

Karthik V. Sarma

Education	California Institute of Technology <hr/>	
	B.S. Computer Science (Hons); GPA: 3.9	2007–2011
	University of California, Los Angeles	
	M.D., Ph.D. Bioengineering (Medical Imaging Informatics)	2011–2021 (Expected)
Current Research	David Geffen School of Medicine at UCLA <hr/>	
	<i>Medical Imaging and Informatics Lab</i>	2015–Present
	<ul style="list-style-type: none">• Thesis project: “Development of a Multimodal Deep Learning Model for the Generation of Cancer Probability Maps and Imaging Biomarkers for Prostate Cancer using Multiparametric MRI”<ul style="list-style-type: none">– Adviser: Prof. Corey W. Arnold– Expected completion: 2019• Research focuses:<ul style="list-style-type: none">– Diagnostic and prognostic analysis of medical images (radiology and digital pathology)– Deep learning– Automated knowledge extraction from text and microposts• Accomplishments to date:<ul style="list-style-type: none">– Awarded >\$150,000 in extramural grant funding from multiple sources for main project– Multiple peer-reviewed publications and awards– Developed and published initial deep learning models using Torch and TensorFlow with proof-of-concept radiology and pathology datasets– Coordinated assembly of 400 patient dataset consisting of mpMRI, prostatectomy specimen registered molds, whole-mount digital pathology images, and radiological and pathological pixel-level annotations across multiple clinical and research departments– Built physical multi-tenant infrastructure for deep learning research from scratch	
Industry	SimX, Inc. <hr/>	
	<i>Co-founder and Chief Technology Officer</i>	2014–Present
	<ul style="list-style-type: none">• Co-founded SimX with two physician colleagues in 2014• Helped develop core product concept and plan to create professional grade medical simulation software for virtual and augmented reality platforms.• Worked with initial team to program software prototype using experimental hardware• Hired initial technical team and manage day to day technical operations• Helped bring company from concept to first major academic institution purchase• Currently leading development of first generally available product• Created multiple co-development proposals for spin-off product lines that are currently under consideration by potential partners	

**Previous
Research**

California Institute of Technology

K. Mani Chandy Lab

2009–2012

- Senior thesis topic: “A System for the Remote Collection and Analysis of Auscultatory Readings in the Developing World”
- Accomplishments
 - Led 5-person team to develop a low-cost stethoscope (\$30) and EKG (\$5) usable with a mobile phone
 - Worked with clinical collaborators at UCI Medical School to field test device during global health work in rural India
 - Developed an online database of auscultatory recordings for education
 - Developed an early automated system to detect arrhythmias and heart murmurs from synchronized auscultatory and electrophysiological readings
 - Published thesis and two conference presentations

Erik Winfree Lab

2009–2011

- Research Focus
 - Development of tools to assist design of nucleic acid molecular computation systems
- Accomplishments
 - Re-implemented, extended, and hardened automated verifier for nucleic acid systems
 - Assisted integration of verifier into nucleic acid tool suite (currently in active use)
 - Co-authored paper on tool suite

Christof Koch Lab

2008–2009

- Research Focus
 - Computational investigation of ephaptic effects of neuronal transmembrane currents
- Accomplishments
 - Extended NEURON simulation system to include electrical fields arising from neuronal transmembrane currents
 - Further extended system for parallel computation to reduce simulation time from weeks to hours
 - Developed visualization software to show perturbations of transmembrane voltage arising from ephaptic fields
 - Resulting system subsequently used in published analyses by the lab

**Fellowships,
Awards & Grants**

RSNA 2016 Trainee Research Award	<i>2016</i>
NIH NCI F30 Predoctoral Fellowship	<i>2016–2020</i>
AMA Foundation Student Seed Grant	<i>2016–2017</i>
NIH Medical Scientist Training Program Fellowship	<i>2011</i>
Bhansali Prize in Computer Science for Best Senior Research	<i>2011</i>
Robert L. Noland Leadership Award	<i>2011</i>
Dean’s Cup	<i>2010</i>
Donald S. Clark Memorial Award	<i>2010</i>
Upperclass Merit Scholarship	<i>2009</i>

**Organized
Medicine**

American Medical Association

Member-Elect, Board of Trustees

2016–Present

- Elected to the Board of Trustees in November 2016 for a term to begin in June 2017.

Member, Council on Medical Service

2016–Present

- Member of the 12-person Council on Medical Service, the policy-making body of the AMA focusing on socioeconomic factors that influence the practice of medicine
- Contributed to the production of 18 reports on a wide array of health policy areas, including:
 - Value-based prescription drug pricing
 - Regulation of mobile medical apps
 - The VA healthcare system
 - The ACA Medicaid expansion
 - Regulation of telemedicine
 - MACRA
 - Health care financing

