

David Ouyang
Curriculum Vitae

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Cardiologist with a focus on cardiovascular imaging, computer vision, machine learning and data science. Background in statistics, programming in R, python, pytorch and SQL

Education

- 01/19 – Present **Stanford University**
Postdoctoral Fellow, Computer Science and Biomedical Data Science
Mentors: James Zou, Euan Ashley
- 07/17– Present **Stanford University**
Cardiovascular Medicine Fellow
- 07/14– 06/17 **Stanford University**
Internship and Residency in Internal Medicine
Stanford Society of Physician Scholars
- 08/10 – 06/14 **University of California San Francisco (UCSF)**
MD, Clinical and Translational Research Pathway
- 08/07– 05/10 **Rice University**
BA Statistics, BS Biochemistry
Magna cum Laude, Phi Beta Kappa, Century Scholar and University Trustees Scholar

Grants

- 01/01/20 **Kirschstein NRSA for Training of Postdoctoral Fellows (F32HL149298-01)**
\$214,266.00 "Applying Machine Learning in Echocardiography to Identify and Predict Subclinical Phenotypes of Cardiovascular Disease"
- 11/01/19 **Stanford Cardiovascular Institute Seed Grant**
\$20,000 Precision Approach to Ventricular Mass: Image-Based Differentiation of Hypertrophic Cardiomyopathy, Amyloidosis, and Phenocopies
- 11/01/19 **Stanford Cardiovascular Institute and Maternal Child Health Institute Seed Grant**
\$20,000 Developing Novel Computational Methods for the Early Detection of Right Heart Failure and Pulmonary Hypertension in the Pediatric and Adult Populations
- 07/01/19 **2019 Stanford Artificial Intelligence in Medicine and Imaging Center Seed Grant**
\$73,524 Computer Vision Prediction of Cardiovascular Outcomes through Echo

- 07/01/19 **Translational Research and Applied Medicine Pilot Grant Renewal**
\$20,000 Deep Learning to Identify Systemic Phenotypes and Unsupervised Learning of Clinical Measurements in Echocardiography
- 06/01/19 **American College of Cardiology Foundation / Merck Research Fellowship**
\$70,000 Big Data Analysis and Machine Learning in Cardiovascular Imaging
- 11/01/18 **Translational Research and Applied Medicine Pilot Grant**
\$20,000 Deep Learning to Identify Systemic Phenotypes and Unsupervised Learning of Clinical Measurements in Echocardiography
- 02/17/12 **T1 Catalyst Mobile Health Translational Project Award**
\$30,000 Mobile Image-Processing for the Identification of Pills.
UCSF Clinical and Translational Science Institute (CTSI)
- 11/23/11 **UCSF Mobile Health Consultation Award**
\$3,000 Exploring Image Processing Using Mobile Applications.
UCSF Clinical and Translational Science Institute (CTSI)

Awards

- 2019 American College of Cardiology Foundation / Merck Research Fellowship
2019 American Society of Echocardiography Arthur Weyman Young Investigator Award Competition Finalist
2018 Circulation Cardiovascular Quality and Outcomes Top Reviewer
2014 The Permanente Medical Group Medical Student Scholarship
2012 UCSF Dean's Prize in Research Finalist
2010 Phi Beta Kappa
2009 Amgen Scholar at the University of California San Francisco
2009 Barry M. Goldwater Scholar for Excellence in Research
2009 USA Today All-USA College Academic 3rd Team
2009 Joe Hamner Scholarship for Excellence in Engineering
2008 Welch Foundation Undergraduate Summer Research Fellowship
2007 Rice University Century Scholarship for Research
2007 Rice University Trustees Distinguished Scholarship

Publications

Ouyang D*, He B, Ghorbani A, Langlotz CP, Heidenreich PA, Harrington RA, Liang DH, Ashley EA, Zou JY* "Interpretable artificial intelligence for beat-to-beat cardiac function assessment" *Nature*. Mar 25, 2020.

**Co-Corresponding author*

Ouyang D*^, Gorbhani A*, Abid A, He B, Chen JH, Harrington RA, Liang DH, Ashley EA, Zou JY^. "Deep Learning Interpretation of Echocardiograms." *npj Digital Medicine*. January 24, 2020. **Co-First author ^Co-Corresponding author*

Vranas KC*, **Ouyang D***, Lin AL, Slatore CG, Sullivan DR, Prasad Kerlin M, Liu KD, Baron RM, Calfee CS, Ware LB, Halpern S, Matthay MA, Herridge M, Mehta S, Rogers AJ. "Gender Differences in Authorship of Critical Care Literature." **Am J Respir Crit Care Med.** Jan 22, 2020 *Co-First author

