT, Mackey S. Conditioned pain modulation is minimally influenced by cognitive evaluation or imagery of the conditioning stimulus. *J Pain Res.* 2014 Nov 26;7:689-97. doi: 10.2147/JPR.S65607.
42. Mackey S, Kao MC, Cook K, Olson G, Pacht T, Darnall B, Weber S. Collaborative Health Outcomes Information Registry (CHOIR): Open source cloud based platform to generate and support learning healthcare systems. *Postgraduate Medicine, Pain Management.* 2014; 66.
43. Deyo RA, Dworkin SF, Amtmann D, Andersson G, Borenstein D, Carragee E, Carrino J, Chou R, Cook K, DeLitto A, Goertz C, Khalsa P, Loeser J, Mackey S, Panagis J, Rainville J, Tosteson T, Turk D, Von Korff M, Weiner DK. Report of the NIH Task Force on Research Standards for Chronic Low Back Pain. *J Pain.* 2014 Jun;15(6):569-85. doi: 10.1016/j.jpain.2014.03.005.
44. Darnall BD, Sturgeon JA, Kao MC, Hah JM, Mackey SC. From Catastrophizing to Recovery: Pilot study of a single-session psychobehavioral class to treat pain catastrophizing. *J Pain.* 2014; 15 (4): S109.
45. Ruchelli G, Chapin H, Darnall BD, Seppala E, Doty J, Mackey S. Compassion meditation training for people living with chronic pain and their significant others: A pilot study and mixed methods analysis. *J Pain.* 2014; 15 (4): S117.
46. Kao M, Cook K, Olson G, Pacht T, Darnall BD, Weber S, Mackey S. Stanford-NIH Pain Registry: Catalyzing the rate limited step of psychometrics with modern patient-reported outcomes. *J Pain.* 2014; 15 (4): S3.
47. Kao M, Weber S, Cook K, Olson G, Pacht T, Darnall BD, Weber S, Mackey S. Stanford-NIH Pain Registry: Open source platform for large-scale longitudinal assessment and tracking of modern patient-reported outcomes. *J Pain.* 2014; 15 (4): S40.
48. Kao M, Cook K, Olson G, Pacht T, Darnall BD, Weber S, Mackey S. Stanford-NIH Pain Registry: Catalyzing the rate limited step of big-data psychometrics with item-response theory and advanced computerized adaptive testing. *Pain Medicine.* 2014; 15 (3): 533.
49. Kao M, Cook K, Olson G, Pacht T, Darnall BD, Weber S, Mackey S. Stanford-NIH Pain Registry: Open source platform for large-scale longitudinal assessment of clinical data and patient-reported outcomes. *Pain Medicine.* 2014; 15 (3): 533.
50. Krieger JN, Stephens AJ, Landis JR, Clemens JQ, Kreder K, Lai HH, Afari N, Rodríguez L, Schaeffer A, Mackey S, Andriole GL, Williams DA; MAPP Research Network. Relationship between chronic nonurological associated somatic syndromes and symptom severity in urological chronic pelvic pain syndromes: baseline evaluation of the MAPP study. *J Urol.* 2015 Apr;193(4):1254-62. doi: 10.1016/j.juro.2014.10.086.
51. Landis JR, Williams DA, Lucia MS, Clauw DJ, Naliboff BD, Robinson NA, van Bokhoven A, Sutcliffe S, Schaeffer AJ, Rodriguez LV, Mayer EA, Lai HH, Krieger JN, Kreder KJ, Afari N, Andriole GL, Bradley CS, Griffith JW, Klumpp DJ, Hong BA, Lutgendorf SK, Buchwald D, Yang CC, Mackey S, Pontari MA, Hanno P, Kusek JW, Mullins C, Clemens JQ; MAPP Research Network Study Group. The MAPP research network: design, patient characterization and operations. *BMC Urol.* 2014 Aug 1;14:58. doi: 10.1186/1471-2490-14-58.
52. Kairys A, Schmidt-Wilcke T, Puiu T, Ichescu E, Labus J, Martucci K, Farmer M, Ness T, Deutsch G, Mayer E, Mackey S, Apkarian A, Maravilla K, Clauw D, Harris R. *Increased Brain Gray Matter in the Primary Somatosensory Cortex is Associated with Increased Pain and Mood Disturbance in Patients with Interstitial Cystitis/Painful Bladder Syndrome.* *J Urol.* 2015 Jan;193(1):131-137. doi: 10.1016/j.juro.2014.08.042.
53. Kao M, Yang L, Smuck M, Mackey S. *Health Research Economics of Randomized Clinical Trials: Probabilistic Model-Based Risk Management and Multi-Objective Decision Support.* American Medical Informatics Association Joint Summits, San Francisco, March 18-22, 2013.

54. Nash P, Reyes B, Hubbard E, Mackey S. *Sensitization of the human spinal cord in the absence of pain*. American Academy of Pain Medicine 29<sup>th</sup> Annual Meeting, Fort Lauderdale, April 10-14, 2013.
55. Chapin H, Bagarinao E, Hubbard E, Dixon E, Glover G, Mackey S. *Neural correlates of effective cognitive modulation of pain*. American Academy of Pain Medicine 29<sup>th</sup> Annual Meeting, Fort Lauderdale, April 10-14, 2013.
56. Hah J, Younger J, Mackey S, Carroll I. American Academy of Pain Medicine 29<sup>th</sup> Annual Meeting, Fort Lauderdale, April 10-14, 2013.
57. Reyes B, Nash P, Wiley K, Mackey S. BOLD Signal Changes in the Human Spinal Cord in Response to Graded Thermal Stimuli. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
58. Ruchelli, Schmidt P, Clay D, Humphreys K, Trafton J, Dirbas F, Giori N, Goodman S, Hoang C, Huddleston J, Maloney W, Merritt R, Miller M, Shrager J, Whyte R, Mackey S, Carroll I. BOLD Signal Changes in the Human Spinal Cord in Response to Graded Thermal Stimuli. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
59. Nash P, Reyes B, Hubbard E, Mackey S. Conditioned Pain Modulation (CPM) Decreases Dorsal Horn BOLD Signal in the Human Spinal Cord. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
60. Oliver-Allen M, Ng P, Bagarinao E, Hush J, Etkin A, Mackey S. Neural processing of threat-related stimuli in patients with chronic low back pain. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
61. Schmidt P, Hah J, McCue R, Mackey S, Carroll I. Neural processing of threat-related stimuli in patients with chronic low back pain. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
62. Martucci K, Barad M, Shirer W, Greicius M, Mackey S. Neural processing of threat-related stimuli in patients with chronic low back pain. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
63. Nilakantan A, Johnson K, Mackey S. Characterizing “Grit” or Perseverance for Long-Term Goals in Patients with Chronic Low Back Pain. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
64. Ng P, Jiang H, Shirer w, Greicius M, Mackey S. Characterizing “Grit” or Perseverance for Long-Term Goals in Patients with Chronic Low Back Pain. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
65. Foti M, Baker K, Jastrzab L, Stringer E, Mackey S, Younger J. Improvements in Cognition Following Opioid Detoxification Program. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
66. Bernaba M, Johnson K, Mackey S. Does Appraisal of the Conditioning Stimulus Alter Subsequent Pain Ratings of the Test Stimulus in a Conditioned Pain Modulation Paradigm? American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
67. Baker K, Foti M, Jastrzab L, Stringer E, Mackey S, Younger J. Immediate and lasting improvements in depressed mood following opioid detoxification. American Pain Society 32<sup>nd</sup> Annual Meeting, New Orleans, May 8-11, 2013.
68. Nash P, Wiley K, Mackey S. *Somatotopic activation of the human spinal cord by noxious heat as seen with fMRI*. American Pain Society 31<sup>st</sup> Annual Meeting, Austin, May 16-19, 2012.
69. Jastrzab L, Mackey S, Chu L, Stringer E, Younger J. *Neural Correlates of Opioid Induced Hyperalgesia*. American Pain Society 31<sup>st</sup> Annual Meeting, Austin, May 16-19, 2012.

70. Bagarinao E, Chapin H, Ung H, Hubbard E, Wiley K, Glover G, Mackey S. *Characterizing the brain's response to different levels of painful thermal stimuli*. American Pain Society 31<sup>st</sup> Annual Meeting, Austin, May 16-19, 2012.
71. Gorraiz G, Nash P, Mackey S. *Variability in the DNIC response in a group of healthy male controls*. American Pain Society 31<sup>st</sup> Annual Meeting, Austin, May 16-19, 2012.
72. Chapin H, Bagarinao E, Hubbard E, Wiley K, Ung H, Glover G, Mackey S. *Using fMRI to investigate strategy-independent neural process underlying cognitive modulation of pain*. American Pain Society 31<sup>st</sup> Annual Meeting, Austin, May 16-19, 2012.
73. Huynh H, Jastrzab L, Tieu M, McCue R, Gandhi V, Mackey S. *Working memory attenuates high pain*. American Pain Society 31<sup>st</sup> Annual Meeting, Austin, May 16-19, 2012.
74. Carroll I, Barelka P, Wang C, Wang B, Gillespie M, McCue R, Younger J, Trafton J, Humphreys K, Goodman S, Dirbas F, Whyte R, Donington J, Cannon W, Mackey S. *Why Patients Consume Opioids Post-Surgery*. American Pain Society 31<sup>st</sup> Annual Meeting, Austin, May 16-19, 2012.
75. Ung H, Brown J, Johnson K, Mackey S. *Detecting chronic low back pain based on brain gray matter*. American Academy of Pain Medicine 27<sup>th</sup> Annual Meeting, Washington DC, March 23-27, 2011.
76. Ung H, Mackey S, Chatterjee N, Tieu M, Moericke R, Carroll I. *Neural effects of systemic Lidocaine on chronic neuropathic pain patients*. American Pain Society 30<sup>th</sup> Annual Meeting, Austin, May 19-21, 2011.
77. Noor N, Gandhi V, McCue R, Younger J, Mackey S. *Prospectively measuring placebo and nocebo effects: development of the Stanford Expectancy of Treatment Scale (SETS)*. American Pain Society 30<sup>th</sup> Annual Meeting, Austin, May 19-21, 2011.
78. Nash P, Brown J, Mackey S. *Central sensitization in the human spinal cord as measured with functional magnetic resonance imaging*. American Pain Society 30<sup>th</sup> Annual Meeting, Austin, May 19-21, 2011.
79. Sohlberg E, Kong JT, Schwarz D, Johnson K, Mackey S. *A Dynamic Temporal Summation Procedure to Detect Individual Changes in Nociceptive Processing*. American Pain Society 30<sup>th</sup> Annual Meeting, Austin, May 19-21, 2011.
80. Johnson K, Chatterjee N, Noor N, Crowell A, McCue R, Mackey S. *Effects of duloxetine and placebo in patients with chronic low back pain*. American Pain Society 30<sup>th</sup> Annual Meeting, Austin, May 19-21, 2011.
81. Brown J, Chatterjee N, Mackey S. *Human Brain Activity Identifies the Presence or Absence of Pain*. American Academy of Pain Medicine 26<sup>th</sup> Annual Meeting, San Antonio, February 2-6, 2010.
82. Noor N, Chao L, Sinskey J, Gandhi V, Peltz G, Carroll I, Mackey S. *Effects of Ondansetron on Opioid Withdrawal Symptoms*. American Pain Society 29<sup>th</sup> Annual Meeting, Baltimore, May 6-8, 2010.
83. Chatterjee N, Noor N, Crowell A, Mackey S. *Duloxetine and Placebo Alter Different Gray Matter Regions in Chronic Low Back Pain Patients*. American Pain Society 29<sup>th</sup> Annual Meeting, Baltimore, May 6-8, 2010.
84. Ung H, Brown J, Mackey S. *Application of Support Vector Machines to the Detection of Chronic Pain*. American Pain Society 29<sup>th</sup> Annual Meeting, Baltimore, May 6-8, 2010.
85. Wang C, Hah J, Mackey S, Carroll I. *Quantitative Sensory Abnormalities in Post-Surgical Cutaneous Nerve Injuries*. American Pain Society 29<sup>th</sup> Annual Meeting, Baltimore, May 6-8, 2010. |
86. McCue R, Lawrence J, Sohlberg E, Knutson B, Mackey S. *Differential Effects of Reward Stimuli on Pain Evaluation in Fibromyalgia Patients and Healthy Controls*. International Association for the Study of Pain 13<sup>th</sup> World Congress on Pain, Montreal, August 29-September 2, 2010.
87. Brown J, Chatterjee N, Mackey S. *Human Brain Activity Identifies the Presence or Absence of Pain*. International Association for the Study of Pain 13<sup>th</sup> World Congress on Pain, Montreal, August 29-September 2, 2010.

