

CURRICULUM VITAE

(June 2020)

I. Personal Information

Name	Martin S. Angst, M.D.
Citizenship	Swiss, Permanent US Resident
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II. Educational Background

A. Education

1987	Medical Doctorate and Thesis, Medical School, University of Berne, Switzerland
1981 – 1987	Medical School, University of Berne, Switzerland

B. Postgraduate Education

1994 – 1996	Postdoctoral Research Fellow, Clinical Pharmacology, Department of Anesthesia, Stanford University School of Medicine, Stanford, CA
1990 – 1994	Residency in Anesthesia and Intensive Care Medicine, Department of Anesthesia, University Hospital of Berne, Switzerland
1988 – 1990	Residency in Internal Medicine, Department of Medicine, Hospital of Burgdorf, Switzerland

C. Medical Licensure

1999	California Medical License A70346
1987	Registered Swiss Medical Doctor

D. Boards

1993	Diplomat, Swiss Board of Anesthesiology
1993	Diplomat, European Academy of Anesthesiology

III. Professional Appointments

A. Hospital Appointment

1996 – present	Staff Physician, Department of Anesthesiology, Stanford Hospital & Clinics, Stanford, CA
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- Member of the Liver Transplantation Subspecialty Group since 1997
- Member of the Neurosurgery Subspecialty Group since 2000

B. Academic Appointments

2011 – present	Professor of Anesthesia, Department of Anesthesia, Stanford University School of Medicine, Stanford, CA
2006 – 2010	Associate Professor of Anesthesia, Department of Anesthesia, Stanford University School of Medicine, Stanford, CA
1998 – 2006	Assistant Professor of Anesthesia, Department of Anesthesia, Stanford University School of Medicine, Stanford, CA
1996 – 1998	Clinical Instructor Department of Anesthesia, Stanford University School of Medicine, Stanford, CA

IV. Awards/Honors

2019	International Anesthesia Research Society: Finalist Kosaka Award (Mentor to Amy Tsai)
2019	Society of Cardiovascular Anesthesiologists: Best of Meeting Award (Senior Investigator to Igor Feinstein)
2019	American Society of Regional Anesthesia: Best of Meeting Award (Senior Investigator to Quentin Baca)
2018	Research Award (Senior Investigator to Igor Feinstein), Department of Anesthesia, Stanford University School of Medicine
2018	American Society of Regional Anesthesia: Best of Meeting Abstract Award (Senior Investigator to Quentin Baca)
2018	Team Science Leadership Workshop (nomination and selection), Stanford Medicine's Office of Faculty Development and Diversity, Stanford University School of Medicine
2017	Research Award (Senior Investigator to Quentin Baca), Department of Anesthesia, Stanford University School of Medicine
2016	The 54th Annual Western Anesthesia Residents' Conference: 2 nd place for best oral presentation competition (Senior Investigator to Quentin Baca)
2015	Research Award (Senior Investigator to Quentin Baca), Department of Anesthesia, Stanford University School of Medicine
2015	Society of Reproductive Investigations on Immunology and Women's Health: Best New Investigator Poster Award (Senior Investigator to Quentin Baca)
2013	International Anesthesia Research Society: Kosaka Award for Best Abstract in Patient-oriented Research (Senior Investigator to Brice Gaudilliere)
2013	International Anesthesia Research Society: Best Abstract of Critical Care, Trauma and Resuscitation Category (Senior Investigator to Brice Gaudilliere)
2013	Research Award (Senior Investigator to Brice Gaudilliere), Department of Anesthesia, Stanford University School of Medicine
2012	Guest on Michael's Krasny's Forum on NPR (Gender Difference in Pain)
2012	Society of Obstetric Anesthesia and Perinatology: Best Abstract
2011	Stanford Society of Physician Scholars (SSPS) Collaborative Research Award

	(Mentor to Brice Gaudilliere and Ryan Schuber), Stanford University School of Medicine
2010	Research Award (Senior Investigator to Dave Ruau), Department of Anesthesia, Stanford University School of Medicine
2009	Research Award (Senior Investigator to Nick Phillips), Department of Anesthesia, Stanford University School of Medicine
2008	Research Award (Senior Investigator to Jason Cuellar), Department of Anesthesia, Stanford University School of Medicine
2007	Research Award (Primary Investigator), Department of Anesthesia, Stanford University School of Medicine
2004	Research Award (Senior Investigator to Larry Chu), Department of Anesthesia, Stanford University School of Medicine
2002	Monthly Teaching Award (elected by anesthesia residents)
2001	Research Award (Senior Investigator to Yehuda Ginosar), Department of Anesthesia, Stanford University School of Medicine
1997	Analgesiology and Headache Section, American Society of Clinical Pharmacology and Therapeutics: Best Abstract.
1996	Research Award (Primary Investigator), Department of Anesthesia, Stanford University School of Medicine
1994 – 1995	Swiss Society of Anesthesiologists, Research Fellowship
1994 – 1995	Ciba-Geigy-Jubilaeumsstiftung, Research Fellowship
1994 – 1995	Janggen-Poehn Stiftung, Research Fellowship

V. Scholarly Publications

A. Original Articles Peer Reviewed

1. Stelzer IA, Ghaemi MS, Han X, Ando K, Hedou J, Feyaerts D, Peterson L, Tsai ES, Ganio EA, Gaudilliere DK, Tsai AS, Traber GM, Ellenberger M, Stanley N, Becker MG, Culos A, Fallahzadeh R, Wong RJ, Quaintance CC, Quake SR, Darmstadt G, Relman DA, Druzin M, Winn V, Gibbs RS, Ling B, Sylvester K, Carvalho B, Snyder MP, Shaw GM, Stevenson DK, Contrepolis K, **Angst MS***, Aghaeepour N*, Gaudillière B* (*co-senior authors). Integrated Metabolomic, Proteomic, and Immunological Trajectories Predict Labor Onset. Submitted to Sci Trans Med.
2. White JR, Rwere F, Zeng X, McNeil L, **Angst MS**, Chen CH, Mochly-Rosen, Gross ER. Phenotyping Genetic Differences in Aldehyde Dehydrogenase 2 after an Alcohol Challenge in Humans. Submitted to JCI.
3. Spatz JM, Fulford MH, Tsai A, Gaudilliere D, Ganio E, **Angst MS**, Aghaeepour N, Gaudilliere B. Human Immune System Adaptations to Simulated Microgravity Revealed by Single-cell Mass Cytometry. Submitted to Nature Microgravity.
4. Authors on behalf of the Alliance for Maternal and Newborn Health Improvement, the Global Alliance to Prevent Prematurity and Stillbirth, and the Premature Research Center at Stanford University (including **Angst MS**). Critical Assessment of Cell-free Transcriptomics, Urine Metabolomics, and Plasma Proteomics for Noninvasive Characterization of Term and Preterm Birth in Low- and Middle-Income Settings. Submitted to Sci Tranl Med.
5. Culos A, Tsai AS, Stanley N, Becker M, Ghaemi MS, McIlwain DR, Fallahzadeh R, Tanada A, Nassar H, Ganio E, Peterson L, Han X, Stelzer I, Kazuo A, , Gaudilliere D, Phongprecha T, Maric I, Chang AL, Shaw GM, Stevenson DK, Bendall S, Davis KL, Fantle W, Nolan GP, Tibshirani R, **Angst MS**, Gaudilliere B, Aghaeepour N. Integration of Mechanistic Immunological Knowledge into a Machine Learning Pipeline Increases Clinical Predictive Power. Submitted to Nature Machine Intelligence

