RAHA2016

International Conference on
Robotics and Automation for Humanitarian Applications

December 18-20, 2016
Amrita University, Kerala, India

www. raha2016.org

AMRITA VISHWA VIDYAPEETHAM UNIVERSITY

ammachi labs

RAHA2016

Amrita University
Amritapuri
Kerala, India

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Details at
www.raha2016.org/app

Welcome to RAHA 2016!

It is our great pleasure to host you at the inaugural Robotics and Automation for Humanitarian Applications (RAHA'16) Conference!

RAHA'16 is the first ever robotics and automation conference dedicated to humanitarian applications. Truly interdisciplinary and crosscutting across disparate fields that might seem seemingly unrelated at first glance, the conference aims to connect technological innovators, policy makers, and humanitarian field workers. It is anticipated that the conference will produce dialogues and discussions that would identify gaps by bringing forward success stories and proven technologies whilst highlighting problematic areas where further work and efforts are needed. We have the opportunity - and indeed the responsibility - to learn from each other how to prepare the world for both the risks and the rewards of developing robots for humanitarian purposes. Through the knowledge gathered at RAHA, a special task force will be formed with the vision to impact society. Stay tuned for more information about this exciting initiative.

The conference is also intended to serve as a platform for practitioners, researchers, and developers in humanitarian technology fields to share their thoughts and experiences. In turn, it is our belief that the interactions and networking will enable, engage, and empower students and junior researchers from developing countries from different engineering disciplines to rethink and tailor their current and future research in ways that benefit their communities in particular, and humanity, in general.

With these motivations, we have put together an excellent conference program complete with 5 plenary and 13 keynote addresses from world-renowned speakers sharing their collective wisdom and invaluable deployment anecdotes on how emerging technologies can effect a change in people's loves for the better. Technical papers related to conference themes will be presented across 8 tracks and in a late breaking poster session. In addition to the technical sessions and invited talks, the conference also features workshops, tutorials, competitions, and social events. Please refer to the conference website at http://raha2016.org/ for a complete listing.

We hope that you combine your participation in RAHA'16 with time to explore the beautiful state of Kerala, its cuisine, and its breathtaking natural beauty or perhaps an extended holiday across the culturally unique heritage that only the subcontinent can offer unlike any other country across the globe. We eagerly look forward to your participation and to the success of RAHA'16!

Raj Madhavan and Rao R. Bhavani
Program Co-Chairs, RAHA'16
Amritapuri, Kerala, India

Raj Madhavan Conference Co-Chair

Previously from University of Maryland, Raj Madhavan is currently a Distinguished Visiting Professor of Robotics with AMMACHI Labs at Amrita University, Kerala, India and the Founder & CEO of Humanitarian Robotics Technologies (HumRobTech), LLC based in Maryland, USA. His research interests include humanitarian robotics and automation.

Rao R. Bhavani Conference Co-Chair

Rao R. Bhavani is the Project Leader of the UNESCO Chair for Gender Equality and Women Empowerment at Amrita University and the Director of AMMACHI Labs. Her work focuses on skill development and women empowerment. She leads the R&D that is centered on on human-computer interaction and robotics and automation technologies for education, skill development, disaster response, medical assistance, rehabilitation and vulnerability mapping.

Thank You!

We wish to express our gratitude to all of our sponsors and individuals who have contributed to the organization of this conference. Special thanks to our colleagues in the Program Committee, Organizing Committee and our volunteers who have dedicated their time toward ensuring the success of this conference.

RAHA at a Glance

About the conference

The aim of the inaugural International Conference on Robotics and Automation for Humanitarian Applications (RAHA) is to provide a platform for researchers, engineers, industry professionals, and humanitarian workers to share knowledge about technological tools, methodologies, and applied robotic and automation solutions for humanitarian applications.

