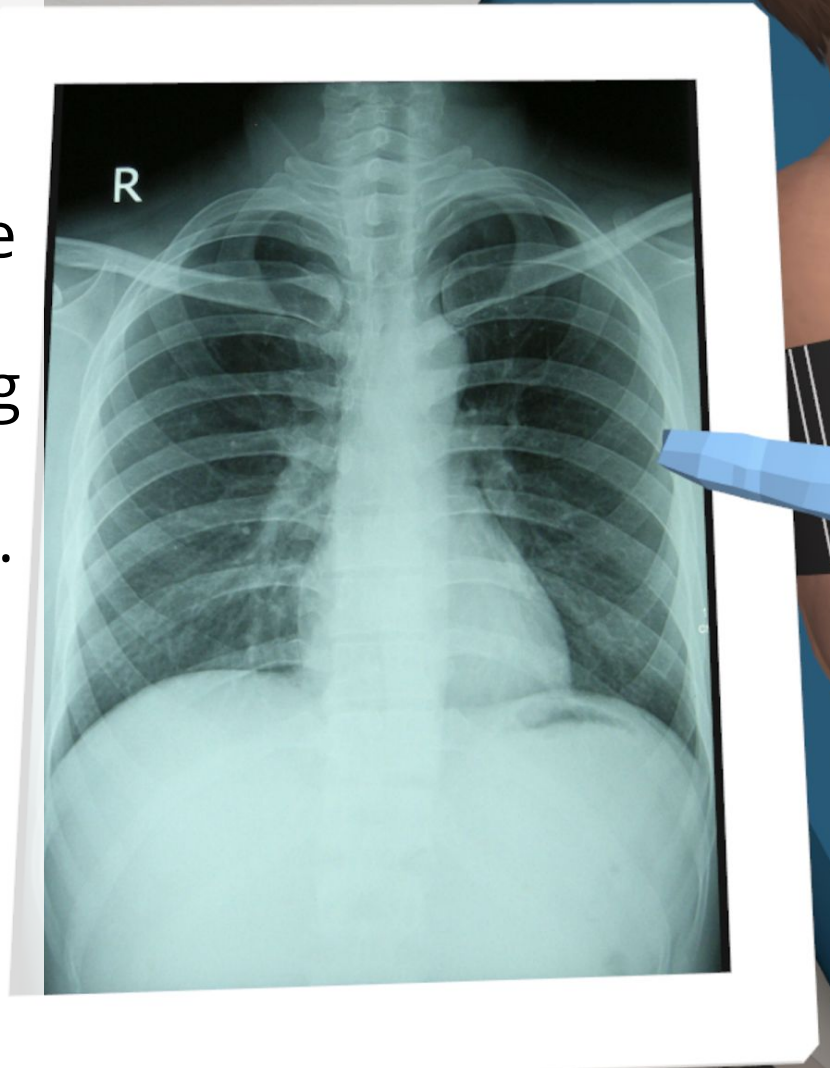

# Leader in Medical Simulation Training

SIMX

SimX uses VR technology to save lives by making simulation training cheaper, easier, and more realistic.



# How Safe Are You in HOSPITALS

In America,

**PREVENTABLE**

- hospital errors lead to:

**50 DEATHS EVERY HOUR**

Sunday 31 — **1,200 DEATHS A DAY**

X24

**TWICE** as many people die of preventable hospital errors weekly as the servicemen that died throughout **THE ENTIRE IRAQ WAR**

January — **8,400 DEATHS A WEEK**

X168

January — **34,000 DEATHS A MONTH**

X680


FLOTATION CUSHION
PULL TO REMOVE


AA

Mannequin-based simulation reduces medical errors & saves lives. But, it also . . .

- Costs 50-250K per mannequin
- Can't portray most conditions
- Requires in-person training
- Hasn't changed in 15 years

