

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire

Excellence in Science Communication: A tool for diversity

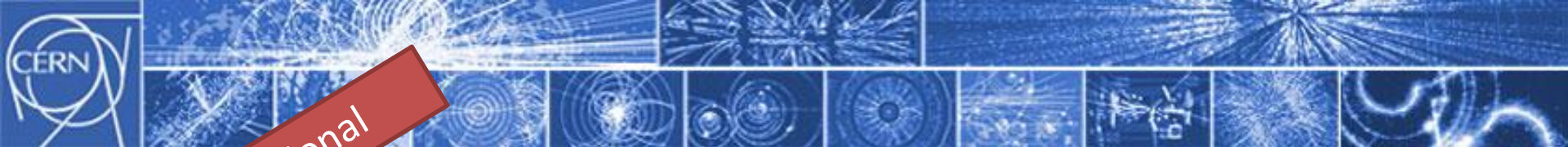
Archana Sharma

PH-Department CERN CH 1211 Geneva Switzerland

WCFDavos|CERN
09 March, 2015

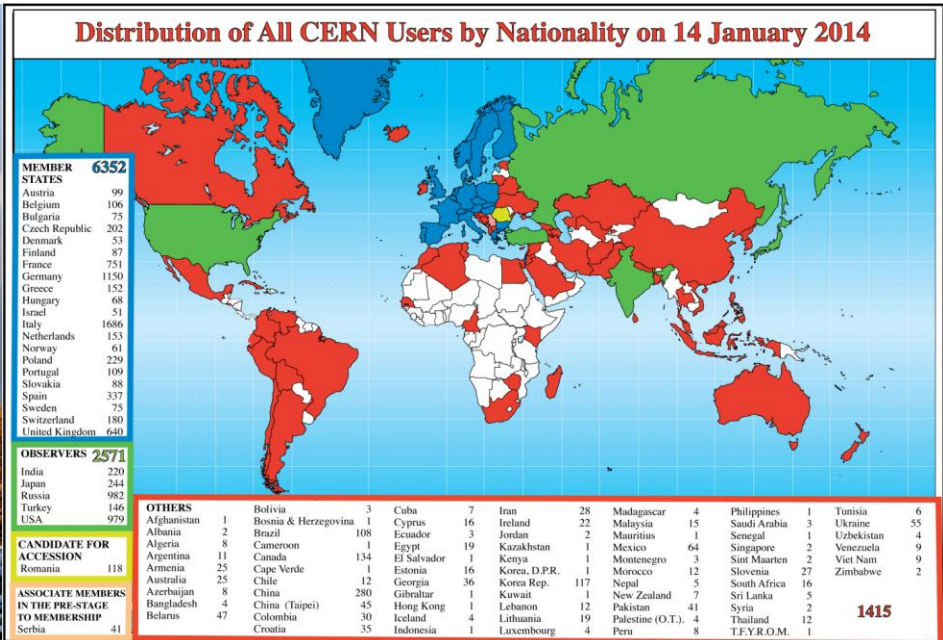
Special Thematic Session:
Communicating Scientific
Breakthrough
In cooperation with CERN, Geneva

>> WCFSessions



Truly International

Every day, around **11 000 scientists** from all over the world perform research at CERN



