Women in Physics in South Africa (WiPiSA)

A Celebration of the World Year of Physics

3- 4 November, 2005

Durban

Blue Waters Hotel

Universiteit van Pretoria

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

1. Background and purpose

1.1 Background

In March 2002, the International Union of Pure and Applied Physics (IUPAP) organized its first international conference on Women in Physics (WIP) in Paris, UNESCO, now known as The Paris Conference of Women in Physics. The aims were to understand the under-representation of women in physics internationally and to formulate ways of addressing the issues. There were about 300 delegates and representation was from 65 countries world wide. A number of resolutions were passed, and these appear in the report of the conference from the South African Delegation at www.saip.org.za. In May 2005, a follow up meeting was held in RIO for the second international conference on WIP (The RIO Conference). The aim of this meeting was to report on regional progress on the status of women in Physics. This conference report is also at SAIP website.

1.2 Steering Committee

A Steering Committee was formed during 2004 with members Mmantsae Diale (Chair, UP), Zinhle Buthelezi (iThemba Labs), Graciela Roston (UP), Sarah Buchner (HartRAO), Diane Grayson (Andromeda cc) and Igle Gledhill (CSIR), consulting with Byren Archary (DST), Tshepo Seekoe (DST), and Prof Johan Malherbe (UP). A workshop prior to the launch identified a series of issues, discerned possible outcomes, and structured the intent and programme of the Launch Conference.

2. Pre- Launch Workshop

The pre-launch workshop was held at the High Performance Centre of the University of Pretoria on the 16 September 2005. The Workshop was attended by Mmantsae Diale (Chair, UP), Sarah Buchner (HartRao), Igle Gledhill (CSIR), Diane Grayson (Andromeda CC), Zinhle Buthelezi (Ithemba Labs), and Graciella Roston (UP, University of Lapampa, Argentina).Those who attended the Launch Workshop were a few women who had been identified to be able to give guidance to the formation of the Working Group of Women in Physics in South Africa. There were apologies from Women in Physics in Gauteng who were specifically invited to take part in the workshop, but could not make it due to teaching loads. The workshop was able to draw from the experience of Diane Grayson, who was able to lead the discussions that led to the

formulation of the issues that formed a basis for discussion for the Launch Conference. Each one of the members of the steering committee did a splendid job. I acknowledge the contributions of all the participants in this workshop. Igle Gledhill and Sarah Buchner were also very helpful in writing the workshop notes and results that became the basis for discussion for the Launch conference.

2.2 Key Values

Early in the process, the key values in employment equity were discussed, which guided the later process:

4 key values

- Diversity: This is a process of actively involving people from a wide variety of backgrounds, strengthening the Physics community.
- Inclusivity: Employment equity issue must be addressed such that all Physicists are given a place and sense of belonging.
- Redress: A need to recognise people who have not had opportunities and provide additional opportunities
- Quality: We need to avoid a situation in which quality is sacrificed in the name of transformation, damaging to enterprise

These key values gave direction to the formulation of the aims and objectives such that the we are not just following what the IUPAP has documented as WIP issues, but we look at South African situation in a unique way. Our history is completely different from those of other countries, thus addressing the issues of WIP will also be different.

2.3 Proposed Aims and Initiatives

The Steering Committee drafted a discussion document for use at the conference, suggesting some aims, possible outcomes and initiatives. The document was written to stimulate rather than pre-empt discussion.These aims are:

- Attracting girls to physics,
- Launching a career, departmental atmosphere,
- Higher positions in institutional structure for Women Physicists,
- Balancing family and career,
- Skills transfer from the retiring cadre of physicists in South Africa,
- Breaking stereotypes,
- Funding,
- curriculum change,
- barriers to eligibility in funding, eg Thuthuka.

3. The Launch Conference

3.1 Attendance

65 delegates and speakers in total attended the conference. In view of the inclusive call that had been made, about 7 delegates were men. Since the conference was held in close proximity to the World Conference on Physics and Sustainable Development, a number of visitors from other countries took the opportunity to attend, and Nigeria, Sudan, Senegal, Germany, Argentina, Brazil and the USA were represented. South African organisations represented were DST, NRF, SAASTA, the Department of Health, the CSIR, NLC, NML, SAAPMB, Tygerberg Hospital, Addington Hospital, iThemba Labs, NECSA, HartRAO, and the Johannesburg Planetarium. At least one small company was represented by its owner. Delegates were present from UP, UJ, UWC, NMMU, U Stellenbosch, U Limpopo(North and South), NWU, and UKZN (in no particular order; see abbreviation list).