35 Competing Student Teams

45 Paper Presentations

18 Distinguished Lectures

12 Countries Represented

31 Poster Presentations

7 Tutorials and Workshops

21 Sponsors & Exhibitors

Thematic areas

- Disaster prevention, preparedness, response, and recovery efforts
- Nuclear site monitoring, decommissioning, and hazardous waste cleanup
- Applications of unmanned ground, aerial, and marine vehicles
- Collaborative and cooperative robotics
- Search and rescue
- Firefighting
- Casualty assessment, care, and extraction
- Agriculture
- Locomotion, load carrying, and manipulation
- Demining
- Inspection and structural assessment of critical infrastructure
- Floods, landslides, and earthquakes
- Robotics and haptics for education and learning
- Rehabilitation and assistive robotics
- Medical and surgical robotics
- Wearable assistive devices
- Telemedicine
- Robotics for automotive safety
- Role of NGOs/NPOs and funding agencies in identifying deployment needs and benefits and sustainability

Venue

The venue of the conference is the beautiful Amritapuri campus of our University, which is nestled in the picturesque village of Vallikavu beside the scenic backwaters of peninsular India. We offer a wonderful and stimulating ambience with endless stretches of coconut palm groves and the Arabian Sea that borders Kerala on the west only a few hundred meters from the campus.

Organizers and Supporters

RAHA 2016 is organized and hosted by Amrita University, a world ranked private university with collaborations with premier US and European universities.
Its research lab, AMMACHI Labs, is also pioneering the use of technology to empower people and bring positive societal changes. It has done several projects in partnership with UNDEF and has now a chair at UNESCO for its work for gender equality and women empowerment.

AMRITA VISHWA VIDYAPEETHAM UNIVERSITY

ammachi labs

- Our supporters:

IEEE

IEEE Robotics & Automation Society

Speakers at RAHA 2016

RAHA 2016 showcases some of the brightest minds in the field of robotics for humanitarian applications, including researchers, practitioners, and experts at the forefront of innovation in their respective domains.

For the latest schedule and locations of the talks please download our mobile conference app. Details at:
www.raha2016.org/app

Ronald Arkin

Regents' Professor and Associate Dean for Research
Georgia Tech

Ronald Arkin is Regents' Professor and Associate Dean for Research in the College of Computing at Georgia Tech. He served as STINT visiting Professor at KTH in Stockholm, Sabbatical Chair at the Sony IDL in Tokyo, and in the Robotics and AI Group at LAAS/CNRS in Toulouse. Dr. Arkin's research interests include behavior-based control and action-oriented perception for mobile robots and UAVs, deliberative/reactive architectures, robot survivability, multiagent robotics, biorobotics, human-robot interaction, robot ethics, and learning in autonomous systems. Prof. Arkin served on the Board of Governors of the IEEE Society on Social Implications of Technology, the IEEE Robotics and Automation Society (RAS) AdCom, and is a founding co-chair of IEEE RAS Technical Committee on Robot Ethics. He is a Distinguished Lecturer for the IEEE Society on Social Implications of Technology and a Fellow of the IEEE.

Talk Title

Civilized Collaboration: Ethical architectures for enforcing legal requirements and mediating social norms in HRI

Georgia Tech

Hajime Asama

Professor
University of Tokyo

Hajime Asama received his B. S., M. S., and a doctoral degree in Engineering from the University of Tokyo. He was Research Associate, Research Scientist, and then Senior Research Scientist in RIKEN (The Institute of Physical and Chemical Research, Japan). He became a professor of RACE (Research into Artifacts, Center for Engineering), the University of Tokyo in 2002, and a professor of School of Engineering, the University of Tokyo in 2009. He received the JSME (Japan Society of Mechanical Engineers) Robotics and Mechatronics Division Academic Achievement Award in 2001, the RSJ (Robotics Society of Japan) Best paper Award, and the JSME Robotics and Mechatronics Award in 2009. His main research interests are distributed autonomous robotic systems, ambient intelligence, service engineering, and mobiligence

He is a vice-president of Robotics Society of Japan. He was an AdCom member of IEEE Robotics and Automation Society from 2007 to 2009, an editor of International Journal of Intelligent Service Robotics, Journal of Field Robotics, Journal of Robotics and Autonomous Systems. He played the director of the Mobiligence (Emergence of adaptive motor function through the body, brain and environment) program in the MEXT Grant-in-Aid for Scientific Research on Priority Areas from 2005 to 2009. He is a Fellow of JSME since 2004 and RSJ since 2008.

