6th Summer School on INtelligent signal processing for FrontIEr Research and Industry

Report of Contributions

https://indico.cern.ch/e/INFIERISS2020

Contribution ID: **1** Type: **not specified**

INTRODUCTORY PRESENTATION of UAM

Monday, 23 August 2021 10:00 (30 minutes)

Presenter: Prof. MANSO-SILVAN, Miguel (Vice Rector of the UAM Campus and Infrastuctures, AUTONOMA de MADRID)

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **2** Type: **not specified**

Presentation of the Insitute of Theoretical Physics, IFT, UAM-CSIC

Monday, 23 August 2021 10:30 (20 minutes)

Presenter: Dr LOPEZ MANZANARES, Esperanza (Member of the IFT Council, UAM, CSIC, Madrid, SP)

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **3** Type: **not specified**

Presentation of the Center for Micro-Analysis of Materials (CMAM), at UAM

Monday, 23 August 2021 12:00 (20 minutes)

Low energy Accelerator Facility

Presenter: Dr GARCIA, Gaston (Director of CMAM, UAM)

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **4** Type: **not specified**

ARTIFICIAL INTELLIGENCE what does it really mean?

This school series since its early stage and indeed as reflected in its tittle include the word “intelligent”. Because the explosion of the AI over these last years, the organizers thought it was a good time to speak about AI and its real meaning on the inaugural day of the School edition in Madrid. What Artificial Intelligence really implies from the HARDWARE and SOFTWARE points of view will be presented/debated here with some high skilled experts in the related fields.

Note that a full day will be dedicated to this topic on the second week, as well as a variety of Hands-on Labs with different applications of the AI tools and in different fields (advanced microelectronics, particle Physics, AstroPhysics and Medicine)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **5** Type: **not specified**

FUTURE in SPACE for ASTRONOMY, ASTROPHYSICS & COSMOLOGY: EXPLORE THE EXTREME UNIVERSE WITH FUTURE SPACE HIGH ENERGY ASTROPHYSICS MISSIONS eXTP and HERD¶

Tuesday, 24 August 2021 09:15 (1h 30m)

The Introduction of the School in Astrophysics will be given by the lecture of Prof Shuang-Nan ZHANG (IHEP and CAS, Beijing, CN). A Theoretical overview will be then given by Prof, Gustavo YEPES on September 1st.

Prof Zhang is the Director of Key Laboratory of Particle Astrophysics and Center for Particle Astrophysics, Institute of High Energy Physics, Chinese Academy of Sciences, Beijing, China; Chief Scientist of the Space Science Research Division and Director of X-ray Imaging Laboratory of National Astronomical Observatory of China;

He is Distinguished Professor of the University of Chinese Academy of Sciences.

Education and work experience: 1984, Bachelor Degree, Tsinghua University; 1989, PhD Degree, University of Southampton, U.K.; 1989-1992, Postdoctoral research associate, University of Pennsylvania, USA; 1992-1998, Senior scientist, Universities Space Research Association and NASA Marshall Space Flight Center, Huntsville, Alabama, USA; 1998-2014, Tenure-track assistant professor, Research associate professor, Research full professor, University of Alabama in Huntsville, USA; 2002-2009, Distinguished professor, Physics Department, Tsinghua University.

Awards: NASA Group Achievement Award; Zhao-Jiu-Zhang "Space Science Award"; National Distinguished Young Investigator of National Science Foundation of China; Copernicus Distinguished Scientist Award (2009), University of Ferrara, Italy; Yangtze Scholar Distinguished Professorship of the Ministry of Education of China at Tsinghua University, China.

Selected into the National "Thousand Talents"Program and appointed as "National Distinguished Expert"by the central government of China.

Space science projects: Principal Investigator of the Space Astronomy Program of China's Manned Space Flight Program, POLAR experiment onboard China's TG-2 Spacelab (launched in 2016), the HXMT astronomy satellite mission (launched in 2017).

Presenter: Prof. ZHANG , Shuang-Nan (IHEP and Chinese Academyc of Sciences, Beijing, CN)

Session Classification: MORNING SESSION 1, PLENARY LECTURES

Contribution ID: **6** Type: **not specified**

INTRODUCTORY VISION TALK on PARTICLE PHYSICS: HIGGS and BEYOND, WHAT WE WILL LEARN WITH THE FUTURE ACCELERATORS?

Tuesday, 24 August 2021 11:15 (1h 45m)

For the first time in this school series this introductory talk will be given by a Theoretician.

Christophe Grojean is Professor at the Physics Department of the Humbolt University in Berlin and leading Scientist at DESY in Hamburg.

Presenter: Prof. GROJEAN, Christophe (DESY (Hamburg) and Humboldt University (Berlin))

Session Classification: MORNING SESSION 1, PLENARY LECTURES

Contribution ID: **7** Type: **not specified**

THE NOVEL NEUROTECHNOLOGIES: IMPACT in SCIENCE, MEDICINE and SOCIETY

More information about the research by Prof Rafael Yuste and his research group at Columbia U. in the link here below

Presenters: Prof. DIEZ TEJEDOR, Exuperio (Autonoma Madrid, Department of Medecine, Hospital Universitario de la Paz); Prof. YUSTE, Rafael (COLUMBIA University, School of Biology, Neurosciences, N.Y. USA)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **8** Type: **not specified**

FUTURE TRENDS in DEEP SUB MICROELECTRONICS

Contribution ID: **9** Type: **not specified**

FUTURE TRENDS in DEEP SUB MICROELECTRONICS

Session Classification: MORNING SESSION 1, PLENARY LECTURES

Contribution ID: **10** Type: **not specified**

FACING RADIATION HARDNESS IN SPACE AND ACCELERATOR-BASED INSTRUMENTS

Session Classification: MORNING SESSION 1, PLENARY LECTURES

Contribution ID: **11** Type: **not specified**

ADVANCES on EMBEDDED PROCESSOR TECHNOLOGY

Session Classification: MORNING SESSION 1, PLENARY LECTURES

Contribution ID: **12** Type: **not specified**

GENERAL INTRODUCTION TO ACCELERATORS

Wednesday, 25 August 2021 18:00 (1 hour)

FOR the FIRST TIME in this SCHOOL SERIES Lectures and Lab sessions will be dedicated to Accelerators.

This keynote lecture will give an introduction to this multi-facets technological and Physics domain.

Accelerators are key instruments in fundamental research, i.e. in Particle Physics. They are unique probes for exploring the ultimate components of the Matter as well as for getting access to the very early stages of the Universe History. (see attached picture here below).
[Document attached here below: "History and Fate of the Universe", courtesy of Contemporary Physics Education Project, CPEP, at CPEPPhysics.org}
Accelerators are key-instruments as well in many applied fields (see next lecture)

Dr Frederick Bordry was the Head of the Technology Department before being appointed as CERN's Director for Accelerators and Technology (Jan. 2014-Dec.2020).

Dr. Bordry came to CERN in 1986, joining the group working on power converters for the Large Electron-Positron Collider (LEP) before moving in 1988 to the Operations Group as an engineer in charge of the Super Proton Synchrotron and LEP.
In 1994, the year that the LHC was approved, he joined the Power Converter Group as the Head of Power Converters Design and Construction for the LHC. He was appointed leader of the Power Converter Group in 2002, a position he held until December 2008.

In 2009, Dr. Bordry was promoted to Head of the CERN Technology Department - responsible for technologies specific to existing particle accelerators, facilities and future projects –where he has remained until 2013.
From 2014 he acted as the Director for Accelerators and Technology, being responsible for the operation and exploitation of the whole CERN accelerator complex, with particular emphasis on the LHC and for the development of new projects and technologies. He was re-appointed CERN' s Director for Accelerators and Technology until December 2020.

Presenter: Dr BORDRY, Frederick (CERN)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **13** Type: **not specified**

TRIGERRING on TRACKING SYSTEMS at HL-LHC and POSSIBLE OUTCOMES for FUTURE MACHINES

Session Classification: MORNING SESSION 1, PLENARY LECTURES

Contribution ID: **14** Type: **not specified**

FUTURE TRENDS in MICROELECTRONICS

Wednesday, 25 August 2021 09:00 (1h 45m)

Dr. Alessandro Marchioro is a worldwide known expert in the field of Advanced Microelectornics applied to the Particle Physics. He led the Microelectronics Division at CERN and has been involved in the R&D developments and design of the Microelectronics devices developed with international collaboration on some of the most challenging instruments built at CERN in particular for LEP, LHC and its upgrades. Organizer and contributor of a number of international events and conference series,

Presenter: Dr MARCHIORO , Alessandro (CERN)

Session Classification: MORNING SESSION 2, PLENARY LECTURES: THE INTELLIGENCE on INSTRUMENTS, THE TECHNOLOGICAL SIDE

Contribution ID: **15** Type: **not specified**

NEW PIXEL TECHNOLOGIES and EMBEDDED INTELLIGENCE

Wednesday, 25 August 2021 11:10 (1 hour)

Prof. Valerio Re is Professor of Electronics at the University of Bergamo and INFN, in Italy. He is Director of the Department of Engineering and Applied Sciences at University of Bergamo.
He and his team are conducting work on Microelectronics, low noise electronics, semi-conductor electronics, 3D Integration with applications to leading experiments in Particle Physics as well as Medical Physics.
He and his team are strongly involved in the RD53 international Collaboration to design and produce the next generation of readout chips for the ATLAS and CMS pixel detector upgrades at the HL-LHC and technological perspectives beyond.

Presenter: Prof. RE, Valerio (University of Bergamo and INFN, Bergamo, IT)

Session Classification: MORNING SESSION 2, PLENARY LECTURES: THE INTELLIGENCE on INSTRUMENTS, THE TECHNOLOGICAL SIDE

Contribution ID: **16** Type: **not specified**

ON-CHIP IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE MACHINE LEARNING

Wednesday, 25 August 2021 12:10 (1 hour)

Dr. Farah Fahim is a senior engineer specializing in mixed-signal ASIC design. She has developed low-noise, high-speed, reconfigurable pixel detectors which operate in harsh environments for a variety of applications including high-energy physics, photon science, and space science. Farah has a Ph.D. in Electrical and Computer Engineering from Northwestern University. She joined Fermilab in 2009, prior to which she was an engineer at Rutherford Appleton Laboratory. She holds five patents and several records of invention. She received the Fermilab Exceptional Performance Recognition Award in 2016 and 2019, as well as the IEEE NSS Best Presentation Award in 2016. She has co-chaired several conferences on quantum cryogenic electronics as well as front-end electronics for radiation detectors.
Farah Fahim is Deputy Head of Quantum Science at Fermilab since Oct. 2019 and Adjunct Professor at Northwestern (where she received her PhD) since University Jan. 2020.

Presenter: Dr FAHIM , Farah (Fermi National Lab , FNAL, and Northwestern University, USA)

Session Classification: MORNING SESSION 2, PLENARY LECTURES: THE INTELLIGENCE on INSTRUMENTS, THE TECHNOLOGICAL SIDE

Contribution ID: **17** Type: **not specified**

REALTIME TRIGGERING APPLIED TO NEW TRACKING SYSTEMS

Thursday, 26 August 2021 09:00 (50 minutes)

New tracking systems are developped for High Luminosity LHC with an embedded real time triggering system: achievements for HL-LHC as well as perspectives for the future machines will be presented in this lecture.

Dr. Ian Tomalin, is a high energy experimental Physicist. He received his PhD from Oxford working at the TASSO experiment at DESY, followed by a postdoctoral position at Imperial College and then a 6 years fellowshiip at CERN both on the ALEPH experiment at LEP. He contributed very early to the CMS experiment even while still involved in the ALEPH, experiment. He participated to the development in the early 2000's of the novel Silicon tracker and especially its new F.E. micro-electronics, He was appointed by Rutherford Lab in 1999 to carry on his contributions to CMS. He is currently the UK Workpackage leader for CMS HL-LHC Track Finder and the convenor for CMS upgrade tracking algorithms group. His work predominantly focuses on the track finding algorithm for the CMS HL-LHC silicon tracker upgrade in backend electronics.

Presenter: Dr TOMALIN, Ian (Science and Technology Facilities Council STFC (GB))

Session Classification: MORNING SESSION 3, PLENARY LECTURES

Contribution ID: **18** Type: **not specified**

REALTIME TRIGGERING APPLIED TO NOVEL CALORIMETRY TECHNOLOGIES

Thursday, 26 August 2021 09:50 (50 minutes)

New calorimeter systems based on new fine-grained technology are developped for High Luminosity LHC. The associated real time triggering system with a strengthened decision/filtering potential as well as perspectives for the future machines will be presented in this lecture.
Dr. Alexandre Zabi got his PhD in 2004 on the D0 experiment at the Tevatron at FNAL, (USA), at the LAL Laboratory in Orsay. He was then appointed as a CNRS Researcher by the Laboratoire Leprince Ringuet (LLR) at Ecole Polytechnique to join the CMS experiment. He is carrying his research activities on both the Physics analysis and the development of the first level Triggering of CMS. In particular he has a leading role on the development of the upgrade of the Trigger for the challenging forthcoming HL-LHC phase, including the new Endcap high granularity calorimeter.

Presenter: Dr ZABI, Alexandre (LLR-Ecole Polytechnique CNRS-IN2P3)

Session Classification: MORNING SESSION 3, PLENARY LECTURES

Contribution ID: **19** Type: **not specified**

NEW HIGH PERFORMANCE TIMING DETECTORS

Thursday, 26 August 2021 11:00 (50 minutes)

New timing detector technologies are developped for the High Luminosity LHC upgrades of both ATLAS and CMS experiments. They represent a new breakthrough in this detectors technology also very promising for the future experiments and also for other fields of application.

Prof. Tommaso Tabarelli de Fatis received his PhD at the Universita degli Studi di Milano working on the DELPHI experiment at the LEP electron-positron accelerator at CERN. He pursued on DELPHI as postdoc and then INFN researcher while starting also an involvement in the development and construction of the CMS experiment for the LHC at CERN in the early 2000's. Several involvements among which various responsibilities on the electromagnetic calorimeter at CMS. Since 2014, PI of the i-MCP R&D project on picosecond timing of high-energy photons (INFN grant CSN-5); co-coordinator of the Fast-Timing Working group in the CMS collaboration; also various contributions to the Physics analysis in CMS. Associate Professor Professor at Milano-Bicocca University from 2004 to 2015 and Full Professor since 2016.