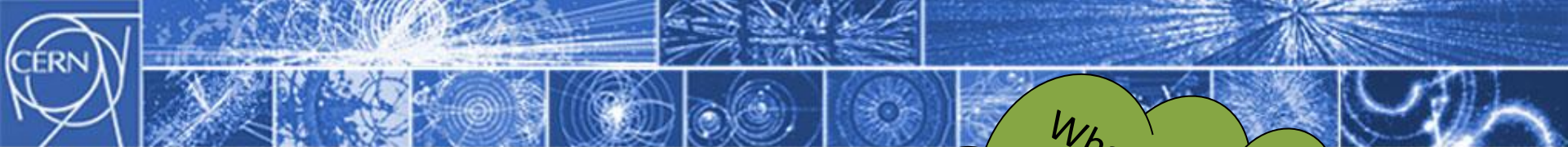
Flags of CERN's Member States

21 European Member States and around 60 additional countries collaborate in our scientific projects.



In the World's biggest laboratory for particle physics research - CERN

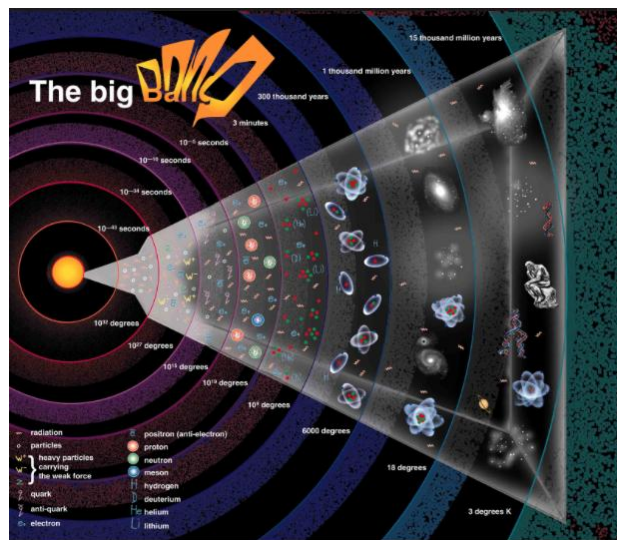
- Answers questions about how the Universe works
- Stimulates advances in technology
- Trains tomorrow's scientists and engineers
- Brings nations together through science

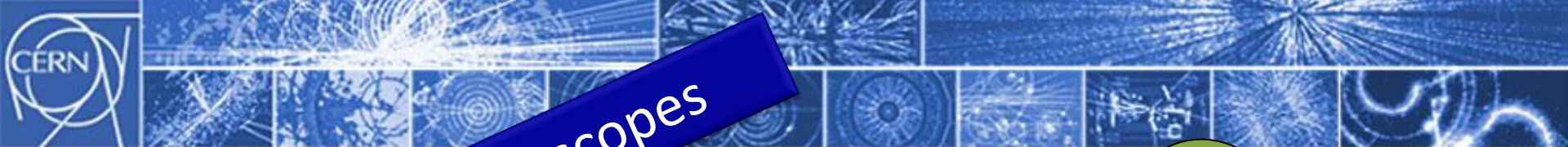


CERN

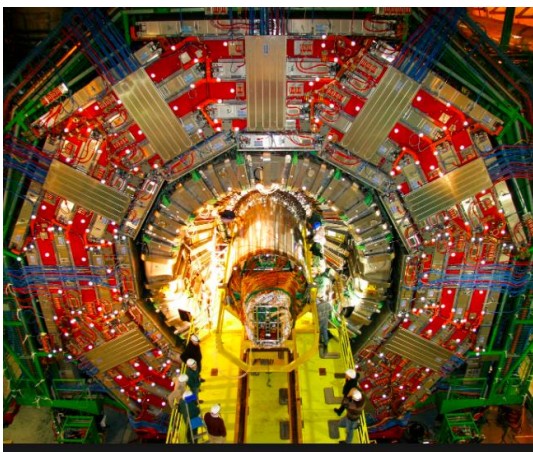
European Organization for Nuclear Physics
 Organisation Européenne pour la Physique Nucléaire

What is the world made of?
What holds the world together?
 Where did we come from?





High Tech Microscopes



Ah ! There
are such
powerful
instruments ?

Yes ! Giant detectors . . .

The largest and most complex ever built ...



CERN

European Organization
Organisation Européenne

But what does CERN, particle
accelerators and
detectors have to do with
everyday life?