Talk Title

Utilization of Robot & Remote-Controlled Machine Technology for Accident Response and Decommissioning of Fukushima Daiichi Nuclear Power Plant

東京大学
THE UNIVERSITY OF TOKYO

Vijay P. Bhatkar

Chancellor of India
International Multiversity

Dr. Vijay Bhatkar is one of the most acclaimed scientists and IT leaders of India. He is best known as the architect of India's first supercomputer and as the founder Executive Director of C-DAC, India's national initiative in supercomputing. He developed the first Indian supercomputer, the Param 8000, in 1991 and then later the Param 10000 in 1998. Based on the Param series of supercomputers, he built the National Param Supercomputing Facility (NPSF) which has been now made available as a grid computing facility on the National Knowledge Network (NKN) providing nationwide access to High Performance Computing (HPC) infrastructure. Currently, Bhatkar is working on exascale supercomputing via the Capability, Capacity and Infrastructure on National Knowledge Network.

He has been awarded the Padma Shri, Padma Bhushan, the Maharashtra Bhushan Award and the Jindal Prize in 2012 for science and technology in the service of society. He received with the Saint Jnaneshwar World Peace Prize in 2010 from the World Peace Center and the Sitaram Jindal Foundation Award-2012 for applying the science and technology to grassroots level.

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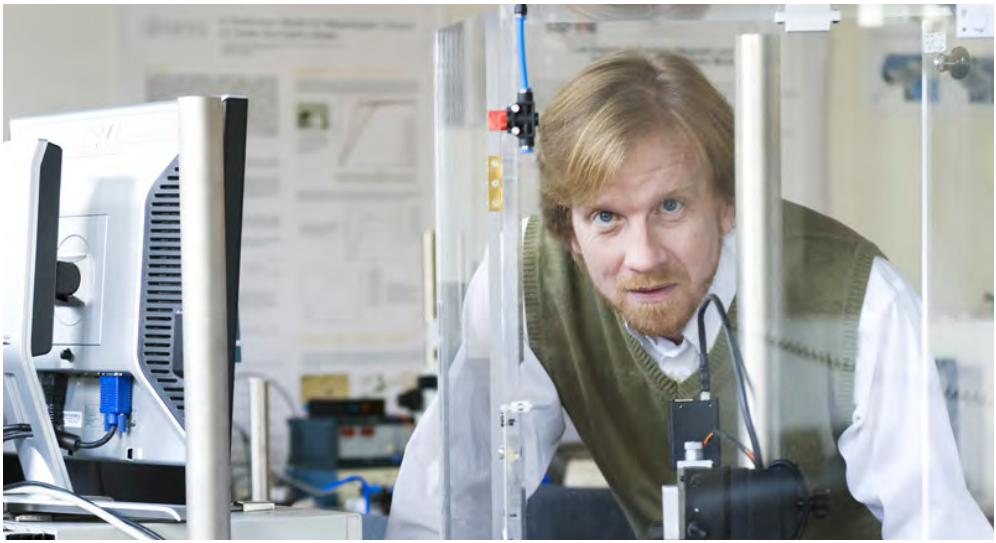

Bradley Nelson

Professor
ETH Zürich

Bradley Nelson has been the Professor of Robotics and Intelligent Systems at ETH Zürich since 2002. He has over thirty years of experience in the field of robotics and has received a number of awards in the fields of robotics, nanotechnology, and biomedicine. He serves on the advisory boards of a number of academic departments and research institutes across North America, Europe, and Asia and is on the editorial boards of several academic journals. Prof. Nelson has been the Department Head of Mechanical and Process Engineering at ETH, Chairman of the ETH Electron Microscopy Center, is a member of the Research Council of the Swiss National Science Foundation, and serves on boards of three Swiss companies. Before moving to Europe, Prof. Nelson worked as an engineer at Honeywell and Motorola and served as a United States Peace Corps Volunteer in Botswana, Africa. He has also been a professor at the University of Minnesota and the University of Illinois at Chicago.

Talk Title

Medical Robotics and its Potential Impact on Surgery in Developing Countries

ETH zürich

Jeffrey Sachs

Director, The Earth Institute

Columbia University

Jeffrey David Sachs is an American economist and director of The Earth Institute at Columbia University, where he holds the title of University Professor, the highest rank Columbia bestows on its faculty. He is known as one of the world's leading experts on economic development and the fight against poverty.

Sachs is the Quetelet Professor of Sustainable Development at Columbia's School of International and Public Affairs and a professor of health policy and management at Columbia's School of Public Health. He is special adviser to United Nations Secretary General Ban Ki-Moon on the Millennium Development Goals, having held the same position under former UN Secretary-General Kofi Annan. He is co-founder and chief strategist of Millennium Promise Alliance, a nonprofit organization dedicated to ending extreme poverty and hunger. Previously he was the director of the United Nations Millennium Project's work on the Millennium Development Goals. He is director of the UN Sustainable Development Solutions Network. He has also served as a commissioner for the Broadband Commission for Digital Development. He is also a member of the International Advisory Council of the Center for Social and Economic Research (CASE).

