



## Lawrence Chu, MD, MS

Professor of Anesthesiology, Perioperative and Pain Medicine at the Stanford University Medical Center

### CLINICAL OFFICES

- **Anesthesia**

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### ACADEMIC CONTACT INFORMATION

- **Stanford Medicine X**

Stanford Medicine X - Emerging Technology and Medicine

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### Bio

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#### BIO

Larry Chu, MD is a Professor of Anesthesiology, Perioperative and Pain Medicine and Director of the Stanford Anesthesia Informatics and Media (AIM) Lab. Dr. Chu founded the START online educational program as well as the Learnly online learning ecosystem for post-graduate anesthesiology education. He is an NIH-funded clinical researcher and is Executive Director of Stanford Medicine X, the world's most-discussed academic program on emerging technology and medicine. He also directs Medicine X | ED, a conference exploring the future of patient-centered medical education. He has written eight books, over 50 papers and over 50 book chapters in academic anesthesiology. He is a member of the editorial advisory board for The BMJ, one of the most influential general medical journals in the world.

#### CLINICAL FOCUS

- Anesthesia
- eHealth
- Emerging Technology and Medicine
- Precision Medicine
- Digital Health Efficacy and Validation
- Patient Partnership in Academic Medicine

#### ACADEMIC APPOINTMENTS

- Professor - Med Center Line, Anesthesiology, Perioperative and Pain Medicine
- Member, Bio-X

#### ADMINISTRATIVE APPOINTMENTS

- Editorial Advisory Board, The BMJ, (2016- present)
- Executive Director, Stanford Medicine X, (2011- present)
- Member, Committee on Admissions, Stanford University School of Medicine, (2007- present)
- Electronic Media and Information Technology Committee, American Society of Anesthesiologists, (2002-2004)

- Trustee, California Medical Association, (2003-2004)
- Member, Editorial Board, MDNetGuide, (1999- present)
- Member, Educational Resources Committee, Society for Education in Anesthesia, (2003- present)
- Member, Web Site Committee, American Pain Society, (2007- present)
- Organizing Chair, Fourth World Congress on Social Media and Web 2.0 in Health, Medicine and Biomedical Research, (2010-2011)

## **HONORS AND AWARDS**

- Excellence in Teaching Award, Stanford University Department of Biological Sciences (1998)
- Research Fellowship Grant, Foundation for Anesthesia Education and Research (1/2003-6/2004)
- Clinical Loan Repayment Program, National Institutes of Health (7/2003 - 7/2006)
- Career Development Award, National Institutes of Health (8/2004-8/2009)
- Innovation in Education Award, International Anesthesia Research Society (2011-2012)
- Independent Scientist Award, National Institutes of Health (2013 - 2018)

## **BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS**

- Editorial Advisory Board Member, BMJ (2016 - present)

## **PROFESSIONAL EDUCATION**

- Fellowship: Stanford Hospital (2004) CA
- Residency: Stanford Hospital (2003) CA
- Internship: St. Mary's Medical Center Internal Medicine Residency Program (2000) CA
- Medical Education: Stanford University School of Medicine Registrar (1999) CA
- Board Certification: Anesthesia, American Board of Anesthesiology (2004)
- MS, Stanford University , Clinical Epidemiology (2006)
- Fellowship, Stanford Medical School , Clinical Pain Research (2004)
- Residency, Stanford Hospital , Anesthesiology (2003)
- Internship, St. Mary's Hospital , Internal Medicine (2000)
- MD, Stanford Medical School , Medicine (1999)

## **PATENTS**

- Gary Peltz, David Clark, and Lawrence Chu. "United States Patent 9,226,918 Methods and compositions for treating or preventing narcotic withdrawal symptoms", Leland Stanford Junior University, Jan 5, 2016

## **LINKS**

- Clinical Research Website: <http://painresearch.stanford.edu>
- Anesthesia Informatics Research Website: <http://aim.stanford.edu>
- Stanford Medicine X: <http://medicinex.stanford.edu>
- Stanford Anesthesia Summer Institute: <http://sasi.stanford.edu>

## **Research & Scholarship**

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### **CURRENT RESEARCH AND SCHOLARLY INTERESTS**

I have two lines of research, one involving educational informatics and use of technology in postgraduate medical education and another involving NIH-funded work in patient-oriented clinical research regarding opioid use and physiologic responses associated with acute and chronic exposure in humans.

