RAHUL MANOJ

RESEARCH SCIENTIST

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PROFESSIONAL OVERVIEW

I am an electrical engineer and interdisciplinary research scientist specialized in biomedical instrumentation. Over the past 8+ years in biomedical R&D, I have developed systems & methods that combine electro-mechanical systems, electronic system design, signal processing, and computational modeling to derive physiological insights from complex sensing environments. My work majorly spans preventative care and wearable technologies and is shaped by close collaboration with clinicians, researchers, and engineers across both academia and industry.

WORK EXPERIENCE

Postdoctoral Research Fellow | 2024 – Present

Division of Biomechanics, Dept. of Structural Engineering,
Norwegian University of Science & Technology (NTNU), Norway

Research Travel Grants: 3
Award-Winning Pitch: Digital Twin for Heart Failure Diagnosis

- Developing calibration-free, non-invasive methods to assess arterial stiffness, central blood pressure, and vascular age, using clinical infrastructure and wearable technology – ultrasound, PPG.
- Building digital twin models of the heart and circulation that combine physics-based simulations (ultrasound shear wave elastography) with *in-vivo* data to estimate heart failure risk (Collaborator: KU Leuven, Belgium).
- Contributing to strategic planning, new project ideation, proposal writing, and competitive grant applications.
- Mentoring and supervising researchers, delivering lectures and technical talks on specialised topics.

Researcher | 2017 – 2024

Advanced Cardiovascular Technology Laboratory (ACT Lab),
Dept. of Electrical Engineering,
Indian Institute of Technology Madras (IIT M), India

Patents: Granted – 1 (India), Filed – 2 (EU, US)
Journal Articles: 5 | Conference Proceedings: 40
Award-Winning Talk: How Not to Die Young?

- Developed multi-modal sensing systems (ultrasound, pressure/strain gauges, PPG, bio-impedance, accelerometers), along with measurement techniques and algorithms for vascular health monitoring.
- Hands-on wet lab experience in designing and building custom *ex-vivo*/*in-vitro* test rigs (semi-automated electromechanical systems) for verification and validation studies on excised animal artery samples.
- Conducted pre-clinical *in-vivo* validation studies on animals (invasive) and human participants (non-invasive).
- Managed budgetary planning, material & equipment procurement and day-to-day lab operations with team size of 20 researchers and engineers.
- Authored and reviewed ethics committee proposals (clinical studies) and intellectual property (IP) filings.

Research Intern | 2018 – 2022 (Part Time)

Healthcare Technology Innovation Centre (HTIC),
Indian Institute of Technology Madras Research Park, India

Patents: Filed – 2 (India, US)
Journal Articles: 1 | Conference Proceedings: 2

- Co-designed and built a functional prototype of a modular and periodic weight measurement system for bedridden patients on hospital beds (Collaborator: Stryker Corporation, India).
- Developed software and integrated electronics, sensors and actuators for an in-house designed automated cover slipper for large-format (6'' X 8'') histopathology human brain section slides.
- Co-drafted the medical device software life cycle document for an in-house developed cardiovascular health assessment device ARTSENS® Plus as per IEC 62304.

EDUCATION

M.S. & Ph.D. in Electrical Engineering
(Biomedical Instrumentation)
GPA: 8.75/10
Indian Institute of Technology Madras (IIT M)
Chennai, Tamil Nadu, India
2017-2024

B. Tech in Electrical and Electronics Engineering
GPA: 7.70/10
National Institute of Technology Calicut (NIT C)
Kozhikode, Kerala, India
2012-2016

(All my education are recognised by Direktoratet for høyere utdanning og kompetanse, Norway)

TECHNICAL SKILLS

- Programming: LabVIEW | MATLAB | Python
- Hardware Prototyping | Test & Measurement
- Embedded Programming | SPICE Simulations
- Electronics | PCB Design | Signal Processing
- Statistics | Machine Learning
- Cardiovascular Modelling – 0D, 1D | FEM
- Git | Linux | Windows | MS Office

COMPETENCIES

- Critical Thinking | Problem Solving
- Collaboration | Project Management
- Technology Development & Validation
- Scientific Communication – Written, Verbal & Presentations

LEADERSHIP | COMMUNITY OUTREACH | VOLUNTEERING

- *Member*, Young Scientist Committee, Virtual Physiological Human Institute (VPHI) | 2025 - Present
    - Co-organise scientific events, webinars, workshops, and networking sessions to foster collaboration between early-stage researchers, academia, and industry.
- *Member*, IEEE with society memberships in IEEE Engineering in Medicine & Biology Society (EMBS) & IEEE Instrumentation & Measurement Society (IMS) | 2022 – Present
- Participant and speaker in IEEE EMBC, IEEE MeMeA, ARTERY Society conferences | 2018 – Present
- *Reviewer* for Nature Scientific Reports, Physiological Measurement, BMC Medical Imaging, Biomechanics and Modelling in Mechanobiology, Annals of Biomedical Engineering – average number of peer-reviews: 6 per year.
- Co-organized the online workshop series *"Vascular Ageing – From Research to Clinical Practice",* in collaboration with Radboud UMC and Maastricht University, Netherlands. This 5-day workshop featured 10 lectures by leading cardiovascular researchers worldwide (as graduate student in March 2022).
- *Team Lead* (2015) & *Team Member* (2013-2016), Robotics Interest Group – NIT C (undergraduate student)
    - Raised seed funding through Technical Education Quality Improvement Program, Government of India for developing an Internet of Things (IoT) prototype for utility power monitoring and control application.
    - Design, fabrication and control of manual and autonomous robots for the ABU Asia-Pacific Robot Contest (RoboCon) India (National Level).
    - Co-organised the annual workshop of Robotics Society of India for the year 2016 at National Institute of Technology Calicut, India, which had a participation of delegates from over 20 premier institutes in India.
    - Conducted and co-organized workshop sessions, talks, exhibitions & demonstrations on hobby robotics for university-level (undergraduate) and school-level.
- Hobbies & Interests: Swimming, outdoor activities & travelling, electronics hobbyist.

REFERENCES

Prof. Leif Rune Hellevik
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