

# Karthik V. Sarma

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## EDUCATION

### University of California, Los Angeles

2011–2021 (expected) MD, PhD Bioengineering (Medical Imaging Informatics)  
2016 MS Bioengineering (Medical Imaging Informatics)

### California Institute of Technology

2007–2011 BS Computer Science (Hons)

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## DOCTORAL RESEARCH

### David Geffen School of Medicine at UCLA

2015–2019 (expected)

*PhD student, Medical Imaging and Informatics Lab*

- 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”
  - Adviser: Prof. Corey W. Arnold
  - Research focuses: Diagnostic and prognostic analysis of medical images (radiology and digital pathology); deep learning; automated knowledge extraction from clinical text and microposts
  - Awarded over \$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 a 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
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## INDUSTRY

### SimX, Inc.

2014–present

*Co-founder and Chief Technology Officer*

- 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 co-development proposals for spin-off product lines that are currently under consideration by potential partners

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**FELLOWSHIPS, AWARDS, & GRANTS**

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

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**ORGANIZED MEDICINE****American Medical Association**

2017–present

*Member, Board of Trustees*

As the student member of the Board of Trustees, I am responsible for representing the values and interests of our country's over 100,000 MD and DO students. I have been at the forefront of our AMA's fight against repeated legislative efforts to weaken our nation's healthcare system and rip health insurance away from tens of millions. I have also worked to guide the AMA's response to a number of events, including the administration's institution of a travel ban, the revocation of the DACA program, the banning of transgender soldiers in the military, and an attempt to redefine discrimination to exclude gender identity and sexual orientation. During my term, I have collaborated with my Board colleagues on many of our initiatives, including efforts to prepare eleven reports, expand the AMA Innovation Ecosystem, draft over a dozen public statements, and create a new Health Equity Task Force. Some of the issues that I have faced on the board include:

- Federal healthcare reform
- AMA Innovation Ecosystem expansion
- DACA, travel ban, and immigration
- Expansion of ChangeMedEd
- Legislative expansion of GME
- Medical student debt
- Insurer consolidation
- Opioid epidemic relief
- Prior authorization reform
- Community engagement
- Health equity
- Anti-harassment and discrimination policy

2016–2017

*Member, Council on Medical Service*

I was a member of the AMA Council on Medical Service, which focuses on making policy recommendations to the House of Delegates on issues involving the socioeconomic factors that influence the practice of medicine. As a Councilor, I advanced the values of our MSS by working to persuade my physician colleagues and crafting policy recommendations for adoption by the House and action by the AMA. During my time on the Council, I helped author 18 reports on major issues including:

- Value-based prescription drug pricing
- Regulation of mobile medical apps
- The VA healthcare system
- The ACA Medicaid expansion
- Regulation of telemedicine
- MACRA
- Health system financing
- Medicaid per capita caps and block grants

2014–2015

*Chair, AMA–MSS Health Information Technology Task Force*

The Health Information Technology Task Force was created in 2014 in response to an effort I led to expand student HIT opportunities. As the inaugural chair of HITTF, I led efforts to develop MSS policy on a wide array of HIT-related issues and to educate medical students about these issues. During my term, the committee authored reports on telemedicine, interstate licensure, EHR usability, and emerging technologies. We also put on two sessions on design thinking and the future of EHR usability that attracted record attendance. At the end of my term, the HITTF was deemed a success and put on track to be made the permanent Committee on Health Information Technology.

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**ORGANIZED MEDICINE (CONT.)**

- 2012–2016 *Regional Delegate to the House of Delegates*
- As a four-time elected RD for Region 1, I provided testimony to reference committees and made speeches on the floor of the House on a wide variety of items of business. During my time as RD, I was appointed by the MSS Delegate to lead the HCC RefCom A team, and then was selected by the Speaker of the HOD to be a member of Reference Committee J. I also worked with the MSS Delegates to create and refine the MSS Resolution Scoring Rubric, which remains in use for Assembly prioritization. During my time as RD, I also co-led successful caucus efforts to develop major AMA 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
- 2015 *Team Leader, AMA–MSS HOD Caucus Reference Committee A Team*
- 2014 *Member, AMA HOD Reference Committee J*
- 2013–2014 *Member, AMA–MSS Committee on Legislation and Advocacy*
- 2013–2014 *Student Ambassador, AMA Foundation*
- 2012–2013 *Delegate, AMA–MSS Assembly*