88. Younger J, Chu L, D'Arcy N, Trott K, Mackey S. *Prescription Opioid Analgesics Rapidly Change the Human Brain*. International Association for the Study of Pain 13<sup>th</sup> World Congress on Pain, Montreal, August 29-September 2, 2010.
89. Brown J, Chatterjee N, Mackey S. *Thalamo-cortical connectivity distinguishes painful from non-painful stimulation in humans*. Society for Neuroscience Annual Meeting, San Diego, November 13-17, 2010.
90. Brown J, Ung H, Mackey S. *A Heat-Capsaicin Model of Pain: Anticipation Significantly Alters the Perception of Pain Reduction*. American Pain Society (APS) 28<sup>th</sup> Annual Meeting, San Diego, May 6-9, 2009.
91. McCue R, Lawrence J, Knutson B, Mackey S. *Cumulative Effects of Reward and Loss on Pain*. American Pain Society (APS) 28<sup>th</sup> Annual Meeting, San Diego, May 6-9, 2009.
92. Tieu M, McCue R, Gandhi V, Mackey S. *Increasing Working Memory Load Attenuates Pain in Healthy Volunteers but not in Chronic Low Back Pain Patients*. American Pain Society (APS) 28<sup>th</sup> Annual Meeting, San Diego, May 6-9, 2009.
93. Younger J, Aron A, Parke S, Gandhi V, Mackey S. *The Analgesic Effects of Romantic Love: A Neuroimaging Study*. American Pain Society (APS) 28<sup>th</sup> Annual Meeting, San Diego, May 6-9, 2009.
94. Younger J, Mackey S. *Low-dose Naltrexone Reduces the Primary Symptoms of Fibromyalgia*. American Pain Society (APS) 28<sup>th</sup> Annual Meeting, San Diego, May 6-9, 2009.
95. Chatterjee N, Crowell A, Maeda U, Moulton R, Mackey S. *Chronic Low Back Pain is Associated with Increased Amygdala and PAG Grey Matter*. Organization for Human Brain Mapping (OHBM) 15<sup>th</sup> Annual Meeting, San Francisco, June 17-23, 2009.
96. Chatterjee N, Mackey S, Peterson W, Moulton R, Tieu M, Carroll I. *Mechanisms of Analgesic Response during IV lidocaine Infusions in Neuropathic Pain Patients*. Organization for Human Brain Mapping (OHBM) 15<sup>th</sup> Annual Meeting, San Francisco, June 17-23, 2009.
97. Boveroux P, Boly M, Menon V, Mackey S, Dixit R, Laureys S, Greicius M. *Propofol Sedation Attenuates Resting-State Connectivity in the Salience Network*. Organization for Human Brain Mapping (OHBM) 15<sup>th</sup> Annual Meeting, San Francisco, June 17-23, 2009.
98. Barad M, Ueno T, Hoeft F, Moulton R, Younger J, Glover G, Mackey S. *Voxel based morphometry analysis of patients with chronic neuropathic pain*. American Pain Society (APS) 27<sup>th</sup> Annual Meeting, Tampa, May 7-11, 2008.
99. Carroll I, Wang J, Wang C, Mackey S. *Psychological impairment influences pain duration following surgical injury*. American Pain Society (APS) 27<sup>th</sup> Annual Meeting, Tampa, May 7-11, 2008.
100. Wang C, Pollard J, Yang G, Humphreys K, Trafton J, Cannon W, Dirbas F, Donnington J, Goodman S, Whyte R, Gillespie M, Wang J, Barelka P, Mackey S, Carroll I. *Risk Factors for Delayed Opioid Cessation Following Surgery*. American Pain Society (APS) 27<sup>th</sup> Annual Meeting, Tampa, May 7-11, 2008.
101. Maeda U, Carroll I, Mackey A, Younger J, Mackey S. *Pain Quality Predicts Response to Sodium Channel Blockade with Lidocaine*. American Pain Society (APS) 27<sup>th</sup> Annual Meeting, Tampa, May 7-11, 2008.
102. Younger J, Parke S, Barelka P, Carroll I, Chu L, Prasad R, Gaeta R, Mackey S. *Decrease of Cold Pain Tolerance Following Opioid Detoxification*. American Pain Society (APS) 27<sup>th</sup> Annual Meeting, Tampa, May 7-11, 2008.
103. Brown J, Kornelsen J, Watcha D, Glover G, Mackey S. *Processing of motor, tonic pain and phasic pain signals in the human spinal cord*. International Association for the Study of Pain (IASP) 12<sup>th</sup> World Congress on Pain, Glasgow, August 16-22, 2008.

104. Prasad R, Younger J, Barelka P, Carroll I, Chu L, Gaeta R, Mackey S, Kaplan K. *Opioid Induced Hyperalgesia: Paradoxical Findings in a Chronic Pain*. International Association for the Study of Pain (IASP) 12<sup>th</sup> World Congress on Pain, Glasgow, August 16-22, 2008.
105. Carroll I, McCue R, Clark D, Mackey S. *Lumbar Sympathetic Block with Botulinum Toxin type A for Complex Regional Pain Syndrome*. International Association for the Study of Pain (IASP) 12<sup>th</sup> World Congress on Pain, Glasgow, August 16-22, 2008.
106. Mackey S, Barad M, Ueno T, Greicius M. *Spontaneous Chronic Neuropathic Pain Remodels the Salience Network*. International Association for the Study of Pain (IASP) 12<sup>th</sup> World Congress on Pain, Glasgow, August 16-22, 2008.
107. Barad M, Ueno T, Hoeft F, Moulton R, Younger J, Glover G, Mackey S. *Voxel Based Morphometry analysis of patients with chronic neuropathic pain*. International Association for the Study of Pain (IASP) 12<sup>th</sup> World Congress on Pain, Glasgow, August 16-22, 2008.
108. Younger J, Aron A, Parke S, Mackey S. *Passionate Love Attenuates Acute Pain Via Involvement of Dopaminergic Reward System Pathways*. International Association for the Study of Pain (IASP) 12<sup>th</sup> World Congress on Pain, Glasgow, August 16-22, 2008.
109. Mackey S, *Modulation of brain networks via real-time fMRI feedback training*, April 2007, Association of University Anesthesiologists Meeting.
110. Watcha D, Brown J, Kornelsen J, Darnauer J, Sarin R, Glover G, Mackey S, *Processing of motor, tonic pain, and phasic pain signals in the human spinal cord*, May 2007, American Pain Society Meeting.
111. Crowell A, Younger J, Lobato R, Kaplan K, Carroll I, Mackey S, Gaeta R. (2007). *Demographic and psychosocial predictors of disability due to pain*. The Journal of Pain, 8,S76.
112. Lucca A, Younger J, Lawrence J, Lutomski K, MacLeod S, Hoeft F, Ueno T, Glover G, Gabrieli J, DeCharms C, Mackey S, (2007). *Modulation of brain networks via real-time fMRI feedback training*. The Journal of Pain, 8,S15.
113. Mackey A, Crowell A, Carroll I, Younger J, Zulauf M, Kaplan K, Gaeta R, Mackey S (2007). *Depressed Mood Predicts Analgesic Response to Intravenous Lidocaine*. The Journal of Pain, 8,S36.
114. Brown J, Kornelsen J, Watcha D, Darnauer J, Sarin R, Glover G, Mackey S, *The hemodynamic response function in the spinal cord in response to motor and nociceptive stimuli*, May 2007 International Society for Magnetic Resonance in Medicine Meeting.
115. Lawrence J, Lucca A, Younger J, Ueno T, Lutomski K, MacLeod S, Hoeft F, Glover G, Gaeta R, deCharms C, Mackey S. *Effective connectivity changes associated with learned control over neural activity: A Granger Causality study*. Organization for Human Brain Mapping (OHBM) 13<sup>th</sup> Annual meeting, Chicago, June 10-14, 2007, 179W-AM.
116. Lawrence J, Hoeft F, Groveman E, Lucca A, deCharms R.C., Mackey S.C. *Functional magnetic resonance imaging of pain modulation by cognitive behavioral strategies*. Society for Neuroscience (SFN) 37<sup>th</sup> Annual meeting, San Diego, November 3-7, 2007.
117. Mackey S, Lucca A, Soneji D, Kaplan K, Glover G, *fMRI Evidence of Noxious Thermal Stimuli Encoding in the Human Spinal Cord*, May 2006, American Pain Society Meeting
118. Ueno T, Barad M, Kaplan K, Lucca A, Hoeft F, Soneji D, Muramoto D, Averill C, Mackey S, *Posterior Cingulate Cortex Volume Reduction and Correlation with Fear of Pain in Complex Regional Pain Syndrome (CRPS)*, June 2006, Organization for Human Brain Mapping.
119. Mackey S, Ludlow D, Soneji D, Lucca A, Ueno T, Glover G, *fMRI of the Human Spinal Cord: Encoding of Noxious Thermal Stimuli*, October 2006, Society for Neuroscience.



120. Mackey, S.C., Ueno, T., Soneji, D., Kaplan, K., Glover, G. Cortical Reorganization in Complex Regional Pain Syndrome. *Anesthesiology*. 2005 103:A935
121. Soneji D, Ueno T, Ludlow D, Kaplan K, Glover G, Mackey S, *A Case of CRPS Showing Rapid Reorganization of the Somatosensory Cortex*, American Pain Society Meeting, March 2005
122. Kaplan K, Reynolds P, Robbins W, Gaeta R, Carroll I, Ludlow D, Ueno T, Soneji D, Mackey S, Affect Changes with Intravenous Lidocaine: Part of the Pain Reduction? American Pain Society Meeting, March 2005
123. Lobato R, Mackey S, Cluster Analysis of SF-36 Scores in Patients Presenting for Initial Evaluation American Pain Society Meeting, March 2005
124. Maeda F, Lutomski K, MacLeod S, Soneji D, Mackey S, Gabrieli J, Glover G, Pauly J, deCharms C, *Control Over Brain Activation and Pain in Chronic Pain Patients Achieved Through Repetitive Real Time fMRI (rtfMRI) Training*, June 2005, Human Brain Mapping Meeting
125. Ueno T, Soneji D, Ludlow D, Kaplan K, Glover G, Mackey SC, *Reorganization of the Somatosensory Cortex in Complex Regional Pain Syndrome*, August 2005, International Association for the Study of Pain Meeting
126. Soneji D, Maeda F, deCharms C, Lutomski K, MacLeod S, Gabrieli J, Glover G, Pauly J, Kaplan K, Mackey S, *Real Time fMRI Augmented Learned Control of Brain Activation and Pain in Chronic Pain Patients: Preliminary Results*, August 2005, International Association for the Study of Pain Meeting
127. Ludlow D, Soneji D, Ueno T, Kaplan K, Palma C, Patil E, Glover G, Sawyer-Glover A, Mackey S, *Intensity Encoding of Noxious Thermal Pain in the Human Cervical Spinal Cord*, August 2005, International Association for the Study of Pain Meeting
128. Shinaman, R., Ludlow, D., Glover, G., Mackey, S. Functional Magnetic Resonance Imaging of Pain Transmission in the Human Spinal Cord. *Anesthesiology*. 2004 101:A1105
129. Maeda F, Soneji D, Ludlow D, Mackey S, Gabrieli J, deCharms C, Learned Modulation of Brain Activation and Pain Perception Using Real Time fMRI, April 2004, CNS Meeting
130. Mackey S, Maeda F, Soneji D, Ludlow D, Gabrieli J, deCharms C, Real-time fMRI Directed Modulation of Pain Perception and Brain Activation in Chronic Pain Patients, May 2004, American Pain Society Meeting
131. Ludlow D, Ochsner K, Knierim K, Hanelin J, Ramachandran T, Glover G, Mackey S, Neural Correlates of Individual Differences in Pain-Related Fear and Anxiety, May 2004, American Pain Society Meeting
132. Maeda F, Soneji, DJ, Mackey S, Ludlow D, Gabrieli G, Pauly JM, deCharms RC, *Learning to Explicitly Control Activation in a Localized Brain Region Through Real Time fMRI Feedback Based Training, with Resulting Impact on Pain Perception*, Society for Neuroscience, October 2004
133. Mackey S, Ludlow D, Knierim K, Hanelin J, Glover G, *fMRI Activation in the Human Cervical Spinal Cord to Noxious Thermal Stimulation*, Journal of Pain March 2003; 4(2 s1):38.
134. Mackey S, Ochsner K, Ludlow D, Knierim K, Hanelin J, Glover G, *Do I Feel What You Feel? A Functional Imaging Study of Empathy of Pain*, Journal of Pain March 2003; 4(2 s1):54
135. Ochsner K, Ludlow D, Mackey S, *The role of medial prefrontal cortex in attributions of emotion in self and others*, November 2003, Society for Neuroscience Annual Meeting
136. Drover DR, Mackey S, Schmidt H, Loetsch J. *Morphine and its Metabolites After Routine Post-operative PCA Use*, October, 2002 American Society of Anesthesiologists Meeting
137. Sze DY, Mackey SC, *Nerve Blocks Using Magnetic Resonance Imaging Guidance*. J VascInterventRadiol 12(1 part 2):S13 2001