Ouyang D*, He B, Gorbhani A, Lungren MP, Ashley EA, Liang DH, Zou JY. "EchoNet-Dynamic: a Large New Cardiac Motion Video Data Resource for Medical Machine Learning". **NeuroIPS Machine Learning for Health Workshop** December 5, 2019. *Corresponding author

Vora M, Kuripla C, **Ouyang D**, Sing DC. "Gender Trends in Authorship of Foot and Ankle Academic Literature Over 24 Years." **J Foot Ankle Surg** 2019 Jul 23, PMID 31340141

Ouyang D*, Harrington RA, Rodriguez F. "The Association between Female Corresponding Authors and Female Co-Authors in Top Contemporary Cardiovascular Medicine Journals." **Circulation** 2019 Feb 19;139(8):1127-1129. doi: 10.1161/CIRCULATIONAHA.118.037763. *Corresponding author

Chen JH, Wang KW, **Ouyang D**, Hom J, Chi J. "Characterizing Inpatient Medicine Resident Electronic Health Record Usage Patterns Using Event Log Data". PLoS One. 2019 Feb 6;14(2):e0205379. doi: 10.1371/journal.pone.0205379. eCollection 2019.

Ouyang D, Sing DC, Shah S, Duvernoy C, Harrington RA, Rodriguez F. "Gender Disparities in Authorship Order of Cardiology Scientific Publications – Trends over 40 Years." **Circulation Cardiovascular Quality and Outcome** 2018 Dec;11(12):e005040. doi: 10.1161/CIRCOUTCOMES.118.005040. *Corresponding author

Ouyang D, Tisdale R, Cheng P, Chi J, Chen JH, Ashley EA. "What's in a Name? Factors that influence the usage of Generic vs. Trade Names for Cardiac Medications among Healthcare Providers." **Circulation Cardiovascular Quality and Outcomes** 2018;11:e004704 *Corresponding author

Ouyang D, Gulati G, Ha R, Banerjee D. "Incidence of Temporary Mechanical Circulatory Support Prior to Heart Transplantation and Impact on Post-Transplant Outcomes." **Journal of Heart and Lung Transplantation** 2018 Apr 26. pii: S1053-2498(18)31438-4. doi: 10.1016/j.healun.2018.04.008. PMID 29907499

Ouyang D, Tisdale R, Cheng P, Chi J, Ashley EA, Chen JH. "Acetaminophen or Tylenol? A Retrospective Analysis of Medication Digital Communication Practices." **Journal of General Internal Medicine** 2018 May 1. doi: 10.1007/s11606-018-4455-1. PMID 29717410 *Corresponding author

Sing DC, Jain D, **Ouyang D**. "Gender trends in authorship of spine-related academic literature - a 39-year perspective." **Spine J.** (Jun 30, 2017) PMID 28673828

Ouyang D, Gulati G, Ha R, Banerjee D. "Impact of Wait Times for Cardiac Transplantation on Outcomes after Implantation of Left Ventricular Assist Devices." **World J Card** . (Feb 26, 2017) PMID 28289529

Weiskopf K, Creighton D, Lew T, Caswell JL, **Ouyang D**, Shah AT, Hofmann LV, Neal JW, Telli ML. "Acute, unilateral breast toxicity from gemcitabine in the setting of thoracic inlet obstruction." **Journal of Clinical Practice.**(Aug 12, 2016) PMID 27511721

Ouyang D, Chen J, Krishnan G, Hom J, Witteles R, Chi J. "Patient Outcomes When Housestaff Exceed Eighty Hours per Week." *American Journal of Medicine*. (April 18, 2016) PMID: 27103047

Ouyang D, Chen J, Hom J, Chi J. "How Much Time Do Internal Medicine Residents Spend on the Computer?: An Electronic Audit of an Inpatient Service." *JAMA Internal Medicine*. (August 7, 2015). PMID: 26642261

Rolston J D, **Ouyang D**, D J Englot, D D Wang, E F Chang. "National trends and complication rates for invasive extraoperative electrocorticography in the USA." *Journal of Clinical Neuroscience*. (February 7, 2015). PMID: 25669117

Ouyang D, I El-Sayed, SS Yom. National Trends in Surgery for Sinonasal Malignancy and the Effect of Hospital Volume on Short-Term Outcome. *Laryngoscope*. (July 4, 2014). PMID: 24390781

Wang D D, **Ouyang D**, D J Englot, A M Molinaro, M Ward, E F Chang. "Trends in surgical treatment for trigeminal neuralgia in the United States from 1988 to 2008." *Journal of Clinical Neuroscience*. (August 7, 2013). PMID: 23932422

Ouyang D, N Yuan, SC Sheu, G Lau, C Chen, CJ Lai. Making a Difference: the impact of education at student-run clinics on sustained improvement in patient's hepatitis B knowledge. *Journal of Community Health*. (November 18, 2012). PMID: 23161212

Englot, D J, **Ouyang D**, D D Wang, J S Rolston, P A Garcia, and E F Chang. "Relationship between Hospital Surgical Volume, Lobectomy Rates, and Adverse Perioperative Events at U.S. Epilepsy Centers". *Journal of Neurosurgery*. (October 26, 2012). PMID 23101453.

