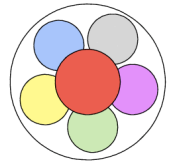
THE ANALYSIS CENTRE



STATUS AND PERSPECTIVES

Thomas Schörner-Sadenius (DESY)

2nd Annual Workshop
Aachen, 28 November 2008

OUTLINE

- Short reminder:
  The Analysis Centre in the Alliance

- What do we want?

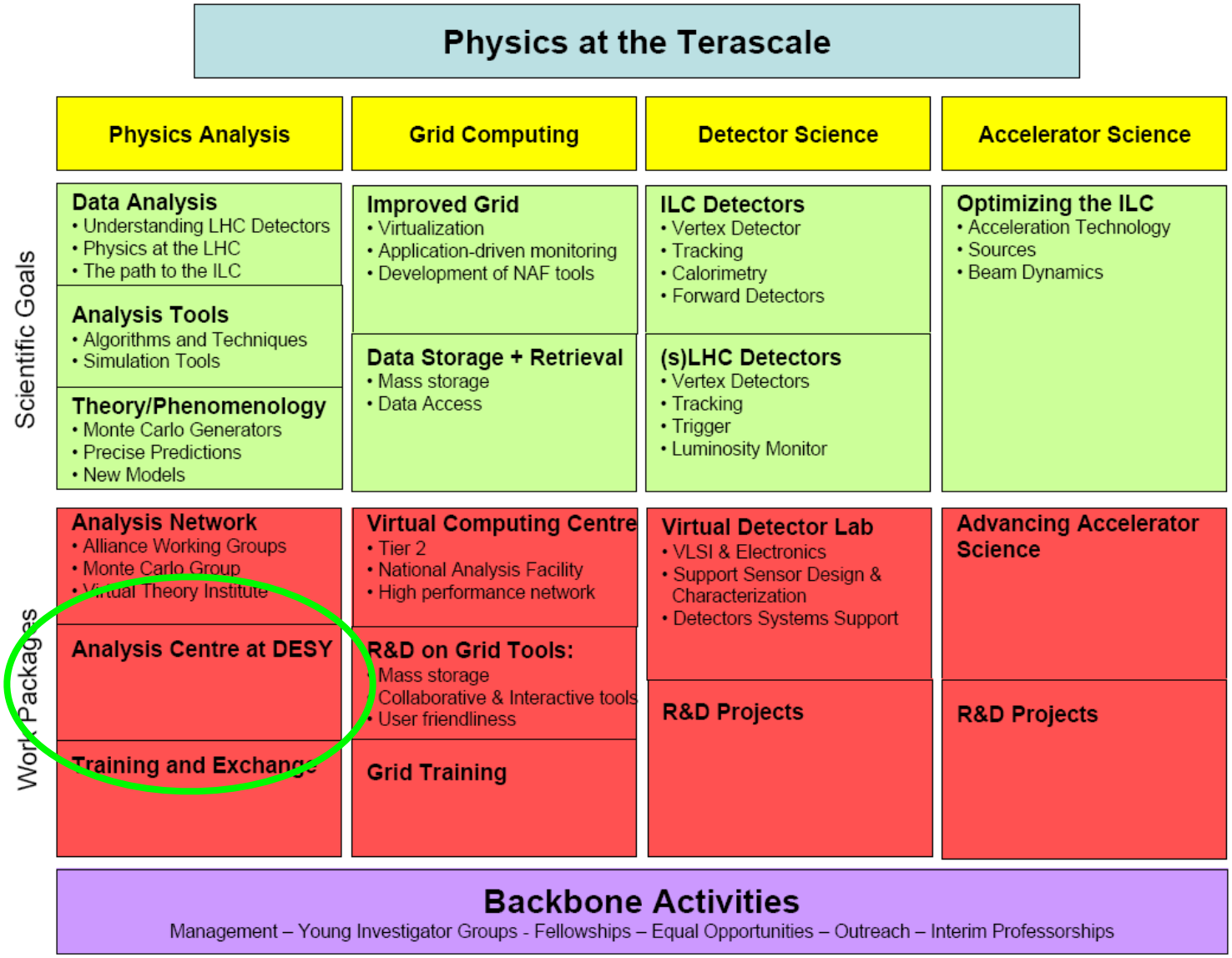
- What do we have?
  What do we offer?

- Questions to the centre.
  What is missing?
  What should we do?
  Ideas!

ANALYSIS CENTRE

What do we want?

THE HELMHOLTZ ALLIANCE



ANALYSIS CENTRE: TASKS

PHYSICS AT THE TERA SCALE Helmholtz Alliance

From the Terascale web page:

"... optimally place German particle physics in an increasingly global environment ..."

"... a tool for more effective collaboration ..."

From job descriptions:

"The Analysis Centre supports German physicists working on analysis at ATLAS, CMS and the ILC in areas like Monte Carlo generators, parton distribution functions and statistics tools. It also holds workshops on these subjects ..."

From the Alliance proposal:

1. "provision of computing resources ... via ... a National Analysis Facility.
2. Coverage of general issues of Monte Carlo production.
3. Coverage of general analysis tools.
4. Introduce the outstanding expertise at DESY on the proton structure obtained at HERA.
5. Methods of documentation, collaborative tools and knowledge preservation.

Current picture:

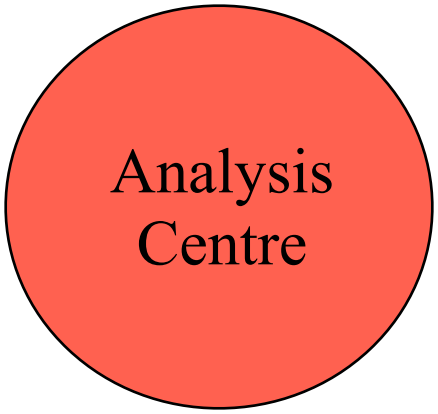
1. "Education": Schools, workshops, ...
2. Contributions to the LHC programme.
3. Networking; exploitation of synergies, …
4. Member support, service

