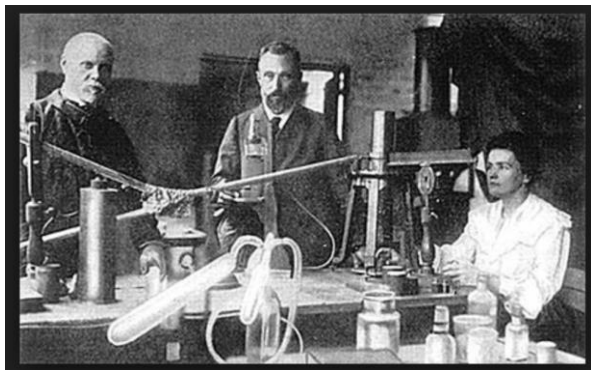
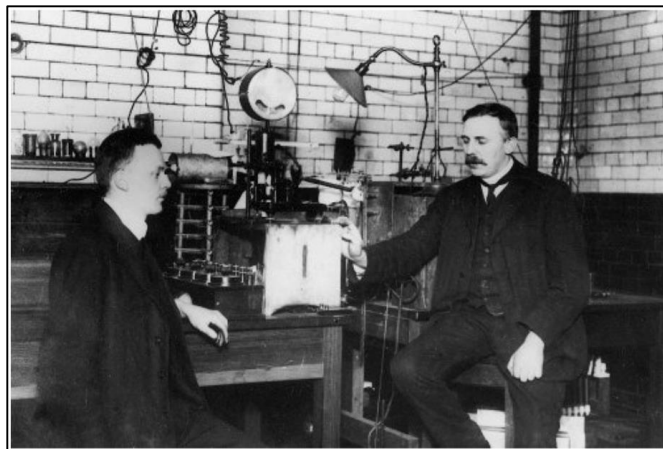


# Individual Recognition in Large Collaborations

Archana SHARMA  
CERN  
CH1211 Geneva  
Switzerland

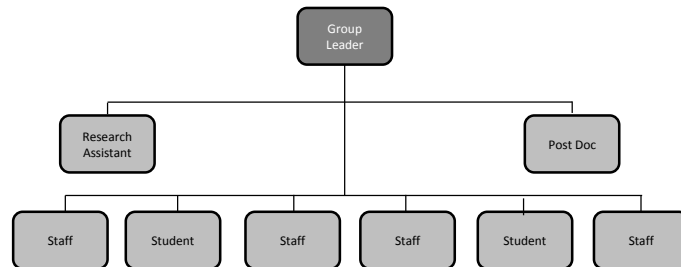


Pierre Curie  
Assistant Petit  
Marie Curie



Hans Geiger and Ernest Rutherford

19<sup>th</sup> and 20<sup>th</sup> Century



A HEP Group in 70s

30-50 physicists from 10-15  
Participating Institutions  
5-8 countries.

UA1 & UA2

1980's

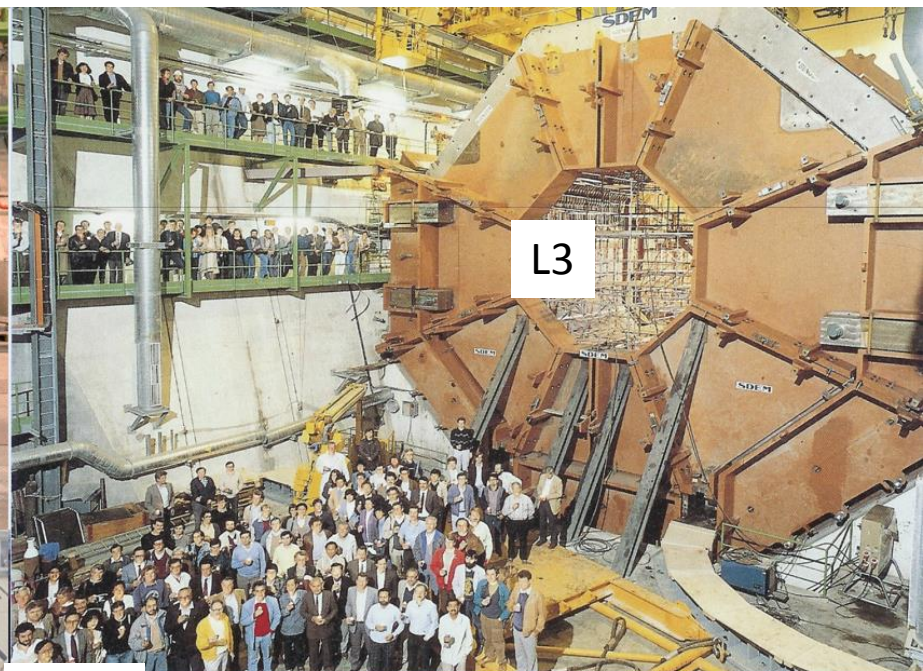
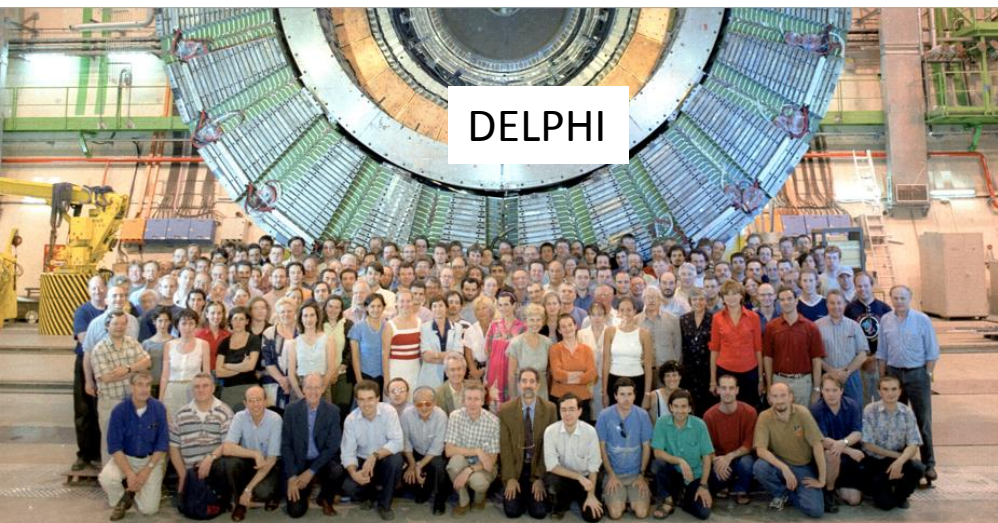


