

Curriculum Vitae

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Education

1996	B.A. <i>magna cum laude</i>	Chemistry	Amherst College, Amherst, MA
2000	M.D.	Medicine	University of Pennsylvania, Philadelphia, PA

Postdoctoral Training

06/00-06/01	Intern	Transitional	Presbyterian Medical Center, Philadelphia, PA
09/01-09/04	Resident	Anesthesia and Critical Care	Massachusetts General Hospital, Boston, MA
10/10-11/10	Visiting Scholar	Neurobiology	University of California, San Diego

Faculty Academic Appointments

09/04-06/07	Instructor	Anaesthesia	Harvard Medical School Boston, MA
07/07-02/15	Assistant Professor	Anaesthesia	Harvard Medical School
03/15-	Associate Professor	Anaesthesia	Harvard Medical School

Appointments at Hospitals/Affiliated Institutions

09/04-09/07	Assistant in Anesthesia	Anesthesia and Critical Care	Massachusetts General Hospital
09/07-08/16	Assistant Anesthetist	Anesthesia and Critical Care	Massachusetts General Hospital
06/09-	Research Affiliate	Brain and Cognitive Sciences	Massachusetts Institute of Technology, Cambridge, MA

08/16- Associate Anesthetist Anesthesia, Critical Care and Pain Medicine Massachusetts General Hospital

Committee Service

Local

2008-2010	Research Task Force	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
2009-2015	Resident Selection Committee	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
2010- 2012-	Research Council	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital Research Mentoring Committee
2015-	Educational Content Reviewer	Dept. of Continuing Education, Harvard Medical School
2015-	Anesthesia Appointments and Promotions Committee	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

Professional Societies

2001- 2009-2012	American Society of Anesthesiologists	Member, Abstract Review Subcommittee on Anesthetic Action and Biochemistry
2010-		Member, Abstract Review Subcommittee on Experimental Neurosciences
2012-2016		Chair, Abstract Review Subcommittee on Experimental Neurosciences
2012-2016		Member, Scientific Advisory Committee
2012-2016		Member, Educational Track Subcommittee on Neuroanesthesia
2013-		Member, Committee on Research
2016-		Member, Committee on Academic Anesthesiology
2001-	Massachusetts Society of Anesthesiologists	

2001-	International Anesthesia Research Society	
2007-	International Society for Anaesthetic Pharmacology	
2008-	Faculty of 1000 in Medicine	
2009-	Society for Neuroscience	
2011-2015	Society of Anesthesia and Sleep Medicine	
	2011-2013	Member, Newsletter Subcommittee
	2011-2014	Member, Abstract Review Subcommittee
2013-	Association of University Anesthesiologists	Elected Member
2016-	Society for Neuroscience in Anesthesiology and Critical Care	

Grant Review Activities

2011-	Review Committee, Departmental Clinical Research Grants (meets twice per year)	Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
2014-	Review Committee, Mentored Research Training Grants (meets twice per year)	Foundation for Anesthesia Education and Research
2016-	Review Committee, Mentored Research Awards (meets once per year)	International Anesthesia Research Society

Editorial Activities

Ad Hoc Reviewer

Anesthesia and Analgesia
 Anesthesiology
 BMC Anesthesiology
 Brain Connectivity
 Brain Research Bulletin
 British Journal of Anaesthesia
 Cerebral Cortex
 Current Biology
 Journal of Clinical Anesthesia
 Journal of Neuroscience
 Journal of Neurosurgical Anesthesiology
 Journal of Pharmacology and Experimental Therapeutics
 Journal of Visualized Experiments
 Molecular Pharmacology
 Neuroscience
 Psychopharmacology
 Sleep