3.2 Introduction

The Launch Conference was juxtaposed with the World Conference on Physics and Sustainable Development in Durban in November 2005. As a result, a number of international key players were captured. In welcoming the delegates, Prof **Diane Grayson** noted the key role of physics in the development of South Africa, and pointed out that only a handful of countries have progressed as far in supporting the role of women in science.

On behalf of the South African Institute of Physics, Prof **Harm Moraal**, the current President, welcomed delegates and expressed the hope that the launch would indeed bring change to the conduct of physics in South Africa.

Dr **Adi Paterson**, Deputy DirectorGeneral: Science & Technology Expert Services at the Department of Science and Technology**,** in opening the conference, spoke poignantly of women scientists fifty years ago, and the need for women to reach the heights to which they aspire. He expressed hope for finding the ways in which the world can be more fruitfully designed and organised to make this happen. He referred to the

most recent data collected on demographics in the sciences[1], and the current framing of gender policy for the next five years; public comment will be called for in the first quarter of 2006. In talking about real career paths, two issues are under particular scrutiny: in complete careers, from primary school to career end, a benchmarking of women's careers against those of men, to design specific interventions; and within the academic life cycle, an analysis of why it so difficult for women to participate in and re-enter careers, and obtain support during their years of child-bearing. In a vignette from his years at the CSIR, he illustrated the way in which women may perceive a marked absence of thought about their situation by senior executives.

In terms of national growth and the rising investment in R&D (from 0.69% in 1997 to 0.80% measured in 2005, with a target of 1%), Dr Paterson pointed out that 56% of R&D investment in SA is attributed to the private sector, and that in academic institutions teaching loads are increasing while the time available for research is decreasing. The programmes in Centres of Excellence, the new Chairs in science, and investment in infrastructure may alleviate this slide.

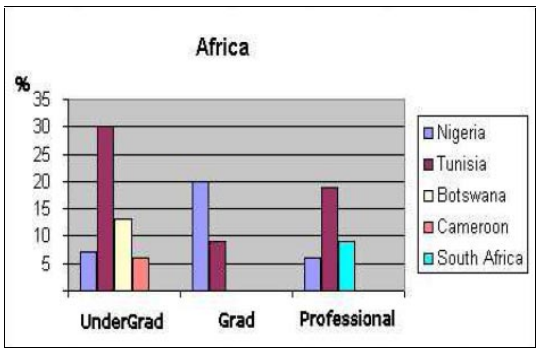
The conference significantly occurred at the time that the Southern African Large Telescope saw first light, the time that the Square Kilometre Array bid was close to submission, and in the time in which Antarctic work shows that the earth is significantly more fragile than previously thought. Dr Paterson finally commented on the situation of parents, who often retain the effects of decades of mystification and exclusion surrounding science. In terms of women in physics, he declared that DST would encourage, affirm, support and, if necessary, clear the way for participation in future.

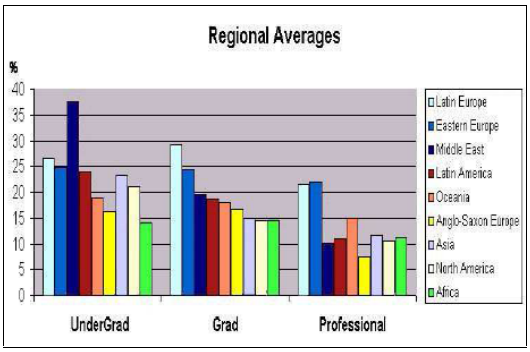
3.3 Invited lectures

Prof **Marcia Barbosa**, of the Universidade Federal do Rio Grande do Sul, Brazil, chairs the IUPAP Working Group on Women in Physics. The conference was privileged to hear her speak on the inception of the IUPAP group, and she summarised the data that has been gathered on WIP across the world to date[2].

[1] "Facing the Facts", www.sarg.org.za/docs/pdf/facing_the_facts_2004.pdf

[2] www.if.uifrgs.br/iupap and www.cbpf.br/women-in-physics





Above: percentages of women in physics[4]

Collecting and understanding the data leads to follow-up in the form of improved networking, country working groups, grant schemes for WIP, regional conferences, and a newsletter. The formation of an African network of WIP is seen as key project follow-up by IUPAP. Among initiatives for the future is the collection of data for a database on individual women in physics, to enable understanding of statistics as well as improved contact.