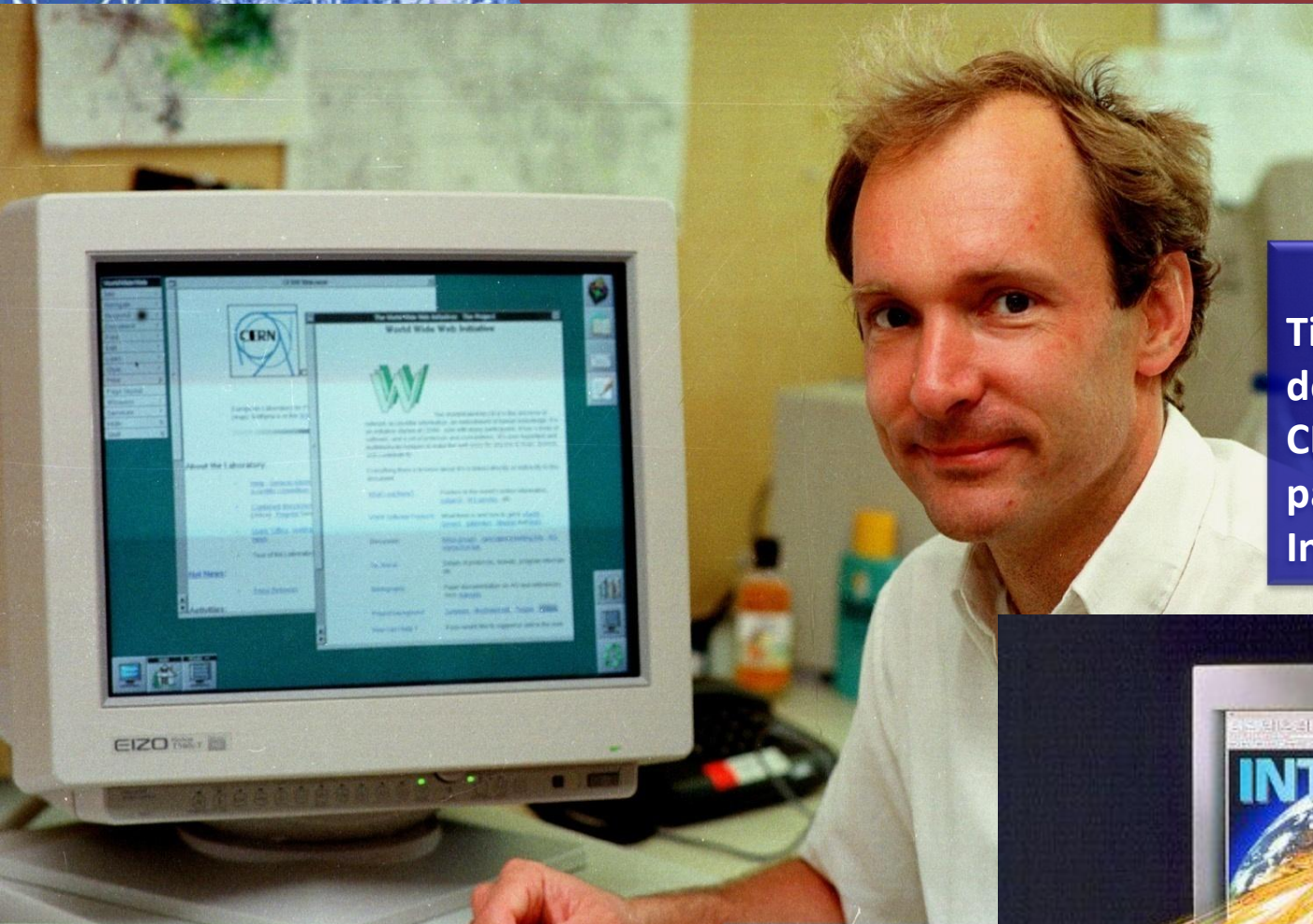


***"I think there is a world market for
maybe five computers."***

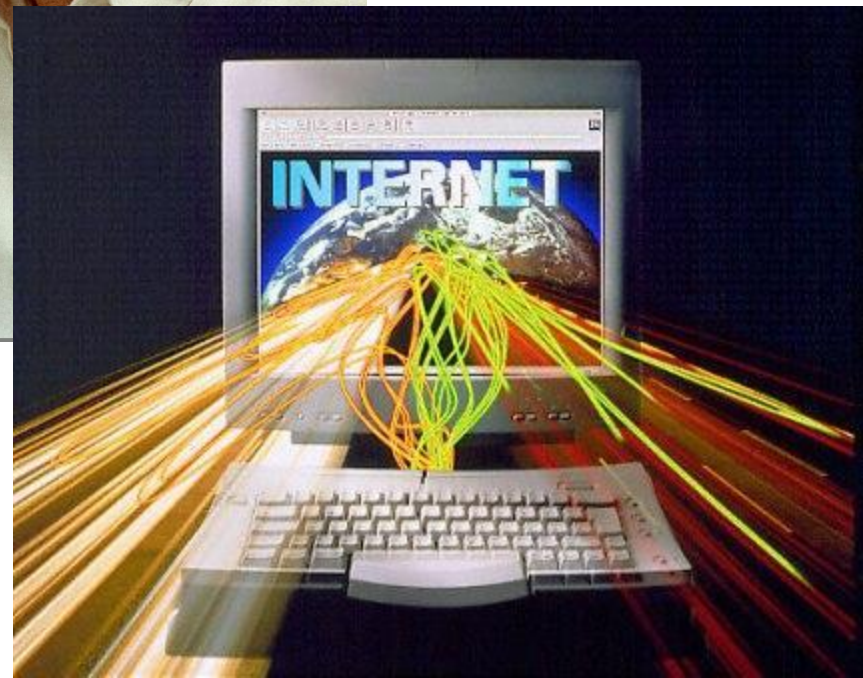
- THOMAS WATSON,
Chairman of IBM, 1943



World Wide Web



**Tim Berners Lee
developed the WWW at
CERN initially for sharing
particle physicists data
In 1989**

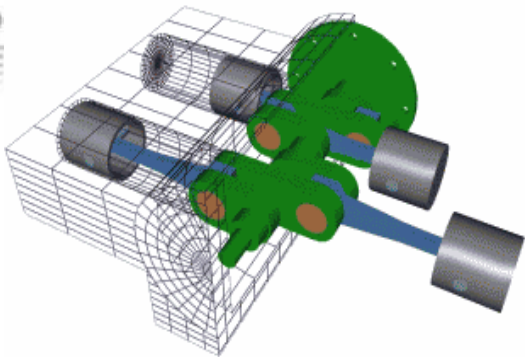