Honors and Prizes

1995	Howard Hughes Research Fellowship	Amherst College	Summer Research Fellowship
1996	Frank Fowler Dow Prize in Chemistry	Amherst College	Academic Achievement
1996	Sigma Xi Scientific Research Society	Amherst College	Academic Achievement
1999	Medical Student Travel Scholarship	Noguchi Medical Research Institute	Medicine Clerkship at the University of Tokyo, Japan
2009	Partners in Excellence Award	Partners® Healthcare	Patient care
2010	Citizenship Award	Dept. of Anesthesia, Critical Care and Pain Medicine, MGH	Contributions to Departmental Missions
2011	Best Abstract Award	Society of Anesthesia and Sleep Medicine Annual Meeting	
2012	NIH Director's Transformative Research Award	National Institutes of Health	
2012	Best Abstract Award	Society of Anesthesia and Sleep Medicine Annual Meeting	
2014	Scholar Award in Understanding Human Cognition	James S. McDonnell Foundation	
2016	Best Neuroscience Abstract Award	International Anesthesia Research Society Annual Meeting	
2016	Kosaka Award for Outstanding Basic Science Abstract	International Anesthesia Research Society Annual Meeting	

Report of Funded and Unfunded Projects

Funding Information

Past

2004-2007	Basic Science Research Training Grant for Anesthetists NIH T32-GM07592 Investigator The goal of this study was to establish the effects of inhaled anesthetics on human serotonin type 3 (5-HT ₃) receptors using two-electrode voltage clamp electrophysiology.
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- 2006-2009 Modulation of 5-HT_{3A} Receptor Kinetics by Inhaled Anesthetics
 Foundation for Anesthesia Education and Research (Mentored Research Training Grant)
 PI (\$255,000)
 The goal of this study was to establish the effects of inhaled anesthetics on human 5-HT₃ receptor kinetics using patch-clamp techniques combined with ultrafast solution exchange.
- 2010-2014 Active Induction of Emergence from General Anesthesia
 NIH K08-GM094394
 PI (\$380,000)
 The goals of this study were to identify CNS arousal pathways that induce emergence from general anesthesia, and to establish the behavioral and neurophysiological correlates of active emergence.
- Current**
- 2012-2017 Redesigning General Anesthesia
 NIH R01-GM104948 (NIH Director's Transformative Research Award)
 Site PI (\$875,000)
 The goal of this study is to redesign general anesthesia by combining optogenetic, electrical and pharmacological manipulations in rodent models to create the behavioral state of general anesthesia.
- 2014-2020 Reanimation and Cognitive Recovery from General Anesthesia
 James S. McDonnell Foundation (Scholar Award in Understanding Human Cognition)
 PI (\$600,000)
 The goal of this study is to test the efficacy of methylphenidate for inducing reanimation and cognitive recovery from general anesthesia in patients undergoing surgery at MGH.

Report of Local Teaching and Training

Teaching of Students in Courses

2004-	Core Clerkship in Anaesthesia Approx. 25 Medical students total	Harvard Medical School 2-3 days/year
2004-	Management of the Patient for Anaesthesia and Surgery Approx. 25 Medical students total	Harvard Medical School 2-3 days/year
2006-2009, 2011, 2013- 2014	Objective Structured Clinical Examination Approx. 40 Medical students total	Harvard Medical School 1 day/year
2011-	Faculty Preceptor for HST-150: Clinical Pharmacology in the Operating Room Approx. 20 Medical students total	Harvard Medical School 1 day/year

Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs)

2007-2013	Local Anesthetic Pharmacology for Obstetrics Anesthesia residents	Massachusetts General Hospital 30-minute lecture, 4 times per year
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2012-2013	Is MAC Clinically Relevant? Anesthesia residents	Massachusetts General Hospital 30-minute lecture, once per year
2014-	Local Anesthetic Pharmacology Anesthesia residents	Massachusetts General Hospital 60-minute lecture, once per year

Clinical Supervisory and Training Responsibilities

2004-	Supervision and teaching of residents and medical students/MGH	10 hours/week, 45 weeks/year
2005-	Intensive one-on-one tutorial of anesthesia residents in first month of training/MGH	50 hours/week, 2 weeks/year