- 138.Sze DY, Mackey SC, *Changes in Blood Flow after Sympathetic Nerve Block Measured and Guided by MR*, ISMRM 2001
- 139.Mackey, S., Sze, D., Gaeta, R., *Magnetic Resonance Therapy Guided Regional Blockade for Pain Management* Anesthesiology September 1999
- 140.Mackey, S., Brodsky, J.B., *Choosing a DLT: Is There a Racial Difference in Airway Size?*, Western Anesthesia Residents Conference, March, 1997
- 141.Tataru C, Mackey S, Zupfer G, Angst M, Dyck B, Brock-Utne JG. Rapid Add Site: *A New Double Lumen Extension Set Reduces Pain Caused By Propofol*. AnesthAnalg 84:S275, 1997.
- 142.Mora-Mangano, C., Mackey, S., Moseley, M., Mangano, D., *Diffusion-Weighted Magnetic Resonance Imaging: A New Technique to Assess Cerebral Ischemia Following Cardiopulmonary Bypass*, October, 1997 American Society of Anesthesiologists Meeting
- 143.Marcus FI, Bosnos MJ, He DS, Sharma PP, Mackey S. *Comparison of Lesions Generated With Conventional and Thicker Ring Electrodes Using Radiofrequency Energy*. Circulation 1997;Suppl I, 96:I-142:791
- 144.He DS, Sharma PP, Marcus FI, Bosnos MJ, Mackey S *Predictive Parameters of Electrode Tissue Contact In Vivo Prior to and During Radiofrequency Energy Application*. Circulation 1997;Suppl I, 96:I-143:796
- 145.Sharma PP, He DS, Bosnos MJ, Marcus FI, Mackey S *A Comparison of Sequential with Simultaneous Delivery of RF energy Application at Multiple Electrodes to Produce Linear Continuous Lesions..* Circulation 1997;Suppl I, 96:I-576:3220
- 146.Taturu C, Mackey S, Zupfer G, Angst M, Dyck B, Brock-Utne JG. Rapid Add Site: *A New Double Lumen Extension Set Reduces Pain Caused By Propofol*. Western Anesthesia Residents Conference 34<sup>th</sup> Annual Conference. University of Arizona Health Sciences, Tucson, Arizona, May 10-12 1996.
- 147.Mackey, S., Marcus, F.I. *Tip Temperature is not an Indicator of Myocardial Temperature During Radiofrequency Catheter Ablation*. Pacing and Clinical Electrophysiology 18:801, April 1995
- 148.He, D., Mackey, S., Marcus, F., Graham, A., Haissaguerra, M., Lampe, L. *Radiofrequency Energy for Cardiac Ablation Using a Multipolar Catheter in Sheep*, Circulation Vol. 92, No 8, October 15, 1995, pg. I265-66
- 149.Mackey S, Marcus FI. *A Model of Myocardial Temperature Distribution During Catheter Ablation*. American Heart Association Scientific Sessions, November 1995.
- 150.Simmons WN, Mackey, SC, He DS, Marcus FI. *Comparison of Maximum Myocardial Lesion Depth Using Radiofrequency Energy Delivered with a Gold or Platinum Electrode*. Circulation 90 No.4 Part 2:I-270, October 1994.
- 151.Mackey, S., Thornton, L., He, D.H., Marcus, F.I., Mylrea, K. *Cardiac Tissue vs. Blood Impedance as a Measure of Catheter Contact*, Clinical Research 41:344A, 1993.
- 152.Mackey, S., He, D., Thornton, L., Lampe, L.F., Marcus, F.I. *Delivery of Radiofrequency Energy to All Four Poles of a Catheter Increases Lesion Size*, Circulation 1992;86:Suppl 1:I-784.
- 153.Mackey, S. *A Thermodynamic Model of Myocardial Temperature Distribution During Radiofrequency Catheter Ablation of Cardiac Arrhythmias*, Clinical Research, February, 1994
- 154.Mackey, S., Lampe, L., Marcus, F.I. *Radiofrequency Power Losses During Catheter Ablation of Cardiac Arrhythmias*, Clinical Research, February, 1994
- 155.Mackey, S., Thornton, L., He, D., Marcus, F.I. *Frequency Dependent Impedance Measurements: An Indicator of Catheter Contact*, Circulation 88 No. 4:400, 1993.

156. Mackey, S., Lampe, L., Marcus, F.I. *RF Power Losses in the Energy Delivery System During Ablation*, Circulation 1993;88; No. 4:400
157. Mackey, S., Cork, R., Mylrea, K. *An Automated Data Analysis and Collection System for Measuring Isolated Atrial Contractility*, Clinical Research Vol. 41, Pg. 72a, February 1992.
158. Cork, R., Behr, S., Mackey, S., DiNardo, J. *Effect of Order of Administration of Amrinone and Dobutamine on Guinea-Pig Heart Muscle*, Anesthesiology, 73:A375, Sept. 1990

## GRAND ROUNDS, INVITED/VISITING LECTURES

### 2020

1. Washington University, Invited Speaker, Grand Rounds, Learning Health Systems for Optimized Care and Real-World Research Discovery and Innovation, St. Louis, MO, January 2020
2. American Academy of Pain Medicine (AAPM) 2020 36<sup>th</sup> Annual Meeting, Invited Speaker, Award Winner, Career Paths for the Clinician Scientist, The Advances and Utility of Neuroimaging for Pain, Latest Advances in CHOIR, Results, and Practice Lessons Learned for Session: Moving from Patient-Reported Outcomes to Medical Informatics Approaches to Help Your Practice, National Harbor, Maryland, March 2020
3. Kauai Pain Conference 2020, Invited Speaker, What Really Matters in the Treatment of Chronic Pain, and Personalizing Pain Medicine, Spoke Virtually (Lihue, HI), March 2020
4. 15<sup>th</sup> Annual NIH Pain Consortium Symposium, Virtual, Invited Keynote Speaker, Technology Integration to Enhance Discovery, Innovation, and Precision Pain Care, June 2020
5. Walter Reed National Military Medical Center, Web Based Distinguished Professor Lecture Series, Invited Speaker, Neuroimaging Based Biomarkers of Pain, August 2020

### 2019

1. 2019 North American Neuromodulation Society (NANS) 22<sup>nd</sup> Annual Meeting, Invited Speaker and Moderator, Cognitive and Affective Components of Pain: Implications for Neuromodulation, Las Vegas, NV, January 2019
2. American Academy of Pain Medicine (AAPM) 2019 35<sup>th</sup> Annual Meeting, Invited Speaker, Advances In Medical Informatics and Cutting Edge Data Analysis of Registry Data, Denver, CO, March 2019
3. Weill Cornell Medical College, Visiting Professor and Grand Rounds Speaker, Learning Health Systems for Optimized Care and Real-World Research Discovery and Innovation, New York, NY, March 2019
4. New York University School of Medicine, Visiting Professor and Grand Rounds Speaker, Learning Health Systems for Optimized Care and Real-World Research Discovery and Innovation, New York, NY, March 2019
5. George Washington Institute for Neuroscience Symposium, Invited Keynote Speaker, Brain Based Biomarkers of Pain: Scientific, Clinical and Ethical Implications, Washington, DC, April 2019
6. IARS 2019 Annual Meeting, Invited Speaker, Scholars Session: Establishing Independence, Building an Academic Career through Innovations in Research and Education, Review Course Lecture: Pain Outcomes, Patient Registries and Learning Health Systems: Delivery of Best Pain Care at Lower Cost, Montreal, Canada, May 2019

7. University of Washington, Visiting Professor, Academic Evening Judge and Grand Rounds Speaker, Learning Health Systems for Optimized Care and Real-World Research Discovery, Seattle, WA, June 2019
8. Food and Drug Administration (FDA), Invited Speaker, 2019 Science Forum, Precision Medicine, Big Data, Pain Opioid Use, Learning Healthcare Systems and Big Data: Advancing the Goal of Precision Pain Medicine, Silver Spring, MD, September 2019

### 2018

1. Kauai Pain Conference, Invited Speaker, The Physician's Role in the Opioid Crisis, The Future of Pain Care at a National Level, Lihue, HI, February 2018
2. American Academy of Pain Medicine (AAPM) 2018 34<sup>th</sup> Annual Meeting, Invited Speaker, Abnormalities of the Dynamic Pain Connectome in Chronic Pain: can Neuroimaging Be Used to Predict Pain and Treatment Outcomes?, Getting Your Research Funded, The Latest CHOIR Enhancements Make it Even Easier to Get It Up and Running, Perspectives from NAM/NASEM: The National Pain Strategy and US Task Force on Pain and Opioids: Shared solutions for our pain and opioid crises, Vancouver, BC, Canada, April 2018
3. WIP 2018 9<sup>th</sup> World Congress of the World Institute of Pain, Invited Speaker, Opioids in chronic non-cancer pain, Learning Health Systems: Using Patient-Reported Outcomes for Research and Patient Care, Dublin, Ireland, May 2018
4. University of Utah, Visiting Professor and Grand Rounds Speaker, Learning Health Systems: A New Dawn in Personalized Pain and Perioperative Care, and Real-World Discovery Research, Brain Based Biomarkers for Pain: Objective Measures of Pain or a Journey Down the Rabbit Hole?, Salt Lake City, UT, May 2018
5. Duke University School of Medicine, Visiting Professor and Grand Rounds Speaker, Learning Health Systems: A New Dawn in Personalized Pain and Perioperative Care and Real-World Discovery Research, Durham, NC May 2018
6. 2018 Marfan Conference, Invited Speaker, Pain and Medications, Santa Clara, CA, July 2018
7. PainWeek 2018, Invited Speaker, Brain Based Biomarkers for Pain: Objective Measures of Pain or a Journey Down the Rabbit Hole? Workshop: Patient Centered Opioid Reduction, Las Vegas, CA September 2018
8. IASP World Congress on Pain, Invited Speaker, ELIP SIG: Pain Scans and Prescribing: The State v. People in Pain - Brain Based Biomarkers of Pain: Objective Measures of Pain or a Journey Down the Rabbit Hole, Lecture: Pain Analytics: The Experience of Pain: Extracting Insights from Learning Healthcare Systems on Real-World Patients, Boston, MA, September 2018
9. 12<sup>th</sup> Annual Pain & Migraine Summit, Invited Speaker, Learning healthcare systems to enable real world research discovery, clinical innovation and optimal patient care, Burlingame, CA, October 2018
10. Anesthesiology 2018, Annual Meeting, Invited Speaker, Objective Biomarkers of Pain or a Journey Down the Rabbit Hole? San Francisco, CA, October 2018
11. For Grace's Change Agent Pain Summit, Invited Keynote Speaker and Panelist, National Pain Strategy, Los Angeles, CA, October 2018
12. American Society of Regional Anesthesia and Pain Medicine (ASRA) 17<sup>th</sup> Annual Meeting, Invited Speaker and Panelist, Central Neurological Function Changes in CRPS, fMRI Directed Diagnosis and Treatment: Ethical and Practical Implications for Clinical Use, San Antonio, TX, November 2018

13. AAPM One Day Workshop Hot Topics in Pain Management, Invited Speaker, Shared Solutions for Our Pain and Opioid Crises, The Importance of Measuring the Multidimensional Nature of Pain using State-of-the-Art Tools, Chicago, IL, December 2018

**2017**

1. Kauai Pain Conference, Invited Speaker, Neuroimaging and Pain, Pain as a National Health Problem, Lihue, HI, February 2017
2. University of North Carolina School of Medicine, Visiting Professor and Grand Rounds Speaker, Pain as a Public Health Problem: Lessons from the IOM Pain Report and National Pain Strategy Report, Learning Health Systems: A New Dawn in Personalized Pain and Perioperative Care and Real-World Discovery Research, Chapel Hill, NC, March 2017
3. Duke University School of Medicine, Visiting Professor, Brain Based Biomarkers for Pain: Objective Measures of Pain or a Journey Down the Rabbit Hole? Durham, NC, March 2017
4. American Academy of Pain Medicine (AAPM) 2017 Annual Meeting, Moderator and Invited Speaker, Pain Psychology Task Force: Behavioral Pain Management Training for Health Care Professionals, Overview & Update on Collaborative Health Outcomes Information Registry (CHOIR): Clinical Treatment Lessons Learned from Analysis of the Data, Pain Medicine Journal & NIH: How to Succeed as an Academic Clinical Pain Researcher, The Career of a Clinician Scientist in Pain Research from the Early Stages to Senior Investigator, Orlando, FL, March 2017
5. 2017 Neuromodulation Society of Australia and New Zealand 12<sup>th</sup> Annual Scientific Meeting, Invited Speaker, Functional Neuroimaging of Pain, Panel Discussion: Mechanisms of Action, Debate: The Neuromodulated Human will Become Common Place by 2030, Adelaide, S. Australia, April 2017
6. 2017 Australian Pain Society 37<sup>th</sup> Annual Scientific Meeting, Invited Speaker, Brain Based Biomarkers of Acute and Chronic Pain, Learning Health Systems: A New Dawn in Personalized Pain Care and Real-World Discovery Research, Adelaide, S. Australia, April 2017
7. 2017 Society for Acupuncture Research Annual Symposium, Invited Speaker, Clinical/Policy Research on the Role of Acupuncture in Mainstream Medicine, San Francisco, CA, April 2017
8. International Anesthesia Research Society, International Science Symposium 2017, Panelist: Functional Neuroimaging of Pain, Affect and Cognition, Washington, DC, May 2017
9. American Psychiatric Association (APA) 2017 Annual Meeting, Invited Speaker, In the Wake of the CDC Opioid Guidelines and the National Pain Strategy: Treating the Patient With Pain and Addiction, San Diego, CA, May 2017
10. International Neuromodulation Society (INS) 13<sup>th</sup> World Congress, Invited Speaker, Lecture #1: Imaging Pain in the Brain, Lecture #2: Learning Health Systems: A New Dawn in Personalized Pain Care and Real-World Discovery Research, Edinburgh, Scotland, May 2017
11. Oregon Health & Science University (OHSU), Invited Speaker, Learning Health Systems: A New Dawn in Personalized Pain Care and Real-World Discovery Research, Portland, OR, June 2017
12. University of Kansas Health System, Invited Grand Rounds Speaker, Learning Health Systems: A New Dawn in Personalized Pain Care and Real-World Discovery Research, Kansas City, MO, October 2017
13. Stanford University, Virtual Reality Conference, Invited Speaker, Advances in Pain Management, Palo Alto, CA, October 2017
14. Annual Meeting of Israel Pain Society (IPS), Invited Speaker, Lecture #1: Brain Based Biomarkers for Pain: Objective Measures of Pain or a Journey Down the Rabbit Hole? Lecture #2: Learning Health Systems: A New Dawn in Personalized Pain Care and Real-World Discovery Research, Eilat, Israel, November, 2017