6. Rishel CA, **Angst MS**, Sun EC. Association between Preoperative Opioid Weaning and Subsequent Long-term Opioid Use: A Retrospective Analysis. Submitted to Anesthesiology
7. Ghaemi MS, Tarca AL, Romero RR, Stanley N, Fallahzadeh R, Tanada A, Culos A, Kazuo A, Xiaoyua H, Blumenfeld YJ, Druzin ML, El-Sayed YY, Gibbs RS, Winn VD, Ling XB, Wong R, Shaw GM, Stevenson DK, Gaudilliere B*, Aghaeepour N*, **Angst MS*** (*co-senior authors). Proteomic Signatures Predict Preeclampsia in Individual Cohorts But not Across Cohorts – Implications for Clinical Studies. Submitted to PLOS One.
8. Tawfik VL, Huck NA, Baca QJ, Ganio E, Elena S, Haight ES, Culos A, Ghaemi S, **Angst MS**, Clark JD, Aghaeepour N, Brice Gaudilliere B. Systematic Immuno-phenotyping Reveals Sex-Specific Responses after Painful Injury in Mice. *Frontiers Immunology* in press.
9. Stanley N, Stelzer I, Fallahzadeh R, Ganio E, Tsai A, Ghaemi S, Culos A, Han X, Rumer K, Peterson L, Becker M, Phongpreecha J, Nassar H, Chang A, Maric I, Gaudilliere D, Tsai E, Ando K, Leipold M, Obermoser G, Cross D, Pollard A, Maecker H, Shaw G, David Stevenson S, **Angst MS***, Gaudilliere B*, Aghaeepour N* (*co-senior authors). VoPo Leverages Cellular Heterogeneity for Predictive Modeling of Single-Cell Data. *Nature Communications* in press.
10. Ganio E, Stanley N, Lindberg-Larsen V, Einhaus J, Tsai A, Culos A, Rumer K, Stelzer I, Gaudilliere D, Tsai E, Fallahzadeh R, Kehlet H, Aghaeepour N*, **Angst MS***, Gaudilliere B* (*co-senior authors). Preferential inhibition of adaptive immune system dynamics by glucocorticoids in patients after acute surgical trauma. *Nature Communications* in press.
11. Stevenson DK, Aghaeepour A, Maric I, **Angst MS**, Gaudilliere B, Ling XB, Moufarrej MN, Quake SR, Relman DA, Snyder MP, Sylvester KG, Shaw GM, Wong RJ. Towards Personalized Medicine in Maternal and Child Health: Integrating Biologic and Social Determinants. *Pediatric Research* 2020 (doi: 10.1038/s41390-020-0981-8).
12. Davis KD, PhD, Aghaeepour N, Ahn AH, **Angst MS**, Borsook D, Brenton A, Burczynski ME, Crean C, Edwards R, Gaudilliere B, Hergenroeder GW, Iadarola MJ, Iyengar S, Jiang Y, Kong JT, Mackey S, Saab C, Sang CN, Scholz J, Segerdahl M, Tracey I, Veasley C, Wang J, Wager TD, Wasan AD, Pelleymounter MA. Discovery and Validation of Biomarkers to Develop Non-Addictive Therapeutics for Pain: Challenges and Opportunities. *Nat Rev Neurol* 2020 (doi: 10.1038/s41582-020-0362-2).
13. Hao S, Zhao H, You J, Chen L, Huang Y, Zheng L, Tian L, Maric I, Liu X, Li T, Bianco YK, Winn VD, Aghaeepour N, Gaudilliere B, **Angst MS**, Zhou X, Li Y, Mo L, Wong RJ, Shaw GM, Stevenson DK, Cohen HJ, McElhinney DB, Sylvester KG, Ling XB. Changes in pregnancy-related serum biomarkers early in gestation are associated with later development of preeclampsia. *PLoS One* 2020;15:e0230000.
14. Peterson LS, Stelzer IA, Tsai AS, Ghaemi MS, Han X, Kazuo Ando K, Winn VD, Martinez NR, Contrepolis K, Moufarrej MN, Relman DA, Snyder MS, Shaw GM, Stevenson DK, Wong RJ, Arck P, **Angst MS**, Aghaeepour N, Gaudilliere B. Multiomic Immune Clockworks of Pregnancy. *Semin Immunopathol* 2020 (doi: 10.1007/s00281-019-00772-1).
15. Van Gassen S, Gaudilliere B, **Angst MS**, Yvan Saeys Y, Aghaeepour N. CytoNorm: A Normalization Tool for Cytometry Data. *Cytometry A*, 2020; 97:268-278.
16. Gaudilliere DK, Culos A, Djebali K, Tsai AS, Ganio EA, Choi WM, Maghaireh A, Choisy B, Ando K, Baca Q, Bertrand B, Einhaus JF, Hedou JJ, Fallahzadeh R, Ghaemi MS, Han X, Okada R, Stanley N, Tanada A, Tingle M, Alpagot T, Helms JA, **Angst MS**, Aghaeepour N, Gaudilliere B. Systemic Immunological Consequences of Chronic Periodontitis. *J Dent Res*. 2019; 98:985-993.
17. Han X, Ghaemi MS, Ando K, Peterson L, Ganio E, Tsai A, Gaudilliere D, Einhaus J, Stanley N, Culos A, Tanada A, Tsai E, Wong R, Winn VD, Druzin ML, Blumenfeld Y, Quintance C, Gibbs R, Lewis D, Carvalho B, Shaw GM, Stevenson DK, **Angst MS***, Aghaeepour N*, Gaudilliere B* (*co-senior authors). Differential Dynamics of the Maternal Immune System in Healthy Pregnancy and Preeclampsia. *Front Immunol* 2019;10:1305.
18. Baca QJ, Marti M, Poblete B, Gaudilliere B, Aghaeepour N*, **Angst MS*** (*co-senior authors). Predicting Acute Pain after Surgery: A Multivariate Analysis. *Ann Surg* 2019; doi: 10.1097/SLA.0000000000003400.