For a full description of my educational informatics work, please see my website [aim.stanford.edu](http://aim.stanford.edu).

My clinical research focuses on the study opiate-induced hyperalgesia in patients suffering from chronic pain.

I am currently conducting an NIH-funded five year double-blinded randomized controlled clinical study (NIGMS award 1K23GM071400-01) that prospectively examines the following hypotheses: 1) pain patients on chronic opioid therapy develop dose-dependent tolerance and/or hyperalgesia to these medications over time, 2) opiate-induced tolerance and hyperalgesia develop differently with respect to various types of pain, 3) opioid-induced hyperalgesia occurs independently of withdrawal phenomena, and 4) opiate-induced tolerance and hyperalgesia develop differently based on gender and/or ethnicity.

The study is the first quantitative and prospective examination of tolerance and hyperalgesia in pain patients and may have important implications for the rational use of opioids in the treatment of chronic pain.

## CLINICAL TRIALS

- Ostim-i Alert Sensor Quality of Life Validation, Recruiting
- 5HT3 Antagonists to Treat Opioid Withdrawal and to Prevent the Progression of Physical Dependence, Not Recruiting
- A Study of Genetic Variation Influencing Pain and Response to Opioid Medications, Not Recruiting
- Functional Magnetic Resonance Imaging of Opioid Withdrawal in Healthy Human Volunteers, Not Recruiting
- Inflammatory Responses to Acute and Chronic Opioid Exposure in Humans, Not Recruiting
- Opiate-Induced Tolerance & Hyperalgesia in Pain Patients, Not Recruiting
- Palonosetron and Hydroxyzine to Reduce Opioid Withdrawal, Not Recruiting
- Study on the Effect of a Beta Blocker on Increased Sensitivity to Pain in Humans Caused by Opioids, Not Recruiting

## Teaching

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### COURSES

#### 2017-18

- Data Science for Digital Health and Precision Medicine: ANES 208A (Aut)

#### 2016-17

- Data Science for Digital Health and Precision Medicine: ANES 208A (Aut)
- Engage and Empower Me: Myths and Truths of Designing for Patient Behavior: ANES 205 (Aut)

### STANFORD ADVISEES

#### Med Scholar Project Advisor

Galym Imanbayev

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Anesthesia (Fellowship Program)

## Publications

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### PUBLICATIONS

- **Daily opioid analgesic use reduces blood insulin levels.** *Journal of opioid management*

