

Leadership PROF APFFELSTAEDT

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# Professor Gadget

## Professor Justus Apffelstaedt's inventive approach to a large problem

**P**rofessor Justus Apffelstaedt is German, but when he is in the United States, apparently, he tells people that he is from South Africa. He has, after all, been living here for 22 years.

Still, when asked about the significance of his award-winning invention, the MammaSphere, being lauded as a South African innovation, he says, "I'm more of a global citizen. If something is good, it's good. If it's nonsense, it's nonsense."

Apffelstaedt shoots straight and from the hip, a characteristic that makes him a valued and sometimes controversial member of the medical community.

"My colleagues phone me after an article has been published and say, 'What have you been saying this time?'," he says.

If you want a proper background on the good professor, you will have to Google him because his CV is intimidatingly long.

To summarise: among many other things, he is Associate Professor of Surgery and head of the Surgical Oncology Service at the University of Stellenbosch.

He is head of Tygerberg Hospital's Breast Clinic, on the council of Breast Surgery International, a member of the Breast Health Global Initiative, and a member of the International Advisory Panel of *The Breast Journal*.

He advises the government, non-governmental organisations, the Cancer Association and pharmaceutical companies.

Oh yes, and a few years ago he invented a rather ground-breaking little device that won

the social category in the 2005 Grand Prix for Excellence in Innovation and Sustainability.

Working with limited resources is a common motivator for innovation. This circumstance is a large part of the background that gave rise to the MammaSphere, a device shaped like a ball and used for intra-operative radiation as a treatment for breast cancer.

"Oh, that was great fun," says Apffelstaedt on the work that went into the invention.

About a decade ago, a team led by Umberto Veronesi, an Italian surgical oncologist, converted an operating theatre at great expense for intra-operative radiotherapy. One feature was a 60cm-thick lead wall, which cost about \$2 million (about R16m).

"When you're the minister of Health of Italy, as Umberto was at the time, financial support is fairly easy to get. We didn't have that kind of privilege," says Apffelstaedt. "So I thought, 'Can't we do this *boere*-style?'"

"We constructed a sphere made from medical nylon into which we could feed a radioactive seed through a stem."

The treatment works like this: once the tumour is removed from a patient's breast, she is immediately wheeled to the radiation bunker, under conscious sedation. The MammaSphere is inserted into the location where the tumour was, and the radioactive seed fed in through a protective tube.

A 30-minute treatment – all that is required – provides the same dosage of radiation as an entire course of external radiation.

"Of course, there were lots of jokes about 'Professor Apffelstaedt's balls'," he says. But

the treatment achieved a serious victory in the fight against breast cancer.

For starters, the hospital's own, unmodified radiation bunker can be used – a room that is often underutilised in the normal course of events.

Then there is the psychologically and physiologically crucial aspect of breast conservation.

In conventional radiotherapy, the entire breast – an average of 800ml of tissue – is treated. The MammaSphere treats only the 40ml that count.

In action-flick speak, it is a targeted hit, with very little collateral damage.

"When you radiate from the outside in, the radiation travels through an awful lot of tissue and does a lot of damage," says Apffelstaedt. "Using this device, you're radiating only one centimetre around the sphere. The result is very little tissue damage, scarring or fibrosis."

"The added advantage is that the surrounding healthy tissue, with its unaffected blood supply, can better support the healing of the small area that has been treated."

As this is a once-off treatment, as opposed to the conventional 32 daily treatments of external radiotherapy, costs are cut roughly in half and trauma to the patient is significantly lessened.

The psychological side of treatment is important to Apffelstaedt. His breast health centre takes a holistic and multidisciplinary approach in order to give patients plenty of options and proper support.

"After a diagnosis, I usually see women shut down mentally," he says.

"We ask them to come back the next day with their families. In the room for that

**Leadership** PROF APFFELSTAEDT

consultation will be a surgical oncologist, a medical oncologist, a radiation oncologist and a plastic surgeon. We discuss the options in a comprehensive way."

Conservation is always first prize in this setup, despite the common attitude that radical is safer – that is, that a mastectomy is more likely to get rid of all the cancer than a lumpectomy.

"I recently saw a patient whose doctor told her, 'Die tietie moet afkom' [The boob must come off]. I was shocked," says Apffelstaedt.

Radical, he says, is not necessarily the way to go. Surgery followed by intra-operative radiotherapy is safe, and the breast itself can be saved.

Ironically, the MammaSphere – a radical approach to non-radical treatment – has been regarded with caution. "Radiation oncologists are very careful," explains Apffelstaedt. "In this field, challenging existing thinking patterns is difficult."

used, and he later discovered that someone else had been commissioned to do the exact same thing five years earlier.

"The problem is administrative inefficiency," he says. But, he adds, "I will not leave the public health sector easily. I have a firm belief that as a leader in the field, one has a responsibility to give to the community rather than just get rich in the private sector and leave the poor to their own devices. Access to resources should be used for upliftment, in all sectors of society."

Raising awareness is something he is conscious of needing to do "on all fronts", particularly now in South Africa.