ANALYSIS CENTRE

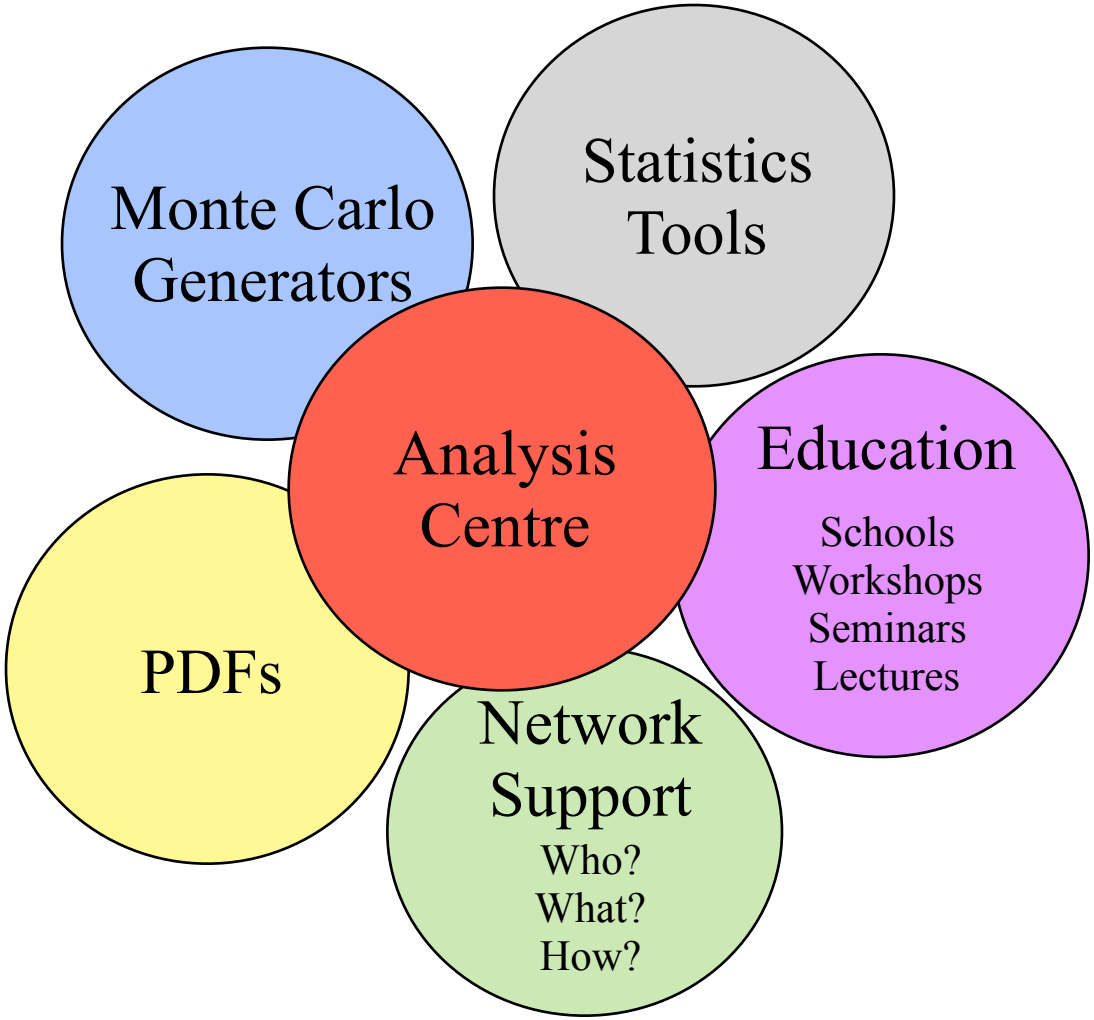
What do we have?
What do we offer?

A lot !!!

