

**BAMBOO**

*in Competition*

**ARCHITECTURE**

*and Exhibition*



**Robert Henrikson**

**David Greenberg**

# **BAMBOO ARCHITECTURE** **in Competition and Exhibition**

**The International Bamboo Building Design Competition  
and the 2010 Shanghai World Expo**

*by Robert Henrikson and David Greenberg*



# BAMBOO ARCHITECTURE

## in Competition and Exhibition

By Robert Henrikson and David Greenberg

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#### Starry Bamboo Mandala

by Gerard Minakawa.  
Erected at the Burning  
Man Festival in Black  
Rock City Nevada USA.  
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#### Indonesia Pavilion at the 2010 Shanghai World Expo.

Photo by D. Greenberg.



#### Vietnam Pavilion at the 2010 Shanghai World Expo.

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#### German-Chinese House

by Markus Heinsdorff.  
at the 2010 Shanghai  
World Expo.  
Photo by D. Greenberg.



#### Pavilion

by Marek Keppl & Toma  
Korec. Appreciation  
Prize, International  
Bamboo Building Design  
Competition.



#### Asian Water Villa

by I. Made Gde  
Dharmendra.  
Resort House Winner,  
Bamboo Building Design  
Competition.



#### Bar Phong Tra

by Vo Trong Nghia.  
Next to the Wind and  
Water Cafe in Vietnam.



#### India Pavilion Dome

at the 2010 Shanghai  
World Expo.  
Photo by D. Greenberg.

# BAMBOO ARCHITECTURE in Competition and Exhibition

## The International Bamboo Building Design Competition and the 2010 Shanghai World Expo

*by Robert Henrikson and David Greenberg*

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## **International Bamboo Building Design Competition Visionary Designs for Ecological Living**

The first International Bamboo Building Design Competition was created in 2006 to develop new award winning designs for bamboo buildings, raise awareness of the use of certified structural bamboo for building code approved structures, and introduce architects, designers and builders to bamboo as a structural material.

Contestants registered from 64 countries and submitted 250 designs in 12 building categories such as family housing, urban buildings, emergency shelters, commercial and public buildings and even treehouses.

An international panel of 16 jurors selected the top 50 finalists. In the final round, the jury chose the overall 1st, 2nd and 3rd prizes. Criteria for judging were Utility (functionality), Strength (structural integrity), Beauty (aesthetic appeal), Concept and Design Development, Graphic Layout and Use and Expression of Bamboo.

50 Finalists came from these 25 countries: Austria, Brazil, Canada, China, Costa Rica, Denmark, Ecuador, France, Germany, India, Indonesia, Italy, Malaysia, Mexico, Netherlands, Peru, Portugal, Slovakia, South Korea, Spain, Thailand, Trinidad & Tobago, United Kingdom, United States, Vietnam.

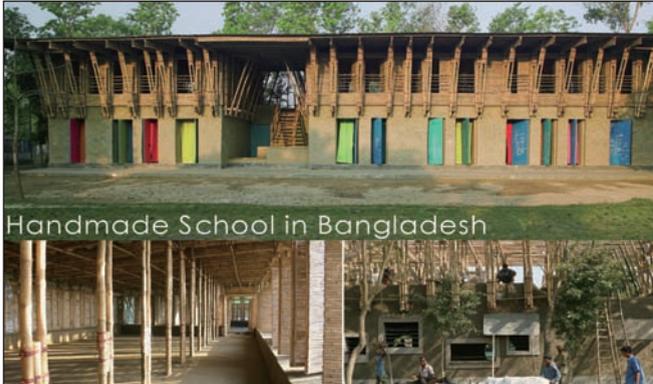
The results of the competition are truly exciting and innovative, providing a fresh outlook for the possibilities for bamboo in a new green world.

Later in 2007 an installation of entries by the 50 finalists opened at an exhibition concurrent with Documenta in Kassel, Germany at the KunstHochschule Design University. Four videos projected on two walls and two monitors showed 3d models and construction of these designs. The show moved to Guangzhou, China and then to Beijing at the Great Hall of the People. It is our hope this show will continue to travel to museums and galleries around the world.



*First Prize: Handmade School in Bangladesh, by Anna Heringer & Eike Roswag, Germany.  
[www.bamboocompetition.com](http://www.bamboocompetition.com)*

# International Bamboo Building Design Competition Top Four Prize Winners



## FIRST PRIZE:

### Handmade School in Bangladesh.

*Anna Heringer & Eike Roswag: Germany.*

This school was hand built in Bangladesh with the community support of craftsmen, pupils and teachers guided by a European architects and students. The aim was to improve building techniques, while maintaining sustainability, strengthening regional identity.

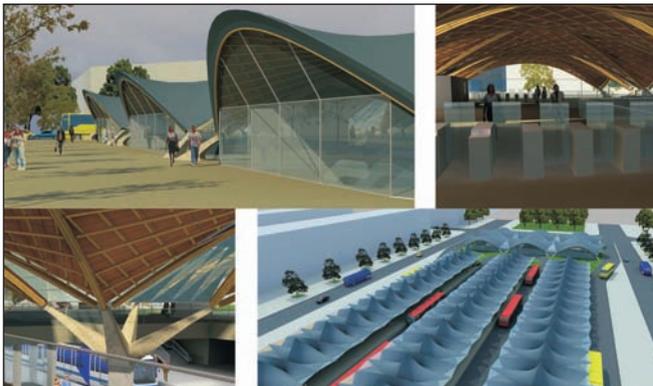


## SECOND PRIZE:

### Wind and Water Cafe.

*Vo Trong Nghia & Nguyen Hoa Hiep: Vietnam.*

This Café is located in Binh Duong, Vietnam and is built to receive as much cooling as possible from the area's prevailing winds. Bamboo is used structurally and decoratively throughout, with wood from the water coconut used as roofing.



## THIRD PRIZE:

### Transport Station in Bogota.

*Luis Alejandro Valencia Ojeda: Spain.*

This bus exchange station is suggested for the tropical climates of Bogota, Colombia. The beautiful curves of the bamboo ceiling provide shade and comfort for waiting passengers. Ball and socket joints are used for connecting the bamboo poles.



## APPRECIATION PRIZE:

### Pavilion.

*Marek Kepl & Toma Korec: Slovak Republic.*

Using the parabolic curve and bamboo's natural flexibility to create a lightweight structure and a pleasant, light filled environment for people to gather. Rainwater runs down the outside surface of the membrane on the conic cylinders and into retaining canals in the foundation.