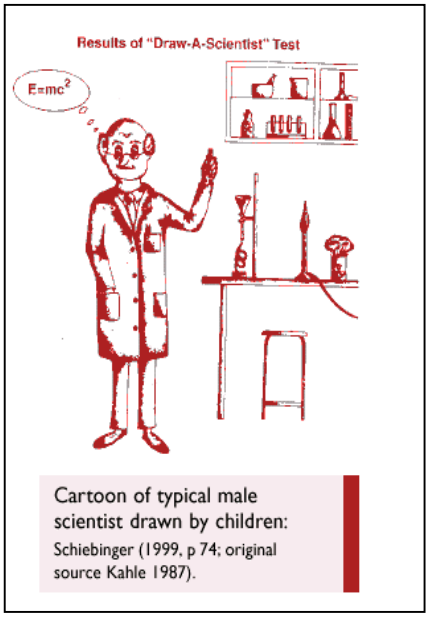
Mmantsae Diale summarised the severe under-representation of women in physics, and talked of the experiences of those who are completely discouraged. Many women in physics do not want others to have to undergo the experiences they have survived. Furthermore, all WIP must be aware of the fact that the issues of women in Physics in South are not race related. It is encouraging to work with WIP in other countries, with whom South Africans have many similarities. Mmantsae expressed the hope that we would reach a time where the stage would be smoothed, and research and publication can be undertaken without hindrances. She remembered the cry taken up by women in South Africa: ***Malibongwe Igama Lama Kozikaze***, and directed the thoughts of the delegates to the women professors still fighting for a smooth path for women issues.

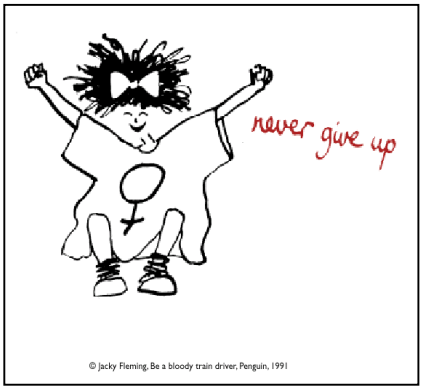
Claire Flanagan, director of the Johannesburg Planetarium, led the delegates into the special world of pulsars in an exhilarating voyage ranging from spinning eggs (is the interior of pulsars liquid?) to results on E50 released on that morning. With pulsars as accurate clocks and references, we may be able to measure the effect of background gravitational waves on the position of the earth; the instrument needed is the Square Kilometre Array. Claire talked about the search for the best site for the earth's largest radio telescope, and how equipment like this is an invitation to scientists and engineers to join in and come up with results that can be shared with everybody.Claire works with school learners, and pointed out that science does not have to be dressed up for kids who love black holes and astronomy. Her experience with "Saturday learners" at the planetarium led her to suspect that their maths remained as bad as ever, but their confidence with science and technology increased enormously.

Barbara Sandow, from the Freie Universität, Berlin, began with the images of scientists propagated by media and advertising, and the negative effects that these images

have on career decisions made by girls. She covered actions that can be taken to improve the image of women as physicists: provide role models, provide mentoring, *know the structures and go in*, and make sure women are active members in commissions. She concentrated on the example of the Physical Society in Germany, and how difficult it is for women to be represented in controlling committees. A committee of women in Germany eventually took the step of writing to the President of the German Physical Society, resulting in the creation of a Committee of Equal Opportunities; this committee now seeks a new framework to improve the atmosphere for women in physics, provide equal opportunities for men and women in the subject, find activities which increase the number of female physicists, and promote activities which increase the number of secondary school and students taking physics. The society has had particular success with "Projects for Girls", running workshops in which girls compete in physics projects[3],

"Ada Lovelace" projects, in which university students teach school students[4], and girl-oriented labs[5]. Barbara ended her talk with her own motto: *Never give up.*

From 

to 

Graciela Punte, from the committee on women in physics in Argentina and the Universidad National de la Plata, talked about the problems of building a crystallography lab from scratch in a country that is geographically isolated in the physics world. She described the development of physics in Argentina and made the parallels with the political development of the country, showing the signal importance of the appointment of Emil Bose in 1909. Her problems in setting up a lab are in the context of a country which allows revenue services and administration to interfere with the development of science; Graciela had had equipment that has spent 4 years in customs and proposals in

[3] e.g. www.ais.fraunhofer.de, "Girls Invade Robots"
[4] www.ada-mentoring.de
[5] e.g. www.nat-schuelerlabor.de, www.lenort-labor.de

1995 which resulted in equipment arriving in 2004. She remarked that *when everything takes so long, you need to be a fighter*. The Associación Fisica Argentina, however, has made progress in terms of WIP, and 29% of the members are women.