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Sunil Agrawal

Professor
Columbia University

Sunil K. Agrawal received a Ph.D. degree in Mechanical Engineering from Stanford University in 1990. He is currently a Professor and Director of Robotics and Rehabilitation (ROAR) Laboratory at Columbia University. He has published close to 400 journal and conference papers. Dr. Agrawal is a Fellow of the ASME and AIMBE. His honors include a NSF Presidential Faculty Fellowship from the White House in 1994, a Bessel Prize from Germany in 2003, and a Humboldt US Senior Scientist Award in 2007. He has held positions of a Distinguished Visiting Professor at Hanyang University in Korea, a Professor of Robotics at the University of Ulster in Northern Ireland and currently a Visiting Professor at the Biorobotics Institute of SSSA in Pisa.

Talk Title: **Robotics for Training of Human Movement**

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Bernardine Dias

CEO and Managing Member
Diyunu Consulting LLC

Bernardine Dias, Ph.D., is a roboticist and consultant who is committed to technology innovation that serves disadvantaged people around the world. Her principal research objective is to explore the different ways in which we can create computing technology to be culturally appropriate and accessible to underserved communities. She founded and directs the TechBridgeWorld research group that enables technology research relevant to, and in partnership with, underserved communities throughout the globe. Her doctoral dissertation developed the "TraderBots" framework for market-based multirobot coordination in dynamic environments. Her current work in this area explores human-robot teams working under dynamic conditions to achieve complex goals. She also has a strong interest in encouraging women in computing and in science, and is a founding member of, and faculty advisor to graduate women@SCS. Dias also founded and runs a technology consulting company, Diyunu Consulting LLC.

Talk Title: **Prioritizing Humans in Humanitarian Technology Applications**

diyunu
Welcome to Progress

Ashish Dutta

Professor
IIT Kanpur

Prof. Ashish Dutta completed his PhD from Akita University, Japan in systems engineering. His research includes Humanoid robotics, grasping, bio-robotics, intelligent control systems, micro sensors and actuators. He has authored books on Industrial Robotics published by McGraw Hill, Robotics Systems published by Advanced Robotic Systems Publications, Austria, Vision Systems: Segmentation and Pattern Recognition by Advanced Robotic Systems Publications, Austria and Vision Systems: Applications Advanced Robotic Systems Publications, Austria. He also serves as the Secretary of the Robotic Society of India.

Talk Title: Design and Control of Hand Exoskeletons

Brent Gillespie

Assistant Professor
University of Michigan

Brent Gillespie completed his PhD in mechanical engineering at Stanford University in 1996 and a postdoctoral fellowship at Northwestern University in 1999. He then joined the department of Mechanical Engineering at the University of Michigan, where he conducts research in manual control interfaces and wearable robots. At Stanford he was associated both with the Center for Computer Research in Music and Acoustics (CCRMA) and the Dextrous Manipulation Laboratory.

Talk Title: The Virtual Teacher: Who is the Real Learner?

Meg Jones

Chief, Economic Empowerment
UN Women

Meg Jones is Chief of the Economic Empowerment Section at UN Women. Before joining UN Women, she worked as Women and Trade Programme Manager at the International Trade Centre, where she was responsible for the design and implementation of the multiyear, multimillion dollar program to increase the economic benefits women derive from trade. Ms. Jones is the former Deputy Director of the Evian Group at IMD (a trade think tank). She has also worked for the Office of the UN High Commissioner of Human Rights and served on the Australian delegation to the UN Commission on Human Rights. She also has private sector experience gained from working in the financial markets and in management consulting. Meg was awarded 'Woman of the Year' in 2013 by the Organisation of Women in International Trade; and a 'World of Difference' award in 2012 by the International Alliance of Women for her contribution to women's economic empowerment. Ms. Jones holds a Master of International Studies and a Bachelor of Economics (University of Sydney) having studied in Malaysia, Indonesia, Australia and the Netherlands.

Talk Title: Inclusive Solutions: What's the real problem?

