

International Centre for Theoretical Physics



APS physics SMR. 2815

IOP Institute of Physics





WORKSHOP ON ENTREPRENEURSHIP FOR SCIENTISTS AND ENGINEERS FROM DEVELOPING COUNTRIES

30 March - 5 April 2016

Organizers:

Dipali Bhatt-Chauhan Surya Raghu Joseph Niemela

WEBPAGE: http://indico.ictp.it/event/7597







Workshop on Entrepreneurship for Scientists and Engineers from Developing Countries

30 March - 5 April 2016

Trieste, Italy

PURPOSE AND NATURE

The Abdus Salam International Centre for Theoretical Physics (ICTP), with the co-sponsorship of the American Physical Society (APS) and the Institute of Physics (IOP), will organize a **Workshop on Entrepreneurship for Physicists and Engineers from Developing Countries**, to be held at ICTP, Trieste, Italy, from 30 March to 5 April 2016.

This one-week intensive Workshop is designed for physicists and engineers from developing countries who are interested in learning entrepreneurial skills to commercialize their scientific inventions. Such an educational programme is missing in many of the developing countries for scientists working in universities and scientific institutions. The participants will benefit from the international perspective provided in this Workshop from both experts and co-participants from developing countries.

GOALS AND TOPICS

The objectives of this Workshop are to introduce to the scientists the process of innovation, generation and protection of intellectual property, technology transfer and commercialization of inventions. The Workshop will consist of lectures by invited speakers, case studies, group discussions and role-playing sessions related to commercialization of a product.

Topics will include:

- Physicists and Engineers as inventors and entrepreneurs;
- Concept of intellectual property (IP) and its significance in developing countries;
- Taking science to the market Timelines and processes for taking an invention to product;
- Business model development;
- Small business financing and business plan fundamentals;
- · Marketing the ideas;
- Success stories;
- Business plan presentation by participants;
- Training of lecturers and scientists in development of an "Entrepreneurship Curriculum"

PARTICIPATION

The program is demanding with mandatory attendance in all sessions - which start early in the morning and go up to late evenings with additional work on group projects. Hence only willing participants are encouraged to apply. Candidates are not eligible if they participated in the previous entrepreneurship workshops held at ICTP or in the regional workshops conducted in other countries.

Scientists and students from all countries which are members of the UN, UNESCO or IAEA may apply for participation in the Workshop. As the activity will be conducted in English, participants should have an adequate working knowledge of this language. Although the main purpose of the Centre is to help research workers from developing countries, students and post-doctoral scientists from developed countries are also welcome to attend.

As a rule, travel and subsistence expenses of the participants should be borne by their home institutions. Every effort should be made by candidates to secure support for their fare (or at least half-fare). Limited funds are available for some participants (to be selected by the organizers) who are nationals of, and working in, developing countries. **There is no registration fee**.

How to apply for participation: until 7 January 2016, candidates can access the Online Application from the activity website: <u>http://indico.ictp.it/event/7597/</u>

Comprehensive instructions will guide you step-by-step on how to fill out and submit the application form. The application process includes a brief questionnaire to be filled in and uploaded.

WORKSHOP SECRETARIAT: smr.2815 c/o Ms. Nicoletta Ivanissevich, ICTP E-mail: smr.2815@ictp.it Fax: +39-040-22407383

Phone: +39-040-2240383



IAEA

CO-SPONSORS

American Physical Society, USA The Institute of Physics, UK

ORGANIZERS

Dipali BHATT-CHAUHAN, UK Joseph NIEMELA, Italy Surya RAGHU, USA

SPEAKERS

Bernard AMADEI, USA Dipali BHATT-CHAUHAN, UK Yumiko HAMANO, France Joseph NIEMELA, Italy Surya RAGHU, USA Rosula REYES, Philippines David SECHER, UK ... and others (TBD)

APPLICATION

7 January 2016

DEADLINE

Webpage:

http://indico.ictp.it/event/7597/





Founded in 1964 by the late Nobel Laureate Abdus Salam, ICTP seeks to accomplish its mandated by providing scientists from developing countries with the continuing education ad skills that they need to enjoy long and productive careers. ICTP has been a major force in stemming the scientific brain drain from the developing world.

ICTP alumni serve as professors at major universities, chairpersons of academic departments, directors of research centres and ministers of science and technology in nations throughout the developing world. Many of them have been recognized in their own contries and internationally for their contributions to science and science policy. The impact of ICTP extends well beyoend the Centre's facilities to virtually every corner of the Earth.