## Handmade School in Bangladesh

A school – handmade by local craftsmen, pupils and teachers together with a European team of architects, craftsmen and students. The philosophy of METI (Modern Education and Training Institute) is learning with joy. The teachers facilitate the children to develop their own potential and to use it in a creative and responsible way. The building reflects these ideas in terms of materials, techniques and architectural design. The aim of the project was to improve existing building techniques, maintaining sustainability by utilising local potential and strengthening regional identity.

»We believe that architecture is more than shelter. It is intimately connected with the creation of identity and self-confidence. And this is the basis of development.«

### Utilized Materials

83 m<sup>3</sup> brickwork for foundation and veranda  
350 m<sup>2</sup> damp proof course  
270 m<sup>3</sup> loam - straw mix for walls, ceiling, floors, caves  
400 to loam  
230 kg steel for poles  
2.300 bamboo poles for ceiling, roof, facade  
Utilized Tools  
4 Weller spades / 2 pitchforks / 3 drill machines / 4 hammers / 2 soldering metals  
saws tension / belts / 2 cows and 2 water buffalos / baskets



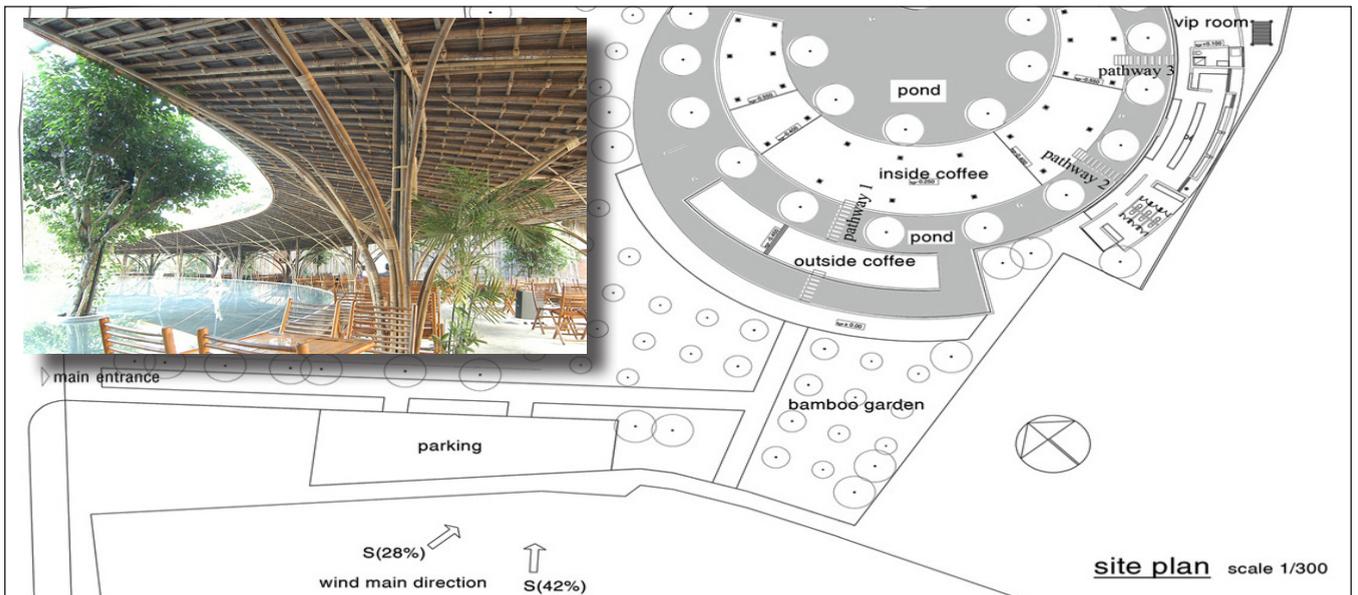
# Wind and Water Café in Vietnam

Second Prize Winner, International Bamboo Building Design Competition  
Vo Trong Nghia, Principal Architect, and Nguyen Hoa Hiep



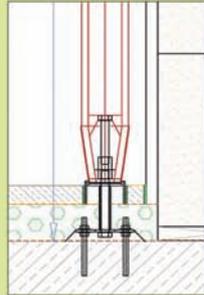
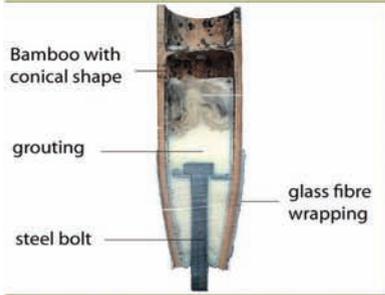
A one hour drive north of Saigon (Ho Chi Minh City) will take you to the Wind and Water Cafe. Here in Binh Duong province, Vietnam's booming industrial park region, is a cafe oasis. Surrounded by bamboo gardens, pools and fountains, Wind and Water Cafe is a refreshing afternoon stop for tea, coffee, drinks and conversation.

Vo Trong Nghia, an architect and entrepreneur, designed with natural and local building materials, using thick structural bamboo poles with a water coconut roof. The 1200m<sup>2</sup> cafe has a crescent shaped design around a water pond, on a 3700m<sup>2</sup> site. He designed it using the wind and the water to replace air conditioners.



