Science for Development at Honours Level

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Science for Development

Science 4 Development

Building bridges across disciplines

On January 30-31 2020, the first Science 4 Development workshop was jointly hosted by the International Science Council's (ISC) Regional Office for Africa (ROA) and the International Astronomical Union's (IAU) Office of Astronomy for Development (OAD), both supported by the Department of Science and Innovation and the National Research Foundation.

Proposal for a Science for Development course at Honours level at the University of the Wester Cape.

RESPICE PROSPICE

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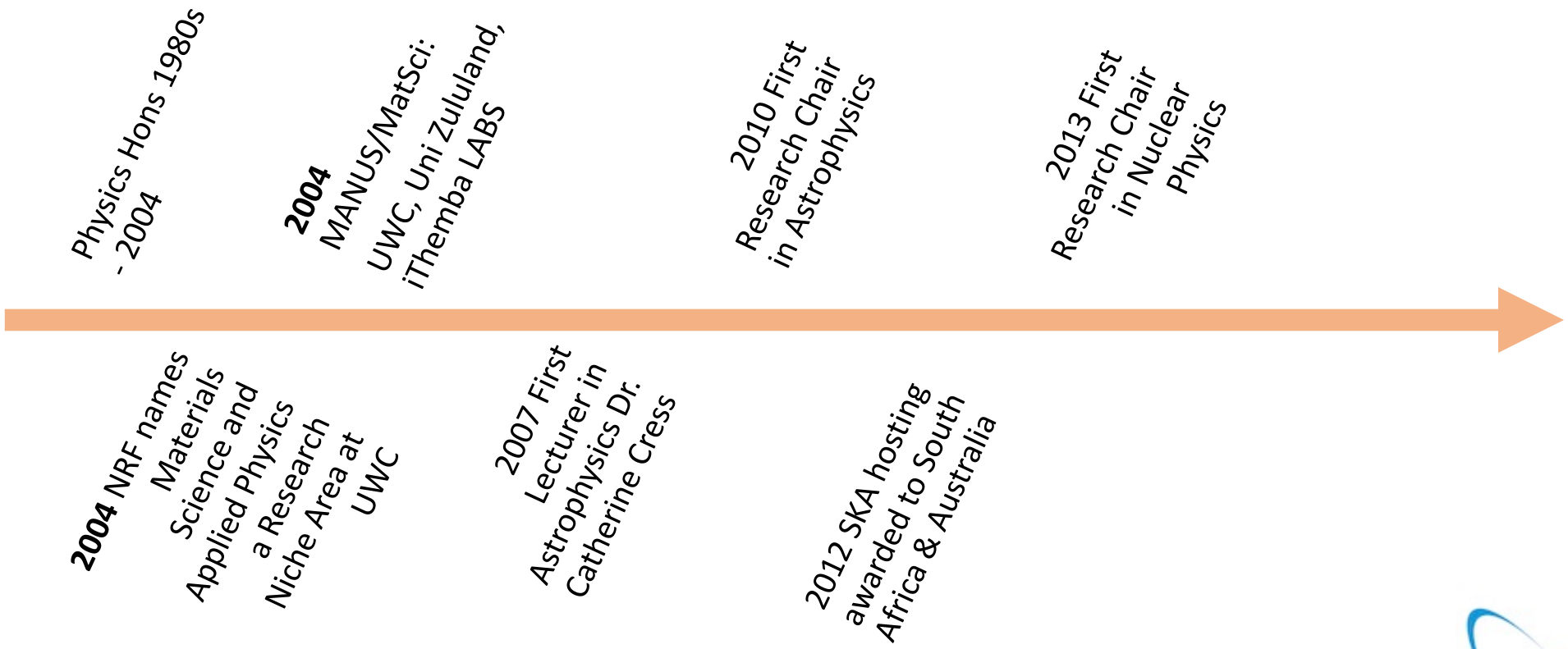
BSc Hons Physical Science at UWC



