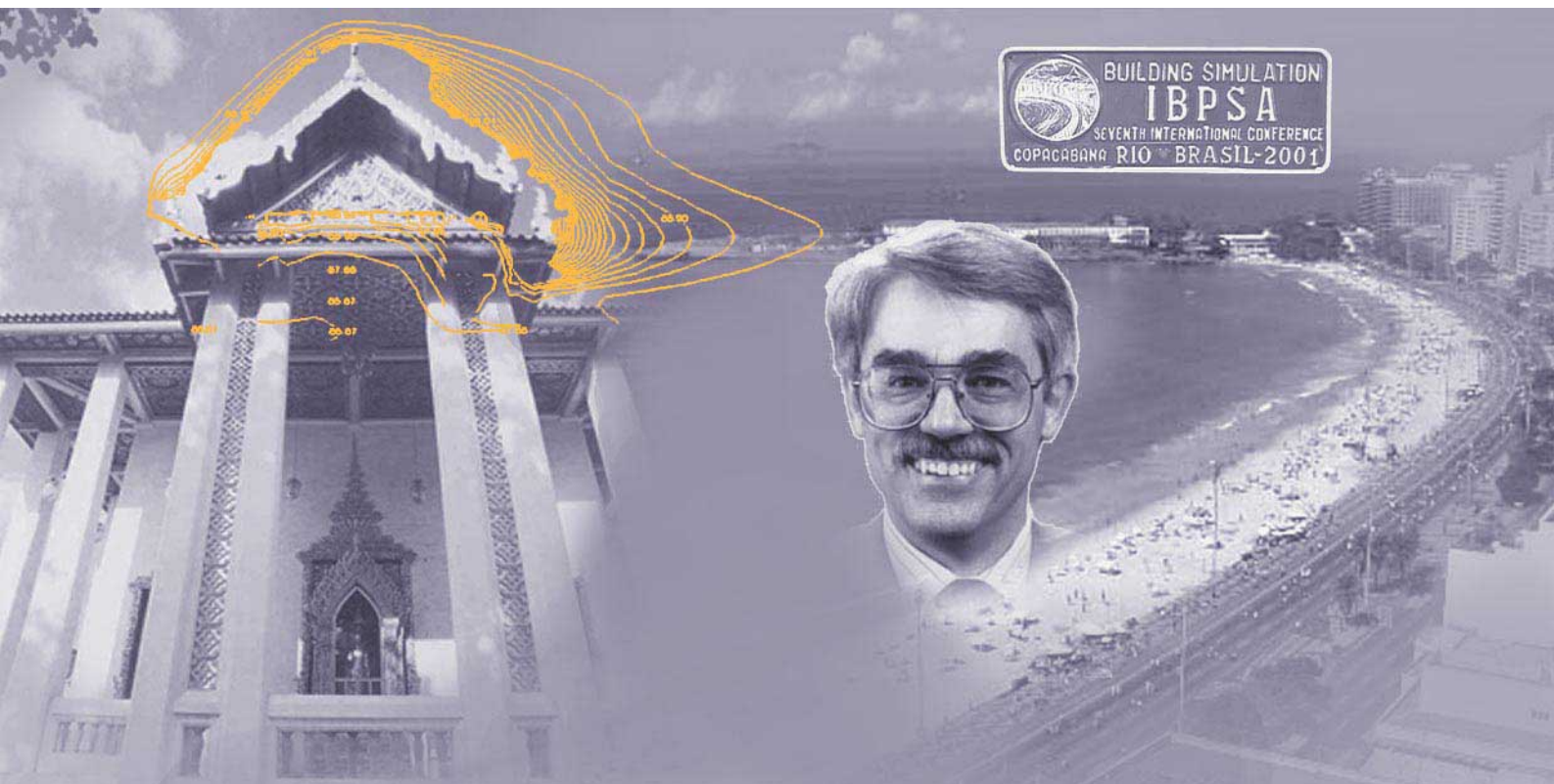
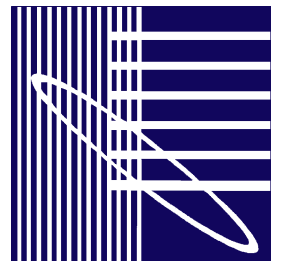


