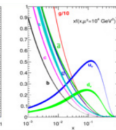
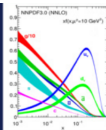
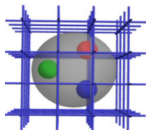


Parton Distributions and Lattice Calculations in the LHC era

Emanuele R. Nocera and Huey-Wen Lin, for the organisers

Balliol College, Oxford - March 22, 2017

<http://www.physics.ox.ac.uk/confs/PDFlattice2017/index.asp>



Welcome to Balliol College



Balliol is a thriving academic community in the heart of Oxford.

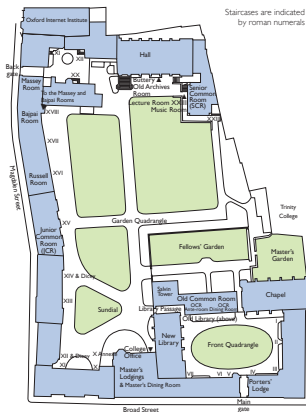
Founded in 1263, it is Oxford's oldest college and the oldest academic institution in the English-speaking world still on its original site.



It is one of the largest colleges within the University of Oxford, counting almost 70 Fellows, around 370 Undergraduate Students, about the same number of Graduate Students and 120 non-academic staff.

Logistics on Balliol main campus

BALLIOL COLLEGE
Oxford OX1 3BJ



Staircases are indicated
by roman numerals

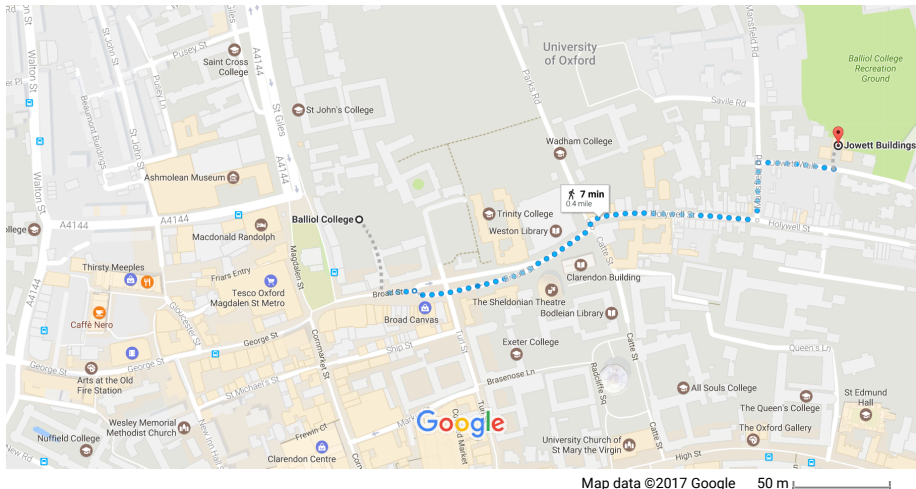
For disabled access, please see www.balliol.ox.ac.uk/disability

For a map of Oxford, other colleges and the University buildings,
please see www.ox.ac.uk/visitors/map



- Workshop sessions
Lecture Room XXIII
- Breakfast (8am to 9am), Lunch
College Hall
- Workshop dinner (Thursday)
Senior Common Room
- Morning coffee/Afternoon tea
In front of Lecture Room XXIII
- Feel free to walk in the gardens
Please do not access private areas
- WIFI
eduroam available, also OWL,
credentials on the back of your badge

Accommodation on Jowett Walk



In the Jowett Walk Buildings, a short walk from Balliol main campus
Please pick up your keys from the Porter in the Lodge
Check-out by 10am on Saturday 25th, please return your keys to the Porter

Meals during the workshop

- Breakfast
Hall, from 8am to 9am
- Lunches
Hall, according to the program
- Workshop reception/dinner
Senior Common Room, 7.30pm/8pm

Menu

Comté and prosciutto ravioli with spinach purée,
toasted hazelnut and creamed chicken espuma
(Contains Nut, Egg, Gluten, Milk)

RK' Riesling, Reichsgraf von Kesselstatt, Germany

* * *

Three pepper marinated rib-eye of beef, heritage carrot
purée, tender stem broccoli, crushed potatoes and onion
(Contains Milk, Celery, Sulphur Dioxide)

Chateauf-neuf-du-Pape, Les Cornalines, France

* * *

Pistachio iced parfait, chocolate mousse and raspberry
(Contains Egg, Nuts, Gluten, Milk)

Balliol College Port

Some of the Old Pubs in town
Turf Tavern, White Horse,
Kings's Arms, Eagle and Child

Some restaurants in town
Turl Street Kitchen (Local, Turl Street)
Marco's (Italian, High Street)
Shanghai 30's (Chinese, St. Aldates)
Chiang Mai Kitchen (Thai, Kemp Hall)
Côte brasserie (French, George Street)

Any vegetarians?

Any special dietary needs?

