International Particle Physics Masterclass

— Welcome —
Trinity College Dublin: School of Mathematics

School of Mathematics
Trinity College Dublin
Dublin 2
Ireland

+353 (0)1 896 8559
+353 (0)1 896 2282

Research & Teaching

Trinity College Dublin (TCD) is the only college constituting the University of Dublin and thus both names are commonly used. It is the oldest University in Ireland, founded by Elizabeth I in 1592. Today there are about 17,000 registered students across all disciplines, almost 5,000 of them postgraduates. Although TCD was the home Institution of Ernest Walton (Nobel prize 1951 together with Cockcroft for their pioneer work on the transmutation of atomic nuclei by artificially accelerated atomic particles), there is currently no experimental particle physics group at TCD. However, the School of Mathematics has a group of theoretical physicists working on string theory and lattice QCD, including aspects of flavour physics and CP violation. Staff members of this group teach all the theoretical physics classes of the 4-year undergraduate degree course "Theoretical Physics", which is shared between the TCD Schools of physics and mathematics.
Timetable:

09:30 Opening and Introduction to the Masterclass  [M.Marinkovic]
[Venue: Synge Lecture Theatre, Hamilton Building, TCD]

09:45 The Physics of Forces and Particles [D. Wilson]
[Venue: Synge Lecture Theatre, Hamilton Building, TCD]

10:30 Refreshments
[Venue: outside Synge Lecture Theatre, Hamilton Building, TCD]

10:45 The Large Hadron Collider and its Experiments [U. Marconi, LHCb Bologna - video lecture]
[Venue: Synge Lecture Theatre, Hamilton Building, TCD]

11:30 Break for lunch with lecturers and tutors
[Venue: outside Synge Lecture Theatre, Hamilton Building, TCD]

12:45 Analysis of LHCb data from CERN
[Venues: School of Mathematics, PC labs: room 1.02 in 19 Westland Row and room 1.4 18 Westland Row]

15:00 Video conference with CERN and students from Italy, Brazil and the USA.
[Venue: East End Lecture Theatre 1, Hamilton Building, TCD]

16:30 End
David Wilson
Royal Society and Science Foundation Ireland University Research Fellow
Hamilton Mathematics Institute & School of Mathematics

Lloyd Building 2.19,
School of Mathematics,
Trinity College Dublin,
College Green,
Dublin

e-mail: djwilson@maths.tcd.ie
phone: +353 1896 8491
department fax: +353 1896 2282

orcid: orcid.org/0000-0003-2364-1161
arxiv: arxiv.org/abs/wilson_d_2
inspire: inspirehep.net

Research interests
I work in the field of hadron spectroscopy which can be understood using Quantum Chromodynamics (QCD), part of the Standard Model of Particle Physics. QCD is a strongly-coupled field theory at the energies where hadrons arise, meaning that perturbation does not apply, posing a significant calculational challenge. One method which has shown great promise in recent years is Lattice QCD, where the quantum fluctuations in a finite volume are sampled numerically using Monte-Carlo methods, to extract finite volume spectra. Using a mapping originally derived by Lüscher and extended by many others, these finite volume energy levels can be used to constrain infinite volume hadron scattering amplitudes. My current research is on numerical extractions of coupled-channel scattering amplitudes, which are in turn used to understand hadron resonances as poles in the complex energy plane.
## Career

<table>
<thead>
<tr>
<th>Year</th>
<th>Position</th>
<th>Institution</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-present</td>
<td>RS-SFI University Research Fellow</td>
<td>School of Mathematics, Trinity College Dublin, Ireland</td>
<td></td>
</tr>
<tr>
<td>2016-2018</td>
<td>Postdoc</td>
<td>School of Mathematics, Trinity College Dublin, Ireland</td>
<td></td>
</tr>
<tr>
<td>2015-2016</td>
<td>Postdoc</td>
<td>DAMTP, University of Cambridge, UK</td>
<td></td>
</tr>
<tr>
<td>2012-2015</td>
<td>Postdoc</td>
<td>Old Dominion University and Jefferson Lab, Virginia, USA</td>
<td></td>
</tr>
<tr>
<td>2010-2012</td>
<td>Postdoc</td>
<td>Argonne National Laboratory, Illinois, USA</td>
<td></td>
</tr>
<tr>
<td>2006-2010</td>
<td>PhD student</td>
<td>IPPP, University of Durham, UK</td>
<td></td>
</tr>
</tbody>
</table>
Umberto Marconi - LHCb (INFN Bologna)

- Spent all the carrier studying quark dynamics (flavour dynamics) at hadronic machines.
- Spent the last 20 years in LHCb, in role as Bologna INFN Team Leader.
- Has been in charge as Italian Team Leader, too.
- Other coordination roles:
  - LHCb computing coordinator.
  - LHCb online team coordinator.
  - Responsible of the L0 Calorimeter trigger.
  - and many more…
- Recently contributed to the design of the new DAQ system for the LHCb upgrade.
- His main experience is in electronics, computing and data acquisition.
- He also did a lot of data analysis, played with detector simulations, etc.

- He now coordinating the muONe project (the INFN group) - Physics Beyond Colliders program @ CERN
Umberto Marconi is INFN senior researcher at INFN Sezione di Bologna. His main research interest is in beauty and charm physics at the LHC collider, with the LHCb experiment. His current research activity focuses on the design and the implementation of the new trigger-less readout system for the LHCb detector upgrade. Umberto Marconi is experienced with calorimetry, trigger, online and offline computing. Within the LHCb experiment he has been in charge as LHCb Computing Resource Coordinator, LHCb National Coordinator, LHCb Bologna Team Leader.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>moderators</td>
<td>Maria</td>
<td>Giacomo</td>
<td>Alex</td>
<td>Pavol</td>
<td>Leonora</td>
</tr>
<tr>
<td></td>
<td>Pedja</td>
<td>Fiederike</td>
<td>Eduardo</td>
<td>Luca</td>
<td>Freya</td>
</tr>
<tr>
<td></td>
<td>Palaiseau</td>
<td>Maynooth</td>
<td>Perugia</td>
<td>Paris</td>
<td>Istanbul, Ozyegin</td>
</tr>
<tr>
<td></td>
<td>Bari</td>
<td>Nantes</td>
<td>Rio de Janeiro CBPF</td>
<td>Moscow MISIS</td>
<td>Zurich UZH</td>
</tr>
<tr>
<td></td>
<td>Genova</td>
<td>Geneva CERN</td>
<td>Cincinnati McAuley</td>
<td>Warwick</td>
<td>São Paulo SPRACE</td>
</tr>
<tr>
<td></td>
<td>Varazdin</td>
<td></td>
<td></td>
<td>Cincinnati Anderson</td>
<td>São Paulo UFABC</td>
</tr>
<tr>
<td></td>
<td>Torino</td>
<td></td>
<td>Dublin TCD</td>
<td></td>
<td>Vilnius VU+VGTU</td>
</tr>
</tbody>
</table>

26.03. - 31.03.2018
Enjoy your particle physics adventure!