15. U.S. Department of Health and Human Services (HHS), Invited Speaker at HHS Opioid Symposium, How Data can lead to Insights in Understanding the Opioid Epidemic and in Considering Novel Solutions, Washington, DC, December 2017

### 2016

1. Pediatric Pain National/International Registry Communication Meeting, Invited Speaker, CHOIR System Presentation and Discussion, Toronto, Canada, February 2016
2. American Academy of Pain Medicine (AAPM) Annual Meeting, National Pain Strategy, Invited Speaker: 1. A Comprehensive Population Health Level Strategy for Pain, 2. The National Pain Strategy: Implications for Interdisciplinary Pain Care, 3. Naltrexone for Treatment of Fibromyalgia, 4. Best Pain Care at Lower Cost: CHOIR as a Model Platform for Learning Health System. Realizing the Institute of Medicine's Vision of Learning Health System, Palm Springs, CA, February 2016
3. Special Committee on Aging, Invited Speaker to testify to Congress, Opioids and Aging, Washington, DC, February 2016
4. Kauai Pain Conference, Invited Speaker, 1. The Strain in Pain Lies Mainly in the Brain: Neuroimaging & Pain, 2. A National Plan to Transform Pain Prevention, Care and Education, Kauai, Hawaii, March 2016
5. American Pain Society Annual Meeting, Invited Speaker, 1. Getting your research funded, 2. Transforming Care of Persons with Back Pain: Next Steps in Implementing the Recommendations of the National Pain Strategy, 3. Learning Health Systems: A New Dawn in Personalized Pain Care and Real-World Discovery Research, 4. Measurement Based Pain Management for Best Care at Lowest Cost, Austin, TX 2016
6. Health Matters 2016, Invited Speaker, Management of Chronic Pain: Getting to the Root of Persistent Pain, Stanford CA, May 2016
7. American Psychiatric Association 2016, Invited Speaker, An Update on Diagnostic and Assessment Considerations for the Treatment of Comorbid Opioid Addiction and Chronic Pain, Atlanta, GA, May 2016
8. Association of University Anesthesiologists 63<sup>rd</sup> Annual Meeting, Poster Presentation, Collaborative Health Outcomes Information Registry (CHOIR): Open Source Platform for a Learning Health System and Informing Therapeutic Development, San Francisco, CA, May 2016
9. 2016 Annual Meeting and International Science Symposium IARS, Invited Speaker, Imaging for Chronic Pain: Can We Improve Patient Outcomes? San Francisco, CA, May 2016
10. WIP Congress 2016, Invited Speaker and Moderator, Pain Assessment and Clinical Outcomes: Collaborative Health Outcomes Information Registry (CHOIR): Open Source Platform for Measuring Health Outcomes and a Learning Based System, New York, NY, May 2016
11. European Pain School, Invited Professor, 1. Delivering a cultural transformation in pain prevention, care, education and research, 2. The strain in pain lies mainly in the brain: lessons learned from the neuroimaging of pain, Sienna, Italy, June 2016
12. NUIG mHealth Conference, Invited Speaker, Precision Surgical Care: Collaborative Health Outcomes Information, Registry (CHOIR) as a Perioperative Learning Health System and Platform to Deliver Targeted, Internet-based Health Interventions, Galway, Ireland, June 2016
13. Summer Pain Meeting – UNE, Invited Speaker, Learning Health Systems: A New Dawn in Personalized Pain Care and Real-World Discovery Research Presentation, Portland, ME, August 2016
14. Pain Week, Invited Speaker, In the Wake of the CDC Opioid Guidelines and The National Pain Strategy: Leveraging Pain Psychology and Platforms to Address the National Pain and Opioid Crises, Las Vegas, NV, September 2016

15. Stanford Medicine X, Invited Panelist, The Opioid Crisis Special Session, Palo Alto, CA, September 2016
16. 16<sup>th</sup> World Congress on Pain, Invited Speaker and Session Organizer, Neuroimaging Refresher Course, Imaging as a Biomarker for Pain, Neuroimaging Based Biomarkers of Acute and Chronic Pain, Realizing the US Institute of Medicine's Vision of Learning Health Systems for Pain Management, Yokohama, Japan, September 2013
17. ASA Annual Meeting, Invited Speaker, Pain Outcomes and Learning Health Systems: Delivery of Best Pain Care at Lower Cost, Chicago, IL, October 2016
18. James E. Eckenhoff Lectureship, Visiting Professor, Learning Health Systems: A New Dawn in Personalized Care and Real-World Discovery Research, Philadelphia, PA, November 2016
19. ASRA 2016 Pain Medicine Meeting, Moderator, Ask the Expert Interactive Session: Measuring Pain Data Outcomes and How This Influences Reimbursement. Invited Speaker, Imaging in Pain/Functional Brain Imaging in Pain: Overview and Clinical Significance, San Diego, CA, November 2016
20. 55<sup>th</sup> ACNP Annual Meeting, Study Group Speaker, Shared Solutions for Prescription Opioid Abuse and Pain, Hollywood, FL, December 2016

### 2015

1. Stanford University Parents' Weekend, Invited Speaker: The Strain in Pain Lies Mainly in the Brain, Palo Alto, CA, February 2015
2. PAP Summit (Programs and Policy, Integrated Healthcare Association), Invited Speaker, Patient-Reported Outcome Measures: What Will It Take To Realize The Promise? San Francisco, CA, March 2015
3. 1st Annual Kauai Pain Meeting, Invited Speaker, 1. When Does Acute Pain Become Chronic? 2. fMRI and Diagnosing Chronic Pain, Kauai, Hawaii, March 2015
4. AAPM Annual Meeting, Invited Speaker, 1. Understanding and Treating Neuropathic Pain, 2. National Pain Strategy Task Force: A Strategy to Transform Pain Prevention, Care, Education and Research, 3. Collaborative Health Outcomes Information Registry (CHOIR): Status and Update, National Harbor, MD, March 2015
5. American Pain Society's 34th Annual Scientific Meeting, Invited Speaker, 1. Perturbed Connectivity of the Amygdala and its Subregions with the Central Executive and Default Mode Networks in Chronic Pain, 2. National Pain Strategy Session, Palm Springs, CA, May 2015
6. UF Pain Research and Intervention Center of Excellence, Brain Imaging Biomarkers for Pain: Scientific Ethical and Legal Implications, Gainesville, FL, May 2015
7. INS 12th World Congress (International Neuromodulation Society), Invited Speaker, 1. Machine Learning Approaches for the Detection of Acute and Chronic Pain: Promises and Limitations, 2. fMRI, 3. The Current Practices: Functional Neuroimaging and the Use of Modulation, 4. Poster Presentation Collaborative Health Outcomes Information Registry (CHOIR): Open Source Cloud-Based Platform to Generate and Support Learning Healthcare Systems Montreal, Canada, June 2015
8. 21st Annual Meeting of the Organization for Human Brain Mapping, Invited Speaker/Organizer, 1. Identification of brain imaging biomarkers for pain, 2. New Developments and Horizons for Spinal Cord fMRI, Honolulu, Hawaii, June 2015
9. PAINS Project, Invited Speaker, Overview of the NPS planning process and major elements – Interagency Pain Research Coordinating Committee, Washington, DC, June 2015
10. Trigeminal Neuralgia Association of Australia, Invited Speaker, Rewiring the Brain to Ease Pain, Sydney, Australia, August 2015

11. University of California, San Francisco, Grand Rounds/Invited Speaker, 1. National Pain Strategy, 2. Collaborative Health Outcomes Information Registry (CHOIR): Open Source Learning Health System Platform to Deliver Best Care at Lower Cost, 3. Biomarkers, San Francisco, CA, October 2015
12. International Pelvic Pain Society (IPPS) Annual Meeting 2015, Invited Speaker, 1. Best Pain Care at Lower Cost: CHOIR as a Model Platform for Learning Health System, 2. Collaborative Health Outcomes Information Registry: Open Source Learning Health Systems Platform, 3. System To Enhance Patient Experience (STEPx): Network of patient experience touch points revealed by Bayesian network reconstruction suggests targets for intervention, San Diego, CA, October 2015
13. ASA Annual Meeting 2015, Invited Speaker, Refresher Course Lecture, Best Pain Care at Lower Cost: CHOIR as a Model Platform for Learning Health System, San Diego, CA, October 2015
14. ASRA 14th Annual Pain Medicine Meeting, Invited Speaker, 1. Best Pain Care at Lower Cost: CHOIR as a Model Platform for Learning Health Systems and Pain Registries, 2. Cognitive and Emotional Regulation of Pain: Lessons Learned from Neuroimaging of Pain, 3. Imaging safety and anatomic correlations: assimilating the information and limiting patient risk: functional brain imaging in pain-overview and clinical significance, Miami, FL, November 2015
15. Medical College of Wisconsin, Visiting Professorship, 1. CHOIR: Open Sources Platform for Measuring Health Outcomes and a Learning Based System, 2. Brain Imaging Biomarkers for Pain: Objective Detection of Pain or a Journey Down the Rabbit Hole? Milwaukee, WI, December 2015
16. American College of Neuropsychopharmacology, Invited Speaker, rt-fMRI Neurofeedback: Are We There Yet? Hollywood, FL, December 2015

#### 2014

1. American Academy of Pain Medicine Annual Meeting, Invited Speaker, 1. Essential Tools for Treating the Patient in Pain: What Every Primary Care and Pain Specialist Needs to Know, 2. Design and Implementation of an Open Source Pain Registry, 3. NIH Grant Writing: a Principal Investigator's Perspective, 4. The Essentials of Acute Pain Medicine, Phoenix, AZ, March 2014
2. NIH Pain Consortium, Research Standards for Chronic Low Back Pain, Bethesda, MD, May 2014
3. American Pain Society Annual Meeting, Invited Speaker, National and International Pain Registries: Analysis and Use of Practice-based Evidence, Tampa, FL, May 2014
4. American Psychiatry Association Annual Meeting, Invited Speaker, 1. Diagnostic and Assessment Considerations for the Treatment of Comorbid Opioid Addiction and Chronic Pain, 2. NIH NIDA Pain Consortium - Research Standards for Chronic Low Back Pain, 3. National and International Pain Registries: Analysis and Use of Practice-based Evidence, 4. Overview of the Treatment of Acute and Chronic Pain in the Patient with a History of Addiction, New York, NY, May 2014
5. PAINWEEK, Invited Speaker, 1. The Brain in Pain, 2. Neuropathic Pain, 3. The Psychology of Opioids, Las Vegas, NV September 2014
6. Napa Pain Conference, When Acute Pain Becomes Chronic, Napa, CA, September 2014
7. IASP Meeting, 15<sup>th</sup> World Congress on Pain, Invited Speaker, Brain-based Classification Algorithms for Acute and Chronic Pain, Buenos Aires, Argentina, October 2014
8. Acute Pain SIG Satellite Symposium, 1. Big data meets acute pain: where are the opportunities? 2. The new US National Pain Strategy, Buenos Aires, Argentina, October 2014
9. ASA Annual Conference, The Strain in Pain Lies Mainly in the Brain: Lessons Learned from the Neuroimaging of Pain, New Orleans, LA, October 2014



10. ASRA Pain Meeting, Invited Speaker, 1. Neuroimaging Based Pain Detection, 2. Brain Imaging Biomarkers for Pain: Objective Detection of Pain or a Journey Down the Rabbit Hole? San Francisco, CA, November 2014
11. ACR/ARHP Meeting, Invited Speaker, Treatment Considerations in Chronic Pain, Boston, MA, November 2014

### 2013

1. American Society of Anesthesiology Conference on Pain Management, Invited Speaker, *Pain: What to Report & Monitor*, Las Vegas, NV, January 2013
2. American Academy of Pain Medicine Annual Meeting, Invited Speaker, 1. Essential Tools for Treating the Patient in Pain, 2. Functional Neuroimaging of Chronic Pain: Promises and Pitfalls, 2. National Institutes of Health (NIH) Pain Research: Optimizing Funding Through Grant Writing, Fort Lauderdale, FL, April 2013
3. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *Functional Neuroimaging of Chronic Pain: Promises and Pitfalls*, Fort Lauderdale, FL, April 2013
4. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *NIH Pain Research: Optimizing Funding Through Grant Writing*, Fort Lauderdale, FL, April 2013
5. American Association of Neurological Surgeons Annual Meeting, Invited Speaker, *Neuroimaging and Pain*, New Orleans, LA, April 2013
6. International Anesthesia Research Society Annual Meeting, Invited Speaker, *Neuroimaging-Based Pain Detection: Objective Measure of Pain or a Journey Down the Rabbit Hole?*, San Diego, CA, May 2013
7. American Pain Society Annual Meeting, NCCAM Pre-Conference Symposium, Invited Speaker, *Centers for Excellence for Research on CAM for Pain (CERC)*, New Orleans, LA, May 2013
8. American Pain Society Annual Meeting, Invited Speaker, *Objective Measures of Pain: Scientific, Legal & Ethical Considerations*, New Orleans, LA, May 2013
9. American Psychiatric Association Annual Meeting, Invited Speaker, *Overview of the Treatment of Acute & Chronic Pain in the Patient with a History of Addiction*, San Francisco, CA, May 2013
10. Neuropathy Action Foundation Annual Meeting, Invited Speaker, *Neuropathic Pain & Treatments*, Los Angeles, CA, June 2013
11. International Neuromodulation Society 11<sup>th</sup> World Congress, Invited Speaker, *Neuroimaging on the Future Treatment of Pain and Headache*, Berlin, Germany June 2013
12. NAF Neuropathy Meeting, Invited Speaker, *Neuropathic Pain and Pain Treatments*, Los Angeles, CA, June 2013
13. Trigeminal Neuralgia Association Australia, Neuroimaging of Pain, Neuropathic Pain Treatments, Queensland, Australia, August, 2013
14. PainWeek, Invited Speaker, *Understanding and Treating Neuropathic Pain, Opening Windows to the Brain: Lessons Learned from Neuroimaging of Pain*, Las Vegas, NV, September 2013
15. 4th Annual Aspen Brain Forum, Translational Neurotechnology Meeting, Invited Speaker, *Brain Imaging Biomarkers for Pain*, Aspen, CO, September 2013
16. California Society of Interventional Pain Physicians, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain: Lessons Learned from Neuroimaging*, Palos Verdes, CA, September 2013
17. AAPM&R Meeting, Invited Speaker, 1. Neuroplasticity in Pain: What We Know From Experience With Amputation, 2. Neuroimaging of Pain, National Harbor, MD, October 2013

