Advances in Robotics (AIR 2021)

5th International Conference of The Robotics Society
June 30 - July 3, 2021, Indian Institute of Technology Kanpur, Kanpur, India

Advances in Robotics (AIR) is a series of biennial conference organized by The Robotics Society (earlier referred to as Robotics Society of India). The conference aims to create a forum to present and exchange new ideas by researchers and developers from India and abroad working in the fields of robotics and its applications. The conference has plenary talks, oral and poster presentations, workshops and special industry oriented sessions. The previous editions of AIR's were held at R&DE, DRDO Pune (AIR 2013), BITS Pilani Goa Campus, Goa (AIR 2015), IIT Delhi (AIR 2017) and IIT Madras (AIR 2019).

AIR 2021, the 5th conference of the series, was conducted in "Fully Online Mode" by IIT Kanpur, Kanpur, Uttar Pradesh, India during June 30-July 3, 2021.

Technical Sessions

AIR 2021 conference received around 115 papers and at least two double-blind review process was conducted on all the papers. Based on the reviewers' comments and the technical committee recommendations, a total of 56 papers were accepted as

38 Full Paper Presentation (14 minutes presentation)
18 Short Presentation (7 minutes) followed by Posters

Workshop

The Robotics Society of Japan (RSJ) and The Robotics Society (TRS, India) **Workshop** – "Robotics in Japan and India" is on June 30, 2021. The following are the speakers in the Workshop

RSJ (Japan)	TRS (India)
Prof. Hiroki Murakami	Prof. Santanu Chaudhury
Prof. Tomohiro Shibata	Prof. Subir Kumar Saha
Prof. Kanako Harada	Prof. Asokan T.
Prof. Kimitoshi Yamazaki	Prof. Ekta Singla
Prof. Gentiane Venture	Prof. Ashish Dutta

Tutorials

Tutorial 1: **"Machine Learning Applications in Robotics using MATLAB"** by Dr. Dhruv Chandel, MathWorks India
Tutorial 2: **"Design and Control of Rehabilitation Robots"** by Prof. Sunil Agarwal, Columbia University, USA

Industry Session

Systemantics India

Plenary and Keynote Speakers

AIR Conferences invite highly reputed researchers from robotics domain to deliver plenary and keynote lectures. For AIR2021, these were delivered by

Prof M. Asada
Osaka University, Japan
"Autonomy in humans and machines: Robot sense of agency: self, pain, and ethics"

Prof. Paolo Fiorini
University of Verona, Italy
"Dreams in medical and surgical robotics: intelligence and affordability"

Prof. Seul Jung
Chungnam National University, Korea
"Balancing mechanism and control in research and life"

Prof. Prathyush P. Menon
University of Exeter, UK
"Autonomous Oceanographic Sampling"

Patron

Prof. Abhay Karandikar
Director, IIT Kanpur

General Co-Chair

Prof. Santanu Chaudhury
IIT Jodhpur (President, TRS)

Programme Co-Chairs

Prof. Ashish Dutta
IIT Kanpur
Prof. Tomohiro Shibata
Kyushu Inst. of Tech., Japan

Publication Chair

Prof. Asokan T
IIT Madras (Secretary, TRS)

Publicity & Sponsorship Chairs

Prof. Subir K. Saha
IIT Delhi (Vice President-Acad., TRS)
Mr. Alok Mukherjee
DRDO (R&DE), Pune

