

A woman wearing a brown hijab with a gold floral pattern and a maroon long-sleeved shirt is shown in profile, facing left. She is holding a white chalk in her right hand and appears to be writing on a green chalkboard. The chalkboard has some faint white markings, including what looks like  $q + i\frac{1}{2}$  and  $-a_3$ .

# Supporting Women in Physics through Outreach and Communication

Kate Shaw (ICTP, Trieste)  
Career Development Workshop for Women in Physics  
31 October 2019

# Supporting Women in Physics

Identify the problem/phenomena you are trying to solve/understand  
e.g.

- Girls are not choosing to study physics at school / at university
- During university / early career women may choose to have children and take majority of child care, resulting in an asymmetry between her and her colleagues without main child care responsibility career progression
- Society may expect different careers from men and women
- Decision makers may be biased towards male applications



# Supporting Women in Physics

We can do outreach projects and communication projects to help solve or discuss these problems!



# Supporting Women in Physics

Design outreach and communication projects with specific aims in mind, how to achieve those aims, identify the problems and how to combat them:

**EXAMPLE: Problem – Few girls study physics**

**Aim:** Work to invite girls into physics

**Audience:** Choose a target audience, 5-8 year olds, 9-12, 12-16...

**Identifiable issues:** Girls identify being a scientist with being male

**Solution:**

- Role models!! This means us! This means our picture of a scientist/ physicist
- Confidence building, play with experiments, lead and speak up

# Women in Physics in South Africa

In November 2005 Women in Physics in South Africa (WiPiSA) was launched, with funding from the Department of Science and Technology (DST) and under the auspices of the South African Institute of Physics.

There is a growing global concern over the declining number of students at higher education institutions enrolling for, and graduating in, physics.

South Africa, like many other countries, experiences under-representation of women in physics in all institutions, including academia, research and development, government institutions and industry.





# Women in Physics in South Africa

WiPiSA aims to address the following areas of concern:

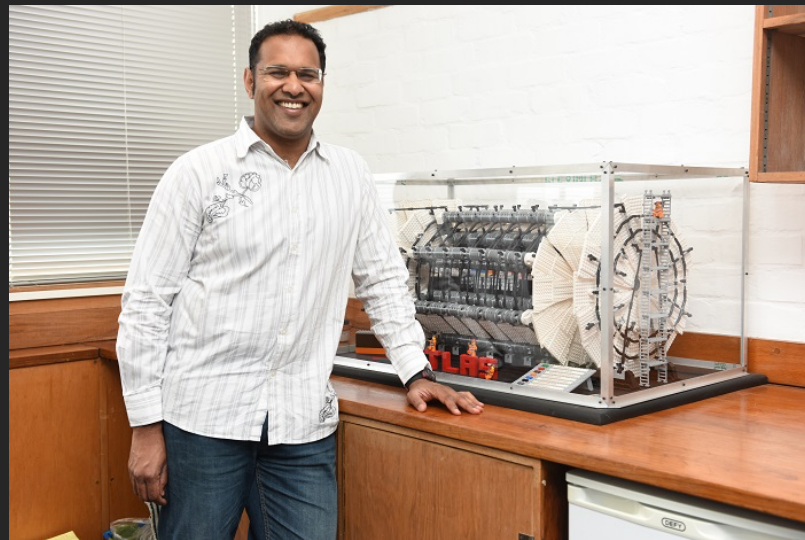
- **Attracting** girls into physics, including changes in teaching and curricula
- Launching a **successful physics career**, including **mentoring** and evaluation
- Getting women into **higher positions** in institutional and leadership structures
- **Breaking stereotypes**
- Balancing **family** and career
- Jobs
- Funding, and eligibility for funding
- Improving the **institutional structure** and climate for



# Women in Physics in South Africa

Myself and Sahal applied for funding to address these WiPiSA Goals:

- Attracting girls into physics, including changes in teaching and curricula
- Breaking stereotypes



Partnered with **Sahal Yacoob**, University of Cape Town, ATLAS experiment

# Women in Physics in South Africa

Aims of project:

**Motivate** female high school students to study physics by understanding, visualising and being inspired by the various career possibilities.

**Breakdown stereotypes** of what a physicist is and does, to all audiences.

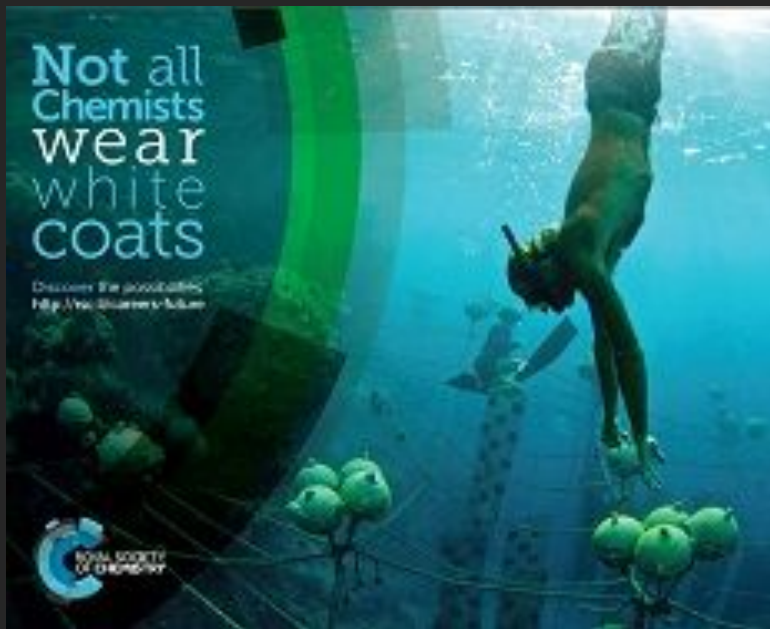
Increase the **understanding of the general public and parents** the varied career possibilities and knowledge that it is a unisex field





