

# The Smart House

Eco-house at National Taiwan University



Green Design and the City

Judy Chen, Fall 2009

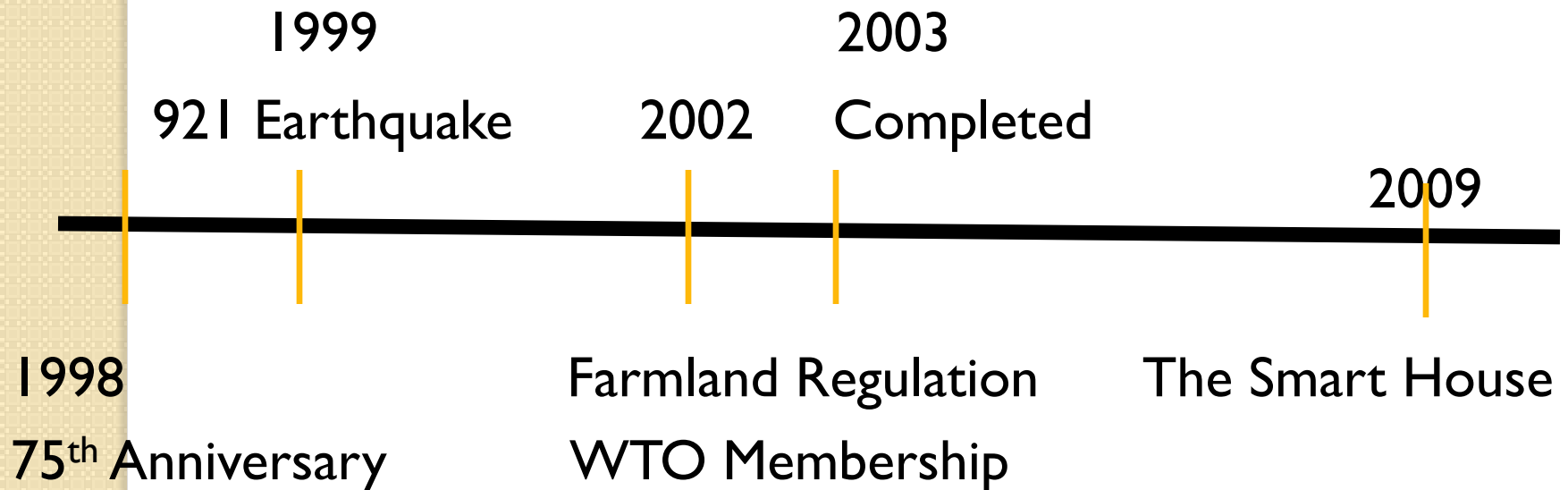
# National Taiwan University

## Background

- Founded by the Japanese in 1928
- Renamed to National Taiwan University in 1945
- NO.1 University in Taiwan
- Location (main campus): Taipei

# The Building of Eco-house

## Timeline



# The Building of Eco-house

## The Eight Shaping Concepts

1. Safety
2. Comfort
3. Environmental Protection
4. Health
5. Energy Saving
6. Ecology
7. Wisdom
8. Culture & Human

# The Smart House

## Facts

- Location: Main campus of National Taiwan University, Taipei, Taiwan
- Occupying area: a three-stories house with garden; total area = 10,800 sq ft.
- Project Leader: Professor Han, Department of Bioenvironmental Systems Engineering
- Funds: NTU & sponsoring enterprises

# The Smart House

2009/9/20

NTU MAIN CAMPUS MAP

國立臺灣大學  
校總區地圖



- 捷運站 MRT
- 公車站 Bus Stop
- 汽車停車場 Vehicle Parking
- 機車停車場 Motorcycle Parking
- 急救站 First-Aid Station
- 廁所 Toilet
- 餐廳 Restaurant
- 金融機構 Bank
- 自動提款機 ATM
- 腳踏車店 Bicycle Shop
- 網球場 Tennis Court
- 籃球場 Basketball Court
- 排球場 Volleyball Court
- 游泳池 Swimming Pool
- 出入口(車輛可行駛) Vehicles Exit
- 出入口(僅供行人與腳踏車通行) Pedestrian/Bicycle Exit

