Stanford

Ekanath Srihari Rangan

- Affiliate, Department Funds
- Resident in Medicine

Bio

BIO

Dr. Ekanath Rangan is a Resident-Physician in Internal Medicine at Stanford University. He came to Stanford as a Postdoctoral Researcher in Department of Genetics after receiving his MBBS degree from Amrita Institute of Medical Sciences (top-10 ranked in India), winning Gold Medals for highest distinction scores in general Medicine and Surgery. Even as an undergraduate student, he envisioned the birth of the whole new field of Digital Health, and started to work closely with computational and AI researchers. By the time he graduated, he had already proposed novel technologies for IoT based remote monitoring, smart and connected m-health, and algorithms for data to decisions so as to deliver the 3P's of modern medicine: precision, personalization, and prevention. This study also showed a surprising result that "Less is Better". Other notable innovations have been a deep learning algorithm for sleep apnea diagnosis, and single sensor architectures for Sepsis.

During his junior and senior years, he organized a first of its kind Research Synergy Meet, bringing together more than 50 researchers in medicine, engineering, and computer science from five different campuses, to deliberate on clinical problems and digital solutions.

Then came the pandemic. Ekanath proposed Health@Home stations to deliver "Digital Health @ Every Doorstep" by integrating affordable non-invasive sensors to monitor vital signs and convert the raw multi-sensor data to clinically meaningful symbolic representation called Health Motifs, suitable for transmission to the Physician. He was also the first to propose "AI in Medicine" Center in India and also delivered a keynote at the 2020 Ideal Village Conference at Stanford. Thereafter, Stanford's Genetics Chair Professor Michael Snyder brought in Ekanath to spearhead the development of a real-time wearable alerting system for detecting community-acquired infections prior to symptom onset, demonstrating how digital biomarkers derived from physiological sensors can identify disease risk before clinical symptoms appear. This translational work, published in Nature Medicine, helped advance the emerging field of continuous health monitoring using wearable devices and multi-omics measurements— and transform them into predictive clinical insights, proactive early warning alerts, pre-emptive therapeutic interventions and preventive lifestyle adjustments. He organized an International Health Innovation Summit on Grand Challenges and Global Collaborations to tackle them.

Ekanath then matched into Stanford's extremely selective Internal Medicine Residency Program, and his clinical approach to patient care has won highest appreciation from attendings who are reputed physicians from Cardiology, Oncology, Neurology, etc. During this time, he generated a lot of interest in the Silicon Valley technopreneurs to establish a funded new Collaboratory for digital health (ajdhc.stanford.edu). He also continued collaborative research on the emerging Large Language Models (LLMs) for health (e.g., their functional limits in medical decision making).

Dr. Ekanath is a Co-Founder of Embrace Ventures for promoting digital health start-up ecosystem, most recently Pocket-MD, a physician-facing tool engineered to deliver evidence-based clinical guidelines at the bedside.

CLINICAL FOCUS

- Residency
- Internal Medicine

HONORS AND AWARDS

- Chancellor's Medal for the best all-round performance, AIMS (November 2020)
- University Gold Medal for the top academic performance in the Faculty of Medicine, AIMS (August 2020)
- Institute Medal of Excellence in General Medicine, AIMS (March 2020)
- Institute Medals of Excellence in General Surgery, AIMS (March 2020)
- Institute Medal for Excellence in Research, AIMS (March 2020)
- Invited speaker, talk titled "Critical Role of Telehealth in the Pandemic Era", Stanford University (October 2020)
- Award for excellent presentation, "Rapid Health Alerts Using Multiple Sensors", UCSF (University of California San Francisco) Bioengineering Symposium (June 2016)
- Undergraduate Research Fellowship at UC San Diego, US National Science Foundation (August 2015)
- Indo-US Bilateral Grant Award: Biomolecular Knowledge Network for COVID-19: Genome and Exposome, Indo-US Science and Technology Forum (July 2020)
- First Prize in Research Paper Presentation, SPASHT National Medical Summit (September 2019)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Coordinator, 3P (Precision, Personaliztion, Predictive Prevention) in Medicine, Amrita Jagadeesh Digital Health Collaboratory (2025 - present)
- Member, IEEE Engineering in Medicine and Biology Society (2017 - present)

PROFESSIONAL EDUCATION

- MD, ECFMG (2023)
- MBBS, Amrita Institute of Medical Sciences & Research , General Medicine & General Surgery (2020)

COMMUNITY AND INTERNATIONAL WORK

- House surgeon
- Symposium Lecturer
- Health camps for underserved populations

PATENTS

- MV Ramesh, RK Pathinarupothi, ES Rangan. "United States Patent 10,542,889 Systems, methods, and devices for remote health monitoring and management using internet of things sensors", Amrita Institute of Medical Sciences, Jan 28, 2020
- Maneesha Vinodini Ramesh, Rahul Krishnan Pathinarupothi, Ekanath Srihari Rangan, Durga P.. "United States Patent 10,433,726 Systems, Methods, & Devices for Remote Health Monitoring & Management using Internet of Things Sensors", Oct 8, 2019