# Visionary Bamboo Buildings

## INNOVATION



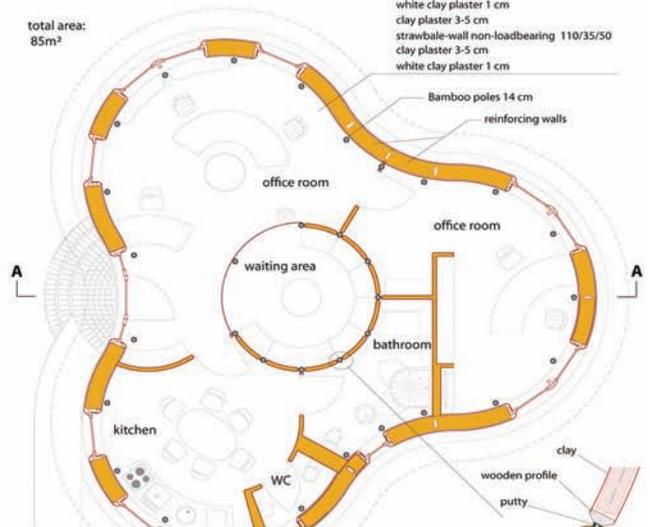
Innovative Bamboo joining technique

Connection floor

Bamboo Pole top

Bamboo in Adobe wall

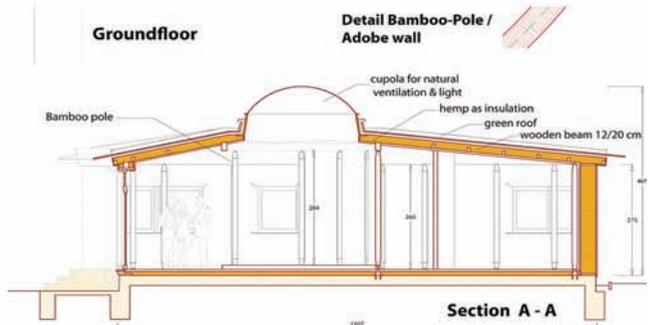
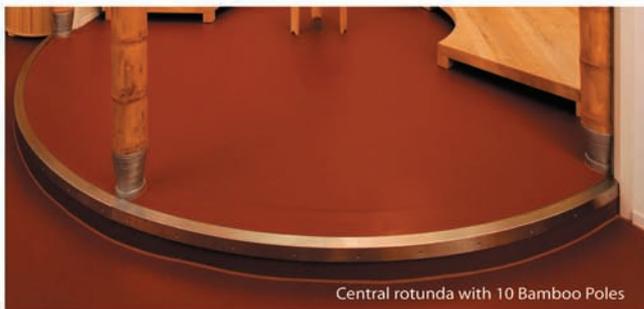
33 Bamboo Poles



Susanne Korner & Tilman Schaeberle

Bamboo Strawbale House

Germany



Low primary energy input

Straw-bale wall provides high insulation

First layer of clay on strawbale wall

Final layer of white

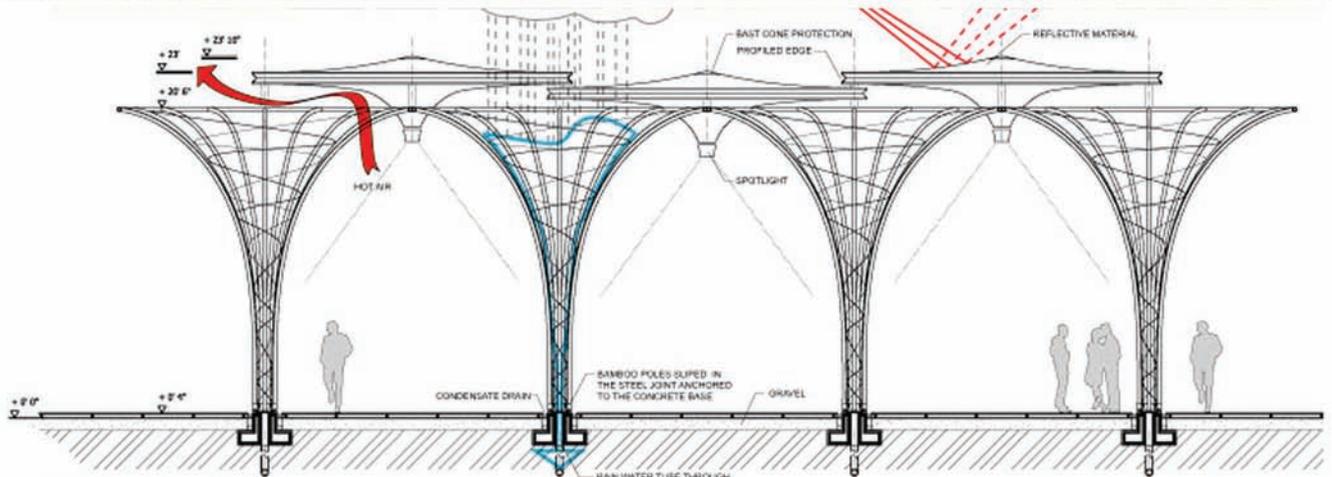


Susanne Korner & Tilman Schaeberle

Bamboo Strawbale House

Germany

## Visionary Bamboo Designs



### space and form

The aim was to gain a space, where roof, walls and support construction would work as one. Stretching over the people, sheltering them and giving them the pleasure of experiencing different sort of environment.

Marek Keppl & Toma Korec

*Pavilion*

Slovak Republic



## Description

Designed and proposed for Over Water Villa at Mallaca Beach Resort-Malaysia. The Asian Water Villa is loosely resembled of the Asian Cup & Saucer Shell form. Designed with one floating master bed at the center with reflecting water effect from the bottom. Private lounge and bathroom area on the both side. Open deck area with staircase down to the water at the rear side and arrival walkway at the front. The material will be using mostly from bamboo as a main structure and finishes, except the concrete pier, timber sub-structure and traditional Balinese grass roofing cover. This organic villa will be designed and dedicated for honeymooners with unlimited ocean view as the prime privacy.



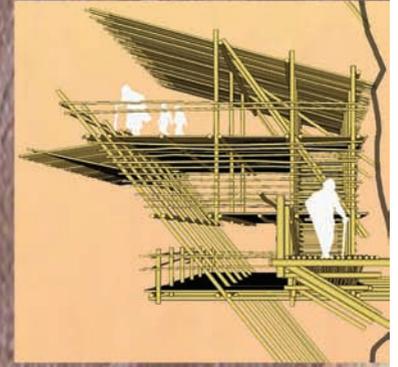
I. Made Gde Dhamendra

*Asian Water Villa for Malaysia*

Indonesia

# “CLIFF HANGAR” / SICHUAN

HANGING TEMPLE / SICHUAN



Sichuan is an inner district area in china. It has many famous beautiful scenic spot such as five colour pool, tiger lake and reed lake etc. But those places are also located near the cliffs. It means no any vehicles can access, you just can go there step by step along the roughly cliff road.