# VR Medical Simulation Software

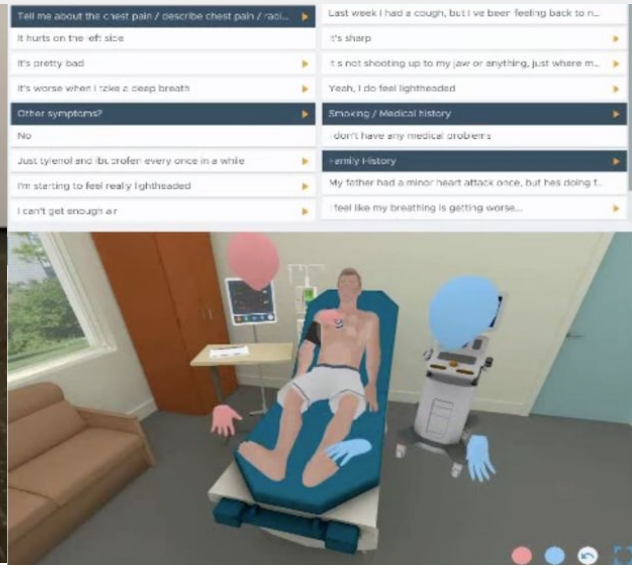
## Improves realism

- Any patient
- Any tools
- Any environment

## Increases flexibility

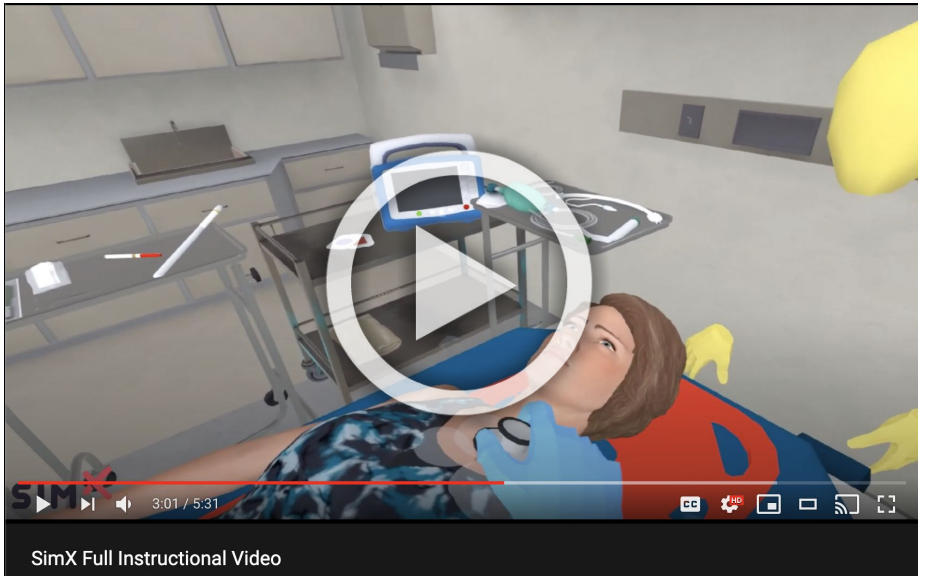
- Sets up in <5 minutes
- Can be run anywhere
- Multiplayer in person or across the world

## Reduces costs

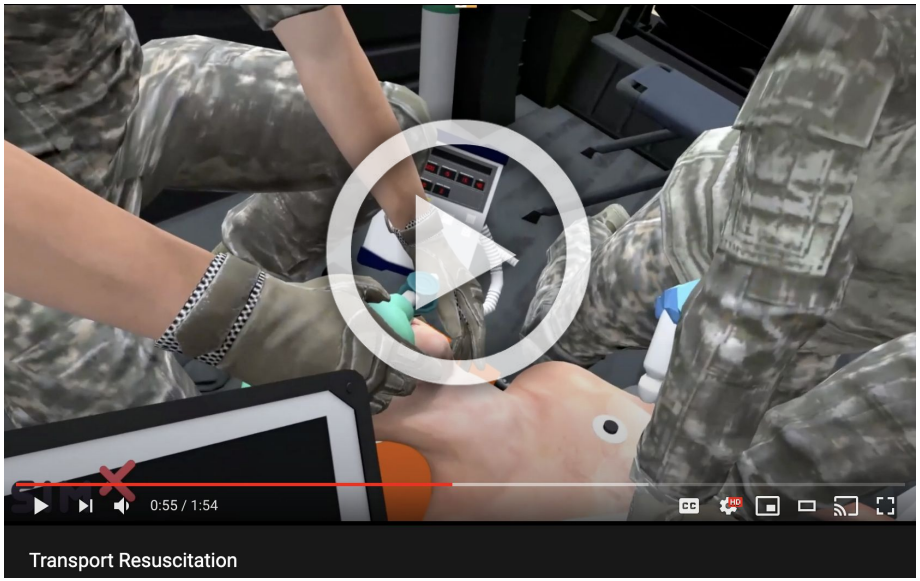



- 1/10th the cost of mannequin sim
- Automated cases reduce staff workload


About SimX




SimX Full Instructional Video




Transport Resuscitation


SimX COVID-19 Evaluation Scenario


The only Medical VR product that is cross platform, running on most major headsets

Can be run completely wirelessly without internet, or power outlet

US010672288B2

(12) **United States Patent**
**Ribeira et al.**

(10) **Patent No.: US 10,672,288 B2**
(45) **Date of Patent: Jun. 2, 2020**

(54) **AUGMENTED AND VIRTUAL REALITY SIMULATOR FOR PROFESSIONAL AND EDUCATIONAL TRAINING**

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( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 342 days.