18. American Academy of Physical Medicine and Rehabilitation Annual Meeting, Invited Speaker, *Neuroimaging of Pain*, San Diego, CA, October 2013
19. American Society of Anesthesiologists, Invited Speaker, *Neuroimaging of Pain*, San Francisco, CA, October 2013
20. American College of Rheumatology Annual Meeting, Invited Speaker, *Future Perspectives for Persistent Pain Management*, San Diego, CA, October 2013
21. Northern California Association of Pain Psychologists, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain: Lessons Learned from Neuroimaging of Pain*, San Francisco, CA, November 2013
22. Penn Pain Symposium, Invited Speaker, *Neuroimaging Based Pain Detection: Objective Measure of Pain or a Journey Down the Rabbit Hole?* Philadelphia, PA, December 2013

### 2012

1. University of Texas Arlington, Keynote Speaker, *Opening Windows to the Brain: Lessons Learned from Neuroimaging of Pain*, Arlington, TX, February 2012
2. World Institute of Pain Annual Meeting, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain*, Miami, FL, February 2012
3. American Association of Orthopedic Surgeons, Invited Speaker, *Opioids for Pain Management, 2012 State of the Art*, San Francisco, CA, February 2012
4. Nevada Psychiatric Association 17<sup>th</sup> Annual Psychopharmacology Conference, Invited Speaker, *Substance Abuse: Treating Co-morbid Chronic Pain and Opioid Addiction*, Las Vegas, NV, February 2012
5. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *Understanding and Treating Neuropathic Pain*, Palm Springs, CA, February 2012
6. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *Pain Outcomes: What to Measure and Why*, Palm Springs, CA, February 2012
7. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *Pain Research*, Palm Springs, CA, February 2012
8. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *Optimizing Funding Through Grant Writing*, Palm Springs, CA, February 2012
9. American Pain Society Annual Meeting, Invited Speaker, *Virtual Reality & Pain Management*, Honolulu, HI, May 2012
10. American Pain Society Annual Meeting, Invited Speaker, *Brain Correlates of Temporal Summation and Conditioned Pain Modulation*, Honolulu, HI, May 2012
11. Oscher Center for Integrative Medicine, Invited Speaker, *Opening Windows to the Brain: Lessons Learned from the Neuroimaging of Pain*, San Francisco, CA, May 2012
12. FDA Chronic Pain Workshop, Invited Speaker, *Neuroimaging Biomarkers for Pain*, Washington, DC, May 2012
13. California Society of Industrial Medicine & Surgery Annual Meeting, Invited Speaker, *Neuroimaging of Pain*, San Diego, CA, June 2012
14. American Psychological Association Annual Meeting, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain*, Orlando, FL, August 2012
15. Napa Pain Conference, Invited Speaker, *When Acute Pain Becomes Chronic: What We Know and How We Can Prevent It*, Napa, CA, September 2012

16. Napa Pain Conference, Invited Speaker, *Opioids: The Good, The Bad, and The Ugly*, Napa, CA, September 2012
17. Reflex Sympathetic Dystrophy Syndrome Association Conference, Invited Speaker, *Opening Windows to the Brain: Lessons Learned from the Neuroimaging of Pain*, Scottsdale, AZ, September 2012
18. Department of Defense Pain Care Symposium, Invited Speaker, *Neurobiology of Pain*, San Diego, CA September 2012
19. Pain Therapeutics Summit, Invited Speaker, *Neuroimaging Based Pain Detection: Findings and Applications*, San Jose, CA, October 2012
20. American Society of Anesthesiology Annual Meeting, Invited Speaker, *Evaluating Pain Outcomes*, Washington DC, October 2012

### 2011

1. Washington University, Visiting Professor, Grand Rounds: *Opening Windows to the Brain: Lessons Learned from Neuroimaging of Pain*, St. Louis, MO, January 2011
2. Washington University, Visiting Professor, *The Strain in Pain Lies Mainly in the Brain*, St. Louis, MO, January 2011
3. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *When Acute Pain Becomes Chronic*, Washington, DC, March 2011
4. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *NIH Grant Writing from a Principle Investigator's Perspective*, Washington, DC, March 2011
5. California Society of Anesthesiologists, Invited Speaker, *Perioperative Patient on Chronic Opioids*. San Jose, CA, May 2011
6. American Psychiatric Association Annual Meeting, Invited Speaker, *Update on Treatment of Comorbid Opioid Addiction and Chronic Pain*. Honolulu, HI, May 2011
7. American Pain Society Annual Meeting, Invited Speaker, *Unraveling the Progression of Acute to Chronic Pain: New Research and Clinical Perspectives*. Austin, TX, May 2011
8. California Society of Interventional Pain Physicians Annual Meeting, Invited Speaker, Santa Barbara, CA, June 2011
9. International Brain Mapping & Intraoperative Surgical Planning Society World Congress, Invited Speaker, *Spinal fMRI and Detection of Pain: Recent Advances in Neuroimaging*, San Francisco, CA, June 2011
10. Neuropathy Action Foundation Annual Meeting, Invited Speaker, *Neuropathic Pain & Pain Treatments*. Sacramento, CA, June 2011
11. Walter Reed Army Medical Center, Grand Rounds, *Opening Windows to the Brain: Lessons Learned From the Neuroimaging of Pain*. Washington, DC, June 2011
12. National Marfan Foundation Symposium, Invited Speaker, Portland, OR, July 2011
13. Arizona Pain Society Annual Meeting, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain*. Paradise Valley, AZ, September 2011
14. PAINWeek Conference, Invited Speaker, *Neuroimaging of Pain*. Las Vegas, NV, September 2011
15. PAINWeek Conference, Invited Speaker, *Opioids: The Good, the Bad and the Ugly*. Las Vegas, NV, September 2011
16. Western Occupational Health Conference, Invited Speaker, *Managing Opioids: Practice Guidelines, Appropriate Use of Drug Testing, Narcotic Contracts & Weaning*. Las Vegas, NV, September 2011

17. Napa Pain Conference, Invited Speaker, Napa, CA, September 2011
18. National Naval Medical Center Pain Symposium, Invited Speaker, *Neurobiology of Pain*. Washington, DC, September 2011
19. Western Pain Society Annual Meeting, Invited Speaker *Functional Neuroimaging of Pain*. Eugene, OR, September 2011
20. Breakthrough In Neurologic Therapies Conference, Invited Speaker, *Current Concepts in Chronic Pain Management*. San Francisco, CA, October 2011
21. Chinese Pain Society Annual Meeting, Invited Speaker, Shenzhen, October 2011
22. National Center for Complementary and Alternative Medicine Distinguished Lecture, Invited Speaker, *Opening Windows to the Brain: Lessons Learned from the Neuroimaging of Pain*. Washington, DC, November 2011
23. North American Neuromodulation Society Annual Meeting, Invited Speaker, *Neuroimaging of Pain*. Las Vegas, NV, December 2011
24. University of California San Francisco Pain Group, Invited Speaker, *Pain & Neuroimaging*. San Francisco, CA, December 2011

### 2010

1. American Academy of Pain Medicine 26<sup>th</sup> Annual Meeting, Invited Speaker, *Mechanisms & Neuroplasticity of Pain: Clinical Implications*, San Antonio, TX, February 2010
2. American Academy of Pain Medicine 26<sup>th</sup> Annual Meeting, Invited Speaker, *Human Brain Activity Identifies The Presence or Absence of Pain*, San Antonio, TX, February 2010
3. American Academy of Pain Medicine 26<sup>th</sup> Annual Meeting, Invited Speaker, *The NIH Review Process*, San Antonio, TX, February 2010
4. American Academy of Pain Medicine 26<sup>th</sup> Annual Meeting, Symposium Chair, *Introduction to NIH Grants*, San Antonio, TX, February 2010
5. Stanford 23rd Annual Anesthesia Update, Invited Speaker, *The Perioperative Patient on Chronic Opioids*, Big Sky, MT, February 2010
6. Stanford 23rd Annual Anesthesia Update, Invited Speaker, *The Challenges of Complex Regional Pain Syndrome*, Big Sky, MT, February 2010
7. University of Pennsylvania, Invited Speaker, *Central Pain Systems: Lessons From Functional Neuroimaging*, Philadelphia, PA, March 2010
8. American Academy of Neurology 62<sup>nd</sup> Annual Meeting, Invited Speaker, *How Functional Neuroimaging Will Transform the Diagnosis and Treatment of Central Neuropathic Pain Conditions*, Toronto, April 2010
9. Spring Pain Research Conference, Invited Speaker, *Prefrontal Cortical Systems in Low Back Pain Versus Generalized Anxiety Disorders*, Grand Cayman, April 2010
10. American Pain Society 29<sup>th</sup> Annual Meeting, Invited Speaker, *Virtual Reality & Pain Management*, Baltimore, MD, May 2010
11. American Pain Society 29<sup>th</sup> Annual Meeting, Symposium Chair, *Mechanisms & Neuroplasticity of Pain: Clinical Implications*, Baltimore, MD, May 2010
12. Potomac Center for Medical Education Symposium, Invited Speaker, *Mechanisms & Neuroplasticity of Pain: Clinical Implications*, Baltimore, MD, May 2010
13. American Psychiatric Association 163<sup>rd</sup> Annual Meeting, Invited Speaker, *Overview of the Treatment of Acute and Chronic Pain in the Patient with a History of Addiction*, New Orleans, LA, May 2010

14. Washington State Pharmacists Association Annual Meeting, Invited Speaker, *Addressing Regional Needs in the Management of Chronic Pain: A Focus on Opioid Misuse, Abuse, and Diversion*, Coeur d'Alene, ID, June 2010
15. Western Pain Society Annual Meeting, Invited Speaker, *Functional Imaging of Pain*, Seattle, WA, June 2010
16. Neural Interfaces Conference Chronic Pain Symposium, Invited Speaker, *Functional Imaging of Pain*, Long Beach, CA, June 2010
17. Case Western University, Visiting Professor, Grand Rounds, *Windows into the Brain: Lessons Learned about Pain From Neuroimaging*, Cleveland, OH, July 2010
18. International Association for the Study of Pain 13<sup>th</sup> World Congress on Pain, Invited Speaker, *CRPS: Where Are We Today?*, Montreal, August 2010
19. Irish Pain Society 10<sup>th</sup> Annual Scientific Meeting, Invited Speaker, *Fibromyalgia: Is This A Brain Problem?*, Dublin, September 2010
20. Walter Reed Army Medical Center, Waging War On Pain: New Strategies to Improve Pain Care for Military & VA Personnel, Invited Speaker, *Neurobiology of Pain*, Washington, DC, September 2010
21. American Association of Neuromuscular & Electrodiagnostic Medicine 57<sup>th</sup> Annual Meeting, Invited Speaker, *Pain in the Central Nervous System: What Have We Learned from Neuroimaging*, Quebec City, October 2010
22. American Society of Anesthesiologists Annual Meeting, Invited Speaker, *When Acute Pain Becomes Chronic: Mechanisms, Prevention & Treatment*, San Diego, CA, October 2010
23. American Society of Anesthesiologists Annual Meeting, Invited Speaker, *What Are the Outcomes We Need to Measure in Pain Medicine?* San Diego, CA, October 2010
24. Texas Pain Society Annual Meeting, Invited Speaker, *fMRI: Brain Re-Mapping - The Pain, It is Plain, Is Mainly in the Brain?* Austin, TX, October 2010
25. American Society of Regional Anesthesia Annual Pain Meeting, Invited Speaker, *Opening Windows to the Brain: Lessons Learned from Neuroimaging of Pain*, San Antonio, TX, November 2010
26. American Society of Regional Anesthesia Annual Pain Meeting, Invited Speaker, *How I Treat Neuropathic Pain*, San Antonio, TX, November 2010
27. American Society of Regional Anesthesia Annual Pain Meeting, Invited Speaker, *Polypharmacy in the Pain Clinic*, San Antonio, TX, November 2010
28. North American Neuromodulation Society Annual Meeting, Invited Speaker, *Fibromyalgia: Is This A brain Problem?* Las Vegas, NV, December 2010
29. NIH Pain & Musculoskeletal Disorder: Translating Scientific Advances into Practice Symposium, Invited Speaker, *Functional Neuroimaging Techniques in Pain*, Bethesda, MD, December 2010