- Mueller, C., Chu, L. F., Lin, J. C., Ovalle, F., Younger, J. W.  
; 14 (3): 165–70
- **I Tweet, Therefore I Learn: An Analysis of Twitter Use Across Anesthesiology Conferences.** *Anesthesia and analgesia*  
Schwenk, E. S., Jaremko, K. M., Park, B. H., Stiegler, M. A., Gamble, J. G., Chu, L. F., Utengen, A., Mariano, E. R.  
2019
  - **Peripheral Nerve Blocks for Hand Procedures REPLY** *NEW ENGLAND JOURNAL OF MEDICINE*  
Chandrasoma, J., Harrison, T., Chu, L. F.  
2018; 379 (22): 2182
  - **Peripheral Nerve Blocks for Hand Procedures.** *The New England journal of medicine*  
Chandrasoma, J., Harrison, T. K., Ching, H., Vokach-Brodsky, L., Chu, L. F.  
2018; 379 (10): e15
  - **Peripheral Nerve Blocks for Hand Procedures** *NEW ENGLAND JOURNAL OF MEDICINE*  
Chandrasoma, J., Harrison, T., Ching, H., Vokach-Brodsky, L., Chu, L. F.  
2018; 379 (10)
  - **A Flawed Design Produces Flawed Results Reply** *JOURNAL OF ADDICTION MEDICINE*  
Chu, L. F., Sun, J., Clemenson, A., Erlendson, M. J., Rico, T., Cornell, E., Obasi, H., Sayyid, Z. N., Encisco, E. M., Yu, J., Gamble, J. G., Clark, J.  
2018; 12 (3): 252–53
  - **Reply to Dr Peltz.** *Journal of addiction medicine*  
Chu, L. F., Sun, J., Clemenson, A., Erlendson, M. J., Rico, T., Cornell, E., Obasi, H., Sayyid, Z. N., Encisco, E. M., Yu, J., Gamble, J. G., Clark, J. D.  
2018; 12 (3): 252–53
  - **Improving Health-Related Quality of Life of Patients With an Ostomy Using a Novel Digital Wearable Device: Protocol for a Pilot Study.** *JMIR research protocols*  
Rouholiman, D., Gamble, J. G., Dobrota, S. D., Encisco, E. M., Shah, A. G., Grajales Iii, F. J., Chu, L. F.  
2018; 7 (3): e82
  - **Internet searches for opioids predict future emergency department heroin admissions.** *Drug and alcohol dependence*  
Young, S. D., Zheng, K., Chu, L. F., Humphreys, K.  
2018; 190: 166–69
  - **Patient-Centric Strategies in Digital Health** *DIGITAL HEALTH: SCALING HEALTHCARE TO THE WORLD*  
Chu, L. F., Shah, A. G., Rouholiman, D., Riggare, S., Gamble, J. G., Rivas, H., Wac, K.  
2018: 43–54
  - **Internet searches for opioids predict future emergency department heroin admissions.** *Drug and alcohol dependence*  
Young, S. D., Zheng, K., Chu, L. F., Humphreys, K.  
2018; 190: 166–69
  - **Ondansetron does not prevent physical dependence in patients taking opioid medications chronically for pain control.** *Drug and alcohol dependence*  
Chu, L. F., Rico, T., Cornell, E., Obasi, H., Encisco, E. M., Vertelney, H., Gamble, J. G., Crawford, C. W., Sun, J., Clemenson, A., Erlendson, M. J., Okada, R., Carroll, et al  
2018; 183: 176–83
  - **Ondansetron Does Not Reduce Withdrawal in Patients With Physical Dependence on Chronic Opioid Therapy.** *Journal of addiction medicine*  
Chu, L. F., Sun, J., Clemenson, A., Erlendson, M. J., Rico, T., Cornell, E., Obasi, H., Sayyid, Z. N., Encisco, E. M., Yu, J., Gamble, J. G., Carroll, I., Clark, et al  
2017
  - **Factors Contributing to Anesthesia Residents' Learner Engagement and Learning Experience in a Mobile App: A Mixed-Method Design Study**  
Traynor, A., Wang, K., Ngai, L., Chu, L.  
LIPPINCOTT WILLIAMS & WILKINS.2017: 102–3
  - **Cytokine signature associated with disease severity in chronic fatigue syndrome patients.** *Proceedings of the National Academy of Sciences of the United States of America*  
Montoya, J. G., Holmes, T. H., Anderson, J. N., Maecker, H. T., Rosenberg-Hasson, Y., Valencia, I. J., Chu, L., Younger, J. W., Tato, C. M., Davis, M. M.  
2017; 114 (34): E7150–E7158