Laboratory and Other Research Supervisory and Training Responsibilities

2006-	Supervision/training of research associate	30 hours/week, 45 weeks/year
2011	Supervision/research training of senior anesthesia resident	30 hours/week, 6 months/year
2011, 2013-	Supervision/research training of summer student	30 hours/week, 8 weeks/year

Formally Supervised Trainees

2006-2009	Elizabeth W. Kelly, M.D. / Attending Obstetrician and Gynecologist, Albany Medical Center, Albany, NY I trained and supervised Ms. Kelly as a Research Technologist, and we co-authored 2 publications (see Research investigations #12 and #16 in the <u>Report of Scholarship</u>). Her experience in my laboratory helped her to apply successfully to medical school.
2009-2012	David Palilla, M.D. / Attending Anesthesiologist, North Shore University Hospital, Manhasset, NY. I taught Dr. Palilla exclusively during the first two weeks of his anesthesiology residency at MGH, and also served as his advisor and clinical mentor throughout his residency.
2010-2012	Jessica J. Chemali, B.E. / Graduate Student, Carnegie Mellon University, Pittsburgh, PA I trained and supervised Ms. Chemali as a Research Technologist. We co-authored 10 publications (see Research investigations #17, #18, #20, #21, #23 - #27 and #30 in the <u>Report of Scholarship</u>), and her experience in my laboratory helped her to apply successfully to graduate school.
2010-2013	John Anderson-Dam, M.D. / Assistant Clinical Professor, University of California, Los Angeles I taught Dr. Anderson-Dam exclusively during the first two weeks of his anesthesiology residency at MGH, and I also served as his advisor and mentor throughout his residency.
2011	Olatoye Olutola, B.A. / Medical Student, University of Toledo, Toledo, OH I trained and supervised Mr. Olutola in my laboratory as part of the Summer Research Training Program sponsored by the Multicultural Affairs Office at MGH. We co-authored one publication (see Research investigation #30 in the <u>Report of Scholarship</u>). His

experience in my laboratory helped him to apply successfully to medical school.

- 2011-2014 Susan Lien, M.D. / Attending Anesthesiologist, White Plains Medical Center, White Plains, NY
I taught Dr. Lien exclusively during the first two weeks of her anesthesiology residency at MGH, and also served as her advisor and mentor throughout her residency.
- 2011- Norman E. Taylor, M.D., Ph.D. / Instructor in Anesthesia, MGH
I trained and supervised Dr. Taylor in my laboratory during his anesthesiology residency at MGH. I currently serve as mentor for his NIH T-32 Award, and co-mentor for his research training grant from the Foundation for Anesthesia Education and Research. We have co-authored 4 publications (see Research investigations #21, #27, #30 and #32 in the Report of Scholarship). The work Dr. Taylor performed under my supervision received best abstract awards at annual meetings of the American Society of Anesthesiologists, Association of University Anesthesiologists, and the Society of Anesthesia and Sleep Medicine.
- 2012-2015 Michael R. King, M.D. / Instructor in Anesthesiology, Northwestern University, Chicago, IL
I taught Dr. King exclusively during the first two weeks of his anesthesiology residency at MGH, and I also served as his advisor and mentor throughout his residency.
- 2012-2015 Jonathan D. Kenny / Graduate Student in Neuroscience, California Institute of Technology, Pasadena, CA
I trained and supervised Mr. Kenny as a Research Technologist. We co-authored 5 publications (see Research investigations #24, #27, #28, #30 and #32 in the Report of Scholarship). The work he performed under my supervision was selected for the Best Basic Science Abstracts Session at the 2013 American Society of Anesthesiologists meeting, where he was the only undergraduate student invited to give an oral presentation. His experience in my laboratory helped him to apply successfully to graduate school.
- 2013 Rachel Feingold / Summer Student, MGH
I trained and supervised Ms. Feingold in my laboratory as part of the “Students on the Forefront of Science” Program at the Brooks School in North Andover, MA.
- 2013-2016 Mitchell J. Donner, M.D. / Fellow in Pain Medicine, University of California, Los Angeles
I taught Dr. Donner exclusively during the first two weeks of his anesthesiology residency at MGH, and I also served as his advisor and mentor throughout his residency.
- 2014-2015 Yasuko Nagasaka, M.D., Ph.D. / Chair, Dept. of Anesthesiology, St. Luke’s International Hospital, Tokyo, Japan
I served as Dr. Nagasaka’s co-mentor for her research as a senior resident and fellow in the Dept. of Anesthesia, Critical Care and Pain Medicine at MGH.
- 2014 Lidiana Lantigua / Summer Student, MGH
I trained and supervised Ms. Lantigua in my laboratory as part of the “Students on the Forefront of Science” Program at the Brooks School in North Andover, MA.
- 2014- Emily Fish, M.D. / Anesthesiology Resident, MGH
I taught Dr. Fish exclusively during the first two weeks of her anesthesiology residency at MGH, and I currently serve as her advisor and clinical mentor.