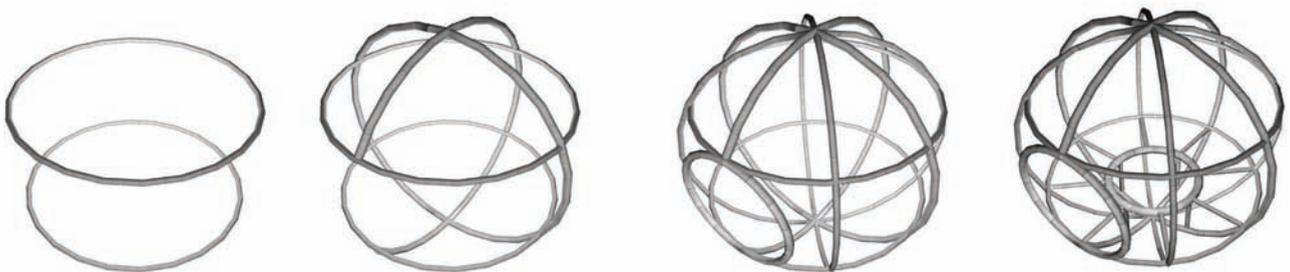
Base on this restriction that the design approaching to provide a place on the halfway of the cliff road. So, people can have a rest thought out the building. On the other hands, it also provided some alternate opportunities for the local inhabitants; they can do some small business inside the building to earn more money for improve their live.

The shelter like structure is inspired by the Hanging Temple in china. It is projected and hanging from the cliff and supported by several wood poles. On the material used, the building used bamboo to construct. Because bamboo is a very common local material: easily to get from the site and it is a light weight, strengthen and flexible material. The other reason is the local labours are already has very well knowledge on using bamboo for construction.

Cheung Kwok Ching

Cliff Hangar for Sichuan China

Hong Kong



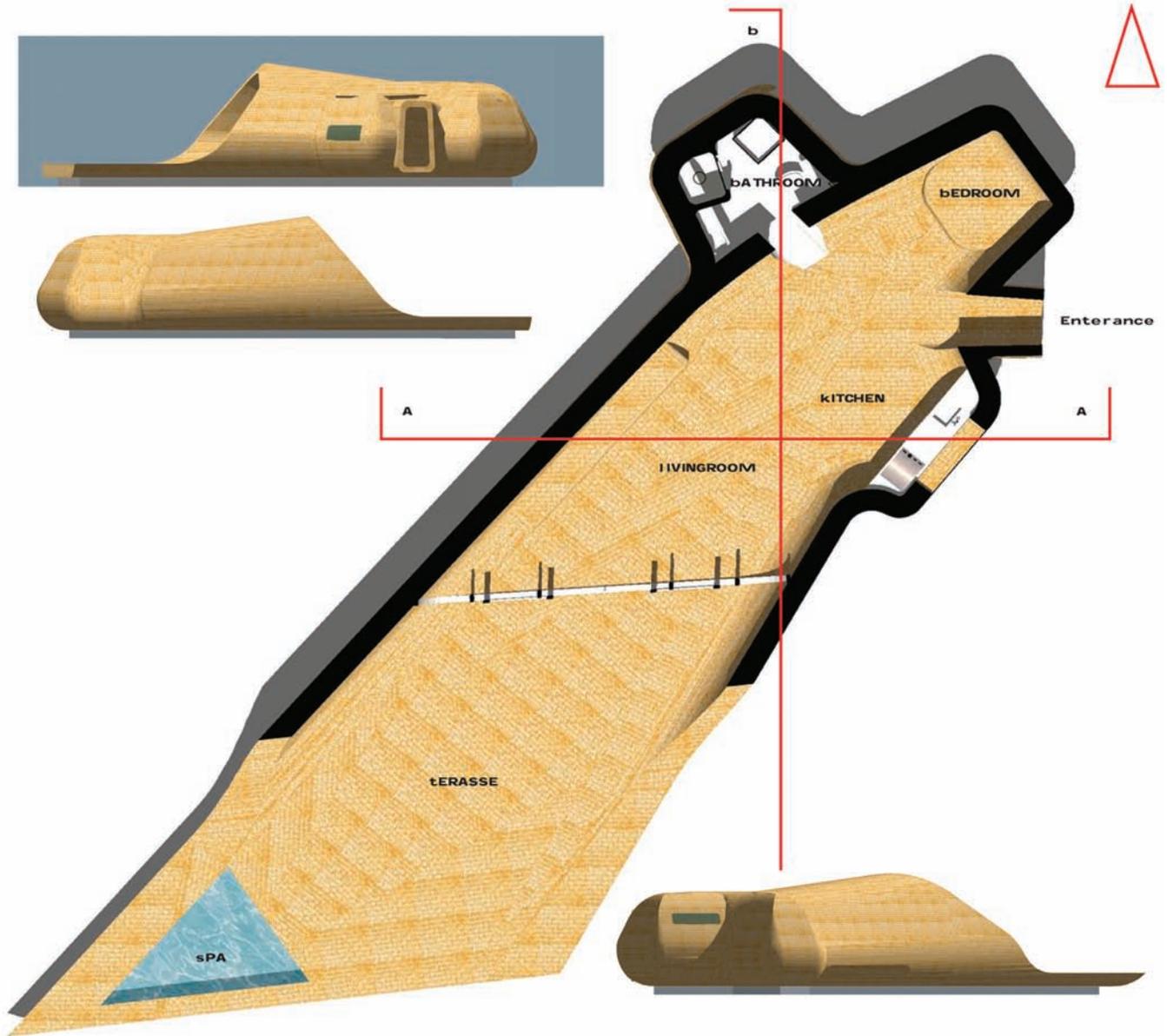
Coconut's concept aims to combine design and structure in a perfect balance. In order to achieve this result, coco features an innovative method of construction which employs only bamboo curved poles. The greater poles are curved while they are still growing, while the thinner ones are bended relying only on the natural flexible power of bamboo. Like a basket, in coco every element plays a key role making harder the whole structure at every

A. Grassi, M. Annoni & R. Zilli

*Coconut Resort Houses*

Italy

# Woven house



Soren Korsgaard

Woven House for Southeast Asia

Denmark

# BAMBOO IN EXHIBITION

## Bamboo Architecture at the 2010 Shanghai World Expo

### Commentary and Photography by David Greenberg

This chapter gives a glimpse at the important role that bamboo and rattan has played in the recent World Exposition at Shanghai. Bamboo was chosen as the dominant architectural material in eight major pavilions. The theme of the exposition was *Better City, Better Life*. Great architects from around the world demonstrated most dramatically the contribution that bamboo can play in a better life.

Part of the better life offered by the use of bamboo at the Expo is its unique quality to create a strong spiritual feeling. In the Pavilion of Vietnam this is done through the creation of a Buddhist temple environment. The dome of the Pavilion of India offers an even greater feeling of spirituality in its ever so delicate and towering design. It may even challenge the great domes of European cathedrals in sheer intensity of inspiring forms.