## Natural evolution of Individual Recognition

Important component of career and job security

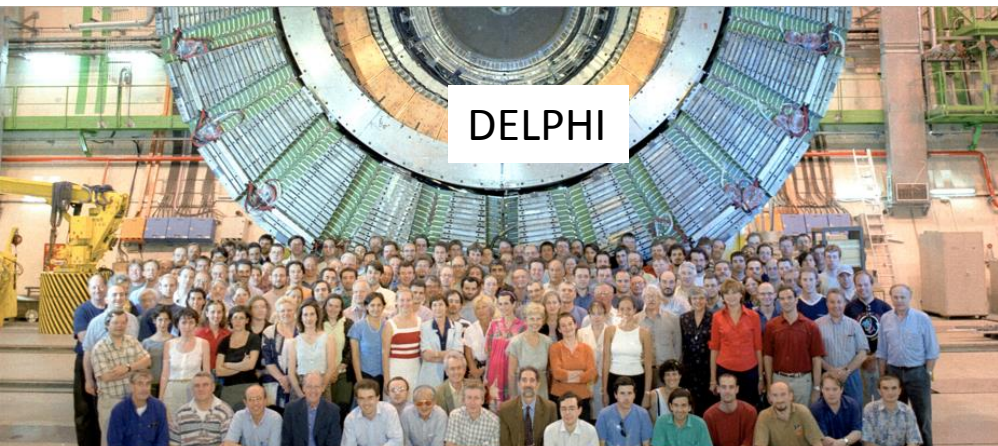
# 1990's

300-550 physicists from 20-30 participating  
Institutions in 15-20 countries

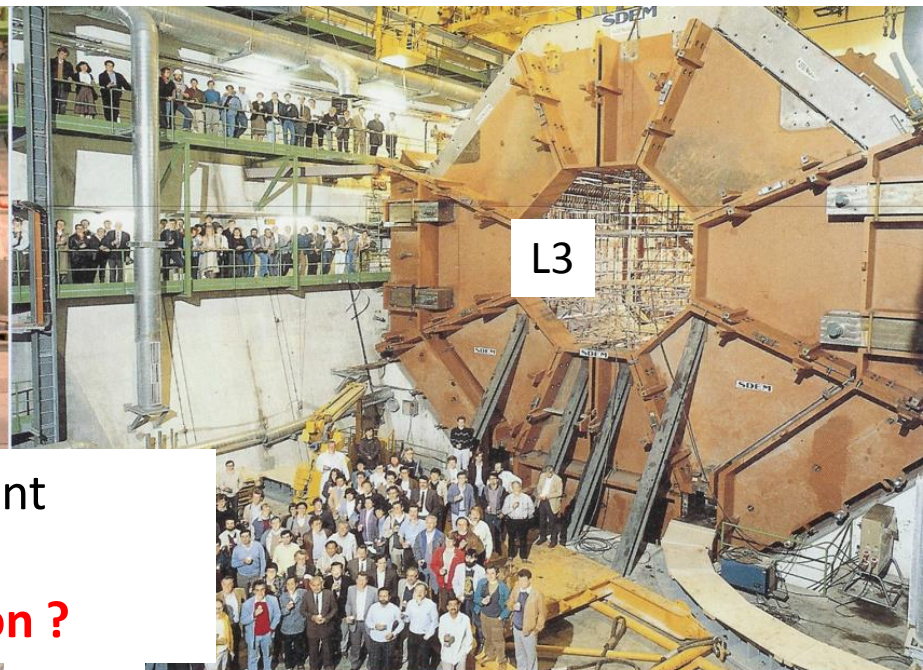


# 1990's

300-550 physicists from 20-30 participating Institutions in 15-20 countries.



DELPHI



L3

Need for Large Collaborations an important component of scientific progress

**But are we diluting Individual Recognition ?**



ALEPH



OPAL

# LHC Experiments

Up to 5500 physicists from 150-200 participating Institutions from 40-50 countries.

2000's  
2010's



# LHC Experiments

Leadership emanating from previous generation experiments

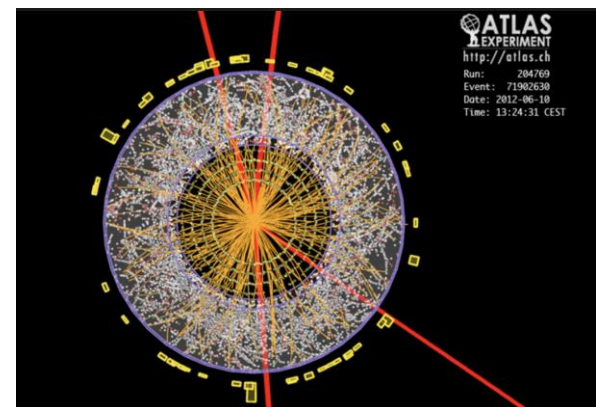
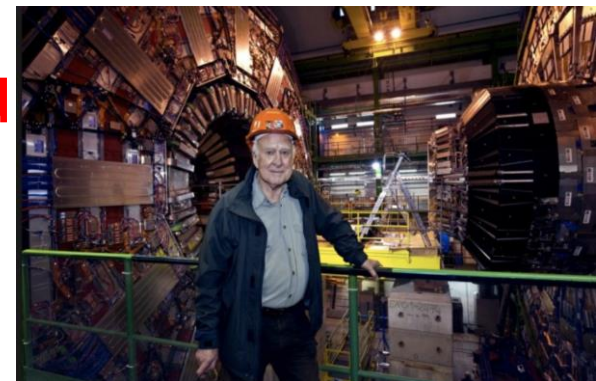
**Caveats in Individual Recognition?**

2000's  
2010's



# Large collaborations are successful

- Clear definitions, agreements on roles
- Open communication within teams
- Recognition and respect
- Addressing problems cooperatively as they occur.
- Group goals are placed above personal satisfaction and/or recognition.
- Absolute willingness to forgiving for mistakes
- Challenges?
- Particularly for young budding



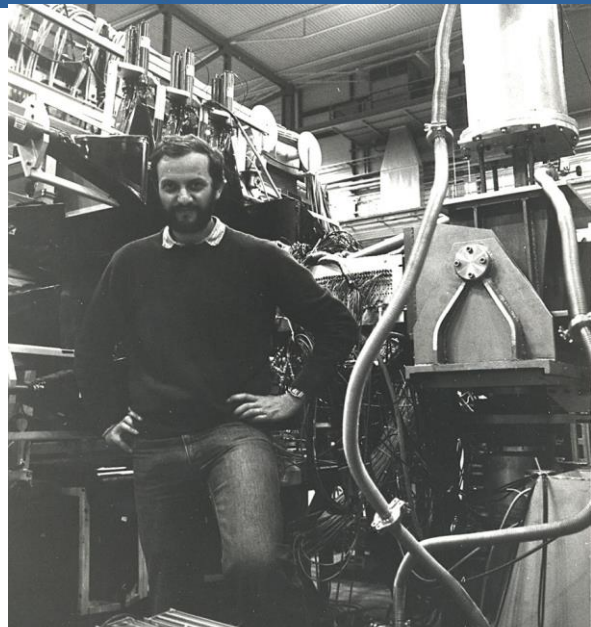
ALBA Synchrotron Barcelona - July 19-20, 2018



SCARF

**Autonomy** – is “the perception of exerting control over one’s environment; a sensation of having choices.”  
Providing multiple choices is preferable

**NA1, NA7, CDF,  
ALEPH  
CMS Spokesperson**



Top: CERN NA close to the UA1 target (1977)  
First silicon and germanium  $\mu$ Strip active targets for the study of charmed particles. Lorenzo Foa was the leader of the experiment.”



His 'mentors': Max Ferro-Luzzi when Peter was a Fellow, Pierre Darriulat at the ISR and UA2, in UA2 Luigi Di Lella, at SLAC Burton Richter...

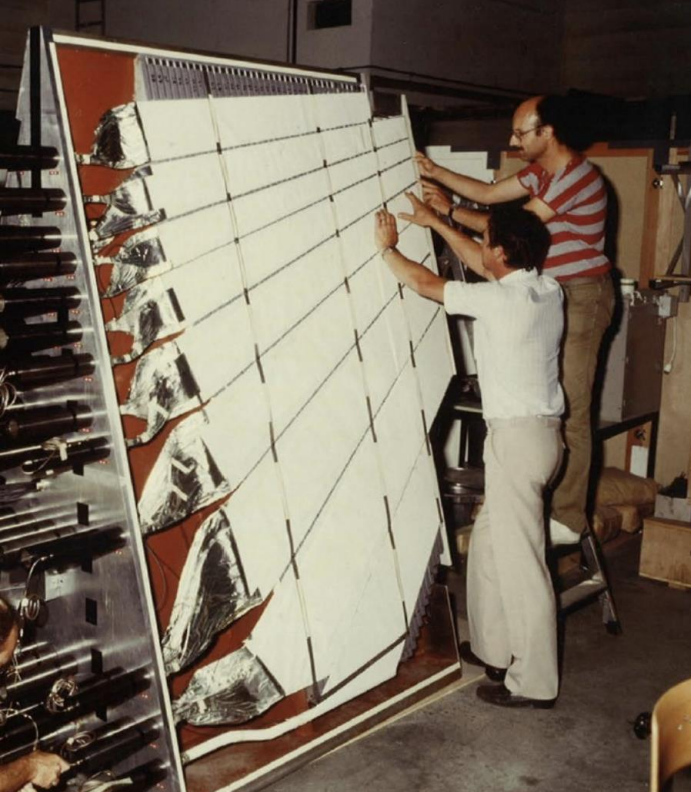
# Peter Jenni

**CONCEIVED and LED the ATLAS EXPERIMENT over two decades**



ENJOY IN A DEEP WAY OUR LUCK TO LIVE ON A BEAUTIFUL PLANET, CONTRIBUTE TO AND SHARE HAPPINESS WITH OTHERS, ADD SOMETHING TO OUR COMMON UNDERSTANDING AND KNOWLEDGE OF NATURE.

*Peter Jenni* LegacyProject  
GROWTH HACK YOUR LIFE



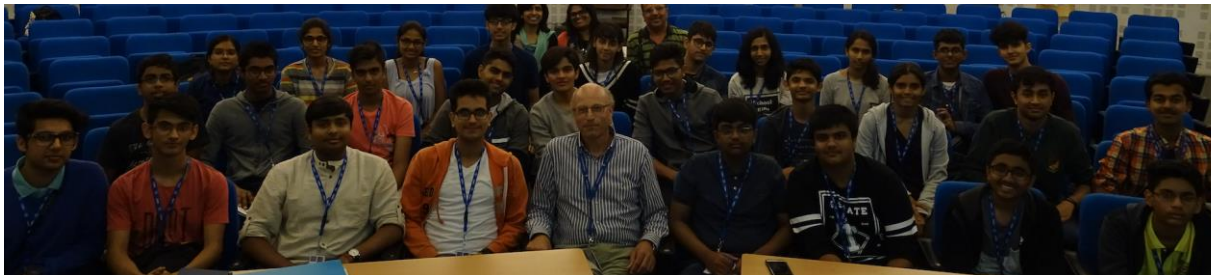
Checking the last details of an end-cap calorimeter module for the upgrade of the UA2 experiment: July 1985.

