Why study physics?

- Physics answers the big questions
- Energy generation and distribution
- Global warming
- Environmental monitoring/protection
- Health (Diagnostics and Therapeutics)
- Quantum/optical computing
- Nanoscience/nanotechnology
- Offers a challenging and rewarding career focused on creation and application of new knowledge
Why study physics?

Physicists provide leadership in:
- Basic research
- Commercial R&D
- Education and training
- Finance/market prediction and modelling
- Industry, business, public service
- Engineering, design, innovation
Why study physics?

- A physics degree provides a broad education
- Offers a challenging and rewarding career focused on creation and application of new knowledge
- A scientific qualification is an international passport

Applicable to a wide variety of jobs
  - IT literate
  - Problem solving
  - Mathematical modelling
  - Ability to think ‘outside the box’
Why study physics at DCU?

- Student-centred: Physics Orientation as well as general University Orientation
- Social events in lab, meet and greet etc.
- Small classes and dedicated Year Tutors
- School is actively involved in Physics Education Research ensuring an excellent standard of teaching/tutoring
- Physics staff have won President’s Teaching and Research Awards, National Teaching Awards…. 
Why study physics at DCU?

- Put yourself at the Cutting Edge ..... 
- DCU Physics has excellent track record in Research & Development 
- Opportunities for students to get involved – internships from Year 2 
- Staff leading Research Centres (FPC@DCU, NCPST, NCSR ...) and involved in International Collaborations CERN, ITER, MAXLAB, SLAC, DESY... 
- 4 Physics staff have been awarded President’s Award for Research; recent papers in Nature / Nature Physics / Nature Photonics / Nature Astronomy / Physical Review Letters
Why study physics at DCU?

- Example of recent paper in Nature in high energy astrophysics:
  - Dr. Masha Chernyakova (DCU School of Physical Sciences) as part of the Hitomi collaboration - Solar abundance ratios of the iron-peak elements in the Perseus cluster, Nature November 13th 2017 (doi:10.1038/nature24301)

Solar abundance ratios of the iron–peak elements in the Perseus cluster

Hitomi Collaboration

The metal abundance of the hot plasma that permeates galaxy clusters represents the accumulation of heavy elements produced by billions of supernovae. Therefore, X-ray spectroscopy of the intracluster medium provides an opportunity to investigate the nature of supernova explosions integrated over cosmic time. In particular, the abundance of the iron–peak elements (chromium, manganese, iron and nickel) is key to understanding how the progenitors of typical type Ia supernovae evolve and explode. Recent X-ray studies of the intracluster medium found that the abundance ratios of these elements differ substantially from those seen in the Sun, suggesting differences between the nature of type Ia supernovae in the clusters and in the Milky Way. However, because the X-ray projections of these studies are limited to the inner regions of the clusters, we cannot rule out the possibility that simple analyses based on the X-ray spectral properties of these supernovae might not accurately reproduce the detailed properties of the underlying iron–peak element production.

Dr. Masha Chernyakova (DCU School of Physical Sciences) as part of the Hitomi collaboration - Solar abundance ratios of the iron-peak elements in the Perseus cluster, Nature November 13th 2017 (doi:10.1038/nature24301)
Undergraduate Programmes

- Applied Physics (DC171)
- Physics with Biomedical Sciences (DC173)
- Physics with Astronomy (DC167)
## Common Physics Topics

<table>
<thead>
<tr>
<th>Year</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Mechanics, Optics, Thermal Physics, Electricity and Magnetism, Chemistry, Computing, Labs and Projects</td>
</tr>
<tr>
<td>Year 2</td>
<td>Quantum Mechanics, Electronics, Mathematics, Electromagnetism, Relativity and nuclear Physics, Labs and Projects</td>
</tr>
<tr>
<td>Year 3</td>
<td>Wave Optics, Quantum Physics, Statistical Mechanics, Mathematics</td>
</tr>
<tr>
<td>Year 4</td>
<td>Choice of Optional Topics, Professional Development, Final Year Project</td>
</tr>
</tbody>
</table>
Applied Physics

General physics degree aimed at industrial R&D and fundamental and applied research

- Semiconductor Physics
- Digital Signal Processing
- Optics and Photonics
- Computer Modelling
- Instrumentation / Measurement
## Applied Physics Topics

<table>
<thead>
<tr>
<th>Year</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>The Universe, Programming</td>
</tr>
<tr>
<td>Year 2</td>
<td>Advanced Programming, Solid State Physics, Electronics</td>
</tr>
<tr>
<td>Year 3</td>
<td>Semiconductor Physics, Wave Optics</td>
</tr>
<tr>
<td>Year 4</td>
<td>Quantum Electronics, Electrodynamics, Materials Growth and Characterisation, Solid State Physics, Quantum Electronics, Nanotechnology</td>
</tr>
</tbody>
</table>
Physics with Biomedical Sciences

Physics is of vital importance to the Biomedical field

- MRI / PET / CAT Scanners
- Imaging Technology
- Radiation Therapy / Nuclear Medicine
- Diagnostic Devices
- Laser Treatment
# Biomedical Specialist Topics

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Chemistry, Anatomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td>Biomechanics</td>
</tr>
<tr>
<td>Year 3</td>
<td>Immunology, Intra Placement in Biomedical Field</td>
</tr>
<tr>
<td>Year 4</td>
<td>Advanced Biomaterials and Processing, Microfluidics, Biophotonics, Project work in Biomedical Field</td>
</tr>
</tbody>
</table>
Physics with Astronomy

Physics is at the core of modern astronomy, both in terms of experimental apparatus, theory, and analysis of data.