Smart House at NTU

# Smart House Floor Plan: Features & Characteristics

## 1<sup>st</sup> Floor

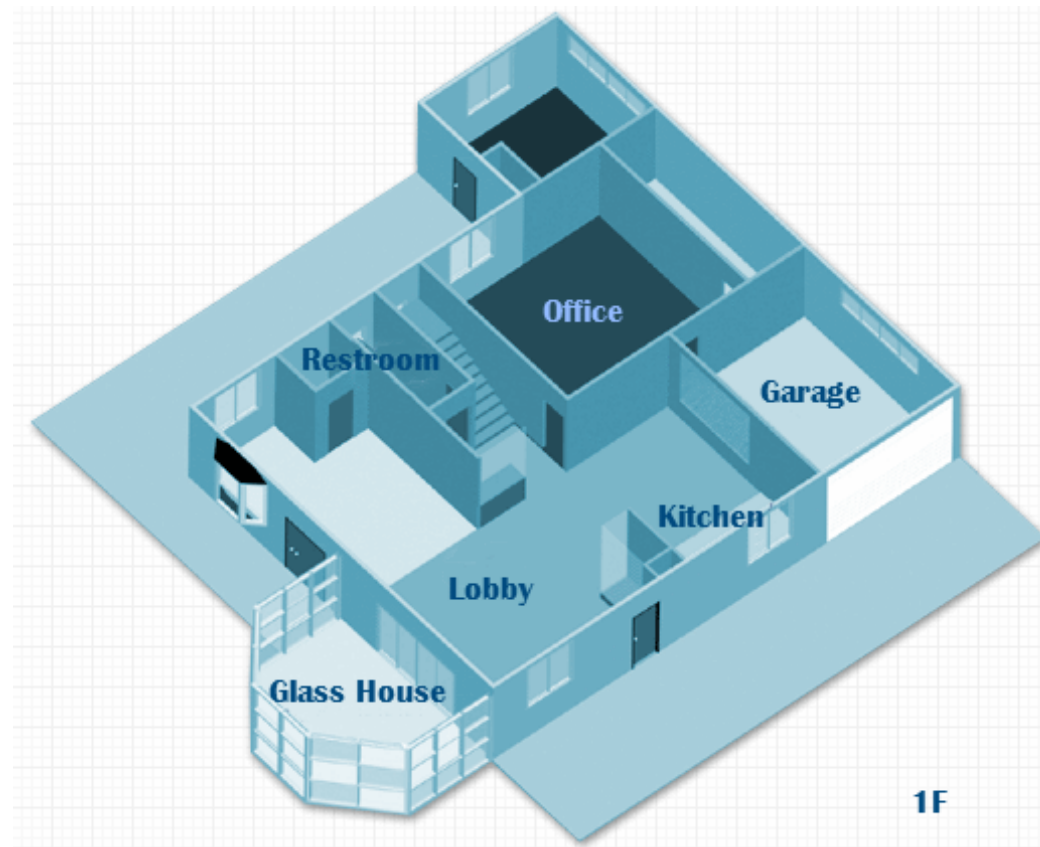
### a. The Glass House

- glass
- stratified glass with low radiation
- anion anti-fouling coating

### b. The Lobby

- solar-powered fiber optic light
- inward tilt-turn window
- energy saving lamps