The conference was privileged to hear from **Zohra Ben Lakdar**, of the University El Manar in Tunis, winner of the L'Oreal-UNESCO Award[6] Laureate for Africa. Born in a Tunisian family where she cared for many of her nine brothers and sisters, Zohra made a sustained and determined effort to establish herself in physics. She described the atmosphere at home based on liberty and equality, and the values of education, respect, generosity, and optimism. Legal equality for women was gained by Tunisia in 1956, in a society where boys "have power by nature", and 4 girls would appear in a class with 50 boys in high school. Through perseverance, she has developed a cluster of groups in atomic and molecular physics, especially spectroscopy, with theoretical, experimental and modeling approaches. She described her research in collision and reaction kinetics, the structures of chlorophylls and argon clusters, and pollution of air and water: *atoms alone and in their society*.

Many young women are daunted by proposal and application processes. **Beverly Hartline** ran a workshop in the basics of successful proposals. As a mentor in this area, Dr Karplus Hartline is exemplary, since she has taught college students and teachers, has been Deputy Director of Argonne National Labs, project-managed major physics installations, written research news articles for Science magazine, worked in government at the White House Office of Science and Technology Policy, served on advisory and review panels at federal, state and local level in the USA, and serves with both the IUPAP Working Group on Women in Physics and the NSF Committee on Equal Opportunities in Science and Engineering. Beverly told the delegates that *you and your ideas strengthen and enrich, if they are fully engaged; it takes access, education and money to pursue these ideas*. She pointed out the value of a PhD in being recognized as a physicist, and gave advice in finding the best mentors and opportunities. For those who are applying to funding agencies, she provided a valuable description of the process, and of pitfalls into which inexperienced applicants fall: *it's a sponsor's market; there are strings attached*. She briefed the delegates on the kind of questions to ask – such as the chances of getting funding, how to become well informed, selection criteria, and general tips (such as using colleagues as sounding boards to read the proposal).

A brief session during Beverly Hartline talk was given to Nonqubela Silulwane of NRF to guide participants on how to get funded in South Africa.

Many women in physics in South Africa have encountered **Beverley Damonse** of SAASTA at the NRF. Beverley outlined SAASTA's strategic approach to science awareness, education, and science communication. She gave examples of using live scientists on exhibition, to break stereotypes of scientists being *in white coats, stuck in their own labs, old, and ugly*, and replace the with images of real people, with real dreams and aspirations.

[6] www.loreal.com

During the conference, a memorable dinner was held in the Blue Waters venue. Prof **Edmund Zingu**, outgoing President of the SAIP, linked the conference with the preceding conference on physics and sustainable development, and warmly thanked Mmantsae Diale and the steering committee. His words were endorsed by Prof **Harm Moraal**, the incoming President of SAIP.

When South African women meet at a conference, given half a chance, they dance. The delegates leapt onto the dance floor, and the international delegates quickly learnt how to move, aided by Mafikizolo and Mandoza.

4. Conference discussions and outcomes

It was the objective of the workshops held during the conference to develop aims, ways of addressing the aims, and specific initiatives appropriate to WIP in SA; and to do so with the full participation of the delegates. The discussion document, appendix A, was provided to stimulate thought and bring some initial structure to discussions.

All workshops were organised in a breakaway mode, with three groups each led by a facilitator. In each case, the resulting notes were combined at the end of the session. These are presented in raw form below as an interim result of the conference. The intentions on how to prioritise and take the initiatives forward for implementation are presented in the following section.

4.1 Discussion document

It was an important feature that members of the conference should contribute fully and openly to the conference outcomes.