*Indonesia Pavilion*



*India Pavilion*



*German-Chinese House*



*Vietnam Pavilion*



*Norway Pavilion*



*Spain Pavilion*



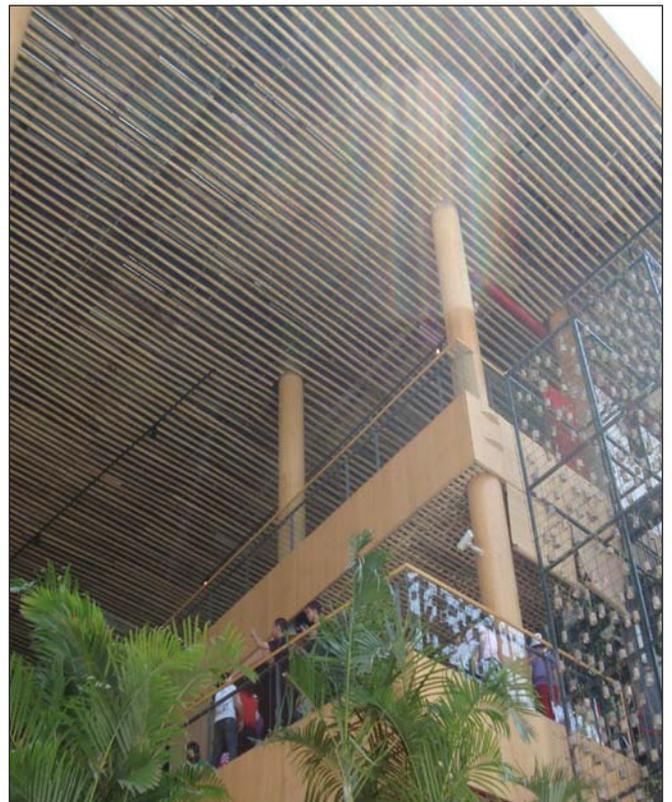
## Pavilion of Indonesia



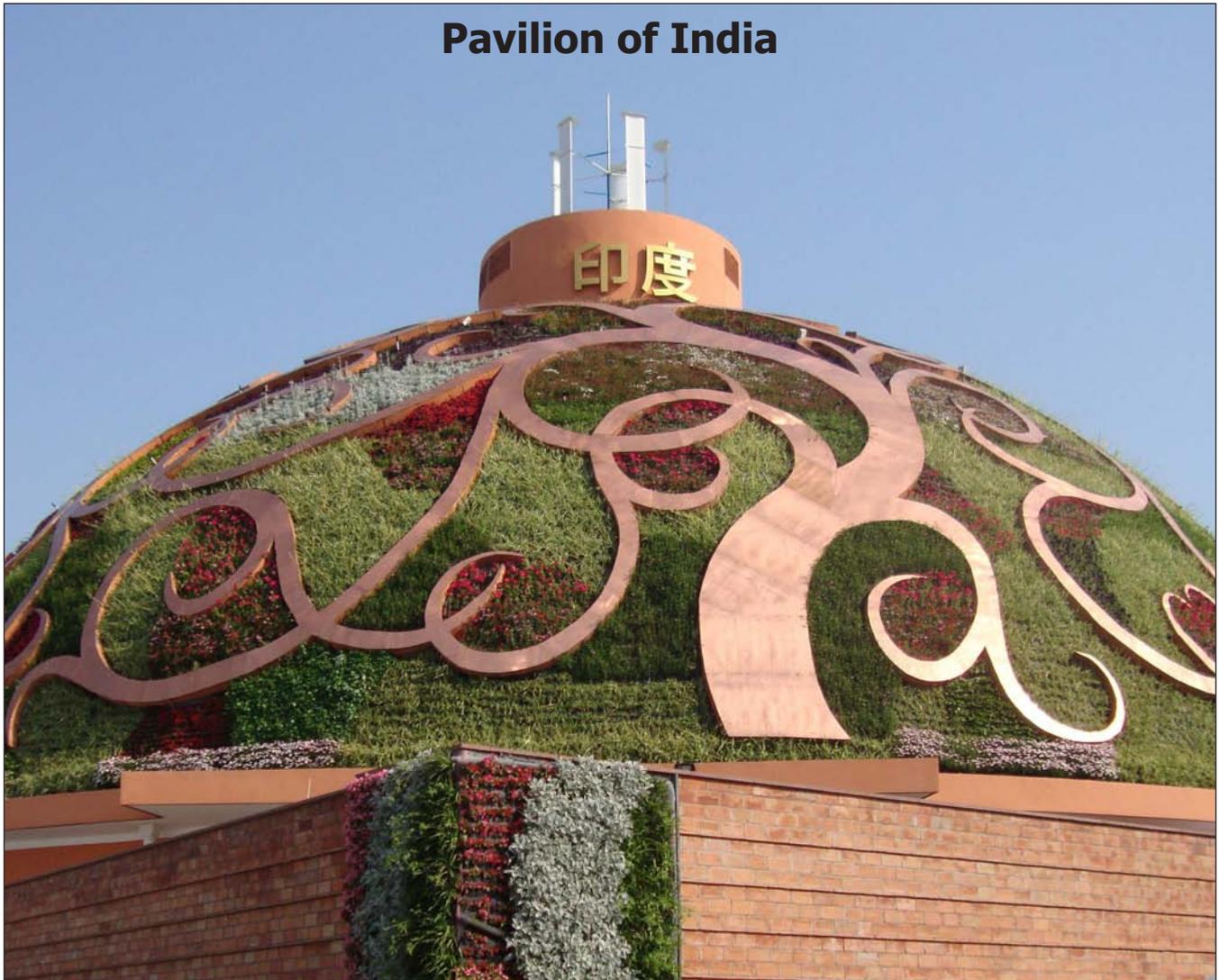
The Pavilion of Indonesia perhaps used bamboo in the most creative ways imaginable from the unique floors to the ceilings and from the walls to the columns both structurally and decoratively. The dominant feeling is very modern in many ways not seen before. The facade itself shows the integration of about eight totally different methods of use.

The large smooth curving wall is accented by a decorative art work in front of it by varying sizes of more funky poles of a darker color. The roof overhang is made of simple pieces of bamboo fitted just next to one another, while a five story vertical screen is created by thousands of little bamboo potted hanging plants. Though beautifully proportioned bamboo louvers form an interesting focus on its classic architectural competition, ones eyes can't help being attracted to the simple bamboo sliced sections forming the false ceilings throughout.

The entire theme of the pavilion seems to investigate new and creative ways of using bamboo architecturally and decoratively.