### c. Nanometer Restroom



# Smart House Floor Plan: Features & Characteristics

1<sup>st</sup> Floor



# Smart House Floor Plan: Features & Characteristics

## 2<sup>nd</sup> Floor

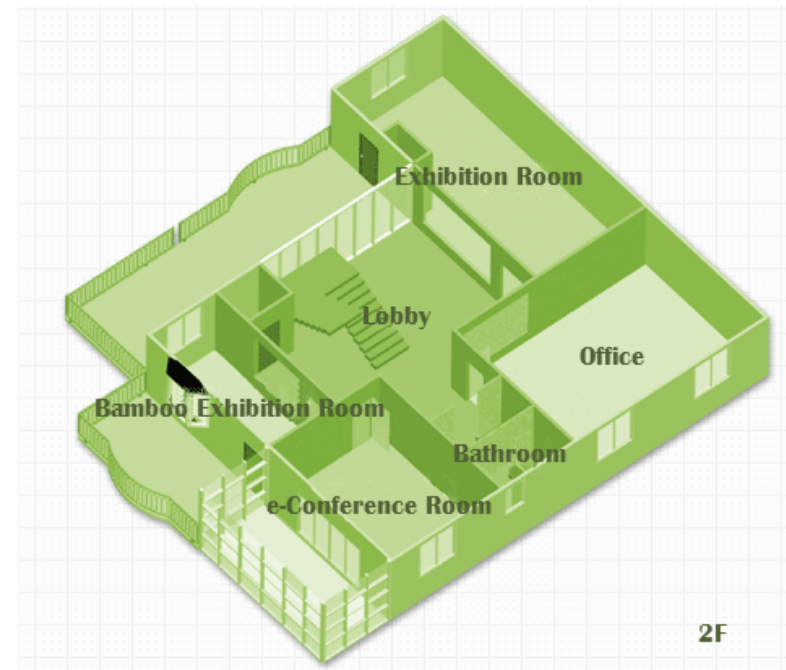
### a. Bamboo Display Room

- locally grown bamboo
- fast growing speed
- natural & sustainable

### b. Lobby

### c. Exhibition Room

- damper
- internal pipeline display: high safety cable
- sun light gathering device
- heat insulation testing