- **How Social Media is Changing the Practice of Regional Anesthesiology.** *Current anesthesiology reports*  
Schwenk, E. S., Chu, L. F., Gupta, R. K., Mariano, E. R.  
2017; 7 (2): 238–45
- **Patient Participation at Health Care Conferences: Engaged Patients Increase Information Flow, Expand Propagation, and Deepen Engagement in the Conversation of Tweets Compared to Physicians or Researchers.** *Journal of medical Internet research*  
Utengen, A., Rouholiman, D., Gamble, J. G., Grajales Iii, F. J., Pradhan, N., Staley, A. C., Bernstein, L., Young, S. D., Clauson, K. A., Chu, L. F.  
2017; 19 (8): e280
- **Palonosetron and hydroxyzine pre-treatment reduces the objective signs of experimentally-induced acute opioid withdrawal in humans: a double-blinded, randomized, placebo-controlled crossover study.** *American journal of drug and alcohol abuse*  
Erlendson, M. J., D'Arcy, N., Encisco, E. M., Yu, J. J., Rincon-Cruz, L., Peltz, G., Clark, J. D., Chu, L. F.  
2016: 1-9
- **One Month of Oral Morphine Decreases Gray Matter Volume in the Right Amygdala of Individuals with Low Back Pain: Confirmation of Previously Reported Magnetic Resonance Imaging Results.** *Pain medicine*  
Lin, J. C., Chu, L. F., Stringer, E. A., Baker, K. S., Sayyid, Z. N., Sun, J., Campbell, K. A., Younger, J. W.  
2016; 17 (8): 1497-1504
- **Teaching the 21st Century Learner: Innovative Strategies and Practical Implementation.** *International anesthesiology clinics*  
Chandrasoma, J., Chu, L. F.  
2016; 54 (3): 35-53
- **Palonosetron and hydroxyzine pre-treatment reduces the objective signs of experimentally-induced acute opioid withdrawal in humans: a double-blinded, randomized, placebo-controlled crossover study** *The American Journal of Drug and Alcohol Abuse*  
Erlendson, M., D'Arcy, N., Encisco, E., Yu, J., Rincon-Cruz, L., Peltz, G., Clark, D. J., Chu, L. F.  
2016: 1-9
- **"Nothing about us without us"-patient partnership in medical conferences.** *BMJ (Clinical research ed.)*  
Chu, L. F., Utengen, A., Kadry, B., Kucharski, S. E., Campos, H., Crockett, J., Dawson, N., Clauson, K. A.  
2016; 354: i3883-?
- **Acute opioid withdrawal is associated with increased neural activity in reward-processing centers in healthy men: A functional magnetic resonance imaging study.** *Drug and alcohol dependence*  
Chu, L. F., Lin, J. C., Clemenson, A., Encisco, E., Sun, J., Hoang, D., Alva, H., Erlendson, M., Clark, J. D., Younger, J. W.  
2015; 153: 314-322
- **A Survey of Resident Educational Technology Preferences from 374 Anesthesiology Residents**  
Ngai, L. K., Eng, R. L., Erlendson, M. J., Chu, L. F.  
LIPPINCOTT WILLIAMS & WILKINS.2014
- **A Pilot Study to Measure the Impact of Blended Learning on Intern Wellness and Burnout**  
Wen, L., Ratner, E., Harrison, T., Chu, L., Mariano, E., Roberts, S., Wang, T., Udani, A.  
LIPPINCOTT WILLIAMS & WILKINS.2014
- **STARTPrep: A 12-Month Multi-Institutional Online Preparatory Course for the American Board of Anesthesiology Part1 Basic Examination**  
Eng, R., Roberts, S. E., Grove, W., Ngai, L., Bartsch, J., Fuller, A. J., Chu, L. F.  
LIPPINCOTT WILLIAMS & WILKINS.2014
- **THE IMPACT OF A FLIPPED CLASSROOM ON INTERN WELLNESS AND BURNOUT: A PILOT STUDY**  
Wen, L., Ratner, E., Harrison, K., Chu, L., Mariano, E., Roberts, S., Udani, A.  
LIPPINCOTT WILLIAMS & WILKINS.2014: S101
- **Laryngeal Mask Airway in Medical Emergencies** *NEW ENGLAND JOURNAL OF MEDICINE*  
Golzari, S. J., Mahmoodpoor, A.  
2014; 370 (9): 883
- **Laryngeal Mask Airway in Medical Emergencies** *NEW ENGLAND JOURNAL OF MEDICINE*  
Wang, H. E., Callaway, C. W., Soar, J.  
2014; 370 (9): 882–83