Regional Delegate to the House of Delegates

2012–2016

- Elected member of the House of Delegates representing medical students living in states west of and including the Dakotas.
- Provided testimony to reference committees and made speeches on the floor of the House on a wide variety of items of business
- Co-led several successful efforts to develop major Association policies, including
 - H-105.988 - Support of a ban on direct-to-consumer advertising for prescription drugs and medical devices
 - H-460.912 - Support of mandatory disclosure of the results of all clinical trials
 - H-425.969 - Opposition to any legislative or regulatory efforts to deny access or coverage of reproductive health services
 - H-65.973 - Recognition that denying civil marriage to LGBT couples is discriminatory and harmful to health
- Served as an expert member of Reference Committee J (Medical Service)
- Founded and chaired the Medical Student Health Information Technology Task Force and led it to attaining permanent standing committee status

California Medical Association

Vice Chair, Subcommittee on Health Information Technology

2016–Present

- Appointed by the CMA Board of Trustees to lead the nine-member CMA working group on health IT issues
- The main activities of the working group are focused on telemedicine regulation, California health information exchanges, and promoting interoperability of electronic health records

Member, Board of Trustees

2014

- Elected member of the Board of Trustees of the California Medical Association
- Involved in effort to re-organize and streamline CMA governance operations, including the substantial reduction in the size of the Board and conversion of the policy-making process from an annual basis to a quarterly basis
- Helped lead a successful major campaign to defeat a deeply flawed ballot proposition

**Papers, Talks,
and Posters**

- Sarma KV**, Spiegel BMR, Reid MW, Chen S, Merchant RM, Seltzer E, Arnold CW. "Estimating Health-Related Quality of Life of Twitter Users: Methods for Semantic Processing of Social Media Posts." 2017. In preparation.
- Li J, **Sarma KV**, Ho KC, Gertych A, Knudsen BS, Arnold CW. "A Multi-scale U-Net for Semantic Segmentation of Histological Images from Radical Prostatectomies". 2017. Submitted.
- Ho KC, Scalzo F, **Sarma KV**, El-Saden S, Arnold CW. "A Temporal Deep Learning Approach for MR Perfusion Parameter Estimation in Stroke." ICPR. Cancun, Mexico; 2016.
- Sarma KV**, Zhong X, Ho KC, Margolis DJA, Raman S, Scalzo F, Sung KH, Tan N, Arnold CW. "An Investigational Patch-based Convolutional Neural Network Model for the Detection of Clinically Significant Prostate Cancer using Multiparametric MRI." RSNA Annual Meeting. Chicago, IL; 2016.
- Ho KC, Scalzo F, **Sarma KV**, El-Saden S, Arnold CW. "A Novel Bi-Input Convolutional Neural Network for Deconvolution-Free Estimation of Stroke MR Perfusion Parameters." RSNA Annual Meeting. Chicago, IL; 2016.
- Ho KC, Scalzo F, **Sarma KV**, El-Saden S, Arnold CW. "A Temporal Deep Learning Approach for MR Perfusion Parameter Estimation in Stroke." 23rd International Conference on Pattern Recognition. Cancun, Mexico; 2017.
- Sarma KV**, Zhong X, Ho KC, Margolis DJA, Raman S, Scalzo F, Sung KH, Tan N, Arnold CW. "Development of a Deep Learning Model for the Detection of Prostate Cancer using MRI." Poster session presented at: Gordon Research Conference in Advanced Health Informatics; 2016 Jul 17-22; Hong Kong, HKSAR.
- Oh AS, Arnold CW, Vangala S, Wallace WD, Genshaft SJ, **Sarma KV**, Aberle DR. "Imaging-Histologic Discordance at Percutaneous Biopsy of the Lung." Acad Radiol. 2015; S1076-6332.
- McNamara M, **Sarma KV**, Aberle DR, Bui AA, Arnold C. "Data Model for Personalized Patient Health Guidelines: An Exploratory Study." AMIA Annu Symp Proc. 2014; 1835-44.
- McNamara M, Arnold C, **Sarma KV**, Aberle D, Garon E, Bui AAT. "Patient portal preferences: Perspectives on imaging information." J Assoc Info Sci Tech. 2014.
- Grun C, **Sarma KV**, Wolfe B, Shin SW, Winfree E. "A domain-level DNA strand displacement reaction enumerator allowing arbitrary non-pseudoknotted secondary structures." VEMDP 2014. Vienna, Austria. 7/17/14.
- Kulkarni SP, Shah KR, **Sarma KV**, Mahajan AP. "Clinical uncertainties, health service challenges, and ethical complexities of HIV 'test-and-treat': a systematic review" Am J Public Health. 2013; 103(6):e14-23.
- Sarma KV**, Xia P, Lin J, Tan A, Bunn J, Chandy KM. "Low-cost Cloud-based Remote Auscultation." Western Student Medical Research Forum. Carmel, CA. 1/27/12.
- Sarma KV**, Bunn J, Lin J, Petrasek D, Tan A, et. al. "Mobile Phones for Remote Monitoring: Applications for Cardiovascular Disease Including Diabetes." Diabetes Technology Meeting. Bethesda, MD. 1/13/10.

**Teaching
Assistantships**

- California Institute of Technology**, *Department of Computer Science* —————
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| Decidability and Tractability (CS 21) | 2010 |
| Introduction to Programming (CS 1) | 2009 |
| Computer Language Shop (CS 11) | 2009–2011 |