Englot, D J, **Ouyang D**, P A Garcia, N M Barbaro, and E F Chang. "Epilepsy Surgery Trends in the United States, 1990-2008." *Neurology*. (March 21, 2012). PMID: 22442428

Talks

Ouyang D. "Deep Learning and Data Science to Enhance Echocardiography" *Cornell Cardiovascular Imaging Conference*, February 21, 2020. New York, New York

Ouyang D. "Deep Learning and Data Science to Enhance Echocardiography" *Cedars-Sinai Cardiovascular Imaging Conference*, February 21, 2020. Beverley Hills, California

Ouyang D. "Deep Learning and Data Science to Enhance Echocardiography" *Northwestern Cardiovascular Imaging Conference*, February 21, 2020. Chicago, Illinois

Ouyang D. "Deep Learning and Data Science to Enhance Echocardiography" *Johns Hopkins Cardiovascular Imaging Conference*, February 19, 2020. Baltimore, Maryland

Ouyang D. "Deep Learning and Data Science to Enhance Echocardiography" *University of Washington Cardiovascular Imaging Conference*, January 31, 2020. Seattle, Washington

Ouyang D. "Deep Learning and Data Science to Enhance Echocardiography" *Stanford Cardiovascular Medicine Grand Rounds*, January 16, 2020. Palo Alto, California

Ouyang D. "Deep Learning and Data Science to Enhance Echocardiography" *University of Pennsylvania Cardiovascular Imaging Conference*, November 19, 2019. Philadelphia, Pennsylvania

Ouyang D. "Deep Learning to Identify Systemic Phenotypes and Supervised Learning of Clinical Measurements" *American Society of Echocardiography 2019 Scientific Sessions, 2019 Arthur E. Weyman Young Investigator's Award Competition*. June 24, 2019. Portland, OR.

Ouyang D. "Big Data Analysis and Machine Learning in Cardiovascular Imaging" *Translational Research and Applied Medicine Annual Research Symposium*, June 11, 2019. Stanford University, Palo Alto

Ouyang D. "Big Data Analysis and Machine Learning in Cardiovascular Imaging" *American College of Cardiology 2019 Scientific Sessions*, March 17, 2019. New Orleans, LA.

Ouyang D. "Big Data Analysis and Machine Learning in Cardiovascular Imaging" *Stanford Cardiovascular Medicine Grand Rounds*, September 6, 2019. Stanford University, Palo Alto

Ouyang D. "Beyond Traditional Data Streams: Analysis of Organic Datasets in Healthcare" *Biomedical Informatics Division Research in Progress*, October 26, 2017. Stanford Center for Biomedical Informatics Research, Palo Alto

Ouyang D. "Residency in 16 Graphs: Data Visualization in Medicine" *Internal Medicine Residency Senior Talk*, March 12, 2017. Stanford University, Palo Alto

Ouyang D. "Outcomes Research using the Electronic Medical Record System." *Bay Area R User Group*, February 9, 2016. Thermo Fisher Scientific, South San Francisco

Ouyang D. "An EPIC Use of Time" *Internal Medicine Residency Noon Conference*, November 30, 2015. Stanford University, Palo Alto

Posters and Abstracts

Powers A, Haddad F, Zou J, Ashley EA, Liang D, **Ouyang D.** "Reports based classification and hierarchical clustering of Echocardiographic Measurements " *Translational Research and Applied Medicine Annual Research Symposium*, June 11, 2019. Stanford University, Palo Alto

Ouyang D. Ghorbani A, Liang D, Ashley EA, Zou J. "Deep Learning to Identify Systemic Phenotypes and Unsupervised Learning of Clinical Measurements" *Big Data in Precision Medicine*, May 23, 2019. Stanford University, Palo Alto

Ouyang D, Ghorbani A, Wang C, Yen A, Haddad F, Zou J, Ashley EA, Liang D. "Defining 'No Significant Change': Standard Error of Standard Echocardiogram Measurements" *American Society of Echocardiography*