# Women in Physics in South Africa

Inspiration:



# Women in Physics in South Africa

## Plan

- Create a set of **posters** of women in physics in South Africa, with inspiration quotes, to be sent to high schools across the country to be displayed on the walls, and put online
- To change ideas of both girls and boys, and parents

# Women in Physics in South Africa

Very diverse in terms of

- Economic status
- Ethnicity
- Culture
- Rural or urban





# South Africa: Limpopo

*“Traditionally women’s role is to stay home and take care of the house and kids. So you want to go to university, and do, what, with that degree?”*



# South Africa: Hellen Chuma

- Hellen grew up in Makgofe, a small village in Polokwane, South Africa
- She is studying for her PhD in material physics
- Her main challenge was financial support for my undergraduate degree
- “I went with a hope to further my studies and get a well-paying job to be able to take my family out of poverty“



# South Africa: Hellen Chuma



***“My mother was very supportive, she believes education is the way to go because she believes if she had an opportunity to go o school she would have had a different life”***



***“When my mother wanted to go to school her dad said no. A woman who goes to school becomes undesirable. So women don't go to school, they must listen to their husbands. So that's how village people are raised. “***



# South Africa: Sylvia Ledwaba

- Sylvia is studying PhD in Physics at the University of Limpopo
- When awarded a prize in physics for her research, was mocked by male colleagues
- “They laughed at me and said I only got the prize because I am a women”
- “I think they are intimidated by a women, they cannot accept a women doing better than them”



“If we have a boy and a girl and we have bicycle then you'll find the boy always will have the first go, until he has had enough, then it's the girls turn. A girl can't be better than you, you know. It starts with the small things.”

”  
My mother is my  
greatest support, she  
always says 'If you have  
education you can  
equip yourself for life.

## Hellen Chuma

Material Modelling, University of Limpopo

Hellen Chuma is from Makgofe, Limpopo. She is a PhD student at the university of Limpopo where she studies the use of palladium as a catalyst for emission control technology.

”  
I love doing research,  
learning about how  
technology works, and  
actually improving the  
science. I find it beautiful.

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Material Modelling, University of Limpopo

Sylvia Ledwaba is a PhD student at the University of Limpopo. Originally from Mashashane, Limpopo, she spends her time working to power sources as part of her PhD at the University of Limpopo. make for efficient portable

# South Africa: Cape Town


“I think for a lot of us, especially for women of colour, to pursue a career in research, there was a lot of sacrifices that had to be made, and so those who made it had **more supportive families**.”

This is especially true if you are the **first person** in their family to go to university. I'm here, because, for instance, in my case both my parents have two degrees each”

**Tana Joseph**





A portrait of Tana Joseph, a woman with short dark hair, smiling. She is wearing a pink top with white polka dots. The background is a bright, sunny outdoor setting with a large white structure, possibly a telescope, visible in the distance.

”  
You do what you must  
to achieve your dreams!  
It's probably not going  
to be easy, but if it's  
what you want to do,  
then it's worth it.

## Tana Joseph

Astronomy, University of Cape Town

Tana Joseph is a Radio Astronomer at the University of Cape

Town. As part of her research she studies black holes outside

of our galaxy which emit X-Ray radiation.

“

I hope one day to continue my research on Mars, and possibly even contribute to the discovery of evidence that life once existed there.

## Adriana Marais

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Adriana Marais is a theoretical physicist with the University of KwaZulu-Natal, and investigates quantum mechanical effects in biological systems. She is currently striving to be one of the pioneers to establish a colony on Mars.

Some information about the project, maybe an internet website and other details details details



[www.womenphysicistsinsouthafrica.com](http://www.womenphysicistsinsouthafrica.com)

“

I had two loves. One was biology, and the other one was physics. So medical physics was actually the obvious choice to go into, I love making a difference in peoples' lives.

## Hester Burger

Medical Physics, University of Cape Town / Groote Schuur

Hester Burger grew up in Stutterheim in the Eastern Cape and completed her MSc degree in Medical Physics in 1997. She is Head of Division for Medical Physics at UCT / Groote Schuur Hospital and spends her time trying to make a difference in the lives of cancer patients.

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”  
I have a burning  
interest in science  
and the success of  
science in South  
Africa.

