Stanford

Ekanath Srihari Rangan

- Affiliate, Department Funds
- Resident in Medicine

Bio

BIO

Ekanath Rangan received his MBBS from AIMS, top-5 ranked in India, winning Gold Medals for highest distinction scores in general medicine and surgery. He has remarkable level of initiative and innovation in the synergistic intersection of medicine, wearable sensors, and artificial intelligence. He has co-authored numerous papers in reputed international journals and conferences and holds two US patents which propose novel systems for IoT based remote monitoring, smart and connected m-health, and techniques for data to decisions so as to deliver the 3P's of modern medicine: precision, personalization, and prevention. Particularly noteworthy, are his deep learning LSTM techniques for non-invasive single sensor based sleep apnea diagnosis.

In addition to architecting a COVID remote patient monitoring system for risk stratification and severity prediction, he is also a co-PI on Indian Government funded Indo-US project for discovery of early warning biomarkers of COVID-19.

Ekanath is a recipient of US NSF fellowship (2015) and excellence award for a talk titled "Rapid Health Alerts Using Multiple Sensors" delivered at University of California-San Francisco Bioengineering symposium (2016). At AIMS, he organized the 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.

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

- Member, IEEE Engineering in Medicine and Biology Society (2017 - present)

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

PERSONAL INTERESTS

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

Sports - Swimming, Tennis, Athletics

Meditation

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My research interests span: Wearable medical systems for non-invasive and pervasive health monitoring in cardiovascular and critical care contexts; Correlation of genomic aspects of disease with phenotypic data from electronic health records; Informatics and machine learning for precise detection and early warning of infectious diseases and CVD in the inpatient and outpatient settings; Preemptive protocols for managing disease severity trajectories; And IoT based Telemedicine.

CURRENT CLINICAL INTERESTS

- Cardiology

Interventional Cardiology with applications to congenital heart disease, valvular dysfunction and cardiac critical care.

LAB AFFILIATIONS

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

Publications

PUBLICATIONS

- **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)