- 2015 Valerie Nam / Summer Student, MGH
I trained and supervised Ms. Nam in my laboratory as part of the “Students on the Forefront of Science” Program at the Brooks School in North Andover, MA.
- 2015 James C. Simpson, M.D. / Anesthesiology Resident, MGH
I taught Dr. Simpson exclusively during the first two weeks of his anesthesiology residency at MGH.
- 2015-2016 Justin T. Lee / Research Technologist, MGH
I trained and currently supervise Mr. Lee as a Research Technologist.
- 2015- JunZhu Pei / Research Technologist, MGH
I trained and currently supervise Ms. Pei as a Research Technologist.
- 2015- Jennifer A. Guidera / Research Technologist, MGH
I trained and currently supervise Ms. Guidera as a Research Technologist.
- 2015- Ksenia Y. Vlasov / Research Technologist, MGH
I trained and currently supervise Ms. Vlasov as a Research Technologist.
- 2016 Caroline Saef / Summer Student, MGH
I trained and supervised Ms. Saef in my laboratory as part of the “Students on the Forefront of Science” Program at the Brooks School in North Andover, MA.
- 2016- Eric Abhold, M.D. / Anesthesiology Resident, MGH
I taught Dr. Abhold exclusively during the first two weeks of his anesthesiology residency at MGH, and I currently serve as his advisor and clinical mentor.

Local Invited Presentations

No presentations below were sponsored by outside entities

- 2004 Modulation of 5-HT₃ Receptor Function by General Anesthetics / Research seminar
Dept. of Anesthesia and Critical Care, Massachusetts General Hospital
- 2005 General Anesthetics Modulate 5-HT₃ Receptor Gating / Research seminar
Dept. of Anesthesia and Critical Care, Massachusetts General Hospital
- 2006 5-HT₃ Receptors: Where are They and What Do They Do? / Research seminar
Dept. of Anesthesia and Critical Care, Massachusetts General Hospital
- 2007 The Putative Targets of General Anesthetic Actions / Research Seminar
Dept. of Anesthesia and Critical Care, Massachusetts General Hospital
- 2010 General Anesthesia and the Neurobiology of Arousal / Research Seminar
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
- 2010 Active Induction of Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
- 2011 Neural Mechanisms of Emergence from General Anesthesia / Research Seminar
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