More information about the ICTP at:

http://www.ictp.it/

IOP Institute of Physics

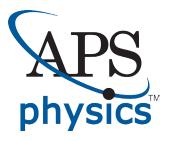
The Institute of Physics, London

The Institute of Physics (IOP) is a leading scientific society promoting physics and bringing physicists together for the benefit of all.

It has a worldwide membership of around 40,000 comprising physicists from all sectors, as well as those with an interest in physics. It works to advance physics research, application and education; and engages with policy makers and public to develop awarenessa dn understanding of physics. Its publishing company, IOP Publishing, is a world leader in professional scientific communications.

For further information please see:

http://www.iop.org



American Physical Society

The American Physical Society (APS) is a non-profit membership organization working to advance and diffuse the knowledge of physics through its ourstanding research journals, scientific meetings, and education, outreach, advocacy and international activities.

APS represents over 50,000 members, including physicists in academia, national laboratories and industry in the United States and throughout the world. Society offices are located in College Park, MD (Headquarters), Ridge, NY, and Washinghton, DC.

For further information please see:

http://www.aps.org



IEEE

A non-profit organization, IEEE is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. It is designed to serve professionals involved in all aspects of the electrical, electronic and computing fields and related areas of science and technology that underlie modern civilization.

The IEEE name was originally an acronym for the Institute of Electrical and Electronics Engineers, Inc. Today, the organization's scope of interest has expanded into so many related fields, that it is simply referred to by the letters I-E-E (pronounced Eye-triple-E). The association is chartered under this name and it is the full legal name. IEEE and its members inspire a global community through its highly cited publications, conferences, technology standards, and professional and educational activities.

For further information please see:

http://www.ieee.org



The Optical Society

The Optical Society's (OSA) mission is to promote the generation, application and archiving of knowledge in optics and photonics and to disseminate this knowledge worldwide. The purposes of the Society are scientific, technical and educational. OSA's commitment to excellence and long-term learning is the driving force behind all its initiatives.

Since 1916, OSA has been the world's leading champion for optics and photonics, uniting and educating scientists, engineers, educators, technical and professional development. Through publications, events and services, the Optical Society is helping to advance the science of light by addressing the ongoing need for shared knowledge and innovation.

OSA was founded more than 90 years ago as The Optical Society of America and has evolved into a global enterprise serving a worldwide constituency. In recognition of its global reach and focus, since 2008 the Society has been known as OSA - The Optical Society.

For further information please see:

http://www.osa.org

Director's Welcome

Welcome Message from the Director

Welcome to ICTP! We are the world's first and leading global scientific institution for fundamental research and development. For over 50 years of its existence, ICTP has played the crucial role of being a bridge between North and South and East and West, the latter during the Cold War. Through the adoption of the universal language of science, ICTP has demonstrted the importance of a global approach to address the problems of our time. Its primordial mission is to bring together scientists from all over the world in order to facilitate the dissemination of scientific know-how in the poorer parts of the world.

In line with the dramatic geo-economic changes taking place, we are now entring a new phase in which ICTP should take a leading role in promoting better working conditions for scientists in the developing world. We aspire to assist science policy makers and scientists of these countries in the creation of local cdentres of excellence and active scientific networks. In order to confront these new challenges, the ICTP collaborate with scientists in emerging countries, assisting in this way the poorest regions in Afrioca, Latin America and Asia whilst, simultaneously, strengthening and boradening the research activities of our Centre.

Over the course of its history, ICTP has benfited over 100,000 scientists although the real impact goes beyond any measurable quantity. Today, we are facing new exciting challenges since the mission of our Centre is as imporntant, if not more, than it was at the time of its inception: to foster top quality scientific research and knowledge in all corners of the world to achieve cultural richness, sustained development and the survival of humankind.

Fernando Quevedo Director, ICTP



Dipali Bhatt-Chauhan International Relations Manager the Institute of Physics (IOP) Manchester, United Kingdom



Dr. Dipali Bhatt-Chauhan is currently responsible for a wide range of IOP's international activities, with particular experience in enhancing educational opportunities in Africa. She manages IOP's school Programme, IOP for Africa, nine IOP Resource and Teacher Training Centers in sub-Saharan Africa, promoting hands-on practical physics in the classroom by providing low-cost equipment and training for teachers in Africa.