Organizing Committee

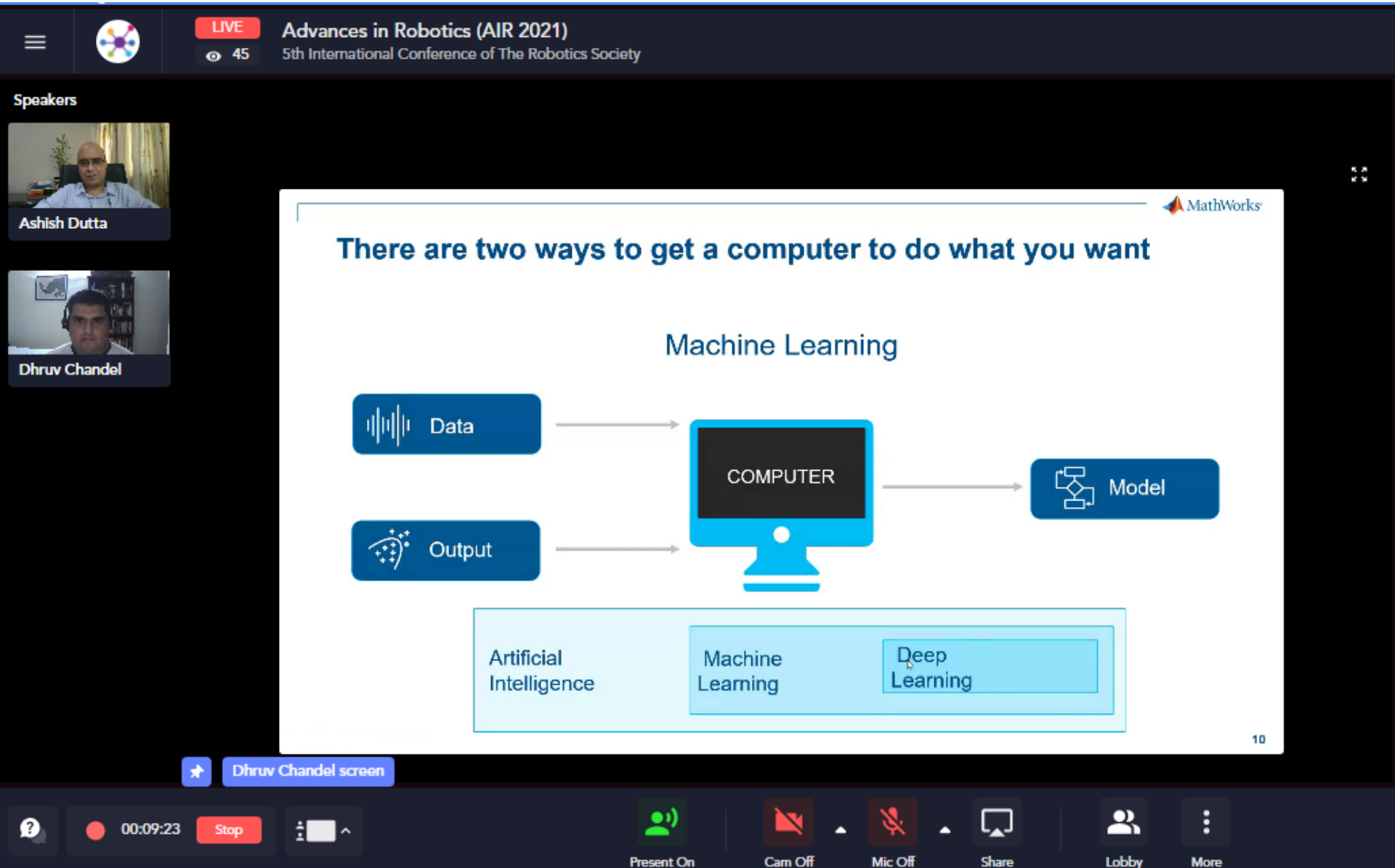
Prof. Laxmidhar Behera, IIT Kanpur
Prof. G. C. Nandi, IIIT Allahabad
Prof. Mangal Kothari, IIT Kanpur
Prof. S. R. Sahoo, IIT Kanpur
Prof. K. S. Venkatesh, IIT Kanpur
Prof. Anjali Kulkarni, IIT Kanpur
Prof. Indranil Saha, IIT Kanpur
Mr. Rajeevlochana G. Chittawadigi
Amrita Vishwa Vidyapeetham, Bengaluru

Proceedings **Technical**

acm IEEE Robotics & Automation Society

Day 1: The Robotics Society of Japan (RSJ) and The Robotics Society (TRS, India) **Workshop** – "Robotics in Japan and India"

Day 1: **Tutorial 1**: Machine Learning Applications in Robotics using MATLAB
by **Dr. Dhruv Chandel**, MathWorks (India)



Day 1: **Tutorial 2**: Design and Control of Rehabilitation Robots
by **Prof. Sunil Agarwal**, Columbia University, USA

LIVE
41
Advances in Robotics (AIR 2021)
5th International Conference of The Robotics Society

Speakers


Ashish Dutta


Sunil K. Agrawal

Robotics to improve Balance, Posture, and Mobility in Children

Sunil K. Agrawal, Ph.D.
Professor of Mechanical Engineering and Rehabilitation Medicine
Director of ROAR Laboratories
Columbia University, New York, NY 10027
Email: Sunil.Agrawal@columbia.edu

Web: https://roar.me.columbia.edu

RObotics
And
Rehabilitation
Laboratory

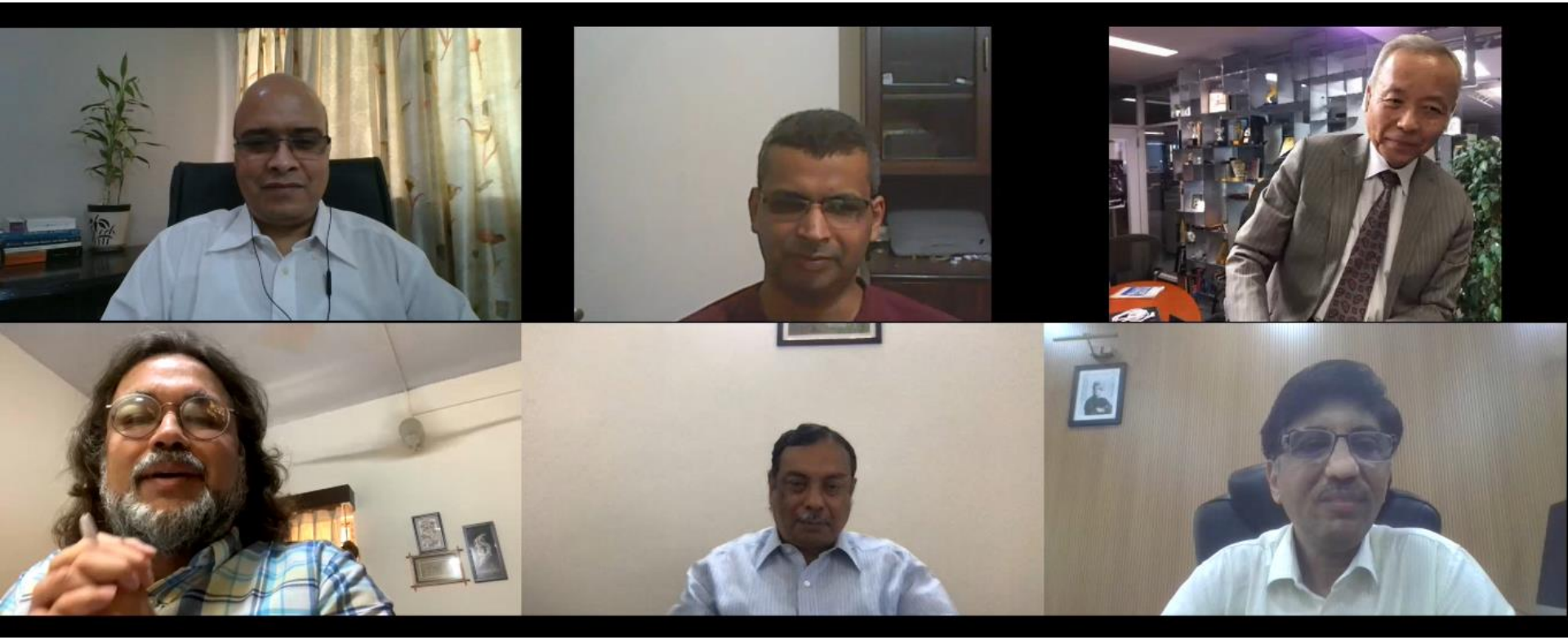
Columbia University Medical Center | NewYork-Presbyterian The University Hospital of Columbia and Cornell | Columbia Engineering The Fu Foundation School of Engineering and Applied Science | National Institutes of Health