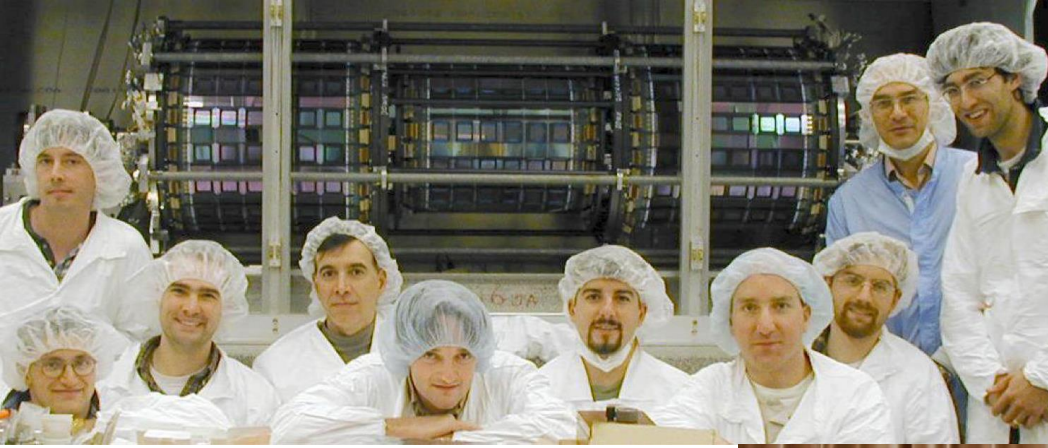


## SCARF

A mentor for generations

**Fairness** –A threat to fairness can be triggered easily and unintentionally. Threats to perceived unfairness are reduced by increasing transparency and communication.





**UA2**  
**Top Quark Discovery**  
**And of course LED the**  
**The Higgs Boson Discovery in CMS!**

**Joe Incandela**

**Mentor** for now distinguished researchers & SPs !

David Stuart

Doug Glenzinski

Chris Hill

Joel Goldstein

Tony Affolder



**Relatedness** – whether others are “in” or “out” of a social group or maybe whether someone is for you or against you. It involves a sense of belonging. Tend to treat people we don’t consider in our group differently and are less likely to work well as a team.



## Individual Recognition



Highest performers – are not only the valuable collaboration members  
Best networked and resourceful people carry progressively increasing information and soft skills  
Are we leaving people behind?  
If yes, why?

# Individual recognition Concerted element of Large Collaborations

- Paradigm change from previous generation
- Our goals apart from physics and technology development are **nurturing scientific temper and individual careers**
- Procedures currently deployed in our very large collaborations and the opportunities
- Requirements to strengthen the system
- The importance of individual recognition from the perspective of the individual's career and the strength and efficiency of the collaboration
- Multi-Institutional and mutually beneficial



ALBA Synchrotron Barcelona - July 19-20, 2018

# Individual recognition Concerted element of Large Collaborations

- Our goals apart from physics and technology development are **nurturing scientific temper and individual careers**

- Procedures currently deployed in our

**SCARF** large collaborations and the  
opportunities or requirements to

[https://www.epa.gov/sites/production/files/2015-09/documents/thurs\\_georgia\\_9\\_10\\_915\\_covello.pdf](https://www.epa.gov/sites/production/files/2015-09/documents/thurs_georgia_9_10_915_covello.pdf)

Established techniques in NLP  
Peer and student mentoring techniques in education

- Career and the strength and efficiency of the collaboration
- Multi-Institutional and mutually beneficial



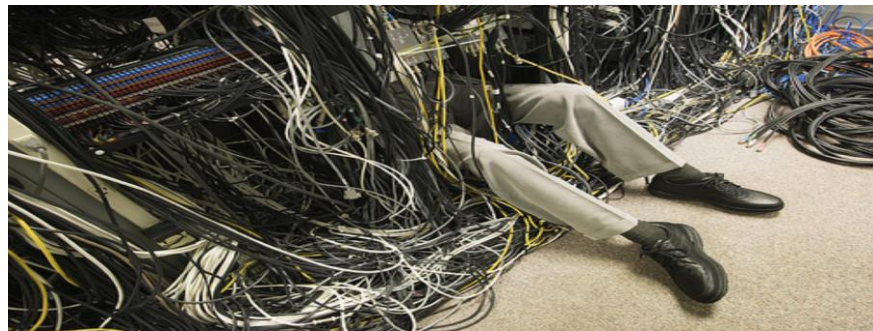
## Framing tough questions and new metrics !

- Individual factors, team dynamics
- Factors at the team, center, or institute level?
- Different management approaches and leadership styles?
- Tenure and promotion policies acknowledge and provide incentives to academic researchers who engage in large collaborations? Metrics? Publications?
- Interplay in productivity and effectiveness of organizations / funding agencies that conduct and support large collaborations?



SCARF

**Status** – Our perceived relative importance and seniority as compared to others. A little appreciation goes a long way !

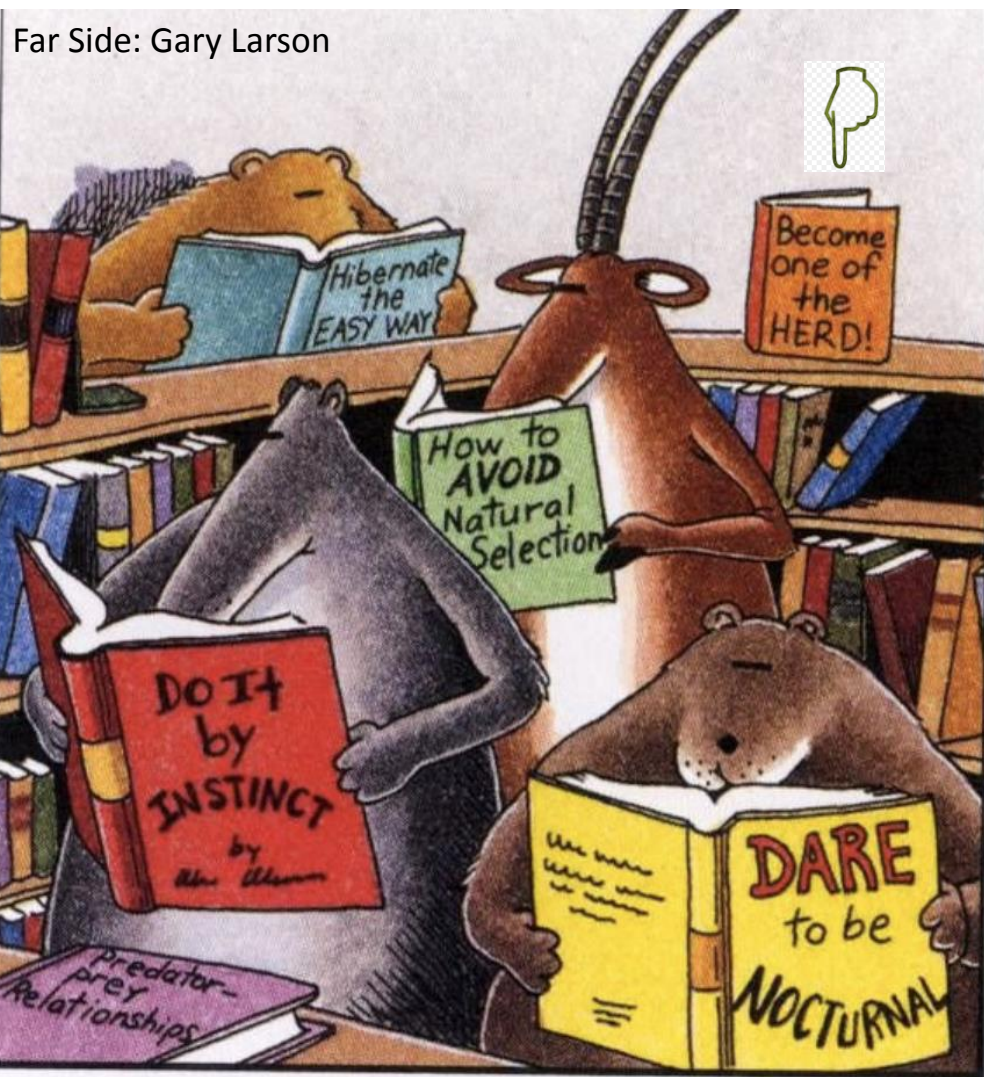


## If I have a novel idea, how do I navigate?



- Numerous discussions, several levels many stages,
- Long process: "how can it be known to the outside world, that the idea was mine" particularly to pertinent committees
- Options and metrics to get individual recognition.
- Motivations to seek more new ideas and/or help career promotion?