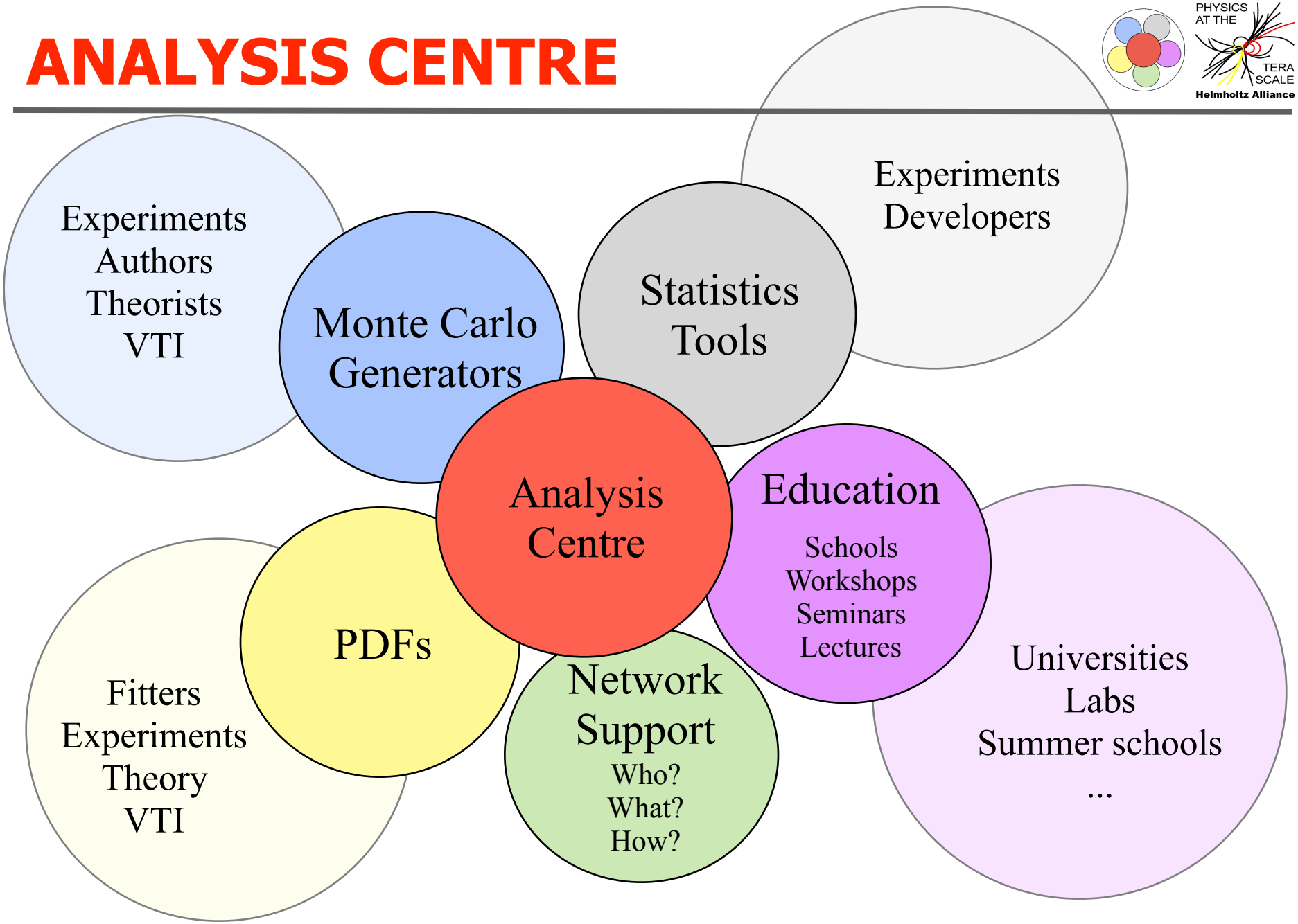
ANALYSIS CENTRE SO FAR



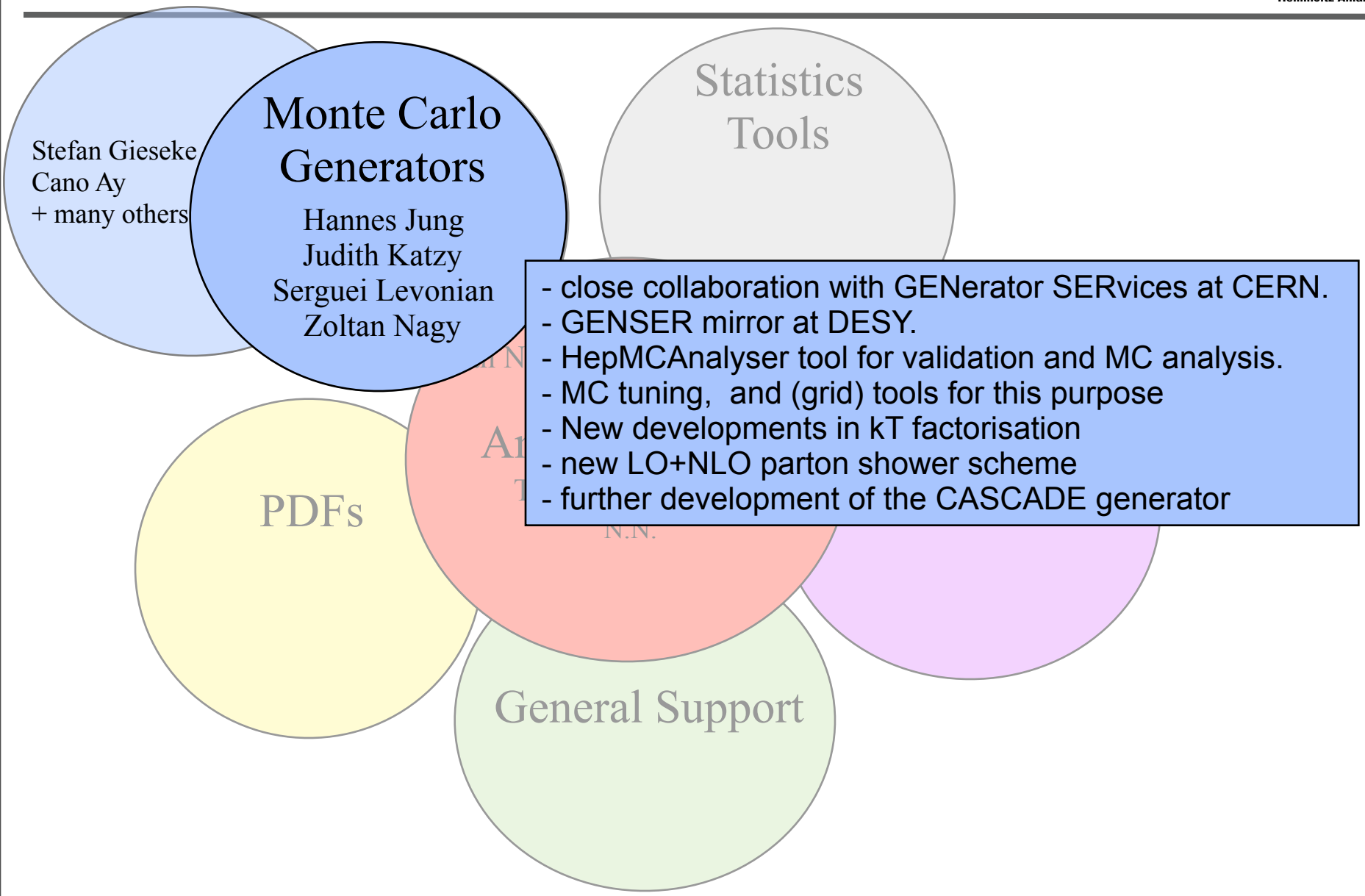
ANALYSIS CENTRE SO FAR



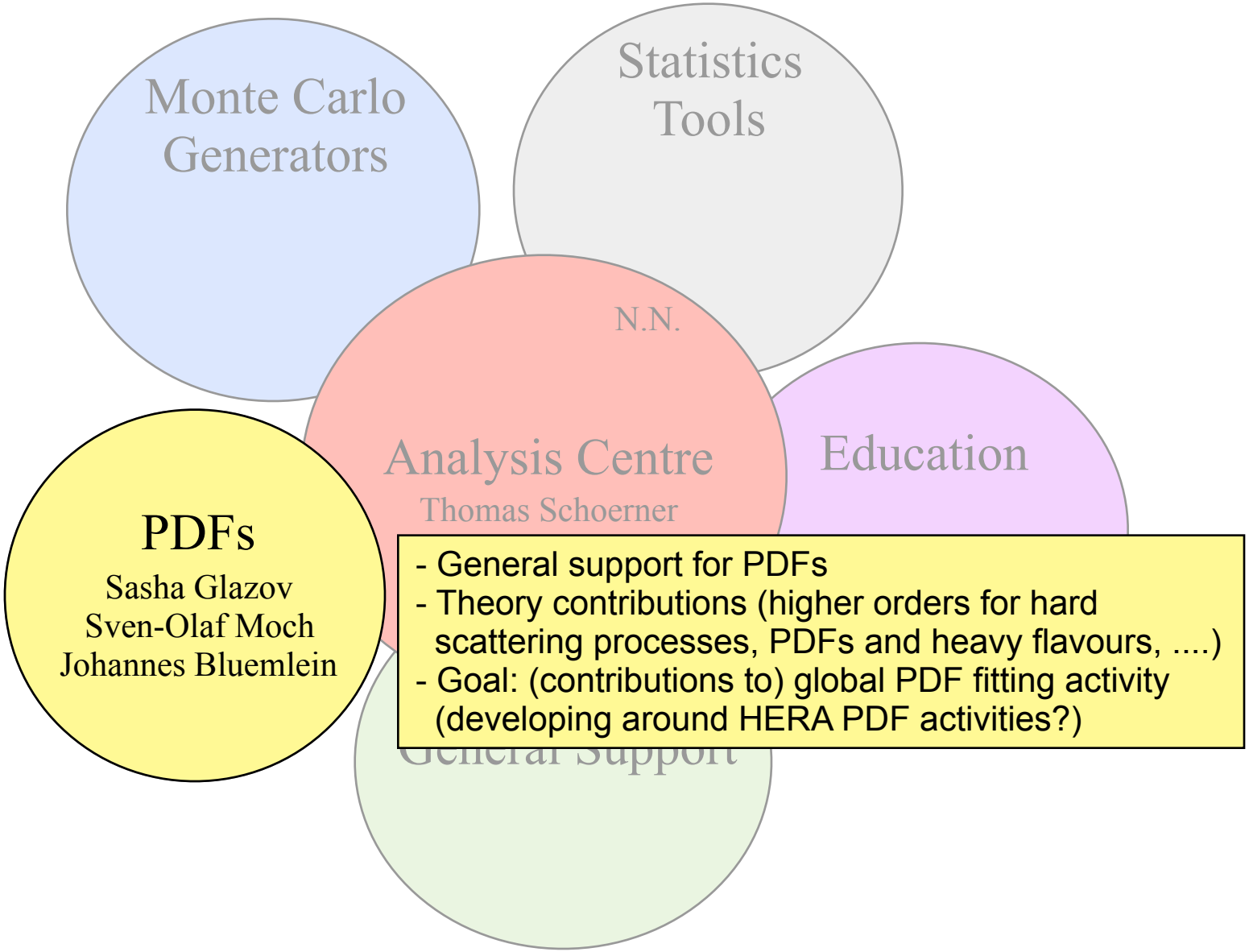
ANALYSIS CENTRE



ANALYSIS CENTRE: MC

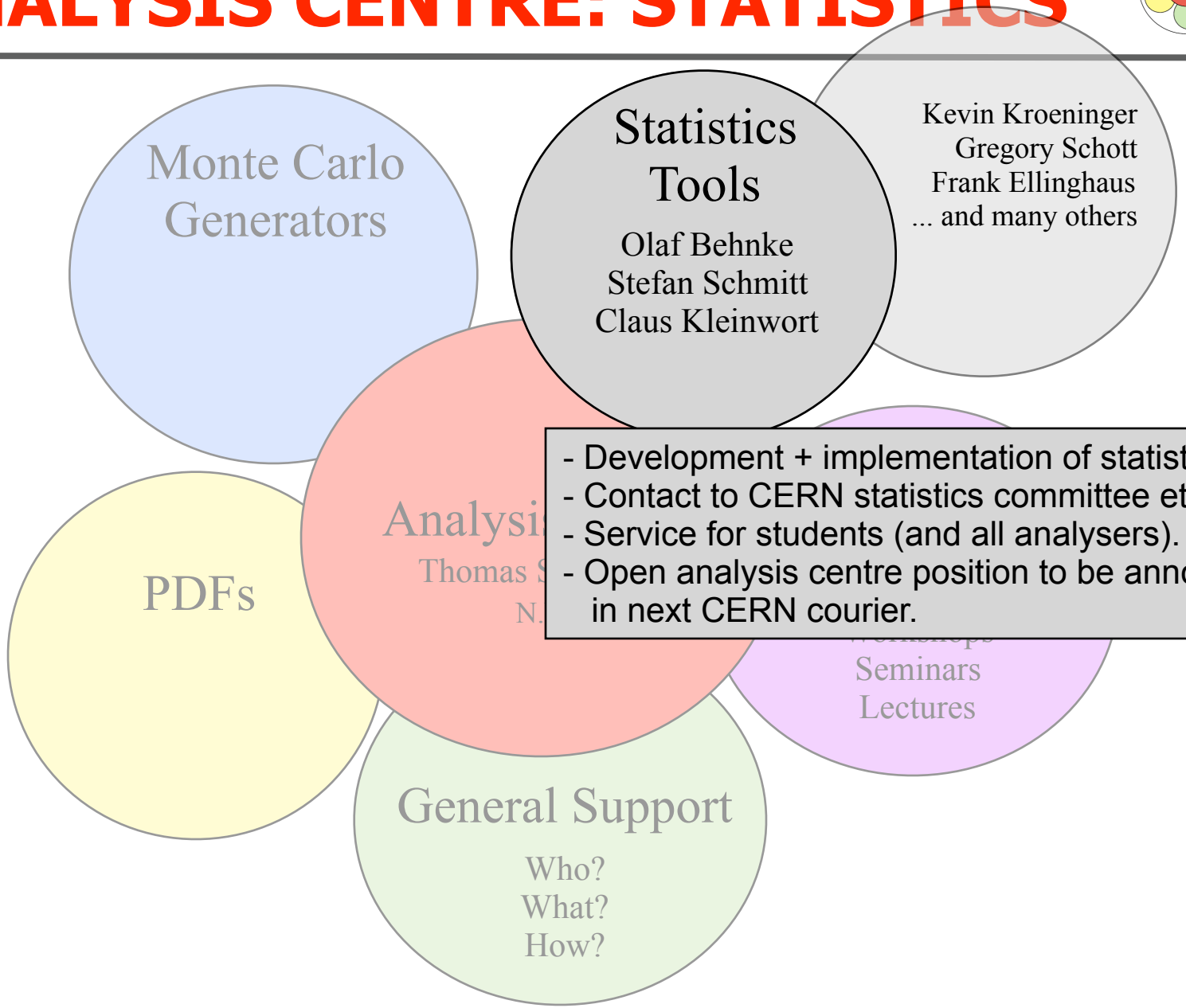


ANALYSIS CENTRE: PDF

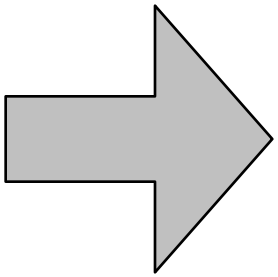


- General support for PDFs
- Theory contributions (higher orders for hard scattering processes, PDFs and heavy flavours, ...)
- Goal: (contributions to) global PDF fitting activity (developing around HERA PDF activities?)

ANALYSIS CENTRE: STATISTICS



- Development + implementation of statistics tools
- Contact to CERN statistics committee etc.
- Service for students (and all analysers).
- Open analysis centre position to be announced in next CERN courier.



The Strategic Helmholtz Alliance "Physics at the Terascale" (http://www.terascale.de) is a research network supported by the Helmholtz Association and comprises the research centres DESY and FZ Karlsruhe, 17 German universities and the Max-Planck-Institut für Physik. Within the framework of the worldwide investigation of the fundamental properties of matter using accelerators at the highest energies, the Alliance will sustainably concentrate and advance the expertise and strengths of the participating institutes.

Scientist

The Analysis Centre of the Helmholtz Alliance "Physics at the Terascale" at DESY, Hamburg site, is seeking a scientist to join the Statistics Tools group of the centre.