- 2011 A 43-year-old Woman with Cardiorespiratory Arrest After a Cesarean Section /
Clinicopathological Conference
Dept. of Obstetrics and Gynecology, Massachusetts General Hospital
- 2011 Cardiopulmonary Collapse in Obstetrical Anesthesia: Causes and Care / Case conference
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
- 2012 Active Reanimation: Utilizing CNS Arousal Pathways to Induce Emergence from General
Anesthesia / Grand Rounds
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
- 2012 A Guide to Writing the Career Development Plan for Your K08 Grant Application /
Research Forum Lecture
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
- 2013 Reanimation from General Anesthesia / Invited Lecture, “Harvard Anesthesia Update:
Innovation and Transformation in Anesthesiology”
Harvard Medical School, Boston, MA
- 2013 Waking Up from General Anesthesia / Research Seminar for Summer Students
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
- 2013 The Critical Role of the Mentor for the Early Stage Investigator / Research Forum Lecture
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
- 2014 A Clinical Trial to Test for Reanimation and Cognitive Recovery from GA with
Methylphenidate / Invited Lecture, Division of General Surgical Anesthesia Team Meeting
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital
- 2015 Reanimation from General Anesthesia: The Role of Dopamine / Invited Lecture, “Infants,
Anesthesia, and ‘Reanimation’ using Monoaminergic Mechanisms”
Dept. of Pathology, Children’s Hospital of Boston
- 2015 A Clinical Trial to Test for Reanimation and Cognitive Recovery from General Anesthesia
with Methylphenidate / Invited Lecture, Nurse Anesthetist Team Meeting
Dept. of Anesthesia, Critical Care and Pain Medicine, Massachusetts General Hospital

Report of Regional, National and International Invited Teaching and Presentations

[Invited Presentations and Courses](#)

Regional

No presentations below were sponsored by outside entities

- 2007 The Multiple Sites and Multiple Mechanisms Hypothesis of General Anesthetic Actions /
Grand Rounds
Dept. of Anesthesiology, University of Massachusetts, Worcester, MA
- 2009 Inducing Emergence from General Anesthesia / Research seminar
Dept. of Brain and Cognitive Sciences, Massachusetts Institute of Technology
- 2012 Activation of CNS Arousal Pathways to Induce Emergence from General Anesthesia /

Invited Symposium Lecture, “35th Annual Anesthesia Symposium”
Dept. of Anesthesiology, Baystate Medical Center, Springfield, MA

- 2012 Mechanisms Underlying General Anesthesia: From Molecules to Neural Circuits /
Research Seminar
Center for Biodynamics, Dept. of Mathematics, Boston University
- 2013 Dopamine Pathways and Reanimation from General Anesthesia / Research Seminar
Dept. of Brain and Cognitive Sciences, Massachusetts Institute of Technology
- 2014 Reanimation from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, University of Massachusetts, Worcester, MA

National

No presentations below were sponsored by outside entities

- 2005 Human NMDA Receptor Inhibition by Structurally Diverse General Anesthetics /
Invited Lecture
Dept. of Anesthesia and Perioperative Care, University of California, San Francisco
- 2006 The Kinetics of Conformational Transitions Induced by General Anesthetics in a Four-
alpha-helix-bundle Protein / Invited Lecture
Dept. of Anesthesia and Perioperative Care, University of California, San Francisco
- 2006 Do Isoflurane and Benzene Have Additive Inhibitory Effects on NMDA Receptors? /
Invited Lecture
Dept. of Anesthesia and Perioperative Care, University of California, San Francisco
- 2006 Isoflurane Accelerates Activation and Deactivation Rates for Human 5-HT_{3A} Receptors /
Abstract Selected for Oral Presentation
American Society of Anesthesiologists Annual Meeting, Chicago, IL
- 2007 The Effects of Isoflurane on Human 5-HT_{3A} Receptor Kinetics / Invited Lecture
Dept. of Anesthesia and Perioperative Care, University of California, San Francisco
- 2010 Mechanisms of General Anesthesia / Visiting Professor Lecture
Dept. of Anesthesiology, University of Michigan, Ann Arbor, MI
- 2010 Methylphenidate Restores the Righting Reflex in Rats During Continuous Exposure to
Isoflurane / Abstract Selected for Oral Presentation
Association of University Anesthesiologists Annual Meeting, Denver, CO
- 2010 Methylphenidate, But Not Physostigmine, Restores Righting in Rats During Isoflurane
Hypnosis / Abstract Selected for Oral Presentation
American Society of Anesthesiologists Annual Meeting, San Diego, CA
- 2010 Anesthetic Action and Biochemistry / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, San Diego, CA
- 2011 Neural Mechanisms of General Anesthesia / Visiting Professor Lecture
Dept. of Anesthesiology, Vanderbilt University, Nashville, TN
- 2011 Active Induction of Emergence from General Anesthesia / Grand Rounds