Sunil K. Agrawal screen

00:03:25 Stop

Present On | Cam Off | Mic Off | Share | Lobby | More

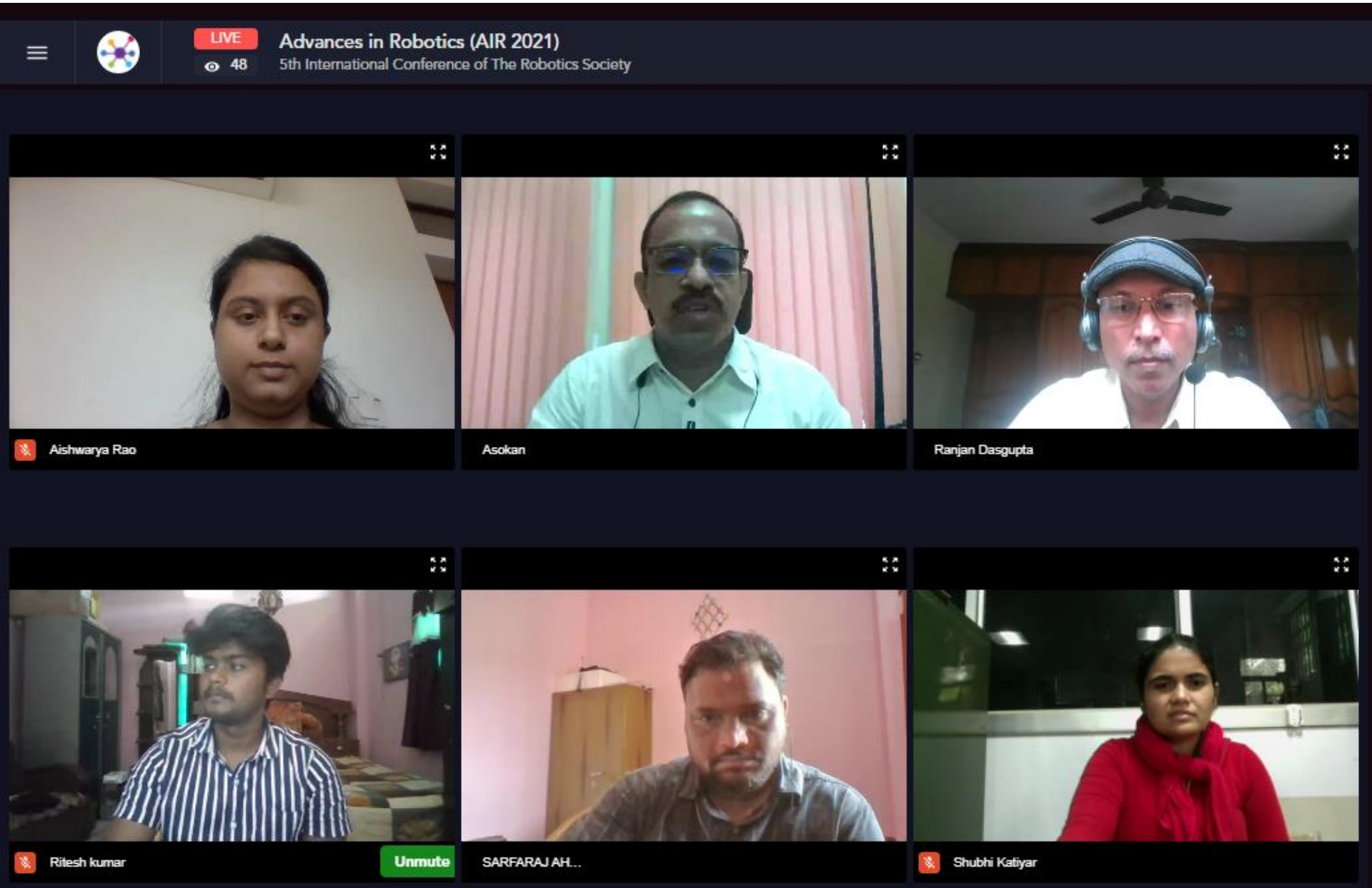
Day 2: **Inaugural Program of AIR 2021**
Upper Row: Prof. Ashish Dutta, Prof. Mangal Kothari, Prof. M. Asada
Lower Row: Prof. Samir Khandekar, Prof. Santanu Chadhury, Prof. Abhay Karandikar)