- **Laryngeal Mask Airway in Medical Emergencies REPLY** *NEW ENGLAND JOURNAL OF MEDICINE*  
Lighthall, G., Harrison, T., Chu, L. F.  
2014; 370 (9): 883–84
- **The development of pediatric fluid resuscitation: an interview with Dr. Frederic A. 'Fritz' Berry** *PEDIATRIC ANESTHESIA*  
Mai, C. L., Yaster, M., Chu, L., Ahmed, Z., Firth, P. G.  
2014; 24 (2): 217-223
- **RapidRead: step-at-a-glance crisis checklists** *Pervasive Health*  
Cirimele, J., Wu, L., Leach, K., Card, S., Harrison, T., Chu, L., Klemmer, S. R.  
2014: 25–32
- **Supporting crisis response with dynamic procedure aids** *Proceedings of the 2014 conference on Designing interactive systems*  
Wu, L., Cirimele, J., Leach, K., Card, S., Chu, L., Harrison, T., Klemmer, S. R.  
2014: 315–24
- **The MOOClet Framework: Improving Online Education through Experimentation and Personalization of Modules** *Social Science Research Network*  
Williams, J. J., Li, N., Kim, J., Whitehill, J., Maldonado, S., Pechenizkiy, M., Chu, L., Heffernan, N.  
2014
- **Videos in clinical medicine: Laryngeal mask airway in medical emergencies.** *New England journal of medicine*  
Lighthall, G., Harrison, T. K., Chu, L. F.  
2013; 369 (20)
- **Laryngeal Mask Airway in Medical Emergencies** *NEW ENGLAND JOURNAL OF MEDICINE*  
Lighthall, G., Harrison, T. K., Chu, L. F.  
2013; 369 (20)
- **SUCCESSFUL TRANSITION TO ANESTHESIA RESIDENCY TRAINING: A MULTICENTER STUDY OF AN ONLINE DISTANCE-LEARNING PROGRAM DESIGNED TO PREPARE INTERNS FOR ANESTHESIA RESIDENCY TRAINING**  
Erlendson, M. J., Ngai, L., Garbin, M., Chu, L. F.  
LIPPINCOTT WILLIAMS & WILKINS.2013: 17–18
- **INTERACTIVE COGNITIVE AIDS FOR CRITICAL EVENTS IN ANESTHESIA**  
Cirimele, J., Cirimele, J., Wu, L., Chu, L., Harrison, K., Card, S., Klemmer, S.  
LIPPINCOTT WILLIAMS & WILKINS.2013: 13–14
- **IMPRINT: A BLENDED-LEARNING ONLINE AND SIMULATION-BASED CURRICULUM TO PROMOTE INTERN WELLNESS AND INCREASE MEDICAL KNOWLEDGE DURING THE CB-1 YEAR**  
Udani, A., Clemenson, A., Harrison, K., Garbin, M., Chu, L.  
LIPPINCOTT WILLIAMS & WILKINS.2013: 70–71
- **SOCIAL MEDIA-BASED DISTRIBUTION OF ANESTHESIA EDUCATIONAL CONTENT: UTILIZATION OF THE ANESTHESIA ILLUSTRATED EDUCATIONAL WEBSITE**  
Clemenson, A., Sun, J., Erlendson, M., Chu, L. F.  
LIPPINCOTT WILLIAMS & WILKINS.2013: 15–16
- **THE USE OF MOBILE COMPUTING DEVICES IN ANESTHESIA RESIDENT EDUCATION: A CROSS-SECTIONAL SURVEY STUDY**  
Sun, J. S., Clemenson, A. M., Garbin, M. C., Chu, L. F.  
LIPPINCOTT WILLIAMS & WILKINS.2013: 68–69
- **Daily cytokine fluctuations, driven by leptin, are associated with fatigue severity in chronic fatigue syndrome: evidence of inflammatory pathology** *JOURNAL OF TRANSLATIONAL MEDICINE*  
Stringer, E. A., Baker, K. S., Carroll, I. R., Montoya, J. G., Chu, L., Maecker, H. T., Younger, J. W.  
2013; 11
- **Daily cytokine fluctuations, driven by leptin, are associated with fatigue severity in chronic fatigue syndrome: evidence of inflammatory pathology.** *Journal of translational medicine*  
Stringer, E. A., Baker, K. S., Carroll, I. R., Montoya, J. G., Chu, L., Maecker, H. T., Younger, J. W.  
2013; 11: 93-?