The following initiatives were suggested (from the Discussion Document, Appendix A):

a. **Promoting positive image** (awareness) of women in Physics
    - Highlighting WIP
    - Attracting girls into Physics
    - Improving image of women as physicists
    - Contextualised curriculum resources
b. **Providing networking and mentoring**
    - Peer support
    - Mentoring of younger students and colleagues
    - Social opportunities
c. **Improving access to funding** for WIP

To support initiatives with good reasoning, it is important to gather relevant data on WIP in all sectors:

d. Data gathering
- Gaps in knowledge of issues
- Next steps in data gathering
- Systematic research

4.2 Aims

The following expanded aims have been collected from the first breakaway workshop. While not all comments may qualify precisely as "aims" the material has been retained for later sifting for good ideas.

a. Attracting girls into physics
- Including changes in teaching and curricula, e.g. everyday examples
- Sensitise teachers not to discriminate, be inclusive, be aware of different approaches preferred by girls and boys (lab work)
- start at primary school age
- Encourage girls to develop confidence in maths
- Include parents—give them info about physics, physics careers

b. Helping women prepare for a successful physics career
- include mentoring, role models, successful graduates
- Encourage collaboration
- Set up database
- Increase contact with, exposure to, industry
- Increase post-doc positions
- Help women prepare themselves
- Help women in the system to support other women entering the system

c. Helping women advance in their careers

d. Helping women develop their full potential
- Develop skills, e.g. job-seeking, business

e. Breaking stereotypes
- Work with media

f. Achieving work-life balance

g. Providing information about careers and jobs
- database
- clearing house for job-seekers, providers

h. Improving access to Funding, and eligibility for funding

i. Improving the institutional structure and climate for WIP

j. Raising awareness amongst men about issues facing women.

4.2 Ways of addressing the aims

The next paragraphs contain material gathered from the second breakaway session.

a) Attracting girls into physics

- Changing curriculum for undergraduate relevance
- Establish communication channels - teachers and lecturers
- Show connection to everyday life
- School visits
- In-service training
- Team work exercises
- Outreach programmes
- Urging government to put in structures at school for experiments
- Concentrating on policymaking, DET, DST from schools to higher education.

b) Preparing for a successful physics career, launching and advancing careers

c) Getting women into higher positions

- Web site with info about development skills e.g. job interviews, link to companies, databases
- Offer management, entrepreneurship, leadership in physics
- Commercialising research as a way of advancing careers
- "WIPy WIKI" – based on Wikipedia, produce and edit relevant articles

d) Breaking stereotypes

- Working with the media, TV programmes
- Work with the teachers
- Involve female undergrads in career expos for school children
- Develop material to help teachers to include the girls

e) Life-work balance

- Promote part-time careers, work from home careers
- Locating accessible facilities for child-care
- Holistic training of students and researchers, e.g. time management, career management
- Recalibrate outputs and assessment of part-time careers
- Maternity leave for post-graduates

- Returning fellowships for those who left for a few years, age limit reviewed

f) Jobs and careers

- SAIP career link – needs to be transmitted to students
- University Departments to pay for SAIP student membership?
- Lecturer/supervisor's duty to inform student about career opportunities
- Duty of academics to inform students of vacation work
- Need strong working relationship between industry and academia – database
- Urge government to stipulate female % of professorships, especially of new Chairs announced by DST, etc.

g) Funding

- Re-entry grants
- Other sources to be used besides NRF, e. g Ponds …

h) Improving the institutional structure and climate

- Identify positive leaders
- Social / informal contact with students and lecturers
- Students at department meetings
- Access to internet and email for students
- Institutional Women's forum – for sensitive matters and other concerns
- Raising awareness amongst men regarding women's situation
- Mentoring – professional, personal and emotional.

4.3 Proposed initiatives

Building on the progress above, the third breakaway session resulted in a set of possible initiates. Prioritisation is left for the following phase.

a. Promoting positive image of women

- Developing communication strategies with media
    - CellC "take a girl child to school (?work)"
    - Tutors to do Public Relations at school
    - Making physics fun
    - Science week to promote physics
    - Physics week/camp
    - DST magazine to profile female physicists
    - Special awards for female students
    - Links from SAIP web to other info
        - Funders and bursaries

