The Fresher's Guide to Physics and Astronomy at St Andrews
DON’T PANIC.

These are the words inscribed in large, friendly letters on the cover of The Hitchhiker’s Guide to the Galaxy. And these are the words I would urge you to remember as you progress through this adventure you have just embarked on.

You have arrived at the School of Physics and Astronomy (PANDA), and you are welcome. Our expert faculty members are here to help you learn and develop, ready to challenge your critical thinking abilities and hone your skills. Here, we are surrounded by world class research facilities, and world class researchers to match. Powerful lasers are fired, matter is explored at the most miniscule scale, and some of the coldest places in the Universe exist right here in our labs. Plus, we have yet to lose anyone in a black hole. Things are going well.

With the entire University abuzz for Orientation week, you won’t be surprised to know that we have some exciting events planned to welcome you to the department. I invite you to attend the Entrants Quiz on Tuesday afternoon, which will be followed by a casual reception (read: free food!) and my favourite part of the day, the research lab tours. The Physics Society will be holding a couple of breakfasts, so you can chat with new and returning students over some of their homemade baked goods. Also, don’t forget to come along to the Astronomical Society’s barbeque, featuring a rocket launch by the Engineering Group. With these events and many more, which are listed in the Orientation Timetable, you’re in for a very full week!

So be excited. Explore the department. Ask questions. Avoid any stray black holes.

Welcome to Physics.

Alisa Danilenko (ad262@st-andrews.ac.uk)
Famous physicists of St Andrews

- **John Napier** - inventor of the logarithm
- **James Gregory** - interference of light, astronomy
- **David Brewster** - polarisation of light
- **Wilson Sibbet** - ultrashort pulses for lasers
- **John Leslie** - heat and refrigeration
- **Moira Jardine** - first observation of a star flipping its magnetic field
- **Kishan Dholakia** - Guinness book of world records for fastest spinning manmade object

**FUN FACTS**

- It’s a long held myth that the dimples on a golf ball come from a design by a university physics professor, after finding an exotic piece of dimpled packing foam flew further than the golf balls at the time.

- Musician K.T. Tunstall is not only from St Andrews, but she spent much of her childhood in the department, as her father was a lecturer.

- The university observatory houses the James Gregory telescope, the largest optical telescope in the UK and the largest of its design.
An interview with Bruce

What do you do?
I’m the director of teaching. This includes a variety of things but most importantly giving you good modules and a good overall programme. I am involved with student welfare in the school, helping deal with problems should they arise. I also liaise with various other bodies in the university. I work closely with the careers centre e.g. organising careers events for the school. All of that and my own teaching.

When will students see you?
Well I teach a variety of classes: Physics 1A optics, Physics 2B Electromagnetism, Junior Honours Transferable Skills for Physicists and the 5th year Advanced Lasers module. I also coordinate part of the 3rd and 4th year labs along with sitting on the Student-Staff Council (SSC).

What’s your research on?
Originally I started researching miniature solid state lasers of which I made a fair bit of progress. Now I work on research of physics education.

What do you do in your spare time?
With my family mostly, gardening (doesn’t that sound middle aged) and I also enjoy hiking and sea kayaking when I can.

What’s the best thing about St Andrews?
Definitely the people (students included!)

Tell us a fun fact?
Which one? There are so many fun facts about physics!
PHYSICS

A 'straight' physics degree will give you all the tools to master physics, including as a laboratory whizz! As well as having a really practical experience fiddling with lasers, electronics, and more, you will also be learning loads of important, core physics. Discover the small and the massive as part of the fundamental study of everything that makes up...everything.

THEORETICAL PHYSICS

This degree is the closest you can get to understanding why things do the stuff...or...something. Use your finely tuned maths skills to open your eyes and brain to some of the coolest intricacies of modern physics. You'll gain unparalleled problem solving skills to approach century long debates around quantum physics, relativity, and other issues that you could be the first to solve!

ASTROPHYSICS

If the ‘Big Questions’ really get your heart going, you enjoy pretending cows are spheres, and your life goal is to be able to explain the entire Universe, then astrophysics is the degree for you! (Don’t hold me to that second part...) You’ll become an explorer of the cosmos from the comfort of a lecture theatre, travelling past stars, planets and galaxies as part of this exciting course.