Alongside her educational work, Dipali designs and organises training programme for scientists and engineers from developing countries on 'Entrepreneurial Skills'. The Entrepreneurship Workshops are designed to introduce key concepts to scientists and engineers, from technology transfer to the commercialisation of research and the generation and protection of intellectual property. Dipali has successfully delivered 17 workshops in developing countries around the world in partnership with other

She also manages the Institute's relations with other physics-related learned societies internationally.

Dipali did her Ph.D. in Molecular Electronics from The University of Sheffield, UK, following which she gained professional experience working in both the semiconductor industry and academia in Scotland. She is a member of International Union of Pure and Applied Physics (IUPAP): Commission C13 Physics for Development and Member of European Physical Society (EPS) - Interdivisional Group of Physics for Development (IGPD).

Email: dipali.bhatt-chauhan@iop.org



Surya Raghu Advanced Fluidics LLC Columbia, Maryland United States

Dr. Surya Raghu has been a co-director and speaker in workshops on Entrepreneurship for Scientists and Engineers in Argentina, Ethiopia, Ghana, India, Indonesia, Italy, Jordan, Kenya, Lebanon, Mexico, Morocco, Oman, Pakistan, Philippines, South Africa and Tanzania, and as member of missions/speaker to Brazil, Oman, Morocco, Pakistan and Tanzania on Entrepreneurship, Tech Transfer and Research Commercialization topics.

He also developed an Entrepreneurship Course Module that has been implemented in several universities in developing countries for training university students in the basics of entrepreneurship.

He obtained his Ph.D. in mechanical engineering from Yale University and is the founder-president of Advanced Fluidics, LLC since 2001 and founding-partner of ET Cube International, Inc. since 2013. His earlier affiliations were with Yale University, Technical University of Berlin, SUNY Stony Brook, and Bowles Fluidics Corporation. He has also been a visiting scientist at NIST and AFOSR Laboratories and a guest lecturer at Kyushu Institute of Technology, Japan.

Dr. Raghu has inventions related to aerospace, automotive, consumer and biotechnology applications and has been awarded 13 US patents and has over 10 pending patents/invention disclosures as an inventor or co-inventor.

He has experience in the development of products from inventions related to physiological monitoring, DNA testing, wireless corrosion sensors, aerodynamic flow control and spray technology and has active research collaborations with many institutions in the US and Europe. Dr. Raghu is a recipient of the Alexander von Humboldt Fellowship from Germany and an Associate Fellow of the AIAA.

Linked-in:

<u>https://www.linkedin.com/profile/public-profile-settings?trk=prof-edit-edit-pub-</u> <u>lic_profile</u>

Email: sraghu@advancedfluidics.com

Joseph Niemela



 \ensuremath{P} rof. Niemela is a Senior Research Scientist and Head of Applied Physics at ICTP.

In addition to conducting research in areas of fluid turbulence and low temperature physics, he also heads ICTP's Office of External Activities.

Serving as Liaison to UNESCO's Science sector, he also co-directs its Teacher-training program in optics and photonics.

He is an elected Vice President of the International Commission for Optics and serves as Global Coordinator of the Secretariat of the International Year of Light and Light-based Technologies 2015.

He represents ICTP as an Observer on the SESAME Council and is co-chair of the SESAME Training Advisory Committee.

He is a Member of the Scientific Council of Centro Fermi, a recipient of the Galileo Galilei Silver medal, presented by the Italian Physical Society, and is a Fellow of the American Physical Society.

Email: <u>niemela@ictp.it</u>



Bernard Amadei



Dr. Amadei is Professor of Civil Engineering at the University of Colorado at Boulder. He received his Ph.D. in 1982 from the University of California at Berkeley.

Dr. Amadei holds the Mortenson Endowed Chair in Global Engineering and serves as a Faculty co-Director of the Mortenson Center in Engineering for Developing Communities.

He is also the Founding President of Engineers Without Borders - USA and the co-founder of the Engineers Without Borders-International network.

Among other distinctions, Dr. Amadei is the 2007 co-recipient of the Heinz Award for the Environment; the recipient of the 2008 ENR Award of Excellence; the recipient of the 2015 Washington and ASCE OPAL awards; an elected member of the U.S. National Academy of Engineering; and an elected Senior Ashoka Fellow. He holds five honorary doctoral degrees (UMass Lowell; Carroll College; Clarkson, Drexel, and Worcester Polytechnic Institute).