Presenter: Prof. TABARELLI DE FATIS , Tommaso (Universita & INFN, Milano-Bicocca (IT))

Session Classification: MORNING SESSION 3, PLENARY LECTURES

Contribution ID: **20** Type: **not specified**

LHCb, AN INNOVATIVE EXPERIMENT AT CERN TO SEARCH FOR NEW PHYSICS THROUGH FLAVOUR

Thursday, 26 August 2021 11:50 (1h 10m)

Dr. Monica Pepe Altarelli will present the LHCb experiment, its objective and main results, with particular emphasis on its triggerless read-out and its impact on the overall data strategy chain.

After completing her studies at the University of Genova, Italy, with a thesis on neutrino counting from radiative Z decays, in 1983 Monica Pepe Altarelli joined the Rutherford Laboratory as Research Associate in the NA32 experiment on hadronic production of charmed particles at the CERN SPS accelerator. In 1987, she joined CERN as research fellow in the ALEPH experiment at the LEP accelerator, working mainly on data analysis; she was one of the principal authors of the first measurement of the number of light neutrino species, one of the main results of LEP, in a small group led by Jack Steinberger. She continued to work with the ALEPH experiment as research physicist at the "Laboratori Nazionali di Frascati"of the INFN, concentrating her research on precision tests of the Standard Model in the electroweak physics sector, as convener of the analysis group on electroweak physics. She became CERN staff in the year 2000 and joined the LHCb experiment at the LHC, first as leader of the CERN team and then, from 2014 to 2017, as deputy spokesperson of the LHCb collaboration. Her current main scientific interest is the search for New Physics beyond the Standard Model through the study of very rare decays of charm and beauty-flavoured hadrons and precision measurements of CP-violating observables with the LHCb detector.
(Credit: Monica Pepe-Altarelli)

Presenter: Dr PEPE-ALTARELLI, Monica (CERN)

Session Classification: MORNING SESSION 3, PLENARY LECTURES

Contribution ID: **21** Type: **not specified**

PHYSICS at the NEXT ELECTRON-POSITRON MACHINE(S)

Thursday, 26 August 2021 18:00 (45 minutes)

It is an extremely exciting and important period in the HEP Fundamental Research field; the decisions at the worlwide level, on the Future Machines to be built, should be well underway by the time of the School.
An important EU strategy workshop was held January 21-25, 2020 at Bad Honnhef (Germany). The outcomes were presented in June 2020 (see link here below). Besides decisions on the Chinese side are also underway. Therefore the detailed program of this keynote session will be available in due time following what will be the status by June 2021.
Currently in project: two Linear Colliders projects (ILC and CLIC) and two Circular Higgs Factory projects: CepC (in China) and FCC-ee in Europe (CERN).

This first session on the Future HEP Machines, will be devoted to the electron-positron projects still to be considered at the time of the school. It will be presented by worldwide key experts with Prof. Juan Fuster (IFIC-UV Valencia) as chair of this session.

Presenter: Prof. FUSTER VERDU, Juan (University of Valencia and IFIC)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **22** Type: **not specified**

NEW SEARCHES for DARK MATTER and DARK ENERGY WITH EUCLID (ESA SPACE EXPERIMENT)

Friday, 27 August 2021 08:50 (1h 20m)

Francisco Javier Castander is member of the Institute of Space Science, ICE at the Institut d'Estudis Espacials de Catalyuna (IEEC). ICE is supported both by IEEC and CSIC.

He is the Chair of the EUCLID Consortium Board and PI of the Spanish collaboration contributing to EUCLID.

Presenter: Prof. CASTANDER, Francisco Javier (Spanish National Research Council-CSIC, Space Science, ICE-IEEC)

Session Classification: MORNING SESSION 4, PLENARY LECTURES

Contribution ID: **23** Type: **not specified**

FROM THE VERY LARGE (VLT) TO THE EXTREMELY LARGE TELESCOPE (ELT)

Friday, 27 August 2021 10:10 (1h 20m)

Dr. Spyromilio is a senior astronomer at the European Southern Observatory. His research interests are focused on supernovae and their use in understanding the physics of explosions. He was a member of the high-z team that co-discovered the acceleration of the expansion of the universe (for which we were all awarded the Gruber prize, more recently the Breakthrough prize and for which Brian and Adam were awarded the Nobel prize for physics) and was a member of the ESSENCE collaboration that continued that work. He participated in work on beta Pic, comets, brown dwarfs, planetary nebulae etc.

He is currently the telescope scientist for ESO's ELT.

In 2015 and 2016 he headed the project scientists'department at ESO. From 2012 to 2014 he was the programme scientist for the EELT (European-Extremely Large Telescope, now the ELT). In 2013 he was seconded by ESO to SKA for one year. At the SKA organization headquarters at Jodrell Bank he worked on setting up the design effort (head of project). 2011 was a science leave year (as a distinguished visitor at the AAO in Australia and visiting in Tuorla and Stockholm). From mid-2006 until the end of 2010 he headed the EELT project office at ESO. In 2005 he was appointed Director of the merged La Silla Paranal Observatory. La Silla Paranal observatory operates the La Silla, Paranal and APEX sites. From 1997 to 2004 he headed the commissioning effort at the VLT and later was deputy director of Paranal.
(Credits to Jason Spyromilio's website)

Presenter: Dr SPYROMILIO, Jason (European Southern Observatory, ESO, Karl-Schwarzschild-Str 2 85748 Garching, Germany)

Session Classification: MORNING SESSION 4, PLENARY LECTURES

Contribution ID: **24** Type: **not specified**

NOVEL SEARCHES on GRAVITY , DARK MATTER and GRAVITATIONAL WAVES with ATOM INTERFEROMETRY: an OVERVIEW

A series of new experiments, so called “Atomic Experiments”, are in project or being built in the world aiming to explore Dark Matter and Gravity. Among these new projects:

The Zhaoshan long-baseline Atom Interferometer Gravitation Antenna (ZAIGA) in China.

the Matter-wave laser Interferometric Gravitation Antenna (MIGA) Experiment in France.

As well as experiments already running or in projects in Italy, UK and USA.

The goal is to gather these research interests within a worldwide collaborative effort, AEDGE (Atomic Experiments for Dark Matter and Gravity Exploration)

Session Classification: MORNING SESSION 4, PLENARY LECTURES

Contribution ID: **25** Type: **not specified**

PHYSICS POTENTIAL at HIGH ENERGY HADRON COLLIDERS

Friday, 27 August 2021 18:00 (45 minutes)

It is an extremely exciting and important period in the HEP Fundamental Research field; the decisions on the future machines to be built should be well underway by the time of the school.
An important EU strategy workshop was held January 21-25, 2020 at Bad Honhef (Germany). The outcomes were presented in June 2020 (see link here below). Besides decisions on the Chinese side are also underway. Therefore the detailed program of this keynote session will be available in due time following what will be the status by June 2021.

This second session on the Future HEP Machines will be mainly devoted to the status, schedule and main Physics and Technical challenges to be confronted for the high energy hadron colliders in projects both at CERN and in China. It will present the status of the FCC-hh (at CERN) and SppC (in China) projects, including the active worldwide R&D on High Field Magnets.

The new developments on a Muon Collider will be also included in this session.

THIS FIRST LECTURE in this Keynote session will give an overview of the Physics potential of high energy hadron colliders in projects. At the end, there will be a brief overview on the Physics reach with a high energy Muon collider.

Presenter: Prof. GROJEAN, Christophe (DESY (Hamburg) and Humboldt University (Berlin))

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **26** Type: **not specified**

The MUON COLLIDERS OPTION

The R&D and especially the new developments on this accelerator option will be presented to complete the presentation on Future machines in projects.

Note that for the first time in this School global series, a set of dedicated Labs on Accelerators, worldwide accelerator physicist experts, will be organized as Hands'on Lab including new acceleratioon technology as the one based on Plasma acceleration.

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **27** Type: **not specified**

IMAGING and NEUROLOGICAL DISEASES

Saturday, 28 August 2021 11:15 (1h 45m)

NeuroSpin, directed by Stanislas Dehaene, is a research centre for the innovation of brain imaging. Activities carried out includes biomedical imaging and diagnostic and therapeutic innovation.

At NeuroSpin Department, physicists, mathematicians and neuroscientists join forces to jointly develop tools and models that will enable a better understanding normal and pathological brain function, before or after treatment. Focused on neuroimaging, research concerns several topics :
- Technological and methodological development (acquisition and processing of data),
- Cognitive neuroscience,
- Preclinical and clinical neuroscience.

NeuroSpin includes 5 Research Entities : MRI and Spectroscopy Unit (UNIRS) ; Analysis and Information Processing Unit (UNATI), Cognitive Neuroimaging Unit (UNICOG), a Mixed Research Unity (U992), belonging to CEA, Paris-Sud University and Inserm ; Translational and Applicative Neuroimaging Research Unit (UNIACT), belonging to UMR 1129 ; and Neurofunctional Imaging Group (GIN) in Bordeaux who is integrated in the Institute of Neurodegenerative Diseases (UMR 5296, belonging to CNRS and Bordeaux University).

In 2010, Cyril Poupon took the position of Director of the laboratory of MRI and Spectroscopy of Neurospin, co-leading the two following transverse research programs: "Pushing the limits of MRI"targeting the development with his team of ultra-high field imaging methods and "Multiscale Human Brain Architecture"modeling the human brain at various scales, and developing, in particular, methods to map the human brain structural connectome and tissue microstructure. Since 2017, he has become the Deputy Director of Neurospin in charge of the MRI platform.

Presenter: Dr POUPON, Cyril (CEA, Frederic Joliot Institute for Life Sciences, NEUROSPIN)

Session Classification: MORNING SESSION 5, PLENARY LECTURES

Contribution ID: **28** Type: **not specified**

TECHNOLOGICAL SOLUTIONS for SPINAL CORD INJURIES

Saturday, 28 August 2021 10:00 (55 minutes)

IMDEA Nanociencia is a non-profit Foundation created on November 23rd 2006 by initiative of the regional Government of the Community of Madrid in November 2006 in order to shorten the distance between the research and society in the Madrid region and provide new capacity for research, technological development and innovation in the field of Nanoscience, Nanotechnology and Molecular Design. In 2007 the former Ministry of Education and Science of the Government of Spain decided to also fund part of the creation and equipment of an institute of Nanoscience in the Community of Madrid.

The Foundation manages the IMDEA Nanociencia Institute, a new interdisciplinary research Centre dedicated to the exploration of basic nanoscience and the development of applications of nanotechnology in connection with innovative industries. The IMDEA Nanociencia Institute is part of one of the strategic lines of the Campus of International Excellence (CEI) UAM+CSIC.

Teresa González got her Bachelor Degree (1996) and her PhD in Physics (2003) at the Universidad de Santiago de Compostela in Spain. Her PhD thesis obtained the Outstanding Doctorate Award. She is an expert in electrical transport properties of matter. She has worked in different fields including supercon- ductivity, during is PhD research, and molecular electronics, that she started during her postdoctoral stay at Universität Basel in Christian Schönenberger's group (2004-2008). She joined IMDEA-Nanociencia in 2008 as Ramón y Cajal researcher. She is in charge of the IMDEA Molecular Electronics Laboratory.

We study the properties of single-molecule junctions formed using scanning tunneling microscopes that are designed and developed in house. We focus on junctions with molecules chemically bound to two metallic electrodes.

Presenter: Dr GONZALEZ, Teresa (IMDEA-Nanoscience Institute, UAM-CSIC)

Session Classification: MORNING SESSION 5, PLENARY LECTURES

Contribution ID: **29** Type: **not specified**

NANOTECHNOLOGY APPLIED TO NEW VACCINES: the COVID-19 case and the perspectives of application to major diseases still without vaccine coverage

Saturday, 28 August 2021 18:00 (2 hours)

The primary focus of PD Dr Steve Pascolo's research activities since the beginning of his scientific career has been the use of molecular biology as a tool for improving health.
Ecole Normale Superieure: PhD in Biochemistry
After developing an immunologically "humanized"mouse model in 1998 at Institut Pasteur in Paris, he used the model to compare vaccine formats, i.e., proteins, peptides and nucleic acids (plasmid DNA and messenger RNA), during his post-doctoral fellowship in Tuebingen, Germany.
As messenger RNA is an innovative, safe and promising vaccine format, he led a team at Tuebingen University which further optimized its efficacy and implemented its clinical evaluation from 1999 to 2006.
This was made possible through collaboration between research and clinical teams at the University Hospital of Tuebingen and a dedicated company that he co-founded, CureVac.
Numerous pre-clinical and clinical studies (from Phase I to pivotal) evaluating different formulations of mRNA vaccines across several therapeutic (e.g., anti-cancer vaccines) and prophylactic (e.g., anti-pathogen vaccines) setups are ongoing.
They foresee that mRNA-based formulations will soon be approved as therapeutic drugs and that many new formulations of mRNA will be used to address a wide range of health issues (e.g., cancer, infectious diseases, allergies, genetic diseases, regenerative medicine). Aiming to combine immunotherapies and chemotherapies for the treatment of cancer, Dr Pascolo joined the University Hospital of Zurich in 2006.
His current activities include the implementation of clinical studies (chemotherapy combinations) and, through the URPP, the pre-clinical optimization and clinical implementation of mRNA-based anti-cancer therapies. This later project comprises primarily (i) active immunotherapies using immunostimulating mRNA-based formulations that can boost natural anti-cancer immunities and (ii) passive anti-cancer immunotherapies using mRNA-coding immune receptors that can endow any relevant lymphocyte with anti-cancer capabilities.

Dr Pascolo is co-founder and CSO of CureVac AG (2000-2006); Founder and CEO of Miescher Pharma GmbH (since 2008); Founder and CEO spRNA (since 2013);
PD Dr Senior Scientist at University Hospital of Zurich at the Oncology Department (2006-2013): at the Dermatology Department (since 2013) and Messenger RNA platform (since 2016).