## Pavilion of India



*This rooftop photo shows grass and flowers on top of a membrane, which covers the bamboo dome below.*

The Pavilion of India for the most part is contained in what must be one of the largest domes ever built with bamboo with the famed collaboration of architect Simon Velez.

Its simple but elegant design is breath taking and becomes the background for a 3D show presentation, a moving hologram explaining the history and future of India. Most of the dome is covered with grass and flowers for its green and red rooftop.

The very simple and almost crude like bamboo system for the seating benches for the show compliments the dome in a lovely way.

It is the world's largest bamboo dome in the "Cities of Harmony" themed-India Pavillion. With a

height of 17 meters, the dome links 36 compound bamboo arched ribs with steel and bamboo rings using steel-concrete grout joints which were developed in Colombia by Velez, the major inspiration for the project.

The idea of it as a living structure included the membrane covering the micro-concrete shell surface over the dome and finished with a triple-layered geo fabric acting as a growing and nutrient distribution medium for herbs, forming a productive landscape covered with living plants in a grand ornamental composition interwoven with copper plates.

*Architects D R Naidu, Design-C, a unit of JWT India, Sanjay Prakeash, Pradeep Sachdeva, Mohan Rao, guided by Simon Velez.*

## **German - Chinese House**



The German-Chinese House at the Shanghai Expo is unique for many reasons, first of all because of the creative genius behind the designs- Markus Heinsdorff.

The structure though mainly bamboo can better be described as a hybrid. The use of both stainless steel and clean vinyl is so important in its construction as well as aesthetic. The purity and beauty comes from the contrasting naturalness of the bamboo with the precision of the stainless steel connections and the covering of the clear synthetic protection- thin film vinyl walls.

Perhaps its most striking feature is its unique aesthetic. It just looks so different from any other structure at expo even though the bottom line there seems to be the creation of architecture that is different.



# Bamboo and Rattan

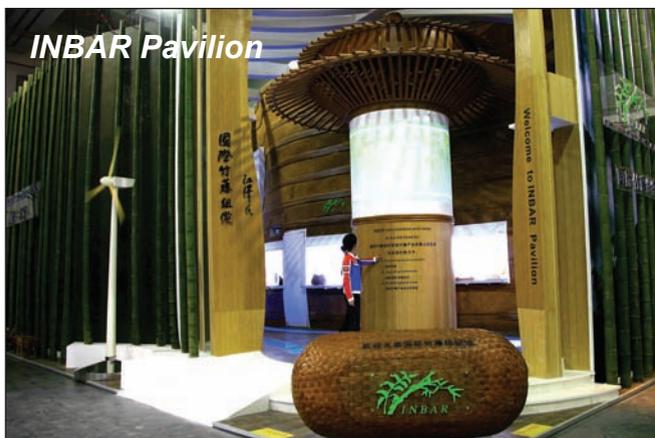
## INBAR Product Ideas Competition at 2010 Expo Shanghai

by Giles Henley and Lou Yiping, INBAR  
(International Network of Bamboo and Rattan)

INBAR's participation in the 2010 Shanghai Expo aimed to further demonstrate the multiple uses and potential for bamboo and rattan in modern, urban life. An important part of this was the demonstration of bamboo-based architecture. Bamboo was well represented at the Expo with eight national pavilions and other structures using it as a prominent part of their structure or design.

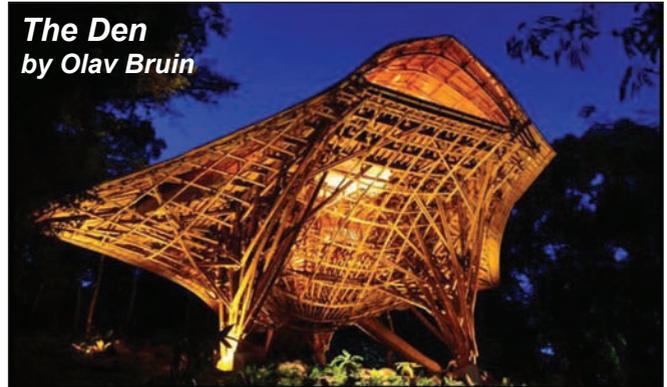
INBAR's own pavilion, using bamboo sourced from nearby Zhejiang province, introduced participants to the multiple household and recreational uses of bamboo and rattan, through a display of products ranging from bamboo bikes and surfboards to exquisite vases, handbags and computers.

INBAR's Congress held in May 2010 in Shanghai brought together over 200 people working with bamboo from government ministries, businesses, NGO's, research institutions and creative industries to discuss how bamboo can create better lives and urban landscapes. As well as sessions on policies and ongoing research, an architecture session brought renowned architects from all over the world together to discuss some of the most fascinating and versatile applications of bamboo both in cities and rural settings, including techniques which were on display in the Expo grounds.



International Network of Bamboo and Rattan (INBAR). 8, Futong Dong Da Jie, Wangjing, Chaoyang District P. O. Box 100102-86, Beijing 100102, P. R. China. Website: [www.inbar.int](http://www.inbar.int)