#### 2009

1. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *Functional Imaging in CRPS*, Honolulu, HI, January 2009
2. Yale University, Visiting Professor, Grand Rounds, New Haven, CT, February 2009
3. Stanford 22<sup>nd</sup> Annual Anesthesia Update, Invited Speaker, *Neuropathic Pain: Current*
4. *Mechanisms and Treatments*, Big Sky, MT, February 2009
5. Stanford 22<sup>nd</sup> Annual Anesthesia Update, Invited Speaker, *Abuse of Prescription Pain Meds*
6. *and How to Stay Out of Trouble While Prescribing Them*, Big Sky, MT, February 2009
7. Stanford 22<sup>nd</sup> Annual Anesthesia Update, Invited Speaker, *When Acute Pain Becomes Chronic*

- *What Do We Know and How Can We Prevent It?*, Big Sky, MT, February 2009
- 8. Society for Urodynamics and Female Urology Annual Meeting, Invited Panelist, *Cortical*
- 9. *Restructuring in Patients with Chronic Pain*, Las Vegas, NV, February 2009
- 10. Google Tech Talk Seminar Series, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain*,
- 11. Mountain View, CA, March 2009
- 12. Western Pain Society Annual Meeting, Invited Speaker, *Functional Imaging of Pain*,
- 13. Englewood, CO, April 2009
- 14. American Pain Society 28<sup>th</sup> Annual Meeting, Invited Speaker, *Cognitive Aspects of Pain*, San
- 15. Diego, CA, May 2009
- 16. University of Pittsburgh, Visiting Professor, *The Strain in Pain Lies Mainly in the Brain: Lessons*
- 17. *Learned from Functional Neuroimaging*, Pittsburgh, PA, May 2009
- 18. National Institutes of Health, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain: What*
- 19. *Have We Learned from the Neuroimaging of Pain?*, Bethesda, MD, May 2009
- 20. Integrative Pain Medicine Course, Invited Speaker, *Viewing the Brain in Pain through*
- Neuroimaging: Understanding and Treating Neuropathic Pain*, San Francisco, CA, July 2009
- 21. Southwestern Medical Center, Visiting Professor, Grand Rounds, Dallas, TX, September 2009
- 22. Annual Innovations in Pain Management Symposium, Invited Speaker, *Introduction to Pain Management*,
- Palo Alto, CA, October 2009
- 23. University of California, Irvine, Visiting Professor, Grand Rounds, Irvine, CA, November 2009
- 24. 12<sup>th</sup> Annual International Conference on the Mechanisms & Treatment of Neuropathic Pain, Invited
- Speaker, *Brain Mechanisms of Neuropathic Pain*, San Francisco, CA, November 2009
- 25. American Society of Regional Anesthesia & Pain Medicine 2009 Annual Pain Meeting, Invited Speaker,
- Can Imaging Identify Analgesics for Chronic Pain; Opioids: The Good, the Bad and the Ugly*, San Antonio, TX,
- November 2009
- 26. North American Neuromodulation Society 13<sup>th</sup> Annual Meeting, Invited Speaker, *Fibromyalgia – Is This a*
- Brain Problem?*; *Functional Imaging of CRPS*, Las Vegas, NV, December 2009

#### 2008

- 1. Neuroscience Institute at Stanford, Lecture for First Year Students, *The Strain in Pain Lies Mainly in the*
- Brain*, Stanford, CA, January 2008
- 2. Stanford Neuroscience, Behavior & Cognition Journal Club, Stanford, CA, January 2008
- 3. Stanford Department of Anesthesia Senior Resident Lecture Series, *Acute Pain Management*, Stanford, CA,
- February 2008
- 4. Stanford Department of Neurology Resident Lecture Series, *Overview of Pain Systems and Management*,
- Stanford, CA, February 2008
- 5. Stanford University School of Medicine 21<sup>st</sup> Annual Anesthesia Update, Invited Speaker, *Update on*
- Regional Anesthesia*, Big Sky, MT, February 2008
- 6. Stanford University School of Medicine 21<sup>st</sup> Annual Anesthesia Update, Invited Speaker, *Current Concepts*
- in Perioperative Pain Management*, Big Sky, MT, February 2008

7. Stanford University School of Medicine 21<sup>st</sup> Annual Anesthesia Update, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain*, Big Sky, MT, February 2008
8. Stanford University School of Medicine 21<sup>st</sup> Annual Anesthesia Update, Invited Speaker, *Opioids: The Good, the Bad, and the Ugly*, Big Sky, MT, February 2008
9. Stanford Department of Anesthesia, ANES 202 Anesthesiology & Pathophysiologic Implications for the Perioperative Patient, *Pain Management in the 21<sup>st</sup> Century*, Stanford, CA, February 2008
10. Stanford University School of Medicine, Med School 101 Lecture to High School Students, Stanford, CA, February 2008
11. Stanford Department of Anesthesia, Resident Journal Club, *Pain Management*, Stanford, CA, March 2008
12. Stanford Neuroscience, Behavior & Cognition Scholarly Concentration Journal Club, Stanford, CA April 2008
13. American Pain Society Annual Meeting, Invited Speaker, *Biofeedback: Past, Present and Future*, Tampa, FL, May 2008
14. Stanford Center for Education 2<sup>nd</sup> Annual Innovations with Pain Management Course, Invited Speaker, *Introduction and Overview of Pain Management*, Palo Alto, CA, August 2008
15. Stanford Center for Education 2<sup>nd</sup> Annual Innovations with Pain Management Course, Invited Speaker, *Current Research/Future Trends*, Palo Alto, CA, August 2008
16. International Association for the Study of Pain 12<sup>th</sup> World Congress on Pain, Invited Speaker, Pain Info Exchange Symposium, *What Neuroimaging Reveals About Pain*, Glasgow, August 2008
17. 12<sup>th</sup> Congress of the European Federation of Neurological Sciences, Invited Speaker, Pain Info Exchange Symposium, *Illuminating our Understanding of Pain*, Madrid, August 2008
18. University of California San Diego, Visiting Professor, *The Strain in Pain Lies Mainly in the Brain*, San Diego, CA, September 2008
19. University of California San Diego, Visiting Professor, *Cortical Changes in Neuropathic Pain*, San Diego, CA, September 2008
20. Massachusetts General Hospital, Visiting Professor, Grand Rounds, Boston, MA, September 2008
21. Stanford Hospital & Clinics CME 3<sup>rd</sup> Annual Focus on Complex Care for Case Managers, Invited Speaker, *Pain Management*, Stanford, CA, September 2008
22. Stanford Hospital & Clinics Community Lecture Series, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain*, Stanford, CA, September 2008
23. Stanford University Sleep Grand Rounds, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain: Lessons Learned Through Neuroimaging*, Stanford, CA, September 2008
24. California Society of Physical Medicine & Rehabilitation, Invited Speaker, *Fibromyalgia: From Mechanisms to Treatment*, San Jose, CA, October 2008
25. Stanford Health Library Community Lecture, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain: Lessons Learned Through Neuroimaging*, Stanford, CA, October 2008
26. Stanford University Sleep Clinic, Grand Rounds, *The Strain in Pain Lies Mainly in the Brain: Lessons Learned Through Neuroimaging*, Stanford, CA, October 2008
27. American Society of Anesthesiologists Annual Meeting, Invited Speaker, *Evaluating Outcomes in Pain Medicine*, Orlando, FL, October 2008
28. American Society of Anesthesiologists Annual Meeting, Forum Moderator, How Do I Treat Neuropathic Pain and Complex Regional Pain Syndrome, Orlando, FL, October 2008

29. Science Writers New Horizons in Science Conference, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain*, Stanford, CA, October 2008
30. Wake Forest University Advances in Physiology and Pharmacology in Anesthesia and Critical Care, Invited Speaker, *Brain Imaging and Pain Perception*, Sulphur Springs, WV, November 2008
31. Stanford Center for Law & The Biosciences, Neuroimaging, Pain & The Law Conference, Invited Speaker, *The Neuroscience of Pain*, Stanford, CA, December 2008
32. North American Neuromodulation Society Annual Meeting, Invited Speaker, *Neural Circuits of Pain*, Las Vegas, NV, December 2008
33. North American Neuromodulation Society Annual Meeting, Invited Speaker, *Clinical Trial Designs*, Las Vegas, NV, December 2008

### 2007

1. University of Washington, 25<sup>th</sup> Annual Bonica Visiting Professor, *Changing Pain in the Brain*, Seattle, WA, March 2007
2. Emory University, *Pain and the Brain – What has Neuroimaging Taught Us?*, Steamboat Springs, CO, February 2007
3. Emory University, *Neuropathic Pain*, Steamboat Springs, CO, February 2007
4. Emory University, *Current Concepts in Perioperative Pain Management*, Steamboat Springs, CO, February 2007
5. Emory University, *New Ideas for Regional Anesthesia in Extremity*, Steamboat Springs, CO, February 2007
6. American Academy of Pain Medicine Annual Meeting, Invited Speaker, *Neuroimaging of the Brain: Changes Due to CRPS*, New Orleans, LA, February 2007
7. Santa Clara Valley Medical Center, Neuroscience Grand Rounds, *The Strain in Pain Lies Mainly in the Brain*, San Jose, CA, March 2007
8. National Institutes of Health, Invited Speaker, *Emotional and Cognitive Factors in Pain*, Bethesda, MD, April 2007
9. American Pain Society Annual Meeting, Invited Speaker, *Opening Windows Into the Brain: Advances in Neuroimaging of Pain*, Washington, DC, May 2007
10. Marin Pain Consortium, Invited Speaker, *Pain and the Brain – What Have We Learned from Neuroimaging?*, Mill Valley, CA, May 2007
11. Juvenile/Adolescent CRPS Consensus Conference, Invited Speaker, *fMRI Imaging CRPS in Adults*, Stanford, CA, May 2007
12. National Marfan Foundation National Conference, Invited Speaker, *Adult Pain Management*, Stanford, CA July 2007
13. Stanford Department of Anesthesia Grand Rounds, *Changing Pain in the Brain*, Stanford, CA, August 2007
14. Stanford Reunion Homecoming, Classes Without Quizzes, *The Strain in Pain Lies Mainly in the Brain*, Stanford, CA, October 2007
15. American Society of Anesthesiologists Annual Meeting, Invited Speaker, *Evaluating Outcomes in Pain Medicine*, San Francisco, CA, October 2007
16. American Society of Anesthesiologists Annual Meeting, Invited Speaker, *Cervicogenic Headache: More Than Just a Pain in the Neck*, San Francisco, CA, October 2007



17. Johns Hopkins University School of Medicine, *Cases and Conversations: A Fibromyalgia Workshop*, Marina del Rey, CA, October 2007
18. IASP 10<sup>th</sup> International Conference on the Mechanisms & Treatment of Neuropathic Pain, Invited Speaker, *Mechanisms and Treatment of Chronic Low Back Pain*, Salt Lake City, UT, November 2007
19. Stanford Department of Neurosurgery Grand Rounds, *Pain and the Brain: What Has Neuroimaging Taught Us?*, Stanford, CA, November 2007
20. Lockheed Martin Palo Alto Colloquium, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain*, Palo Alto, CA, November 2007

### 2006

1. American Academy of Pain Management National Conference, *Functional Neuroimaging of Pain*, San Diego, CA, January, 2006
2. UCSF Pain Symposium, Invited Speaker, *Psychopharmacology of Pain Management*, San Francisco, CA, January, 2006
3. San Jose Regional Medical Center, Grand Rounds, *Neuropathic Pain*, San Jose, CA, January, 2006
4. Stanford Internal Medicine Department, Grand Rounds, *Pain and the Brain – What has Neuroimaging Taught Us?*, Stanford, CA, March 2006
5. American Society of Pain Educators, CME, *Pain Mechanisms: The Basis for Optimizing Outcomes*, Los Angeles, CA, May, 2006
6. Good Samaritan Hospital, Grand Rounds, *Neuropathic Pain*, San Jose, CA, May, 2006
7. American Pain Society Meeting, Invited Speaker, *Pain and the Brain: What Has Neuroimaging Taught Us?* Talk broadcast nationally to 4,000 physicians, San Antonio, TX, May, 2006
8. American Pain Society Meeting, Invited Speaker, *Prevalence and Pathophysiology of Chronic Pain*, San Antonio, TX, May 2006
9. California Society of Industrial Medicine Annual Meeting, *The Strain in Pain Lies Mainly in the Brain*, Lake Tahoe, NV, June 2006
10. Los Gatos Community Hospital, Grand Rounds, *Multidisciplinary Pain Management*, Los Gatos, CA, August 2006
11. American Association Physicians Indian Origin, Guest Speaker, *What has Neuroimaging Taught us About Pain and the Brain?* Newark, CA, August 2006
12. Swedish Hospital Annual Pain Management Symposium, Invited Speaker, *Pain and the Brain – Functional Studies and Potential New Therapies*, Seattle, WA, September 2006
13. UCSF Pain Group, Invited Speaker, *Neuroimaging and Pain: Results from the Spinal Cord to the Brain*, San Francisco, CA, September 2006
14. American Society of Anesthesiologists Annual Meeting – Refresher Course, Outcomes in Pain Management, Chicago, October 2006
15. Johns Hopkins, Visiting Professorship, *Pain and the Brain – What has Neuroimaging Taught Us?*, Baltimore, MD, October, 2006
16. American Society of Pain Educators, CME, *Pain Mechanisms: The Basis for Optimizing Outcomes*, Palo Alto, CA, November 2006
17. American Society of Regional Anesthesia and Pain Medicine Annual Meeting, *Neuroimaging of Pain*, San Francisco, CA, November 2006