19. Tsai A, Berry K, Beneyto MM, Gaudilliere D, Quach L, Ganio E, Lansberg M, **Angst MS**, Drag L, Gaudilliere B, Buckwalter MS, Aghaeepour N. Deep Profiling of the Systemic Immune Response to Stroke over the Course of One Year in Humans. *Brain* 2019;142:978-991.
20. Ghaemi MS, Callahan B, Contrepois K, DiGiulio DB, Lee BA, Lehallier B, Ngo T, Mcilwain D, Rosenberg-Hasson Y, Wong RJ, Culos A, Tanada A, Tsai A, Gaudilliere D, Ganio E, Han X, Ando K, McNeil L, Okada R, Tingle M, Maric I, Wyss-Coray T, D Winn VD, Druzin ML, Gibbs R, Darmstadt GL, B Lewis DB, Nia VP, Agard B Maecker H, Nolan G, Tibshirani R, Snyder MP, Relman D, Quake SR, Shaw G, Stevenson D, **Angst MS***, Gaudilliere B*, Nima Aghaeepour N*. Multiomics Modeling of the Immunome, Transcriptome, Microbiome, Proteome, and Metabolome Adaptations during Human Pregnancy. *Bioinformatics* 2019; 35:95-103. (*co-senior authors)
21. Stevenson D, Wong R, Aghaeepour N, **Angst MS**, Darmstadt G, DiGiulio D, Druzin M, Gaudilliere B, Gibbs R, Gould J, Katz M, Li J, Moufarrej M, Quaintance C, Quake S, Relman D, Shaw G, Snyder M, Wang X, Wise P. Understanding health disparities. *J Perinatol* 2019; 39:354-358.
22. Aghaeepour N, Simonds EF, Knapp DJ, Bruggner RV, Sachs K, Culos A, Gherardini PF, Samusik N, Bendall SC, Fragiadakis GK, Gaudilliere B, **Angst MS**, Eaves CJ, Weiss WA, Fantl WJ, Nolan GP. GateFinder: Projection-based Gating Strategy Optimization for Flow and Mass Cytometry. *Bioinformatics* 2018; 34:4131-4133.
23. Berger M, Schenning KJ, Brown CH 4th, Deiner SG, Whittington RA, Eckenhoff RG, **Angst MS**, Avramescu S, Bekker A, Brzezinski M, Crosby G, Culley, DJ, Eckenhoff M, Eriksson LI, Evered L, Ibinson J, Kline RP, Kofke A, Ma D, Mathew JP, Maze M, Orser BA, Price CC, Scott DA, Silbert B, Su D, Terrando N, Wang DS, Wei H, Xie Z, Zuo Z; Perioperative Neurotoxicity Working Group. Best Practices for Postoperative Brain Health: Recommendations from the Fifth International Perioperative Neurotoxicity Working Group. *Anesth Analg* 2018; 127:1406-1413.
24. Aghaeepour N, Lehallier B, Ganio EA, Baca Q, Wong RJ, Quaintance C, Winn VD, El-Sayed YY, Blumenfeld Y, Druzin ML, Gibbs RS, Shaw GM, Stevenson DK, Tibshirani R, Gaudilliere B, **Angst MS**. A Proteomic Clock of Pregnancy. *Am J Obstet Gynecol* 2018; 218:347.
25. Wise PH, Shaw GM, Druzin ML, Darmstadt GL, Quaintance C, Makinen E, Relman DA, Quake SR, Butte AJ, **Angst MS**, Muglia LJ, Macones G, Driscoll D, Ober C, Simpson JL, Katz M, Howse J, Stevenson SK. Risky Business: Meeting the Structural Needs of Convergent Science. *J Pediatr* 2017; 191:255-58.
26. Aghaeepour N, Ganio EA, Mcilwain D, Tsai AS, Tingle M, Van Gassen S, Gaudilliere DK, Baca Q, McNeil L, Okada R, Furman D, Wong RJ, Winn VD, Druzin ML, El- Sayed Y, Quaintance C Gibbs R, Darmstadt GL, Shaw GM, Stevenson DK, Tibshirani R, Nolan GP, Lewis DB, **Angst MS**, Gaudilliere B. An Immune Clock of Human Pregnancy. *Sci Immunol* 2017; 15:1-11.
27. Aghaeepour N, Tingle M, Ganio E, Lancero HL, McNeil L, Okada RL, Kin C, Shelton A, **Angst MS***, Gaudilliere B* (*co-senior authors). Deep Immune Profiling of an Arginine-Enriched Nutritional Intervention in Patients Undergoing Surgery. *J Immunol* 2017 9. pii: ji1700421
28. Tzabazis A, Kori S, Mechanic J, Miller J, Pascual C, Manering N, Carson D, Klukinov M, Spierings ELH, Jacobs D, Cuellar J, Frey II W, Hanson L, **Angst MS**, Yeomans D. Oxytocin and Migraine Headache. *Headache* 2017; 57:64-75.
29. Castellano JM, Mosher KI, Abbey RJ, Berdnik D, Shen JC, Zhou B, Xie XS, Tingle M, **Angst MS**, Wyss-Coray T. Human Umbilical Cord Plasma Proteins Revitalize Hippocampal Function in Aged Mice. *Nature*, 2017; 544:488-92.
30. Blazkova J, Gupta S, Liu Y, Gaudilliere B, Ganio E, Bolen CR, Saar-Dover R, Fragiadakis GK, **Angst MS**, Aghaeepour N, Stevenson D, Chaussable D, Altman M, Kaplan MJ, Davis MM, Furman D. Multicenter Systems Analysis of Human Blood Reveals Immature Neutrophils in Males and During Pregnancy. *J Immunol*, 2017;198:2479-2488.
31. Fragiadakis GK, Baca QJ, Gherardini PF, Ganio EA, Gaudilliere DK, Tingle T, Lancero HL, McNeil L, Okada RL, Spitzer MH, Wynn VD, Wong RJ, Shaw GM, Darmstadt GL, Sylvester KG, Carvalho B, Lewis DB, Stevenson DK, Nolan GP, Aghaeepour N, **Angst MS**, Gaudilliere B. Mapping the Interface of Fetomaternal Immunity at Term Pregnancy. *J Immunol* 2016, 197:4482-4492.

32. Edwards RR, Dworkin RH, Turk DC, **Angst MS**, Dionne R, Freeman R, Hansson P, Haroutounian S, Arendt-Nielsen L, Attal N, Baron R, Brell J, Bujanover S, Burke LB, Carr D, Chappell AS, Cowan P, Etropolski M, Fillingim RB, Gewandter JS, Katz NP, Kopecky E, Lin AH, Markman JD, Nomikos G, Porter L, Rappaport BA, Rice A, Scavone J, Scholz J, Simon LS, Smith SM, Tobias J, Tockarshewsky T, Veasley C, Versavel M, Wasan A, Wen W, Yarnitsky D. Patient Phenotyping in Analgesic Clinical Trials: IMMPACT Recommendations. *Pain* 2016; 157:1851-71.
33. Tzabazis A, Jacobs D, Mechanic J, Miller J, Pascual C, ManFrey N, Klukinov M, Cuellar J, Frey II W, Carson D, **Angst MS**, Yeomans DC. Oxytocin Receptor: Expression in the Trigeminal Nociceptive System and Potential Role in the Treatment of Headache Disorders. *Cephalgia* 2016; 36:943-50.
34. Fragiadakis GK, Brice Gaudillière, Ganio EA, Aghaeepour N, Tingle M, Nolan GP, **Angst MS**. Patient-specific Immune States before Surgery are Strong Correlates of Surgical Recovery. *Anesthesiology* 2015; 123:1241-55.
35. Gaudilliere B, Ganio EA, Tingle, Lancero H M, Fragiadakis GK, Baca QJ, Nolan GP, **Angst MS**. Implementing mass cytometry at the bedside to study the immunological basis of human diseases: Distinctive immune features in patients with a history of term and preterm birth. *Cytometry A*, 2015; 87:817-29.
36. Gaudilliere B, Fragiadaki GK, Bruggner RV, Nicolau M, Rachel F, Tingle M, Silva J, Ganio EA, Yeh CG, Maloney WJ, Huddleston JI, Goodman SB, Davis MM, Bendall SC, Fantl WJ, Nolan GP*, **Angst MS***. Clinical recovery from surgery correlates with single-cell immune signatures. *Sci Transl Med* 2014;6:255ra131 (*co-senior authors)
37. Ginosar Y, Riley ET, **Angst MS**. Analgesic and Sympatholytic Effects of Low-dose Intrathecal Clonidine Compared with Bupivacaine: A Dose-response Study in Female Volunteers. *Br J Anaest* 2013;111:256-63.
38. Pepper A, Li W, Kingery WS, **Angst MS**, Curtin CM, Clark JD. Complex Regional Pain Syndrome-Like Changes in Patients after Surgery and Immobilization. *J Pain* 2013;14:516-24.
39. Carvalho B, Clark DJ, **Angst MS**. Postoperative subcutaneous instillation of low-dose ketorolac but not hydromorphone reduces wound exudate concentrations of interleukin-6 and interleukin-10 and improves analgesia following cesarean delivery. *J Pain* 2013; 14:48-56.
40. Bayman EO, Chaloner KM, Hindman BJ, Todd MM; **IHAST Investigators**. Bayesian Methods to Determine Performance Differences and to Quantify Variability Among Centers in Multi-center Trials: the IHAST Trial. *BMC Med Res Methodol* 2013; 13:5. doi: 10.1186/1471-2288-13-5.
41. Oertel BG, Vermehren J, Zimmermann M, Huynh TT, Ferreiros N, Doehring A, Schmitz-Rixen T, Geisslinger G, Harder S, **Angst MS**, Lötsch J. Re-evaluation of Safety and Necessity of Arterial Blood Sampling for Remifentanyl Pharmacokinetic-pharmacodynamic Assessments. *Clin Pharmacokinet* 2012;5:629-38.
42. Chu LF, D'Arcy N, Brady C, Zamora A, Young C, Kim J, **Angst MS**, Clark JD. Analgesic Tolerance but no Opioid-induced Hyperalgesia: A Double-blinded, Randomized, Placebo-controlled Trial of Sustained-release Morphine for the Treatment of Chronic Non-radicular Low Back Pain. *Pain* 2012; 153:1583-92.
43. **Angst MS**, Phillips NG, Drover DR, Tingle M, Swan GE, Lazzeroni LC, Clark DJ. Aversive and Reinforcing Opioid Effects: A pharmacogenomic Twin Study. *Anesthesiology* 2012; 117:22-37.
44. Ruau D, Dudley JT, Chen R, Phillips NG, Swan GE, Lazzeroni LC, JD Clark, Butte AJ, **Angst MS**. Integrative Approach to Pain Genetics Identifies Pain Sensitivity Loci Across Diseases. *PLoS Computational Biology* 2012; 8:6.
45. **Angst MS**, Phillips NG, Drover DR, Tingle M, Swan GE, Lazzeroni LC, Clark DJ. Pain Sensitivity and Opioid Analgesia: A pharmacogenomic Twin Study. *Pain* 2012; 153:1397-1409.
46. Chu LF, Cun T, Ngai LK, Kim J, Zamora AK, Young CA, **Angst MS**, Clark JD. Modulation of Remifentanyl-induced Post-infusion Hyperalgesia by the beta-adrenergic Antagonist Propranolol in Humans. *Pain* 2012: 153:974-81.
47. Ruau D, Liu LY, Clark JD, **Angst MS**, Butte AJ. Sex Differences in Reported Pain across 12,000 Patients Captured in Electronic Medical Records. *J Pain* 2012; 13:228-34.
48. Chu LF, Dairmont J, Zamora AK, Young CA, **Angst MS**. The Endogenous Opioid System is Not Involved in Modulation of Opioid-Induced Hyperalgesia. *J Pain* 2011; 12:108-115.

