



Peterhouse Cambridge PHYSICS



General Peterhouse Trivia

Age: Peterhouse is the **oldest Cambridge College**. It was founded in 1284.

Size: In terms of physical size, it is **one of the largest of the centrally located colleges**, extending on both sides of Trumpington Street, and having a large and attractive garden ("The Deer Park") behind the Fitzwilliam Museum connecting the first year accommodation in the south to the third year accommodation in the core of the old college to the north. The second year accommodation is on the east side of Trumpington Street, approx 100 metres from the Porters' Lodge.

Support: Peterhouse has **assets exceeding £200 million**¹ placing it in the top four or five colleges by overall endowment. However, given that Peterhouse has a smaller than average number of undergraduates², it is able to be one of the **most generous per student**.

In 2011 Peterhouse **distributed a total of £140,000** in means-tested grants to 56 students (the majority receiving £3,400) under a scheme designed to ensure **no student should be put off from applying to Cambridge because of financial considerations**.

¹ 1 Year ending 30th June 2011 : <http://tinyurl.com/cwa55cl>
² Peterhouse admitted 74 students in 2010 compared to a university average of 117 per college:
<http://www.study.cam.ac.uk/undergraduate/apply/statistics/>

In 2011 Peterhouse **awarded £39,000 in prizes to undergraduates** to recognise and reward excellence and achievement.

In 2011 Peterhouse **awarded £20,000 to students for vacation study and travel**. For example:

- one natural scientist flew to New Zealand to visit the Southern Alps,
- another visited CERN,
- one built a cosmic ray detector (see YouTube videos at <http://tinyurl.com/5r82ou>)
- another simply went hiking in the UK.

In 2011 the Peterhouse library was able to purchase 1,854 books at the request of students and Fellows. **No science student at Peterhouse need ever go without a book** relevant to his/her course.

What about physics?

Peterhouse has the strongest links to CERN of any college. Four of its fellows work at CERN, of whom three regularly teach for the college, and one is the **head of the physics department**. They are:



Dr Lester. University Lecturer and Director of Studies (DoS) for "physical" natural scientists at Peterhouse. He usually teaches³ maths and particle physics to students at Peterhouse. He works on the **ATLAS experiment at CERN**, looking for invisible particles that might make up **dark matter** and **supersymmetry**. He is occasionally known to lecture from one of his unicyles.



Prof Parker. Head of the university's Particle Physics group, ex glider pilot, and lectures particle-astrophysics courses. He teaches physics to first year students at Peterhouse and works on the **ATLAS experiment at CERN**, looking for **exotic states of matter**, and has run a number of summer projects connected to ATLAS, for Peterhouse students.

³ Technically "supervises", to use Cambridge parlance.



Prof Stirling, FRS. Head of the Physics Department (The Cavendish Laboratory) and lecturer in theoretical physics. He works closely with **CERN's Theory Division**, as the leading authority on the **partonic content of hadrons**. Ceilidh band founder, guitarist and bodhran player.



Dr Frost. Research Fellow, cricketer and badminton blue. He has supervised second year physicists for Peterhouse and Trinity College for many years. He searches for **microscopic black holes** and signs of **quantum gravity** with the **ATLAS experiment at CERN**.



Do CERN links affect Peterhouse students?

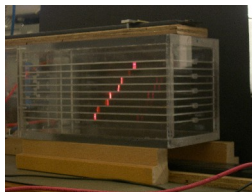
Many Peterhouse students have gone on to work in High Energy or Theoretical Physics, and/or have undertaken project work at CERN. Here are examples of students who have graduated in each of the last four years:

Sky French. She left school in 2004 to read natural sciences at Peterhouse, graduated with a first in 2008, and went straight on to a PhD in Particle Physics (also at Peterhouse) with Prof Parker as her supervisor. She did two particle physics projects as an undergraduate, one with Dr Lester and one at CERN. **She is now a Fellow of Pembroke College, Cambridge**, and is the **CERN** physicist leading the search for signals of new physics in unexpected lepton-production at **ATLAS**.

Tjonnje Li. Left school in 2005. Read natural sciences at Peterhouse (specialising in Astrophysics) and graduated with a 2.1 in 2009. **Tjonnje is now a Gravitational Wave expert** in the national Netherlands Institute for High Energy Physics (NIKHEF).