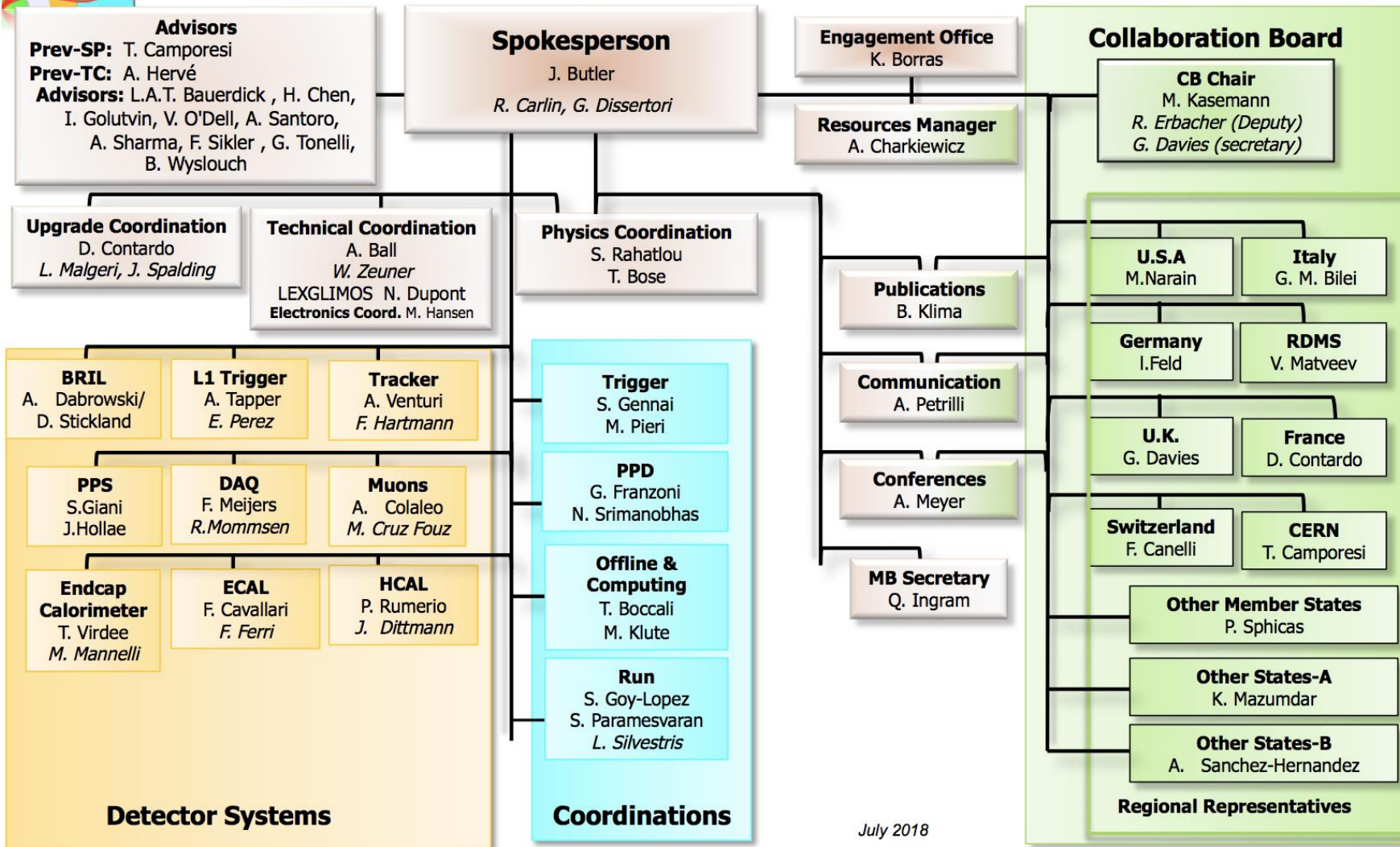
## What are the challenges?



In the animal self-help section



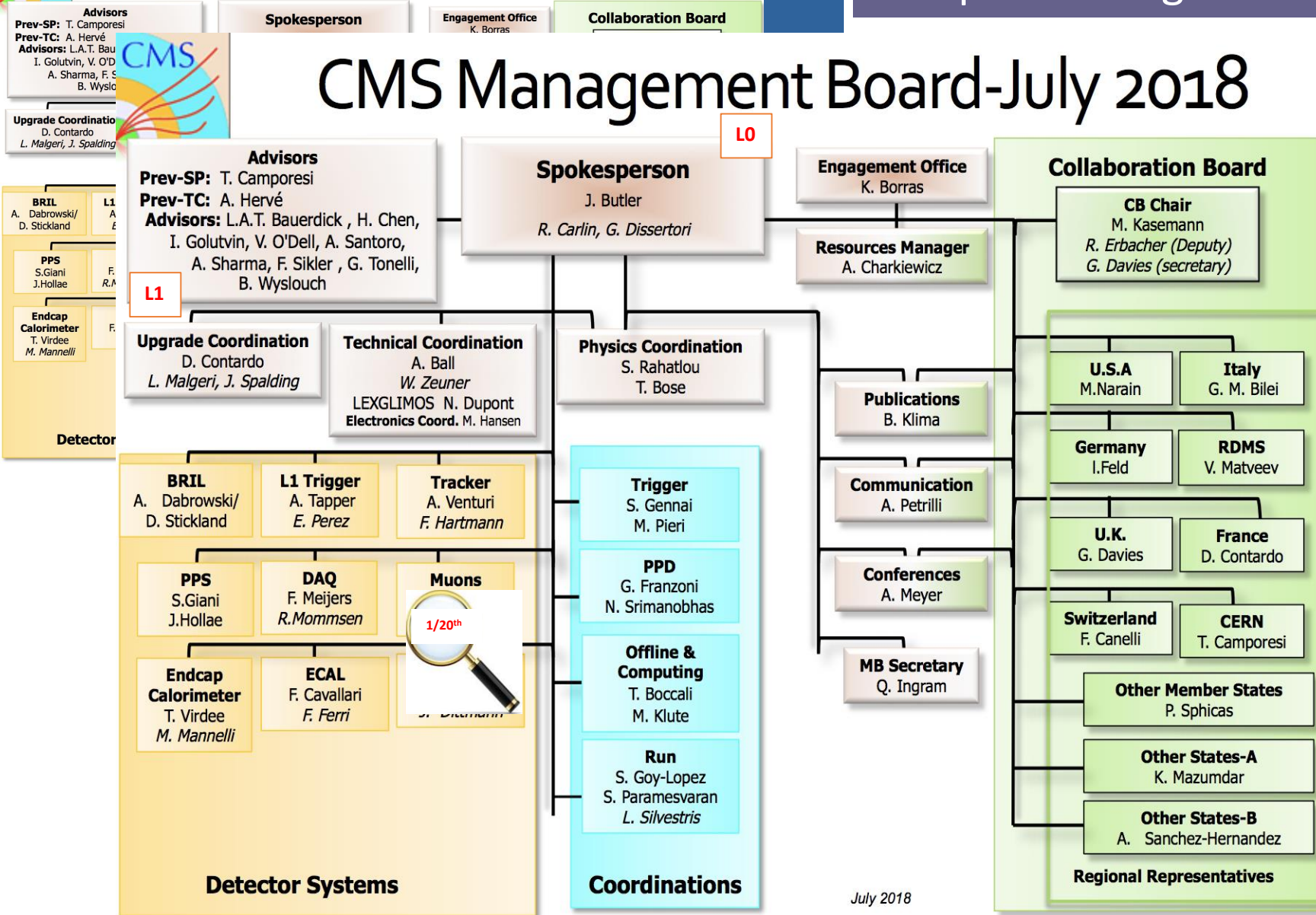
# CMS Management Board-July 2018



July 2018

Challenge #1

# CMS Management Board-July 2018

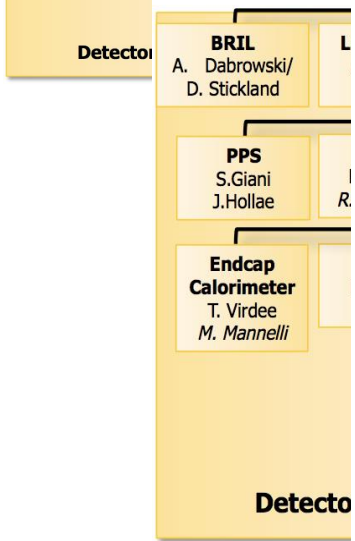
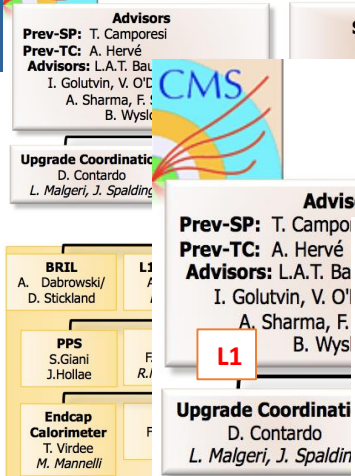