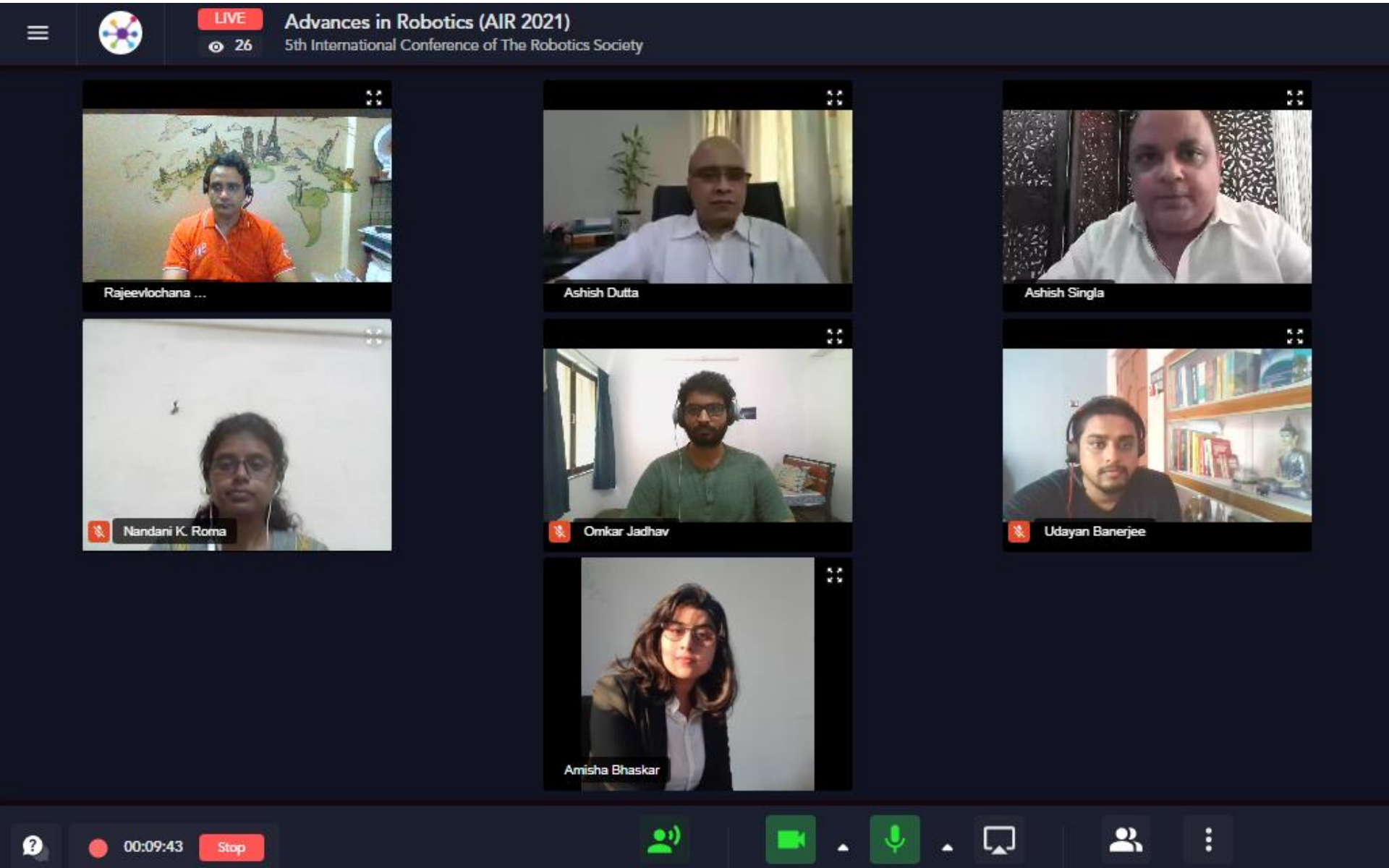
Day 2: **Plenary Talk 1**: **Prof M. Asada**, Osaka University, Osaka, Japan

"Autonomy in humans and machines: Robot sense of agency: self, pain, and ethics"