Alaa Khamis

Associate Professor
Suez University

Alaa Khamis worked as Senior Research Scientist at Vestec, Inc., Robotics and Automation Consultant at InnoVision Systems, Director of Engineering R&I – Canada at Marques Aviation Ltd., Associate Professor and Director of Robotics and Autonomous Systems (RAS) research group at German University in Cairo (GUC), Research Assistant Professor and Cooperative Algorithms and Machine Intelligence Lecturer at University of Waterloo, Canada, Visiting Professor at Charles III University of Madrid, Spain and Universite de Sherbrooke, Canada, a Visiting Researcher at University of Reading, UK and Distinguished Scholar at FH Ravensburg-Weingarten, Germany. His research interests include cooperative multirobot systems, algorithmic robotics, humanitarian robotics, multisensor data fusion, intelligent data processing and analysis, combinatorial optimization and machine learning.

Talk Title: Humanitarian Robotics: Minefield Reconnaissance and Mapping

Taskin Padir

Associate Professor
Northeastern University

Dr. Taskin Padir received his Ph.D and M.S. degrees in electrical and computer engineering from Purdue University. He holds a B.S in electrical and electronics engineering from the Middle East Technical University in Turkey. He is the Director of Robotics and Intelligent Vehicles Research Laboratory (RIVeR Lab). His projects have been sponsored by NSF, NASA, DARPA, AFRL, and many industry partners. Dr. Padir led project teams for the NASA Sample Return Robot Centennial Challenge, SmartAmerica Challenge and the DARPA Robotics Challenge. Dr. Padir presented at the Innovation on the Edge: Accelerating Solutions in the Fight Against Ebola event hosted by OSTP and USAID at the White House in 2015 and organized and hosted OSTP/NRI Workshop on Safety Robotics for Ebola Workers in 2014. A team led by Padir was recently selected to receive one of NASA's humanoid robot Valkyrie for research and development.

Talk Title: RARE: Robotics for Advanced Response to Epidemics

Northeastern University

Mike Richards

President and CEO
Drone America

Drone America strives to be one of the World's Top Providers of Autonomous Unmanned Vehicles, and high tech equipment and services. Their mission is to use UAS technologies as means to survey, protect, and preserve human life and strategic resources around the Globe. They are proud to employ technologies and innovations to help defend countries, secure borders, and protect life. Drone America, an aerospace company, and American Medical Response (AMR), a medical transportation company, have announced a partnership that aims to bring Unmanned Autonomous Systems (UAS) to the EMS industry. By leveraging UAS technologies, AMR's specialty teams would be able to provide swifter and safer rescue operations in dangerous situations such as disaster response, mountain rescue and swift water rescues. Drone America's medical DAx8 UAS is specifically engineered with emergency services and first responders in mind.

Talk Title: Humans, Drones and Humanity

DRONE AMERICA
DRONES FOR PROFESSIONALS™

Subir Kumar Saha

Professor
IIT Delhi

Prof. Subir Kumar Saha, B.Tech in mechanical engineering from the NIT, Durgapur, India, completed his M. Tech from IIT Kharagpur and Ph. D from McGill University, Canada. He joined Toshiba Corporation's R&D Center in Japan and with IIT Delhi since 1996. He established the Mechatonics Laboratory at IIT Delhi in 2001. Prof. Saha was awarded the Humboldt Fellowship in 1999 by the AvH Foundation, Germany, and the Naren Gupta Chair Professorship at IIT Delhi in 2010. He has authored books on "Introduction to Robotics" by McGraw-Hill India, two books on multibody dynamics by Springer, and conducted several sponsored projects and consultancies worth INR 5.6 crores (around one million USD). Prof. Saha has written several books. To make robotics learning fun, a software RoboAnalyzer was developed under his supervision. He has more than 175 research publications in reputed journals/conference proceedings, and delivered more than 150 invited/keynote lectures in India and abroad.

Talk Title: R2 : Robotics to Rural

Balakrishnan Shankar

Associate Dean
School of Engineering at Amritapuri campus
Amrita University

He currently serves as a Professor and the Chairperson at the Department of Mechanical Engineering at Amrita School of Engineering, Amritapuri. His research interest includes Materials Science. Dr. Balakrishnan Shankar received his Ph. D. from University of Texas at Austin, USA.