Communicating Excellence

European Organization for
Européenne p



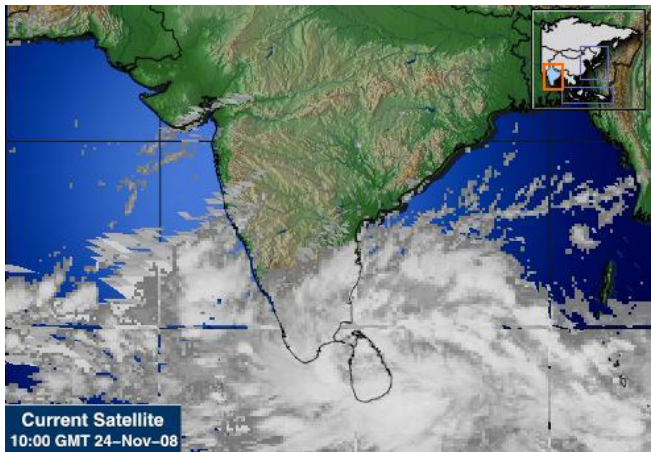
Bio Informatics



Education, Training



- **WEATHER GRID SYSTEM**
- Distributed computing allows remotely located PCs work on small sections of huge amounts of data.
- Money and human lives can and are being saved using accurate weather forecasting.