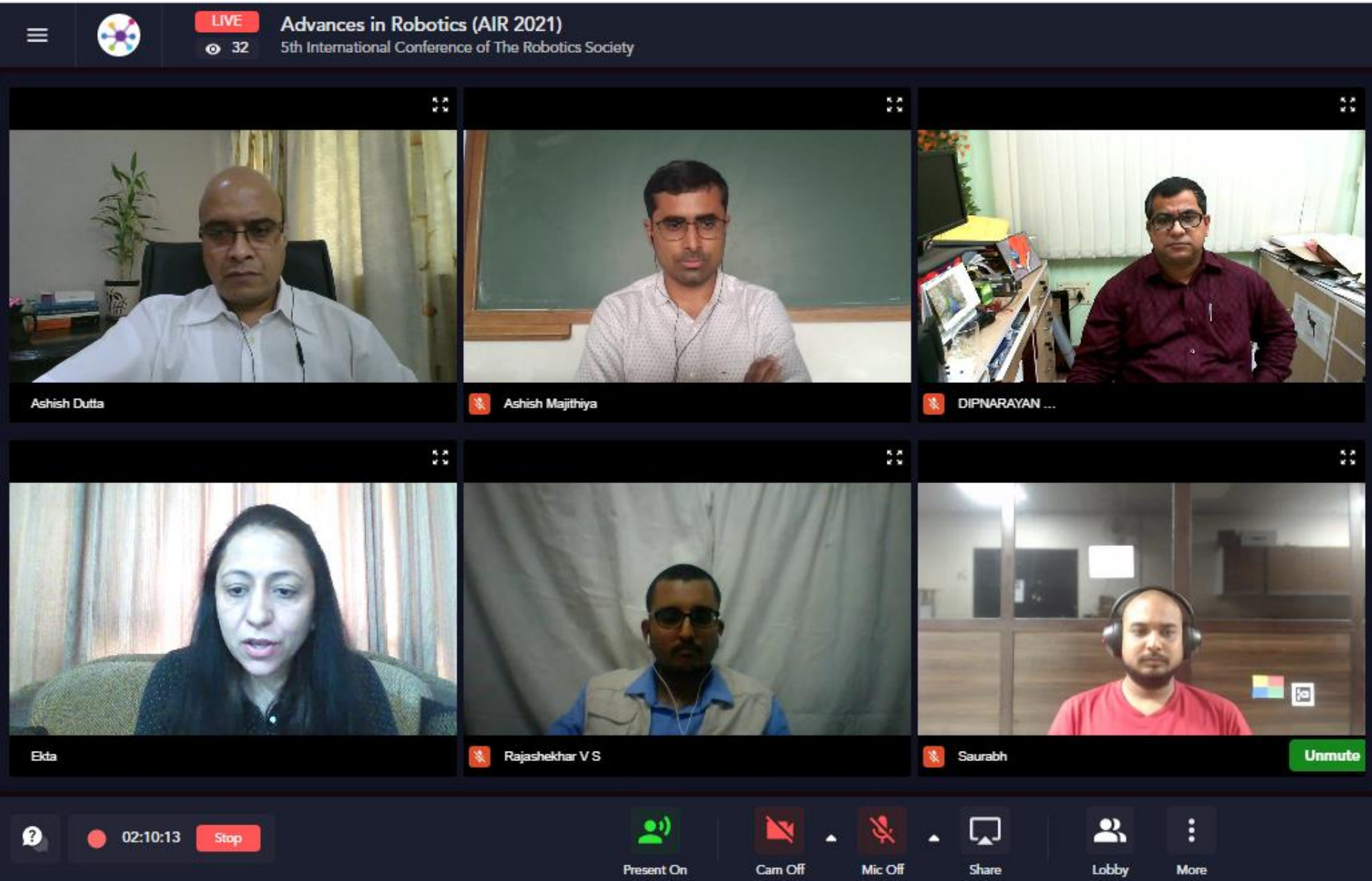
Day 2: **Technical Session 1**: Kinematics, Dynamics, Control and Simulation
Session Chair: Prof. Asokan T



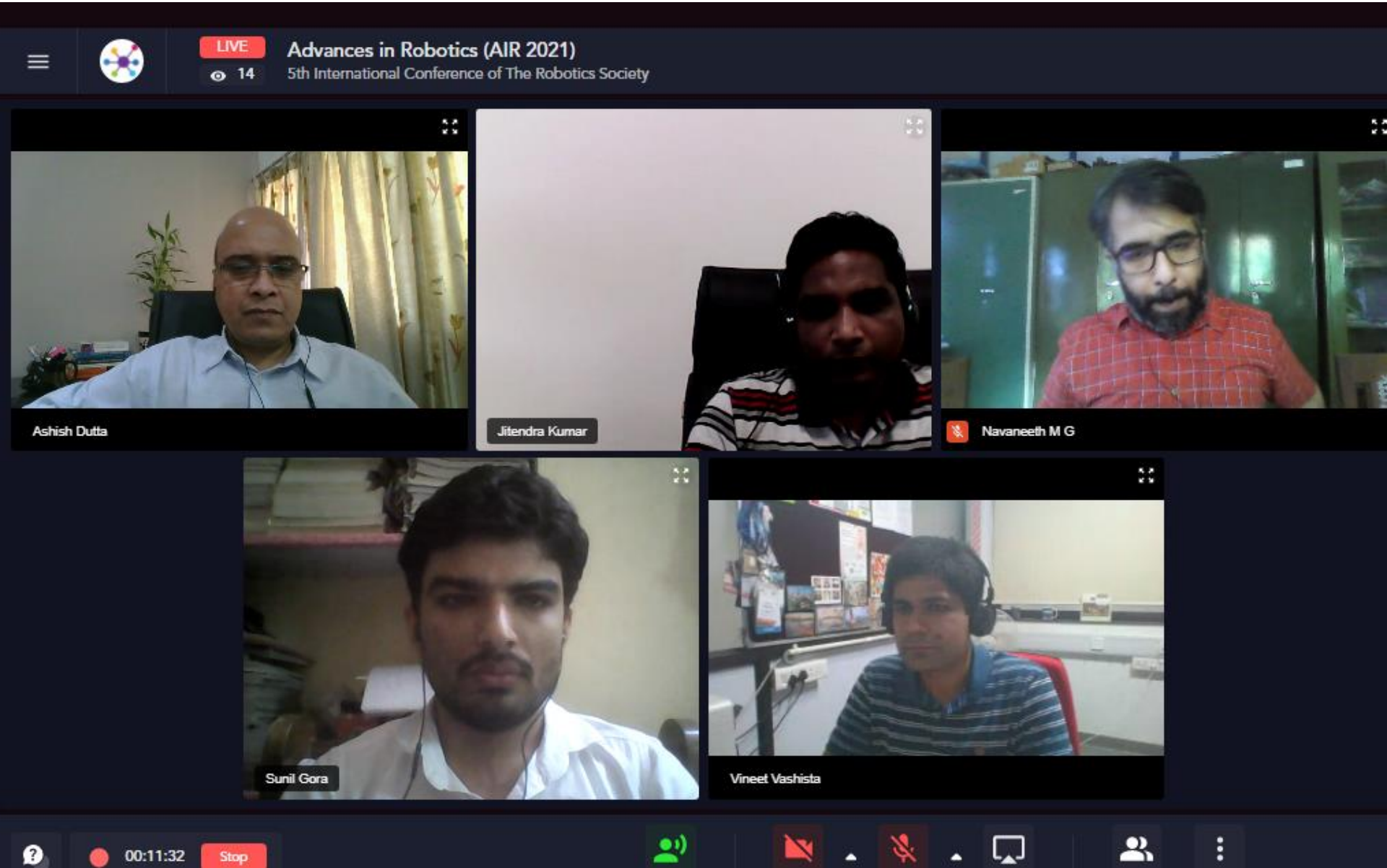
Day 2: **Technical Session 2**: Kinematics, Dynamics, Control and Simulation
Session Chair: Prof. Ashish Singla