Asokan Thondiyath

Professor
IIT Madras

Dr T. Asokan is a Professor in the Department of Engineering Design at IIT Madras . He completed his B.Tech. and M.Tech. in mechanical engineering from Calicut University. Dr Asokan received his Ph.D in Mechanical Engineering from the IIT Madras. He has worked as a researcher at the Robotics Research Center, Nanyang Technological University, Singapore where was instrumental in developing the Remotely Operated Underwater vehicle and a 7-axis underwater manipulator. Prior to this, he spent 3 years in DRDO as a Scientist. He was awarded the Stanford-India biodesign fellowship by the Stanford University, USA in 2009 and has completed a post doctoral fellowship in medical device development at the Stanford University. Dr. Asokan is a visiting Fellow of the University of New South Wales, Australia. He is a member of the Bureau of Indian Standards (BIS) Sectional Committee on Industrial and Production Automation Systems and Robotics (PGD 18) and the Indian representative in the Joint Working Group (JWG9) of the International Standards Organisation's (ISO) sectional Committee on Robots and Robotic Devices. Dr Asokan has published more than 75 papers in International Journals and conferences and has filed 9 patents in India and Singapore.

Talk Title: Design and Control of Variable Buoyancy Modules for Selective Underwater Deployment for Surveillance, Search, and Rescue Missions

Hervé Le Treut

Climatologist
French Academy of Sciences

Hervé Le Treut studied Physics at Ecole Normale Supérieure in Paris, and specialized in the development of atmospheric-cor coupled ocean-atmosphere climate models. He carried out simulations of the climate response to a CO2 increase since the mid-eighties, and analyzed the dependence of their response to a large range of feedback factors, including biogeochemical ones. Hervé Le Treut is the author or coauthor of more than 100 peer-reviewed papers. He is presently a professor at University Pierre et Marie Curie (on leave from CNRS) and at EcolePolytechnique. He is the director of Institut Pierre Simon Laplace, a federation of 9 laboratories of the Paris area. He has been a member of the Joint Scientific Committee of the World Climate Research Programme, and a regular participant in the IPCC Assessment Reports. He is strongly involved in the studies at the interface between science and society, was a member of the pilot Committee of COP21, and coordinated a report on the adaptation to climate change in the South-West of France.

Talk Title: Adaptation to climate change: the potential use of data from multi-model simulation exercises

INSTITUT DE FRANCE
Académie des sciences

Paul F.M.J. Verschure

Director, SPECS Lab
Universitat Pompeu Fabra

Prof. Paul F.M.J. Verschure is a research professor with the Catalan Institute of Advanced Studies (ICREA) and Director of the laboratory of Synthetic Perceptive, Emotive and Cognitive Systems (SPECS) at Universitat Pompeu Fabra in Barcelona. He received both his MA. and PhD in psychology and pursued his research at different leading institutes: the Neurosciences Institute and The Salk Institute, both in San Diego, the University of Amsterdam, University of Zurich and the Swiss Federal Institute of Technology-ETH and currently with ICREA and Universitat Pompeu Fabra. He is a consultant for the European Commission regarding the integration of Neuroinformatics in the 5th-6th & 7th FP and a referee for Science, Nature, Royal Society London, Trends in Neuroscience, IEEE neural networks, PLoS Computational Biology and PLoS ONE.

Talk Title: Living Machines for a Dignified Society: A Report from the Front Line

upf. Universitat Pompeu Fabra Barcelona

RAHA Workshop & Tutorials

The conference includes one workshop and several tutorials specializing in various robotics themes. For the latest schedule, locations and updates please download our mobile conference app at: http://www.raha2016.org/app

Workshop
Social Entrepreneurship - Research to Commercialization

By Rejin Narayanan, Ingen Robotics, Abheek Bose, Systemantics Ltd. and Snehal Shetty, Amrita TBI
Get ready for your own Robotics Startup! Take a walk through the challenges of building a robotics startup, and taking your product from concept to production.

Tutorial 1
Design & Deploying Control Algorithms for Robotics Application using Matlab

By Dhirendra Singh, and Application Engineer, Math Works India
Learn about three crucial issues: how to design and simulate a robot, how to prototype and test its algorithms, and how to connect to robot platforms and peripherals.

Tutorial 2
Learning Robot Kinematics using RoboAnalyzer and ABB Robots

By Rajeevlochana Chittawadigi, Amrita University, Bengaluru, Vishnu Rajendran, Amrita University, Amritapuri, Prof. Subir Kumar Saha, IIT Delhi, New Delhi
We will go deep into RoboAnalyzer and ABB Robots to give you the skills needed to visualize sophisticated concepts in robotics.