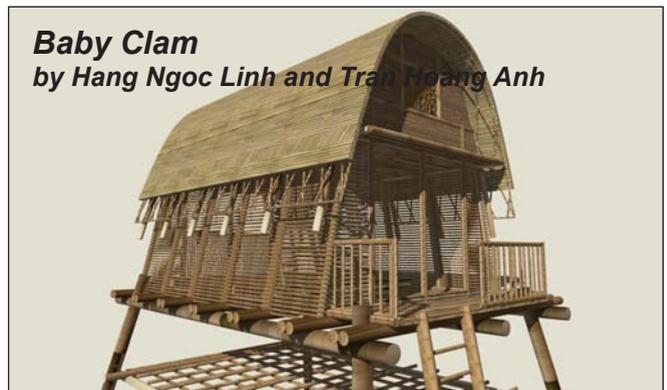
**The Den**  
by Olav Bruin



**Bendy Hut**  
by Mui Paul, UK



**Baby Clam**  
by Hang Ngoc Linh and Tran Hoang Anh



**Phu Quoc Airport**  
by Ton Men Banh and Yu Ri Shin



## The Den Soneva Kiri Resort Thailand



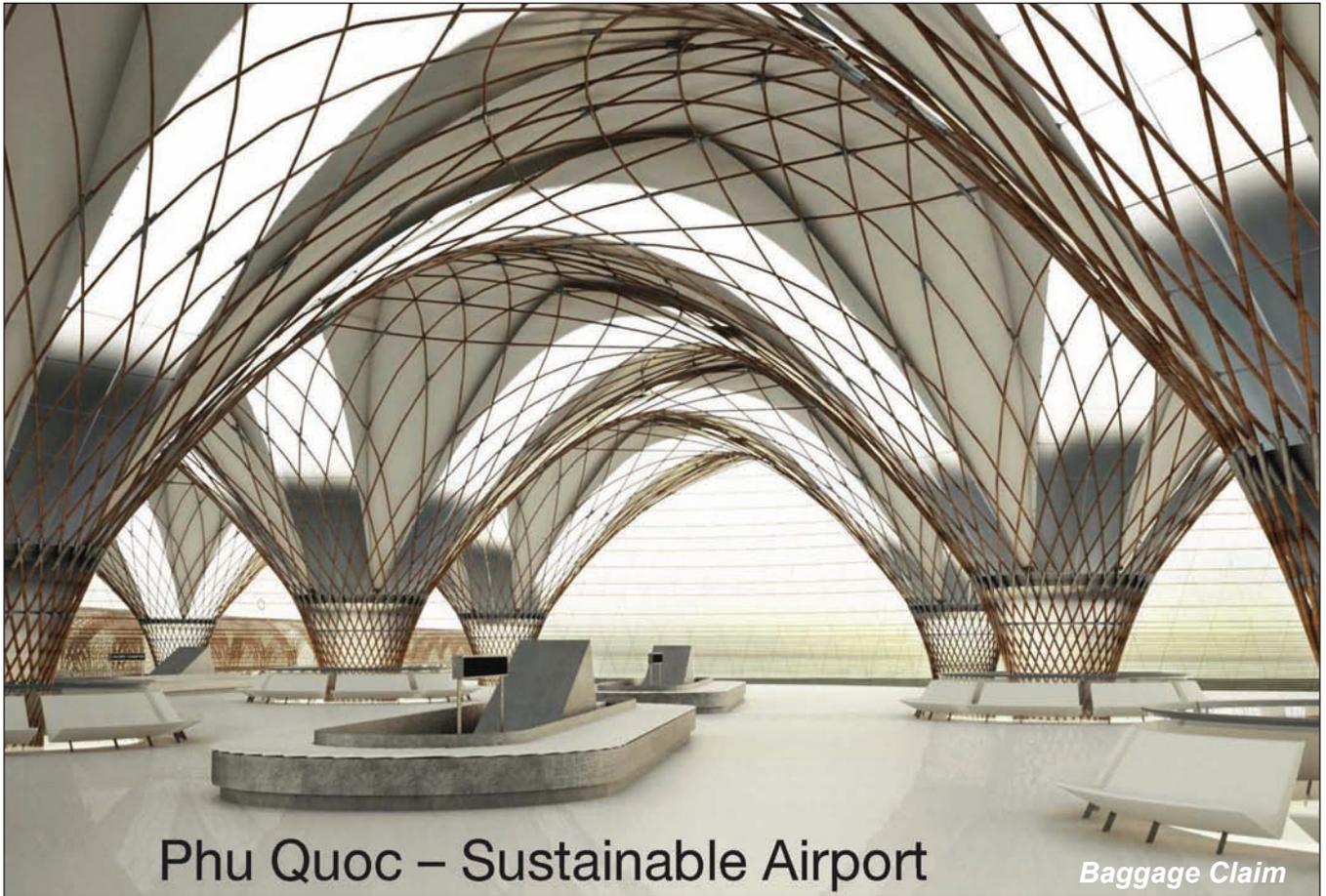
Bamboo is one of the most widely used building materials in the world, but mainly by poor people. It's nickname is the 'poor man's timber' and as soon as people have enough money they will build a house of stone and concrete.

The aim of the project is to change the bad reputation of bamboo and inspire people and architects by showing it is an amazingly beautiful material which is also suited for making modern architecture. Besides, bamboo is one of the most environment friendly building materials. It can be harvested after 4-5 years when the bamboo is strong enough for structural purposes. Since the bamboo plant grows new shoots each year, it's a continuous process of harvesting and growing.



This 6 star hotel resort is located on Koh Kood, an island in the Gulf of Thailand. This Den provides an auditorium/cinema for films, lectures and plays, a library with books on permaculture and local traditions, an art room, a music room and fashion room, thus giving children both creative and ecological education while playing.

The main structure has been made using Pai Tong bamboo (*Dendrocalamus asper*) in lengths up to 9m and a diameter of 10-13cm. The secondary roof and 'belly' structure is made from Pai Liang bamboo (*Bambusa multiplex*) in 4m lengths and a diameter around 5cm. Both types of bamboo come from plantations in the neighboring Thai province of Prachinburi.



## Phu Quoc – Sustainable Airport

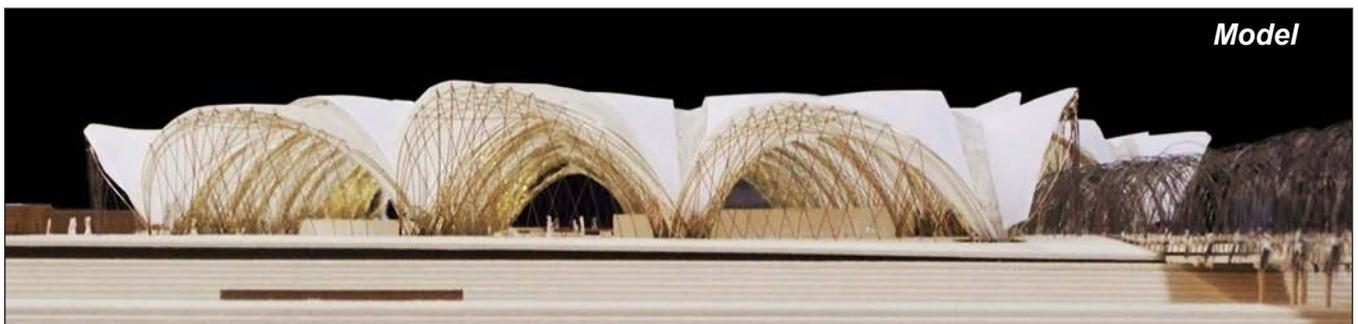
*Baggage Claim*

Vietnam's tourist industry is booming. One of the most sought after destinations is the paradise island of Phu Quoc. Located in the Gulf of Siam 60 km offshore from the coasts of Vietnam and Cambodia, its biggest industry used to be fishing and the export of its famous fish sauce. Now outsiders are starting to learn about its long pristine beaches, national park forest and coral reefs, all tempered by its the sub tropical climate.