Dept. of Anesthesiology, Vanderbilt University, Nashville, TN

- 2011 Pharmacological Reversal of General Anesthesia / Invited Symposium Lecture,
“Ambulatory Anesthesia Symposium”
American Society of Anesthesiologists Annual Meeting, Chicago, IL
- 2011 Anesthetic Action and Biochemistry / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, Chicago, IL
- 2011 Experimental Neuroscience: Neuroprotection / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, Chicago, IL
- 2012 Active Reanimation: Utilizing CNS Arousal Pathways to Induce Emergence from General
Anesthesia / Grand Rounds
Dept. of Anesthesiology and Critical Care, University of Pennsylvania, Philadelphia, PA
- 2012 Is Median Alveolar Concentration (MAC) Clinically Relevant? / Visiting Professor
Lecture
Dept. of Anesthesiology and Critical Care, University of Pennsylvania, Philadelphia, PA
- 2012 General Anesthesia and the Neurobiology of Arousal / Visiting Professor Lecture
Dept. of Anesthesiology, Washington University, St. Louis, MO
- 2012 Active Reanimation: Utilizing CNS Arousal Pathways to Induce Emergence from General
Anesthesia / Grand Rounds
Dept. of Anesthesiology, Washington University, St. Louis, MO
- 2012 Inducing Emergence / Invited Panel Lecture, “AUA President’s Panel: The Emergence of
Consciousness”
Association of University Anesthesiologists Annual Meeting, Cleveland, OH
- 2012 Manipulating Monoaminergic Arousal Pathways to Induce Emergence from General
Anesthesia / Invited Panel Lecture, “General Anesthesia: Sleep Circuits and Arousal
Pathways”
Associated Professional Sleep Societies Annual Meeting, Boston, MA
- 2012 Electrical Microstimulation of the Ventral Tegmental Area Induces Emergence from
General Anesthesia / Abstract Selected for Oral Presentation
Society of Anesthesia and Sleep Medicine Annual Meeting, Washington, DC
- 2012 Early Grants: What You Need To Do / Invited Panel Lecture, Physician Scientist Panel,
Foundation for Anesthesia Education and Research
American Society of Anesthesiologists Annual Meeting, Washington, DC
- 2012 Anesthetic Action and Biochemistry / Invited Moderator, Scientific Oral Presentation
Session
American Society of Anesthesiologists Annual Meeting, Washington, DC
- 2012 Experimental Neuroscience: Mechanisms / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, Washington, DC
- 2012 Experimental Neuroscience: Toxicity and Development / Invited Moderator, Scientific
Oral Presentation Session