        - Mentors
    - Holistic approach with job opportunities
    - Informed teachers - urban and rural
    - Mentoring projects – "*nthombi"*
    - MNet science centre
- Be more aware of current projects and use to full extent
- Influence curriculum

b. Providing networking and mentoring

- Website development
    - News distribution
    - Information resource on current local research +
    - Support group – chat room
    - Links to other chat rooms
    - Dynamic website – like WIKIpaedia
- Database
    - Students and WIP, teachers, science clubs
    - Mentors and assigning mentors
- Teacher problem – lack of resources
    - Connect with other institutions/network
- SAIP conference
    - Women in Physics session
    - Plenary session
    - Social functions
- Vacation jobs

c. Improving access to funding for WIP

- International collaboration
- Age restriction, esp. Thuthuka, revised (time absent or removed)
- Mentoring = successful funding proposals
- Institutional assistance
    - Training
    - Workshops
- Mobility grants – to access other mentors or equip. and network
- Student bursaries/funding
    - Inform scholars that money is available – via district offices to get info to schools
- Further studies
    - NASP Hons. and MSc are continuous program and funded
    - Academics have closer contact with industry to get funding for student projects
- WIP group to lobby for additional funding.

5. The Working Group

The Working Group was selected on the second day from a list of volunteers. Terms of Reference for the Working Group had been drafted by the Steering Committee, and were revised during a plenary workshop. The revised Terms of Reference are attached as Appendix B.

5.1 The Working Group members

1 Sarah Buchner	HartRAO sarah@hartrao.ac.za
2 Zinhle Buthelezi	iThemba Labs zinhle@tlabs.ac.za
3 Catherine Cress (subject to acceptance)	UKZN mailto:cressc@ukzn.ac.za
4 Mmantsae Diale (Chair)	UP mdiale@postino.up.ac.za
5 Igle Gledhill	CSIR igledhil@csir.co.za
6 Sharmila Goedhart	HatRAO sharmila@hartrao.ac.za
7 Diane Grayson	Andromeda dgrayson@absamail.co.za
8 Onalenna Kegopotsemang	Dept.Hth mailto:KegopO@health.gov.za
9 Nonhlanhla Mokoena	iThemba mailto:nonhlanhla@tlabs.ac.za
10 Jackie Nel	UP jnel@.up.ac.za
11 Patience Segonyane	NECSA mailto:sps@necsa.co.za
12. Nnenesi Kgabi	UNW mailto:KGABIN@uniwest.ac.za

6. Conclusions, and the next steps

6.1 Conclusions

By the end of the launch, a considerable feeling of camaraderie and mutual support had developed among the delegates. However, it is important to note that the delegates form a fraction of the community interested in issues affecting Women in Physics in South Africa, and that the wider community should be both informed of the conference and its outcome, and be welcomes to participate if they wish.

Both students and professional physicists attended (including two first year physics students). An advantage has proved to be the inclusion of the point of view of students and their very relevant suggestions, and the support that is provided to them by a sense of belonging to a supportive community.

The Working Group has considerable material to proceed with. No men were included in the Working Group, but the possibility of making the group more inclusive by co-opting men as members was discussed.

The conference was forward-looking and dedicated to producing real change.

6.2 The next steps

The Working Group will assess the expanded aims, ways of addressing the aims and possible initiatives, and develop a means of prioritising these and finding viable proposals.

The Working Group will report to SAIP through its Council, as addressed in the Terms of Reference. It is also probable that direct report back will take place through a session at the annual conference of the SAIP.

Contact with other related organisations would be initiated, to avoid duplication of effort, and where appropriate to add the ideas and energy of this group to those already existing, rather than producing an additional group amongst many.

A proposal will be submitted to the Department of Science and Technology, as originally envisaged, to embark on the prioritised actions.

6.3 Grateful acknowledgements

The support of DST, University of Pretoria, SAIP and IUPAP is gratefully acknowledged. Without these three organisations' sponsorship and encouragement, it is most unlikely that such an inclusive and productive meeting would have taken place.

The Steering Committee gratefully acknowledges the help of each person involved with the conference, and wishes to mention Kevin Govender of NECSA in this respect.