## Igle Gledhill

Fluid Dynamics, Centre of Scientific and Industrial Research

Igle Gledhill studies the aerodynamics of agile aircraft for the CSIR. She is from Grahamstown. An expert in fluid dynamics, Igle has studied a wide range of problems ranging from molecular treatments of TB and HIV to the Space Shuttle.



”  
My grandfather used to  
take me to the library  
every week. And I always  
made sure that at least  
one of the books I took  
was a science book.

## Riona Ramraj

Astronomy, University of Cape Town

Originally from Pietermaritzburg, Riona Ramraj is a PHD candidate from the University of Cape Town working on the details of the light emitted from the brightest part at the centre of a galaxy (the Active Galactic Nucleus) in order to determine their nature and evolution.







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# Women in Physics in Palestine

- More women than men are graduating in science in the Arab world
- In physics the number is much higher
- This is very encouraging that Arab countries **do not struggle to get women to study science**



# Women in Physics in Palestine

occupied Palestinian territory - Reference Map

OCHA



The number of women studying physics in the Palestinian Territories is greater than the number of men, yet women faculty members remain a tiny minority.

The demands of social norms, of gender bias across the international scientific community, in addition to the challenges of pursuing science in the developing world and under occupation render a career in physics a difficult undertaking.

Yet despite these obstacles, and in an ever changing landscape, **more and more women are choosing to embark on a career in physics.**



# Women in Physics in Palestine





# Women in Physics in Palestine



Dr Wafaa Khater was born in the village of Ein Sinia in the West Bank, the ninth of ten children.

“My father was a farmer and we all worked with him, I am a peasant girl who grew up on the farm. Whenever I said I wanted time to study for my exams and I wanted to excuse myself from working on the farm, father told me ‘It’s the fresh air and farm fresh vegetables that make you smart at school’ “.

# Women in Physics in Palestine

- If the family can afford it, they will almost certainly send the daughters to university
  - women make up half of the people that go to university
- After university women often marry have children and may work part time.



***"Maybe the only thing that restricts our dream to continue our education is the social point: you should have a family. You should marry, but according to my family it's my choice, they didn't restrict me with these social ideas"***

***Waad awad***

# Physics in Palestine: Tasneem Saleem

- Physics master student at Birzeit University 2014
- Married with two young children
- Was the strongest in her year
- Masters HEP at Paris Sud, PhD on ATLAS experiment, currently a postdoctoral fellow



“Maybe a lot of people say that when you have children what will you do with your certification? But I say that this is my life and I love this field I have a lot of interest. So I don’t listen to people.”



# Physics in Palestine: Tasneem Saleem

Tasneem: “ Being a women in physics, I see **its normal for me**. I don't see such a difference.

Maybe because here in the university all of us are girls. When Kate came and said that there are a lot of girls I was surprised.”

“Because I can see that in the West there are a lot of facilities for any one to study. And we here in Palestine we have really a lot of challenges to do that. I am really surprised why there are so many facilities to do science there are no women.”



# Reverse gender gap

Palestinian women don't think that physics is for boys

“Did you ever feel that studying Physics was a subject for men? And what is it like to be a female scientist?”

Suhad: “Well first, I don't know why you say Physics is only for men, because here in our university in the science as a whole many students are women, not men.

For example in undergraduate we were 18 girls and only 3 boys. So with respect to me it is not strange to be a female scientist.”





# Photoessay

The women in physics in Palestine were inspirational, we wanted to share their thoughts and ideas about issues in physics, gender and living under occupation.



Doa Hawamdeh:

"I think physics is the mother of all the sciences. If I can learn physics I will learn mathematics, chemistry, everything. It is the principle of life. That is my feeling."

# Photoessay



Dr Wafaa Khater: “Nowadays with the existence of the Palestinian Authority and the state-to-be Palestine, there is a Ministry of Education and Higher Education which provides various kinds of **grants and loans** to help students get their education, and more and **more young women are going to university** to get a degree as they are not **entirely dependent** on their parents to support them financially.”

# Photoessay



Worood Shadeed: “I don’t have my own family, but when you get married and have children it is difficult for you. I know that it’s difficult, but you can.”

We see Wesal and Tasneem, yes, **they have family and they are studying and they have work.** Of course their lives are harder but you can.”



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# Supporting Women in Physics

## Communication and Outreach

Always think about:

- What are your aims and goals – what are you trying to achieve?
- Who are your target audience – what do they need?
- What are your key messages? What do you want them to go away with?
- What platforms will you use to communicate/ deliver a program?

# Physics Without Frontiers

ICTP Physics Without Frontiers works to inspire, train and motivate physics and mathematics university students worldwide with some focus on science and technology lagging countries, to help build the next generation of scientists. Each project is unique, developed with the country's specific needs in mind.



- We work with volunteer scientists, who are PhD students, postdoctoral researchers, or lecturers from all over the world passionate to promote physics and mathematics.

- PWF has worked with over 5000 students worldwide in 17 different countries! Read about our projects in countries all over the world!

<https://www.ictp.it/physics-without-frontiers.aspx>  
@ictp\_PWF



Thank You

<https://www.ictp.it/about-ictp/media-centre/galleries/women-in-physics-in-the-palestinian-territories.aspx>