# *ibpsa*NEWS

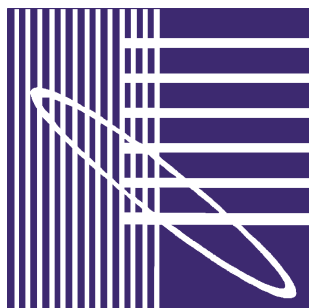
volume 12 number 1  
spring 2002



[www.ibpsa.org](http://www.ibpsa.org)



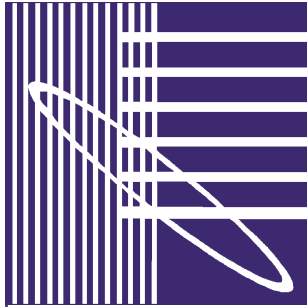
*The journal of the International Building Performance Simulation Association*



# Contents

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<b>IBPSA contacts</b>	<b>2</b>
IBPSA Central contacts	2
IBPSA Regional affiliates	3
IBPSA Management Board	5
<b>Building Simulation '01</b>	<b>6</b>
<b>Other forthcoming events</b>	<b>9</b>
Building Simulation '03, Eindhoven	9
TRNSYS events	10
DMinUCE conference, November 2002, London	11
6 <sup>th</sup> International SSB conference, December, 2002, Liège	12
<b>IBPSA Awards</b>	<b>13</b>
Distinguished Service award - Ed Sowell	13
Award photos	14
Outstanding Young Contributor award - Ian Beausoleil-Morrison	15
<b>Announcements</b>	<b>16</b>
<b>News from IBPSA Slovakia</b>	<b>17</b>
<b>Software news</b>	<b>18</b>
TRNSYS World-wide	18
VisualSPARK 1.0.1	19
ASHRAE Standard Method of Test	22
<b>Case study</b>	<b>24</b>
Improving thermal comfort in a Thai Buddhist temple	24
<b>IBPSA Board business</b>	<b>27</b>
Forthcoming Board elections and By-laws changes	27
<b>TRNSYS conference and training details</b>	<b>28</b>
Details of recent TRNSYS user's day, Barcelona	28
Details of recent TRNSYS training course, Barcelona	30
<b>Forms:</b>	<b>34</b>
IBPSA Central Membership form	34
IBPSA Publications order form	35
IBPSA Regionalization Guide	36



The International Building Performance Simulation Association (IBPSA) exists to advance and promote the science of building performance simulation in order to improve the design, construction, operation and maintenance of new and existing buildings worldwide.

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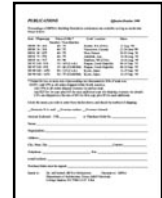
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IBPSA Central membership form



Publications order form

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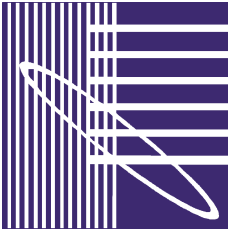
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## IBPSA Website

For full information on how to order IBPSA's publications, or to look at Proceedings of past IBPSA Building Simulation conferences or past IBPSA Newsletters, please look on the IBPSA Website at: [www.ibpsa.org](http://www.ibpsa.org).



# IBPSA Regional affiliates

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For information on joining IBPSA, please contact your nearest regional affiliate. If there is no affiliate in your region, join IBPSA by using the Central membership form.



IBPSA Central  
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form

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(continued on next page)



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---

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### IBPSA-UK (BEPAC):

BEPAC has now closed down, but UK building simulationists are welcome to join IBPSA by becoming members of the new affiliate, **IBPSA-Scotland**. Individual membership is currently free of charge.

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# IBPSA Management Board

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# Building Simulation

13-15 August 2001  
Rio de Janeiro - Brazil

## Seventh International IBPSA Conference

Report by Jan Hensen, Center for Building & Systems, Technische Universiteit Eindhoven



BS'01 website containing  
photos and list of conference  
delegates

The 7th International IBPSA Conference in Rio de Janeiro, 13 - 15 August 2001, was a big success both in terms of content and location (next to Copacabana beach !). The organizers did their utmost to maintain the standard of the Building Simulation conferences as the premier event in the field and the climate, surroundings and atmosphere made it an unforgettable Brazilian experience for all who participated in the conference and social program.