The Analysis Centre supports physicists at German institutes working on analyses at ATLAS, CMS and ILC. The centre contains three main branches: Monte Carlo Generators, Parton Distribution Functions and Statistics Tools. A major goal of the statistics tools group is to provide support and education for all kinds of statistics-related tasks and questions in high-energy physics data analysis.

The successful candidate is supposed to strengthen the activities of the group by

- contributing to the development of statistics tools,
- implementing existing tools into software frameworks like ROOT,
- taking part in the organisation of meetings, workshops and schools and
- helping to provide user support and web documentation.

The candidate is also expected to carry out research within one of the Alliance projects for about 50 % of his or her time.

The position requires

- a Ph.D. in physics,
- interest and experience in the development of statistics tools and
- programming, software maintenance and analysis experience (e. g. C++, Fortran, ROOT).

The position is initially limited until 30 June 2012, the nominal end of the Helmholtz Alliance funding period. For further information please contact Dr. Thomas Schörner-Sadenius (Thomas.Schoerner@desy.de).

Physicist

"Physics Data Analysis with the CMS Experiment"

The applicant is expected to contribute to physics data analysis within the CMS experiment, and to the Visual Physics Analysis project being developed at the RWTH Aachen. The position is funded by the Helmholtz Alliance "Physics at the Terascale" for a period of 3.5 years.