(21) Appl. No.: **15/452,108**

(22) Filed: **Mar. 7, 2017**

(65) **Prior Publication Data**

US 2017/0213473 A1 Jul. 27, 2017

**Related U.S. Application Data**

(63) Continuation of application No. PCT/US2015/049021, filed on Sep. 8, 2015.

(60) Provisional application No. 62/047,589, filed on Sep. 8, 2014.

(51) **Int. Cl.**

| | |
|---|---|
| ***G09B 19/00*** | (2006.01) |
| ***G09B 9/00*** | (2006.01) |
| ***G06T 19/00*** | (2011.01) |
| ***G06F 19/00*** | (2018.01) |

(Continued)

(52) **U.S. Cl.**

CPC ..... ***G09B 9/00*** (2013.01); ***G06F 3/011*** (2013.01); ***G06F 19/3456*** (2013.01);

(Continued)

(58) **Field of Classification Search**

CPC ..... G09B 9/00; G09B 23/30; B25J 9/1689; G06F 19/3456; G06F 19/3481; G06K 9/00342; G06T 11/60; G06N 3/008

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

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|---|---|---|---|
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| 8,647,124 B2 * | 2/2014 | Bardsley ..... | G09B 23/30 434/262 |

(Continued)

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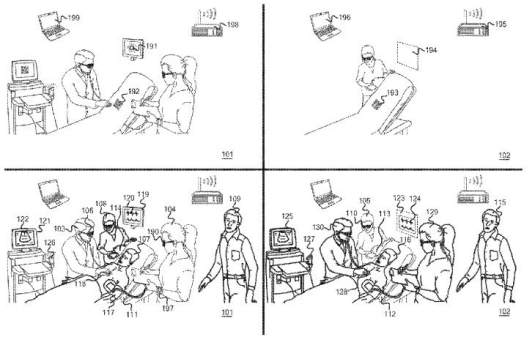
(57) **ABSTRACT**

A method and apparatus for an augmented reality simulator for professional and educational training is provided. The simulator provides a training environment spanning one or more physical locations in which one or more virtual avatars representing purely virtual objects or persons or real physical objects or persons which are located at a different physical location are projected into the physical space. The avatars are interactive with other avatars and real objects or persons and update over time or in response to actions taken by other real or virtual elements, or based on predefined instructions. Sensors and devices are used to detect the locations of and actions taken by real persons or real objects and this sensed data is used to evolve the state of the simulation and avatars based on predefined instructions and programs and update the view of all participants.

**20 Claims, 9 Drawing Sheets**







**AUGMENTED AND VIRTUAL REALITY SIMULATOR FOR PROFESSIONAL AND EDUCATIONAL TRAINING**

## CROSS-REFERENCE TO RELATED APPLICATIONS; BENEFIT CLAIM

This application is a continuation of International Application No. PCT/US2015/049021, filed Sep. 8, 2015, which claims the benefit of Provisional Appln. No. 62/047,589, filed Sep. 8, 2014, the entire contents for both of which are hereby incorporated by reference as if fully set forth herein.

## FIELD OF THE DISCLOSURE

The present disclosure relates to computer-based training utilizing simulation, and more specifically to augmented reality simulation software for professional and educational training purposes, including but not limited to medical and mechanical training.

## BACKGROUND

The concept of simulation of critical events to hone skills, in contrast to mere practice, has long been a staple of human training methodology. At its heart, the goal of simulation is to truly mimic the physical and psychological experience of an event, thus harnessing the power of emotional context and psychological stress to retain both physical and intellectual skills and lessons with more reliability than practice alone can yield.

Various industries have adopted and refined simulation-based training methodologies, attempting to replicate work environments as precisely and accurately as possible to prepare students and professionals for critical events that may be encountered in practice. In the aviation industry, for example, flight simulators have improved over time as computer technology has become more advanced and affordable. In the institution of medicine, medical scenario simulation has grown to become a standard component of medical training and continuing education, typically relying on physical "dummy" apparatuses to represent the "patients" or "subjects" of the simulation.