Where previously the only flight was from Ho Chi Minh City, connections are now being made direct to the island from all over South East Asia.

To cope with the increase in air traffic a new airport is being planned. The new terminal will have an annual capacity of 2 million passengers.

The proposal by Ton Men Banh and Yu Ri Shin Architects cleverly combines the arrival with a jetty for water taxis to collect tourists on arrival taking them to the hotels, resorts and beaches along the south west coast. Here the elements of air, land and water are combined. The new airport is an important gateway; representing the culture, industry and materials of the region, not just another off-the-shelf air conditioned box.



*Model*

## About the Authors

**David Greenberg** is trained as an architect and urban designer. He now spends half his time in Maui and half in China in pursuit of his new found field of Sustainable Ruralism, an integrated approach to helping rural culture in an ecological way, in this very one sided non ecological urban oriented world even in China.

Greenberg's various projects both in Hawaii, but mainly in China are ever aware of the urgency of the importance of saving the planet by saving the rural, agricultural, natural and social life of the non-urban areas.

He is closely associated with the Chinese Academy of Sciences, Ecological and Environmental Division as a board member of Intecopolis and gives lectures throughout major Chinese cities on ecological matters. Greenberg feels strongly about China's responsibility to help rural areas be more sustainable. He has spent the last few years working in Shenzhen with a people participation group and consulting with a nationwide think tank, China Development Institute (CDI), and the local government on ecological development.

As a consultant on designing with bamboo for INBAR he has lectured world wide, created exhibits and promoted creativity with bamboo on four continents in the belief that it is one of the important paths for a low carbon future.



*Author Greenberg relaxing for a moment in the Peruvian Amazon Jungle in search of the perfect eco tourist resort site, after lecture and exhibition in Lima on bamboo.*

For over 10 years, much of his practice has involved eco-tourism projects. One of his keenest goals involves the challenge of using bamboo in eco-tourist and poverty reduction projects.

Greenberg is probably most famous for his treehouse designs especially “*The Big Beach in the Sky*” at the Nanshan Buddhist Culture Zone near Sanya on Hainan Island. He authored the book “*Treehouses in Paradise-fantasy designs for the 21st Century*”, an Abrams book. He loves to think of himself first and foremost as a 21st Century Renaissance man with a bamboo staff.

TreeHousesofHawaii.com. hanatreehouse@yahoo.com.  
david@bambooarchitecturethebook.com.  
Bambooarchitecturethebook.com.



During the summer of 2010 he lived in one of China's largest bamboo forests near Anji in Zhejiang province promoting sustainable ruralism. He worked on the integration of culture, agriculture, art, and social as well as spiritual matters on an 18 sq. kilometer site of bamboo. Eating bamboo for breakfast, lunch and dinner, cooked many ways. Drinking a bamboo soft drink was a daily occurrence as was meditating often with his best friend, Master Chang, a Zen Monk who visited him often in the middle of the bamboo forest.



## About the Authors



**Robert Henrikson** was the creator and director of the International Bamboo Building Design Competition (BambooCompetition.com), and the former CEO of a leading company building certified, code-approved bamboo buildings.

Robert is the co-author of the book “Visionary Bamboo Designs for Ecological Living” based on the International Bamboo Building Design Competition.

Robert has been a green business entrepreneur for over 30 years in sustainable development business models for algae, bamboo and natural resources. He is an Algae Alliance consultant on business development, branding, sales and marketing, advising companies and investors in algae ventures (AlgaeAlliance.com).

In 2011 he launched the International Algae Competition (AlgaeCompetition.com): A Global Challenge to Design Visionary Algae Food and Energy Systems.

Robert was a founder of Earthrise Farms and for 20 years, was President of Earthrise, pioneer in algae. He developed Earthrise® brand products in the USA and 30 countries. Authored the book “Spirulina World Food” in 2010, previously “Earth Food Spirulina”, translated into 6 international editions (SpirulinaSource.com).

**The 2011 International Algae Competition**  
*Visionary Designs for Sustainable Algae Food and Energy Systems*

**OBJECTIVES:** Create a collaborative that expands and shares a vision for algae in our future with design ideas for algae production landscapes, sustainable and affordable algae production systems for food, feed, energy, nutrients, water remediation, carbon capture, fine medicines, and superb new algae foods.

**Track 1: Algae Landscape Designs**

**Track 2: Algae Production Systems**

**Track 3: Algae Food Development**

**CALL FOR ENTRIES:** The 2011 Algae Competition is open to everyone: algae enthusiasts, architects, designers, engineers, builders, entrepreneurs, chefs, cooks, food developers, visionaries, algae eaters, students and teams. Register online at [algaecompetition.com](http://algaecompetition.com). Competition entries will be uploaded as pdf and video files and judged by world's leading experts. Prizes will be awarded.

**Timeline:**  
 Dec-15-2010 - Competition launch  
 Jan-11-2011 - Registration opens  
 Sep-11-2011 - Registration closes  
 Oct-11-2011 - Submission deadline  
 Nov-11-2011 - Begin jury review  
 Nov-11-2011 - Website and YouTube exhibition  
 Feb-12-2012 - Finalists announced  
 Mar-12-2012 - Major Award Winners announced  
 Apr-12-2012 - Algae Competition exhibition tour

**Official Website:** [www.algaecompetition.com](http://www.algaecompetition.com)  
 Visit website for all competition details.  
 Official Sponsors, Jurors, Awards, Media Exhibition Schedule to be announced.

**VISIONARY BAMBOO DESIGNS FOR ECOLOGICAL LIVING**

**ROBERT HENRIKSON DAVID GREENBERG**

Robert is a photographer (Panmagic.com) and documentary filmmaker, and produced the DVD series Folding Time and Space at Burning Man over the past 5 years (Folding-Time.com).

Co-Owner of Hana Gardenland, a botanical paradise retreat in Hana Maui, with vacation retreats, agricultural and eco tourism (HanaPalmsRetreat.com). Co-Owner of Wild Thyme Farm, a sustainable forestry and permaculture farming eco-community near Olympia Washington (WildThymeFarm.com).

RobertHenrikson.com. email: [roberthe@sonic.net](mailto:roberthe@sonic.net).



**BAMBOO ARCHITECTURE** in Competition and Exhibition

*Fascinating bamboo buildings and designs from around the world from the International Bamboo Building Design Competition and the Shanghai World Expo. \$29.95*