49. Boyer K, **Angst MS**, Asay J, Giori NJ, Andriacchi TP Sensitivity of Gait Parameters to the Effects of Anti-inflammatory and Opioid Treatments in Knee Osteoarthritis Patients. *J Orthop Res.* 2011; 30:1118-24.
50. Tzabasis AZ, Klukinov M, Crottaz-Herbette S, Nemenov MI, **Angst, MS**, Yeomans DC. Selective Nociceptor Activation in Volunteers by Infrared Diode Laser. *Mol Pain* 2011; 7:18.
51. Carvalho B, Aleshi P, Horstman D, **Angst MS**. Effect of a Preemptive Femoral Nerve Block on Cytokine Release and Hyperalgesia in Experimentally Inflamed Skin of Human Volunteers. *Reg Anesth Pain Med* 2010; 35:514-9.
52. Hu Y, Liang D, Li X, Liu H, Zhang X, Zheng M, Dill D, Shi X, Qiao Y, Yeomans D, Carvalho B, **Angst MS**, Clark JD, Peltz G. The Role of IL-1 in Wound Biology Part I: Murine in Silico and in Vitro Experimental Analysis. *Anesth Analg* 2010; 111:1525-33.
53. Hu Y, Liang D, Li X, Liu H, Zhang X, Zheng M, Dill D, Shi X, Qiao Y, Yeomans D, Carvalho B, **Angst MS**, Clark JD, Peltz G. The Role of IL-1 in Wound Biology Part II: In vivo and Human Translational Studies. *Anesth Analg* 2010; 111:1434-42.
54. Carvalho B, Clark JD, Yeomans DC, M, Qiao Y, **Angst MS**. Continuous Subcutaneous Instillation of Bupivacaine Compared to Saline Reduces Interleukin 10 and Increases Substance P in Surgical Wounds after Cesarean Delivery. *Anesth Analg* 2010; 111:1452-9.
55. **Angst MS**, Phillips NG, Drover DR, Tingle M, Galinkin JL, Christians U, Swan GE, Lazzeroni LC, Clark DJ. Opioid Pharmacogenomics Using a Twin Study Paradigm: Methods and Procedures for Determining Familial Aggregation and Heritability. *Twin Res Hum Genet* 2010; 13:412-25.
56. Nekhendzy V, Lemmens HJ, Tingle M, Nekhendzy M, **Angst MS**. The Analgesic and Antihyperalgesic Effects of Transcranial Electrostimulation with Combined Direct and Alternating Current in Healthy Volunteers. *Anesth Analg* 2010; 111:1301-7.
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58. Scuderi GJ, Woolf N, Dent K, Golish SR, Bowser R, Cuellar JM, Cuellar VG, Yeomans DC, Carragee EJ, **Angst MS**, Hanna LS. Identification of a Complex between Fibronectin and Aggrecan G3 Domain in Synovial Fluid of Patients with Painful Meniscal Pathology. *Clin Biochem* 2010;43:808-14.
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60. Oertel BG, Felden L, Tran PV, Bradshaw MH, **Angst MS**, Schmidt H, Greer JJ, Geisslinger G, Varney MA, Lotsch J. Selective Antagonism of Opioid-induced Respiratory Depression by Ampakines in Humans Without Loss of Opioid Analgesia. *Clin Pharmacol Ther* 2010;87:204-11.
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62. Hindman BJ, Bayman EO, Pfisterer WK, Torner JC, Todd MM; **IHAST Investigators**. No Association between Intraoperative Hypothermia or Supplemental Protective Drug and Neurologic Outcomes in Patients Undergoing Temporary Clipping during Cerebral Aneurysm Surgery: Findings from the Intraoperative Hypothermia for Aneurysm Surgery Trial. *Anesthesiology* 2010; 112:86-101.
63. Scuderi GJ, Cuellar JM, Gabrovsky V, Yeomans DC, Carragee EJ, **Angst MS**. Epidural Interferon Gamma- immunoreactivity: A Biomarker for Lumbar Nerve Root Irritation. *Spine* 2009;34:2311-7.
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 61. Chu LF and **Angst MS**. Acute Opioid Tolerance in Humans: Some Evidence in Models of Acute Experimental Pain. *ASA* 2004.
 62. Chu LF, **Angst MS**, Clark JD. Measurement of Opioid-induced Tolerance and Hyperalgesia in Pain Patients on Chronic Opioid Therapy. *APS* 2004.
 63. **Angst MS**, Pahl I, Koppert W, Schmelz M. A Short Infusion of Remifentanil Aggravates Secondary Hyperalgesia in Humans. *IASP* 2002.
 64. Koppert W, **Angst MS**, Alsheimer M, Sittl R, Schmelz M, Schüttler R. Effects of S-Ketamine on Remifentanil-induced Hyperalgesia in a New Human Pain Model. *ESA* 2002.
 65. Ginosar Y, Riley ET, **Angst MS**. Epidural Bolus Administration and Continuous Epidural Infusion of Fentanyl Differ in Their Mode of Action. *ASA* 2001.
 66. Brock-Utne JG, Smith DL, **Angst MS**, De Battista C. Remifentanil and Low Dose Methohexital Increases Seizure Duration during ECT versus Methohexital Alone. *IARS* 2001.
 67. Lotsch J, Geisslinger G, **Angst MS**. Single-day Trial on Analgesic Remifentanil Effects. *World Conference Clin Pharm Ther* 2000.
 68. **Angst MS**, Drover DR, Naidu S, Rhamaswamy B. Single Oral Dose of Sustained Release Hydromorphone Provides Long-lasting Analgesia in Humans. *APS* 1999.
 69. **Angst MS**, Drover DR, Naidu S, Rhamaswamy B. Single Dose SR-Hydromorphone Provides Sustained Analgesia for more than 24-Hours. *ASA* 1999.
 70. Drover DR, **Angst MS**, Naidu S, Lotsch J. An Inverse Gaussian Density Function Provided an Adequate Model to Describe the Absorption Characteristics of Sustained Release Hydromorphone. *ASA* 1999.
 71. Drover DR, **Angst MS**, Naidu S, Rhamaswamy B. The Population Pharmacokinetics of Hydromorphone. *ASA* 1999.
 72. Drover DR, **Angst MS**, Naidu S, Rhamaswamy B. The Pharmacokinetics of Hydromorphone. *ASA* 1999.
 73. Lotsch J, Tegeder I, **Angst MS**, Geisslinger G. Antinociceptive Effects of Morphine-6-glucuronide in Homozygous mdr1a P-Glycoprotein Knockout and in Wildtype Mice in the Hotplate Test. *Br Pharm Soc* 1999.
 74. Zupfer GH, Wiggins MH, **Angst MS**, Jaffe RA, Brock-Utne JG. Delayed Onset of Ischemic Pain in Humans Receiving Glucose Containing IV Regional Anesthesia – A Preliminary Study. *ASA* 1998.
 75. Wiggins MH, Zupfer GH, Jaffe RA, **Angst MS**, Brock-Utne JG. The Addition of 5% Glucose Does not Delay the Onset of Tourniquet Pain During Bier Block Anesthesia. *IARS* 1998.
 76. **Angst MS**, Poree LR, Ramaswamy B. Reliable Quantification of Opioid Analgesia with a New Experimental Pain Model in Man. *Am Soc Clin Pharm Ther* 1997.
 77. Tatura C, Mackey S, Zupfer G, **Angst MS**, Dyck JB, Brock-Utne J. Rapid Add Site, a New Double-Lumen Extension Set, Reduces Pain Caused by Propofol. *IARS* 1997.
 78. **Angst MS**, Poree LR, Dyck JB. Evaluation of Sequential, Centering and Spacing Bias in a New Experimental Pain Model in Humans. 8th World Congress on Pain 1996.
 79. Poree LR, **Angst MS**, Dyck JB. Evaluation of a New Experimental Electrical Pain Model in Humans. *IASP* 1996.
 80. **Angst MS**, Brose WG, Dyck JB. IV Methadone Titration: Significant Difference in Lag Times to Peak