- **Interactive cognitive aids in medicine** *CHI '13 Extended Abstracts on Human Factors in Computing Systems*  
Wu, L., Cirimele, J., Leach, K., Card, S., Chu, L., Harrison, K., Klemmer, S.  
2013: 2887–88
- **Head-mounted and multi-surface displays support emergency medical teams** *Proceedings of the 2013 conference on Computer supported cooperative work companion*  
Wu, L., Cirimele, J., Bassen, J., Leach, K., Card, S., Chu, L., Harrison, K., Klemmer, S.  
2013: 279–82
- **Clinical Anesthesiology Board Review**  
edited by Chu, L. F.  
McGraw-Hill.2013
- **Mobile computing in medical education: opportunities and challenges** *CURRENT OPINION IN ANESTHESIOLOGY*  
Chu, L. F., Erlendson, M. J., Sun, J. S., Alva, H. L., Clemenson, A. M.  
2012; 25 (6): 699-718
- **Analgesic tolerance without demonstrable opioid-induced hyperalgesia: a double-blinded, randomized, placebo-controlled trial of sustained-release morphine for treatment of chronic nonradicular low-back pain** *PAIN*  
Chu, L. F., D'Arcy, N., Brady, C., Zamora, A. K., Young, C. A., Kim, J. E., Clemenson, A. M., Angst, M. S., Clark, J. D.  
2012; 153 (8): 1583-1592
- **Modulation of remifentanyl-induced postinfusion hyperalgesia by the beta-blocker propranolol in humans** *PAIN*  
Chu, L. F., Cun, T., Ngai, L. K., Kim, J. E., Zamora, A. K., Young, C. A., Angst, M. S., Clark, D. J.  
2012; 153 (5): 974-981
- **Information technology and its role in anaesthesia training and continuing medical education.** *Best practice & research. Clinical anaesthesiology*  
Chu, L. F., Erlendson, M. J., Sun, J. S., Clemenson, A. M., Martin, P., Eng, R. L.  
2012; 26 (1): 33-53
- **Analysis of 4999 Online Physician Ratings Indicates That Most Patients Give Physicians a Favorable Rating** *JOURNAL OF MEDICAL INTERNET RESEARCH*  
Kadry, B., Chu, L. F., Kadry, B., Gammas, D., Macario, A.  
2011; 13 (4)
- **Prescription opioid analgesics rapidly change the human brain** *PAIN*  
Younger, J. W., Chu, L. F., D'Arcy, N. T., Trott, K. E., Jastrzab, L. E., Mackey, S. C.  
2011; 152 (8): 1803-1810
- **A sensitive assay for the quantification of morphine and its active metabolites in human plasma and dried blood spots using high-performance liquid chromatography-tandem mass spectrometry** *ANALYTICAL AND BIOANALYTICAL CHEMISTRY*  
Clavijo, C. F., Hoffman, K. L., Thomas, J. J., Carvalho, B., Chu, L. F., Drover, D. R., Hammer, G. B., Christians, U., Galinkin, J. L.  
2011; 400 (3): 715-728
- **Self-Reported Information Needs of Anesthesia Residency Applicants and Analysis of Applicant-Related Web Sites Resources at 131 United States Training Programs** *ANESTHESIA AND ANALGESIA*  
Chu, L. F., Young, C. A., Zamora, A. K., Lowe, D., Hoang, D. B., Pearl, R. G., Macario, A.  
2011; 112 (2): 430-439
- **The Endogenous Opioid System Is Not Involved in Modulation of Opioid-Induced Hyperalgesia** *JOURNAL OF PAIN*  
Chu, L. F., Dairmont, J., Zamora, A. K., Young, C. A., Angst, M. S.  
2011; 12 (1): 108-115
- **A visual guide to anesthesia procedures**  
Chu, L. F., Fuller, A. J.  
LWW.2011
- **Coagulopathies** *Manual of Clinical Anesthesiology*  
Fanning, R., Chu, L. F.  
Lippincott Williams and Wilkins.2011