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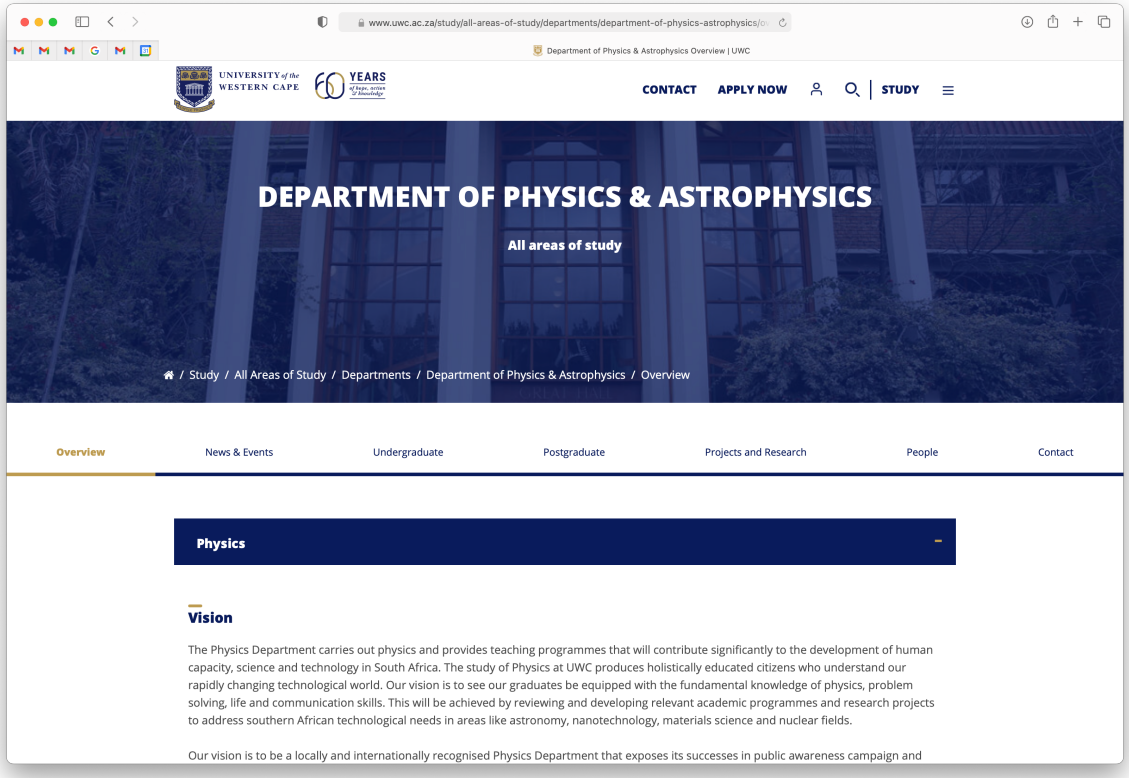
UWC Physics in 2021



- 8 Professors
- 4 Research Chairs
- 10 Lecturers & Senior lecturers

Materials Science and Solid State Physics
Applied and Fundamental Nuclear Physics
Nanotechnology
Physics Education
Astrophysics and Cosmology

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Additional Considerations

UWC Graduate Attributes

Scholarship: A critical attitude towards knowledge:
Critical citizenship and the social good: A relationship and interaction with local and global communities and the environment:
Lifelong learning: An attitude or stance towards themselves:

Inquiry-focused and knowledgeable
Critically and relevantly literate
Autonomous and collaborative
Ethically, Environmentally and Socially Aware and Active
Skilled Communicators
Interpersonal flexibility and confidence to engage across difference

Benchmark Statement for Physics in South Africa

public training programmes should be of relevance to its needs, lead to employment, prepare for citizenship
over-emphasis on passing examinations as opposed to meaningful learning. Graduates often lack the skill to integrate knowledge
disciplinary expertise is only one of a much larger set of components that determine whether an individual will operate successfully on entering a profession

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New BSc Hons Physical Science at UWC

Core Modules aimed at consolidating the foundations: Terms 1 & 2

Classical Mechanics
Quantum Mechanics
Mathematical methods for Physics
Statistical Physics and Thermodynamics
Electromagnetism
Computational Physics
Science for Development

Intro and Specialisation Modules aimed at tasting research: Terms 3 & 4

Solid State Physics
Nuclear and Particle Physics
Astronomy and Astrophysics
Physics Education

Research Module

Research Project

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Science for Development Topics

1. Introduction to development
   - Definitions, Organisations, SDGs, Goals, targets and indicators
2. Science in development topics
   - Environment and Energy
   - People and Health
   - Infrastructure, Governance and Economy
3. Data week
   - Where to find development data?
   - GIS and Earth Observation
   - Open Science, FAIR principles, reproducibility
4. Beyond data
   - Reading scientific papers
   - Mathematical ideas in Economics and Social Science
   - Mathematics of democracy
5. From Indicators to modelling and prediction
   - PDEs and applications (e.g. climate)
   - Stochastic Processes (e.g. traffic, cybersecurity)
   - Time series analysis (e.g. econometrics, health)
6. Applied Statistics
   - Evidence
   - RCTs (e.g. in health and economics)
   - Correlation and Causality
7. Machine Learning
   - ML in Health
   - ML in Language
   - ML and People (e.g. Social Media)
8. Science Communication
   - Introduction
   - Language and Science
   - Stakeholders of science
   - Multi-disciplinarity
9. Science and Policy
   - How it works
   - IKS
   - Sensitive topics (e.g. Religion)
10. Putting it all together
    - Ethics
    - Lateral thinking
    - Scientific Intuition

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Conclusions

At the end of the course, we want the students to be able to look out the window and see that it is the laminar air flow that makes the condensation above Table Mountain create lenticular clouds, then look at the traffic and see that one more lane may not help congestion as it doesn't affect the viscosity of traffic as a fluid, then look at the side of the road and see the importance of green corridors in networking habitats for the maintenance of biodiversity in a built environment, then see that the proximity of housing in a township can be interpreted as a mean free path for pathogen propagation and then see the phase of the moon and Venus and visualize the ecliptic plane in 3D, then smell the ocean and think of how ocean spray contributes or not to the acidity of the top soil, etc. etc. That kind of broad scientific thinking is what the Science for Development course aims to achieve.

Thank you!

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