Presenter: Dr PASCOLO, Steve (University of Zurich, URPP Translational Cancer Research)

Session Classification: KEYNOTE LECTURE: KEYNOTE 6 —> NANOTECHNOLOGY APPLIED TO NEW VACCINES

Contribution ID: **30** Type: **not specified**

MACHINE LEARNING and DEEP LEARNING: 2nd PART

Monday, 30 August 2021 12:00 (1 hour)

Juan C. San Miguel received the degree in Electrical Engineering (5-years program "Ingeniero de Telecomunicación" degree) in 2006, the Master's degree in Multimedia Signal processing in 2008 (two year program) and the PhD in Computer Science and Telecommunication in 2011, all at Universidad Autónoma of Madrid (UAM). Since 2017, he is associate professor at UAM. He has been undergraduate fellow (2004-2005), scholarship researcher (2005-2008), teaching/research assistant (2008-2012), assistant professor (2012-2015) and interim associate professor (2015-2017). He also was on a postdoctoral Marie Curie IAPP fellowship at Queen Mary University of London (UK) in 2013-2014. He was an academic visitor at the Institute of Computing Technology of the Chinese Academy of Sciences (Beijing, China) in December 2015 and June 2016.

His current research interests (http://bit.ly/2n7ztpR) are in the areas of visual sensor networks and performance evaluation, oriented to target detection, tracking and activity understanding. He has co-authored over 50 papers in JCR-indexed international journals and conferences; and two book chapters. He has recognized 1 six-year research period (sexenios, last 2008-2013) by the Spanish government agency "Comisión Nacional Evaluadora de la Actividad Investigadora (CNEAI)".

He has participated as a lecturer in the summer school for video surveillance at UAM (editions 2008 and 2010) and training courses for the Spanish law enforcement agency in 2013-2015. He has given invited talks at the X Conference on Science and Technology ESPE 2015 (Quito, Ecuador), the Chinese Academy of Sciences (CAS) in 2015 and 2016 (Beijing, China). He has also given tutorials in major international conferences: FUSION 2016 (Heidelberg, Germany) and IEEE ICIP 2017 (Beijing, China).

He also received two awards in 2013 for the Best PhD thesis in multimedia (runner up) (Electrical engineering Spanish association) and in 2014 for the best PhD thesis (School of Electrical engineering, UAM).

He also serves as a regular reviewer for several international journals (IEEE TIP, IEEE CSVT, IEEE TSP, Elsevier IMAVIS, ESWA, CVIU, Springer JRTIP, MVAP, MTAP,⋯) and international conferences (IEEE ICIP, IEEE WACV, IEEE AVSS, ACM Multimedia⋯).
(Credit: UAM VPULab)

Presenter: Prof. AVEDILLO, Juan Carlos San Miguel (Escuela Politecnica Superior, University Autonoma de Madrid)

Session Classification: MORNING SESSION 6, PLENARY LECTURES

Contribution ID: **31** Type: **not specified**

QUANTUM COMMUNICATION

Presenter: Prof. MARTIN, Vicente (Universidad Politecnica de Madrid, UPM, Madrid, ES)

Session Classification: MORNING SESSION 6, PLENARY LECTURES

Contribution ID: **32** Type: **not specified**

PHYSICS AT THE INTERFACE OF NANOTECH & BIOLOGY WILL TRANSFORM MEDICINE AND WHAT WE THINK ABOUT LIFE

Sonia Contera, is Professor of Biological Physics and
Associate Head of the Department of Physics (Equality, Diversity and Inclusion) at the University of Oxford, UK
https://www2.physics.ox.ac.uk/contacts/people/antoranzcontera.

She is the Author of "Nano comes to life "(Princeton University Press, 2019).
Reviewed by Nature, Nature Physics, New Scientist, BBC, Harvard Business Review⋯

Presenter: Prof. CONTERA, Sonia (OXFORD, Physics Department)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **33** Type: **not specified**

KEYNOTE on NEW ENERGIES: Part 1: THE NEXT GENERATION OF SOLAR ENERGY: THE PEROVSKYTE SOLAR CELLS

Tuesday, 31 August 2021 09:00 (1h 20m)

Nam-Gyu Park is distinguished professor at Sungkyunkwan University in South Korea. Considered as one of the precursors of solar cells based on hybrid perovskites, it has especially led to improve the efficiency of the first cells from 3.8% for the first (carried out by T. Miyasaka) to 6.5% in 2011 and 9% in 2012.

In 1995, NG Park obtained his PhD in "Inorganic Solid State Chemistry"at Seoul National University. His adventure in renewable energies really began in 1996 when he decided to pursue his post-doctoral studies in France at ICMCB-CNRS until 1997. He then moved to the USA and began his research on high-efficiency mesoscopic solar cells, including perovskite solar cells and dye-sensitized solar cells, while working at the National Renewable Energy Laboratory as a post-doctoral researcher. After 5 years abroad, NG Park returned to Korea and joined the Electronics and Telecommunications Research Institute as a principal scientist until 2005. He then became Director of Solar Cell Research Center at Korea Institute of Science and Technology before joining Sungkyunkwan University in 2009.

During these years, NG Park received many awards including the Scientific Award of the Month (MEST, Korea), the KyungHyang Electricity and Energy Award (KEPCO, Korea), the KIST Award of the Year (KIST, Korea), the Dupont Science and Technology Award (Dupont, Korea) and the SKKU fellowship. He has written more than 150 scientifc papers, filed more than 35 patent applications and written 3 book chapters. In 2011, his paper announcing a 6.5% efficiency for perovskite cells was mentioned 2360 times. But it was in 2012 that NG Park triggered the incredible rise of halogenated hybrid perovskites in the NREL diagram with its article, taken up nearly 5,000 times, announcing a 9% yield, only one year after the 6.5% record.
(Credit: Summary by PhotoVoltaic Institute of Ile de France, IPVF, Palaiseau, FR)

THE KEYNOTE SESSION ON NEW ENERGIES IS CHAIRED BY Jose Manuel PEREZ, Head of the Technology Department at CIEMAT

Presenter: Prof. PARK, Nam Gyu (Sungkyunkwan University, SKKU, South Korea)

Session Classification: MORNING SESSION 7, PLENARY LECTURES

Contribution ID: **34** Type: **not specified**

PLENARY SESSION ON BIG DATA MPC and HPC:

Tuesday, 31 August 2021 10:40 (2h 30m)

This plenary session will give an overall introduction to the BIG DATA taking the advances in Big data, High performance and Massive Computing developed within Frontier research framework.

THE CONVENER OF THIS SESSION IS Dr. DIEGO MARTINEZ SANTOS from IGFAE at the UNIVERSITY OF SANTIAGO de COMPOSTELA.

It includes an overall introductory lecture on the topic, followed by an interesting application of Artificial Intelligence to compress high rates and high speed data flow, a key issue on this domain.

Another interesting talk and developed framework on HPC from fundamental sciences will be given on September 3rd by Maria Girone, completing the lectures on the advanced data processing domain where again Physics driven advanced solutions are developed => Stay tuned

Session Classification: MORNING SESSION 7, PLENARY LECTURES

Contribution ID: **35** Type: **not specified**

IMPACT of ARTIFICIAL INTELLIGENCE in the RENEWABLE ENERGIES WORLD

Presenter: TBA

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **36** Type: **not specified**

INTRODUCTION TO QUANTUM SYSTEM

Wednesday, 1 September 2021 09:00 (1 hour)

Prof. German Sierra is a Prof. of Theroetical Physics at the Institute of Theoretical Physics at the Autonoma of Madrid and CSIC.
His current research interests are on:
- Quantum entanglement in many body systems
- Topological quantum matter
- Conformal Field Theory applied to Condensed Matter Physics
- Tensor networks: MPS, PEPS, ...
- Exactly solvable models
and applications to Quantum Computing.
He collaborates with Prof. Jose Ignacio Latorre and other Q.C. experts.
He teaches Quantum Computing at the Master students.

Presenter: Prof. SIERRA, German (IFT-UAM, CSIC)

Session Classification: MORNING SESSION 8, PLENARY LECTURES

Contribution ID: **37** Type: **not specified**

QUANTUM COMPUTING INTRODUCTION

Wednesday, 1 September 2021 10:10 (1 hour)

At the end of German's lecture we took a SCHOOL PHOTO.
.See here below

Presenter: Prof. SIERRA, German (IFT, UAM-CSIC)

Session Classification: MORNING SESSION 8, PLENARY LECTURES

Contribution ID: **38** Type: **not specified**

MASSIVE PARALLEL COMPUTING: INNOVATIVE DEVELOPMENTS on the HIGH TECH INDUSTRIAL SIDE

Presenter: INTEL REPRESENTATIVE

Session Classification: MORNING SESSION 8, PLENARY LECTURES

Contribution ID: **39** Type: **not specified**

STARS and their PROTO_PLANETARY DISKS FORMATION

Presenter: TBA

Session Classification: FUTURE in SPACE

Contribution ID: **40** Type: **not specified**

INTRODUCTION TO QUANTUM COMMUNICATION

Thursday, 2 September 2021 09:00 (2 hours)

Professor Vicente Martin, received his Ph.D. in physics from the Universidad Autonoma de Madrid, Spain, in 1995. He is a full professor at the Universidad Politécnica de Madrid (UPM). Founding member of the Specialized Group in Quantum Information and Computing of the Spanish Royal Society of Physics and of the Quantum Industry Specification Group, European Telecommunications Standards Institute. His main research interest is in quantum cryptography and its integration in conventional networks. He leads the Research Group on Quantum Information and Computation at UPM and is director of the UPM Center for Computational Simulations that he is currently promoting. Previously he was Director at the Madrid Supercomputing and Visualization Center. (Credit UPM and IEEE)

Presenter: Prof. MARTIN, Vicente (Universidad Politecnica de Madrid, UPM)

Session Classification: MORNING SESSION 9, PLENARY LECTURES

Contribution ID: **41** Type: **not specified**

INTRODUCTION TO QUANTUM COMPUTING

Session Classification: MORNING SESSION 9, PLENARY LECTURES

Contribution ID: **42** Type: **not specified**

QUANTUM COMPUTING: The INDUSTRIAL SIDE

Presenter: Dr PATTI, Robert (NHANCED Semiconductors, Co, USA)

Session Classification: MORNING SESSION 9, PLENARY LECTURES

Contribution ID: **43** Type: **not specified**

INTRODUCTION to QUANTUM SYSTEM

A panel will gather the experts from the Quantum System to the Hardware R&D and industrial world. They will present the state of the art and the main issues to be still confronted and eventual alternatives to this new computing field.

Presenter: Prof. SIERRA, German (IFT, UAM-CSIC)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **44** Type: **not specified**

HIGH PERFORMANCE COMPUTING: THE CERN, SKA0, GEANT and PRACE COLLABORATION

Friday, 3 September 2021 11:20 (40 minutes)

Dr. Maria GIRONE is the Chief Technology Officer (CTO) of the CERN openlab. She leads the development of High Performance Computing (HPC) technologies for particle physics experiments. CERN openlab was established in 2001 and supports academics at CERN in their collaborations with independent companies.
Dr. Girone has worked on the upgrade of the Large Hadron Collider (the High Luminosity Large Hadron Collider), which will require up to one hundred times more computing capacity than it did originally.This increase in capacity will come through access to commercial cloud computing platforms, data analytics, deep learning and new computing architectures.
(Credit WIKIPEDIA)

Presenter: Dr GIRONE, Maria (CERN)

Session Classification: MORNING SESSION 9, PLENARY LECTURES

Contribution ID: **45** Type: **not specified**

INTRODUCTION to PHOTONICS INTEGRATED CIRCUITS

Friday, 3 September 2021 09:00 (2 hours)

Pr. Dr. Ir, Wim Bogaerts is full professor in the Photonics Research Group of Ghent University and IMEC. He specializes in silicon photonics, design of complex photonics circuits, and programmable photonics. During and after his PhD, he laid the foundations for IMEC's silicon photonics platform, and the multi-project-wafer service ePIXfab which made this technology accessible for many researchers in Europe and beyond. To enable design of these circuits, Wim and his colleagues developed the parametric design software IPKISS. In 2014, Wim co-founded the spin-off company Luceda Photonics, to commercialize IPKISS, which is now used by hundreds of designers worldwide.
In 2016, Wim Bogaerts received a consolidator grant from the European Research Council, and returned full-time to Ghent University, with a research focus on programmable photonics. He also coordinates the European project MORPHIC, which enhances programmable silicon photonic circuits with advanced waveguide MEMS. In 2019 he was an invited professor at EPFL in Lausanne, Switzerland.
Wim teaches photonic circuit design techniques, at the level of master students as well as specialists in dedicated short courses. He is a very strong adept of Agile and Lean philosophies, with a passion to apply them to the peculiar ecosystem of academic research. He holds a black belt in Lean, and applies this in hands-on workshops for early-career researchers.
He is a Fellow of the IEEE, and senior member of the SPIE and the Optical Society.
(Credit: Photonics Research Group at Ghent University)

Presenter: Prof. BOGAERTS, Wim (Gent University and IMEC)

Session Classification: MORNING SESSION 9, PLENARY LECTURES

Contribution ID: **46** Type: **not specified**

WHY FUNDAMENTAL RESEARCH IS ESSENTIAL

This final lecture will be given by the Head of the TECHNOLOGY DEPARTMENT at CERN

Presenter: Dr JIMENEZ, Jose Miguel (HEAD of the CERN TECHNOLOGY DEPARTMENT)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **47** Type: **not specified**

General Introduction on Accelerators

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **48** Type: **not specified**

THE MANY USES and APPLICATICNS of ACCELERATORS: an OVERVIEW

Wednesday, 25 August 2021 19:00 (1 hour)

Besides the Fundamental research, accelerators have a wide range of applications from Medicine to Chemistry, Biology, to several Industrial applications etc…and without forgetting the outcomes from accelerator technologies to Magnets, cryogenics etc…

Presenter: Dr BORDRY, Frederick

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **49** Type: **not specified**

The ELECTRON-POSITRON MACHINES in PROJECTS

Thursday, 26 August 2021 18:45 (1 hour)

Two accelerator technologies are the object of an active R&D since a number of years for building the next electorn-positron colliders. Namely the circular electron positron colliders (CepC and FCC-ee) and the Linear Colliders (ILC and CLIC). This lecture will review the current status of these projects especially at the time of the School.