Analgesia and Sedation. American Society of Clinical Pharmacology and Therapeutics, 1996.

81. **Angst MS**, Brose WG, Schnider TW, Dyck JB. Different Times to Peak Effect for Analgesia and Sedation: Impact on IV Methadone Titration. Annual Meeting of the International Anesthesia Research Society, 1996.
82. Bevan DR, Kuhwagi R, Shanks CA, Fragen R, Bikhazi G, Deepika K, Dyck JB, **Angst MS**. ORG 9487 - A New Rapid Onset Muscle Relaxant: Dose Ranging Study in Adults. IARS 1996.
83. **Angst MS**, Brose WG, Dyck JB. Pre-Exposure to the Full Analgesic Range is Required for Consistent Use of the Visual Analog Scale During Analgesic Trials. APS 1995.
84. Brose WG, **Angst MS**, Macario A, Harrapat S. Optimizing Treatment of Chronic Intractable Pain with Methadone: Empiric Oral Dosing versus Computer Controlled Intravenous Titration. ASA 1995.
85. **Angst MS**, Brose WG, Dyck JB. Simultaneous Assessment of Pain Level and Pain Relief: Implications for Analgesic Trials. AUA 1995.

VI. Editorial Services

A. Member of Editorial Board

2012 – 2014	Section Editor Pain and Analgesic Mechanisms, Anesthesia & Analgesia
2010 – 2012	Editor, Anesthesia & Analgesia
2007 – 2010	Associate Editor, Anesthesia & Analgesia
2010 – 2019	Associate Editor, European Journal of Pain

B. Other Peer Review Activities

2002 – present	Editorial review boards: Anesthesiology, Anesthesia & Analgesia, Annals of Surgery, British Journal of Anesthesia, British Medical Journal, European Journal of Pain, Experimental Neurology, Journal of Pain, Molecular Pain, Pain, PLOS Medicine, Science.
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VII. Grants

A. Novel Initiatives

2012 – 2017	Department of Anesthesia, Stanford University School of Medicine “Mass cytometry: A systems-based approach for studying immune health in surgery and anesthesia” Role: Primary Investigator
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B. Peer Reviewed Grants

Submitted	Templeton World Charity Foundation “Hypnosis for Pain and Anxiety Control during Radio-surgical Treatment of Bone Metastases” Role: Co-investigator (Spiegel)
Submitted	IARS, Mentored Research Training Grant “Investigating Cognitive Decline after Cardiac Surgery: A Magnetic Resonance Spectroscopy Approach” Role: Primary mentor
2020-2025	NIH, R35 NIGMS Machine Learning Analysis of the Immune System

2020 – 2025
Role: Co-investigator (Aghaeepour)
NIH, R21/33 NIAAA
“Building a Platform for Precision Anesthesia for the Geriatric Surgical Patient”

2020 – 2025
Role: Co-investigator (Drover)
NIH, R01 NINDS
“B Lymphocyte-Mediated Autoimmunity in Pain after Trauma”

2020 – 2021
Role: Site PI (Clark)
FIDL Award, Department of Anesthesiology, Stanford University
“Oxidative Stress and Surgical Outcomes”

2019 – 2024
Role: Co-investigator (Clark)
NIH, R61/33 NINDS (NS114926)
“Signatures of Pain Recovery in Teens (SPRINT)”

2019 – 2023
Role: Co-investigator (Simons)
Career Award at the Scientific Interface, Burroughs Welcome Fund
“Multiomics Modeling of the Immunological Clock of Pregnancy”

2019 – 2021
Role: Collaborator (Aghaeepour)
SCA/IARS, Mid-Career Research Grant
“Enhanced Recovery after Cardiac Surgery with Erector Spinae Plane Catheters: A Prospective, Randomized, Placebo Controlled Trial”

2019 – 2021
Role: Co-investigator (Brodt)
ASRA, Young Investigator Award
“Enhanced Recovery with Erector Spinae Plane Blockade after Pediatric Cardiac Surgery: A Prospective Randomized Controlled Trial”

2019 – 2020
Role: Mentor (Nasiri)
ITI Center for Systems Immunology & Bill/Melinda Gates Foundation Pilot Grant
“Machine Learning for Integrated Multiomics Analysis of Preeclampsia”

2019 – 2020
Role: co-PI
ITI Center for Systems Immunology & Bill/Melinda Gates Foundation Pilot Grant
“Identifying a Predictive Immune Signatures of Preeclampsia”

2019 – 2020
Role: co-PI
Stanford Maternal and Child Health Research Institute – Transdisciplinary Initiatives Program
“Maternal Life Stress, Prenatal Inflammation, and the Developmental Origins of Child Temperament”

2018 – 2023
Role: Co-investigator (Gotlib)
NIH, R01 NIA (AG058417-0251 Supplement)
“Dietary Modulation of Neuro-inflammation in Age-Related Memory Disorders”

2018 – 2023
Role: Stanford site PI (Sloan, Columbia)
NIH, R01 NIA (AG058417)
“Dietary Modulation of Neuro-inflammation in Age-Related Memory Disorders”

2018 – 2022
Role: Stanford site PI (Sloan, Columbia)
NIH, R01 NHLBI (HL139844)
“Preeclampsia to cardiovascular disease: Life course analysis of biomarkers and risks”

2018 – 2020
Role: Co-investigator (Hlatky & Winn)
NIH, R21 NIDCR (DE027728)
“Identifying a Systemic Immune Signature of Periodontal Disease with Mass Cytometry”

2018 – 2020
Role: Co-investigator (Gaudilliere)
American Heart Association, Innovative Project Award