In 2013 and 2014, Dr. Amadei served as a Science Envoy to Pakistan and Nepal for the U.S. Department of State.

Email: <u>amadei@colorado.edu</u> Web: <u>http://www.colorado.edu/mcedc/bernard-amadei-phd-nae</u>

Recent books by B. Amadei:

- Engineering for Sustainable Human Development <<u>http://www.amazon.com/Engineering-Sustainable-Human-Development-Small</u> <u>Scale/dp/0784413533/ref=sr_1_1?ie=UTF8&qid=1421296295&sr=8-1&keywords=Ber-nard+Amadei></u>, ASCE Press (2014)

- A Systems Approach to Modeling Community Development Projects <<u>http://www.momentumpress.net/books/systems-approach-modeling-communi-</u> <u>ty-development-projects></u>, Momentum Press (2015)



Yumiko Hamano Intellectual Property Consultant Partner, ET Cube International

Dr. Yumiko Hamano, a national of Japan, has extensive experience in the field of intellectual property in particular, patents, Patent Cooperation Treaty (PCT) System, university intellectual property management, university intellectual property policies, technology transfer, technology commercialization, entrepreneurship and technology based business strategies.

For over 27 years, she worked, as a senior official, at World Intellectual Property Organization (WIPO), Geneva (Switzerland) based United Nations' specialized agency. Together with another partner, Dr. Raghu Surya, she established a non-profit company, ET Cube International providing training and consulting services on intellectual property policies, intellectual property management, technology transfer and technology based entrepreneurship in collaboration with various international organizations including government agencies. She is a frequent speaker and lecturer in international conferences and professional training courses.

LLM Intellectual Property Law: School of Law, University of Edinburgh, United Kingdom

IO-MBA specialized in Management in International Organizations: University of Geneva, Switzerland

Languages: Fluent: Japanese, English and French (UN proficiency certificate) Good command: Chinese (UN proficiency certificate)

Email: yhamano309@gmail.com

Rosula San Jose - Reyes Associate Professor and Chairperson Department of Electronics, Computer, and Communications Engineering Ateneo de Manila University Manila, Philippines



Dr. Rosula San Jose - Reyes is an accomplished educator, researcher, and entrepreneur.

As a teacher, she has been with the academe for 38 years. She handles courses on digital design, microelectronics, and entrepreneurship in the Electronics Engineering and Computer Engineering programs.

Rosula believes that doing research enlivens her teaching and advances her knowledge in the courses that she teaches. Thus as a researcher, she has numerous publications in her field of study that encompasses robotics and instrumentation, various wireless sensor applications and biomedical devices.

As an entrepreneur, she co-founded several start-up companies including Blue Chip Designs, Inc. where she is Chief Executive Officer, and SparkSoft Solutions, Inc. where she is Chief Operating Officer.

She shares her entrepreneurial experiences to students in her classes in Entrepreneurship for Scientists and Engineers and in Innovations and New Businesses. The most significant role that these two companies provide to engineering students and young engineers is their actual exposure as interns to idea generation and implementation.

Rosula is an ASEAN Engineer, a Professional Electronics Engineer, an ASEAN University Network Assessor, and a recipient of various professional and research awards. She firmly believes that innovations and entrepreneurship when properly incorporated in the academic setting will be a catalyst for change.

Email: <u>rsjreyes@ateneo.edu</u>

David Secher



Dr. David Secher is an independent consultant in the areas of research commercialisation, intellectual property and technology transfer - in the UK and internationally. Recent assignments include work in Japan, Saudi Arabia, Brazil, Chile, Lebanon, Jordan, Mexico and Europe.

He is based in the University of Cambridge and is a Life Fellow and Senior Bursar of Gonville and Caius College.

In 2002, together with Lita Nelsen of MIT, he founded Praxis (now PraxisUnico), the leading UK technology transfer training organisation. He served as chairman or as a director of that company until 2014 and is now Patron. For his contributions to "creating environments that favour enterprise, specialising in the practical aspects of commercialising the results of academic research", he received the Queen's Award for Enterprise Promotion in 2007.