JOINT DEGREES

Perhaps you are looking to expand your degree beyond just physics! Our joint degree options allow you the flexibility to keep studying everything you love, whether it’s maths, chemistry, philosophy or computer science. Follow your heart!
Entry points

**FIRST YEAR ENTRY**

The most common entry point, providing an introduction to classical mechanics, as well as exposure to quantum mechanics, laser physics, and more, at a level equivalent to Advanced Higher Physics or A Level. This route allows you to study another subject, such as Italian or Music, alongside Physics and Maths.

**SECOND YEAR/DIRECT ENTRY**

A popular choice for students taking A-levels, Advanced Highers, and international equivalents. Roughly one third of students take this route, so there will be no problems integrating with the rest of your class. **Note that if you change your mind, there is an opportunity to change between first and second year entry before the end of Week 1.**

**GATEWAY**

This entry route is available only to those who have been offered this route of entry in the admissions process.

**Unsure which entry route to take?**

Come along to the meeting on Monday, September 11th from 4 to 5pm. Hear from staff and students and make an informed decision!
Managing the workload

For many people, university is a time of great change. Managing your workload is at the heart of what makes you a successful student. Finding your optimum potential lies in lifestyle, balance, and vision.

- **Work Habits** - Your study habits are at the crux of how you execute your assignments, digest new information, and prime yourself for success. Everyone finds their own rhythm and study style. You may find practices like study groups, routine revising of notes, and planning ahead to avoid last minute stress beneficial. It is important to remember that useful study should start at the start of teaching, staying ahead is always easier than trying to catch up!

- **HEALTH WARNING**: it is impossible to do all the extras for every single course. Go to all timetabled opportunities, and focus on the things you are struggling with. Remember not to be too hard on yourself!

- It is important that you prioritise your own health. Regular healthy eating, as well as daily physical activity can help to lower needless stress, and to promote better concentration in your studies.

- **Sleep** - Effects of sleep deprivation on health and cognition are well documented. Most literature indicates that it is advisable to sleep around eight hours each night when possible. As well as being vital to being efficient in your work, thorough and regular sleep is key to physical and emotional wellbeing.

- Remember that you can use your peers as a major resource. Working together enables students to aid each other’s understanding, and reduces stress.

Remember that you can **ALWAYS** ask for help. You are a student and your task is to learn, not to already know.

The staff in the Advice and Support Centre (ASC) can provide advice on problems affecting your studies or personal life, including academic matters, finance, accommodation, health and disability, relationships, stress or anxiety.

ASC - Student Advice and Support Centre
Tel: +44 (0)1334 462020
Email: theasc@st-andrews.ac.uk
“Our services are friendly, effective, efficient and confidential.”
Further engagement

Researchers within the School are very enthusiastic about their work and they’re always happy to talk about it. Some may also be looking to take on interns. These positions are usually not advertised!

To learn more about your lecturers listen to PhySoc’s podcast, insight, where we find out what led them to where they are today, discovering their passions, inspirations and motivations along the way.

If you want to explore physics outside of the lecture theatre we recommend joining a student society like PhySoc, AstroSoc or SEG (Engineering). These are all friendly communities full of fascinating people wanting to explore their flavour of physics.

AstroSoc hosts stargazing nights at the University Observatory. With your cup of hot chocolate in hand you can explore what the universe has to offer.

PhySoc hosts academic talks where researchers within the school present their current work. These are excellent opportunities to engage with academics and discover what area of physics you are most intrigued by.

The School also hosts a series of academic talks, Colloquia, given by specialists from across the world where the latest developments in physics are discussed. These are usually held on Friday mornings at 10 in Theatre C.
The School works through a collective known as the Student Staff Council (SSC), which meets twice a semester to discuss issues within the School. Each year group elects a Class Representative who gives feedback on the modules at the SSC meetings, and works closely with the module coordinators to make improvements and act on suggestions from the class.

Why get involved?

Being a class rep is extremely rewarding. You work with a team of others to highlight good practice, address problems, brainstorm ideas and implement solutions. These skills, coupled with the organisation you develop, are an amazingly effective and universal skillset.

Available positions for 1st and 2nd years:

- 1st year physics
- 1st year astro
- 2nd year physics
- 2nd year astro
- 2nd year direct entry physics
Research within the School

Photonics

Ensuring an abundance of ‘laser hazard’ signs about the department, St Andrews photonics researchers explore various topics, including semiconductor optoelectronics, quantum optics, and mm-waves. The School’s Photonics Innovation Centre interacts regularly with industrial organisations, while recent efforts in biophotonics have enabled new techniques for the study and treatment of disease at a cellular level.