Dr. Angeles Faus-Golfe is a Research Engineer at the Accelerator Department at Laboratoire de Physique des 2 Infinis Irène Joliot-Curie (IJCLab) CNRS-IN2P3 since January 2017, presently deputy of the Beam Physics group of the IJClab Accelerator Department.
More on the file here below (Credit Dr. A. Faus-Golfe)

Presenter: Dr FAUS-GOLFE, Angeles (Laboratoire de l'Accelerateur Lineaire, CNRS, FR)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **50** Type: **not specified**

NOVEL HIGH GRADIENT ACCELERATORS: PLASMAS & BEYOND

Thursday, 26 August 2021 19:45 (45 minutes)

For electrons and also the protons case

Dr Ralf W. Assmann received his PhD in physics (1995) from the Ludwig Maximilian University, and Max-Planck-Institute for Physics, Munich
Since 2012, as Leading Scientist at DESY Ralph Assmann is working on the development of modern particle accelerators. One focus of his work is the study and development of new accelerator technologies such as plasma acceleration or acceleration with dielectric structures (accelerators on a chip). The objective is to develop particle accelerators suitable for routine use which, due to short particle impulses and their compact size, can achieve economic advantages as well as expand into new fields of application in science, medicine and society.

Ralph Assmann's group is preparing a dedicated accelerator facility at DESY (SINBAD - Short and INovative Bunches and Accelerators at DESY) in international cooperation. The group is also involved in the conception of new accelerator projects and the analysis and advancement of existing accelerator facilities at DESY and the partner institutes. Before Aßman came to DESY in 2012 he worked at the Max Planck Institute in Munich at Stanford in the US and at CERN in Switzerland.

He gained international experience in the development, contruction and operation of accelerators as Primary Investigator at the SLAC experiment E-157 for plasma acceleration a subproject of the Large Hadron Collider (LHC), and as machine coordinator for the operation of LHC at CERN.
(Credit, DESY: https://www.desy.de/about_desy/lead_scientists/ralph_w_assmann/index_eng.html)

Presenter: Dr ASSMAN, Ralph Wolfgang (Deutsches Elektronen-Synchrotron , DESY, (DE))

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **51** Type: **not specified**

FCC-hh and THE HIGH FIELD MAGNET R&D ROADMAP

Friday, 27 August 2021 18:45 (1 hour)

In order to reach 100 Tera-electron volts (TeV) or even beyond in proton-proton collisions, an active worldwide R&D on novel high field supraconductor magnets is underway. This will be presented in this lecture together with the presentation of: the FCC-hh (the SppC project in China will be presented in the keynote by Jie GAO (IHEP).
This lecture will also mention the importance of the R&D on the High Field magnets for other fields of application such as Medical application (see also NEUROSPIN lecture by Dr. Cyril POUPON on Saturday Aug. 28), the FUSION (see keynote by Dr. Jean JACQUINOT on Aug 31) and the new developments for the use of WAVE POWER (see keynote by Dr. Luis TABARES GARCIA, on Aug. 31).

Pierre Vedrine is the Head of the Department of Accelerators, Cryogenics and Magnets (DACM) at the CEA-IRFU. He led the work of his Department on the construction of the Toroidal Magnet for the ATLAS experiment at LHC-CERN, the construction of the 11.7 T Magnet (Highest field magnet so far in the world) for MRI at NEUROPSIN (see lecture by Cyril Poupon on Saturday 28). He is currently working on the R&D for new high filed magnets in particular for the FCC-hadron-hadron collider at 100 TeV.

Presenter: Dr VEDRINE, Pierre (Department of Accelerators, Cryogenics and Magnets, CEA-IRFU, FR)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **52** Type: **not specified**

MUON COLLIDERs

Friday, 27 August 2021 19:45 (45 minutes)

This lecture will conclude the different R&D projects for new HEP machines.

Muon colliders can offer collisions of point-like particles at very high energies, since muons can be accelerated in a ring without limitation from synchrotron radiation.
However, the need for high luminosity faces technical challenges which arise from the short muon lifetime at rest and the difficulty of producing large numbers of muons in bunches with small emittance. Addressing these challenges requires the development of innovative concepts and demanding
technologies.

Dr. Daniel Schulte is Principal Physicist at the Beam Department (BE) at CERN since 2015.

Presenter: Dr SCHULTE , Daniel (CERN)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **53** Type: **not specified**

THE IMMUNE SYSTEM: INTRODUCTION & BASIC CONCEPTS

Saturday, 28 August 2021 09:00 (1 hour)

Presenter: Dr DEL VAL, Margarita (Center of Molecular Biology Severo Ochoa, CBM, CSIC & UAM, Madrid)

Session Classification: MORNING SESSION 5, PLENARY LECTURES

Contribution ID: **54** Type: **not specified**

QUANTUM COMPUTING: the R&D ASPECTS

An active R&D is undergoing worlwide led by academics and research Labs as well as Industrial High Tech Firms: some examples will be presented and discussed here

Presenter: REPRESENTATIVES FROM R&D IN ACADEMIA & RESEARCH LABS & INDUSTRIAL FIRMS (TBA)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **55** Type: **not specified**

QUANTUM COMPUTING: PROS & CONS & PERSPECTIVES

Panel organized with all the contributors of the Keynote session

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **56** Type: **not specified**

INTRODUCTORY VISION TALK on COSMOLOGY and GRAVITY

Presenter: TBA

Session Classification: MORNING SESSION 1, PLENARY LECTURES

Contribution ID: **57** Type: **not specified**

CREATING A SUN in THE LAB: THE ITER WORLDWIDE ENTERPRISE

Formerly Director of the Joint European Torus (JET) and Director of the French CEA's magnetic fusion research department (DRFC, today IRFM), Jean Jacquinot has been closely associated with ITER for the past quarter century. He is presently a scientific advisor to the French High Commissioner for Atomic Energy and Senior Advisor to the ITER Director-General.

Presenter: Dr JACQUINOT, Jean (Commissariat at the Atomic Energy, FRANCE)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **58** Type: **not specified**

The NANCY GRACE ROMAN SPACE TELESCOPE

Wednesday, 1 September 2021 19:00 (1h 15m)

Dr Julie McEnery is the Chair Senior Scientist Project of the Nancy Grace Roman Space Telescope. Julie McEnery was the Project Scientist for the Fermi gamma-ray Space Telescope and an astrophysicist in the Astrophysics Science Division of NASA's Goddard Space Flight Center. She is an Adjunct Professor of Physics at the University of Maryland and at the George Washington University. She is co-Director of the Joint Space Science Institute between Goddard Space Flight Center and the University of Maryland. In 2011, she was elected a fellow of the American Physical Society.

As Fermi Project Scientist, a role she took on in 2009, Julie provides scientific guidance and information to mission staff, working with all elements of the mission – from instrument teams to mission operations. These efforts will maximize scientific return from the observatory. She is involved in all LAT science topics, as well as with team science activities such as low-level simulations, analysis development, and publication planning.

Julie previously served as the Analysis Coordinator on the Large Area Telescope (LAT), Fermi's primary science instrument. In this role, she coordinated the science activities within the LAT instrument team. She was named one of Fermi's deputy project scientists in 2005.

Julie has previously worked with ground-based gamma-ray telescopes, which detect Cherenkov radiation produced when gamma rays from deep space strike Earth's atmosphere. As a graduate student she used the Whipple Observatory to make very-high-energy observations of the active galaxy Markarian 421. She later worked with the Milagro collaboration primarily on gamma-ray burst (GRB) observations. Active galaxies and GRBs remain her main science interests, but she also explores interesting topics in other areas.

In April 1990 she was an observer at the United Kingdom's Schmidt Telescope at Siding Spring, Australia. From 1993 to 1997 she was a postgraduate scholar at University College Dublin, Ireland. From 1997 to 1999 she was a Postdoctoral Research Associate at the University of Utah, Salt Lake City. She was an Assistant Scientist at the University of Wisconsin, Madison, from 2000 to 2002. From 2002 to 2005 she was a Fermi research scientist at the University of Maryland, Baltimore County.

She is a member of several organizations and instrument teams, including the American Physical Society, the American Astronomical Society, the Milagro Collaboration, and the VERITAS Collaboration.

Julie received her BSc in Physics with Astrophysics from the University of Manchester in June 1993. In August 1997 she received her Ph.D. in Physics from University College Dublin
(Credit NASA Content Adminsitrator)

Presenter: Dr MC ENERY, Julie E. (NASA Goddard Space Flight Center, Science and Exploration Directorate)

Session Classification: FUTURE in SPACE

Contribution ID: **59** Type: **not specified**

EUROPE & SPACE

Session Classification: FUTURE in SPACE

Contribution ID: **60** Type: **not specified**

THEORETICAL INTRODUCTION: OVERVIEW OF COSMOLOGY

Wednesday, 1 September 2021 18:00 (1 hour)

Presenter: Prof. YEPES, Gustavo (IFT, UAM, Madrid, SP)

Session Classification: FUTURE in SPACE

Contribution ID: **61** Type: **not specified**

Introduction to Quantum Computing

Session Classification: MORNING SESSION 9, PLENARY LECTURES

Contribution ID: **63** Type: **not specified**

QUANTUM COMPUTERS: THE R&D CHALLENGES

Thursday, 2 September 2021 11:30 (1h 30m)

Pol FORN-DIAZ leads the experimental team at QUANTIC. He has a background on superconducting quantum devices for quantum information applications and quantum optics. He obtained his PhD from TU Delft in 2010, with a study of superconducting flux qubits and the limits of the interaction strength to a superconducting resonator. He was then a postdoctoral researcher in the Kimble group at the California Institute of Technology working on interfacing cold atoms and photonic waveguides. Later he was a postdoctoral fellow at the Institute for Quantum Computing in the University of Waterloo, working with Dr. C. M. Wilson on superconducting qubits interacting with propagating microwave fields. He is a partner at Entanglement Partners SL.

Since May 2019, Pol holds a researcher position at the High Energy Physics Institute (IFAE) at the Bellaterra campus near Barcelona. His group at IFAE is the Quantum Computing Technology.

QUANTIC is a joint venture between the Barcelona Supercomputing Center, the University of Barcelona and the High Energy Physics Institute (IFAE). The research directions are focused on performing quantum computation in a laboratory of superconducting quantum circuits and studying new applications for quantum processors.

The Barcelona Supercomputing Center –Centro Nacional de Supercomputación (BSC-CNS) is the leading supercomputing center in Spain. It hosts MareNostrum 4, one of the most powerful supercomputers in Europe with 165,888 processors providing 11.1 Petaflops/s of processing power to scientific research.
(credit QUANTIC @ BSC/UB/IFAE), http://quantic.bsc.es/)

Presenter: Dr FORN DIAZ, Pol (Institut de Fisica d'Altes Energies, IFAE, Barcelona)

Session Classification: MORNING SESSION 9, PLENARY LECTURES

Contribution ID: **64** Type: **not specified**

INTRODUCTION to ARTIFICIAL INTELLIGENCE and THE INTERNET of THINGS¶

Monday, 30 August 2021 09:00 (1h 30m)

Prof. Julia Díaz, graduated in Mathematics at Autonoma in Madrid (UAM). She performed her Doctorate in Engineering in Informatics at UAM . Programa de Dirección General (PDG) for the IESE-Business School University of Navarra (UNAV).
With over 30 years of experience she developed her career in the Institute of Engineering of the Knoweledge (Instituto de Ingeneria del conecimiento, IIC) as Director of the Health and Predictive Analises in Energy. She is currently Data Science Senior Manager at REPSOL Company while pursuing a part time Associate Professorship at UAM as well as at IESE.

Presenter: Prof. DIAZ, Julia (DATA Science Senior Manager at REPSOL and Ajunct Prof. at UAM)

Session Classification: MORNING SESSION 6, PLENARY LECTURES

Contribution ID: **65** Type: **not specified**

HIGH PERFORMANCE COMPUTING: THE CERN, SKA0, GEANT and PRACE COLLABORATION

Session Classification: MORNING SESSION 6, PLENARY LECTURES

Contribution ID: **66** Type: **not specified**

INTRODUCTION TO QUANTUM COMPUTING (cont'd): ADVANCED Q.C.

Wednesday, 1 September 2021 11:50 (1h 30m)

Jose Ignacio Latorre got his PhD in Particle Physics at University of Barcelona. He was a Fullbright Fellow at MIT (USA) and a postdoc at the Niels Bohr Institute in Copenhagen. He then became associate professor at the Univ. Barcelona and, later, full professor in Theoretical Physics.

Prof. José Ignacio Latorre is Chief Researcher of the Quantum Research Centre at the Technology Innovation Insttitute TII (Arab Emirates)

Prof. Latorre was appointed Director of the Centre for Quantum Technologies (CQT) in July 2020. He is also Professor and Provost's Chair in the National University of Singapore's (NUS) Department of Physics.
A leading figure in particle physics and quantum information, José Ignacio joined CQT, NUS from the University of Barcelona. He has been heading a research group at the Barcelona Supercomputing Center to build the first quantum processor in Spain. José Ignacio is also the founder of the Centro de Ciencias de Benasque Pedro Pascual, a Spanish scientific facility that is well known in the quantum information community for hosting workshops and conferences.

A Full Professor of Theoretical Physics at the University of Barcelona (on leave), he has been associated with several prestigious research institutions including the Niels Bohr Institute (Copehangen, Denmark), Centre for Quantum Technologies (Singapore), CERN (Geneva, Switzerland), the Dutch National Institute for Subatomic Physics - Nikhef (Amsterdam, the Netherlands) and Massachusetts Institute of Technology (Cambridge, Massachusetts, USA).

He was also a founder of the NNPDF collaboration that performs research in the field of high-energy physics and develops artificial intelligence technology for the treatment of all data coming from the high-energy physics laboratory LHC, at CERN.

Prof. Latorre has authored over 130 research papers in international journals on particle physics and quantum information and three books on quantum mechanics and the ethics of artificial intelligence. He is actively engaged in outreach - giving motivational talks to young people everywhere, organising large-scale scientific exhibitions and editing science documentaries. Prof. Latorre was also associated with multiple startups, including a spinoff from the University of Barcelona. He consults national research agencies as Advisor.

Presenter: Prof. LATORRE, Jose Ignacio (National University of Singapore, NUS, Sg, and University of Barcelona, SP)

Session Classification: MORNING SESSION 8, PLENARY LECTURES

Contribution ID: **67** Type: **not specified**

THE NEXT GENERATION OF SOLAR ENERGY: THE PEROVSKITE SOLAR CELLS

Nam-Guy Park is distinguished professor at Sungkyunkwan University in South Korea. Considered as one of the precursors of solar cells based on hybrid perovskites, it has especially led to improve the efficiency of the first cells from 3.8% for the first (carried out by T. Miyasaka) to 6.5% in 2011 and 9% in 2012.