18. North American Neuromodulation Society Annual Meeting, *Functional Brain Imaging: Neural Circuitry of Pain, Movement Disorders, and Psychiatric Disorders*, Las Vegas, NV, December 2006
19. Stanford Department of Otolaryngology/Head and Neck Surgery, Grand Rounds, *Pain and the Brain: Insights through Neuroimaging*, Palo Alto, CA, December 2006

#### 2005

1. Stanford Department of Orthopedics, Division of Hand Surgery, Invited Speaker, *Complex Regional Pain Syndrome*, January 2005
2. UCSF Memory and Aging Group, Grand Rounds, *The Strain in Pain is Felt Mainly in the Brain – The Imaging of Pain Processing*, January 2005
3. Stanford Department of Anesthesia/Medical College of Wisconsin Annual Anesthesia Meeting, Invited Speaker, *Current Concepts in Perioperative Pain Management*, Copper Mountain, Colorado, February 2005
4. Stanford Department of Anesthesia/Medical College of Wisconsin Annual Anesthesia Meeting, Invited Speaker, *New Ideas in Regional Anesthesia for Extremity Surgery*, Copper Mountain, Colorado, February 2005
5. Stanford Department of Anesthesia, Grand Rounds, *Chronic Pain Management – An Overview and Update on Multidisciplinary Treatment*, March 2005
6. Pain Management CME Lecture, *Chronic Pain Management – Focus on Multidisciplinary Treatment and Opiates*, Hayward CA, April, 2005
7. Northern California Orthopedics Association Annual Meeting, Invited Speaker, *Current Concepts in Perioperative Management for the Orthopedic Surgeon*, Aptos, CA, May 2005
8. Association for University Anesthesiologists, *Control of Brain Activation and Pain Perception Through Real-Time fMRI Feedback*, Baltimore, MD, May 2005
9. Kaiser Annual Pain Management Symposium, *Chronic Pain Management: A Focus on Multidisciplinary Treatment and Opiates*, Stockton, CA June 2005
10. Stanford Department of Surgery, Invited Speaker, *Perioperative Pain Management*, Stanford CA, August 2005
11. American Society of Pain Educators Annual Meeting, Keynote Speaker, *Pain: A Focus on Central Sensitization*, August 2005
12. Stanford Pain and Palliative Care Conference, Invited Speaker, *Pain Clinic Referrals and Outpatient Interventions*, Stanford, CA, September 2005
13. Swedish Hospital Annual Pain Management Symposium, Invited Speaker, *Opiates – The Good, The Bad and The Really Ugly*, September 2005
14. American College of Surgeons Annual Conference, Invited Speaker, *Perioperative Pain in the Anticoagulated Patient*, San Francisco, CA, October 2005
15. Stanford Neurology Grand Rounds, *Functional Neuroimaging of Pain*, Stanford, CA, October, 2005
16. American Society of Regional Anesthesia and Pain Medicine, Invited Speaker, *Outcomes in Pain Management*, Miami, FL, November 2005
17. American Medical Association Science Writers Conference, Featured Speaker, *Improving Quality of Life when Battling Diabetic Peripheral Neuropathy*, Washington, DC, November 2005

#### 2004

1. Stanford University Neurosciences Institute, Invited Speaker – Meet the Press, *Chronic Pain – Seeking a Solution in the 21st Century*, March 2004

2. American Academy of Orthopedic Surgeons Annual Meeting, Invited Speaker, *Chronic Pain Management – Focus on Opiates*, San Francisco, CA, March 2004
3. Oregon Health Sciences Center, Grand Rounds, *The Imaging of Pain Processing*, Portland, OR, April 2004
4. Stanford Department of OB/GYN, Grand Rounds, *Perioperative Pain Management*, April 2004
5. University of Wisconsin, Visiting Professorship, Madison WI, April 2004
6. *Chronic Pain Management – Focus on Interdisciplinary Treatment and Opiates*
7. *The Strain in Pain is Felt Mainly in the Brain – The Imaging of Pain Processing*
8. American Pain Society Meeting, Invited Speaker – Psychosocial Data Blitz, *Augmented Control of Brain Activity and Pain Through Real Time fMRI Feedback*, Vancouver, Canada, May 2004
9. Marin General Hospital Pain Management Symposium, Invited Speaker, *Chronic Pain Management – Focus on Multidisciplinary Treatment and Opiates*, Marin, CA, May 2004
10. Stanford Annual Physical Therapy Conference, *Complex Regional Pain Syndrome*, May 2004
11. Santa Clara Valley Medical Center Department of Urology, Grand Rounds, *Perioperative Pain Management for the Urologic Surgeon*, San Jose, CA May 2004
12. Emory University Department of Anesthesia, Visiting Professor, *Current Concepts in Perioperative Pain Management, The Strain in Pain is Felt Mainly in the Brain – The Imaging of Pain Processing*, Invited Speaker, Functional imaging and the neural systems of chronic pain, , Atlanta Georgia, May 2004
13. California Society of Industrial Medicine, Invited Speaker, *Chronic Pain Management – Focus on Multidisciplinary Treatment and Opiates*, San Diego, CA June 2004
14. University of Utah Pain Management, Grand Rounds, *An Update on Neuroimaging of Pain*, Salt Lake City, Utah, September 2004
15. Latter Day Saints Hospital, Invited Speaker, *Chronic Pain Management – Focus on Coxibs and Opiates*, Salt Lake City, Utah, September 2004
16. Bay Area Podiatry Association, Invited Speaker, *Perioperative Pain Management*, Los Gatos, CA, September 2004
17. Stanford University Community Lecture Series, *Pain in the Brain: Novel Treatments Made Possible by Neuroimaging*, November 2004

### 2003

1. University of Utah Pain Management Center, *Functional Neuroimaging of Pain Processing*, Grand Rounds, Salt Lake City, UT, February 2003
2. McKay General Hospital, Grand Rounds, *Current Concepts in Chronic Pain Management*, Utah, February 2003
3. Stanford Brain Research Center, Invited Speaker, *The Imaging of Pain Processing – Future Directions in Pain Research*, Stanford, CA, March 2003
4. California Society of Industrial Medicine, Invited Speaker, *Management of Chronic Pain – Focus on Opiates*, July 2003
5. John Muir Hospital, Grand Rounds, *The Strain in Pain Lies Mainly in the Brain – Insights into Chronic Pain through Functional Neuroimaging*, August 2003
6. American College of Rheumatology (ACR) Annual Meeting, Invited Speaker for Advances in Rheumatology Symposium, *Mechanisms of Inflammatory Pain*, Orlando, Florida, November 2003
7. Marin General Hospital Annual Pain Symposium, Invited Speaker, *Multimodal Perioperative Pain Management*, December 2003

## 2002

1. Education for Physicians on End-of-life Care, Invited Speaker, *Management of Chronic Pain*, San Mateo, California, January 2002
2. Mercy San Juan Hospital, Grand Rounds, *Management of Patients in Acute Pain*, Mercy, California, January 2002
3. Pain Management Symposium, *Perioperative Management of Pain*, Sacramento, California, January 2002
4. American Academy of Pain Medicine (AAPM) Annual Meeting, Invited Speaker, *Acute Pain Management*, February 2002
5. Stanford Department of Anesthesia, Grand Rounds, *Advanced Imaging Techniques for Pain Research*, March 2002
6. Education for Physicians on End-of-life Care, Invited Speaker, *Current Concepts in Chronic Pain Management*, San Mateo, California, March 2002
7. Société Internationale de Chirurgie Orthopédique et de Traumatologie (SICOT), Keynote Speaker *Perspectives in Pain for the Orthopaedic Surgeon – Optimizing the Management of Surgical Pain : Recent Advances and Current Trends*, San Diego, CA, August 2002
8. Swedish Medical Center Annual Medical Meeting, Invited Speaker, *The Strain in Pain Lies Mainly in the Brain: The Imaging of Pain Processing*, Seattle, WA, 2002
9. New York Post Graduate Assembly (PGA) Annual Anesthesia Meeting, *Perioperative Pain: Novel Approaches to Management*, New York, NY, December 2002

## 2001

1. Stanford University Department of Urology, Grand Rounds, *Perioperative Pain Management of the Urologic Patient*, January 2001
2. Travis Air Force Base, January 2001
3. Department of Surgery, Grand Rounds, *Current Concepts in Perioperative Pain Management*  
Department of Orthopedic Surgery, Invited Speaker, *Acute Pain Management for Orthopedic Patients*
4. Department of Anesthesiology, Invited Speaker, *Multimodality Perioperative Pain Management*
5. Stanford University Department of Internal Medicine, *Current Concepts in Chronic Pain Management*, March 2001
6. Palo Alto VA Hospital Department of Internal Medicine, *Multidisciplinary Chronic Pain Management*, April 2001
7. Pain Management Symposium, *Perioperative Orthopedic Pain Management*, Lake Tahoe, Nevada, March 2001
8. Queens Medical Center Department of Obstetrics and Gynecology, Grand Rounds, *Multimodality Perioperative Pain Management*, Hawaii, April 2001
9. Stanford University Annual Hand Physical Therapy Symposium, Invited Speaker, *Management of the Patient with Complex Regional Pain Syndrome*, Stanford, California, June 2001
10. Pain Symposium, *Current Concepts in Perioperative Pain Management*, Stockton, California, July 2001
11. Pain Management Symposium, *Multimodality Perioperative Pain Management*, Modesto, California, July 2001
12. San Mateo Medical Center, Grand Rounds, *Current Strategies in Acute Pain Management*, July 2001

13. Kern Hospital Department of Anesthesiology Grand Rounds, *Perioperative Pain Management Techniques*, August 2001
14. Pain Symposium, Multimodality Acute Pain Management, Walnut Creek, California, September 2001
15. Stanford University Annual Hand Physical Therapy Symposium, Invited Speaker, *Management of Patients with Complex Regional Pain Syndrome*, Stanford, California, October 2001
16. Tacoma Valley Medical Center, Grand Rounds, *Current Concepts in Perioperative Pain Management*, Tacoma, Washington, October 2001
17. Pain Management Symposium, *Acute Pain Management*, Tacoma, Washington, October 2001
18. Pain Management Symposium, *Mechanistic Approach to Neuropathic Pain Management*, Oakland California, November 2001
19. Santa Clara County Medical Center, Grand Rounds, *Current Strategies in Perioperative Pain Management*, Santa Clara, California, November 2001
20. American College of Rheumatology (ACR) Annual Meeting, Invited Speaker for Advances in Rheumatology Symposium, *Perioperative Pain Management*, San Francisco, California, November 2001
21. Stanford University Pain Management Symposium, Stanford, California, December 2001 *Acute Pain Management Physiology of Pain*

#### 2000

1. Continuing Medical Education, Invited Speaker, *Management of Pain Using NSAIDs and Cox-2 Inhibitors*, Menlo Park, CA April 2000
2. Stanford University Annual Hand Physical Therapy Symposium, Invited Speaker, *Complex Regional Pain Syndrome*, Stanford, California, June 2000
3. Oregon Health Sciences Center, Invited Speaker, *Management of Acute Pain*, Portland Oregon, September 2000
4. Spokane Washington VA Medical Center, Invited Speaker, *Management of Acute and Chronic Pain*, Spokane, Washington, September 2000
5. Stanford University Department of Neurosurgery, Grand Rounds, *Current Concepts in Acute Pain Management*, October 2000
6. UC Davis Department of Orthopedics, Grand Rounds, *Management of Acute Pain in Orthopedic Patients*, Davis, California, November 2000
7. UC Davis Department of Physical Medicine and Rehabilitation, Invited Speaker, *Physiology and Pharmacology of Pain Management*, Davis, California, November 2000
8. UC Davis Department of Anesthesiology, Invited Speaker, Division of Pain Management, *Multimodality Acute Pain Management*, Davis, California, November 2000
9. Pain Management Symposium, Invited Speaker, *New Concepts in the Management of Acute Pain*, Los Gatos, California, December 2000
10. Stanford University Department of Orthopedics Annual Research Forum, Keynote Speaker, *Multimodality Pain Management and Rehabilitation in Orthopedic Patients*, December 2000
11. Continuing Medical Education, Invited Speaker, *Current Concepts in the Management of Acute Pain*, San Francisco, California, December 2000

#### 1991-1997

1. Arizona Health Sciences Center Student Research Forum, *An Automated Data Analysis and Collection System for Measuring Isolated Atrial Contractility*, May 1991 (Second Prize, 11th Annual Medical Student Research Forum, 1991)
2. American Federation for Clinical Research Western Regional Conference, *An Automated Data Analysis and Collection System for Measuring Isolated Atrial Contractility* Carmel, CA, February 1992
3. American Federation for Clinical Research National Conference, *An Automated Data Analysis and Collection System for Measuring Isolated Atrial Contractility* Baltimore, MA, May 1992
4. Arizona Health Sciences Center Student Research Forum, Featured Speaker, *Characterization and Optimization of Radiofrequency Catheter Ablation for the Treatment of Cardiac Arrhythmias*, May 1992
5. American Heart Association National Conference, *Delivery of Radiofrequency Energy to All Four Poles of a Catheter Increases Lesion Size*, New Orleans, Louisiana, October 1992
6. Yuma Friends of Arizona Health Sciences Center, Keynote Speaker, *Radiofrequency Catheter Ablation as a New Treatment for Cardiac Arrhythmias*, March 1993
7. American Heart Association National Conference, *RF Power Losses in the Energy Delivery System During Ablation*, Atlanta, Georgia, November 1993
8. American Heart Association National Conference, *Frequency Dependent Impedance Measurements: An Indicator of Catheter Contact*, Atlanta, Georgia, November 1993
9. Arizona Health Sciences Center Student Research Forum, *A Thermodynamic Model of Radiofrequency Catheter Ablation for the Treatment of Cardiac Arrhythmias*, May 1994 (First Prize, 14th Annual Medical Student Research Forum, 1994)
10. Pacing and Cardiac Electrophysiology National Conference, *Tip Temperature is not an Indicator of Myocardial Temperature*, Boston, March, 1995
11. Western Anesthesia Residents Conference, *Choosing a DLT: Is There a Racial Difference in Airway Size?*, Universal City, California, April 1997
12. Western Anesthesia Residents Conference, *Magnetic Resonance Therapy Guided Stellate Ganglion Block*, April 1997 (Finalist)
13. American Society of Anesthesiologists, *Choice and Placement of DLTs in Asian Patients*, October, 1997
14. Bard, Electrophysiology Division, *New Directions in Radiofrequency Catheter Ablation* Billerica, MA, October 1997
15. California Society of Anesthesiologists, *Magnetic Resonance Therapy Guided Stellate Ganglion Block*, San Francisco, CA June 1998
16. Mackey, S., Sze, D., Gaeta, R., *Magnetic Resonance Therapy Guided Regional Blockade for Pain Management* American Society of Anesthesiologists, October 1999