# Smart House Floor Plan: Features & Characteristics

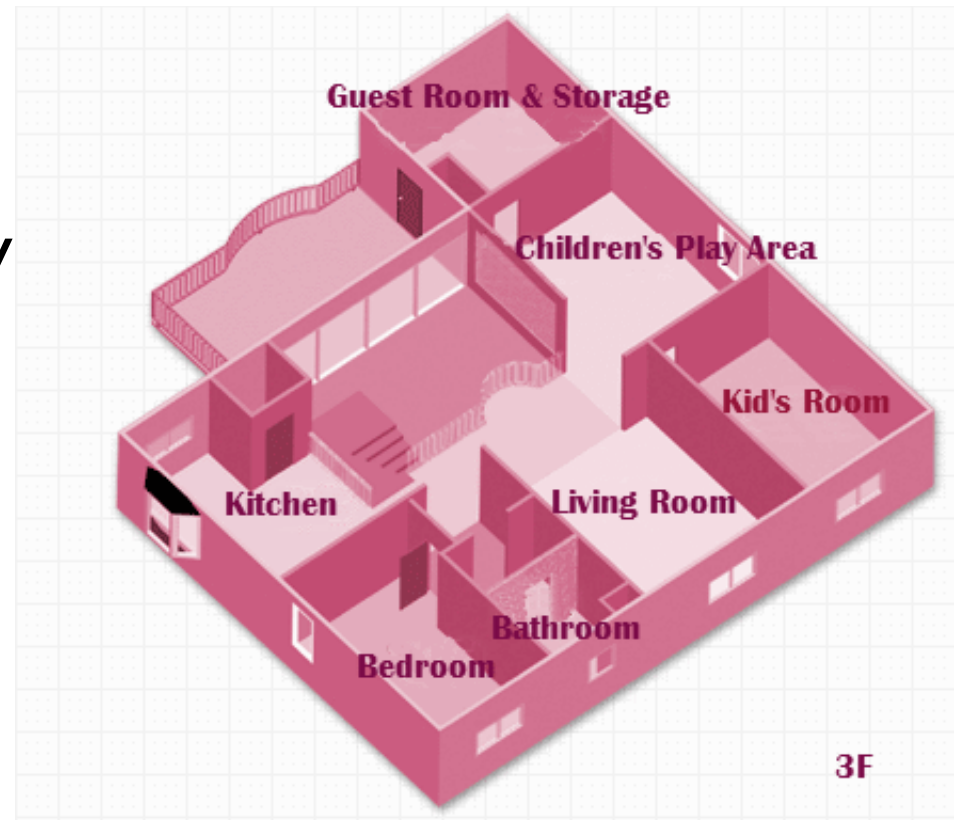
## 2<sup>nd</sup> Floor



# Smart House Floor Plan: Features & Characteristics

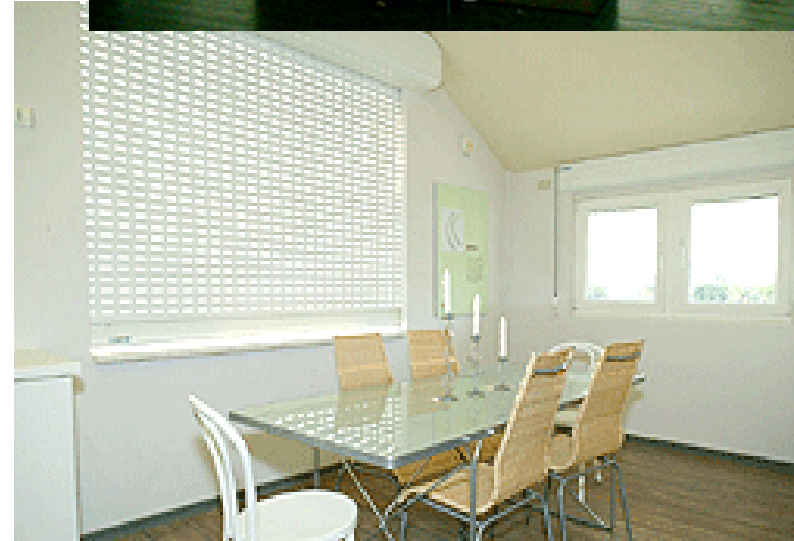
## 3<sup>rd</sup> Floor

Living area for  
classic three-  
generation family



# Smart House Floor Plan: Features & Characteristics

## 3<sup>rd</sup> Floor



# Smart House Floor Plan: Features & Characteristics

## Garden & Backyard

- a. Ecological pond
- b. Planting Design
- c. Small animals and insects habitat
- d. Permeable pavement
- e. Rainwater Recycle System

# Smart House Floor Plan: Features & Characteristics

## Garden & Backyard



# Checklist: Smart House and the Top Ten Measures

- American Institute of Architects
- Top Ten Award Winners
- Evaluated based on Top Ten Measures:
  - Measure 1: Sustainable Design Intent & Innovation ———> Demonstration Project; The Eight Concepts
  - Measure 2: Regional/Community Design & Connectivity ———> Earthquake Resistant

# Checklist: Smart House and the Top Ten Measures

- ☑ Measure 3: Land Use & Site Ecology → Ecological ponds; On-site ecosystems
- ☑ Measure 4: Bioclimatic Design → Sun-light gathering;
- ☑ Measure 5: Light & Air → Ventilation Sys.
- ☑ Measure 6: Water Cycle → Rainwater Recycle
- ☑ Measure 7: Energy Flows & Energy Future → Heating, Cooling, Lighting, Water Heating

# Checklist: Smart House and the Top Ten Measures

- ☑ Measure 8: Materials & Construction ———→  
Steel; Bamboo
- ☑ Measure 9: Long Life, Loose Fit ———→  
Ecological, Social, Economic Values
- ☑ Measure 10: Collective Wisdom & Feedback  
Loops ———→ Seminars, Exhibitions, Educational  
Events

# Smart House Today: Current Situation

## Guided Tour

--individuals/groups

--8 USD

## Project Demonstration

--companies vs. consumers

## Seminars & Educational Events

## Implications: Reconstruction of 921 Earthquake

# Intent vs. Outcome & The Future of the Smart House

## Intent: 1998

- 70<sup>th</sup> Anniversary of National Taiwan University
- Demonstration project for “Energy Saving” and “Earthquake Resistant”

## Final Outcome: 2003

- A completed demonstration house with various functions

## Future:

- Inspiration for green buildings in Taiwan and Asia



**Thank You!**

Q & A