For further information please contact Prof. Martin Erdmann (+49-241-8027317, erdmann@physik.rwth-aachen.de).

Physicist

"Physics Data Analysis with the ATLAS Experiment"

The Faculty of Physics at LMU Munich has an immediate opening for a physicist on the search for signals of new physics beyond the Standard Model within the ATLAS experiment. The LMU ATLAS group is contributing to the muon spectrometer, Grid computing and the preparation of the data analysis. The appointee is expected to establish a strong research programme involving diploma and Ph.D. students with particular emphasis on searches for Higgs Bosons or supersymmetric particles and to contribute actively to a successful start-up phase of the ATLAS experiment.

The position is partially funded by the Strategic Helmholtz Alliance „Physics at the Terascale" and the salary follows the standard for public employment (TVL E13). The position is vacant and initially limited to two years with the possibility of an extension. Candidates should hold a Ph.D. in experimental particle physics.

For further information please contact Prof. Dorothee Schaile (dorothee.schaile@physik.uni-muenchen.de).

Physicist

"Detector Development with the ATLAS Experiment"

The University of Göttingen offers a full-time position for a research assistant/post-doc (salary level TVL E13) beginning as soon as possible. The position is available for an initial period of two years with a possible extension by two years.

The post-doc will be member of the recently formed particle physics group to work on the ATLAS experiment at the Large Hadron Collider at CERN. The ATLAS experiment is designed to search for physics phenomena responsible for electroweak symmetry breaking and to study a variety of subjects related to physics at the TeV scale. The successful applicant is expected to participate in the supervision of students, in the start-up of the new particle physics group in Göttingen, in the research activities of the group and to play a leading role in detector development in the context of the Helmholtz Alliance, in particular in the ATLAS pixel detector upgrade.

For further information please contact Prof. Arnulf Quadt (aquadt@uni-goettingen.de).

Two Physicists/Engineers

The Heidelberg ASIC Laboratory located in the Kirchhoff-Institut für Physik at the Ruprecht-Karls-Universität Heidelberg will extend its scope to support scientists and Ph.D. students in the area of analogue and mixed-signal VLSI component and system design and test. The institute has openings for two Physicists/Engineers for the design of integrated microelectronics, in particular analogue and mixed-signal circuits. An excellent knowledge of state-of-the-art-design and simulation tools is required as well as experience in the design and testing of complex electronic circuits employing ASICs and FPGAs. Practical experience in electronic circuit design and construction is required. Both positions are located in the existing ASIC laboratory for microelectronics. They are immediately available and will be limited until 30 June 2012.

For further information please contact Prof. Karlheinz Meier (meierk@kip.uni-heidelberg.de).

Applications (preferably by email) including a letter of application, CV, academic record as well as a list of publications and the names of three persons who can provide further information about the candidate should be addressed to:

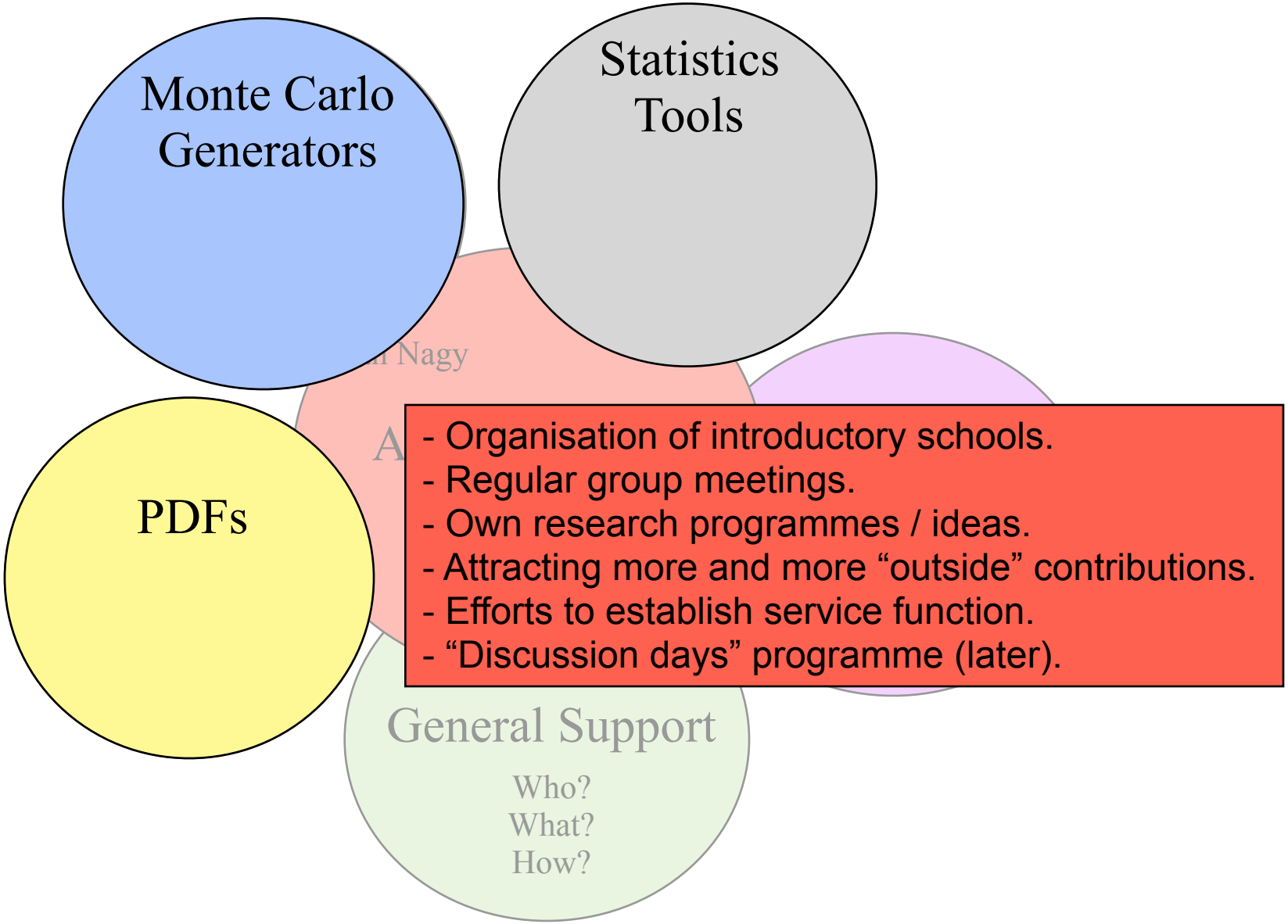
Prof. Ian Brock (Scientific Manager of the Helmholtz Alliance)