In 1995, NG Park obtained his PhD in "Inorganic Solid State Chemistry"at Seoul National University. His adventure in renewable energies really began in 1996 when he decided to pursue his post-doctoral studies in France at ICMCB-CNRS until 1997. He then moved to the USA and began his research on high-efficiency mesoscopic solar cells, including perovskite solar cells and dye-sensitized solar cells, while working at the National Renewable Energy Laboratory as a post-doctoral researcher. After 5 years abroad, NG Park returned to Korea and joined the Electronics and Telecommunications Research Institute as a principal scientist until 2005. He then became Director of Solar Cell Research Center at Korea Institute of Science and Technology before joining Sungkyunkwan University in 2009.

During these years, NG Park received many awards including the Scientific Award of the Month (MEST, Korea), the KyungHyang Electricity and Energy Award (KEPCO, Korea), the KIST Award of the Year (KIST, Korea), the Dupont Science and Technology Award (Dupont, Korea) and the SKKU fellowship. He has written more than 150 scientifc papers, filed more than 35 patent applications and written 3 book chapters. In 2011, his paper announcing a 6.5% efficiency for perovskite cells was mentioned 2360 times. But it was in 2012 that NG Park triggered the incredible rise of halogenated hybrid perovskites in the NREL diagram with its article, taken up nearly 5,000 times, announcing a 9% yield, only one year after the 6.5% record.
(Credit: Summary by PhotoVoltaic Institute of Ile de France, IPVF, Palaiseau, FR)

Presenter: Prof. PARK, Nam Gyu (Sungkyunkwan University, SKKU, South Korea)

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **68** Type: **not specified**

RD53 Pixel Front-End Characterization

Monday, 23 August 2021 14:30 (6 minutes)

LAB PRESENTED BY Profs. Luigi GAIONI, and Valerio RE (University of Bergamo and INFN, IT)

Presenters: Prof. GAIONI, Luigi (University of Bergamo and INFN - National Institute for Nuclear Physics); Prof. RE, Valerio (University of Bergamo and INFN, IT)

Session Classification: LABS PRESENTATION

Contribution ID: **69** Type: **not specified**

FD-SOI Pixel Detector

Monday, 23 August 2021 14:36 (6 minutes)

LAB PRESENTED by Dr. Konstantin ANDROSOV (EPFL and ETH Zurich, CH)

Presenters: Dr ANDROSOV, Konstantin (EPFL and ETH Zurich (CH)); UNNO, Yoshinobu (High Energy Accelerator Research Organization (JP))

Session Classification: LABS PRESENTATION

Contribution ID: **70** Type: **not specified**

Thin Moderate Gain Ultrafast Timing detectors

Monday, 23 August 2021 14:42 (6 minutes)

LAB PRESENTED BY Dr. Giulio PELLEGRINI (Centro Nacional de Microelectrónica (IMB-CNM-CSIC), Barcelona, SP)

Presenters: Dr PELLEGRINI, Giulio (Centro Nacional de Microelectrónica (IMB-CNM-CSIC) (ES)); Dr MOFFAT, Neil (Consejo Superior de Investigaciones Cientificas (CSIC) (ES)); Dr FERNANDEZ MARTINEZ, Pablo (IFAE, UAB, Barcelona, SP); Prof. GRINSTEIN, Sebastian (IFAE - Barcelona (ES))

Session Classification: LABS PRESENTATION

Contribution ID: **71** Type: **not specified**

Introductory Computer Lab to Silicon Photonics Integrated Circuittss

Monday, 23 August 2021 14:48 (6 minutes)

LAB PRESENTED by Prof. Wim BOGAERTS (University of GENT, and IMEC, BE)

Presenter: Prof. BOGAERTS, Wim (GENT University and IMEC (BE))

Session Classification: LABS PRESENTATION

Contribution ID: **72** Type: **not specified**

Artificial Intelligence-on Chip: Physics Driven Hardware Codesign

Monday, 23 August 2021 14:54 (6 minutes)

LAB PRESENTED by Dr. Farah FAHIM (Deputy Division Head, Quantum Science, Fermi Quantum Institute and ASIC Research & Development Department Head, Particle Physics Division, Fermi National Accelerator Laboratory, USA)

Presenters: Dr FAHIM ET AL., Farah (Fermi National Lab , FNAL, USA); Dr DI GUGLIELMO, Giuseppe (Columbia, University, N.Y. USA); BLANCO VALENTIN , Manuel (Northewestern University, Evanston, Ill, USA); Dr TRAN, Nahn (Fermi National Lab, FNAL, Batavia, Ill. USA); Prof. MEMIK, Seda O. (School og Electrical Engineering, Northwestern University, Evanston, Ill, USA)

Session Classification: LABS PRESENTATION

Contribution ID: **73** Type: **not specified**

Quantum Communication Lab

Monday, 23 August 2021 15:00 (6 minutes)

LAB presented by Dr. Laura ORTIZ (University Polytechnic of Madrid, UPM, SP)

Presenters: Dr BRITO MENDEZ, Juan Pablo (Universidad Politecnica de Madrid, UPM, SP); Dr ORTIZ, Laura (Universidad Politectnica de Madrid, UPM, SP); Prof. MARTIN, Vicente (Universidad Politecnica de Madrid, UPM, SP)

Session Classification: LABS PRESENTATION

Contribution ID: **74** Type: **not specified**

Fast clock transmission systems for HL-LHC

Monday, 23 August 2021 15:06 (6 minutes)

LAB PRESENTED by Dr. Mehmet Ozgur SAHIN (CEA-IRFU, Univerity Paris Saclay, FR)

Presenter: Dr SAHIN, Mehmet Ozgur (Université Paris-Saclay , IRFU-CEA (FR))

Session Classification: LABS PRESENTATION

Contribution ID: **75** Type: **not specified**

Light Detection & Ranging (LiDAR)

Monday, 23 August 2021 15:12 (6 minutes)

LAB PRESENTED by Prof. Yoshinobu UNNO (KEK), JP.

Presenter: Dr UNNO, Yoshinobu (High Energy Accelerator Research Organization (JP))

Session Classification: LABS PRESENTATION

Contribution ID: **76** Type: **not specified**

Getting started with µcontrollers

Monday, 23 August 2021 15:18 (6 minutes)

LAB PRESENTED by Dr. Luigi CALLIGARIS (UNESP, Sao Paulo, BR)

Presenter: Dr CALLIGARIS, Luigi (UNESP - Universidade Estadual Paulista (BR))

Session Classification: LABS PRESENTATION

Contribution ID: **77** Type: **not specified**

EASy-Silicon Strip Sensor Testbench

Monday, 23 August 2021 15:24 (6 minutes)

LAB PRESENTED by Dr. Carlos LACASTA (IFIC, CSIC-Valencia, SP)

Presenters: Dr LACASTA LLACER, Carlos (IFIC/CSIC-UV); Dr GARCIA, Carmen (Univ. of Valencia and CSIC (ES))

Session Classification: LABS PRESENTATION

Contribution ID: **78** Type: **not specified**

Charged Particle Track Reconstruction in an FPGA

Monday, 23 August 2021 15:36 (6 minutes)

LAB PRESENTED by Dr. Ian TOMALIN (Rutherford Lab, RAL, Science and Technology Facilities Council STFC, GB)

Presenters: Dr FEDI, Giacomo (Imperial College (GB)); Dr TOMALIN, Ian (Science and Technology Facilities Council STFC (GB))

Session Classification: LABS PRESENTATION

Contribution ID: **79** Type: **not specified**

Triggerless system: HLT GPU based:

Monday, 23 August 2021 15:42 (6 minutes)

LAB PRESENTED by Dr. Diego MARTINEZ SANTOS (University of Santiago de Compostela, Galician Institute of High Energy Physics, IGFAE, SP)

Presenters: Dr MARTINEZ SANTOS, Diego (Universidade de Santiago de Compostela (ES)); Prof. VILASIS CARDONA , Xavier (La Salle, Ramon Llull University (ES))

Session Classification: LABS PRESENTATION

Contribution ID: **80** Type: **not specified**

IA tools & real-time HEP Trigger

Monday, 23 August 2021 15:48 (6 minutes)

LAB PRESENTATION BY Dr. Nhan TRAN (FERMI, National Laboratory, USA)

Presenters: Dr HAWKS, Benjamin (Fermi National Accelerator Laboratory, FANL, Batavia, Ill, USA); Dr NGADIUBA, Jennifer (Fermi National Lab, FNAL, Batavia, Ill, USA, Wilson Fellow.); Dr MITRIEVSKI, Jovan (Fermi National Lab, FNAL, Batavia, Ill, USA); Dr TRAN, NHAN (Fermi National Accelerator Lab. (US)); Dr JINDARIANI, Sergo (Fermi National Accelerator Lab. , FNAL, Batavia, Ill, USA, Head of the LPC Center.)

Session Classification: LABS PRESENTATION

Contribution ID: **81** Type: **not specified**

High Granularity Calorimeter Signal Processing, with M.L. based Reconstruction in the CMS HGCAL

Monday, 23 August 2021 15:54 (6 minutes)

LAB PRESENTED by Dr. Shamik GHOSH (LLR, Ecole Polytechnique and Centre National de la Recherche Scientifique, Palaiseau, FR)

Presenters: Dr ZABI, Alexandre (LLR-Ecole Polytechnique CNRS-IN2p3); Dr GHOSH, Shamik (LLR, Centre National de la Recherche Scientifique (FR))

Session Classification: LABS PRESENTATION

Contribution ID: **82** Type: **not specified**

Dark Energy Spectroscopic Instruments, DESI: Quasar Identification

Monday, 23 August 2021 16:00 (6 minutes)

LAB PRESENTED by Dr. Ignasi PEREZ RAFOLS (LPNHE, University Pierre et Marie Curie, CNRS/IN2P3, Paris, FR)

Presenter: Dr PEREZ RAFOLS, Ignasi (LPNHE, University Paris Pierre & Marie Curie, CNRS?IN2P3, FR)

Session Classification: LABS PRESENTATION

Contribution ID: **83** Type: **not specified**

Characterization of a CCD (Charge-Coupled Device) Camera

Monday, 23 August 2021 16:30 (6 minutes)

LAB PRESENTED by Dr. Auguste LE SUU (Deputy Director Institut Pytheas at Observatoire de Haute Provence-CNRS/INSU, FR)

Presenters: Dr LE VAN SUU, Auguste (Deputy Director Institut Pytheas at Observatoire de Haute Provence-CNRS/INSU, FR); Dr CUBY, Jean Gabriel (Astrophysics Lab of Marseille, LAM , CNRS/INSU and Marseille-Aix University)

Session Classification: LABS PRESENTATION

Contribution ID: **84** Type: **not specified**

Remote Astronomical observations with a 50cm Telescope at Observatoire of Haute Provence (IRiS), After Lab hours (night)

Monday, 23 August 2021 16:36 (6 minutes)

LAB PRESENTED by Dr. Auguste LE SUU (Deputy Director Institut Pytheas at Observatoire de Haute Provence-CNRS/INSU, FR)

to be held at the Astronomical Observatory at UAM.
The astronomical observatory of the Universidad Autónoma de Madrid is on the seventh floor of the módulo 15, Facultad de Ciencias. It consits in a computer room, used by members of the Astrophysics group and last-year undergraduate students for numerical simulation and observational data reduction, and a 5-meter dome that hosts the Telescopio Jerónimo Muñoz (TJM), a 20-inch (51 cm) reflector with German equatorial mount.

The second part of the slides are introducing this Lab

Presenters: Dr VAN LE SUU, Auguste (Deputy Director Institut Pytheas at Observatoire de Haute Provence-CNRS/INSU, FR); CUBY, Jean Gabriel (Astrophysics Lab of Marseille, LAM , CNRS/INSU and Marseille-Aix University)

Session Classification: LABS PRESENTATION

Contribution ID: **85** Type: **not specified**

Clinical Positron Emission Tomography/Magnetic Resonance Imaging: Acquisition and Quantification

Monday, 23 August 2021 16:42 (6 minutes)

LAB PRESENTED by Prof. Angel TORRADO CARVAJAL (Biomedical Engineering, University Rey Juan Carlos, Madrid, SP)

Lab to be held at the University Rey Juan Carlos and HM Hospitales in MADRID.

Presenters: Prof. TORRADO CARVAJAL, Angel (Biomedical Engineering, University Rey Juan Carlos, Madrid, SP.); Prof. MALPICA, Norberto (University Rey Juan Carlos and HM Hospitales, Madrid, SP)

Session Classification: LABS PRESENTATION

Contribution ID: **86** Type: **not specified**

In Silico Deep Brain Stimulation (DBS)

Monday, 23 August 2021 16:48 (6 minutes)

LAB PRESENTED by Dr. Daniel ORTEGA PONCE (IMDEA, NANOSCIENCE INSTITUTE, Madrid, SP)

Lab to be held at the IMDEA Nanoscience Center at UAM

Presenter: Dr ORTEGA PONCE, Daniel (IMDEA, NANOSCIENCE INSTITUTE, Madrid, SP.)

Session Classification: LABS PRESENTATION

Contribution ID: **87** Type: **not specified**

Irradiation of a Bio Material using a Proton Beam and characterization of the damage produced for proton therapy pre-clinical studies

Monday, 23 August 2021 16:54 (6 minutes)

LAB PRESENTED by Dr. Gaston GARCIA (Head of the Centre for Micro Analysis of Materials (CMAM), at UAM, Madrid, SP).

