

Kevin Tan talks to  
Dr Woffles Wu about

# The Geometry of **Beauty**

Beauty – an elusive concept that is so broad, so hard to quantify. Or is it?

Poets have raved about it for centuries in enough odes to fill a library in a dozen languages. Artists have attempted with varying degrees of success to depict it, ranging from Leonardo da Vinci's *Mona Lisa* to Botticelli's *The Birth of Venus*. Beautiful people plaster fashion magazines and assail people from the idiot box every hour on the hour.

Our heads turn when a handsome man or a lovely woman walks by us at the mall, on the street or on the monorail. We can recognise it when we see it. Yet, what is the definition of beauty?

"There is no definition of beauty," says Dr. Woffles Wu, one of Asia's foremost cosmetic surgeons. If there is an authority on just what beauty is, Dr. Woffles is eminently qualified. As an aesthetic surgeon, it is his business to make people beautiful. People seek him and other cosmetic surgeons out in the quest to be beautiful.

"If you wish to talk about what beauty is per se or to define it, it becomes a question loaded with philosophical, sociological, sexual and mathematical connotations," said Dr. Woffles at a recent talk at the Singapore National Library on the subject of beauty, "There is no simple straightforward answer."

#### **BENEFITS OF BEAUTY**

"We all know and recognise a beautiful face when we see it," says Dr. Woffles, "Beauty has to touch us and take our breath away and captivate us."

People who are beautiful are also perceived to be virtuous, even though they may be anything but! Odds are that they are trusted more and given more chances in life. Doubters of this notion should note that a recent study indicated that attractive people earned more than their aesthetically challenged counterparts by a significant margin.

"A study involving some 33,000 people conducted by Leeds University and from the US showed that good looking adult men earned 15% more income than their average looking counterparts and good looking women earned 11% more than their less attractive counterparts," said Dr. Woffles.

"Not only is it survival of the fittest, but the prettiest. In many rural villages and areas of the world, a beautiful bride is prized far above one with a huge dowry. With beauty, you can get things you can never imagine. A beautiful girl in a slum in Argentina can become a top model and actress and splash her face on the cover of every magazine," highlighted Dr. Woffles.

As a counterpoint, Dr. Woffles added, "On the other hand, take the poor slob in

society. He may have an education, be working in a decent job and have a great personality but by being aesthetically challenged with acne scars and the like, he has reduced chances of finding a mate or getting married."

Dr. Woffles holds up one hand as he explains further, "This also holds true for an aesthetically challenged girl even if she were to be capable, intelligent, with a good job, had a good salary and a great personality. Men would automatically end up wondering if they can do better looking elsewhere. If a man were to end up with such a woman, people would automatically assume that he has other ulterior motives in mind other than love – like being after her money."

"As much as we try to be conscious of the economic divide and aesthetically challenged people, deep down we probably won't marry someone who is aesthetically challenged," said Dr. Woffles.

He hammers home the obvious, "Beauty is currency in society." But if such a currency does not have a definable means of measurement, how can it be traded?

#### **MILLIHELENS AND FABLES**

While understood, beauty is something nebulous that defies definition. Ancient philosophers and artists have tried for centuries but still haven't hit the nail on the head. What is agreed on is the effect of beauty on history. Helen of Troy, reputedly the loveliest woman of her era, started a major ruckus with the Trojans and the Greeks because of her beauty. Her beauty has been referred to as "The face that launched a thousand ships." In rather humorous fashion, some fashion pundits attempted to quantify beauty in terms of *millihelens* – the amount of beauty required to launch one ship. Needless to say, this attempt was unsuccessful due to the ambiguity of the means of measurement – one's mileage varies in terms of the size of ship launched and the aesthetic tastes of the measurer mean that the *millihelen* is somewhat impractical to use.

"What some ancient philosophers have tried to do is try to reduce everything to a mathematical equation. Some of the early philosophers and early artists felt that there must be something mystical and cosmic in a face, especially in a beautiful face," said Dr. Woffles. "We instinctively know something is beautiful, be it a work of art or an individual, but it is something mystical, unusual and out of the ordinary. That is why supermodels are who they are – they have visually arresting looks."

Studies indicate that the ability to recognise beauty is hardwired in our brains from the moment we draw our first breath –



Singaporean cosmetic Surgeon Dr. Woffles Wu says that the more times the Golden Ratio occurred on a face, the more beautiful the face was perceived to be.

babies when shown a beautiful person's picture and a less attractive one gravitate towards the beautiful one.

Not only that, it seems our mindsets are already formed from the various parables and children's stories told to us when we were young.

"We've been conditioned through movies, books and media to automatically assume that those with a long chin, or a hooked nose, or deep furrows beside the nose are automatically the bad guy. This is something handed down and taught to us so subtly that it becomes pervasive," says Dr. Woffles, "sit back and think about all the stories you know – Hansel and Gretel, Sleeping Beauty, Peter Pan. All of these have clear-cut villains with clear-cut, identifiable features. Captain Hook has a hooked nose and a hook. The Big Bad Wolf has a snout and fangs. The witch also has a long, hooked nose, warts and looks like a crone."