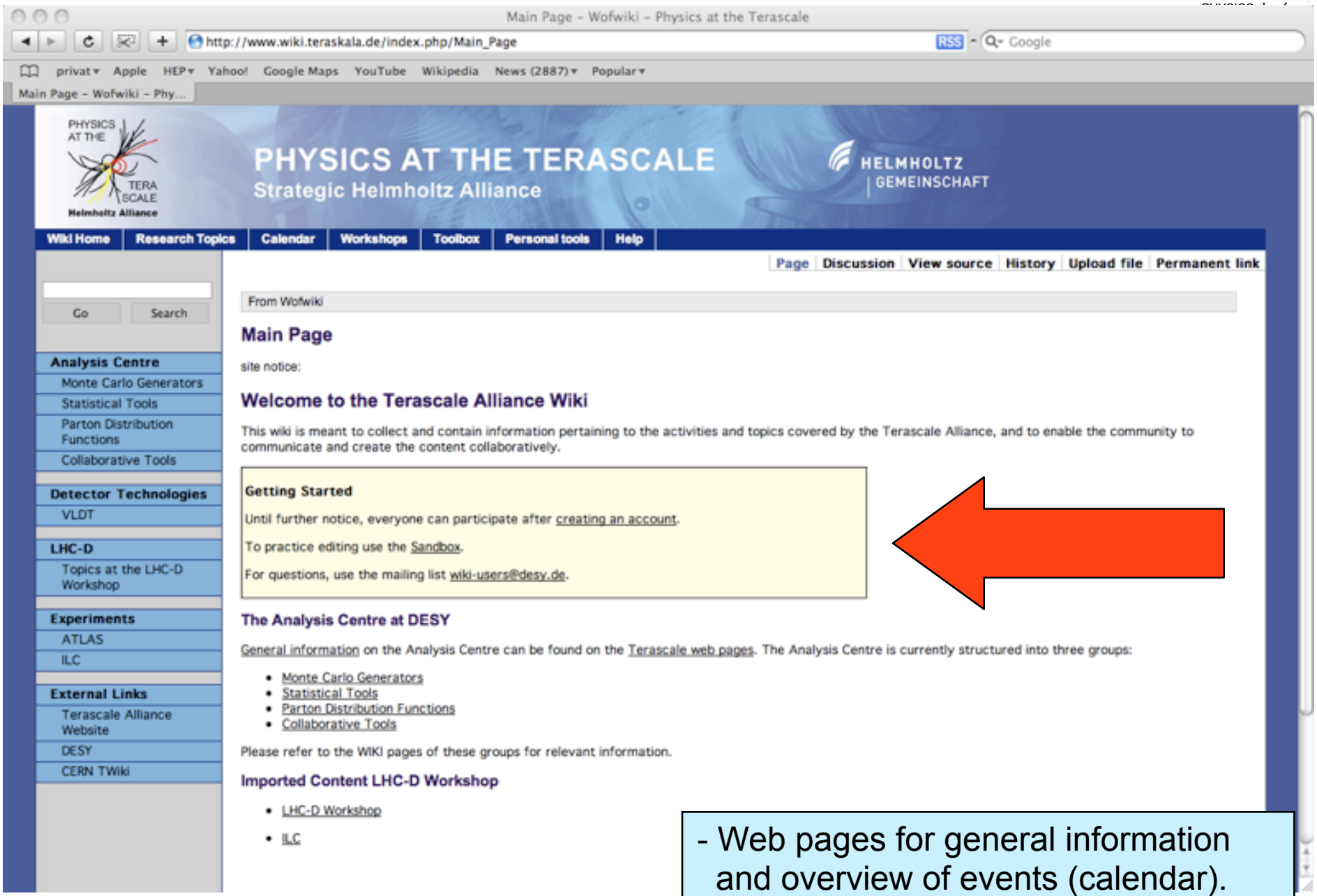
DESY, Notkestraße 85, 22607 Hamburg, Germany (Ian.Brock@desy.de).

For all positions, salary and benefits are commensurate with those of public service organisations in Germany. Handicapped persons will be given preference to other equally qualified applicants. DESY and the universities are equal opportunity, affirmative action employers and encourage applications from women.

Closing date for all applications is 31 December 2008.

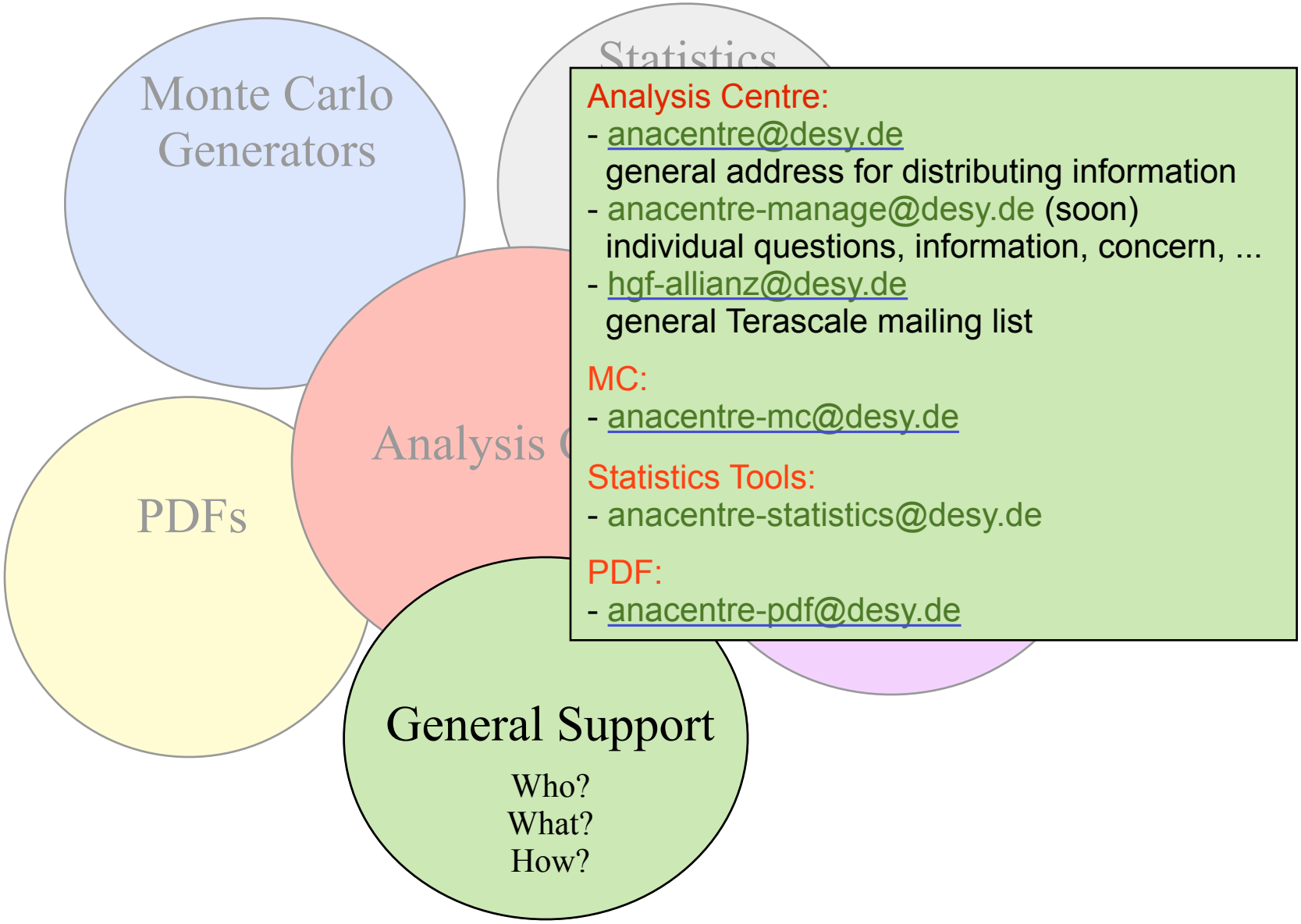
ANALYSIS CENTRE





- Web pages for general information and overview of events (calendar).
- WIKI for discussions / documentation.