PEOPLE ARE KEY



YOUNG DIVERSE PEOPLE ARE KEY



MISSION...inspiring future scientists

CERN
European Organization for Nuclear Research
Organisation pour la Recherche Nucléaire



100,000 visitors / year (~50% young students)

**‘Real, live working scientists as guides,
sharing their experience, their knowledge and
their passion for science’**

Brahm Capoor, Singapore

“The fervor from CERN is truly unique and can never be experienced anywhere else. I will always keep this experience close to me. ... Maybe next time, I might get a chance to do some hands on work of my own!

These two and a half weeks have only whetted my appetite for more knowledge.

There is truly nothing quite like CERN anywhere else on Earth!”

Siddharth Sehgal : Visiting high school student 2013, Dubai



MISSION...EXCELLENCE – NOBEL PRIZES CERN





Nobel Prize: 2013

MISSION... INCLUSIVE .. 7000+ people discovered the Higgs Boson

The winners of CERN's Special Award at the Intel International Science and Engineering Fair (ISEF): 2013





Proliferation of communication channels and sources of information

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire

doi:10.1038/nindia.2012.98 Published online 4 July 2012

- With increased use of technology traditional channels of communication are now being challenged
- Facebook, Twitter, blogs, other online clutter
- Cutting edge of “Information technology”
- Exploit diversity : Foster Collaboration

The Convenient Truth

The excitement and anticipation surrounding CERN's scientific seminar on the "Latest update in the search for the Higgs boson" was so palpable at the Route de Meyrin that you could cut it with a kitchen knife, says CERN staff physicist *Archana Sharma*.

Mankind's curiosity has always challenged him to charter unknown territories and put an interrogation before every assertion. Questions like "How big is the Universe?", "Is it still expanding" or "What is responsible for mass?" and even attempts to fathom the mysteries surrounding the Big Bang and black holes have been plaguing him, like the annoying itch, for eons.

But the funny thing is whenever mankind has failed to suitably understand one particular phenomenon, he has sought to attribute it to a greater phenomenon-God, or as many would agree, the "The God particle".

This is not yet a solution *per se*, but a question of context. And it is this context that has quite recently sent the scientific sphere into an infectious tizzy of excitement.

It had taken the genius of an Indian physicist Satyendra Nath Bose and the perseverance of an Edinburgh University emeritus professor Peter Higgs to propose its existence (in addition to Anglert and Brout from Belgium) and around 48 years of research and speculation to attempt to prove it.

Standing on the precipice of a phenomenal scientific breakthrough today is CERN, coming closest to unlocking one of the Universe's best kept cosmic secret.

Higgsteria

The excitement and anticipation surrounding CERN's scientific seminar on the "Latest update in the



Archana Sharma at her desk in CERN.

© Subhra Priyadarshini



Communication: Challenges and Opportunities

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire



LARGE HADRON COLLIDER

WE BUILT IT FOR THE LULZ!

motivateurself.wordpress.com

Temple built for Higgs-Boson God particle in Tamil Nadu, devotees throng to get darshan

Posted on July 7, 2012 by UnReal Mama in Featured, General, Latest, Perspectives, Science with 10 Comments

[Facebook](#) 1.1k [Twitter](#) 74 [Google+](#) 29 [Reddit](#) 18 [+](#)



Aarthi being performed for Lord Higgs-Boson

In what is a testament to Hinduism's assimilative capacity, the elusive Higgs-Boson or God particle has been admitted as a full fledged God into the Hindu pantheon and a temple in His honor has been built in Tamil Nadu's Kancheepuram district.