Previous roles include Chief Executive of the N8 Research Partnership (a collaboration of the eight most research-intensive universities in the North of England); Director of Research Services, University of Cambridge; Director of Drug Development, Cancer Research Campaign (now Cancer Research UK); and Director of Monoclonal Therapeutics, Celltech Ltd. As a consultant, he has advised universities, governments and individuals on commercialisation of intellectual property, as well as acting as a non-executive director of high technology and investment companies. He is a non-executive director of Crossword Cybersecurity plc and an angel investor.

Secher graduated from the University of Cambridge (Churchill College) with first class honours in biochemistry. His PhD work at the Medical Research Council (MRC) Laboratory of Molecular Biology was with the late César Milstein (Nobel Prize-winner for discovery of monoclonal antibodies).

Together with Derek Burke, Secher made and patented the first monoclonal antibody to human interferon.

Email: dss15@cam.ac.uk

Stephen Taylor



Dr. Stephen Taylor has over twenty five years-experience as a Director and Senior Consultant, helping major firms and government agencies in Europe and North America to access the latest knowledge and expertise for analysis and planning for new business, market research, new product development, and technology commercialization.

His collaboration with AREA Science Park (Trieste) started at the beginning of 2009 and in September of the same year he was appointed as Director of the Technology Transfer Department to optimize strategic activities for technology transfer.

Since January 2010 he sits on the board of Innovation Factory S.r.l., the inhouse incubator of AREA Science Park, with specific responsibility for business competitiveness and internationalization and in May 2011 he was named CEO.

In 2015 he became Director of Marketing, Communications and Business Development of AREA Science Park.

Email: stephen.taylor@areasciencepark.it



Programme Directors: Dr. Dipali Bhatt-Chauhan and Dr. Surya Raghu

DAY 1: Wednesday, 30 March 2016

Speaker Time Subject 8:15 - 9:00 Registration 9:00 - 9:30 All to be seated ICTP - J. Niemela D. Bhatt-Chauhan Welcome Remarks S. Raghu 9:30 -10:15 Brief introduction of speakers and organizers D. Bhatt-Chauhan D. Bhatt-Chauhan / Workshop Expectations and intro to group projects S. Raghu "Speed-Networking" Exercise D. Secher / J. Niemela Need for Sustainable Solutions in Developing Countries 10:15 - 10:45 B. Amadei Coffee break 10:45 - 11:00 Importance of Knowledge Transfer for economic 11:00 - 11:30 D. Secher development Identify 10 selected problems related to developing 11:30 - 13:00 D. Secher /

Session Chairs: Morning and afternoon: Dipali Bh

Dipali Bhatt-Chauhan

11:30 - 13:00	countries and generate list of skills and resources needed to invent, innovate and implement solutions to the problems	D. Secner / D. Bhatt-Chauhan
		Group Activity
13:30 - 14:30	Lunch Break	
14:30 - 16:00	Tools for Opportunity Assessment and Feasibility Analysis	S. Raghu
		Group Activity
16:00 - 16:15	Coffee Break	
16:15 - 18:00	Gathering the talent pool in the class for developing solutions to the problems Technical skills Other skills related to business What are you willing to learn to get the job done? Example of a good team to execute a solution to a typical problem	D. Secher/R. Reyes with support from all speakers Participant-intensive session
18:00 - 18:15	Wrap-up	S. Raghu / D. Bhatt-Chauhan

Session Chairs:

Morning: David Secher

Afternoon: Dipali Bhatt-Chauhan

Time	Subject	Speaker
9:00 - 10:30	Down-selecting high-impact projects and Resource Mapping and teaming the talent pool for working on specific ideas - team formations Project planning and setting up timelines Group Project Part 1	D. Secher / S. Raghu / D. Bernard Group Activity
10:30 -11:30	Teaming and Coffee Break	
11:30 -12:30	Developing a winning Value Proposition	S. Taylor
12:30 - 14:00	Lunch Break (Group Photo before lunch)	
14:00 -15:00	Financial Estimations for Start-ups Basic Financial Terminology	R. Reyes
15:00-16:00	Tools for protecting Intellectual Property Copyrights, trademarks, patents, trade secrets, etc.	Y. Hamano
16:00 - 16:15	Coffee Break	
16:15 - 17:15	Project Planning and Systems Approach to Implementing Solutions	B. Amadei
17:15 - 18:15	Group Project Part 2 Technology Road mapping and opportunity assessment Market analysis Preliminary costs and margins IP strategy	All Speakers
18:15 - 18:30	Wrap-up for the Day 2	S. Raghu / D. Bhatt-Chauhan
19:30 - 21:00	RECEPTION (Adriatico Guest House, Cafeteria)	