“A systems-based mass cytometry approach to study the post-cardiac arrest immune response”
 Role: Co-investigator (Hirsch)
 2016 – 2021
 March of Dimes (Stanford Prematurity Research Center)
 “Immune Mechanisms and Proteomic Signatures Predicting and Determining Preterm Birth”
 Role: co-PI
 2018 – 2020
 Bill and Melinda Gates Foundation
 “Maternal and fetal markers for new biology and maternal/fetal/newborn birth risk”
 Role: co-PI
 2016 – 2019
 NIH, T32-GM089626 (Anesthesia Training Grant in Biomedical Research)
 “The Effects of Lidocaine on Pain Trajectories and Immune Responses after Hip Arthroplasty”
 Role: Primary Mentor (Baca)
 2017 – 2018
 SPARK Translational Research Program Stanford University
 “Cocoa Flavanols for Modulating the Immune Response to Surgery and Accelerate Recovery”
 Role: Principal Investigator
 2017 – 2018
 Lukas Center Grant, Stanford University School of Medicine Seed Grant
 “Cognitive Decline after Cardiac Surgery: A Multimodal Magnetic Resonance Spectroscopy Approach”
 Role: Co-investigator
 2014 – 2018
 Stanford Neuroscience Institute
 “The Stroke Collaborative Action Network: Redefining Stroke Recovery”
 Role: Co-investigator
 2014 – 2018
 NIH, K23-GM111657
 “Role of Myeloid-derived Suppressor Cells in the Immune Response to Surgery”
 Role: Mentor (Gaudilliere)
 2017
 Prematurity Research Center Stanford University School of Medicine
 “A Proteomic Signature of Preeclampsia”
 Role: Principal Investigator
 2016 – 2017
 HPI Hasso Plattner Institute
 “Human Technology Teamwork: Enabling Clinicians to Focus on Complex Design Thinking Tasks through Advances in IT Systems Engineering: Tools to Improve Human-centered Communication between Patients and Providers”
 Role: Co-investigator
 2016 – 2017
 Robert Butler Columbia Aging Center
 “Plasticity in Recovery from Surgery: The Effects of Exercise Prehabilitation on Cognitive and Functional Recovery after Shoulder Replacement Surgery in Older Adults”
 Role: Co-investigator
 2013 – 2017
 NIH, K23-HD07097201
 “Postpartum Hemorrhage and Anemia: Epidemiologic and Cost-Effectiveness Analyses”
 Role: Mentor (Buttwick)
 2014 – 2016
 Bill & Melinda Gates Foundation
 “Use of Molecular Features in Peripheral Blood to Understand Relationships between Microbiome and Host in the Setting of Preterm Birth”
 Role: Co-investigator
 2013 – 2016
 Stanford University School of Medicine, BioX Graduate Fellowship “Systems-

analysis of the Human Immune Response to Surgery”
 Role: Mentor and Faculty Advisor
 2013 – 2015 March of Dimes (Stanford Prematurity Research Center)
 “Characterizing Immune Signatures in Preterm Labor with Single Cell Mass
 Cytometry”
 Role: Co-PI
 2013 – 2014 NIH, T32-GM089626 (Anesthesia Training Grant in Biomedical Research)
 “Systems Analysis of the Human Immune Response to Surgical Trauma”
 Role: Primary Mentor (Gaudilliere)
 2008 – 2012 NIH, R01-DA023063-01
 “Opioid Efficacy: A Twin-study”
 Role: Principal Investigator
 2008 – 2011 DARPA, W911NF-07-1-0462 (Phase II)
 “Feedback Regulated Drug Delivery System Based on Polymer Hydrogels and
 Vesicles”
 Role: Consortium Principal Investigator
 2009 – 2010 NIH, 1R43-DA027259-01
 “Intranasal Nociceptin for the Treatment of Migraine and Head Pain”
 Role: Consultant (Trigemina Inc.)
 2008 – 2010 ITII, Stanford Institute for Immunity, Transplantation and Infection
 “A Systems Biology Approach for Discovery of Biomarkers for Inflammatory
 Pain”
 Role: Principal Investigator
 2008 – 2010 NIH, 1R43-DA026228-01
 “Naso-cerebral Administration of Peptides for Temporo-mandibular Joint Pain”
 Role: Consultant (Trigemina Inc.)
 2007 – 2008 DARPA, W911NF-07-1-0462 (Phase I)
 “Feedback Regulated Drug Delivery System Based on Polymer Hydrogels and
 Vesicles”
 Role: Consortium Principal Investigator
 2007 Department of Anesthesia, Stanford University School of Medicine – Seed Grant
 “Pilot-Study: Heritability of Opioid Analgesia”
 Role: Principal Investigator
 2006 – 2008 NIH, K12
 “Chronic Persistent Pain Following Cesarean Delivery: The Role of Wound
 Cytokines”
 Role: Primary Mentor (Carvalho)
 2005 – 2007 Department of Anesthesia, Stanford University School of Medicine – Seed Grant
 “Effects of Trans-cranial Electro-stimulation on Pain Perception, Cognition and
 Mood in Human Volunteers”
 Role: Mentor and Senior Investigator (Nekhendzy)
 2005 – 2006 Department of Anesthesia, Stanford University School of Medicine – Seed Grant
 “Effect of Nicotine on Inflammatory & Nociceptive Biomarkers in a Sunburn
 Model of Hyperalgesia in Healthy Volunteers”
 Role: Principal Investigator
 2004 – 2009 NIH, K23
 “Opiate-induced Tolerance & Hyperalgesia in Pain Patients”
 Role: Mentor (Chu)
 2004 – 2005 Department of Anesthesia, Stanford University School of Medicine – Seed Grant
 “Human Biomarkers of Inflammation and Nociception: Validation of an in-vivo
 Model”

2003 – 2004 Role: Principal Investigator
 Foundation for Anesthesia Education and Research
 “Opiate-induced Tolerance & Hyperalgesia in Pain Patients”

2002 – 2004 Role: Mentor (Chu)
 Foundation for Anesthesia Education and Research
 “Differential Rate for the Development of Acute Tolerance to Opioid Induced Analgesia, Respiratory Depression and Sedation”

2001 – 2002 Role: Principal Investigator
 Department of Anesthesia, Stanford University School of Medicine – Seed Grant
 “Gender and Rate Differences in Acute Tolerance and Withdrawal to the Analgesic, Sedative, and Respiratory Depressant Effects of Opioids”.

2000 – 2001 Role: Principal Investigator
 Department of Anesthesia, Stanford University School of Medicine – Seed Grant
 “Experimental Model of Acute Opioid Tolerance and Withdrawal in Man”
 Role: Principal Investigator

C. Grants/support from Industry

2019 – 2021 Alkahest, San Carlos, CA
 “A randomized, placebo-controlled pilot study to evaluate the effect of GRF6019 on intracellular signaling cascades in blood leukocytes and post-surgery recovery of participants undergoing primary hip or knee arthroplasty”
 Role: Principal Investigator

2016 SomaLogic, Boulder, CO
 “Aptamer Technology to Infer Gestational Age in the Plasma Proteome”
 Role: Principal Investigator

2008 Scientific Imaginetics, Beverly Hills, CA
 “Analgesic and Anti-inflammatory Effects of Electromagnetic Therapy (TMR™) in Humans”
 Role: Principal Investigator

2007 I-Flow Corporation, Lake Forest, CA
 “Continuous Administration of Bupivacaine and Ketamine to Surgical Wounds via the Follow-on Pain Buster System: Analgesic, Anti-hyperalgesia and Anti-inflammatory Effects.”
 Role: Principal Investigator

2006 Organon Pharmaceuticals Inc., Roseland, NJ
 A Multi-center, Randomized, Phase III Trial Assessing the PK/PD of Org 25969 in Subjects of Various Ages. 2015-present
 Role: Co-investigator

2005 Organon Pharmaceuticals Inc., Roseland, NJ
 A Multi-center, Randomized, Assessor-blinded, Phase II, Parallel Dose-finding Trial to Assess the Efficacy and Safety of Org 25969.
 Role: Co-investigator

2001 – 2002 Physiometrix Inc., Billerica, MA
 “Data Collection Study for PSA 4000 with Hypnos Software Upgrade”
 Role: Co-investigator