The Lab is set-up at the Centre for Micro Analysis of Materials (CMAM) .
This is a research center belonging to the Universidad Autónoma de Madrid (UAM) whose main experimental tool is an electrostatic ion accelerator with a maximum terminal voltage of 5 MV, devoted to the analysis and modification of materials.
https://www.cmam.uam.es/

Presenters: Dr GARCIA , Gaston (Head of Center of Micro-analysis of Materials, CMAM, UAM , Madrid, SP); Prof. YNSA, Maria Dolores (Applied Physics Dept, Faculty of Science, UAM & CMAM, Madrid, SP); Dr CRESPILLO, Miguel (Center for Microanalysis of Materials (CMAM), UAM, Madrid, SP); Prof. MANSO, Miguel (Applied Physics Dept, Faculty of Science, UAM & CMAM, Madrid, SP); Dr VINALS, Silvia (Center for Microanalysis of Materials (CMAM), UAM, Madrid, SP)

Session Classification: LABS PRESENTATION

Contribution ID: **88** Type: **not specified**

Digital Positron Emission Tomography

Monday, 23 August 2021 17:00 (6 minutes)

LAB PRESENTED by Prof. Nicola d'ASCENZO (HUST, CN and NEUROMED, IT)

Presenter: Prof. D'ASCENZO, Nicola (HUST University, CN and NEUROMED, IT)

Session Classification: LABS PRESENTATION

Contribution ID: **89** Type: **not specified**

Design of Electronics for Portable Reflectance Pulse Oximetry and Electrocardiography systems

Monday, 23 August 2021 17:06 (6 minutes)

LAB PRESENTED by Prof. Jose Luis PAU (Vice Dean of Research, Applied Physics, School of Sciences, UAM, Madrid, SP)

Presenters: Dr REDONDO, Andres (Applied Physics, School of Sciences, UAM, Madrid); Prof. GARCIA, Basilio Javier (Applied Physics Dept. School of Sciences, UAM, Madrid); Prof. PAU, Jose Luis (Applied Physics, School of Sciences, UAM, Madrid, SP)

Session Classification: LABS PRESENTATION

Contribution ID: **90** Type: **not specified**

Designing a super-conducting magnet

Monday, 23 August 2021 17:12 (6 minutes)

LAB PRESENTED by Dr. Concepcion OLIVER (CIEMAT, Madrid, SP)

LAB Set-up at Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas , CIEMAT, in MADRID:
https://www.ciemat.es

Presenters: OLIVER, Concepcion (CIEMAT); Dr GARCIA-TABARES, Luis (CIEMAT)

Session Classification: LABS PRESENTATION

Contribution ID: **91** Type: **not specified**

Applied Superconductivity

Monday, 23 August 2021 17:18 (6 minutes)

LAB PRESENTED by Dr. Concepcion OLIVER (CIEMAT, Madrid, SP)

LAB Set-up at Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas , CIEMAT, in MADRID:
https://www.ciemat.es

Presenters: Dr OLIVER, Concepcion (CIEMAT); Dr GARCIA TABARES, Luis (CIEMAT)

Session Classification: LABS PRESENTATION

Contribution ID: **92** Type: **not specified**

Beam Dynamics for CMAM accelerator

Monday, 23 August 2021 17:24 (6 minutes)

LAB PRESENTED by Dr. Concepcion OLIVER (CIEMAT, Madrid, SP)

The Lab is set-up at the Centre for Micro Analysis of Materials (CMAM) .
This is a research center belonging to the Universidad Autónoma de Madrid (UAM) whose main experimental tool is an electrostatic ion accelerator with a maximum terminal voltage of 5 MV, devoted to the analysis and modification of materials.
https://www.cmam.uam.es/

Presenters: Dr ARTECHE GONZALEZ, Alberto (University of London (GB)); Dr OLIVER, Concepcion (CIEMAT); Dr GARCIA, Gaston (Head of the Center of Micro-analysis of Materials, CMAM, UAM , Madrid, SP); Dr NEVAY, Laurence (Royal Hollway, University of London, UK); Dr SHIELDS, William (Royal Holloway, University of London, UK)

Session Classification: LABS PRESENTATION

Contribution ID: **93** Type: **not specified**

Can we feel Dark Matter?

Monday, 23 August 2021 17:36 (6 minutes)

LAB PRESENTED by Dr. Alberto CASAS (Institute of Theoretical Physics, IFT, UAM and CSIC, Madrid, SP)

Theoretical Masterclass, held at Institute of Theoretical Physics, IFT, UAM.

Presenters: CASAS, Alberto (IFT, UAM-CSIC); Dr CERDENO, David (UAM, Madrid, SP)

Session Classification: LABS PRESENTATION

Contribution ID: **94** Type: **not specified**

Higgs Physics in the Standard Model and Beyond

Monday, 23 August 2021 17:42 (6 minutes)

LAB PRESENTED by Dr. Alberto CASAS (Institute of Theoretical Physics, IFT, UAM and CSIC, Madrid, SP)

Theoretical Masterclass, held at the Institute of Theoretical Physics, IFT, UAM and CSIC

Presenters: CASAS, Alberto (IFT, UAM-CSIC); Dr BAGNASCHI, Emanuele Angelo (Paul Scherrer Institute (CH)); Dr HEINEMEYER, Sven (IFT, UAM-CSIC (Madrid, ES))

Session Classification: LABS PRESENTATION

Contribution ID: **95** Type: **not specified**

Massive Parallel Computing: Fundamentals of parallel programming using INTEL Architecture and Software tools

Monday, 23 August 2021 17:48 (6 minutes)

DESPITE THE HARD EFFORTS for several weeks, of Dr Rogerio Iope both to attend in-person or to make his Lab session a reliable online session, both him and us had to finally decide not to have this Lab session in this School edition. Rogerio are sorry and sad about it and we look to the next school edition to have his Lab in a new revisited way available for the next edition.

Presenter: Dr IOPE, Rogerio (UNESP - Universidade Estadual Paulista (BR))

Session Classification: LABS PRESENTATION

Contribution ID: **96** Type: **not specified**

Quantum Computing Lab: Enjoying the IBM Quantum Experience

Monday, 23 August 2021 17:54 (6 minutes)

LAB PRESENTED by Prof. German SIERRA (Institute of Theoretical Physics, IFT, UAM and CSIC, Madrid, SP)

Computer based Lab, held at the Institute of Theoretical Physics, IFT, UAM and CSIC.

Presenters: Dr LOPEZ MANZANARES, Esperanza (IFT, UAM, CSIC, Madrid, SP); Prof. SIERRA, German (IFT, UAM-CSIC)

Session Classification: LABS PRESENTATION

Contribution ID: **97** Type: **not specified**

The Circular Collider Project in China: From the Higgs Factory with CepC to the Energy Frontier with SppC

Professor Jie Gao is an accelerator Physicist at the Institute of High Energy Physics (IHEP).
He obtained his Bachelor degree in 1983 and his Master degree in 1986, both at the Tsinghua University i Beijing.
In 1986-1989 at the Institute of High Energy Physics, Chinese Academyc of Sciences (CAS) he worked on Ph. D degree (Supervisor Academician, Prof. J.L. Xie).
In April 1992, he obtained the Ph. D degree from the University of Paris XI, France (supervisor Dr. J. Le Duff, Committee chairman: Prof. M. Davier)
In June 1996 he obtained the diploma of Habilitation to Direct Research from University of Paris XI, France (Committee chairman Prof. M. Davier).
Jie Gao worked on his PhD research from 1989-1992 as a Foreign visitor at the CNRS/IN2P3 Laboratory of Linear Accelerator (LAL) at Orsay, France.
He obtained in 1993 a permanent CNRS position as an Accelerator Physicist at the Laboratory LAL at Orsay, France, where he performed his research activities until 2004.
In 2005 he joined the Institute of High Energy Physics, CAS, China, as a Professor and ILC-IHEP group leader.
In 2010, he became Asia Linear Collider Steering Committee Chairman and ICFA Linear Collider Steering Committee (Board) member till 2021 and 2020, respectively.
He is currently leading the accelerator part of the CEPC Project in China together with CEPC accelerator convener team.

IHEP: is the biggest and comprehensive fundamental research center in China. The major research fields of IHEP are particle physics, accelerator physics and technologies, radiation technologies and application, including the following leading research areas: - Particle physics experiments: BES, neutrino experiments, experiments at LHC and B-factories⋯- Theoretical Physics: particle physics, medium and high energy nuclear physics, cosmology, field theory⋯- Particle astrophysics: cosmic ray, astrophysics experiments⋯- Accelerator physics and technology: high luminosity e+e–collider, high power proton accelerator, accelerator applications⋯- Synchrotron radiation: technology and application; - Nuclear analytical technique and application; - Free electron laser; - Nuclear detector and fast electronics; Computing and network application; - Radiation protection. IHEP has extensive cooperation with all high energy physics laboratories and participates in many important particle physics experiments in the world.

Presenter: Prof. GAO, Jie (Institute of High Energy Physics, IHEP, and CAS, China)

Session Classification: FUTURE in SPACE

Contribution ID: **98** Type: **not specified**

PHYSICS AT THE INTERFACE OF NANOTECH & BIOLOGY WILL TRANSFORM MEDICINE AND WHAT WE THINK ABOUT LIFE

Monday, 30 August 2021 18:00 (2 hours)

CONVENER of THE KEYNOTE SESSION: Prof. Nicola d'ASCENZO (HUST, CN and NEUROMED, IT)

SPEAKER, SONIA CONTERA, is Professor of Biological Physics and
Associate Head of the Department of Physics (Equality, Diversity and Inclusion) at the University of Oxford, UK.

She is the Author of "Nano comes to life "(Princeton University Press, 2019).
Reviewed by Nature, Nature Physics, New Scientist, BBC, Harvard Business Review⋯

Presenter: Prof. CONTERA, Sonia (OXFORD, Physics Department, UK)

Contribution ID: **99** Type: **not specified**

CREATING A SUN in THE LAB: THE ITER WORLDWIDE ENTERPRISE

THIS IS THE SECOND PART of the KEYNOTE SESSION DEDICATED TO NEW ENERGIES started with the lecture by Prof Nam Gyu PARK this morning.

Formerly Director of the Joint European Torus (JET) and Director of the French CEA's magnetic fusion research department (DRFC, today IRFM), Jean Jacquinot has been closely associated with ITER for the past quarter century. He is presently a scientific advisor to the French High Commissioner for Atomic Energy and Senior Advisor to the ITER Director-General.

Presenter: Dr JACQUINOT, JEAN (Commissiarat at the Atomic Energy, CEA, FRANCE)

Contribution ID: **100** Type: **not specified**

QUANTUM TECHNOLOGIES FOR FUNDAMENTAL PHYSICS: THE SCIENCE AND THE TECHNOLOGY LANDSCAPE

Thursday, 2 September 2021 18:00 (2 hours)

CONVENER of THIS KEYNOTE SESSION: Dr. Aurore SAVOY-NAVARRO, CEA-IRFU, University Paris-Saclay and CNRS/IN2P3.

"QUANTUM SENSING"describes the use of a quantum system, quantum properties or quantum phenomena to perform a measurement of a physical quantity. Historical examples of quantum sensors include magnetometers or atomic clocks. More recently, quantum sensing has become a distinct and rapidly growing branch of research within the area of quantum science and technology, with the most common platforms being spin qubits, trapped ions and flux qubits. The field is expected to provide new opportunities –especially with regard to high sensitivity and precision – in applied physics and other areas of science." (Cite from C. L. Degen, F. Reinhard, P. Cappellaro, in ReV of Modern Physics:10.1103/RevModPhys.89.035002)

Quantum sensing will be presented in this keynote session with its application to many key areas of the fundamental Physics (i.e particle physics, particle-astrophysics and cosmology).
This includes atom interferometry, but also other quantum sensing ways of searching for dark matter, neutrino mass, relic neutrinos, measuring fundamental constants, Electric Dipole Moments (EDMs), dark energy and the multiverse.

Ian Shipsey is the Henry Moseley Centenary Professor of Experimental Physics and Head of the Department of Physics. He is a Professorial Fellow at St. Catherine's College.

Presenter: Prof. SHIPSEY, Ian (University of Oxford (GB), HEAD of the PHYSICS DEPARTMENT)

Contribution ID: **101** Type: **not specified**

INTELLIGENCE on INSTRUMENTS

Session Classification: KEYNOTE SESSION on AI

Contribution ID: **102** Type: **not specified**

NEUROLOGY CONFRONTING COMPUTATIONAL NEUROSCIENCE

Tuesday, 24 August 2021 18:00 (2 hours)

This keynote session is the opening on the Medical part of this School edition. It will be led by two prominent personalities in the field of Neurology, Professor Exuperio Diez Tejedor from the UAM Medical School and Head of the Neurology Department at UAM and of the Center of ICTUS at the Hospital La Paz in Madrid (see link here below) and computational neuroscience, Prof. Nestor Parga, from UAM University, Department of Theoretical Physics, Madrid (Spain) (see the links here below).

The plasticity of the brain is actively explored with impressive progress in the understanding of the brain functioning.
Professor Diez Tejedor will give the medical point of view whereas Professor Parga will address the computational neuroscience aspect.

Presenters: Prof. DIEZ TEJEDOR, Exuperio (UAM, SCHOOL OF MEDICINE, HOSPITAL OF LA PAZ, MADRID, SP); Prof. PARGA, Nestor (UAM, Theoretical Physics Department)

Session Classification: INTRODUCTORY VISION TALK on MEDICAL PART of THE SCHOOL

Contribution ID: **103** Type: **not specified**

THE MANY WAYS TO EXPAND RESEARCH CAPABILITIES WITH AI

Session Classification: KEYNOTE SESSION on AI

Contribution ID: **104** Type: **not specified**

CLOSING SCHOOL LECTURE

Session Classification: INTRODUCTION TO ACCELERATORS

Contribution ID: **105** Type: **not specified**

WHY FUNDAMENTAL SCIENCE IS ESSENTIAL

Saturday, 4 September 2021 15:00 (1 hour)

Dr. Jose Miguel Jimenez is the head of the Technology Department (TE) at CERN.
The TE Department is responsible for technologies specific to existing particle accelerators, facilities and future projects.
The main domains of activities cover : magnets (superconducting, normal conducting, fast pulsed magnets, electrostatics and magnetic septa), their machine integration and protection, power converters, cryogenics, vacuum systems, coatings and surface treatments.
The TE Department is responsible for injection and extraction systems in the entire accelerator complex for beam transfer lines (conception, commissioning, performance follow-up) between accelerators and primary beam lines up to targets.
The TE provides support to the experimental detectors, mainly for cryogenics vacuum, coatings, surface treatments and power converters.
The dominating part of the activities for the next years is the exploitation of the LHC complex and its upgrades.
The TE Department is responsible to contribute to design studies and to design equipments and systems where necessary for consolidations, upgrades and future CERN projects.
The TE is responsible to guarantee permanence of expertise, follow the state-of-the-art and to develop knowledge in the particle accelerator technology fields.
(Credit: CERN TE Department)

Presenter: Dr JIMENEZ, Jose Miguel (CERN)

Session Classification: CLOSING SCHOOL SESSION

Contribution ID: **106** Type: **not specified**

CREATING A SUN in THE LAB: THE ITER WORLDWIDE ENTERPRISE

Presenter: Dr JACQUINOT, Jean

Contribution ID: **107** Type: **not specified**

CREATING A SUN in THE LAB: THE ITER WORLDWIDE ENTERPRISE

Tuesday, 31 August 2021 18:00 (1h 15m)

Formerly Director of the Joint European Torus (JET) AT CULHAM UK, and Director of the French CEA's magnetic fusion research department (DRFC, today IRFM), Jean Jacquinot has been closely associated with ITER for the past quarter century. He is presently a scientific advisor to the French High Commissioner for Atomic Energy and Senior Advisor to the ITER Director-General.