Confirming the development, Swami Vajranand Sarwasti, head of the decade old Higgs-Boson consciousness sect dedicated to the propagation of devotion to Lord Higgs-Boson and attainment of spiritual salvation by chanting His name, said, "Ever since CERN confirmed that they had

discerned the Lord's temporal presence after detecting a bump in the mass range based on the data generated from collisions of trillions of sub-atomic particles, we have been inundated with calls by eager devotees seeking a *darshan* of Higgs-Boson *bhagwaan*. So we decided to build a temple in His honour to satisfy the cravings of His devotees."

- Living and working in a community that accepts and celebrates diversity is a joy and a privilege that contributes to the vitality and excellence of the experience
- All collaborators have access to the transformative experience of an outstanding opportunity for success without any bearing from where they come
- Different perspectives, interacting with people from different backgrounds, exploring ideas with those from different cultures in order to succeed in an increasingly diverse workplace and global community
- Increasing presence of individuals from diverse populations among **those in charge at all levels**
- Outreach opportunities every single day

Some Personal Notes from Diverse Role Models

2014
2013
2012
2011
2010
2008
2007

Harrison Prosper: "The physics in the 'Angels and Demons' movie"

By Todd Adams May 28, 2009



Dr. Harrison Prosper

Consequently, the experiments at Fermilab and CERN are critical for improving our understanding of the deepest puzzles in physics today such as the nature of dark matter and dark energy.

On May 28, 2009, the FSU High School Physics Teacher named FSU Distinguished Researcher for 150 people.

The presentation built on the storyline of the movie "Angels and Demons" inspired by the storyline. The scientists in the movie use antimatter to make a bomb. Prosper found the bomb before it detonated. He discussed how it is used in the movie and how much antimatter as depicted in the movie.

Parts of the movie were filmed at Fermilab and its movie version contrast his experience at CERN. Prosper, an active participant in recording data at the Large Hadron Collider at the Tevatron as the world's most powerful particle accelerator since its inception, discussed his interpretations of data analysis.

Also discussed were some of the challenges in a laboratory environment that can be used to improve our understanding of the deepest puzzles in physics today such as the nature of dark matter and dark energy.

“with the plausible hypothesis that the distribution of potential excellence in homo sapiens is, at least to a good approximation, independent of our biologically superficial differences of the members of that species.

If so, it seems exceedingly shortsighted, and therefore, foolish for any human endeavor that requires excellence not to draw from as large a pool as possible.

..

marshal the largest pool of excellence ..

.. embrace diversity in order to make sure we embrace excellence wherever it resides. It is also the right thing to do”

Harrison Prosper, Ph.D.

TEDxFSU - Harrison Prosper - Echoes of the Past

From Kerstin Borrás Deputy Spokesperson CMS



- Sure enough also our globally working collaboration has its difficulties to embrace all minorities and to mirror it back in the management structures.
- **Be present, really physically present. If we are not present in the room, we are not present for any election, nomination, talk ... in the minds of our (male) colleagues.**
- In the section particle physics of the German Physical Society; last year in November we were 3 women among 110 participants.



Christine Nattrass

Physicist ALICE

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire

There is an extreme dearth of women in leadership positions - about $1/3$ the number one would expect from their fraction in the collaboration, even taking seniority into account.



- > Dr. Christine Nattrass

Assistant professor in Relativistic Heavy Ion physics at the University of Tennessee at Knoxville: ALICE

christine.nattrass@utk.edu



Anna Lipniacka: Physicist ATLAS

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire

ATLAS diversity reflects the diversity of home laboratories in an augmented way. **The result is that gender and national minorities persons often play more important role in ATLAS than they play at home.** For example there is percentagewise more women in various leadingis crucial and responsibility is largely institutional, for example detector project leaders- we see mostly men in this roles."..now university professors/lecturers. **I was supervising the first Icelandic summer student at CERN who just completed his PhD in particle physics.** It makes me happy that all my master students, three of them female, pursued a research career, **my first master student is now a professor in Stockholm.** I have been a supervisor or co-supervisor of master and PhD students of following nationalities, American, Armenian, Egyptian, Greek.. through ... **It was extremely touching to learn, sometimes accidentally and much later that having a "role model" was important for their further achievements.**



.. we have around 20% women held appointments these days...