## TEACHING ACTIVITIES

2011-2020	Medical School Course	Neurobiology NBIO206; Somatosensation and Pain
2020	Medical School Course	PTD-A Treatment of Pain II, III Opioid Agonists, Chronic Pain
2011-2016	Medical School Course	Human Health & Disease 223; Opioids 1 & 2

2009, 2011-2016	Medical School Course	Human Health & Disease 223; Local Anesthetics
2009-2015	Medical School Course	Anesthesia 202; Pain Management in the 21 <sup>st</sup> Century
2007, 2011-2016	Medical School Course	Neurobiology of Disease NEN 205; Neurobiology of Pain
2006	Class	Human Biology 100; Pain & the Brain
2006	Class	Psychology 202; Cognitive Neuroscience; Functional Neuroimaging of Pain
2006	Medical School Course	Spinal Cord. Neurosciences Lab
2004-Present	Fellowship	Post-Doctoral Research
2003-2011	Fellowship	Graduate Students
2003-2005	Class	Resident Refresher Course. Dept. of Anesthesia
2002-2005	Class	Upper Extremity Regional Blocks
2002		Department of Anesthesia; Stanford School of Medicine, Call Committee
2002	Class	Chronic Pain Management
2001-2002	Class	Pharmacology for Pain Management-Neuropathic Agents. Dept. of Physical Medicine and Rehabilitation
2000- Present	Medical School Course	Anesthesia Medical Student Clerkship #304A; Acute Pain
2000- Present	Class	IASP Pain Management Fellow Lecture Series
2000-2013	Fellowship	Faculty, Pain Management Fellowship
2000-2006	Fellowship	Founder & Director, Regional Anesthesia Program, Department of Anesthesiology

2000-2005	Class	Lower Extremity Regional Blockade
2000	Class	Current Concepts in Acute Pain Management
2000	Class	Current Concepts in Acute Pain Management. Dept. of General Surgery
2000	Class	Lumbar Sympathetic Blockade-A Review
1999-2006	Class	Annual Regional Anesthesia Workshop
1999-2000	Class	Complex Regional Pain Syndrome
1999	Class	Outcomes in Spinal Cord Stimulation

## COMMITTEES

2020-2022	Nominating Committee	American Academy of Pain Medicine (AAPM)
2020	Advisory Board Member HSRD Naloxone Distribution IIR	Veterans Affairs (VA)
2020	Invited Member	Network of Digital Health Experts program, (FDA) & Center for Devices & Radiological Health (CDRH)
2020	Technical Expert Panel Member PCOR TEP Pain/ODU	National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)
2018-2021	Delegate	California Medical Association, (CMA)
2019-2021	Council Member	Council on Science & Public Health, (CMA)
2019-2020	Committee Co-Chair - Committee on Temporomandibular Disorders (TMD)	National Academies of Sciences, National Institutes of Health, (NAS)/(NIH)



2019	Advisory Committee Member	Drug Safety and Risk Management Advisory Committee, Anesthetic and Analgesic Drug Products Advisory Committee (DSaRM/AADPAC)/(FDA)
2018	Committee Member Innovations in Medical Devices to Prevent Opioid Use Disorder (OUD)	Analgesic, Anesthetic, and Addiction Clinical Trial Translations, Innovations, Opportunities, and Networks (ACTTION)
2017	Panelist at Workshop – Advancing Therapeutic Development for Pain and Opioid Use Disorders through Public-Private Partnerships	National Academies of Sciences, Engineering, and Medicine, (NASEM) / NIH
2017, 2018	Board Member	Association of Pain Program Directors (APPD)
2017, 2018	Member	American Society of Anesthesiologists Committee on Research (ASA)
2017	Oversight Committee	Analgesic, Anesthetic, and Addiction Clinical Trial Translations, Innovations, Opportunities, and Networks (ACTTION)
2017	Committee Member	National Academy of Medicine, Marshaling Physician Leadership to Counter the Opioid Epidemic
2016-2018	Member	NIH Chronic Overlapping Pain Working Group
2016-2017	Working Group Member to add Pain questions to National Health Interview Survey	Centers for Disease Control and Prevention (CDC)
2016	Testimony to Senate Special Committee on Aging – Pain and Opioids	National Academy of Medicine
2015-2016	Immediate Past-President	American Academy of Pain Medicine
2014-2015	President	American Academy of Pain Medicine

2017-2018	Member	NIH Healthy People 2030 Chronic Pain Workgroup
2014-2016	Member	NIH Healthy People 2020 Chronic Pain Workgroup
2014	Member	Healthy People 2020 Pain Task Force
2013	Chair	Department of Anesthesia; Stanford School of Medicine, Faculty & Development and Mentoring Committee
2013-Present	Member of Clinical Practice Guidelines in Oncology, Adult Cancer Pain	National Comprehensive Cancer Network, Adult Cancer Pain Committee
2013-2016	Co-Chair	Prevention and Care Working Group; National Pain Strategy Task Force NPSTF
2012-Present	Member	Department of Anesthesia; Stanford School of Medicine, Finance Committee
2012-2013	Member	NIH Pain Consortium Chronic Low Back Pain Research Task Force
2012-2013	Member	NIH Interagency Pain Research Coordinating Committee
2012-2016	Co-Chair	Oversight Committee; National Pain Strategy Task Force NPSTF
2012	Co-Chair	American Academy of Pain Medicine Annual Meeting
2012	Member	FDA Chronic Pain Workshop
2011-2013	Vice President Scientific Affairs	American Academy of Pain Medicine
2010-2011	Committee Member & Author	IOM (Institute of Medicine) 2011 Committee on Advancing Pain Research, Care, and Education
2009-Present	Member	American Academy of Pain Medicine CME Oversight Committee

2009-Present	Member	American Academy of Pain Research Committee
2009-2015	Member	American Academy of Pain Medicine Executive Committee
2009-2011	Member	American Pain Society Nominating Committee
2008-2015	Director at Large	American Academy of Pain Medicine
2008-Present	Member	Department of Anesthesia; Stanford School of Medicine, Appointments & Promotions Committee
2008-Present		Association of Pain Program Directors
2008-2009		California Neuropathy Task Force
2008	Board of Directors	International Association of Pain Clinic Guidelines Taskforce
2007-Present		California Department of Workers Compensation
2007-Present		American Society of Anesthesiology Pain Directors
2007-Present		American Society of Anesthesiology Pain Committee
2007		NHLBI Workshop on Sickle Cell Disease Sub-Committee on Pain
2005-Present		Department of Anesthesia; Stanford School of Medicine, Research Committee
2005-2012		Stanford University, American Society of Anesthesiology; Continuing Education
2005-2008		Stanford University, Electronic Medical Record Committee
2005-2006		Stanford University, Clinical Commitment Committee

2004-Present		Stanford University, Neuroscience Committee
2004-2005		Stanford University, Deep Venous Thrombosis Committee
2003-Present		Department of Anesthesia; Stanford School of Medicine, Governance Committee
2003-2010		Stanford University, Medical School Committee
2002		Department of Anesthesia; Stanford School of Medicine, Call Committee
2000		Department of Anesthesia; Stanford School of Medicine, Incentive Committee
1999-Present		Department of Anesthesia; Stanford School of Medicine, Residency Selection Committee
1999-2006		Department of Anesthesia; Stanford School of Medicine, Information Technology Committee
1997-1998		Stanford University Medical Center; General Medical Education Committee
1996-1998		Department of Anesthesia; Stanford School of Medicine, Education Committee
1992-1994	Founding Member	University of Arizona, MD/PhD Committee

## MEMBERSHIPS

American Society of Anesthesiologists  
 American Pain Society  
 American Society of Regional Anesthesia and Pain Medicine  
 American Academy of Pain Medicine  
 National Academy of Medicine  
 International Association for the Study of Pain  
 International Anesthesia Research Society

California Society of Anesthesiologists  
 California Medical Association  
 Institute of Electrical and Electronic Engineers  
 Etta Kappa Nu (Electrical Engineering Honor Society – Founder Univ Arizona Chapter)  
 Society for Neuroscience

## LICENSES

Diplomat - Pain Medicine Subspecialty, American Board of Anesthesiologists 2000, Recertified 2010  
 Diplomat of American Board of Anesthesiologists 1999, Recertified 2009  
 California Medical License A055270  
 DEA BM4962848  
 ACLS Certification 2009

## LANGUAGES

Computer Languages: C, Visual Basic, Pascal, FORTRAN

## Web Sites Developed and Administered

<http://paincenter.stanford.edu/> - Developed and maintain Stanford Pain Management Center Web Site

<http://snapl.stanford.edu/> - Developed and maintain Stanford Systems Neuroscience & Pain Lab Web Site

<http://anesthesia.stanford.edu/> - Developed and maintain an internal Stanford Department of Anesthesia web site focused on resident, faculty, and staff education

<http://anesthesia.stanford.edu/regionalanesthesia> - Developed and maintain internal Stanford site focused on the principles and practices of regional anesthesia

## PUBLIC & PROFESSIONAL SERVICES

1997-2000	Board of Medical Directors	Interplast
1991-1993	Co-Founder & President, University of Arizona	MD/PhD Club, College of Medicine
1987-1993	Founding Member, University of Arizona	Etta Kappa Nu, Electrical Honor Society

## OTHER EMPLOYMENT AND CONSULTING

*Member - Board of Directors, Acoustic Technologies Inc., 1997-2006.*

A company whose goal is to bring medical technologies to market and provide an environment to pursue innovative research.

*Project Leader/Consultant to IREF Inc., San Francisco, CA., 1996 – 1998.*

Co-investigator with Dr. Christina Mora-Mangono on project to develop multimodality neurological monitoring system. Development of a system will to study the effects of cardiac surgery and anesthesia on neurologic and psychiatric outcomes in patients. Supervise engineers, manage budget, coordinate purchasing, conduct experiments, analyze and prepare data for publication.

*Owner and Founder* - Altech Consultants, Sunnyvale, California, 1987-Present Operate an engineering consulting company specializing in medical electronics, computer systems and their integration to medical instrumentation. Designed hardware and software, operated day to day business including accounting, subcontracted work, negotiated with clients, delegated assignments, developed consulting plans.

*Principal Investigator/Consultant to C.R. Bard Inc.*, 1987 - 1998. Directed several projects using radiofrequency catheter ablation to treat cardiac arrhythmias at the Department of Internal Medicine, Section of Cardiology, Tucson, Arizona. Work focused on the treatment and cure of atrial fibrillation. These projects include determining optimal delivery parameters for delivery of radiofrequency energy, computer modeling of ablation energy and its effect on the myocardium, characterizing energy losses in delivery system, and determining temperatures within myocardium during ablation. Write protocols, obtain grants, manage budget, coordinate purchasing, coordinate and supervise multiple studies, supervise engineers and medical students, conduct experiments, analyze and prepare data for publication and presentation at national conferences.

*Research Assistant/Electrical Engineer* - University Medical Center - Department of Anesthesiology, Tucson, Arizona. 1987-93. Designed and built automated system to measure contractility effects of anesthetic agents on guinea pig heart tissue *in vitro*. Assisted with anesthesia, delivery and monitoring during bovine artificial heart (Jarvik 7) replacement.

*Research Associate/Biomedical Engineer* - Philadelphia VA Hospital, Department of Pulmonary Medicine, Philadelphia, Pennsylvania. 1985-86.

*Principal Investigator* - Designed automated system to determine thoracoabdominal configuration in patients with COPD.

*Co-investigator* - Designed protocol and implemented study to determine optimal flow parameters in jet nebulizers delivering bronchodilator agents to patients with COPD.

*Research Engineer/Technician* - La Jolla Technology, La Jolla, California, 1985. Performed feasibility study on electrical stimulation for soft tissue healing. Initiated design and development of microprocessor-based muscle stimulator/TENS. Assisted development of devices to promote osteogenesis in non-unions through the use of electrical stimulation. Conducted experiments for the University Of Pennsylvania Orthopedic Research Department to test these devices.

## **VOLUNTEER ACTIVITIES**

1997	Thailand	Volunteer Trips
1989, 2009-2011	Chicago, Illinois	American Pain Society
1988-1993	Tucson, Arizona	University Medical Center, Section of Cardiology
1987-1991	Tucson, Arizona	University Medical Center, Department of Anesthesiology
1985-1986	Philadelphia, Pennsylvania	VA Hospital, Department of Pulmonary Medicine