

SizeChina

THE WORLD SHAPES

How does a designer living in Vermont or Arizona serve the needs of a client living in Japan or China? As Asia's economies surge, creating a vast new middle class who will enjoy both ample leisure time and the disposable income to go with it, this challenge promises to become a staple of the American design community.

Shaping the Problem

I first faced this problem in 1998 when I designed a helmet for Burton Snowboards. Unaware of any difference between Asian and Caucasian body shapes, I was unprepared as I entered what would prove to be a life-altering meeting with a group of Japanese snowboarders. They told me they loved my helmet's style and features but couldn't wear it because it gave them headaches. Wasn't I aware of the Asian head shape? To illustrate, one of the snowboarders leaned forward and balanced his coffee cup on the back of his head, which was flat—so different from the bony Western dome.

My client directed me to get started on an "Asian fit" redesign, and I confidently set out to locate the necessary anthropometric data. Except there wasn't anything; even though Asia comprises one fifth of the world's population, no such information was available. It wasn't just me. Dior eyeglass frames, Giro bike helmets and 3M hygienic face-masks were also designed using only Western data.



Moving to Hong Kong in 2004, I watched colleagues and neighbors struggle with poorly fitted designs. A fashion journalist confided that she was thinking about having plastic surgery on her nose so she could finally wear the Gucci sunglasses she so adored. During the SARS outbreak, genuine fear was created by Western-designed hygienic face-masks, which utterly failed to fit the petite features of Chinese women and children.

SizeChina designed by Roger Ball, IDSA, Arvin Chan, S.T. Yam, Ki Wong, Janis Tsui, Lorraine Justice, FIDSA and Joyce Wong of **Hong Kong Polytechnic University School of Design** (Hong Kong); Johan Molenbroek and Daan Van Eijk of **Delft University of Technology** (The Netherlands); Bruce Bradtmiller of **Anthrotech**; Arnold Pang of **Hong Kong Productivity Council** (Hong Kong); and Heidi Overhill of **Sheridan College, Institute of Technology** (Canada) for Innovation and Technology Commission of the Government of Hong Kong Special Administrative Region (Hong Kong), Strategic Sports HK Ltd. (Hong Kong) and New Era Cap Ltd.

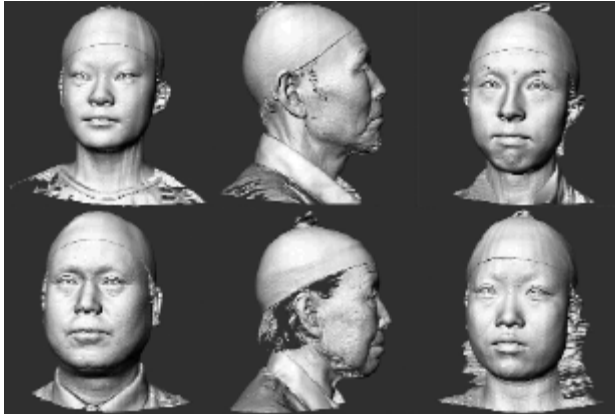


UP



Article by Roger Ball, IDSA

Roger Ball has been crafting iconic consumer products since 1983 for such clients as Burton Snowboards, Bauer, Fisher Price, Cooper Canada, Itech Sports, Brine Lacrosse, Bell Helmets and Nike. During his 20-year teaching career, he has led studio design classes at four different schools in Canada, Hong Kong and the Netherlands.



Max headroom. Each scan file contains more than 150,000 data points.
■ Twenty-first century man. A rural worker in Lanzhou is laser scanned.

I realized that my new position teaching design at the Hong Kong Polytechnic University offered a unique vantage point from which to combine old industry contacts with new research partners and address the long unresolved issue of Asian fit. I received a US \$1 million grant from the Hong Kong government's DesignSmart Initiative to create a 3D database of Chinese head and face shapes. A condition of the grant stipulated that 15 percent of the funding must come from at least three industry sponsors. The three corporate partners were Strategic Sports, the world's largest OEM helmet manufacturer, located in Hong Kong with factories throughout China; New Era Cap, the world's largest baseball hat manufacturer, based in Buffalo, NY; and Anson Optical Products Co. Ltd., also located in Hong Kong. These companies all shared a common interest in discovering the shape of Chinese heads and faces in order to create new Asian-fit products.

For instance, New Era Cap saw direct applications for the research in its markets in licensed sports and hip-hop products. Chinese teenagers, like teenagers everywhere, love hip-hop, and baseball caps are the crowning feature of the hip-hop fashion look. However, because the Chinese head is taller than the Western head, Chinese rappers are frustrated in their attempts to wear their caps at the proper menacing, low-slung angle. In turn, New Era Cap had long been frustrated by its inability to properly serve its teenage clients.