July 2018

## Challenge #1



# CMS Management Board-July 2018



## GEM Upgrade Project

**Institute Representatives**  
*with*  
**M. Tytgat (IB Chair),**  
**P. Giacomelli (Deputy)**

L1

**Project Manager**  
**A. Sharma**  
**A. Safonov (Deputy)**

**Resource Manager**  
**S. Bianco**

Muon RM Office

**Project Engineer**  
**A. Conde Garcia**

**GEM Conference & Publications Committee**  
**P. Karchin (chair),**  
**M. Naimuddin (deputy),**  
**O. Bouhali,**  
**K. Hoepfner,**  
**C. Riccardi**

Muon Conf. Pub. Board

L2

**Technical Coordination**  
**A. Marinov**  
**M. Bianco (Depty)**

Muon TC Office

**DPG**  
**C. Calabria**  
**T. Kamon (Depty)**

Muon DPG Office

**Upgrade Coordination**  
**A. Safonov**  
**M. Hohlmann (Depty)**

**Upgrade Physics**  
**F. Cavallo**  
**R. Venditti**

**R&D Phase II**  
**M. Hohlmann**  
**P. Vitulo**

**Electronics**  
**P. Aspell**  
**G. de Lentdecker**

**Operation & Online Systems**  
**J. Sturdy**  
**M. Maggi (Depty)**



**Detector Hardware**  
**L. Benussi**  
**B. Dorney**

**Challenge #1**



# CMS Management Board-July 2018

**Advisors**  
 Prev-SP: T. Camporesi  
 Prev-TC: A. Hervé  
 Advisors: L.A.T. Bau, I. Golutin, V. O'D., A. Sharma, F. B. Wysokinski

**Upgrade Coordination**  
 D. Contardo, L. Malgeri, J. Spalding

**Spokesperson**  
J. Butler

**Engagement Office**  
K. Borras

**Collaboration Board**  
CB Chair

**BRIL**  
A. Dabrowski, D. Sticland

**PPS**  
S. Giani, J. Hollae

**Endcap Calorimeter**  
T. Virdee, M. Mannelli

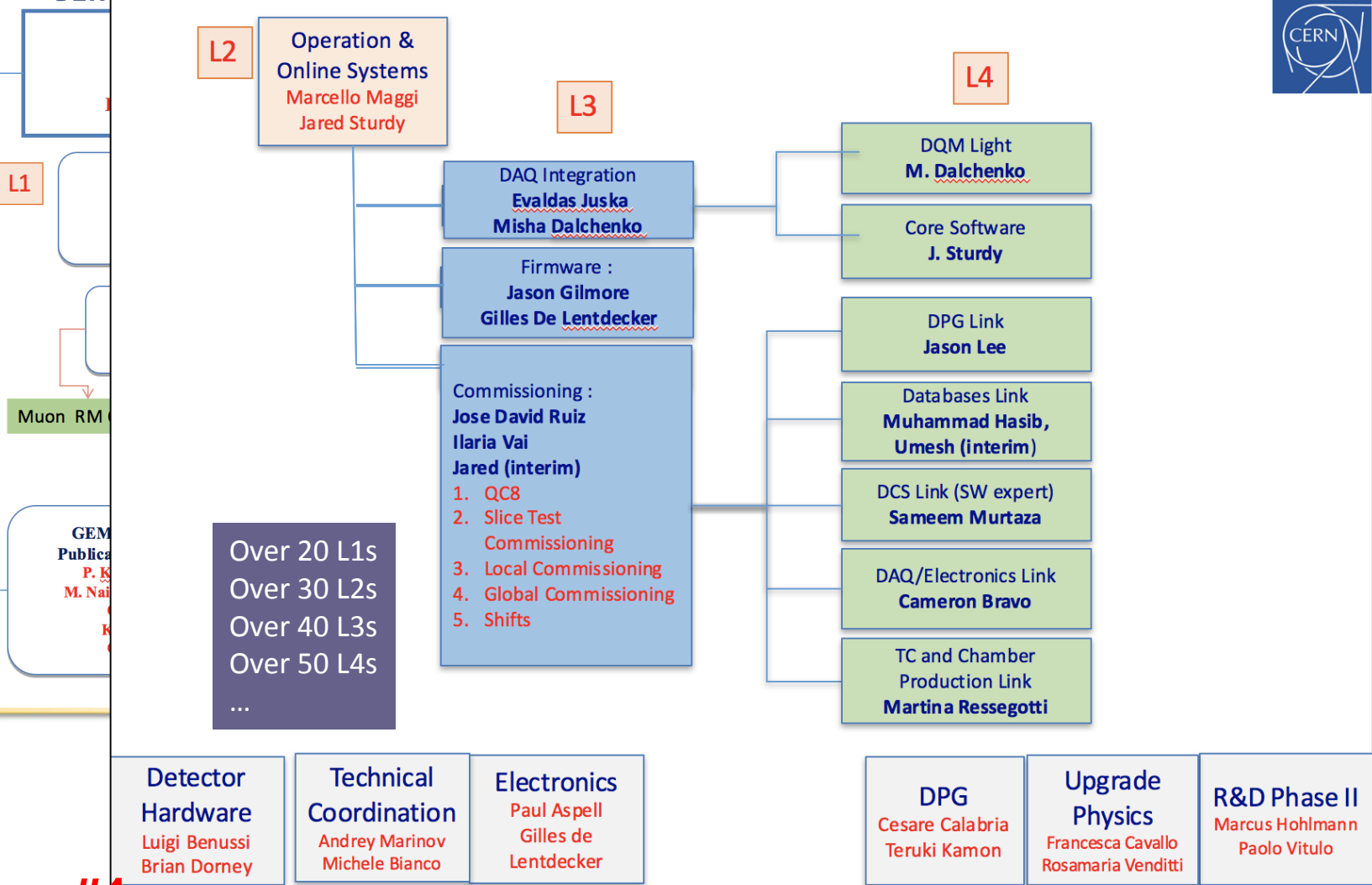
**Detector**

**BR**  
A. Dabrowski, D. Sticland

**P**  
S. Giani, J. Hollae

**Endcap Calorimeter**  
T. Virdee, M. Mannelli

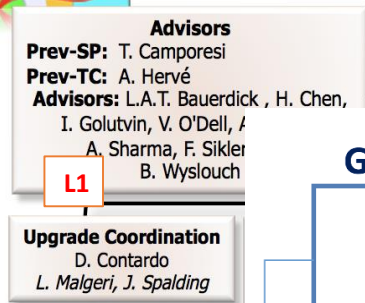
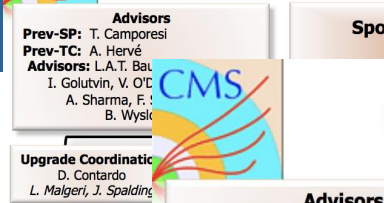
### GEM Upgrade Project