Simulation-based training systems that are both low cost and completely immersive are significantly limited or non-existent in many industries. Further, current simulation tools are not tightly integrated with computer systems that allow for simulation case scenarios to be authored for distribution and reuse, or stored and aggregated for analysis, scoring, and review. With regard to medicine specifically, the majority of simulation taking place in medical education today involves the use of full-scale, computer-driven manikins that are capable of portraying human physiology and around which a realistic clinical environment can be recreated. In this sense, manikin simulators are uniquely suited for training scenarios capable of satisfying the requirements for equipment fidelity, environment fidelity, and psychological fidelity, or the capacity to evoke emotions in trainees that they could expect to experience in actual practice. However, there remains a gap in the manikin's ability to represent a broad array of demographics or visually important clinical scenarios. In addition, there are significant logistical challenges associated with gathering work-hour limited trainees at sufficiently frequent intervals to foster maintenance of clinical competency using manikin simulation. Instructor salaries, technician salaries, and opportunity-costs involved in equipping and maintaining a state-of-the-art simulation facility employing such manikins represents a significant cost and places significant limitations on the ability of manikin simulation to integrate fully into existing curricula.



Beyond the training of novice medical staff, simulation-based training has also come to be recognized as integral to maintaining skills of fully licensed and practicing medical staff, but the logistical challenges of bringing staff together outside of regularly scheduled hours to a high fidelity environment or of bringing a high fidelity environment to the regular work location of the staff has presented an almost insurmountable challenge to simulation-based training in this population. The cost and lack of portability of the modern high fidelity medical simulation system also presents a barrier to its wider adoption outside of medical education institutions and outside of wealthy nations, despite the clear need for such maintenance training within community institutions and novice and maintenance training in developing countries. The limited ability of manikin based systems to represent different ethnicities, age groups, and visual symptoms, including rashes, also represents a degradation of psychological fidelity, with these aspects of medical simulation particularly relevant to training of experienced providers and in the field of tropical medicine.

The approaches described in this section are approaches that could be pursued, but not necessarily approaches that have been previously conceived or pursued. Therefore, unless otherwise indicated, it should not be assumed that any of the approaches described in this section qualify as prior art merely by virtue of their inclusion in this section.

## BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiments of the present invention described below with detailed descriptions and accompanying drawings. Embodiments of the invention have been described with reference to numerous specific details that may vary from implementation to implementation. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense. The sole and exclusive indicator of the scope of the invention, and what is intended by the applicants to be the scope of the invention, is the literal and equivalent scope of the set of claims that issue from this application, in the specific form in which such claims issue, including any subsequent correction.

FIG. **1** is a diagram illustrating the use of a shared augmented reality environment for medical training over multiple geographic locations;

FIG. **2** is a diagram illustrating the use of an augmented reality environment for automotive training;

FIG. **3** is a diagram illustrating the use of a shared augmented reality environment for training over multiple geographic locations and the communications between those locations;

FIG. **4** is a diagram illustrating the use of a shared augmented reality environment for training using a physical dummy as a point of reference to anchor the augmented reality environment;

FIG. **5** is a diagram illustrating the use of an augmented reality environment for training, a series of computing devices used to create the environment, and an instruction file specifying the training augmented reality environment;