As introduction, here below the abstract of the article:
ITER: The Stakes of a Major International Collaboration
by Jean Jacquinot, Gabriel Marbach
In Revue internationale et stratégique Volume 55, Issue 3, 2004, pages 93 to 97

"For the last few months, officials from six important countries or groups of countries –China, North Korea, the United States, Russia, Japan and the European Union (EU) –have been working together in order to launch a global research initiative of magnetic fusion on occasion of the ITER project (International Thermonuclear Experimental Reactor). This collaboration brings about competition, for instance on the question of the ITER's settlement which is played out between the EU, who proposed Cadarache in the South-East of France, and Japan who put forward Rokkasho-Mura. However, signifying a global rising of awareness of an energy problem which is of concern to all mankind, the ITER project is thus strategic for the future, as it opens the perspective of placing an abundant source of energy, respectful of the environment, at humanity's disposal."

Presenter: Dr JACQUINOT, Jean (Commissiarat at the Atomic Energy, CEA, FRANCE))

Session Classification: KEYNOTE on NEW ENERGIES: Part 2: THE FUSION, THE SEA WAVES

Contribution ID: **108** Type: **not specified**

CONCEPTS IN WAVE ENERGY CONVERSION: THE SEA TITAN EU-Funded PROJECT

Tuesday, 31 August 2021 19:15 (1 hour)

Wave energy conversion is a promising alternative to produce clean energy from the huge available resource at sea, but it is also a challenging mission because extraction conditions are difficult due to the harsh environment and also to the low frequency of the energy conversion process. In the Ocean Energy Strategic Roadmap was estimated that 100GW of ocean energy capacity could be deployed in Europe by 2050, producing around 350TWh of electricity meeting up to 10 % of Europe' s demand by 2050. For this target to be attained it is essential the development of wave energy converters and specifically of its Power Take-Off (PTO), as one of the key technological priorities to increase the reliability and performance of ocean energy devices.During the session, the main concepts underlying the conversion of wave energy into electricity will be explained as well as the description of the SEA TITAN EU-funded project to develop a new type of Power Take-Off with improved performances.

The CIEMAT (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas) is a public research body assigned to the Ministry of Science, Innovation and Universities under the General Secretariat for Scientific Policy Coordination focusing on energy and environment and the technologies related to them. It has offices in several different regions of Spain, and its activity is structured around projects which form a bridge between R&D&I and social interest goals.

Dr.Luis GARCIA TABARES started his professional activity working on Power Electronics and Systems for high-speed trains. Later he started to work in applied superconductivity and particularly in superconducting magnets for Particle Accelerators. He currently leads the Electrical Engineering Division at CIEMAT with two core activities: Energy Generation and Storage (which includes wave energy generation) and Particle Accelerators, including compact accelerators for medical applications. He has been lecturing Electrical Machines for more than 10 years at the Universidad Pontificia de Comillas.
(credit: CIEMAT and L. Tabares Garcia)

Presenter: Dr GARCIA TABARES, Luis (CIEMAT)

Session Classification: KEYNOTE on NEW ENERGIES: Part 2: THE FUSION, THE SEA WAVES

Contribution ID: **109** Type: **not specified**

KEYNOTE SESSION on:FUTURE in SPACE for ASTRONOMY, ASTROPHYSICS & COSMOLOGY (SOME HIGHLIGHTS) ====> PART 1:==> EXPLORE THE EXTREME UNIVERSE WITH FUTURE SPACE HIGH ENERGY ASTROPHYSICS MISSIONS eXTP and HERD¶

THE KEYNOTE SESSION OF SEPTEMBER 1st, WILL START AT THAT UNUSUAL TIME: PLEASE NOTE

Prof Zhang is the Director of Key Laboratory of Particle Astrophysics and Center for Particle Astrophysics, Institute of High Energy Physics, Chinese Academy of Sciences, Beijing, China; Chief Scientist of the Space Science Research Division and Director of X-ray Imaging Laboratory of National Astronomical Observatory of China;

He is Distinguished Professor of the University of Chinese Academy of Sciences.

Education and work experience: 1984, Bachelor Degree, Tsinghua University; 1989, PhD Degree, University of Southampton, U.K.; 1989-1992, Postdoctoral research associate, University of Pennsylvania, USA; 1992-1998, Senior scientist, Universities Space Research Association and NASA Marshall Space Flight Center, Huntsville, Alabama, USA; 1998-2014, Tenure-track assistant professor, Research associate professor, Research full professor, University of Alabama in Huntsville, USA; 2002-2009, Distinguished professor, Physics Department, Tsinghua University.

Awards: NASA Group Achievement Award; Zhao-Jiu-Zhang "Space Science Award"; National Distinguished Young Investigator of National Science Foundation of China; Copernicus Distinguished Scientist Award (2009), University of Ferrara, Italy; Yangtze Scholar Distinguished Professorship of the Ministry of Education of China at Tsinghua University, China.

Selected into the National "Thousand Talents"Program and appointed as "National Distinguished Expert"by the central government of China.

Space science projects: Principal Investigator of the Space Astronomy Program of China's Manned Space Flight Program, POLAR experiment onboard China's TG-2 Spacelab (launched in 2016), the HXMT astronomy satellite mission (launched in 2017).

Presenter: Prof. ZHANG, Shuang-Nan (IHEP and Chinese Academyc of Sciences, Beijing, CN)

Session Classification: MORNING SESSION 8, PLENARY LECTURES

Contribution ID: **110** Type: **not specified**

INTRODUCTION TO MACHINE LEARNING

Presenter: Prof. AVEDILLO, Juan Carlos SanMiguel (Escuela Politecnica, Autonoma de Madrid, SP)

Session Classification: MORNING SESSION 6, PLENARY LECTURES

Contribution ID: **111** Type: **not specified**

Presentation of the Science School, UAM

Monday, 23 August 2021 10:50 (20 minutes)

Presenter: Prof. PAU, Jose Luis (Vice Dean of Research, UAM, Madrid, SP)

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **112** Type: **not specified**

Presentation of CIEMAT

Monday, 23 August 2021 11:30 (30 minutes)

Presenter: Dr PEREZ, Jose Manuel (Director of the Tehnology Department of CIEMAT)

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **113** Type: **not specified**

Presentation of the University Rey Juan Carlos and The HM Hospital

Monday, 23 August 2021 12:20 (20 minutes)

Presenters: Dr GARCIA , Lina (HM Puerta del Sur, Head of the Nuclear Medecine); Prof. MALPICA , Norberto (Universidad Rey Juan Carlos, Director of the Medical Imaging Laboratory)

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **114** Type: **not specified**

Presentation of the Polytechnic School at UAM

Presenter: Prof. MARTINEZ SANCHEZ, Jose Maria (Director of the Polytechnic School at UAM)

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **115** Type: **not specified**

INFIERI International Summer School Series: Goals and organization

Monday, 23 August 2021 12:40 (30 minutes)

INFIERI: INtelligent signal processing for FrontIEr Research and Industry

The co-organizers of this School edition held this year at UAM Madrid, will introduce the INFIERI International School series: the objectives of this cross-disciplinary summer school of 2 weeks duration;
Built on the success of the previous 5 editions held in Oxford (2013), Paris (2014), Hamburg (2015), Sao Paulo (2017), Wuhan (2019).
How the program built as the "navigation along the full signal & data processing chain of an instrument" develops the synergy and complementarity between different domains of Fundamental Research (e.g. Astrophysics, Particle Physics) and Applied Fields (e.g. Medecine and this year New Energies) and with the most advanced High Tech aspects; Stressing the importance of the interplay between Fundamental Research, Applied Fields and Industry for their progress;
Showing how Research is essential for the Education; Stressing how the advances in technology & instrumentation are demanded by the Physics needs,
Thus making clear the link between Theory-Experiments-Technology/instrumentation.

The specific training objectives and topics of the INFIERI edition in Madrid, also including the in-person organisation essential for this school and so challenging in this COVID time will be presented.

Presenters: Dr SAVOY-NAVARRO, Aurore (IRFU-CEA, Université Paris-Saclay (FR), CNRS/IN2P3); Prof. DEL PESO, Jose (Universidad Autonoma de Madrid, UAM, SP); SCHOOL ORGANIZERS

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **116** Type: **not specified**

REGISTRATION

Monday, 23 August 2021 08:30 (1h 30m)

Session Classification: OPENING SESSION and REGISTRATION

Contribution ID: **117** Type: **not specified**

FINAL LABS REGISTRATION by the SCHOOL ATTENDEES

Monday, 23 August 2021 18:00 (1h 30m)

The School attendees have at their disposal since July 14, the booklet of Hands on Labs. They are thus expected to have made their choice in the Menu of Labs prepared for this School.by the opening day. The Labs are obligatory and must be selected on fields of expertise outside of the research/training expertise of the School attendant.

The final registration to the Lab sessions the students will follow will be done at the end of this afternoon plenary session. Discussions and Q/A with the Lab organizers will take place at that time.

Session Classification: LABS PRESENTATION

Contribution ID: **118** Type: **not specified**

MACHINE LEARNING and DEEP LEARNING: 1st PART

Monday, 30 August 2021 10:50 (1 hour)

Presenter: Prof. AVEDILLO, Juan Carlos SanMiguel (Escuela Politecnica Superior, University Autonoma de Madrid)

Session Classification: MORNING SESSION 6, PLENARY LECTURES

Contribution ID: **119** Type: **not specified**

HOW ADVANCED PACKAGING IS CHANGING INTEGRATED CIRCUITS

Friday, 3 September 2021 12:00 (1 hour)

ABSTRACT of the LECTURE:
For decades semiconductor advancement has depended almost entirely on ever shrinking transistors and wires. This trend, known as Moore's Law, has enabled the modern miracle electronics which we all use and enjoy. Today however, we are reaching the physical limits of shrinking transistors and wires further. Manufacturing today's nanometer transistors requires billions of euros in capital investment and many tens or even hundreds of millions more for each integrated circuit design. Perhaps the worst aspect is the scant improvement these large sums of money actually bring. However, there is a new path forward. One focused on applying advanced packaging technology to integrated circuits.
Advanced packaging uses semiconductor fabrication technologies to integrate smaller chips or "chiplets" into a larger single chip. Using semiconductor manufacturing techniques to accomplish packaging, yields tightly coupled circuitry that acts and performs as if it were built as a single chip. However, the small chiplets can be manufactured in a wide variety of technologies and thus the performance of the combined chiplets can far out perform what could be created as a single monolithic circuit. Chiplets can also be reused in many designs with no redesign or reengineering. Advanced packaging and chiplets are already producing higher performance lower cost integrated circuits with far less capital and development expense and doing so in shorter development cycles. This talk will discuss advanced semiconductor packaging technologies and how its application can enable more from semiconductors.

ABOUT NHANCED SEMICONDUCTORS:
Brilliant Concepts Deserve Brilliant Implementation

If your product would benefit by 3D architecture, a smart interposer, chiplet integration, or other advanced packaging, let NHanced Semiconductors be your complete supply chain solution. We provide turnkey assemblies and components including custom design, design consultation, TSV insertion, and access to the latest and best semiconductor technologies. Take advantage of our deep experience in 3D and 2.5D enablement. We do multi-die design, assembly, sourcing, packaging, final test –everything you need to carry your project from original idea to beautiful finished device.

NHanced Semiconductors, Inc., holds a deep library of technical expertise in cutting edge semiconductor technologies. The company has extensive experience in advanced packaging: 3D-ICs, silicon interposers, 2.5D, chiplets, additive silicon manufacturing, photonics, microfluidics, and other innovative solutions.

Our development and manufacturing facility (fab) specializes in BEoL and advanced packaging. The fab works with a large variety of materials including III-V compound semiconductors. It currently performs small volume manufacturing, in-house process development, and customer prototyping. The fab is being expanded to house an additional dedicated high-volume production line for advanced packaging.

In addition to its fab, the company boasts a seasoned team of design engineers. Their specialized skills in 3D semiconductor design have built a strong customer base. Working under the leadership of 3D pioneer Bob Patti, they extend the functionality of advanced ICs in exciting new directions. (Credit: NHanced Semiconductors Inc, Website announcement)

Presenter: Dr PATTI, Robert (NHanced Semiconductors Inc., Napperville, Ill, USA)

Session Classification: MORNING SESSION 9, PLENARY LECTURES

Contribution ID: **120** Type: **not specified**

FUTURE COLLIDERS (cont'd): The Circular Collider Project in China: From the Higgs Factory with CepC to the Energy Frontier with SppC

Friday, 27 August 2021 11:50 (1h 20m)

THIS IS the FIRST PART OF THE KEYNOTE SESSION ON FUTURE COLLIDERS PROJECT, IN CONTINUATION OF THE ONE DEDICATED TO .ELECTRON-POSITRON COLLIDER PROJECTS (26/8).
IT WILL BE CONTINUED by the KEYNOTE SESSION from 6 to 8pm.

CONVENER OF THIS OVERALL KEYNOTE SESSION: Dr. Monica PEPE-ALTARELLI (CERN)

Professor Jie Gao is an accelerator Physicist at the Institute of High Energy Physics (IHEP).
He obtained his Bachelor degree in 1983 and his Master degree in 1986, both at the Tsinghua University i Beijing.
In 1986-1989 at the Institute of High Energy Physics, Chinese Academyc of Sciences (CAS) he worked on Ph. D degree (Supervisor Academician, Prof. J.L. Xie).
In April 1992, he obtained the Ph. D degree from the University of Paris XI, France (supervisor Dr. J. Le Duff, Committee chairman: Prof. M. Davier)
In June 1996 he obtained the diploma of Habilitation to Direct Research from University of Paris XI, France (Committee chairman Prof. M. Davier).
Jie Gao worked on his PhD research from 1989-1992 as a Foreign visitor at the CNRS/IN2P3 Laboratory of Linear Accelerator (LAL) at Orsay, France.
He obtained in 1993 a permanent CNRS position as an Accelerator Physicist at the Laboratory LAL at Orsay, France, where he performed his research activities until 2004.
In 2005 he joined the Institute of High Energy Physics, CAS, China, as a Professor and ILC-IHEP group leader.
In 2010, he became Asia Linear Collider Steering Committee Chairman and ICFA Linear Collider Steering Committee (Board) member till 2021 and 2020, respectively.
He is currently leading the accelerator part of the CEPC Project in China together with CEPC accelerator convener team.