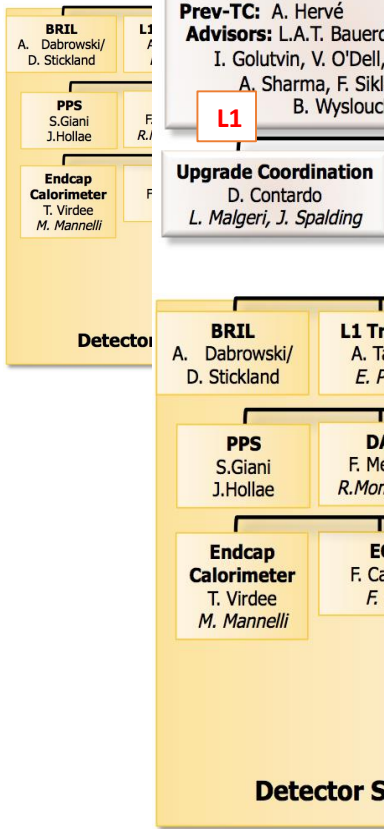
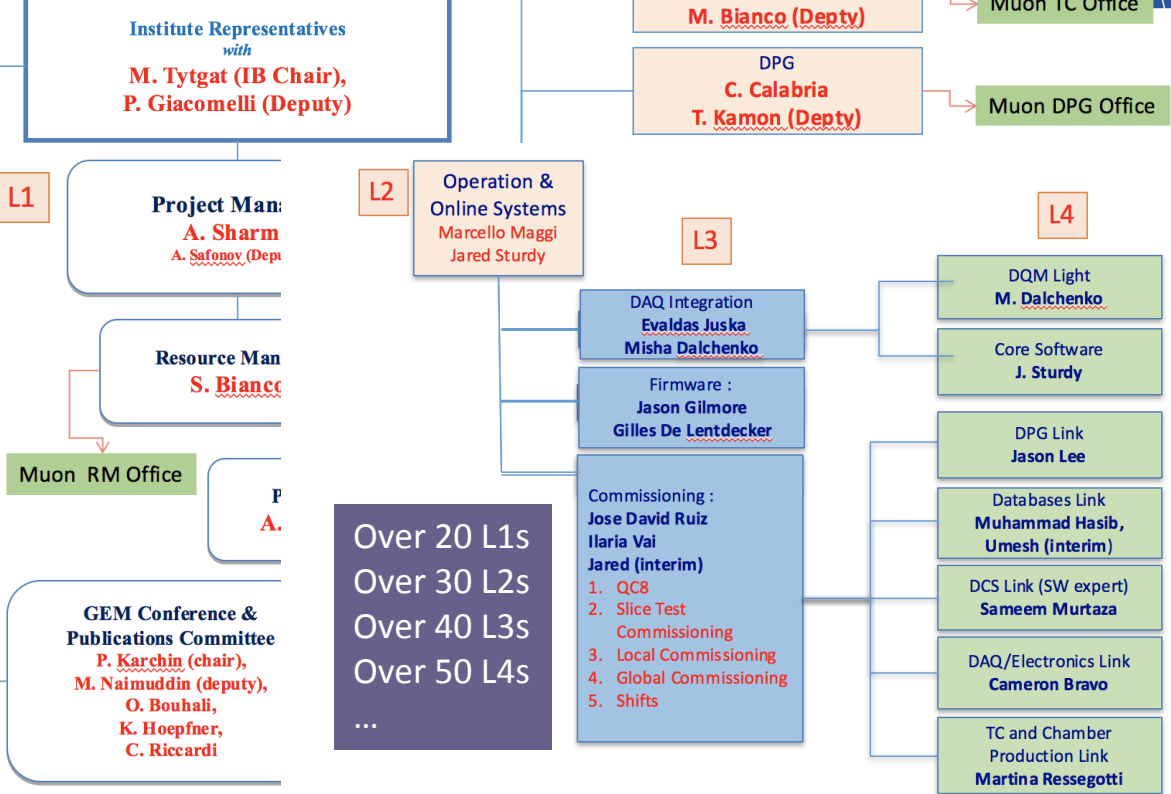
**Challenge #1**



# CMS Management Board-July 2018



## GEM Upgrade Project

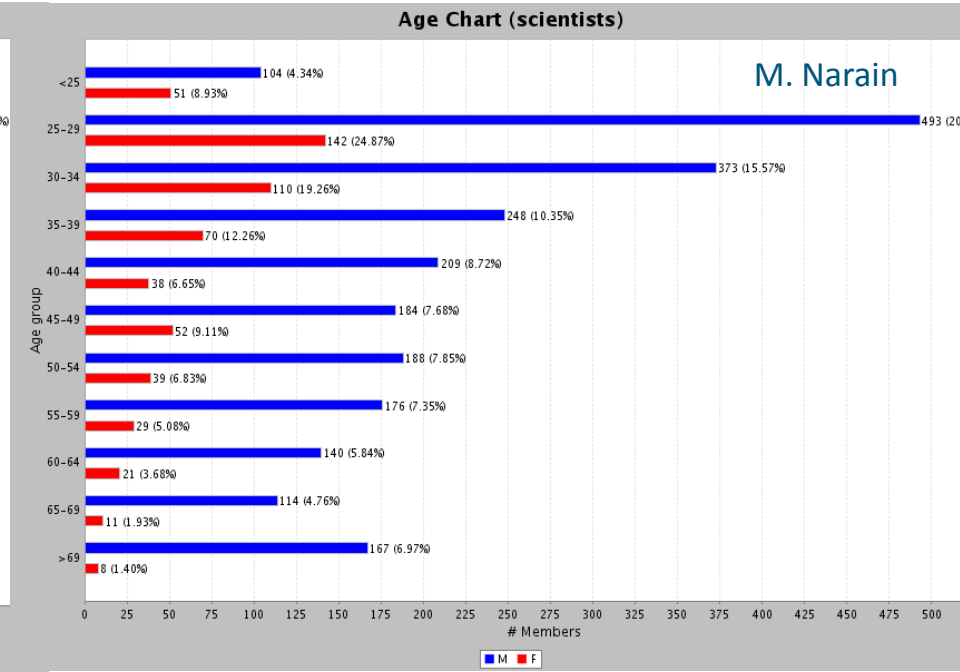
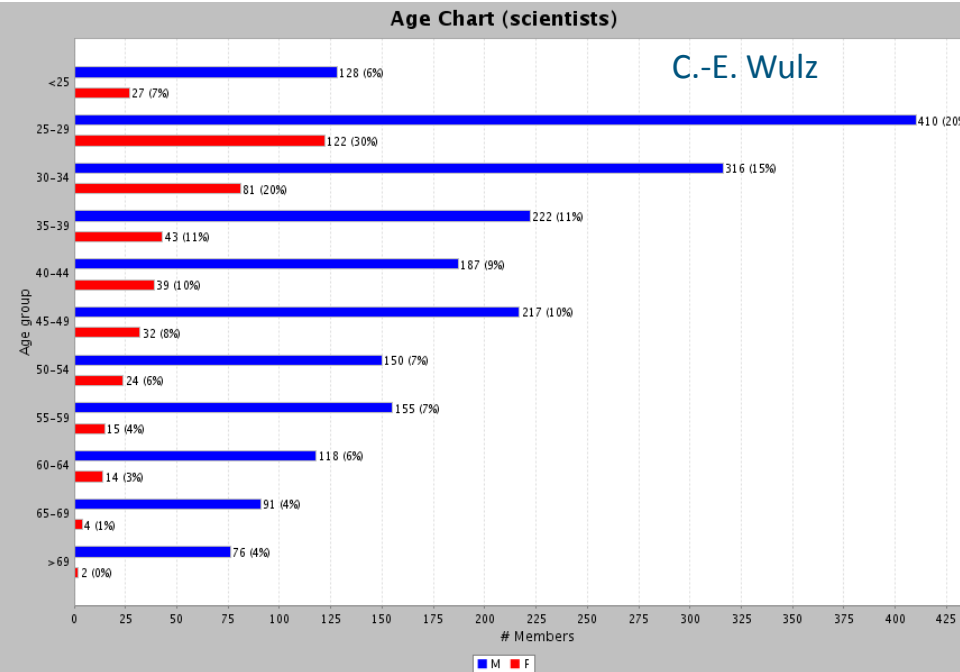


**Challenge #1**

**Demographic** - Gender, ethnical / cultural and age diversity  
**Multi-disciplinary and cross-functional** - Physicists, Engineers, Software specialists, Electronics ...  
**Knowledge & Education** - different perspective on similar things