- Data Acquisition
- Imaging Technology
- Computational Physics
- Cosmology and Relativity
<table>
<thead>
<tr>
<th>Year 1</th>
<th>The Universe, Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td>Advanced Programming, Relativity, Nuclear and Particle Physics, Space Science and Technology</td>
</tr>
<tr>
<td>Year 3</td>
<td>Astronomical Techniques, Stellar Physics, Field Trip to Foreign Observatory (Switzerland, Spain, Italy)</td>
</tr>
<tr>
<td>Year 4</td>
<td>Applied Spectroscopy, Image Processing, Topics in Astrophysics, Extragalactic Astrophysics and Cosmology, Astronomy project</td>
</tr>
</tbody>
</table>
Industry Engagement/INTRA Opportunities

- Applied Physics
  - Six month Industry/Enterprise placement
- Physics with Biomedical Sciences
  - Six month INTRA placement (in hospital / biomedical industry)
- Physics with Astronomy
  - Field trip to foreign observatory
  - Six month industry/enterprise option
- Lab Placements in School or Research Centre
- Opportunities for research placements through scholarships and networking in EU and US
Entry Requirements

Physics with Biomedical Sciences
O3 or H6 in Mathematics
O3 or H5 in a Laboratory Science or Applied Mathematics
Points cut-off 2017 – 465
2016 – 415
2015 – 435

Physics with Astronomy
O3 or H6 in Mathematics
O3 or H5 in a Laboratory Science or Applied Mathematics
Points cut-off 2017 – 444
2016 – 415
2015 – 440

Applied Physics
O3 or H6 in Mathematics
O3 or H5 in a Laboratory Science or Applied Mathematics
Points cut-off 2017 – 423
2016 – 415
2015 – 410
Graduate Employment
Sectors where our graduates are employed

- Computing
- Internet
- Finance
- Medical Physics
- Research Scientist
- Renewable

- Computer hardware
- Mobile Communications
- Science teaching
- Astronomy/Space Science
- Semiconductor industry
- Nanotechnology
Companies who have employed our recent graduates (3 years)

Intel
Applied Materials
Meteor
O₂/Three
Eircom/Eir
AIB Group
Hibernian Group
FORFÁS
Science Foundation Ireland
Hewlett Packard

Crème Software
FEM Software
DIT
St. James’s Hospital
Mater Hospital
Google
First Derivatives
State Street Corporation
Royal College of Surgeons, Ireland RCSI
RAPT Touch

More than 90% or our recent graduates are either employed or in further education!
Recent Physical Sciences Student Highlights

- **Undergraduate students:**
  
  **Rachel Hanley, Physics with Biomedical Sciences**, highly commended in the Undergraduate in the Undergraduate Award Medical Sciences category, 2016

  **Columb Doherty, Applied Physics**, highly commended and regional Undergraduate Award winner in the category of Maths and Physics, 2016

  **Adam Dempsey, Applied Physics**, winner of Institute of Physics in Ireland Earnshaw Award for final year project, 2016

  **Rachel Moloney, Physics with Astronomy**, top 3 place in Institute of Physics in Ireland Earnshaw Award for final year project, 2017

- **Postgraduate students:**
  
  Daniel Kirby won the best video competition at recent Miniaturized Systems for Chemistry and Life Sciences (µTAS) conference in Korea, 2015.

  Cathal O'Broin (a recent PhD graduate supervised by Dr. Lampros Nikolopoulos) won the IoP Computational Physics Group Thesis Prize 2016.
B.Sc. in Science Education

DCU has responded to the need for a new generation of science teachers by preparing a new integrated curriculum including:

- Science (Physics + Chemistry)
- Mathematics
- Education
- Information Technology

Further information in XG01 (Friday)/XG15 (Saturday)
Other routes into Physics

- You have the option of entering the Physics programmes after a common first year on Common Entry into Science – further information in XG22 (Friday)/XG19 (Saturday)

(DC201)
Points 2017 - 478
Points 2016 - 480

- You can study Physics as part of the BSc in Environmental Science and Technology – further information in XG21 (Friday)/XG20 (Saturday)

(DC166)
Points 2017 - 392
Points 2016 - 425
Life at DCU

- New student centre
- Student Advice Centre
- Uaneen Module
- Students Union / Office of Student Life – www.dcusu.ie
- Elite Athlete Entry Scheme
- Clubs and Societies
- Learning Support Service
- Disability Service
- Student Accommodation
- Class Representation
Getting Here
Getting here, either by public transport or under your own steam, is easy; we’re close to the M50 and M1 motorways and serviced by bus routes from all parts of the city.
Getting there

- 44 & 104 now stop on campus, with numerous other buses from Ballymun Road and Collins Avenue
- Private buses from Dundalk, Drogheda, Bettystown, Skerries, Lusk, Laytown and Rush
- Bus Eireann 101 and 109A
- Go Car on campus
- M50 links
- Walking and Cycling routes
- Drumcondra Train Station
Physics graduates 2015
Physics graduates 2016
Physics graduates 2017
Messages from Physics Alumni
Brendan Owens
(Physics with Astronomy 2009)
Messages from Physics Alumni
Lisa Cusack
(Applied Physics 2008, now an Aer Lingus pilot)
And Finally...

At DCU we have the

People
Facilities
Opportunities
Questions?

Prof. Enda McGlynn, Head of School
enda.mcglynn@dcu.ie