Abbreviations

DET	Department of Education and Training
DST	Department of Science and Technology
HartRAO	Hartebeeshoek Radio Astronomy Observatory
IUPAP	International Union of Pure and Applied Physics
NECSA	SA Nuclear Energy Corporation
NLC	National Laser Centre
NML	National Metrology Laboratory
NMMU	Nelson Mandela Metropolitan University
NRF	National Research Foundation
NWU	North West University
SA	South Africa
SAAPMB	SA Association of Physicists in Medicine and Biology
SAASTA	SA Agency for Science and Technology Advacement
SAIP	South African Institute of Physics
SET	Science, Engineering and Technology
UJ	University of Johannesburg
UKZN	University of Kwa-Zulu-Natal
UL	University of Limpopo
UP	University of Pretoria
USA	United States of America
UWC	University of the Western Cape
WIP	Women in Physics
WiPiSA	Women in Physics in South Africa

Appendix A: Discussion Document

A Discussion Document: Women in Physics in South Africa
November 2005

0. About this initiative

There is a growing global concern over the declining number of students at higher institutions of learning 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.

With the support of the SA Institute of Physics (SAIP) and the Universities of Pretoria and the Witwatersrand, a proposal has been submitted to the Department of Science and Technology (DST) to launch the South African Women in Physics Group through the present conference. A Steering Committee has been formed to establish the conference, and has set out some thought for discussion in this document.

The launch conference is expected to result in strategies, recommended actions, and plans for the future.

1. Aims of the Workshop

The IUPAP International Conferences on Women in Physics in 2002 and 2005 have set out a number of aims. The steering committee has added three, and suggests the following list:

a. Attracting girls into physics
   i. including changes in teaching and curricula
b. Launching a successful physics career
   i. including mentoring and evaluation
c. **Getting women into higher positions** in institutional and leadership structures
d. Breaking stereotypes
e. Balancing family and career
f. Jobs
g. **Funding**, and eligibility for funding
h. **Improving the institutional structure and climate** for WIP.

2. Principles

As an introduction, these key values in employment equity were put forward.

a. **diversity**: actively trying to involve people from a wide variety of backgrounds, and strengthening the organisation;
b. **inclusivity**: employment equity is not at the expense of others; giving everyone a place and sense of belonging;
c. **redress**: recognising that people have not had opportunities, providing additional opportunities;
d. **quality**: not sacrificing quality in the name of transformation, or damaging the enterprise.

3. Proposed initiatives

Given the above aims, the Steering Committee considered a variety of possible actions, directed at specific outcomes, and grouped these under some headings, as follows. It will be seen that each of these addresses multiple aims, above.

e. Promoting positive image (awareness) of women in Physics
    a. Highlighting WIP
    b. Attracting girls into Physics
    c. Improving image of women as physicists
    d. Contextualised curriculum resources
f. Providing networking and mentoring
    a. Peer support
    b. Mentoring of younger students and colleagues
    c. Social opportunities
g. Improving access to funding for WIP

To support initiatives with good reasoning, it is important to gather relevant data on WIP in all sectors:

h. Data gathering
    a. Gaps in knowledge of issues
    b. Next steps in data gathering
    c. Systematic research

Appendix B: Working Group Terms of Reference, November 2005 (amended at launch conference)

South African Women in Physics

Formation of a Working Group:
Draft Terms of Reference

Draft 2 20051010

1. Background

There is a growing global concern over the declining number of students at higher institutions of learning 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.

With the support of the SA Institute of Physics (SAIP) and the Universities of Pretoria and the Witwatersrand, a proposal has been submitted to the Department of Science and Technology (DST) to launch the South African Women in Physics Group through the present conference. A Steering Committee has been formed to establish the conference.

The launch conference is expected to result in strategies, recommended actions, and plans for the future. A Working Group is needed to take the initiatives into the future.

2. Tasks of the Working Group

The Working Group will have 5 primary tasks:

- Establish a structure for WIP in South Africa,
- Report to the SAIP, and
- Begin work on selected activities.
    - Establish a reference group and communicate with it by means of email and phone to solicit ideas and feedback and seek assistance on projects
    - Take policy and strategy decisions and take responsibility for outcomes

3. Formation, status, reporting and life of the Working Group

The members of the WG will be appointed at the Launch Conference. Additional members may be co-opted later as needed. The Steering Committee will take

responsibility for the selection process and for representivity, with attention to representation of subgroups (including: regions, academia/R&D organisations, and industry; initiating bodies DST, NRF and SAIP).

The Working Group will report at each meeting of the Council of the SAIP.
It is proposed that it should have an equivalent status to that of an SAIP Specialist Group, but will not cover a research area.
After setting up the long-term structure for WIP in SA and reporting to SAIP in July 2006, the Working Group will dissolve.