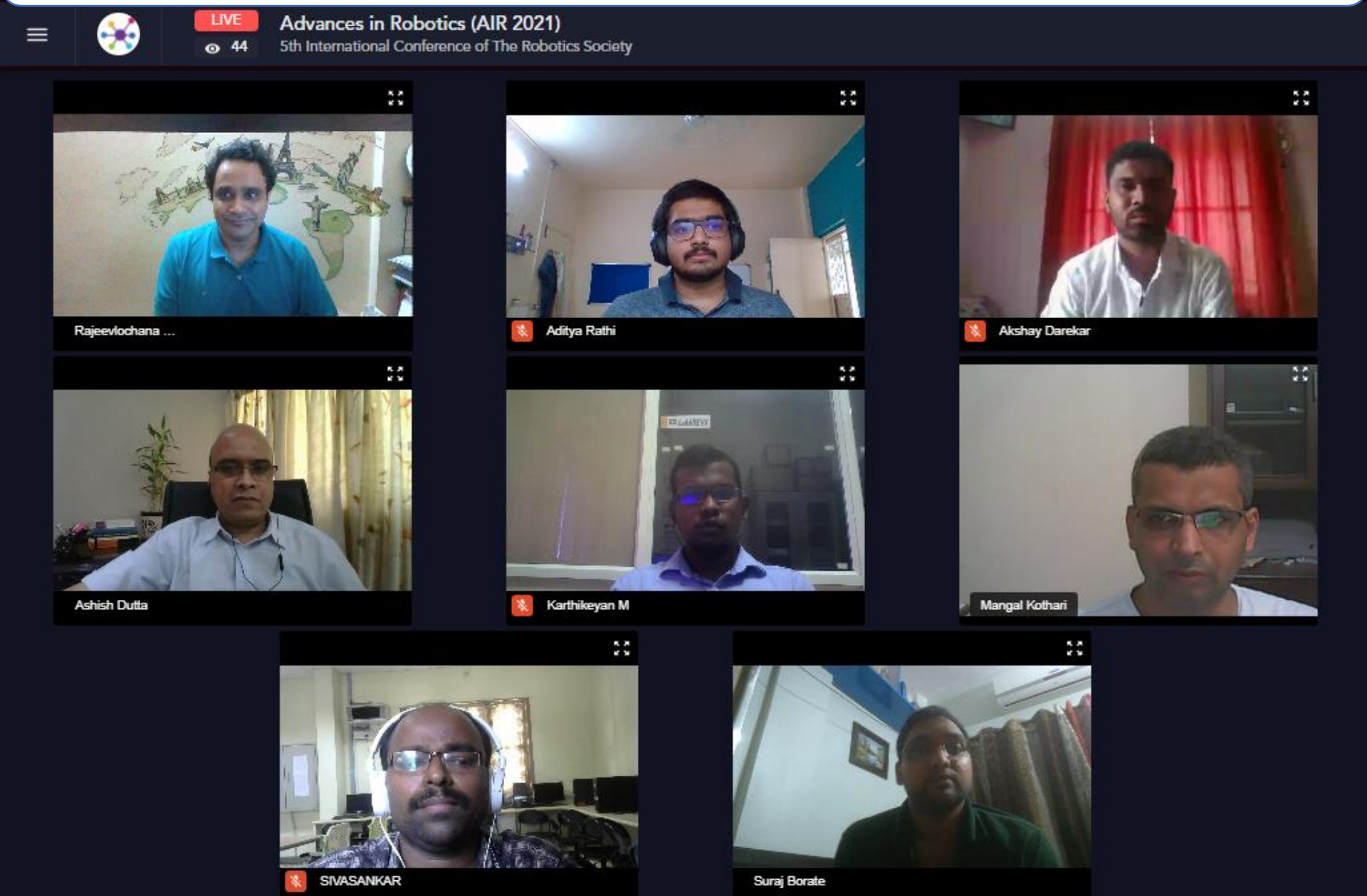
Day 2: **Technical Session 3**: Design of Robotic Mechanisms
Session Chair: Prof. Ekta Singla



Day 3: **Technical Session 4**: Humanoid Robotics, Active Sensory Perception
Session Chair: Prof. Vineet Vashista