Emanuel Malek. Left school in 2006. Read natural sciences at Peterhouse, graduated in 2010 with a distinction in the mathematical tripos, and has entered into a fully funded PhD in String Theory at Peterhouse.

Jack Collins. Left school in 2007. Read natural sciences at Peterhouse. Graduated in 2011 with a first class degree, having done a project at CERN and having (in his spare time while at Cambridge) built two spark chambers for detecting and imaging cosmic rays (see videos <http://tinyurl.com/5r82ou>). He is now undertaking a PhD in Theoretical Physics at Cornell in the US.



Of course, many people who come to Peterhouse to study natural sciences intending to specialise in physics end up finding that some other part of natural sciences is even more interesting. In the last six years, Peterhouse natural scientists who took physics have gone on work in a huge number of different areas including: management of a multi-billion pound oil refinery; teaching in schools; scientific research from zoology to history of science; the priesthood; banking; and management consultancy (to name just a few).



Quality of Teaching

To succeed at Cambridge you must have teachers who care about you, and who *want* to teach. It is not good enough to have people who are simply eminent in their field. They must inspire.

Here is a sample of comments left by real Cambridge students, about the physics and mathematics teaching provided by Peterhouse fellows. Many of the comments come from students *from other colleges* for whom Peterhouse fellows have been also asked to teach.

"You have been a real inspiration to me and I am immensely pleased to have been supervised by you this year. I feel that I have discovered a new importance with how I go about my subjects ... and develop my own way of understanding how to apply what we are taught in lectures. I think above all my other supervisors you have excelled at teaching me this and I will remember our supervisions for many years to come." (2012) [First year supervisee, not from Peterhouse]

"So very pleased!! :) Thanks again for all your help this year. I definitely learnt a lot and enjoyed it all too." (2012) [First year supervisee, not from Peterhouse]

"[Named Peterhouse Fellow] was by far the best lecturer I have seen at Cambridge. His enthusiasm and energy were captivating, he was frequently amusing, always engaging, and laid out the key points clearly. Give the man a medal, a raise and then make him teach all my courses next year." (2009) [Third year student, not from Peterhouse]

"Having just completed my MSci NatSci course at Cambridge (specialising in Physics) I thought it might be appropriate for me to send this note. Over the last four years of study I must have been lectured by just over 50 lecturers. Of these there were 6 that truly stood out, both at the time, and now looking back.

... [lists names and courses] ...

I'd like to thank you for a really great experience. You did not share teaching techniques yet you all found a way to make us leave each lecture feeling smarter, more interested and happier! I believe that to pull this off with consistency is the perhaps the greatest achievement in teaching." (2009) [Fourth year student, not from Peterhouse, sent to six lecturers in natural sciences]

"I have been accepted to do a PhD in [subject and university deleted], I am still very thankful [to] you for very motivating and inspiring supervisions during my first year, which definitely helped me to chose to continue with physics, and I have always been very happy with this choice." (2012) [Departing fourth year student from Peterhouse]

Famous Scientists

Peterhouse "science" can claim four Nobel Prize winners among its past and present members:



- **Sir Aaron Klug** - Nobel Prize for developments in crystallographic electron microscopy,
- **Max Perutz** - Nobel Prize for determining the structure of haemoproteins,
- **Sir John Kendrew** - Nobel Prize for determining the structure of haemoproteins,
- **Archer Martin** - Nobel Prize for developing partition chromatography,

in addition to a number of eminent scientists and inventors including:

- **Lord Kelvin** – after whom the temperature scale is named; founder of thermodynamics,
- **Air Commodore Sir Frank Whittle** - Inventor of the Jet Engine



- **Charles Babbage** - Originated the concept of a programmable computer,
- **Henry Cavendish** - Discovered hydrogen and was first person to "weigh" the Earth,
- **Sir Christopher Cockerell** - Inventor of the hovercraft,
- **Sir James Dewar** - Inventor of the explosive cordite, and the "dewar" (thermos flask).

Alas, not all Peterhouse undergraduates who went on to become famous studied natural sciences, as the comedian David Mitchell would probably admit.

Contacts

Email Dr Lester Lester@cern.ch if you have any questions about Physics or Mathematics within Natural Sciences. Find the Peterhouse admissions website via google, or email it via: admissions@pet.cam.ac.uk .