4. Establishing a structure for WIP in SA

The Working Group should propose, for the long-term structure for WIP in SA,

- aims,
- selection or election processes, eligibility and term of office of office bearers,
- criteria for membership and process for becoming a member, and
- structural relationship with, and reporting mechanisms to, SAIP.

5. Reporting to SAIP

The WIP Working Group should report to each meeting of the SAIP Council, and should report to the SAIP Conference in July 2006 (just like the specialist groups).

Where issues arise that affect not only WIP but also other groups within the SAIP, the Working Group should bring these to the attention of the Council. Where issues arise that also affect bodies outside the SAIP, the WG is asked to identify the relevant body, make recommendations, and request SAIP Council to bring these to the attention of the relevant body for consideration in their activities.

6. Beginning work on selected activities

The Working Group and its successor should take responsibility for implementing the initiatives identified at the Pre-Launch Workshop of 16 September 2005 and the Launch in November 2005.

The Working Group should

- seek resources through submission of a business plan to DST by a deadline compatible with the DST funding cycle, and, if successful,
- implement the short-term activities recommended.

The long-term structure should

- pursue the strategies recommended
- monitor issues relevant to WIP in SA
- form and maintain links with appropriate bodies.

7. Documents for the information of the WG

- Proposal to DST for Launch of WIPSA, Mmantsae Diale, 2004
- Report on attendance of IUPAP WIP Conference, Paris 2002
- Report on attendance of IUPAP WIP Conference, Rio 2005
- Papers delivered by Mmantsae Diale and Nnenesia Kgabi at above conferences.
- Shaping the Future of Physics in South Africa

Appendix C: Delegate list

Surname	Initials	Institution
1. Bubu	A	North West
2. Khasa	Nkane	North West
3. Lebenya	Letsebela	North West
4. Maaga	Thato	North West
5. Kgabi	Nnenesi	North West
6. Derrett	Helen	UJ
7. Lombard	Elsa	NNMU
8. Silulwane	Bella	NRF
9. Gledhill	Igle	CSIR
10. Marshall	Delia	UWC
11. Johnson	Samantha	iThemba
12. Mhlungu	Thembi	iThemba
13. Mokoena	Nonhlanhla	iThemba
14. Vilakazi	Lindi	iThemba
15. Steenkamp	Christine	University of Stellenbosch
16. Buthelezi	Zinhle	iThemba Labs
17. Baisitse	Tshepiso	CSIR, NLC, NMMU
18. Goedhart	Sharmila	HartRAO
19. Flanagan	Claire	Wits / Joburg Planetarium
20. Nel	Jackie	UP
21. Prinsloo	Linda	UP
22. Rammutla	K	
23. Cele	Nonhlanhla	UWC
24. Lang	Stephanie	UWC
25. Masina	Bathusile	UWC
26. Mhlongo	Gugu	UWC
27. Vhutshilo	Vekhliwha	UWC
28. Lekganyane	Maria	Medunsa
29. Mhlongo	Rebecca	Medunsa
30. Kegopotsemang	Onalenna	Dept of Health
31. Sandow	Barbara	Germany
32. Chale	Tebogo	Limpopo
33. Kgaka	Komogelo	Limpopo
34. Khomotjo	Mphahlele	Limpopo
35. Ramaboea	Dimakatjo	Limpopo
36. Theron	Suzanne	UP
37. Van der Merwe	Tina	UP
38. Zander	Claudia	UP
39. Buchner	Sarah	HartRAO
40. Grayson	Diane	Androeda
41. Botes	Danielle	UP
42. Cilliers	Laetitia	UP
43. Diale	Mmantsae	UP

44.	Hartline	Beverly	USA
45.	Prozesky	Adri	UP
46.	Roston	Graciela	UP
47.	Hillie	Thembela	CSIR Metrology Lab
48.	Moraal	H	SAIP
49.	Rae	William	Addington Hospital
50.	Punte	Graciella	Argentina
51.	Archery	Bryan	DST
52.	Barbosa	Marcia	Brazil
53.	Ghoorun	Shivani	Tygerburg Hospital
54.	Govender	Kevin	NECSA
55.	Naidoo	Nirvashnee	DST
56.	Ntshangase	Noluthando	iThemba
57.	Paterson	Adi	DST
58.	Pillay	Sadha	UKZN
59.	Seekoe	T	DST
60.	Segonyane	Patience	NECSA
61.	Zingu	Edmund	SAIP

Appendix D: Programme of the Launch Conference