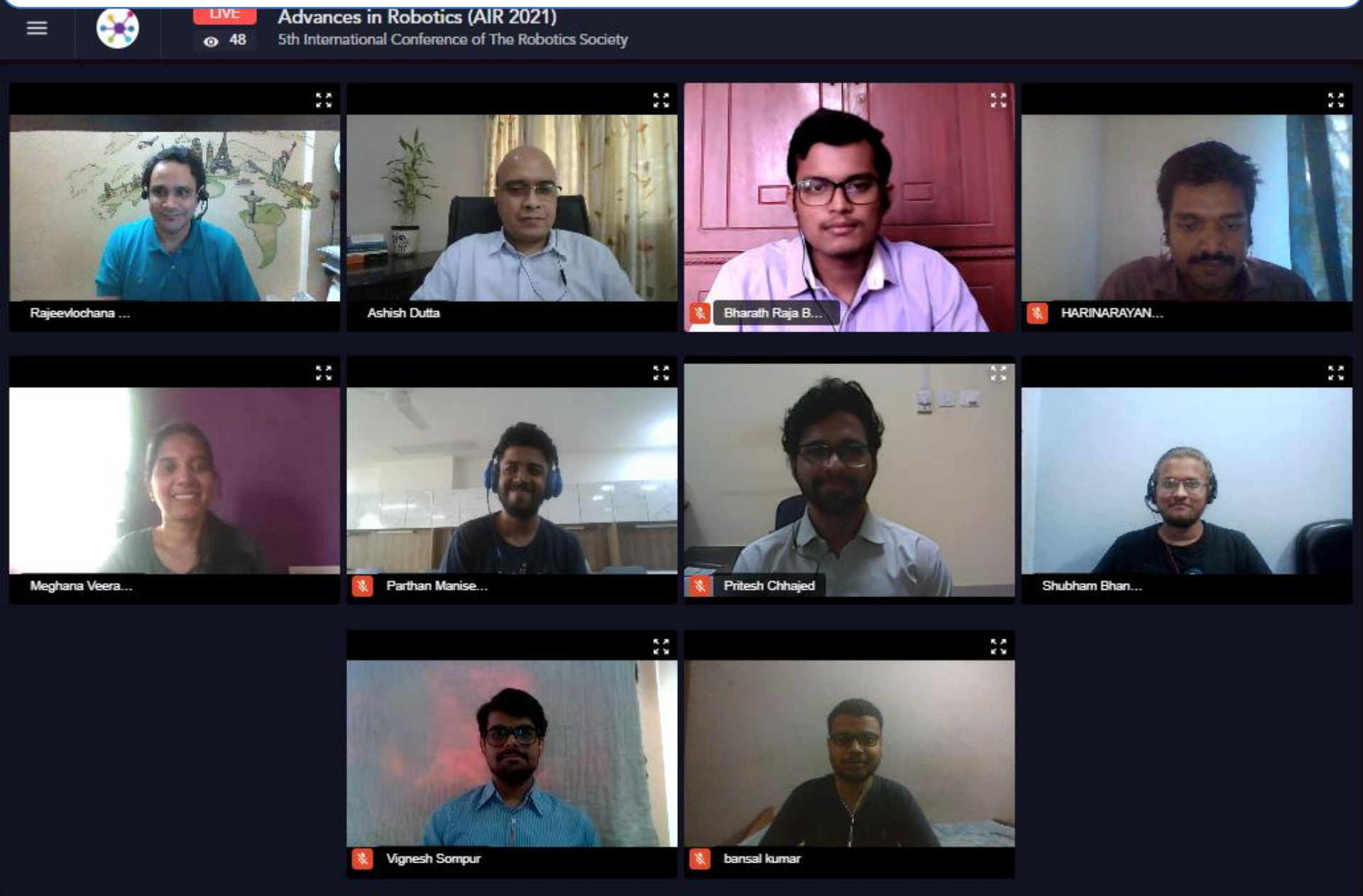


Day 3: **Technical Session 5**: Humanoid Robotics, Active Sensory Perception
Session Chair: Unmanned Vehicles and Virtual Reality