ANALYSIS CENTRE: SERVICE



Analysis Centre:
- anacentre@desy.de
  general address for distributing information
- anacentre-manage@desy.de (soon)
  individual questions, information, concern, ...
- hgf-allianz@desy.de
  general Terascale mailing list

MC:
- anacentre-mc@desy.de

Statistics Tools:
- anacentre-statistics@desy.de

PDF:
- anacentre-pdf@desy.de

EDUCATION AND EVENTS

Past:
- MC School, 100 participants
- Statistics Tools School, 120 participants
- PDF School, 40 participants.

In preparation:
- Fitting Workshop, March 30 - April 1.
- MC School 2009, April 20-24.
- Computer Alg. School, March 29 - April 3.

Wishes?
- CTEQ+MCNET+Alliance School 2010?
- Introduction to HEP statistics
- Limits+Combination Workshop
- Yearly introductory course to beginners
- Scientific computing? ROOT? C++?
- ... ?

Education

Schools
Workshops
Seminars
Lectures

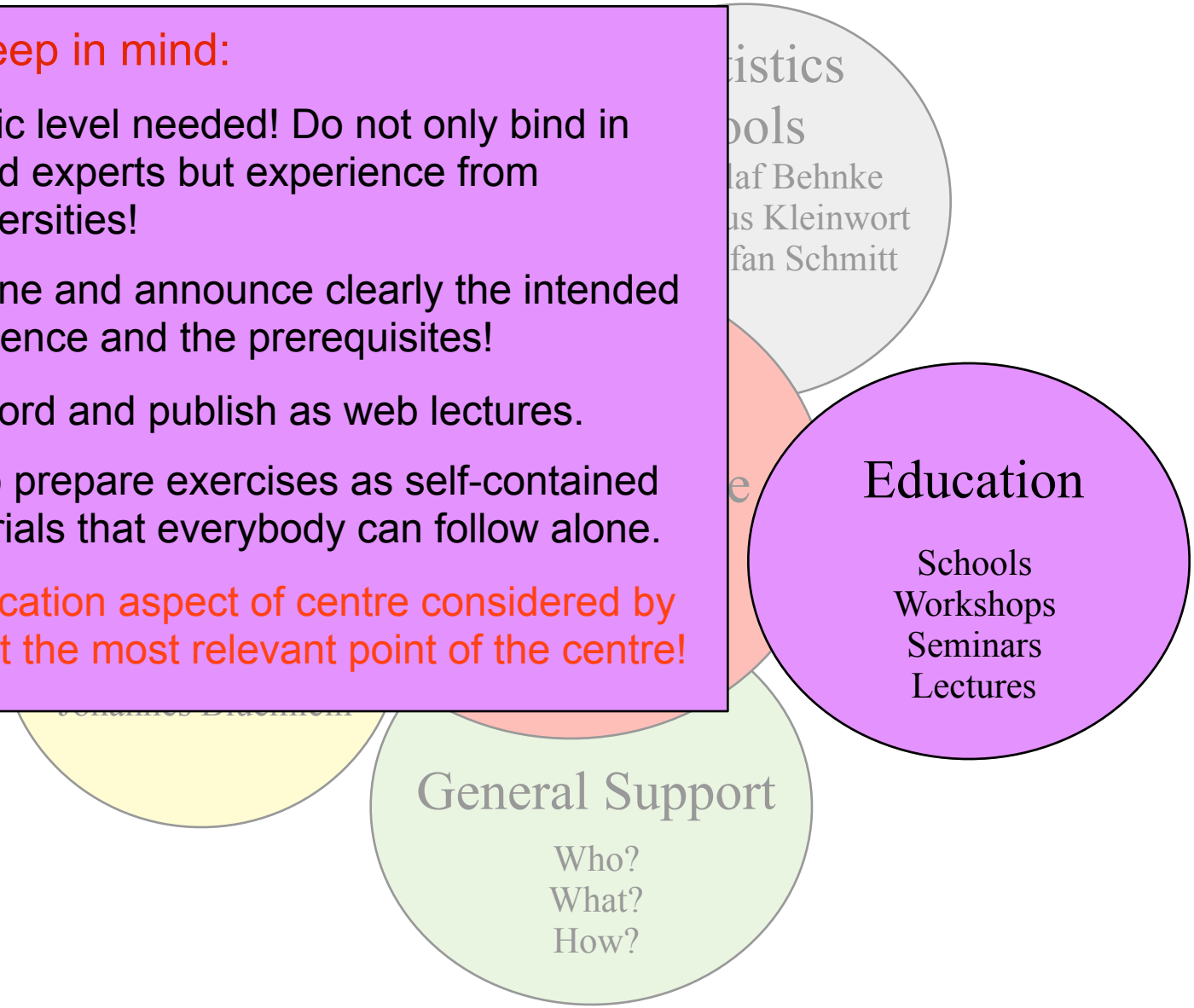
Schools: Better basic than very high-level. Interplay lectures / hands-on and theo-exp!