Tutorial 3
Cable-Driven Parallel Robots

By Dr. Vineet Vashista, IIT Gandhinagar
Cable driven robots have some unique properties that make them exciting choices for a wide range of applications. This tutorial will go deeply into cable driven robots in theory and practice.

Tutorial 4
Introduction to Robot Navigation using Robot Operating System (ROS)

By M. Vasanthakumar, PSG Tech, Coimbatore, Gayathri Manikutty, AMMACHI Labs, Amrita University

This tutorial will offer a hands-on introduction to ROS applied to embedded platforms where you can use ROS to control your custom made mobile robots and extend its application to localization, navigation and control.

Tutorial 5
Digital Manufacturing - Tools for the Maker

By Viswesh Srinivasan, SVP Laser Pvt. Ltd, Akshay Nagarajan, AMMACHI labs, Amrita University

This tutorial provides a hands-on training in the use of subtractive prototyping tools that form the foundation for robot design for any engineering student or researcher.

Tutorial 6
Robotics for Children (RoC)

By Akshay Nagarajan, Alekh Velayudhan, Nidhin Sugunan, Abel Varghese, Gayathri Surendran, Gayathri G., Thejas Menon, Rahul Ravindran, Pradeep Venna, Amrita University, Amritapuri

This tutorial offers a primer to robotics touching upon its various components such as sensors, actuators and controllers. We further will teach you to control a cartesian robot to draw shapes, following a path using a laser light source, pick and place objects, and create your own designs on thermocol and vinyl stickers.

Late Breaking Posters

Students, professors and researchers in academia and industry will present recent results in robotics and methods during a poster presentation session. There will be two awards for best Late Breaking posters. Around 31 posters will be presented.

Humanitarian Robot Competition

RAHA 2016 has a national and international robotics and automation competition aimed at encouraging research and application of innovative solutions for humanitarian purposes.

RAHA Organizers

Amrita University

Amrita University is a multi-campus, multi-disciplinary research university that is accredited 'A' by NAAC and is ranked as one of the best research universities in India. The university is spread across five campuses in three states of India - Kerala, Tamil Nadu and Karnataka, with the University headquarters at Ettimadai, Coimbatore, Tamil Nadu.

The university continuously collaborates with top US universities including Ivy league universities and top European universities for regular student exchange programs, and has emerged as one of the fastest growing institutions of higher learning in India.


Amritapuri Campus


Amrita University


Coimbatore Campus


Kochi Campus


Mysore Campus


Banglore Campus

For more information about Amrita University visit:
www.amrita.edu

Robotics @ Amrita

Amrita ABB Robotics Lab

The Amrita ABB Robotics Lab is India's first ROS-industrial lab. The labs include pneumatic and hydraulic kits, a PLC with a simulator unit and micro controller training kits. Students at Amrita get hands on opportunities with the ABB manipulators, a Clearpath Husky UGV, and Parrot AR Drones.

Humanitarian Technology Labs

HuT Labs is a dedicated research lab mainly focusing on health care, robotics, human aided devices, and embedded sensor networks.

In Kerala coconuts are grown in large scale and harvesting is an increasingly tedious and dangerous task with high labor costs. A robot that could automate this job would provide a safe and cost effective solution. The HuT Labs developed a remote controlled robot to harvest coconuts while manipulated by a person safely on the ground.

Department of Mechanical Engineering

The Department of Mechanical Engineering offers comprehensive, student-centric learning opportunities, designed to inspire learners through hands-on workshops, lab sessions, seminars, projects and independent study. Students conduct research and participate in global robotics and automation forums such as the Mars Rover challenges in the US and UK.

Computational Neuroscience Lab

Amrita's Computational Neuroscience Lab works on experimental neurophysiology, theoretical and computational biophysics of neural dynamics and applied robotics. The aim of the lab is to understand circuit and computational properties during brain function and dysfunction, neurological disorders, studying impacts of yoga and meditation using noninvasive techniques, building biologically inspired circuit and algorithms for robotics. The lab is funded by scientific grants from DST, Ministry of HRD, MeitY and DBT, Government of India and was part of the Indo-Japan joint projects and the Indo-Italy program of cooperation.