chart\_2009-12-10:14:33:440.png: TotalM = 2070, TotalF = 403



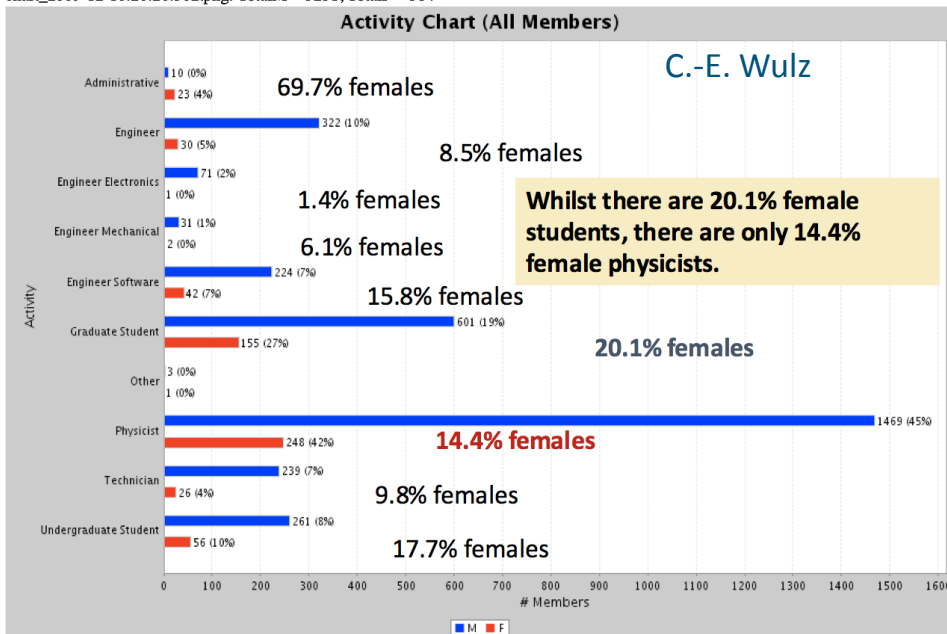
Age and gender distribution 2009

Age and gender distribution 2018

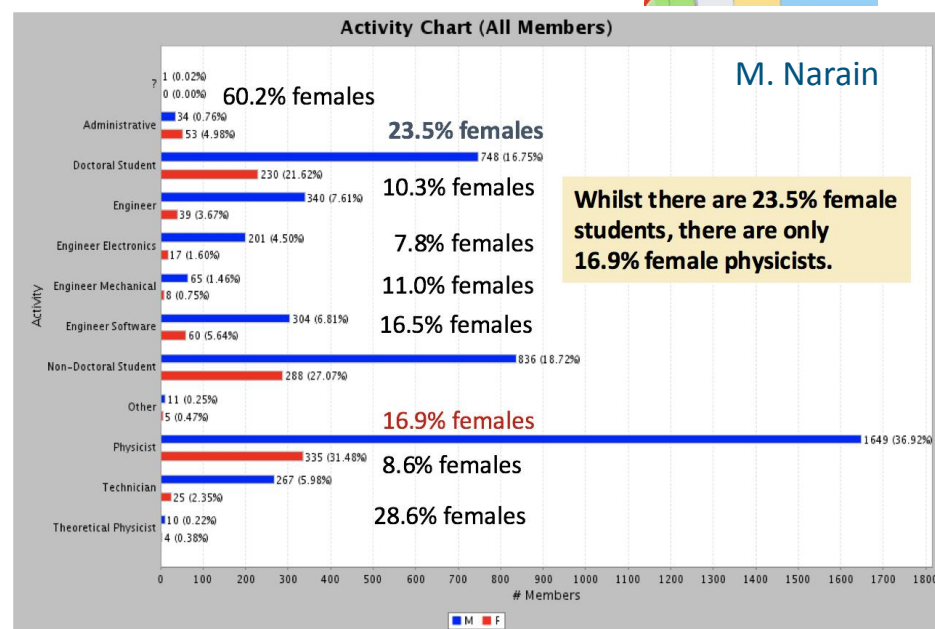
**Experience - Diversified experiences**  
**Generalists & Specialists - Breadth vs. Depth**  
**Extra-curricular interests - we are the sum of our experiences**



chart\_2009-12-10:20:26:302.png: TotalM = 3231, TotalF = 584



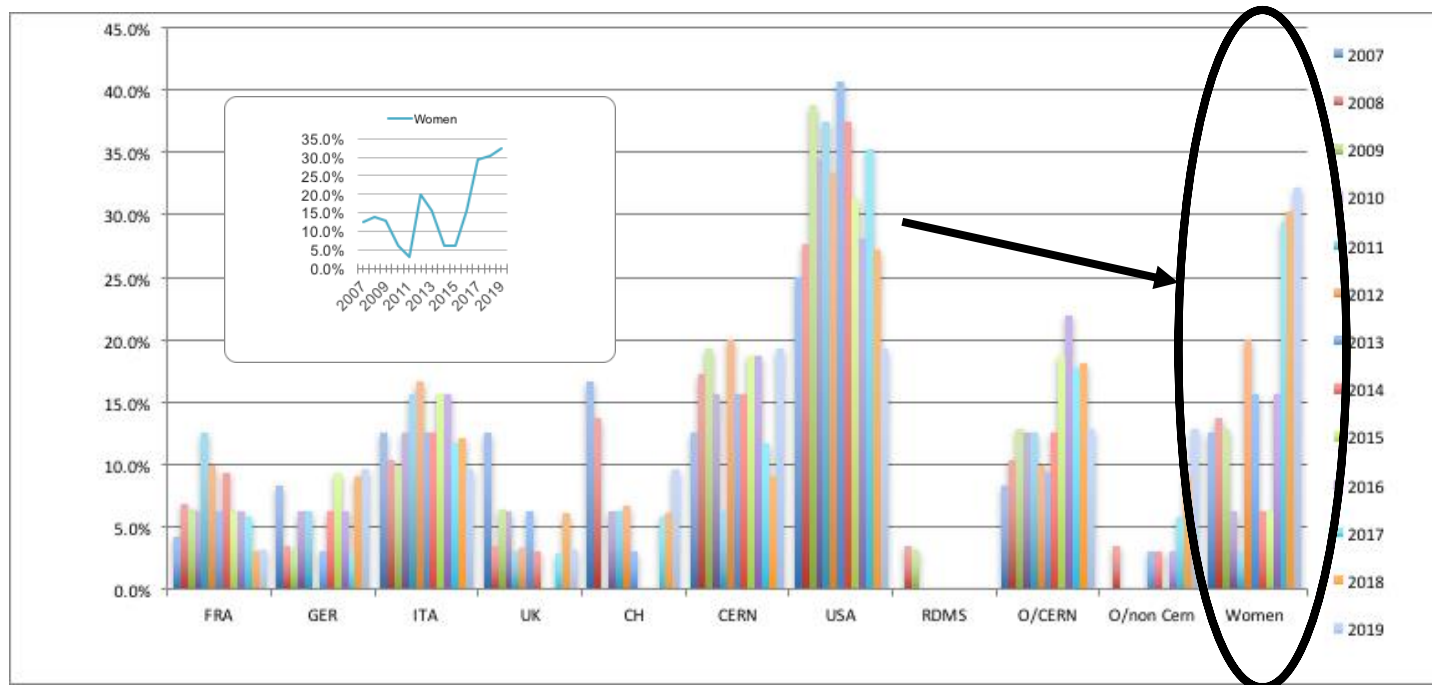
Distribution by activity 2009



Distribution by activity 2018

**Challenge #3**

**Cognitive Preferences - Introverts vs Extroverts**  
**Risk taking – Some willing to take more risk than others**  
**Visionaries vs. Pragmatists – Optimists vs devil’s advocates**



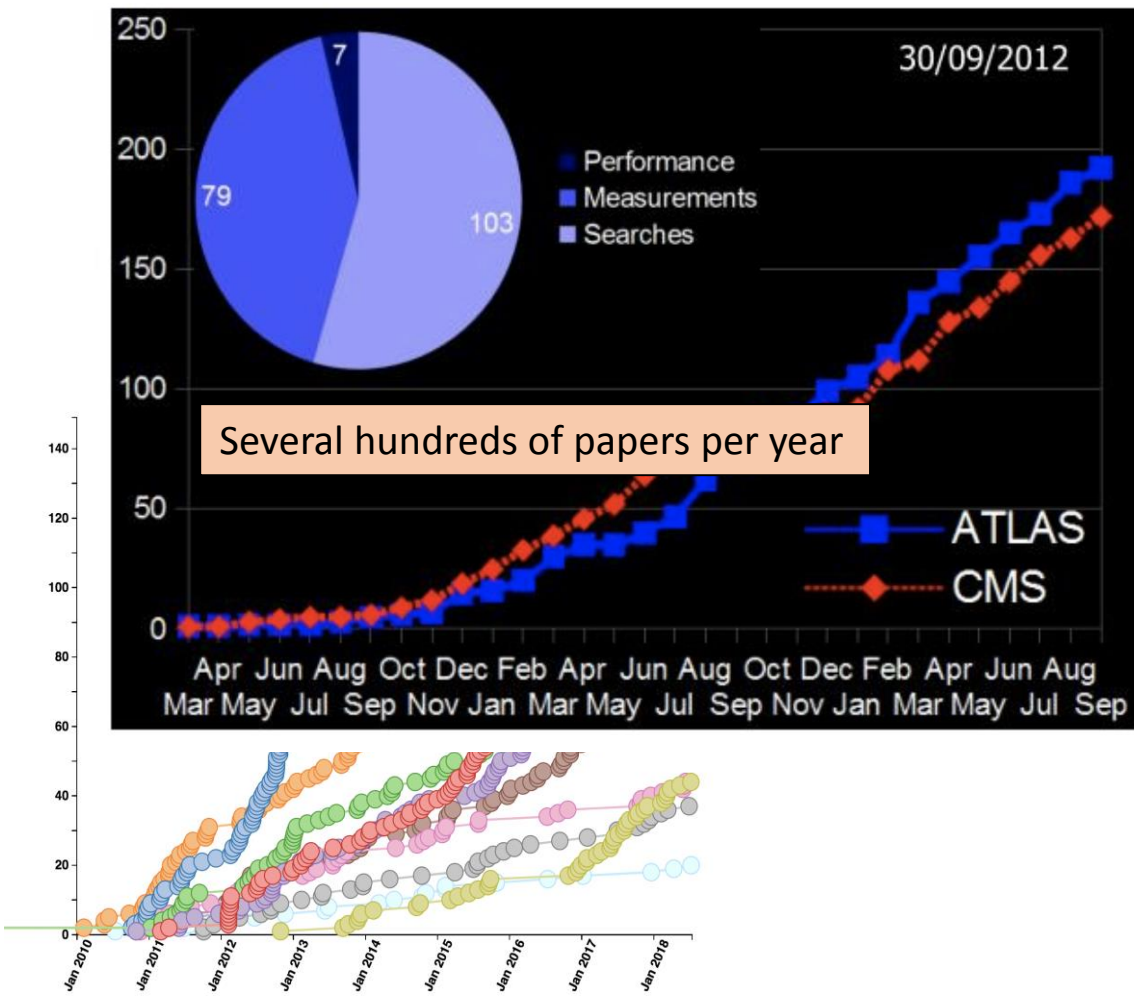
CMS Level 2 positions:  
Gender in PAG and POG 2007-2017