EDUCATION AND EVENTS

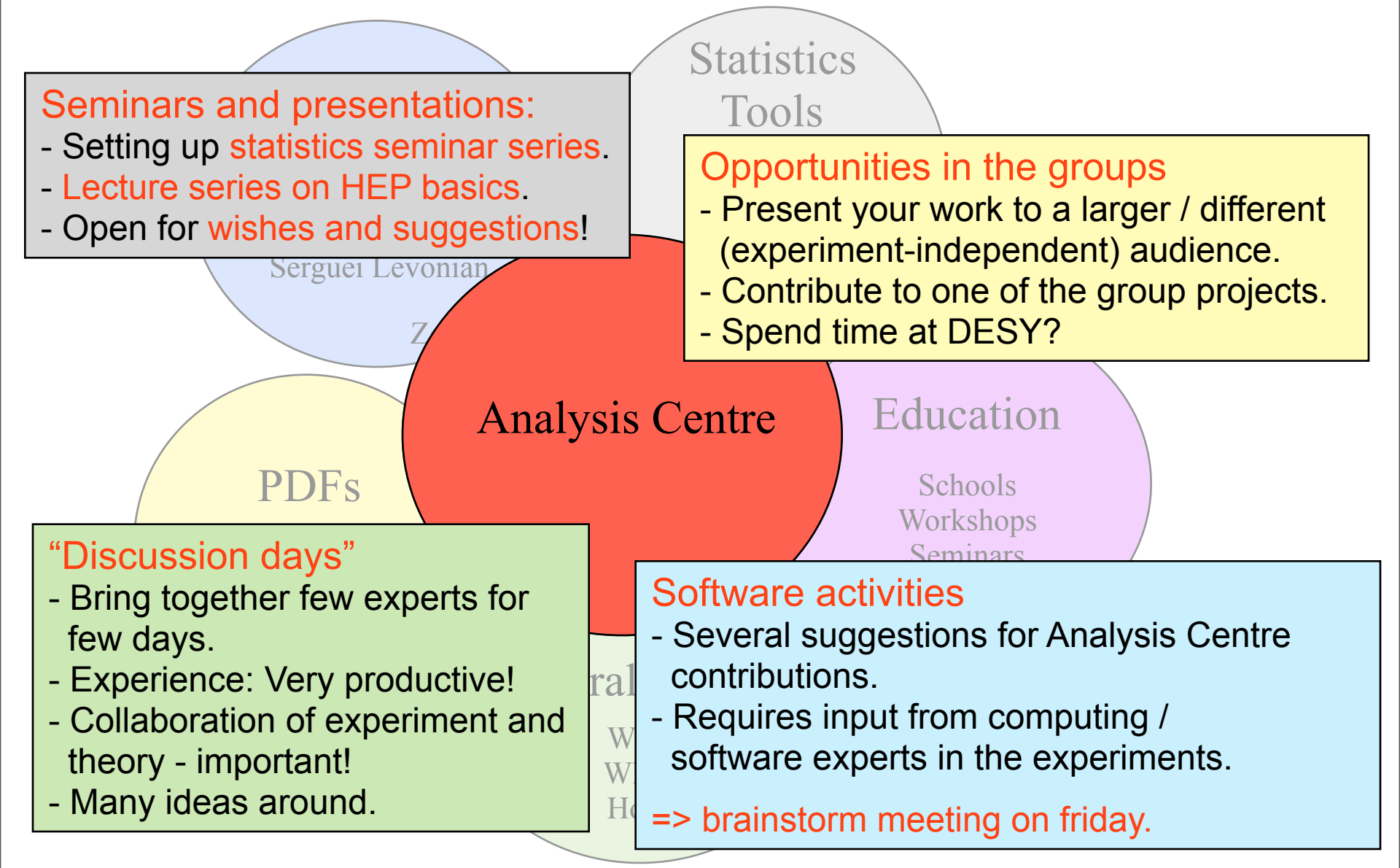
EDUCATION AND EVENTS

To keep in mind:

- Basic level needed! Do not only bind in world experts but experience from universities!
- Define and announce clearly the intended audience and the prerequisites!
- Record and publish as web lectures.
- Also prepare exercises as self-contained tutorials that everybody can follow alone.
- Education aspect of centre considered by most the most relevant point of the centre!



ANALYSIS CENTRE: WHAT ELSE?



Seminars and presentations:
- Setting up statistics seminar series.
- Lecture series on HEP basics.
- Open for wishes and suggestions!

Opportunities in the groups
- Present your work to a larger / different (experiment-independent) audience.
- Contribute to one of the group projects.
- Spend time at DESY?

"Discussion days"
- Bring together few experts for few days.
- Experience: Very productive!
- Collaboration of experiment and theory - important!
- Many ideas around.

Software activities
- Several suggestions for Analysis Centre contributions.
- Requires input from computing / software experts in the experiments.

=> brainstorm meeting on friday.

ANALYSIS CENTRE

Coming back to the question ...

What do we have?
What do we offer?

A lot! Thanks to the names listed before and to more and more other (non-DESY) contributors!

- Education ✔
- Networking ✔
- Contributions to LHC ✔
- Service and support ?

QUESTIONS

What is missing?
What should we do?
Ideas!

QUESTIONS TO THE CENTRE

- Use case for service / support function? How to avoid a simple doubling of information, structure, service?

  Knowledge data base. “Who is who?” Emphasis: collecting / organising / structuring information (“matrix”).

- Credit for contributions to the centre?

  Visibility! Benefit for all!

- Experiment-specific tasks in the centre?

  Not really an issue (?)

- Restrictions for discussing experiment-internal questions in the centre / alliance? (Limitations even at DPG meetings????)

  Need to find a constructive way to deal with that!

- Attractiveness of the centre / groups?

  Critical mass necessary - accumulate more momentum, then they come!

Many issues will only become relevant (and can only be decided upon) once (real) data analysis at the LHC is starting - then we will know what is needed!

IDEAS AND PLANS (not discussed in detail)

Education (selection):

- HEP basics lecture series based on university experience.
- Introductory course twice (?) a year (level: below Maria Laach) + “primer”.
- Course “HEP Statistics for beginners”.
- Course “MC for beginners”: Distributions, integration, parton showers, ...
- “Data analysis for theorists”, “Theory for experimentalists!”: LHC physics!
- Scientific computing (bugs, memory leaks, non-standard ROOT/C++)
- Detector understanding with first data: reconstruction, calibration, etc.
- Minimum bias physics: What to learn from it? What is it?
- Established analysis techniques (from HERA and the Tevatron).
- Continuation, improvement, standardisation of existing schools.

=> questionnaire to institutes soon !

IDEAS AND PLANS (not discussed in detail)

Service:

- Re-think mailing list concept.
- Provide overview (web/wiki pages) on:
  - MC generators, settings, authors, contacts, FAQs (or at least “complete” list of links to other such pages).
  - same for NLO calculations.
  - Who is doing what and willing to help where?
    => big table with names coupled to specific expertise.
  - Statistics tools/methods with benefits and shortcomings.
- “Beginners help” => instance for “stupid” questions from newbys etc.?
- Document projects that are being worked on in the groups.
- Further collect use cases for service function.

=> also include questions for this topic in the questionnaire.

IDEAS (not discussed in detail)

Networking:

- Discuss role of LHC-D / analysis working groups? Experiment-specific restrictions on sharing of information ?
- Keep close contact with the institutes, fellows, YIGs
  => find out about their needs and wishes (Visits to institute visits so far very productive!)
- “Discussion days”

Scientific contributions from the Analysis Centre (who is that?):

- Encourage all to do their best ;-)
- Profit from the “four” analysis centre positions (fill the remaining two veeeery quickly!)
- ...

SUMMARY

The Analysis Centre is
- alive and working!
- attracting more and more people.
- in some places still looking for its justification (taking the proposal as reference scale).

Pro's:
- Education ✔ ✔ ✔ ✔
- Networking (groups, discussion days, "matrix") ✔ ✔ ✔
- Own contributions ✔ ✔
- Service and support (✔?)

Challenges:
- Filling the service function with life.
- Creating surplus value that is felt by everybody.
- Tightening the connections between the centre and the experiments.
- Further establishing the centre as network of activities and knowledge.

http://www.terascale.de/anacentre