PERSONAL INTERESTS

Music - Indian classical, Instrumental - piano, keyboard, percussion, flute

Sports - Swimming, Tennis, Athletics

Meditation

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

3D-3P-3I-3W-3C approach to Medicine

Dr. Ekanath's background spans two distinct worlds in each of the following 3 drivers of Paradigm Shift in Healthcare: 1. UG in resource-limited India vis-à-vis Advanced PG clinical and research at Stanford; 2. Devices, Deployment, Delivery technologies vis-à-vis Precision, Personalized, Predictive patient care; 3. Data-Driven Research in Snyder Lab vis-à-vis Start-ups ecosystem in Embrace Ventures.

Dr. Ekanath's goal is to leverage the above synergy for outcomes such as: Cardiovascular, Neurological, and other organ systems health through non-invasive and pervasive - Wear, Watch & Warn - disease severity trajectories; Measure, Monitor, & Modify for Predictive, Preemptive & Preventative health. Multidisciplinary synergy of collaborative creativity through the joining of forces of technology and intelligence with medicine to overcome intractable diseases. Coherence of Computation and Compassion for holistic health @ home.

Dr. Rangan’s research integrates wearable sensors, machine learning, and multi-omics data to study early disease detection and personalized health monitoring. His work explores: AI-driven interpretation of physiological data from wearable devices

Digital biomarkers for early detection of infectious and chronic diseases

Machine learning approaches for early warning detection in sepsis and clinical deterioration

AI-assisted clinical reasoning and diagnostic decision support

Multi-omics integration for precision medicine

His research has appeared in leading biomedical journals including Nature Medicine, Cell, NPJ Digital Medicine, Cell Reports Medicine, PLOS Digital Health, and JMIR, reflecting the interdisciplinary impact of his work across medicine, computational biology, and digital health.

LAB AFFILIATIONS

- Ronald Witteles (6/19/2023)
- Michael Snyder, Stanford Healthcare Innovation Lab (11/4/2020)

Publications

PUBLICATIONS

- **A comparison of deep multiomics profiles across ethnicity, geography, and age.** *Cell*
  Barapour, N., Cao, J. Z., Wu, Y., Gupta, S., Hoopmann, M. R., Qin, R., Midha, M. K., Mireault, M., Juanes-Velasco, P., Hanson, C., Ahadi, S., Higgs, E., Baxter, et al
  2026; 189 (10): 3004-3024.e35

- **The Digital Physical Exam: A Pilot Exploring the Utility of Smartphone and Smartwatch Wearable Data for Hospital Medicine.** *Digital biomarkers*
  Srivastava, U., Rangan, E. S., Kumar, W., Snyder, M., Savage, T.
  2026; 10 (1): 74-78

- **An encyclopedia of the cord blood metabolome reveals maternal-fetal interactions and disease risk.** *Cell reports. Medicine*
  Lancaster, S., Mataraso, S., Reiss, J. D., Contrepois, K., Trowbridge, C. A., Michael, B., Simms, I., Ellenberger, M., Gibson, M., Clary, M., McGuire, L., Wong, F., Canfield, et al
  2026: 102548

- **Longitudinal wearable sensor data enhance precision of Long COVID detection.** *PLOS digital health*

Uwakwe, C. K., Rangan, E. S., Kumar, S., Gutjahr, G., Miao, X., Brooks, A. W., Maguire, P., Mishra, T., McGuire, L., Snyder, M. P.
2025; 4 (11): e0001093

- **Fine-Tuning Methods for Large Language Models in Clinical Medicine by Supervised Fine-Tuning and Direct Preference Optimization: Comparative Evaluation.** *Journal of medical Internet research*
  Savage, T., P Ma, S., Boukil, A., Rangan, E., Patel, V., Lopez, I., Chen, J.
  2025; 27: e76048

- **Individual variations in glycemic responses to carbohydrates and underlying metabolic physiology.** *Nature medicine*
  Wu, Y., Ehlert, B., Metwally, A. A., Perelman, D., Park, H., Brooks, A. W., Abbasi, F., Michael, B., Celli, A., Bejikian, C., Ayhan, E., Lu, Y., Lancaster, et al
  2025

- **Efficacy and Safety of Catheter Ablation in Patients with Hematologic Malignancies**
  Paranjpe, I., Rangan, E., Narayan, S., Baykaner, T., Fazal, M.
  LIPPINCOTT WILLIAMS & WILKINS.2024