2019 Scientific Sessions. June 24, 2019. Portland, OR.

Dixon JA, King L, Nshimiyimana JF, Sibomana JP, Leng M, Mushuru E, Kabakambira D, Canoso R, Block C, Muvunyi B, van Leeuwen D, Kailani L, Seminega B, Bitunguhari L, Masaisa F, Tuyizere A, Bagasha P, **Ouyang D**, Seruyange E, Manzi OM, Walker T, Dusabejamo V. "Implementation of a Low-Tech, Flipped Classroom Core Lecture Series for Internal Medicine Residents in Rwanda: One-Year Outcomes." *Consortium of Universities for Global Health*. (New York, New York, April 7, 2018)

Ouyang D, Sing DC, Shah S, Duvernoy C, Harrington RA, Rodriguez F. "Gender Disparities in Authorship Order of Cardiology Scientific Publications – Trends over 40 Years." *AHA Quality of Care and Outcomes Research Scientific Sessions* (Arlington, Virginia, April 6-7, 2018).

Tisdale R, **Ouyang D**, Ashley E, Chi J, Chen J. "Carvedilol or Coreg? Medication Communication Practices Between Providers in Cardiology. *American College of Cardiology's 67th Annual Scientific Session*(Orlando, Florida, March 9-11, 2018).

Tooley J, **Ouyang D**, Hadley D, Froelicher V, Perez M. "Analysis of QT interval correction formulas in atrial fibrillation – A big data approach". *American Heart Association Scientific Sessions*. (Anaheim, California, November 11-15, 2017).

Tisdale R, **Ouyang D**, Ashley E, Chi J, Chen J. "Acetaminophen or Tylenol? Medication Communication Practices and Habits in Text Pages. *American College of Physicians California Northern Chapter Meeting*. (Walnut Creek, California, October 20-22, 2017).

Ouyang D, Gulati G, Banerjee D. "Incidence and Outcomes of Acute Circulatory Support Prior to Heart Transplantation". *International Society for Heart & Lung Transplantation 37th Annual Meeting and Scientific Sessions*. (San Diego, California, April 5-8, 2017) **Oral Presentation**

Gulati G, **Ouyang D**, Banerjee D. "Differential survival benefit of IABPs and PVADs by procedural timing and clinical indication". *American College of Cardiology's 66th Annual Scientific Session* (Washington DC, March 17-19, 2017.)

Sing D, **Ouyang D**, Hu S. "Gender Trends in Authorship of Spine-Related Academic Literature – A 38-Year Perspective". *North American Spine Society 31st Annual Meeting*.(Boston, October 26-29, 2016.)**Podium Presentation**

Ouyang D, Gunsagar G, Banerjee D. "Impact of wait times for cardiac transplantation on outcomes after implantation of left ventricular assist devices (LVAD)"*American College of Cardiology.16 65th Annual Scientific Session and Expo*. (April 2, 2016).

Ouyang D, Chen J, Hom J, Chi J. "Effect of Resident Workload on the Resident Work Hours and the Quality of Patient Care" *2016 SGIM California-Hawaii Regional Meeting*. (January 15, 2016). **1st Place Scientific Abstract Poster**

Ouyang D, Chen J, Hom J, Chi J. "Behavioral Analysis of Electronic Medical Record Use by Internal Medicine Residents on the General Medicine Service" *2015 Stanford Quality Improvement/Patient Safety Symposium*(June 3, 2015).

Ouyang D, El-Sayed I, YomSS. National Trends in Surgery for Sinonasal Malignancy: The Effect of Hospital Volume on Short-Term Outcome. *American Radium Society 96th Annual Meeting*. April 26-29, 2014.

Ouyang D, Yu A, Qian D, Deo RC. Mobile Image-Processing Application for the Identification of Pills. *IEEE Healthcare Innovation Conference*. November 7-9, 2012.

Ouyang D, Sheu SC, Yuan N, Lau G, Chen C, Lai CJ. Patients' retention of hepatitis B knowledge after education sessions at student-run screening and vaccination clinics. *Society of General Internal Medicine 35th Annual Meeting*. May 9 – 12, 2012.

Yuan N, **Ouyang D**, Sheu SC, Lau G, Chen C, Lai CJ. Efficacy of student-led patient education sessions on patient knowledge retention at two student-run hepatitis B clinics. *11th Annual UCSF Medical Education Day*. April 27, 2012.

Chang EF, Englot D J, **Ouyang D**, N Barabaro. “Temporal Lobe Epilepsy Surgery Trends in the United States from 1990 to 2008 from the Nationwide Inpatient Sample Database. *American Epilepsy Society 65th Annual Meeting*. December 2 – 6, 2011.

Reviewer for

BMJ Open

Circulation

Circulation Cardiovascular Quality and Outcomes

JAMA Cardiology

JACC EP

NeuroIPS

PLOS One

Lancet Digital Medicine

New England Journal of Medicine