"If we analyse it further, these tales offer beauty as a reward. Look at Beauty and the Beast and the Frog Prince – these women looked beyond superficial appearances of abject ugliness and were rewarded with their handsome man. All this programming spills over into our adult life," says Dr. Woffles.

### RATIFYING BEAUTY

Philosophers always thought that beautiful faces were based on some mathematical formula that is reproducible in pictures and art. The Greeks were some of the first to attempt to define and quantify beauty and theorised that the face could be divided into

a series of thirds. They found that the distances in a beautiful face were in the ratio of  $1/3$  and that a beautiful face can be segmented from the hairline to the root of the nose as  $1/3^{\text{rd}}$  of the face and from the nose to the bottom of the chin as another  $1/3^{\text{rd}}$ . Based on these ratios, a beautiful face could be 'constructed' by the Greeks.

The painter Botticelli, who came up with the aforementioned masterpiece *The Birth of Venus* believed that the face could be divided into a series of ratios of sevens. The space between the eyes is  $2/7^{\text{th}}$  the height of the face and so on. He believed that by using these ratios he could come up with a beautiful face by matching up those proportions.

The trouble was, these faces always had some kind of flaw to them that didn't end up appealing to people. It worked on real people, but reverse engineering and drawing them proved to be a challenge. Slight variations of a centimetre or more ended up making a picture or person downright ugly. When it did work, such pictures of such beautiful people really weren't biologically possible since they were so beautiful as to be unlikely, leading to a further sense of disbelief. Witness for example the Mona Lisa – people still haven't made up their minds whether it is a 'female' version of da Vinci, a friend or confidante of his or simply the product of a fertile imagination.

One universal ratio that all agree on that works and is present in one form or another

The Golden Ratio has many interesting properties. Shapes, structures and patterns constructed by the ratio have been considered to be pleasing to the eye. In fact, this ratio appears in nature as well, especially in terms of the whorls formed on a snail's shell. They conform to the Golden Ratio perfectly.

er in all these prior suppositions, however, is what has been termed throughout history as the Golden Ratio, the Golden Mean, the Golden Number, the Divine Proportion or the Sectio Divina.

The Golden Ratio has many interesting properties. Shapes, structures and patterns constructed by the ratio have been considered to be pleasing to the eye. In fact, the ancient Parthenon in Athens was supposedly built based on the Golden Ratio. Da Vinci's *The Last Supper* is also supposed to incorporate the Golden Ratio. This ratio appears in nature as well, especially in terms of the whorls formed on a snail's

shell. They conform to the Golden Ratio perfectly.

For the more pragmatic Chinese, the Golden Ratio itself is a cause for celebration since 1.618 translated into Chinese sounds like good luck and prosperity all the way. Certainly a good reason to prescribe to the Golden Ratio itself.

### THE GOLDEN RATIO RATIFIED

"If you draw a line," explains Dr. Woffles, while sketching a line and labelling the ends of it A and B on a piece of paper, "and if you draw a point which we'll call G on the line that divides the line into two parts we'll end up with sections which we'll call AG and BG."

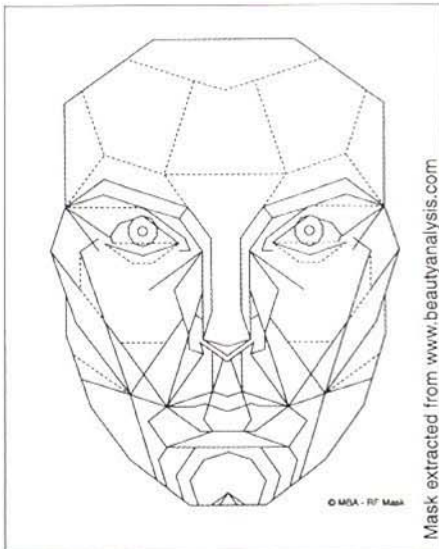
"Now, if you place the point G, in such a way that the smaller section BG has the same ratio to it's larger counterpart AG, you'll find that AG is also in the same ratio as the whole of the line AB."

On paper, it looks like a line with a point on it dividing the line into two sections with one slightly more than the other. "This ends up with the interesting and unique ratio of 1 to 1-6180339887. This is the Golden Ratio. Euclid, Leonardo da Vinci and others found this figure constantly repeated in nature and in things considered beautiful."

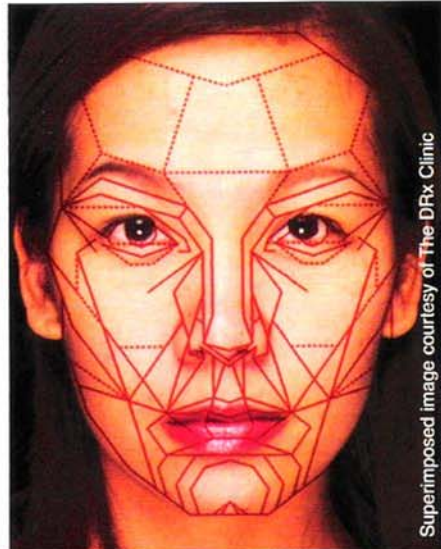
"When research was done on the faces of beautiful people, it was found that many women considered to be beautiful have a high proportion of this ratio in their facial measurements be it the length of the nose, the forehead, the lips to the eyes.