**Challenge #4**



# Conferences, talks, Publications Information Management !

A measure of success is publications in prestigious journals and funding



## Challenge #5

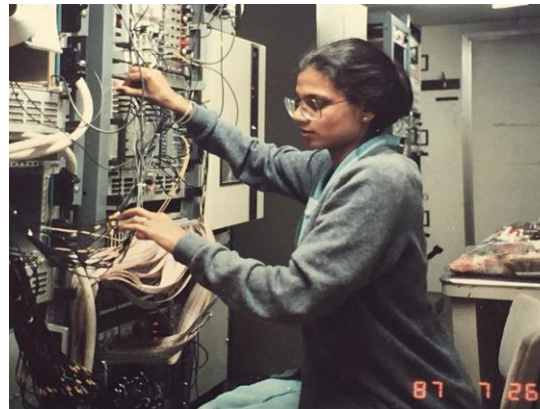
# Recognition in home institutions

- Participate in Large experiments?
- **Hyper-authorship**
- Research spanning decades
- **Career progression increasingly long and daunting**
- Individual research greater academic credit

Physics paper sets record with more than 5,000 authors

Detector teams at the Large Hadron Collider collaborated for a more precise estimate of the size of the Higgs boson.

Only the first nine pages in the 33-page article, published on 14 May in *Physical Review Letters*<sup>1</sup>, describe the research itself — including references. The other 24 pages list the authors and their institutions.



**Challenge #6**

## Enhancing & Coordinating Individual Recognition

- Policies that could affect large and small teams
- Assess individual performance and communicate
- Understand and manage circumstances that facilitate or hinder
- Understand how teams connect
- Unattainable by individual or simply additive efforts
- Team dynamics, team management, and institutional structures



**Design appropriate Survey?**  
**Are we qualified?**  
**Professional Consultants?**  
**Combination?**

## Factors, team dynamics for effectiveness and productivity vs Individual Recognition

- Contagious enthusiasm
- Constructive collaboration vs competition within a team
- Strongest group domination
- Leadership of the team is the most critical element that determines success
- Perceives appreciation by the group's leadership.
- Conscious and coherent effort to promote young scientists
- Shadowing the efforts of other members of the team
- Each member feels to be an essential part of the project

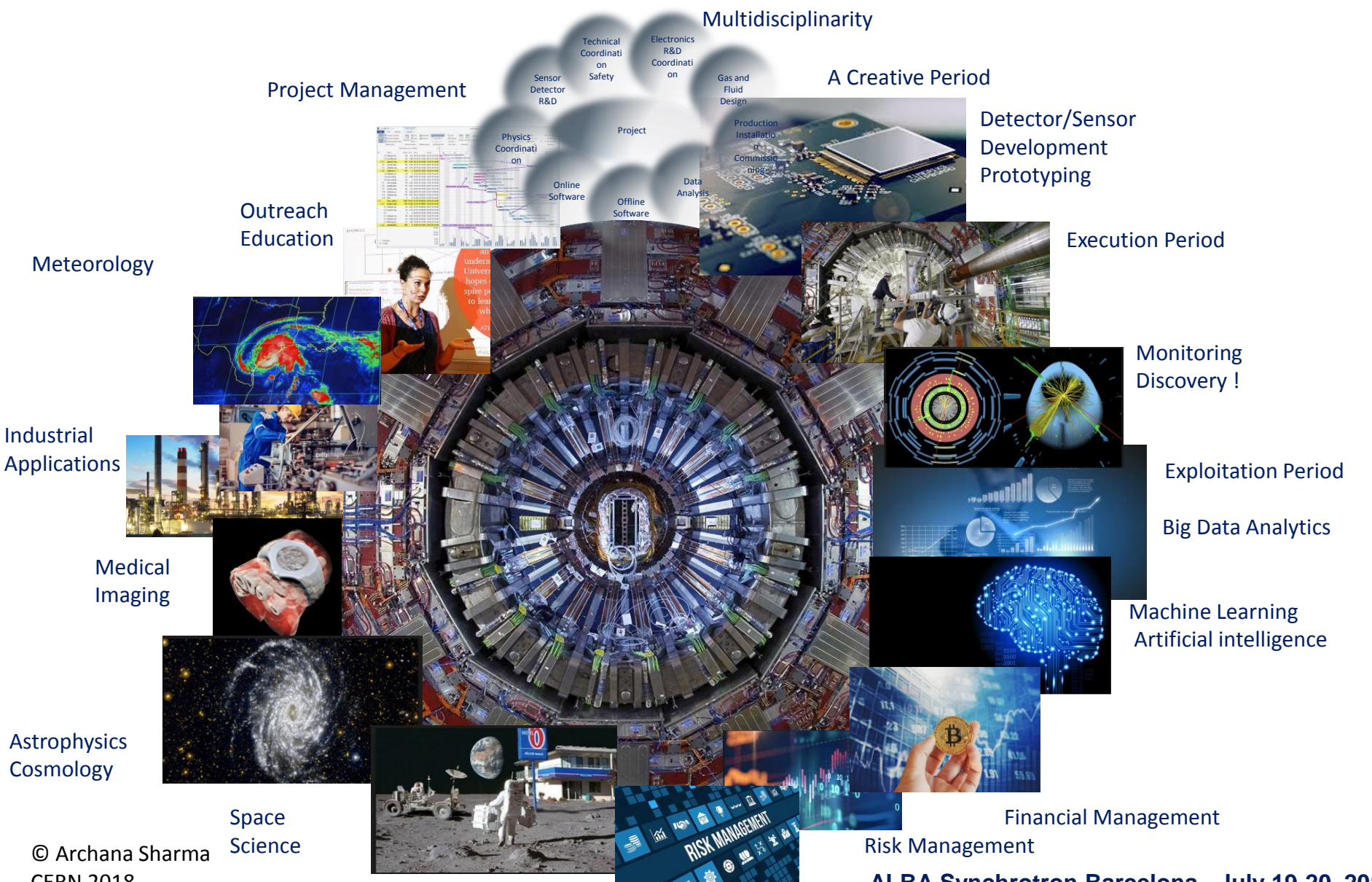


- Design and Launch
- Appropriate Survey ?

# Particle physicists are sought after in every domain

## The skill set is unique – “a new value” creation by Large HEP Collaborations

### Multidimensional Growth - Publication Count is not a valid metric anymore



## Redefining Individual Recognition as a metric

1. Every phase of the project
2. Every phase of a career
3. Reward all creative incremental success
4. No one / No group is weak enough to be left behind or strong enough to do it alone !
5. Develop a common perspective

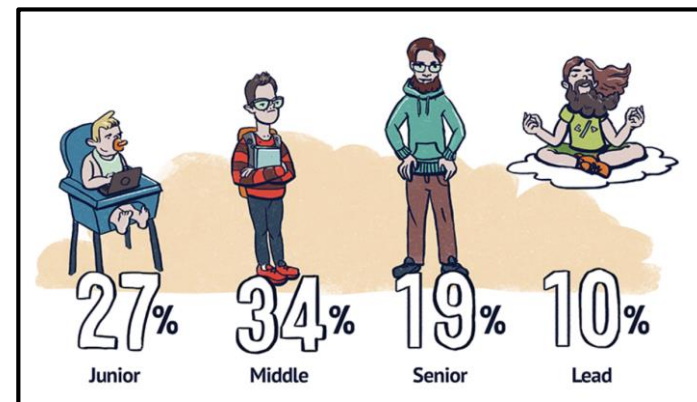


## Outlook:

1. Exploit and improve the strength and power of a large collaboration !
2. Bring every single person to the maximum effectiveness !
3. Motivate and Stimulate Individual Recognition, Career choices !
4. Formulate new metrics with the help of a study and survey of Large Collaborations and (NLP/SCARF) tools !



The power of being persistent



# THANK YOU FOR YOUR ATTENTION

## Acknowledgements:

Jorgen D'Hondt

Peter Jenni

Joe Incandela

Guido Tonelli

Dave Barney

Duccio Abbaneo

*Apologies for a certain bias towards CMS simply for availability of data*