2000 – 2001 Cellergy Pharmaceuticals Inc., South San Francisco, CA
 “Pharmacokinetics of Anogestic in Patients with Anal Fissure”
 Role: Co-investigator

1997 – 2001 Knoll Pharmaceutical Company, North Mount Olive, NJ
 “Pharmacokinetics and Pharmacodynamics of Slow Release Hydromorphone in Humans”

1996 – 1997 Role: Principal Investigator
Abbott Inc., Abbott Park, IL
“Analgesic Action of Dexmedetomidine in Humans”

1996 Role: Principal Investigator
Neurobiological Technologies Inc., Richmond, CA
“Pharmacokinetics of Corticotropin-Releasing Factor in Man”

1995 – 1996 Role: Principal Investigator
Organon Inc., West Orange, NJ
“ORG-9487: A New Rapid Onset Muscle Relaxant”
Role: Co-investigator

C. Patents and patent applications

2018 US62/767,957 – Compositions and Methods of Prognosis and Classification
for Preeclampsia

2015 US14/562,401– Methods and compositions for treating aging-associated
conditions

2016 US 9,238,053 – Methods for the treatment of pain

2013 US 8,551,949 – Methods for the treatment of pain

2013 US 8,501,691 – Methods for the treatment of headaches by administration of
oxytocin

2012 US 8,258,096 – Therapy procedure for drug delivery for trigeminal pain

2012 US 8,252,745 – Methods for treatment of headaches by administration of oxytocin

2012 US 8,202,838 – Methods for the treatment of headaches by administration of
oxytocin

2012 US 8,198,240 – Methods for the treatment of headaches by administration of
oxytocin

D. Service as Grant Reviewer

2019 NIH: Special emphasis panel ZRG1 IFCN-L (70) – HEAL Initiative

2017 NIH: Special emphasis panel NCCIH - Phased Innovation Award for Mechanistic
Studies to Optimize Mind Body Interventions in NCCIH High Priority Research
Topics

2011 NIH: Somatosensory and Chemosensory Systems Study Section

2009 NIH: ZRG1 SBIB-V Challenge Grant Panel

2006 NIH, NAIDA: Ad hoc Reviewer

2001 – 2006 Research Grants Council of Hong Kong, China

E. Training/Advisor of Postdoctoral Fellows, Graduate Students and Scholars

2019 – present Jessica Brodt, M.D., Junior Faculty, SCA/IARS Award

2019 – present Tom Caruso, M.D., Junior Faculty, ASRA Award

2019 – present Karen Hirsch, M.D., Junior Faculty, AHA Award

2017 – present Chris Rishel, M.D., FARM fellow, NIH T32 Award

2015 – present Igor Feinstein, M.D., Ph.D., FARM fellow

2014 – 2018 Brice Gaudilliere, M.D., Ph.D., Junior Faculty, NIH K-23 Award

2013 – 2019 Quentin Barca, M.D., Ph.D., FARM fellow, NIH T32 Award

2013 – 2017 Alexander Buttwick, M.D., Junior Faculty, NIH K-23 Award

2012 – 2016 Gabi Fragiadakis, Graduate Student, BioX Graduate Fellow Award

2010 – 2014	Brice Gaudilliere, M.D., Ph.D., FARM fellow, NIH T-32 Award
2011	Ryan Schuber, Medical Student, SSPS Scholar Award
2010	Jeremy Harris, Medical Scholar Fellowship Award (Stanford)
2009 – 2012	David Ruau, Ph.D., Postdoctoral Fellow
2009	Victor Wang, M.D., FAER Medical Student Fellow Award
2006 – 2007	Brooks Rohlen, M.D., Resident in Research
2006 – 2008	Brendan Carvalho, M.D., Junior Faculty, BIRCWH Scholar, NIH K12 Award
2005 – 2007	Jason M. Cuellar, Ph.D., Medical Student, Stanford Scholar Fellowship Award
2005	Marcus Jang, Medical Student
2003 – 2004	Larry F. Chu, M.D., Postdoctoral Fellow, FAER award, NIH K23 Award
1999 – 2001	Yehuda Ginosar, M.D., Postdoctoral Fellow
1998 – 1999	Joern Lotsch, M.D., Visiting Scholar
1997 – 1998	Bhamini Rhamaswamy, M.D., Postdoctoral Fellow

VIII. University Administrative Services

A. *Committee Services*

2020 – present	Research Executive Committee, Department of Anesthesia, Stanford University School of Medicine
2019 – present	CVH Operations Leadership Group, Stanford Cardiovascular Health Service Line
2019 – present	Governance Committee, Department of Anesthesia, Stanford University School of Medicine
2019 – present	Finance Committee, Department of Anesthesia, Stanford University School of Medicine (by faculty vote)
2018 – present	Search committee member: Rolling search for 4 MCL faculties, Department of Surgery, Stanford University School of Medicine
2018	Ad hoc committee for paradigm and compensation review of after-hour OR work, Department of Anesthesia, Stanford University School of Medicine
2017 – 2018	Search committee chair: Division Chief Cardiothoracic Anesthesia, Department of Anesthesia, Stanford University School of Medicine
2016 – present	Stanford Biobank Working Group, Representative for the Department of Anesthesiology, Perioperative and Pain Medicine
2016	Member High Value Care Team for Spine Surgery, Stanford Medicine
2015 – present	Appointment and Promotion Committee, Stanford University School of Medicine
2015	Search committee member: Head bio-banking and population-based genetic research, Division of Cardiovascular Medicine, Department of Medicine, Stanford
2014	Search committee chair: Clinician scientist in pain medicine, Department of Anesthesia, Stanford University School of Medicine
2014	Search committee member: Senior scientist, Department of Anesthesia, Stanford University School of Medicine
2011	Search committee member: Chief of Multi-Specialty Division, Department of Anesthesia, Stanford University School of Medicine
2011	Search committee member: Research faculty, Stanford Neuroscience Institute
2012	Search committee member: Clinician scientist, Critical Care Division, Department of Anesthesia, Stanford University School of Medicine
2013	Search committee member: Clinician scientist in clinical pharmacology, Department of Anesthesia, Stanford University School of Medicine
2009 – 2012	Member of Stanford Hospital Committee for Establishing ICU CNS

2001 – present Pharmacotherapy Guidelines
2000 – 2006 Research Committee Department of Anesthesia
 Admissions Panel, Stanford University School of Medicine

B. Leadership Roles

2019 – present Director of CTA Strategic Initiatives and Operations
2011 – present Leader of Programmatic Initiative for the Study of Perioperative Immunity at
 Stanford Hospital and Clinics
2007 – 2013 Founder/Chair: Working Group of Pain and Inflammation, Institute of Immunity,
 Transplantation and Infection (ITI)
1996 – 2011 Founder/Director: Stanford Human Pain Laboratory

IX. Services to Professional Organizations

A. Professional Memberships

2015 – present Shock Society
2015 – present American Association of Immunologists
2009 – present Association of University Anesthesiologists
1997 – 2000 American Society for Clinical Pharmacology and Therapeutics
1996 – present International Anesthesia Research Society
1995 – 2014 International Association for the Study of Pain
1995 – 2014 American Pain Society
1995 – present California Society of Anesthesiologists
1995 – present American Society of Anesthesiologists

B. Committee Services

2008 – 2009 Member of National Panel on Establishing Opioid Research Guidelines
2004 – 2016 Faculty of 1000 Medicine: General Pharmacology Section

X. Other Services/Activities

A. Consulting

Patent Litigation: 1. Sidley Austin LLP,
 2. Gowling Lafleur & Henderson LLP,
 3. Ropes & Gray LLP

B. Member of Scientific Advisory Boards

1. SiteOne Therapeutics, Bozeman, MT, USA
2. Cytonics Inc., West Palm Beach, FL, USA
3. AfaSci Research Laboratories, Redwood City, CA, USA
4. Trigemina Inc., Moraga, CA, USA