- **Diagnostic reasoning prompts reveal the potential for large language model interpretability in medicine.** *NPJ digital medicine*
  Savage, T., Nayak, A., Gallo, R., Rangan, E., Chen, J. H.
  2024; 7 (1): 20

- **Diagnostic Reasoning Prompts Reveal the Potential for Large Language Model Interpretability in Medicine**
  Savage, T., Nayak, A., Gallo, R., Rangan, E., Chen, J.
  ARXIV. https://arxiv.org/abs/2308.06834v1.
  2023

- **Performance effectiveness of vital parameter combinations for early warning of sepsis-an exhaustive study using machine learning** *JAMIA OPEN*
  Rangan, E., Pathinarupothi, R., Anand, K. J. S., Snyder, M. P.
  2022; 5 (4): ooac080

- **Real-time alerting system for COVID-19 and other stress events using wearable data.** *Nature medicine*
  Alavi, A., Bogu, G. K., Wang, M., Rangan, E. S., Brooks, A. W., Wang, Q., Higgs, E., Celli, A., Mishra, T., Metwally, A. A., Cha, K., Knowles, P., Alavi, et al
  2021

- **Real-time Alerting System for COVID-19 Using Wearable Data.** *medRxiv : the preprint server for health sciences*
  Alavi, A., Bogu, G. K., Wang, M., Rangan, E. S., Brooks, A. W., Wang, Q., Higgs, E., Celli, A., Mishra, T., Metwally, A. A., Cha, K., Knowles, P., Alavi, et al
  2021

- **Heart Lung Health Monitor: Remote At-Home Patient Surveillance for Pandemic Management**
  Shaji, S., Pathinarupothi, R., Rangan, E., Menon, K., Ramesh, M., IEEE
  IEEE.2021: 127-130

- **IoT-Based Smart Edge for Global Health: Remote Monitoring With Severity Detection and Alerts Transmission** *IEEE INTERNET OF THINGS JOURNAL*
  Pathinarupothi, R., Durga, P., Rangan, E.
  2019; 6 (2): 2449-2462

- **Data to diagnosis in global health: a 3P approach** *BMC MEDICAL INFORMATICS AND DECISION MAKING*
  Pathinarupothi, R., Durga, P., Rangan, E.
  2018; 18: 78

- **Deriving High Performance Alerts from Reduced Sensor Data for Timely Intervention in Acute Hypotensive Episodes.** *Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference*
  Pathinarupothi, R. K., Rangan, E. S., Durga, P.
  2018; 2018: 3260-3263

- **When Less is Better: A Summarization Technique that Enhances Clinical Effectiveness of Data**

Durga, P., Pathinarupothi, R., Rangan, E., Ishwar, P., Assoc Comp Machinery
ASSOC COMPUTING MACHINERY.2018: 116-120

- **Effective Prognosis Using Wireless Multi-sensors for Remote Healthcare Service**
  Pathinarupothi, R., Rangan, E.
  edited by Giokas, K., Bokor, L., Hopfgartner, F.
  SPRINGER INTERNATIONAL PUBLISHING AG.2017: 204-207
- **Severity Summarization and Just in Time Alert Computation in mHealth Monitoring** *INFORMATICS FOR HEALTH: CONNECTED CITIZEN-LED WELLNESS AND POPULATION HEALTH*
  Pathinarupothi, R., Alangot, B., Rangan, E.
  edited by Randell, R., Cornet, R., McCowan, C., Peek, N., Scott, P. J.
  2017; 235: 48-52
- **Instantaneous Heart Rate as a Robust Feature for Sleep Apnea Severity Detection using Deep Learning**
  Pathinarupothi, R. K., Vinaykumar, R., Rangan, E., Gopalakrishnan, E., Soman, K. P., IEEE
  IEEE.2017: 293-296
- **Real-time and Offline Techniques for Identifying Obstructive Sleep Apnea Patients**
  Prathap, D. J., Rangan, E., Pathinarupothi, R.
  edited by Krishnan, N., Karthikeyan, M.
  IEEE.2016: 399-402
- **Real-Time Identification & Alert of Ischemic Events in High Risk Cardiac Patients**
  Durga, P., Rangan, E., Pathinarupothi, R.
  edited by Krishnan, N., Karthikeyan, M.
  IEEE.2016: 394-398
- **A Systematic Methodology to Transform Campuses in the Developing World into Sustainable Communities**
  Rangan, E., Das, K., IEEE
  IEEE.2016: 466-473
- **Large Scale Remote Health Monitoring in Sparsely Connected Rural Regions**
  Pathinarupothi, R., Rangan, E., IEEE
  IEEE.2016: 694-700

PRESENTATIONS

- Critical Role of Telehealth in the Pandemic Era - Stanford University (10/2020)
- Rapid Health Alerts Using Multiple Sensors - UCSF Bioengineering Symposium (6/2016)