Essentially, the more times this ratio occurred, the more beautiful the woman was," said Dr. Woffles.

Rather than going out with a bunch of tape measures and a refresher course in High School mathematics, some bright sparks have done all the work for us. A researcher and retired cosmetic surgeon, Dr. Stephen Marquardt, applied this theory and came up with a template, a facial mask based on the Golden Ratio. By overlaying this mask on a person's face, one could see how close the person resembled the ideal paragon of beauty. Dubbed the Phi Mask, which draws its name from the Greek letter



Mask extracted from www.beautyanalysis.com



Superimposed image courtesy of The DRx Clinic

The above diagram (picture on the left) shows the facial mask based on the Golden Ratio derived by researcher and retired cosmetic surgeon, Dr. Stephen Marquardt. By overlaying this mask on a person's face (picture on the right), one can see how close the person resembled the ideal paragon of beauty.

to symbolise the Golden Ratio, it is a blank geometrical template that is constructed with a series of Golden Ratios to form the idealisation of the perfect face from the front and from the side. A copy of the mask is available for download at [www.beauty-analysis.com](http://www.beauty-analysis.com).

When overlaid on a series of faces, both male and female, it was found that the closer a face conformed to the template, the more beautiful it was. Well, some faces that is because the vast majority are off slightly in one way or another, be it with eyebrows that are too high, or lips that are too thin or full or other minor discrepancies. The interesting question is, if beauty can be defined as a ratio and boiled down to a mask, why are cosmetic surgeons not simply measuring people's faces and just making them conform to the ratio?

Dr. Woffles denies that beauty can be simplified to such a degree. "Faces can't be reduced to a single mask. Take, for example, a selection of what we consider beautiful women – Zhang Zi Yi, Maggie Cheung, Michelle Yeoh and Gong Li," says Dr. Woffles as he counts them off with his fingers, "Maggie Cheung is a serene Buddhist kind of beauty while Michelle Yeoh has more beautiful angular features with a worldly, earthy kind of beauty. Zhang Zi Yi has features that tell of a more petulant, rash kind of beauty and Gong Li, who has a really voluptuous face, idealises a much more petulant form of beauty." With their images laid next to each other, there was no doubt that all these four women are considered beautiful, yet, they were all beautiful in a different kind of

way.

"All four of them are beautiful, but none of them will fit the Phi Mask perfectly. Their face shapes are different and their features are all in different proportions so it is not a case of one mask fits all," says Dr. Woffles. "Most cosmetic surgeons don't use such grids or measurements in their surgery though the Golden Ratio is a useful thing to keep in mind. We should be open minded enough to accept that there are different notions of beauty and many different variations. While there may be an ideal face that fits into the mask or the Golden Ratio, there are also many faces that are considered beautiful that fit outside the mask," said Dr. Woffles.

"Beauty means different things to different people and ethnic groups, though it is understood by most races that there are some ideals that we look for in a beautiful face," elaborates Dr. Woffles. Some features that can be nailed down as desirable are symmetry, proportion, balance and harmony of the facial features.

A beautiful face ought to have symmetrical, proportional and balanced features. If not, you'd end up with Quasimodo – the Hunchback of Notre Dame. Studies have

shown that people with such features were perceived to be free from disease and to have grown up in a healthy manner; also implying that they were free from genetic defects. Such people as mates were better bets because offspring would also inherit superior genes. "It is very important to have symmetrical features. One can't be beautiful without being symmetrical but, by and large, symmetry itself doesn't guarantee beauty," said Dr. Woffles, "proportion itself plays a major part."

It is all a question of how all the features – the eyes, the nose, the lips, cheekbones – all harmonise with each other," explained Dr. Woffles. "One can have a large nose, but if this is balanced out by other features, the person can still be considered beautiful." If one were to take that same nose and put it on say, Elisabeth Taylor's face, the results would be disastrous, to say the least. "It is a matter of relativity and proportion," sums up Dr. Woffles.

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Ultimately, a cosmetic surgeon's work is artistic and involves the mixing and matching of many features on a person's face to form symmetry, proportion, balance and harmony. "What does resonate, however, is that beautiful people have proportions of the Golden Ratio apparent in their features and in their proportions and they feature prominently but in different areas of the face," said Dr. Woffles.

"The Golden Ratio is something that defies explanation, some believe that our very DNA reflects that ratio too and that, perhaps, in itself reflects a divine presence," muses Dr Woffles. Certainly, the number of occurrences of the ratio in nature itself is something to contemplate.

"God and beauty may just be 1.618."

#### THE GOLDEN RATIO

Defined as the ratio of 1 to 1-6180339887, the Golden Ratio occurs with alarming frequency in both natural and manmade objects that are considered aesthetically pleasing. Mathematicians have been studying this ratio for centuries. Beautiful people often had more occurrences of this ratio in their features than those who were not. 