University of Bergen, Allegatan 55, 5007 Bergen, Norway.
PHYSICIST ATLAS



Kajari Mazumdar: Physicist CMS

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire

... I really find the people at CERN are much unbiased ..very thankful to several seniors in CMS collaboration for their effort in reducing the skew in the situations regarding ethnicity, gender biases etc.

...the atmosphere extremely encouraging to maintain excellence. I did not have much inhibition to carry on with my diversity and people accepted me. This allowed me to learn maximally without being bothered about my diversity with respect to the larger fraction of people at CERN or in the collaboration.





CERN

Google - Physicist from Lugos

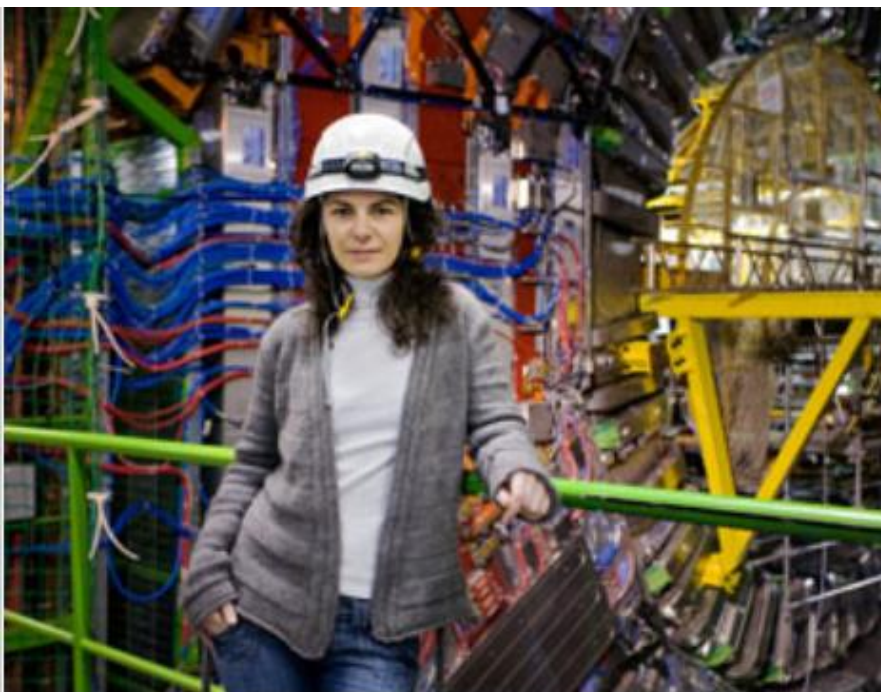
European Organization for Nuclear Research

CMS - Physicist from Lugos

Silvia Goy Lopez



- If you want to
 - learn more
 - see more
 - understand more (and better),
 - Open your mind
- then try to
 - meet more different people
 - see more different places
 - and above all, dance different dances! (top secret!)
- And if you want to communicate to wider audience, evident, have wider pool of communicators



Silvia Goy López é licenciada em Física pela Universidade de Santiago e doutora pelas de Turín e Parisí Sud XI - FOTO: Alberte Pelteável



Satyajit Jena: Physicist ALICE

C



search
erche Nucléaire

Outstanding
Outreach !!





Chiara Mariotti : CMS Physicist



Chiara Mariotti

Si è laureata in Fisica a Torino, svolgendo una tesi di ricerca sperimentale al Laboratorio "Fermi" di Chicago. Dopo aver conseguito il dottorato, ha cominciato a lavorare sull'esperimento DELPHI del CERN: nel 1999 conquista l'incarico di coordinatrice di ricerca in questo esperimento che impegnava ben 550 fisici di 17 nazioni diverse. Pur mantenendo il suo ruolo in DELPHI, nel 2002 si unisce alla grande avventura di LHC, entrando nell'esperimento CMS e diventando uno dei responsabili del gruppo di Torino: questo, mentre nascevano i due figli Pietro di 4 anni e Sergio di 3. Dal 2008 è Coordinatrice centrale delle analisi di CMS per la ricerca del bosone di Higgs.