**California Medical Association**

- 2016–present *Vice Chair, CMA Subcommittee on Health Information Technology*
- 2013–2016 *Member*
- I was appointed by the CMA Board of Trustees to the nine-member CMA working group on health IT issues, and later promoted to be vice chair of the subcommittee. As vice chair, I am responsible for directing the activities of the working group on a variety of priority policy areas for the CMA, including telemedicine regulation, California health information exchanges, and promoting interoperability of electronic health records.
- 2014 *Member, Board of Trustees*
- As the student member of the Board of the California Medical Association, I worked to lead CMA's strategic efforts during a challenging time for the Association. During my time as Trustee, a vicious and deeply flawed ballot proposition was aimed at physicians by the trial lawyer lobby in California that would have substantially increased the cost of malpractice insurance, decreased access to maternity care, and imperiled the privacy of millions of Californians. During our opposition, I worked to build a novel statewide grassroots strategy that used medical students as organizers to build support for physicians across the state, and personally represented the CMA at the California Democratic Party's executive board and convention meetings. The student campaign was a great success, and we successfully defeated the proposition. I was also involved in several other Board initiatives, including an effort to re-organize and streamline CMA governance operations, the substantial reduction in the size of the Board, and the conversion of the policy-making process from an annual basis to a quarterly basis.
- 2015–2016 *Member, CalPAC Board of Directors*
- 2012–2013 *Delegate, CMA House of Delegates*

**Sarma KV**, Ho KC, Li J, Priester AM, Nagarajan M, Natarajan S, Raman S, Arnold CW. "A Convolutional Neural Network Model for Segmentation of Clinically Significant Prostate Cancer on Multiparametric MRI Using Whole-Mount Histopathology." 2018. In preparation.

Garcia-Gathright JI, Matiasz NJ, Adame C, **Sarma KV**, Sauer L, Smedley NF, Spiegel ML, Strunck J, Garon EB, Taira RK, Aberle DR, Bui AAT. "Evaluating Casama: Contextualized semantic maps for summarization of lung cancer studies." *Comp Bio Med.* 2018; 92:55-63.

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". AMIA Annual Symposium. Washington, DC; 2017.

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.

**Sarma KV.** “Student Advocacy with the AMA.” AMA–MSS Philadelphia Area Mixer. Philadelphia, PA. 12/7/17.

**Sarma KV.** “Toward the Medical Education System of the Future.” 2017. Memo to Dr. Gerald E. Harmon, Chair, AMA Board of Trustees.

AMA Board of Trustees. “Redefining AMA’s Position on ACA and Healthcare Reform.” 2017. Interim Meeting of the AMA House of Delegates.

AMA Board of Trustees. “2017 AMA Advocacy Efforts.” 2017. Interim Meeting of the AMA House of Delegates.

AMA Board of Trustees. “Removing Restrictions on Federal Funding for Firearms Violence Research.” 2017. Interim Meeting of the AMA House of Delegates.

AMA Board of Trustees. “Limitations on Reports by Insurance Carriers to the National Practitioner Data Bank Unrelated to Patient Care.” 2017. Interim Meeting of the AMA House of Delegates.

AMA Board of Trustees. “Effective Peer Review.” 2017. Interim Meeting of the AMA House of Delegates.

AMA Board of Trustees. “Electronically Prescribed Controlled Substances without Added Processes.” 2017. Interim Meeting of the AMA House of Delegates.

AMA Board of Trustees. “Parental Leave.” 2017. Interim Meeting of the AMA House of Delegates.

AMA Board of Trustees. “High Cost to Authors for Open Source Peer Reviewed Publications.” 2017. Interim Meeting of the AMA House of Delegates.

AMA Board of Trustees. “2018 Strategic Plan.” 2017. Interim Meeting of the AMA House of Delegates.

**Sarma KV.** “Student Advocacy at the AMA.” AMA–MSS Chicago Area Meeting. Chicago, IL. 9/26/17.

**Sarma KV.** “Federal Advocacy Update.” Medical Society of the State of New York Fall MSS Meeting. Westbury, NY. 9/23/17.