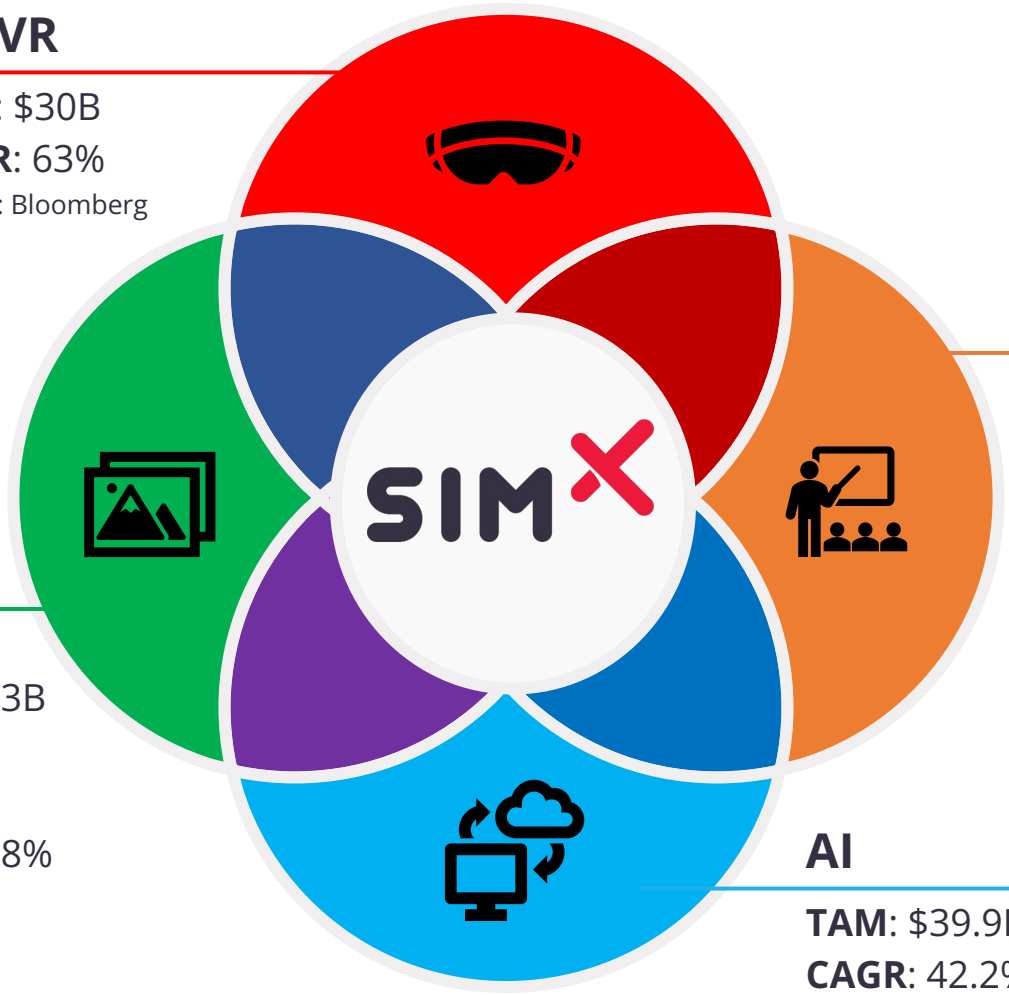
FIG. **6** is a diagram illustrating the use of one or more network computer systems for retrieval of stored instruction files for augmented reality environments, with optional use of a marketplace for instruction files;

SimX owns broad patents filed in 2013.
First in the space & widening the lead.

# Big, Fast-growing, Converging Markets

## AR/VR

**TAM**: $30B
**CAGR**: 63%
Source: Bloomberg




## DISTANCE LEARNING

**TAM**: $58.7B
**CAGR**: 9%
Source: Technavio/Business Wire

## SIMULATION

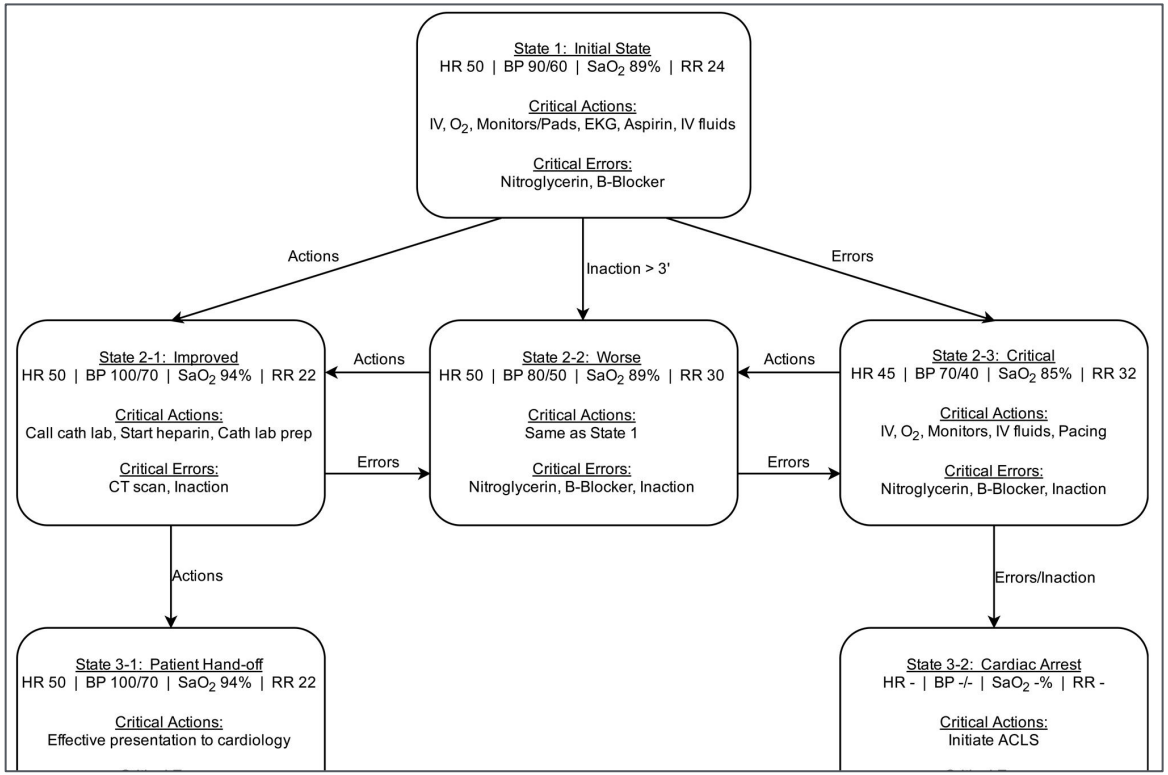
**TAM**:
Simulation Training: $8.3B
Medical Sim: $2.1B
**CAGR**:
Simulation Training: 16.8%
Medical Sim: 19.1%
Source: MedSim Market