AMMACHI Labs

AMMACHI Labs (Amrita Multi Modal Applications and Computer Human Interaction) is an academic and research center at Amrita University that brings an interdisciplinary approach to addressing ocietal challenges through skill development and women empowerment.The labs designs human centered solutions and technological innovations through focused R&D for HCI, robotics and automation, haptic technologies and applied robotics. In 2012, the first batch of female plumbers trained in part on haptic simulators, with a life skills component, successfully graduated from AMMACHI Labs. Today, the women are active members in the workforce and have set a new standard and broken through gender barriers in the traditionally male-dominated vocation of plumbing.

RAHA Task Force

From the wealth of knowledge gathered at RAHA, we will form a special task force to mobilize the robotics and automaton solutions into real humanitarian applicatons. This team will compile and document policy recommendations.Stay connected and engage in this exciting inititative at:

www.raha2016.org

Organizing Committee

HONORARY CHAIR

Mata Amritanandamayi Devi
Chancellor, Amrita University

Sri Mata Amritanandamayi Devi (Amma) who is a world-renowned humanitarian leader. She was awarded with a Honorary Doctor of Humane Letters degree by the State University of New York (SUNY) at Buffalo, USA in 2010. Amma is the founder, inspiration and guiding light for all institutions under Amrita University. In our continued quest for excellence under Amma's unparalleled leadership, our thrust has been to develop world-class centers of learning and research, as well as to nurture and encourage value-based education amongst our students and faculty.

It was the unwavering resolve of humanitarian and spiritual sage Amma who inspired us to innovate, create, and research robotics technologies for humanitarian applications. She is a design thinker and philanthropist who guided us to approach societal challenges in a novel way and start AMMACHI Labs in 2009 with a focus on robotics, skill development and women empowerment.

GENERAL CHAIR

P. Venkat Rangan
Vice Chancellor, Amrita University

PROGRAM CO-CHAIRS

Raj Madhavan, HumRobTech, LLC
Rao R. Bhavani, Amrita University

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Ganesh Udupa, Amrita University

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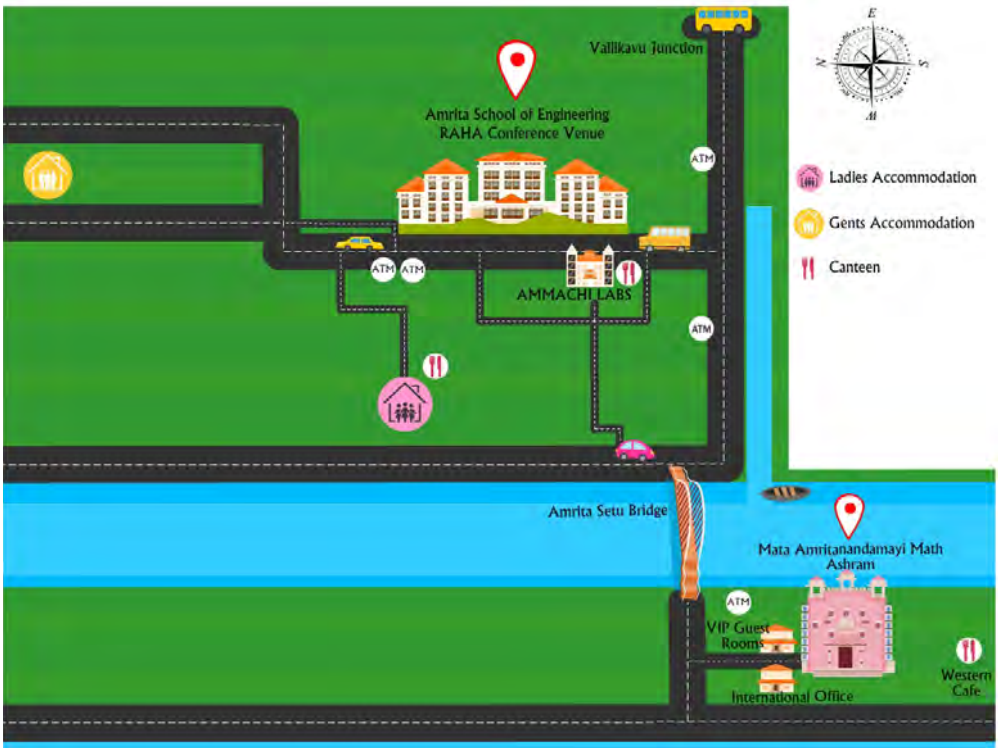
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