XI. Presentations/Lectures/Workshops

1. Presentation/lectures/workshops 2020 cancelled because of COVID-19
2. Cocoa Flavanols for Modulating the Surgical Immune Response and Accelerating Clinical Recovery – Final Results, SPARK Stanford, 2019.
3. Persistent Postsurgical Pain - Pathophysiology and Preventive Strategies: Perioperative Inflammation and Immune Response, ASA, Orlando 2019.
4. Intraoperative Opioids: Postoperative Consequences, Opioid-free Anesthesia, and Nociception-Index Guided Anesthesia, IARS, Montreal 2019.
5. Shifting Gears – Biological Hall Marks of Surgical Recovery, Shock, San Diego, 2019
6. Signals to Begin Labor – Inflammation and PTL, March of Dimes, Washington DC 2019.
7. Immune Signatures for Risk Profiling of Surgical Patients, Intensive Care Symposium, Switzerland, 2019
8. Emerging Tools and Approaches in Biomarker Discovery and Development, Panel Chair NIH Workshop, Washington DC 2018.
9. Multiomic and Computational Approaches to Biomarker Discovery: Mass Cytometry and Data Integration, NIH Workshop, Washington DC 2018.
10. A Proteomic Signature of Preeclampsia. Stanford Prematurity Research Center. Stanford, 2018.
11. Deep Multiomic Profiling in Clinical Studies, UCSF/Stanford Research Retreat, Millbrae 2018.
12. Cocoa Flavanols for Modulating the Surgical Immune Response and Accelerating Clinical Recovery, SPARK Stanford, 2018.
13. Immune Correlates of Surgical Recovery. McMaster University, Hamilton, Canada, 2017.
14. A Proteomic Clock of Pregnancy. Stanford Prematurity Research Center. Stanford, 2017.
15. New Thoughts on Predicting and Preventing Chronic Pain after Surgery: An Immune Biomarker for Slow Recovery and How to Modify Risk in Slow Recovery. Annual Meeting of the International Anesthesia Research Society, San Francisco 2016.
16. Cellular and Proteomic Signatures of Term/preterm Birth. Annual March of Dimes Meeting, Montreal 2016.
17. The Resolution of Pain after Surgery and Trauma - New Concepts Bring New Opportunities: Immunologic Aspects of Recovery from Surgery. Annual Meeting of the American Society of Anesthesiology, New Orleans, 2015.
18. Immune signatures of clinical recovery from surgical trauma: Mass cytometry to comprehensively surveil the entire immune system with single-cell resolution at the bedside. Seminar in Perioperative Therapy at Rigshospitalet, Copenhagen University, Denmark 2015
19. Single-cell analysis of the peripheral immune system in patients with a history of term and preterm labor. Grand Round Department of Pediatrics, Stanford 2015.
20. Implementing Mass Cytometry at the Bedside: Single-cell Immune Signatures of Clinical Recovery from Surgical Trauma. Monthly Meeting of the Stroke Collaborative Action Network, Stanford, 2015.
21. Single-Cell Immune Signatures Predict Clinical Recovery after Surgery. Bi-annual UCSF and Stanford Anesthesia Research Meetings, Millbrae 2015.
22. Immunity in the context of surgery and anesthesia. Grand Round Department of Anesthesiology, Pain and Perioperative Medicine, Stanford 2014.
23. Clinical Recovery from Surgery Strongly Correlates with Single-Cell Immune Signatures. CCR Research Seminar UCSF 2014
24. TIVA – Implications on Pain management. Mylan Roundtable, New Jersey 2013. The role of pharmacologic challenge in patient phenotyping for Phase 2 and 3 trials.” IMMPACT meeting (Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials), Washington DC 2013.
25. Opioid-induced Hyperalgesia: Clinical presentation and Implication. Sixth World Congress World Institute of Pain, Miami, Florida 2012.
26. All about Opioids: Opioid-induced Hyperalgesia. Annual Meeting of the American Academy of Pain Medicine, Washington, 2011.
27. Opioid Pharmacogenomics in a Twin-Study Paradigm. Laboratory of the Biology of Addictive Diseases, Rockefeller University, New York, 2011.

28. Surrogate Markers of Opioid-induced Hyperalgesia in Humans: Are they Valid and where Do We Stand? Spring Pain Conference, Grand Cayman Island, 2010.
29. Update on Opioid Safety and Tolerability: Current Concepts to Minimize Side Effects and Risks. Annual Meeting of the American Society of Anesthesiology, San Diego, 2010.
30. The Heritability of Opioid Effects – Preliminary Results of a Twin Study. Annual Meeting of the American Society of Anesthesiology, New Orleans, 2009.
31. Update on Opioid Safety and Tolerability: Current Concepts to Minimize Side Effects and Risks. Annual Meeting of the American Society of Anesthesiology, New Orleans, 2009.
32. The Relevance of Descending Inhibition to Understanding and Treatment of Neuropathic Pain: Experimental Assessment of Descending Inhibition in Normal Humans and those with Neuropathic Pain. Annual Meeting of the American Pain Society, San Diego, 2009.
33. Difficult Airway Workshop: Flexible Fiberoptic Bronchoscopy. Annual Meeting of JAEPE, Recife, Brazil, 2009.
34. From Mice to Men: Translational Experimental Protocol to Study Nociception and Inflammation in Tissue Injury. Stanford Scientific Conference of Immunology and the Institute of Immunity, Transplantation and Infection, Asilomar, 2008.
35. Altered Sensitivity to Opioids – Hyperalgesia and Tolerance. Annual Meeting of the European Society of Anesthesiology, Copenhagen, Denmark, 2008.
36. Pain Assessment in Experimental Medicine. Annual Meeting of the European Society of Anesthesiology, Copenhagen, Denmark, 2008.
37. Update on Opioid Safety and Tolerability: Current Concepts to Minimize Side Effects and Risks. Annual Meeting of the American Society of Anesthesiology, Orlando, 2008.
38. Towards a Definitive Evidence Base for Opioid Management of Chronic Non-cancer Pain: Clinical Assessment of Opioid-induced Hyperalgesia. National Panel at the Pain Research Center of the University of Utah, Salt Lake City, 2008.
39. Opioid-induced Hyperalgesia, a Newly Recognized Side Effect of Opioid Therapy? Department of Physiology and Pharmacology, Oregon Health & Science University, Portland, 2008.
40. Pharmacokinetic Considerations for the Rational Use of Opioids. Department of Physiology and Pharmacology, Oregon Health & Science University, Portland, 2008.
41. Opioid-induced Hyperalgesia. Symposium Interface between Pain and Opioids sponsored by the National Institute of Drug Abuse, American Academy of Addiction Society, St. Pete Beach, 2006.
42. Electrical Experimental Pain Models in Humans. International Experimental Pain Model Advisory Board to Eli Lilly and Company, Indianapolis, 2006.
43. Opioid-induced Hyperalgesia. Forum at the Center for Health Care Evaluation, Department of Veteran Affairs, Menlo Park, 2006.
44. Opioid-induced Hyperalgesia: What Does It Mean for Pain Treatment? American Society of Anesthesiology, New Orleans, 2005.
45. Acute Opioid Tolerance: No Evidence in Models of Acute Experimental Pain? Association of University Anesthesiologists, Sacramento, 2004.
46. Opioid-induced Hyperalgesia in Humans. UCSF Pain Interest Group, UCSF, San Francisco, 2004.
47. Human Studies on Acute Opioid Tolerance. American Society of Regional Anesthesia and Pain Medicine, San Diego, 2003.
48. Do Painkillers Cause Pain? Department of Psychiatry and Behavioral Sciences, Stanford University, Stanford, 2003.
49. Apparent Acute Analgesic Opioid Tolerance: A Reflection of Opioid-induced Hyperalgesia? Department of Anesthesia, Hospital of Lucerne, Lucerne, Switzerland, 2002.
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