## AI

**TAM**: $39.9B
**CAGR**: 42.2%
Source: GrandView Research

*Note: TAM $ as of 2019*

# More Than Medicine




The same underlying platform can be used without modification to run non medical training cases, drastically increasing the market opportunity. We already have contracts for veterinary and chiropractic training and have High schools, dental schools, firefighter training programs, and more currently progressing through our sales pipeline.

# SIMX Customers





































And many more

# Partners & Distributors

## Partners

American Red Cross

ELSEVIER

oculus

Society for Simulation in Healthcare

verizon

## Distributors

htc

ARAMED Y LABORATORIO

BUNDLE OF RAYS

Dynamic spirit technology DYMSTEC

EDUCIENTEC EDUCACIÓN | CIENCIA | TECNOLOGÍA

MÉDICAS

STELL DIR V R

Rawlings Technologies

LEADER HEALTHCARE

# SIMX Pricing

Our business model brings SaaS to medical simulation and creates an ecosystem around the product

## Free

Free

**FEATURES**
- Access to free SimX training cases

**SUPPORT**
- Online support resources

## Pro

$3,000
per headset per year

*OR*

$100
per student per year

**FEATURES**
- Access to free SimX training cases
- **Eligible for custom case creation**
- **Access to the case marketplace**
- **Access to the SimX Case Creator**

**SUPPORT**
- Online support resources
- **Priority email-based support**
- **Phone support for your sim staff**
- **Service level response guarantees**

- **Because of our platform, fully custom cases can be purchased for $8–20k per case in 8–12 weeks. Drastically cheaper and faster than others.**
- **Customers can license these cases or cases they make with the case creator to others on the marketplace and keep 50% of the revenue. Which they can reinvest in SimX.**
- **Because of custom case development and case creator, SimX avoids chicken and egg problem of most two sided marketplaces**

# SIMX Team

## Ryan Ribeira, MD, MPH

## CEO

**Emergency Medicine Physician**
*Stanford Hospital*

**Assistant Professor**
*Stanford Medical School*

**Former Board**
*American Medical Association, California Medical Association*

**Former Program Manager**
*Google Health Search*

**MPH in Health Management**
*Harvard University*

## Karthik Sarma, MS

## CTO

**Former AI Researcher**
*UCLA School of Medicine*

**Former Board**
*American Medical Association, California Medical Association*

**BS with Honors in Comp. Sci.**
*Caltech*

## CMO

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**EM Physician**, *Sutter Health*
**Former Member**, *AMA Council on Sci & Pub Health*
**Former Board**, *California Medical Association*

## Chief Architect

### Sri Namperumal, MD, ME

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**Former Aerospace Modeling Engineer**, *Sandia Labs*
**Honors Engineering**, *Cornell University*

## Director of Bus. Dev.

### Tyler Andre, MD

**EM Physician**, *Washington State University*
**Serial Entrepreneur**

## Program Manager

### Talia Weiss, MS

**Former Manager**, *Stanford VR Interactions Lab*
**Former Consultant**, *IMS Consulting Group*

*And a large team of game designers, physicians, modeling experts, PAs, education specialists, nurses, military veterans, and more.*


# Leader in Medical Simulation Training