Ha una studentessa, Giorgia, che ogni tanto si ricorda di quando faceva lezione alla fine dell'ottavo mese di gravidanza e, mentre scriveva formule nella parte alta della lavagna, cancellava senza rendermene conto con la pancia le scritte sottostanti. Vedendomi, tutti mi chiedevano perché non me ne stessi tranquilla a casa... Come spiegare che il lavoro della ricerca non pesa a chi lo fa con passione? Un mese dopo, arrivò la doglia: mentre affrettavo le valigette per andare in ospedale, ricordo d'aver inviato una serie di programmi dal portatile di casa e d'aver raccomandato a mio marito, che mi guardava con occhi spalancati: "Non toccare nulla, i programmi devono girare: sono il mio studente, come si laurea?" Fisica e famiglia, la mia sfida quotidiana, ma anche la mia felicità sta nel riuscire a occuparmi di entrambi.

for Nuclear Research

ne pour la Recherche Nucléaire

Outstanding Mentor:

Dozens of "professionals"
Churned out...

<http://www.ba.infn.it/donne-lhc/mostra.php?lang=en>

Chiara Mariotti graduated in physics in Turin, with a thesis on experimental research at the Fermi lab in Chicago. After getting her Ph.D., she began working on CERN's DELPHI experiment. In 1999 she reached the position of research coordinator of this experiment, which engaged 550 physicists from 17 different nations. While keeping her role at DELPHI, in 2002 she joined LHC's big adventure by getting involved in the CMS experiment and becoming one of the people in charge of the Turin group. All of this while having her two children: Pietro, 4, and Sergio, 3. Since 2008 she has been the main coordinator of CMS analysis for the search of the Higgs boson.

"I have a student, Giorgia, who once in a while reminds me of myself when I was at school. I was 8 months pregnant and while I was writing formulas in the upper part of the blackboard, I didn't realize I was erasing the bottom part with my belly. Looking at me, everyone would ask me why I didn't just stay at home and take it easy... How could I explain that research work isn't a hassle to those who do it with passion? A month later, I started to get contractions. While I was grabbing the suitcase to go to the hospital, I remember I ran a series of programs from my home laptop and told my husband, who was looking at me wide-eyed: "Don't touch anything. The programs have to run. Otherwise how will my student graduate?" Physics and family, my daily challenge, but my happiness lies also in being able to have both. "



Enhancing research quality and its impact

New research perspectives

Higher institutional profile

Influence and networking opportunities

Forming new collaborations and partnerships

Enjoyment and personal reward

Possible additional funding

Increasing awareness of the value of research to society

Inspiring the next generation of researchers



Excellence in Science Communication: A tool for diversity

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire



Scientific Advisor

of the Secretary-General of the U

h
U
Scientific and C





Blowing smithereens to smithereens...
.... Religion begins where science ends





ACKNOWLEDGEMENTS

CERN

European Organization for Nuclear Research

Organisation Européenne pour la Recherche Nucléaire

Many thanks to:

Satyajit Jena, Kerstin Borrás, Chiara Mariotti, Silvia Goy Lopez, Kai-Feng Chen, Kajari Mazumdar, Harrison Prosper, Guy Paic, Lashkar Kashif, Anna Lipniacka, Suyog Shrestha and Geeta Chadha.

T. Camporesi, P. Giubellino and D. Charlton.

Thank you for your attention !!

*The woods are lovely, dark, and deep,
But I have promises to keep,
And miles to go before I sleep,
And miles to go before I sleep.*

Robert Frost