Places to visit in Oxford



- Radcliffe Camera Square
University Church/All Souls/Bodleian
- Museums
Ashmolean, Pitt Rivers
- Colleges (all 38 are beautiful)
Magdalen, Christ Church, Merton
- Walks in open spaces
Christ Ch. Meadows, Botanic Garden
- Shops
The Covered Market, since 1780

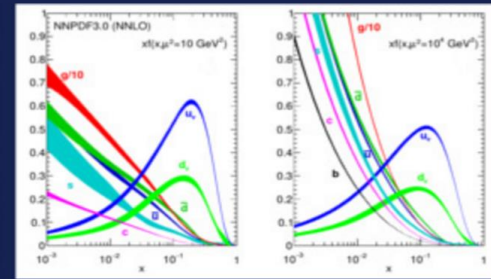
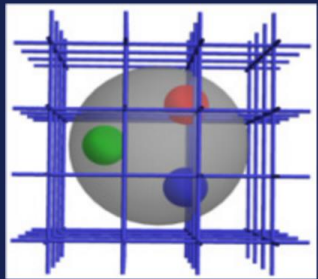
Oxford City Guide: <http://www.oxfordcityguide.com/ee2/index.php>

What's on in Oxford today: <http://www.dailyinfo.co.uk>

A New Era

§ First joint workshop with global-fitting community to address key LQCD inputs

➤ <http://www.physics.ox.ac.uk/confs/PDFlattice2017>



Parton Distributions and Lattice Calculations in the LHC era
(PDFLattice 2017)

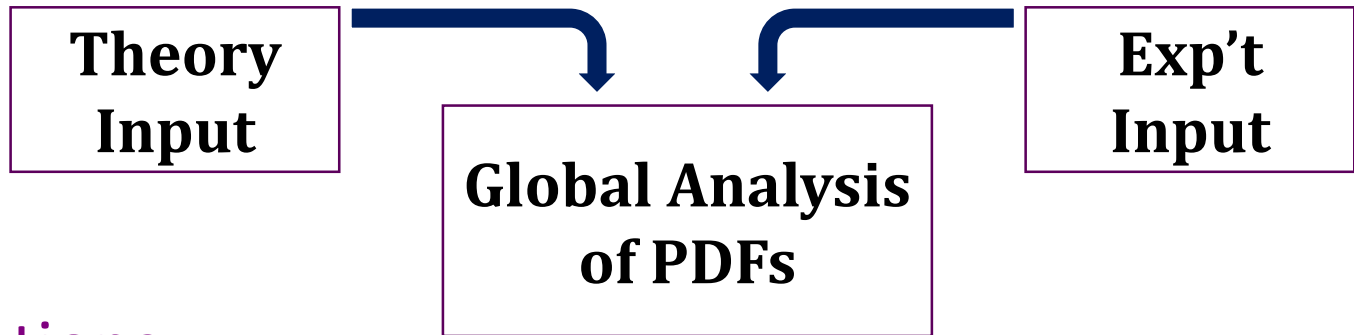
22-24 March 2017, Oxford, UK

*“The goal of this workshop is to **bring together the global PDF analysis and lattice-QCD communities** to explore ways to improve current PDF determinations. In particular, we plan to **set precision goals for lattice-QCD** calculations so that these calculations, together with experimental input, can achieve more reliable determinations of PDFs. In addition we will discuss what impact such improved determinations of PDFs will have on future new-physics searches.”*

Global Analysis

§ Experiments cover diverse kinematics of parton variables

∞ Global analysis takes advantage of all data sets



§ Data limitations

∞ Assumptions imposed

∞ SU(3) flavor symmetry, strange and sea distributions, etc.

$$s = \bar{s} = \kappa(\bar{u} + \bar{d})$$

∞ Lack of data or nuclear-effect complications

∞ Strange and charm are not very well constrained

∞ Debates on intrinsic charm, etc.

Lattice QCD

§ Multiple ways to contribute

∞ Moments

- ∞ Lowest couple moments can have full systematic control (just like FLAG standard)
- ∞ Can be implemented as “constraints” in global fit
- ∞ New ideas to calculate $n > 3$ moments (ongoing)

§ Direct x -dependence PDFs

- ∞ Still need full-systematics estimates/study
 - ∞ Replace large- x data

§ “Lattice data”

- ∞ Hadronic tensor, some lattice cross sections
- ∞ To what precision in what quantities have the most impact?
What improved knowledge of LHC phenomenology do we get as a direct outcome out of this? (in addition to PDFs)

Muon $g-2$ Model

- § On the lattice, the precision is often correlated with computational resources
- § Multiple workshops at different locations with 2 different communities + whitepaper
- § Specific deadlines and precision goal for physics impact
 - ∞ In the US, muon $g-2$ has the highest priority in getting funded (money and computational time)
 - ∞ New lattices are generated exclusively for this purpose (How many are done for the nucleon case?)
- § Beneficial for both communities to move forward toward great discovery

Workshop Format

§ Wed. afternoon: overview talks

§ Thursday (LQCD, PDF fitters)

- ↻ Slightly more detail in the overview talks
(but be kind to the other half of the community...
reduce technical jargon when possible)
- ↻ Stick to the big picture for short talks
(will have a chance to follow up details if there is interest)

§ Friday

- ↻ Selected topics by organizers of Thursday talks for follow-up
- ↻ Floor-nominated topics in the remaining morning session
- ↻ Afternoon for white paper organization:
structure, assignments, format, deadline