**Sarma KV.** “Advocating for Our Patients—A Time to Speak.” University of Cincinnati SOM Advocacy Week. Cincinnati, OH. 9/12/17.

AMA Council on Medical Service. “Ensuring Continuity of Care Protections during Active Courses of Treatment.” 2017. Annual Meeting of the AMA House of Delegates.

AMA Council on Medical Service. “Retail Health Clinics.” 2017. Annual Meeting of the AMA House of Delegates.

AMA Council on Medical Service. “Prior Authorization and Utilization Management Reform.” 2017. Annual Meeting of the AMA House of Delegates.

AMA Council on Medical Service. “Survey of Addiction Treatment Center Availability.” 2017. Annual Meeting of the AMA House of Delegates.

AMA Council on Medical Service. “Hospital Consolidation.” 2017. Annual Meeting of the AMA House of Delegates.

AMA Council on Medical Service. “Extension of US Veterans’ Health Care Choices.” 2017. Annual Meeting of the AMA House of Delegates.

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**HEALTH POLICY TALKS, MEMOS & REPORTS (CONT.)**

AMA Council on Medical Service. "Capping Federal Medicaid Funding." 2017. Annual Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Value of Preventive Services." 2017. Annual Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Health Care Financing Models." 2017. Annual Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Physician-Focused Alternative Payment Models: Reducing Barriers." 2017. Annual Meeting of the AMA House of Delegates.

**Sarma KV.** "Mobilizing our Medical Student Section to Fight for Pharmaceutical Cost Transparency." 2016. Memo to Dr. Patrice A. Harris, Chair, AMA Board of Trustees.

AMA Council on Medical Service. "Integration of Mobile Applications and Devices into Practice." 2016. Interim Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Providers and the Annual Wellness Benefit." 2016. Interim Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Concurrent Hospice and Curative Care." 2016. Interim Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Hospital Discharge Communications." 2016. Interim Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Infertility Benefits for Veterans." 2016. Interim Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Health Care while Incarcerated." 2016. Interim Meeting of the AMA House of Delegates.

AMA Council on Medical Service. "Incorporating Value into Pharmaceutical Pricing." 2016. Interim Meeting of the AMA House of Delegates.

**Sarma KV.** "Starving Our Future with Food Deserts." Brain Food Daily. Participant Media. 2/26/13. YouTube.

**Sarma KV, Lin J, Saleh R, You C, White C.** "Broad Solutions for Big Problems." UC Global Health Day 2012. Berkeley, CA. 2/4/12.

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**OTHER ACTIVITIES**

2012

*Fall Campaign Fellow, Organizing for America*

As a fall campaign fellow, I helped run OFA's Santa Monica field office in support of the re-election of President Obama. My main responsibilities were volunteer recruitment and coordination, and during the course of the campaign I set up a new system to facilitate outreach calls that substantially increased the reach and effectiveness of our phone-bank volunteers. I then took that knowledge to help coordinate the Santa Monica GOTV operation, which made tens of thousands of GOTV calls immediately before the election.

2011–2014

*Volunteer, UCLA Mobile Clinic Project*

As a medical student volunteer at the UCLA Mobile Clinic, I primarily worked with patients without access to other forms of healthcare on the west side of Los Angeles. We provide basic medical care and supplies to our patients and also work to link them with community support programs, including housing, specialty care, mental health care, and transitional employment.

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**OTHER ACTIVITIES (CONT.)**

2011–2012

*Medical Education Committee Representative*

As an elected representative of the class of 2015 to the medical education committee of the DGSOM, my duties included organizing student feedback on education, working with faculty to further the educational mission of the school, and sitting on both the faculty Medical Education Committee and the administrative Human Biology and Disease Chairs Committee.

2011–2012

*Finance Director and Liaison Officer, Global Health Awareness Week*

As Finance Director, I was primarily responsible for coordinating the budgeting for the week across five divisions of labor. I was also responsible for writing and obtaining grant funding for the week. As Liaison Officer, I was responsible for recruiting our keynote speaker, UC Regent Richard C. Blum, and was responsible for coordinating directly with all of the speakers for the keynote Gala event.