With funding in place, it was time to structure the methodology to the highest scientific standards. Two of the world's leading anthropometric experts agreed to fly to Hong Kong to help set up research parameters and train my newly hired team on our newly acquired 3D head-and-face scanner from Cyberware Corp.

Trained and equipped, the team began to visit the field partners, mostly universities, who had committed to providing volunteers to represent a statistically valid cross-section of the population. Spread across the Chinese mainland, the six field sites allowed us to investigate potential head differences between ethnic groups. The eight-step data-collection process captured biographical data, photographs and traditional measurements as well as the all-important 3D

“I was most impressed by the artifacts from this research. Despite the enormous logistical challenges, the valuable physical and digital resources now available to researchers and designers will not only promote awareness of cross-ethnic physical differences, but also engagement and collaboration between Western and Asian designers. From that perspective, this project stands as a great beginning.”

—Bill Mak, IDSA, interaction design professional and innovation entrepreneur, IMI Studios

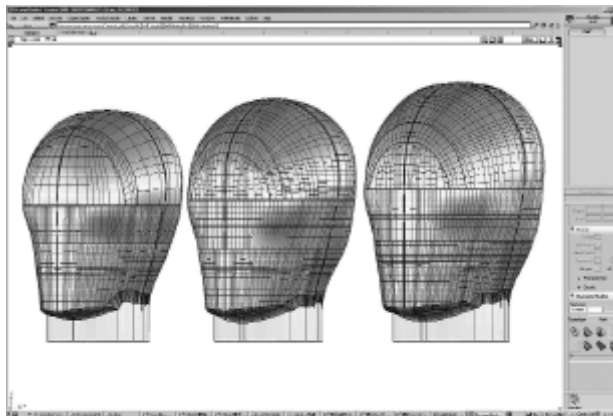
scans. Close to 2,500 people participated, making this one of the largest anthropometric surveys ever completed. Back in Hong Kong, the raw data underwent a rigorous process of cleaning and statistical analysis.

Shaping the Future

Anthropometric head research has a mixed history. Its origins lie in 19th century phrenology, when “head-readers” associated bumps on a customer’s skull with different personality traits. In the 1940s, Nazi pseudo-scientists used head measuring to prove the inferiority of non-Aryan races. These dark moments may have encouraged subsequent researchers to go too far the other way, pretending that all heads are the same shape. This is not true. People may be equal in moral terms, but we vary tremendously in height, weight and head shape—and some of that variation is ethnic.

Even when anthropometric research is undertaken, the results are not well distributed and can be hard to find without the aid of a good librarian. And once found, the data is often presented in the challenging languages of statistics and anatomy. Most designers don’t want to know the “standard deviation of popetial height for a 95 percentile female Caucasian sample.” They just want to know how tall to make the chair. While designers don’t understand the sophisticated analytical language of anthropometrics, anthropometric researchers don’t seem to understand the sophisticated visualization tools of design. Ergonomic data usually comes in the form of dry numerical spreadsheets, neglecting the growing potential of accurate 3D software.

For this reason, the final step of the SizeChina project structured our research findings to suit the needs of its end users—designers. Two distinct sets of products both emphasize off-the-shelf friendliness. In physical form, 10 SLA head forms cover the full size range of Chinese head shapes and sizes. The 2,000 individual scans are available in IGES format on DVD sets. These products exceed the international ISO head form standard, which specifies separate head forms for different sizes. But where ISO head forms are scaled from a single original master head form, our research calculated each size separately, based on the



Data rich. Each of the 10 head forms was designed using 200 individual scans.

200 original scans falling within that range. In addition, we were also able to add extra information about ear center location and facial length.

One of the joys of research is how it can exceed your expectations. **Everyone knew that Asian fit was going to reveal new shapes, but we weren’t expecting to discover an Asian aesthetic—the sculptural beauty that emerged from our averaged data clouds.** When it comes to products that fit the human body, function still follows form, and so do aesthetics.

SizeChina is just the start of a new age of Asian anthropometrics. Opportunities abound. I look forward to expanding our research into the slimmer Chinese foot with its higher arch. I want to see others take up the challenge as well, with a SizeIndia and a SizeAfrica—maybe even a new-and-improved SizeUSA—that will ultimately lead to the creation of a universal anthropometric shape library of the entire human race.

Helping human beings to see each other more clearly will bring us closer to the kind of international community in which all participate equally. Sympathy and curiosity are the beginning, but good design requires more—it takes knowledge. ■