- American Society of Anesthesiologists Annual Meeting, Washington, DC
- 2013 Drugs and Physical Interventions to Promote a Preferred Sequence of Brain Circuit Activation / Invited Lecture, “Anesthesiologists Concerned with Cognition, Emergence, Sleep and Sedation (ACCESS) Conference”
Dept. of Anesthesiology, Emory University, Atlanta, GA
- 2013 Reanimation from General Anesthesia: The Role of Dopamine / Invited Panel Lecture, “Basic Science of Sleep”
Society of Anesthesia and Sleep Medicine Annual Meeting, San Francisco, CA
- 2013 Hijacking Arousal Centers to Reverse General Anesthesia / Invited Panel Lecture, “Interfaces of Sleep and Anesthesia”
American Society of Anesthesiologists Annual Meeting, San Francisco, CA
- 2013 Experimental Neuroscience: Mechanisms / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, San Francisco, CA
- 2013 Experimental Neuroscience / Invited Moderator, Scientific Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, San Francisco, CA
- 2014 Probing the Neural Circuitry of Emergence from General Anesthesia / Invited Keynote Lecture, Academic Career Enrichment Scholars (ACES) Annual Research Symposium
Dept. of Anesthesiology, Duke University, Durham, NC
- 2014 Reanimation: Hijacking Arousal Circuits in the Brain to Induce Active Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, University of Michigan, Ann Arbor, MI
- 2014 Inducing Emergence through the Dopaminergic System / Invited Symposium Lecture, “Basic Science Symposium: Neuroscience Issues in Emergence from Anesthesia”
Society for Neuroscience in Anesthesiology and Critical Care Annual Meeting, New Orleans, LA
- 2014 Hijacking Arousal Centers to Reverse General Anesthesia / Invited Panel Lecture, “Mechanisms of Induction and Emergence from General Anesthesia”
American Society of Anesthesiologists Annual Meeting, New Orleans, LA
- 2014 Late-breaking Abstracts: Basic Translational Science / Invited Moderator, Scientific Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, New Orleans, LA
- 2014 Experimental Neuroscience: Mechanisms / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, New Orleans, LA
- 2015 VTA Dopamine Neurons Induce Reanimation and Cognitive Recovery from General Anesthesia / Invited Panel Lecture, “Steep Slopes: Understanding New Sites and Substrates for Sleep and Sedation”
Winter Conference on Brain Research, Big Sky, MT
- 2015 Low-Dose Isoflurane Profoundly Impairs the Ability of Rats to Perform a Visual Discrimination Task / Abstract Selected for Oral Presentation

- American Society of Anesthesiologists Annual Meeting, San Diego, CA
- 2015 Experimental Neuroscience: Mechanisms / Invited Moderator, Scientific Oral Presentation Session
American Society of Anesthesiologists Annual Meeting, San Diego, CA
- 2015 Experimental Neuroscience / Invited Facilitator, Scientific Poster Session
American Society of Anesthesiologists Annual Meeting, San Diego, CA
- 2016 Reanimation: Stimulating Arousal Circuits in the Brain to Induce Active Emergence from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, Weill Cornell Medical College, New York, NY
- 2016 Targeting Dopamine Circuits in the Brain to Induce Reanimation from General Anesthesia / Grand Rounds
Dept. of Anesthesiology, Emory University School of Medicine, Atlanta, GA

International

No presentations below were sponsored by outside entities

- 2012 Active Reanimation from General Anesthesia / Invited Symposium Lecture, “International Science Symposium: Mechanisms of Anesthesia”
International Anesthesia Research Society Annual Meeting, Boston, MA
- 2013 Reanimation from General Anesthesia: Potential Clinical Applications / Invited Panel Lecture, “Neural Mechanisms of General Anesthesia: Clinical Implications”
International Anesthesia Research Society Annual Meeting, San Diego, CA
- 2013 Reanimation from General Anesthesia / Invited Panel Lecture, “Neuroscience of General Anesthesia”
European Society of Anaesthesiology Annual Meeting, Barcelona, Spain
- 2014 Activating Arousal Pathways to Induce Reanimation from General Anesthesia / Invited Panel Lecture, “Translational Neuroscience”
International Anesthesia Research Society Annual Meeting, Montreal, Canada
- 2014 The Role of Dopamine in Reanimation from General Anesthesia / Invited Symposium Lecture, “Mechanisms of Anesthetic Action and Consciousness”
9th International Symposium on Memory and Awareness in Anesthesia, Tokyo, Japan
- 2014 Mechanisms of Anesthesia / Invited Symposium Moderator
9th International Symposium on Memory and Awareness in Anesthesia, Tokyo, Japan
- 2015 Reanimation and Cognitive Recovery from General Anesthesia / Invited Lecture (in Japanese)
Dept. of Anesthesiology, Yokohama City University, Yokohama, Japan
- 2015 Reanimation: Inducing Active Emergence from General Anesthesia / Invited Lecture (in Japanese)
Japanese Society of Anesthesiologists Annual Meeting, Kobe, Japan
- 2015 Ventral Tegmental Area Stimulation Induces Reanimation and Cognitive Recovery from General Anesthesia / Invited Symposium Lecture, “Neural Circuit Mechanisms of General