Condensed Matter

The condensed matter research going on at the School is extensive and varied. Theoreticians work hard on concepts ranging from quantum many body effects to dynamics in nanostructures, while the basement hides an ever expanding array of facilities, from cutting edge ultra-high vacuum chambers in which the electron structures of materials are probed, to complex laser systems for cooling and trapping atoms.

Astrophysics

Astronomy at St Andrews is diverse. Although most of our researchers focus on either exoplanets or galaxies, it’s always a mixed bag. Utilising state-of-the-art observatories from around the world and in space, the School constantly produces noteworthy scientific papers, working to answer fundamental questions of extra-terrestrial life, and the fate and evolution of the Universe itself.
RESEARCH INTERNSHIPS are exceptional for any potential career, academia or otherwise; they develop your skills in a professional lab environment whilst also introducing you to situations from the wider world of work. A lot of places will also pay you a wage while you are there. What’s not to love?

- Don’t be afraid to email around, and check research projects online, either in the department or elsewhere.
- Enjoyed a talk? Speak to the lecturer afterwards! They may be able to offer some useful advice, and could even be looking for a summer student.
- Contact the researcher or fill in any application forms. It’s useful to send a CV and Transcript with your initial email; this will get your foot in the door.
- Be conscious of funding. Funding internships abroad may be very difficult but there are scholarships and other funding sources you can apply for. Be sure to ask the researcher or lab.
- If you intend to do an internship, be sure to contact researchers before Christmas as this is when many summer students are chosen.
- Need advice? You can always contact the careers centre at http://www.st-andrews.ac.uk/careers
- Find information and advice on Physics placements: https://www.st-andrews.ac.uk/physics/pandaweb/admin/vacplacements.htm

For more information, look out for internship events in the department or speak to the School President.
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If you enjoy our Freshers’ week events you can join PhySoc to access all of the events and opportunities that we have on offer.

We have organised many events recently including Liquid Nitrogen Ice Cream, quizzes, dinners and a Games & Free Nachos’ Night as well as an interesting lecture series.

Find out more: st-and.ac.uk/~physoc1 fb.com/PhySocStA

SEG
ST. ANDREWS
ENGINEERING GROUP

Promoting engineering through teaching workshops and year-long design projects.

A medium for like-minded individuals to share ideas, build gadgets and have fun in the process.

ASTROSOC
UNIVERSITY OF ST ANDREWS
ASTRONOMICAL SOCIETY

Promoting engineering through teaching workshops and year-long design projects.

A medium for like-minded individuals to share ideas, build gadgets and have fun in the process.

M42 - THE ORION NEBULA
Taken by AstroSoc at the Observatory!

STARGAZING NIGHTS
PUBSOCIALS
NORTHERN LIGHTS

WELCOME TO THE UNIVERSE
UPCOMING EVENTS

PhySoc

Quizzes
Cool prizes available.

Pub Crawls

Trips Away
Last year we visited CERN.

Bake Sales
With our new Baking Rep. position you can expect lots more of these.

Cinema Trips
See the latest films that are related to physics.

Talks
Learn about the research being done in St Andrews.

ASTROSOC

Stargazing Nights
Explore the Universe with a cup of hot chocolate.

BBQ & Rocket Launch WITH SEG
Happening Wednesday 13th September, 1200-1500, University observatory

STAR Ball WITH PHYSOC
Our very popular yearly ball held jointly with PhySoc.

SEG

Engineering Workshops
2/3 taught sessions throughout the year. Past workshops have involved Arduinos.

Balloon Launch
Join us around the end of the year when we'll be launching our high-altitude balloon.

University of St Andrews
School of Physics and Astronomy

fb.com/Astrosocstandrews

Burns Supper
Join fellow students and staff for a traditional Scottish meal followed by a ceilidh.

Internships Talk & Question Panel
Learn about the opportunities that are available over the summer from fellow students.

Research Colloquia
Find out about the latest developments in physics from experts. Fridays 10:00 in Theatre C.

Find out more about these events and others still to be announced on their Facebook pages!

School Orientation Week calendar: https://www.st-andrews.ac.uk/physics/pandaweb/admin/vacplacements.htm
1. Main entrance
2. Concourse
3. Cafe
4. Restrooms
5. School office and lecturers' mailboxes
6. Downstairs to some staff mailboxes

7. Library
8. PC classroom
9. Gateway classroom
10. Lecture room 301
11. Lecture room 222
12. Lecture theatre A
13. Lecture theatre B
14. Lecture theatre C
15. 1st year physics lab
16. Teaching labs
17. Astro lab
18. Tutorial room 233
19. Tutorial room 338
20. Tutorial room 330