- **A visual guide to regional anesthesia**  
Chu, L. F., Fuller, A. J., Mariano, E.  
LWW.2011
- **Wire Cricothyroidotomy** *Manual of Clinical Anesthesiology*  
Chu, L. F., Tanaka, P.  
Lippincott Williams and Wilkins.2011
- **Endotracheal Intubation** *Manual of Clinical Anesthesiology*  
Chu, L. F., Harrison, T.  
Lippincott Williams and Wilkins.2011
- **Maintaining shared mental models in anesthesia crisis care with nurse tablet input and large-screen displays** *Proceedings of the 24th annual ACM symposium adjunct on User interface software and technology*  
Wu, L., Cirimele, J., Card, S., Klemmer, S., Chu, L., Harrison, K.  
2011: 71–72
- **Mask Ventilation** *Manual of Clinical Anesthesiology*  
Chu, L. F., Harrison, T.  
Lippincott Williams and Wilkins.2011
- **Insertion of Peripheral IV** *Manual of Clinical Anesthesiology*  
Chu, L. F.  
Lippincott Williams and Wilkins.2011
- **The Anesthetic Plan and Induction of Anesthesia** *Manual of Clinical Anesthesiology*  
Hairston, J., Ludwin, D., Chu, L.  
Lippincott Williams and Wilkins.2011
- **Radial Artery Catheterization** *Manual of Clinical Anesthesiology*  
Chu, L. F., Harrison, T.  
Lippincott Williams and Wilkins.2011
- **Insertion of Left-Sided DLT** *Manual of Clinical Anesthesiology*  
Chu, L. F., Kulkarni, V., Harrison, T.  
Lippincott Williams and Wilkins.2011
- **Awake Fiber Optic Intubation** *Manual of Clinical Anesthesiology*  
Chu, L. F., Harrison, T.  
Lippincott Williams and Wilkins.2011
- **Spinal Anesthesia** *Manual of Clinical Anesthesiology*  
Chu, L. F., Fuller, A., Harrison, T.  
Lippincott Williams and Wilkins.2011
- **A visual guide to transesophageal echocardiography**  
Chu, L. F., Fuller, A. J., Weitzel, N.  
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- **A visual guide to crisis management**  
Chu, L. F., Fuller, A., Goldhaber-Fibert, S., Harrison, K.  
LWW.2011
- **Standard Induction of GA** *Manual of Clinical Anesthesiology*  
Chu, L. F., Harrison, T.  
Lippincott Williams and Wilkins.2011
- **Laryngeal Mask Airway Insertion** *Manual of Clinical Anesthesiology*  
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- **Lumbar Epidural Placement** *Manual of Clinical Anesthesiology*  
Chu, L. F., Fuller, A., Harrison, A.  
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- **Central Venous Catheterization** *Manual of Clinical Anesthesiology*  
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- **Manual of Clinical Anesthesiology**  
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- **Learning management systems and lecture capture in the medical academic environment.** *International anesthesiology clinics*  
Chu, L. F., Young, C. A., Ngai, L. K., Cun, T., Pearl, R. G., Macario, A.  
2010; 48 (3): 27-51
- **The role of social networking applications in the medical academic environment.** *International anesthesiology clinics*  
Chu, L. F., Zamora, A. K., Young, C. A., Kurup, V., Macario, A.  
2010; 48 (3): 61-82
- **Learning Management Systems and Lecture Capture in the Medical Academic Environment** *INTERNATIONAL ANESTHESIOLOGY CLINICS*  
Chu, L. F., Young, C. A., Ngai, L. K., Cun, T., Pearl, R. G., Macario, A.  
2010; 48 (3): 27-51
- **Finite element modeling of subcutaneous implantable defibrillator electrodes in an adult torso** *HEART RHYTHM*  
Jolley, M., Stinstra, J., Tate, J., Pieper, S., MacLeod, R., Chu, L., Wang, P., Triedman, J. K.  
2010; 7 (5): 692-698
- **Anesthesia 2.0: Internet-based information resources and Web 2.0 applications in anesthesia education** *CURRENT OPINION IN ANESTHESIOLOGY*  
Chu, L. F., Young, C., Zamora, A., Kurup, V., Macario, A.  
2010; 23 (2): 218-227
- **Bilateral infraorbital nerve blocks decrease postoperative pain but do not reduce time to discharge following outpatient nasal surgery** *Annual Meeting of the American-Society-of-Anesthesiologist*  
Mariano, E. R., Watson, D., Loland, V. J., Chu, L. F., Cheng, G. S., Mehta, S. H., Maldonado, R. C., Ilfeld, B. M.  
SPRINGER.2009: 584-89
- **Anesthesia-controlled time and turnover time for ambulatory upper extremity surgery performed with regional versus general anesthesia** *31st Annual Spring Meeting of the American-Society-of-Regional-Anesthesia-and-Pain-Medicine*  
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