Anesthesia”

9th International Conference on Mechanisms of Anesthesia, Bonn, Germany

2016 Recent Advances in the Study of Anesthetic Mechanisms: From Molecules to Neural Circuits / Invited Keynote Lecture
Beijing Society of Anesthesiology Annual Meeting, Beijing, China

Report of Clinical Activities and Innovations

Current Licensure and Certification

2001 United States Medical Licensing Examination
2004 Massachusetts Medical License
2005 Diplomate, American Board of Anesthesiology
2015 Maintenance of Certification, American Board of Anesthesiology

Practice Activities

2004-	Anesthesiology	Mass. General Hospital	1 day/week
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Clinical Innovations

Development of intravenous methylphenidate for reanimation and cognitive recovery from general anesthesia	I discovered that intravenous methylphenidate restores conscious behaviors in rodents under general anesthesia, and filed a patent application for human use in 2011. In 2013, I received FDA approval to administer IV methylphenidate as an investigational new drug (IND), and the Partners IRB approved our clinical trial to test the efficacy of methylphenidate for reanimation and cognitive recovery from general anesthesia in surgical patients at MGH. In 2014, I received the James S. McDonnell Foundation Scholar Award to fund our clinical study, which is now underway.
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Report of Technological and Other Scientific Innovations

Development of intracranial stimulation for the recovery of consciousness	I discovered that electrical stimulation of the ventral tegmental area (VTA), a key dopamine nucleus in the brain, restores conscious behaviors in rodents under general anesthesia. This was the first report of anesthetic reversal in freely behaving animals using intracranial stimulation. This technology may be applied to promote recovery of consciousness and cognition in patients suffering from brain injury.
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Report of Scholarship

Publications

Peer reviewed publications in print or other media

Research investigations

1. **Solt K**, Johansson JS. Binding of the active metabolite of chloral hydrate, 2,2,2-trichloroethanol, to serum albumin demonstrated using tryptophan fluorescence quenching. *Pharmacology* 2002;64(3):152-9. PMID: 11834892.

2. Johansson JS, **Solt K**, Reddy KS. Binding of the general anesthetics chloroform and 2,2,2-trichloroethanol to the hydrophobic core of a four-alpha-helix bundle protein. *Photochem Photobiol* 2003;77(1):89-95. PMID: 12856888.
3. Dougan ML, Chin JL, **Solt K**, Hansen DE. Rapid cleavage of cyclic tertiary amides of Kemp's triacid: effects of ring structure. *Bioorg Med Chem Lett* 2004;14(16):4153-6. PMID: 15261260.
4. Stevens R, Rusch D, **Solt K**, Raines DE, Davies PA. Modulation of human 5-HT_{3A}B receptors by volatile anesthetics and n-alcohols. *J Pharmacol Exp Ther* 2005;314(1):338-45. PMID: 15831437.
5. **Solt K**, Stevens RJ, Davies PA, Raines DE. General anesthetic-induced channel gating enhancement of 5-HT₃ receptors depends on receptor subunit composition. *J Pharmacol Exp Ther* 2005;315(2):771-6. PMID: 16081679.
6. **Solt K**, Johansson JS, Raines DE. Kinetics of anesthetic-induced conformational transitions in a four-alpha-helix bundle protein. *Biochemistry* 2006;45(5):1435-41. PMID: 16445285.
7. Eger EI, Liao M, Laster MJ, Won A, Popovich J, Raines DE, **Solt K**, Dutton RC, Cobos FV, Sonner JM. Contrasting roles of the NMDA receptor in the production of immobilization by conventional and aromatic anesthetics. *Anesth Analg* 2006;102(5):1397-406. PMID: 16632817.
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