Session Chairs:

Morning: Bernard Amadei

Afternoon: Dipali Bhatt-Chauhan

Time	Subject	Speaker
9:00 - 10:30	Legal Contracts and Documents for Start-ups	Y. Hamano
10:30 - 11:00	Coffee break	
11:00 - 12:00	Taking the inventions to market -Evaluating the Technology Readiness Level (TRL) of an invention for commercialization, processes involved and estimates of time required to develop a product from an invention.	S. Raghu
12:00 - 13:00	Pitching for cash	D. Secher
	Equity issues, share dilution	
	Valuation at various stages of development.	
	Funding needs at different stages	
13:00 - 14:00	Lunch Break	
14:00 - 15:00	Business Model Development	S. Raghu
15:00 - 16:30	Classroom Exercise on taking an idea to market	D. Secher / Y. Hamano
16:30 - 16:45	Coffee Break	
16:45 - 18:45	Group Project Part 3 Forecasting costs and cash requirement Stage of your product/service and time to market Valuations and Return on Investment Collaborations/ partnerships/ Strategic Relationships Competition Analysis Barriers to Entry	All speakers and participants
18:45 - 19:00	Wrap-up for the Day 3	S. Raghu / D. Bhatt-Chauhan

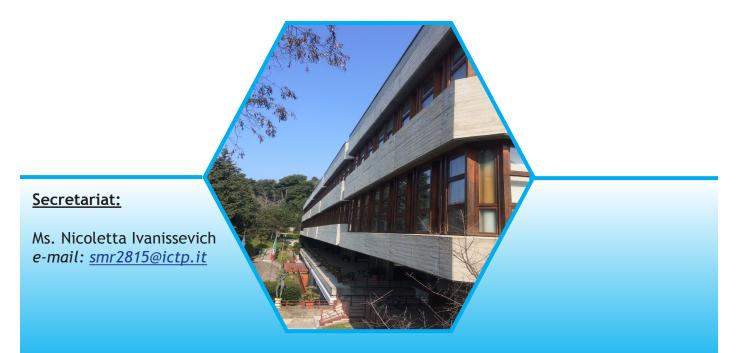
Session Chairs:

Morning: Bernard Amadei

Afternoon: Dipali Bhatt-Chauhan

Time	Subject	Speaker
9:00 - 10:30	Case studies and participant innovators	1. R. Reyes
	Entrepreneurship Curriculum Module	2. Participants
		3. D. Bhatt-Chauhan and S. Raghu
10:30 - 10:45	Coffee Break	
10:45 - 11:45	Soft-Skills & Presentation Skills	D. Secher
11:45 - 12:30	Writing Skills for Scientists and Engineers	J. Niemela
12:30 - 13:30	Lunch Break	
13:30 - 14:30	Start, stumble and succeed	S. Raghu
14:30 - 15:30	Project trouble shooting Q&A for speakers Group Project Part 4 - Complete the 10-minute pitch and practice for the presentation using guidelines provided.	All Speakers
15:30 - 15:45	Coffee Break	
15:45 - 18:30	Group Project (contd.) and Business Pitch	
18:30 - 18:45	Wrap-up for the Day 4 and announcements	D. Bhatt-Chauhan./
		S. Raghu

Time	Subject	
09:00 - 10:00	Upload business-pitch presentations Determine order of presentations	Panel: All Speakers, (TBD) B. Amadei
	Introduction to rules of presentations Introduction to the panel of judges	D. Secher
10:00 - 11.00	Session 1, Groups 1, 2, 3	Timekeeping Official: TBD
11:00 - 11:15	Coffee Break	
11:15 - 12:15	Session 2, Groups 4, 5, 6	Timekeeping Official:TBD
12:15 - 14:00	Lunch Break	
14:00 - 15:00	Feedback to the participants on their presentations	All panelists:
	Feedback from participants to the organizers (written and informal)	Moderator: D. Secher
		All participants
		Moderator: S. Raghu
15:00 - 15:15	Follow-up Support from IOP	D. Bhatt-Chauhan
15:30 - 16:00	Concluding Remarks Distribution of Certificates after handing out the written	D. Bhatt-Chauhan
	evaluations	J. Niemela
		S. Raghu



ICTP Home Page: <u>http://www.ictp.it</u>