Breast cancer, being a lifestyle disease, which is more common in sedentary and obese people, cannot be left unchallenged.

An early proponent of digital mammography in South Africa, Apffelstaedt has spoken about the superior accuracy and patient comfort offered by the technology. (Breast compression

"A screening programme takes decades to develop," he says. "It doesn't fall out of the sky. You need training, infrastructure and consciousness."

He believes South Africa is "fertile ground" for change on this front and says he has seen great improvement in the quality of screening and mammogram interpretation in the private sector.

This, he asserts, is where improvements start – but they must be fed throughout the system into public health.

Apffelstaedt is involved in the launch of a mobile mammography unit, which will hit the road in the next two years. "It's part of the filtering-down process through an unequal society," he says. "It will help spread the technology – and awareness – to the country's poorest."

Securing government attention for a disease such as cancer – when it is faced with combating fast spreading and widespread problems such as tuberculosis and HIV – is challenging.

Cancer takes expertise to diagnose, and money to treat.

An advocate of social activism, Apffelstaedt says, "We should all be standing up for our rights."

"We shouldn't let the authorities get away with poor services. There's too much reverence for authority here. Somebody should be held responsible for the problems within healthcare. We live in a country with limited resources and we all have a responsibility to use them wisely."

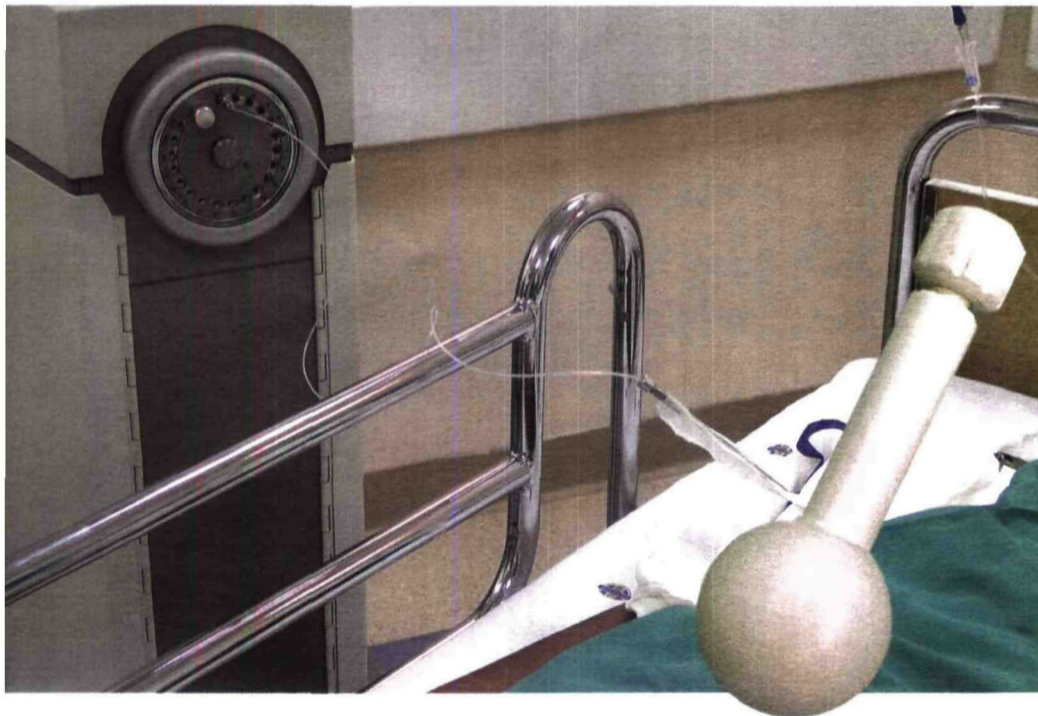
With President Jacob Zuma's Cabinet differing largely from the previous administration, Apffelstaedt has a positive outlook for what happens next. He says, "I'm hopeful for some improvement in the near future. There's a new administration in the health sector now and I hope it will adopt an attitude of consultation and recognise the expertise in the country."

The little MammaSphere is a microcosmic illustration of Professor Justus Apffelstaedt's inventive approach to a large problem: take your modest resources and make a plan.

The device itself has already made a direct difference to the lives of 39 patients, but its broader impact can reach untold horizons.

Innovation in the face of financial insufficiency. Optimism in the face of bureaucratic inefficiency. Courage in the face of the seemingly insurmountable. These are things that bring revolution. ▲

Kerry Rogers



Challenging existing thinking patterns is what Apffelstaedt does best, though. While he posts a frequent disclaimer that his knowledge is mostly of the Western Cape's healthcare system, he is critical – in an extraordinarily supportive way – of South Africa's health structure.

In 2000, he says, he was paid "a nice sum of money" to compile a breast-cancer screening policy for the Health Department. It was never

does not have to be as extreme, which makes the experience more bearable for the woman being scanned.)

A mammogram is only really as good as the training of the operator, the skill of the interpreter, and the condition of the machine itself.

Apffelstaedt's own 15 years of mammography experience include his interpreting about 4 000 mammograms a year.