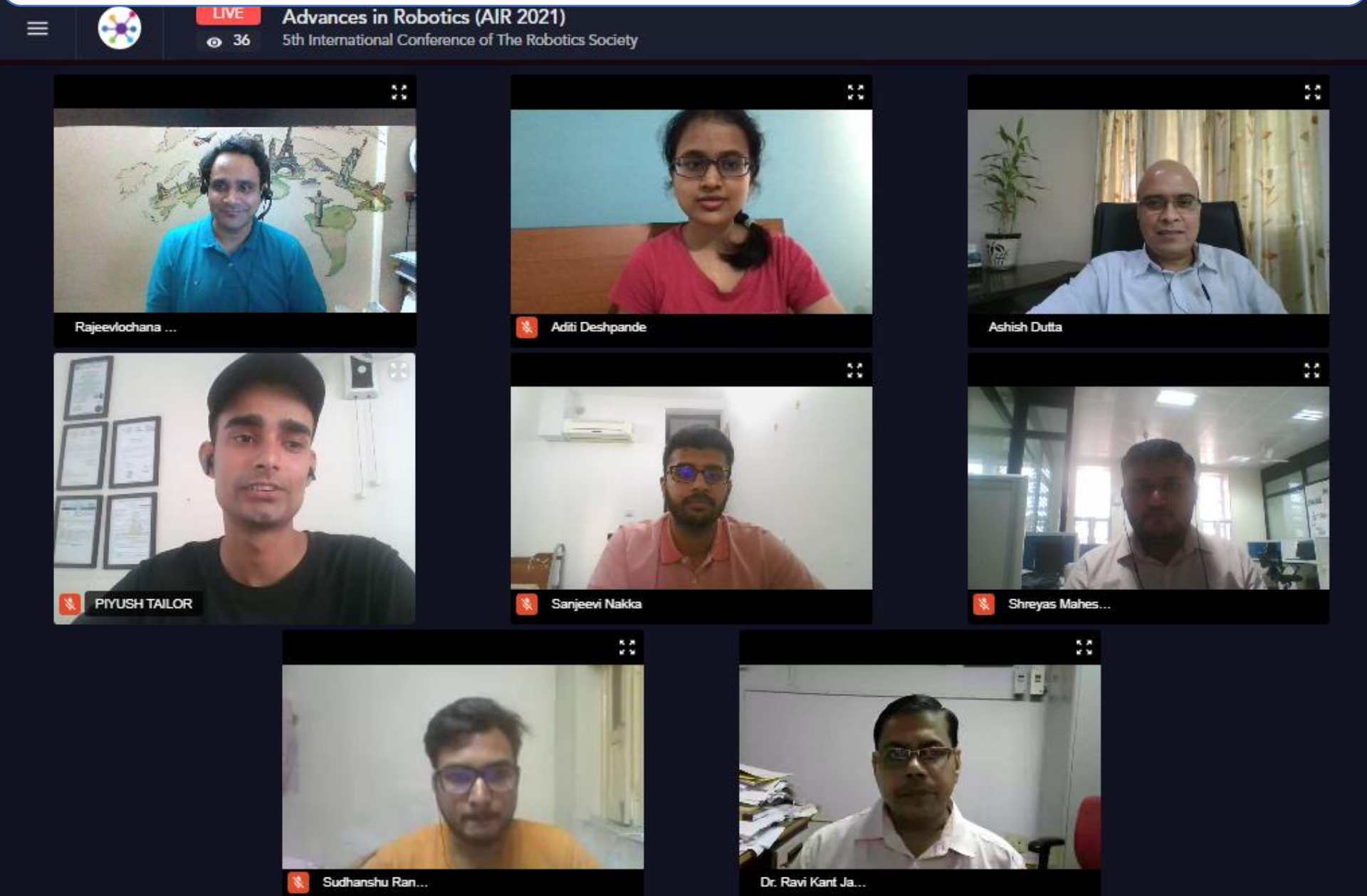


Day 3: **Plenary Talk 2**: **Prof. Paolo Fiorini**, University of Verona, Verona, Italy
"**Dreams in medical and surgical robotics: intelligence and affordability**"

Day 3: **Technical Session 6**: Poster Presentation
Session Chair: Prof. Ashish Dutta



Day 3: **Technical Session 6**: Poster Presentation
Session Chair: Prof. Ashish Dutta



Day 4: **Plenary Talk 3**: **Prof. Seul Jung**, Chungnam National Univ., Korea

"Balancing mechanism and control in research and life"

Day 4: **Technical Session 7**: Poster Presentation and Industry Talk
Session Chair: Prof. Subir K. Saha

Advances in Robotics (AIR 2021)

5th International Conference of The Robotics Society
June 30 - July 3, 2021, Indian Institute of Technology Kanpur, Kanpur, India

Day 4: July 3, 2021 (Saturday)

Timings mentioned are Indian Standard Time (IST) which is GMT + 5:30 hours

Technical Session 7: Poster Presentation 2 and Industry Talk

Time	Paper ID	Presenter	Paper Title
10:00 – 10:10	52	Aakarsh Goel	Adaptive Look-ahead distance for Pure Pursuit Controller with Deep Reinforcement Learning Techniques
10:10 – 10:20	22	Lalit N Patil	Enhancing Safety of Electric Vehicle Drivers through Vision Oriented Monitoring System
10:20 – 10:30	69	Nayan M. Kakoty	Development of A Technology Education Programme based on Self-Driven, Self-Learning and Self-Evaluating Approach
10:30 – 11:00		Industry Talk	**Industry Talk from Systemantics** (Bengaluru, India) By **Dr. Jagannath Raju** (CTO, Systemantics)

Day 4: **Technical Session 8**: Bio-mimetic and Computer Vision
Session Chair: Prof. Sudheer A. P.

Day 4: **Technical Session 9**: Machine Learning, Man Machine Systems
Session Chair: Prof. Nayan M. Kakoty

Day 4: **Keynote Talk**: **Prof. Prathyush P. Menon**, Univ. of Exeter, UK
"**Autonomous Oceanographic Sampling**"

LIVE
25
Advances in Robotics (AIR 2021)
5th International Conference of The Robotics Society

Speakers

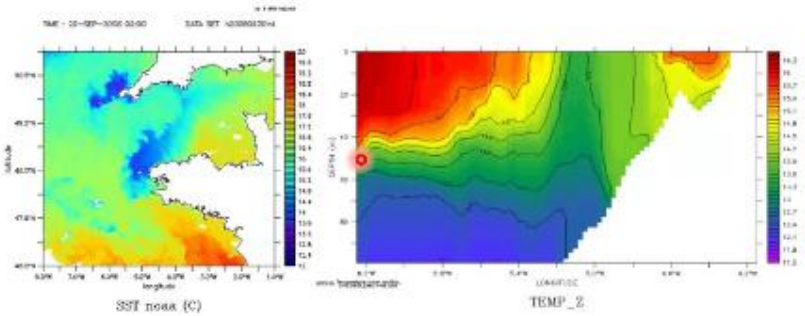
Prathyush

Ashish Dutta

UNIVERSITY OF EXETER

Oceanography Applications

- Tidal fronts separate the stratified deeper waters from the mixed/homogeneous shallower waters



Prathyush screen

00:09:56 Stop

Day 4: Closing Ceremony