IHEP: is the biggest and comprehensive fundamental research center in China. The major research fields of IHEP are particle physics, accelerator physics and technologies, radiation technologies and application, including the following leading research areas: - Particle physics experiments: BES, neutrino experiments, experiments at LHC and B-factories⋯- Theoretical Physics: particle physics, medium and high energy nuclear physics, cosmology, field theory⋯- Particle astrophysics: cosmic ray, astrophysics experiments⋯- Accelerator physics and technology: high luminosity e+e−collider, high power proton accelerator, accelerator applications⋯- Synchrotron radiation: technology and application; - Nuclear analytical technique and application; - Free electron laser; - Nuclear detector and fast electronics; Computing and network application; - Radiation protection. IHEP has extensive cooperation with all high energy physics laboratories and participates in many important particle physics experiments in the world.
Speaker: Prof. Jie GAO (Institute of High Energy Physics, IHEP, and CAS, China)

Presenter: Prof. GAO, Jie (Institute of High Energy Physics, IHEP, and CAS, China)

Contribution ID: **121** Type: **not specified**

Registrations to the Lab Sessions

Wednesday, 25 August 2021 11:05 (5 minutes)

Presenter: SAVOY NAVARRO, Aurore (Université Paris-Saclay (FR))

Session Classification: MORNING SESSION 2, PLENARY LECTURES: THE INTELLIGENCE on INSTRUMENTS, THE TECHNOLOGICAL SIDE

Contribution ID: **122** Type: **not specified**

BTW S-Band High-Gradient Acceleration Cavity Studies

Saturday, 4 September 2021 09:00 (8 minutes)

Presenter: MARTINEZ REVIRIEGO, Pablo (IFIC, Valencia, SP)

Session Classification: THE POSTER SESSION

Contribution ID: **123** Type: **not specified**

BSM physics at the International Lineal Collider

Saturday, 4 September 2021 09:08 (8 minutes)

Presenter: MÁRQUEZ HERNÁNDEZ, Jesús (IFIC/CSIC/UV)

Session Classification: THE POSTER SESSION

Contribution ID: **124** Type: **not specified**

Top quark mass measurements using ttbar+1 jet events in the ATLAS detector at 7, 8 and 13 TeV

Saturday, 4 September 2021 09:16 (8 minutes)

Presenter: PRADES IBANEZ, Alberto (IFIC, Valencia, SP)

Session Classification: THE POSTER SESSION

Contribution ID: **125** Type: **not specified**

Assembly Process of the Innermost Modules of the ATLAS ITk Pixel Detector

Saturday, 4 September 2021 09:24 (8 minutes)

Presenter: CARLOTTO, Juan Ignacio (IFAE - Barcelona (ES))

Session Classification: THE POSTER SESSION

Contribution ID: **126** Type: **not specified**

LOW GAIN AVALANCHE DETECTOR (LGAD) FOR ATLAS AND CMS EXPERIMENTS

Saturday, 4 September 2021 09:32 (8 minutes)

Presenter: ANTONIO VILLEGAS DOMINGUEZ, Jairo (IMB-CNM,CSIC, Barcelona, SP)

Session Classification: THE POSTER SESSION

Contribution ID: **127** Type: **not specified**

A machine learning algorithm for tau leptons identification at L2 Trigger in the CMS experiment

Saturday, 4 September 2021 09:40 (8 minutes)

LAUREATE OF THE POSTERS AWARDS:
Valeria D'AMANTE, 3rd BEST POSTER ex-aequo

Presenter: D'AMANTE, Valeria (Universita & INFN Pisa (IT))

Session Classification: THE POSTER SESSION

Contribution ID: **128** Type: **not specified**

3D detectors for timing applications

Saturday, 4 September 2021 09:48 (8 minutes)

Presenter: OSCAR, Ferrer (IMB CNM-CSIC)

Session Classification: THE POSTER SESSION

Contribution ID: **129** Type: **not specified**

Measurement of D0 mixing and CP violation in D0 →K+π− decay at LHCb

Saturday, 4 September 2021 09:56 (8 minutes)

Presenter: RIBATTI, Roberto (Universita & INFN Pisa (IT))

Session Classification: THE POSTER SESSION

Contribution ID: **130** Type: **not specified**

Simulating quench dynamics on a digital quantum computer with data-driven error mitigation

Saturday, 4 September 2021 10:04 (8 minutes)

Presenter: SOPENA, Alexandro (IFT, UAM)

Session Classification: THE POSTER SESSION

Contribution ID: **131** Type: **not specified**

FINE-TUNING in the 2-HDM

Saturday, 4 September 2021 10:12 (8 minutes)

Presenter: BERNAL, Alexander (IFT, UAM)

Session Classification: THE POSTER SESSION

Contribution ID: **132** Type: **not specified**

FPGA Signal Processing for the Trigger System of a Space High Energy Particle Detector

Saturday, 4 September 2021 10:20 (8 minutes)

Presenter: MARCO NAVARRO, Ruben (CIEMAT)

Session Classification: THE POSTER SESSION

Contribution ID: **133** Type: **not specified**

Developments and Characterisation Results of DMAPS in TowerJazz in 180 nm for High Luminosity LHC

Saturday, 4 September 2021 10:28 (8 minutes)

Presenter: VAN RIJNBACH, Milou (University of Oslo (NO))

Session Classification: THE POSTER SESSION

Contribution ID: **134** Type: **not specified**

Triggering schemes for SuperCDMS

Saturday, 4 September 2021 10:36 (8 minutes)

Presenter: ZAYTSEV, Alexander (University of Hamburg)

Session Classification: THE POSTER SESSION

Contribution ID: **135** Type: **not specified**

MUON ISOLATION (ATLAS)

Saturday, 4 September 2021 10:44 (8 minutes)

Presenter: WEI, Yingjie (University of Oxford (GB))

Session Classification: THE POSTER SESSION

Contribution ID: **136** Type: **not specified**

In situ mass calibration of Large-R jets via Forward Folding method other tt events at 13 TeV

Saturday, 4 September 2021 10:52 (8 minutes)

Presenter: MONSONIS ROMERO, Luis (Univ. of Valencia and CSIC (ES))

Session Classification: THE POSTER SESSION

Contribution ID: **137** Type: **not specified**

Collimator Design for Gamma-Ray Cascade Angular Correlations in Medical Imaging

Saturday, 4 September 2021 11:00 (8 minutes)

Presenter: OLSHANOSKI, Kaylyn (Department of Physics and Engineering Physics –University of Saskatchewan –Canada)

Session Classification: THE POSTER SESSION

Contribution ID: **138** Type: **not specified**

Programmable integrated photonics using liquid crystal

Saturday, 4 September 2021 11:08 (8 minutes)

LAUREATE of BEST POSTERS AWARDS:
Lukas VAN ISEGHEM, 3rd BEST POSTER ex-aequo

Presenter: VAN ISEGHEM, Lukas (University of Gent, BE)

Session Classification: THE POSTER SESSION

Contribution ID: **139** Type: **not specified**

Development of SPADs for NIR light detection

Saturday, 4 September 2021 11:16 (8 minutes)

Presenter: GAUTAM, Viveka (IFAE- Barcelona(ES))

Session Classification: THE POSTER SESSION

Contribution ID: **140** Type: **not specified**

Testing Lepton Flavour Universality in □ ⟶ □□+□− decays at LHCb

Saturday, 4 September 2021 11:24 (8 minutes)

LAUREATE of BEST POSTERS AWARDS;
Sara CELANI, 2nd BEST POSTER ex-aequo

Presenter: CELANI, Sara (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: THE POSTER SESSION

Contribution ID: **141** Type: **not specified**

Evaluation of the PETsys TOFPET2 ASIC SIPM Readout System in the Scintillating Fibre Tracker (SciFi) prototype

Saturday, 4 September 2021 11:32 (8 minutes)

Presenter: CHOLAK, Serhii (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: THE POSTER SESSION

Contribution ID: **142** Type: **not specified**

OPTICAL PROPERTIES OF SILICON AND TIN NANOSHEETS

Saturday, 4 September 2021 11:40 (8 minutes)

Presenter: BONAVENTURA, Eleonora (CNR-IMM, U. Milano Bicocca, IT)

Session Classification: THE POSTER SESSION

Contribution ID: **143** Type: **not specified**

Search for New Physics in the Leptonic Decays at the CMS Experiment at LHC

Saturday, 4 September 2021 11:48 (8 minutes)

Presenter: SHALAEV, Vladislav (Joint Institute for Nuclear Research (RU))

Session Classification: THE POSTER SESSION

Contribution ID: **144** Type: **not specified**

Development and simulation of a new preshower detector for the FASER experiment at the LHC

Saturday, 4 September 2021 11:56 (8 minutes)

Presenter: KOTITSA, Rafaella Eleni (Universite de Geneve (CH))

Session Classification: THE POSTER SESSION

Contribution ID: **145** Type: **not specified**

CMS HCAL Run II Communication Loss and VTRx Studies

Saturday, 4 September 2021 12:04 (8 minutes)

LAUREATE OF BEST POSTERS AWARDS:
Grace CUMMINGS, 2nd BEST POSTER ex-aequo

Presenter: CUMMINGS, Grace (University of Virginia, USA)

Session Classification: THE POSTER SESSION

Contribution ID: **146** Type: **not specified**

Towards Novel Wafer-Wafer Bonded Pixel Detectors

Saturday, 4 September 2021 12:12 (8 minutes)

LAUREATE OF BEST POSTERS AWARDS:
Johannes WUETHRICH, BEST POSTER

Presenter: WUTHRICH, Johannes Martin (ETH Zurich (CH))

Session Classification: THE POSTER SESSION

Contribution ID: **147** Type: **not specified**

LOCO-ANS: An Optimization of JPEG-LS Usinf an Efficient and Low-Complexity Coder Based on ANS

Saturday, 4 September 2021 12:20 (8 minutes)

Presenter: ALONSO, Tobias (UAM)

Session Classification: THE POSTER SESSION

Contribution ID: **148** Type: **not specified**

HPC with GPUs in LHCb analysis

Saturday, 4 September 2021 12:28 (8 minutes)

Presenters: PEREIRO CASTRO, Asier (Universidade de Santiago de Compostela (ES)); ROMERO LAMAS, Marcos (Universidade de Santiago de Compostela (ES))

Session Classification: THE POSTER SESSION

Contribution ID: **149** Type: **not specified**

BM@N experiment online data processing and QA system

Saturday, 4 September 2021 12:36 (8 minutes)

Presenter: GABDRAKHMANOV, Ilnur (Veksler and Baldin Laboratory of High Energy Physics, JINR, Dubna, Russia)

Session Classification: THE POSTER SESSION

Contribution ID: **150** Type: **not specified**

DATABASE DEVELOPMENT FOR THE HIGH GRANULARITY TIMING DETECTOR for ATLAS UPGRADE

Saturday, 4 September 2021 12:44 (8 minutes)

Presenter: AIT TAMLIHAT, Malak (Universite Mohammed V , Rabat, (MA))

Session Classification: THE POSTER SESSION

Contribution ID: **151** Type: **not specified**

SOFTWARE DEVELOPMENT for the UPGRADED LHCb MUON ELECTRONICS

Saturday, 4 September 2021 12:52 (8 minutes)

On behalf of the LHCb Muon Group

Presenter: KOTRIAKHOVA, Sofia (Universita e INFN, Ferrara (IT))

Session Classification: THE POSTER SESSION

Contribution ID: **152** Type: **not specified**

A REAL TIME SUB-PICOSECOND PHASE CORRECTION SYSTEM

Saturday, 4 September 2021 13:00 (8 minutes)

Presenter: SARADHY, Rohith (University of Minnesota (US))

Session Classification: THE POSTER SESSION

Contribution ID: **153** Type: **not specified**

LHCb Scintillating Fibre (SciFi) Tracker,

Saturday, 4 September 2021 13:08 (8 minutes)

Presenter: SOARES LAVRA, Lais (Université Clermont Auvergne (FR))

Session Classification: THE POSTER SESSION

Contribution ID: **154** Type: **not specified**

Classifying Jets with Graphical NeuralNet and Boosted Particle Flow

Saturday, 4 September 2021 13:16 (8 minutes)

Presenter: DAS, Abhishek (University of Notre Dame, USA)

Session Classification: THE POSTER SESSION

Contribution ID: **155** Type: **not specified**

AdS/CFT superconductors and non-Hermitian Holography

Saturday, 4 September 2021 13:24 (8 minutes)

Presenter: FULGADO CLAUDIO, Carlos (UAM, SP)

Session Classification: THE POSTER SESSION

Contribution ID: **156** Type: **not specified**

Comparative analysis of the possible configurations of a magnetic refrigeration stage in an autonomous cryogenic cooling system

Saturday, 4 September 2021 13:32 (8 minutes)

Presenter: HERNANDO, Carlos (CYCLOMED and CIEMAT, SP)

Session Classification: THE POSTER SESSION

Contribution ID: **157** Type: **not specified**

nuclear medicine application in the GAMUS projec: Gamma ray detection system for breast cancer biopsy

Saturday, 4 September 2021 13:40 (8 minutes)

Presenter: FERNANDEZ MARTINEZ, Elena (UCM, Computiense, Madrid, SP)

Session Classification: THE POSTER SESSION

Contribution ID: **158** Type: **not specified**

Swap Monte Carlo Methods in Deep Neural Network Training

Saturday, 4 September 2021 13:50 (8 minutes)

Presenter: MUNOZ, Juan Manuel (Kings College London, UK)

Session Classification: THE POSTER SESSION

Contribution ID: **159** Type: **not specified**

J. WUTHRICH

Presenter: WUTHRICH, Johannes Martin (ETH Zurich (CH))

Session Classification: THE POSTER SESSION

Contribution ID: **160** Type: **not specified**

PHOTO OF THE SCHOOL-FIRST SESSION

Wednesday, 1 September 2021 11:30 (20 minutes)

Photograph taken by Patchi Gaillardo (UAM) during the coffee break of the first day on “Introduction to the Quantic World”, in the outdoors of the Biology Auditorium.

Session Classification: MORNING SESSION 8, PLENARY LECTURES