169 papers were presented in oral parallel sessions and 3 papers were presented as posters (at the authors' request); there were also 18 "non-commercial" software demonstrations. Some Rio '01 statistics, in comparison to Prague '97 and Kyoto '99:

	Prague	Kyoto	Rio
abstracts submitted	215	286	288
abstracts accepted	204	285	279
manuscripts submitted	134	194	186
papers presented	120	183	175



IBPSA website with full list of  
papers and more photos

There were 3 keynote presentations: **Building Simulation in Brazil** by Nathan Mendes, Roberto Lamberts and Jos. A. Bellini da Cunha Neto, **Building Simulation Trends going into the new Millennium** by Godfried Augenbroe, and **Issues on the Integration of CFD to Building Simulation Tools** by Clovis R. Maliska.

You will find a list of delegates and lots more photos of the conference on the conference website (<http://www.labeec.ufsc.br/bs2001/> or use link at left). For a full list of paper titles and a different selection of photos, visit <http://www.ibpsa.org/conferences.htm> or go to [www.ibpsa.org](http://www.ibpsa.org) and follow the conferences link.

Over the page you will also find some photos which are *not* on the websites. To order proceedings from BS'01 use the **publications order form** at the back of this IBPSA News.

The two IBPSA Award winners for 2001 were announced at the conference and their awards were presented. See **pages 13 - 15** for details and photos of the award winners.



Publications  
order form



Roberto Lamberts, conference organiser



## Photos around Rio



Out and about Rio photos

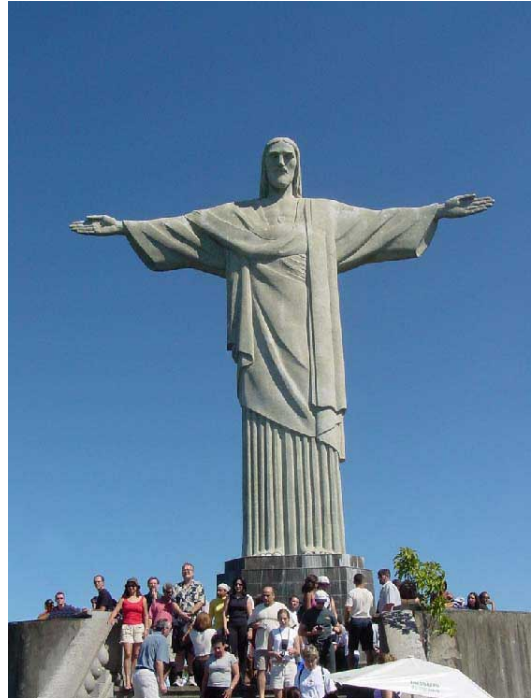
For pictures at the conference, point your browser at: <http://www.labeee.ufsc.br/bs2001/photos/photos.htm>

and for photos taken around the Rio region look at:

<http://www.ibpsa.org/riopictures.htm>  
and  
<http://www.ibpsa.org/riooutandaboutpictures.htm>

Here (and on the next page) are some additional photos not found on the websites. Enjoy!

Up close view of Cristo statue on Corcovada Mountain



Othon Hotel room view of Copacabana Beach





Street café view toward the Copacabana Beach



View back toward the ocean from Corcovado Mt.

# Building Simulation '03

**11 - 14 August 2003**

**Building Simulation 2003**

**8th International Building Performance Simulation Association**

**CONFERENCE + EXHIBITION**

**Eindhoven, Netherlands**

*Jan Hensen, Center for Building & Systems, Technische Universiteit Eindhoven*



BS'03 preliminary website

BS'03, the 8th international IBPSA conference, will take place at the university campus site of Technische Universiteit Eindhoven (TU/e) in the Netherlands on 11 - 14 August 2003. The campus is within walking distance of the city centre and the main hotels.

Not far from the TU/e, the “flying pins” are a real eye catcher. This monument has recently been set up with sponsorship from the city of Eindhoven and companies such as Philips and the TU/e. The flying pins symbolise the development of the city of Eindhoven. Just as the bowling ball is surrounded by pins, the city of Eindhoven has risen as the larger core separating itself from 5 smaller independent villages. The yellow colour of the pins reflects the yellow of the narcissus that is widespread in the immediate surroundings. The pins represent sport in general and not specifically bowling.

A nice touch of this work of art is that Dutch merchants introduced the game “Bowls” to America. Originally it was played on grass in a park in Manhattan. This park is still called “Bowling green” to this day.

The conference website (a preliminary site at the moment) at:

<http://www.bs2003.tue.nl/> has links to more general information about the venue and the location.



The “flying pins”  
near TU/e in Eindhoven

# Other forthcoming events

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## TRNSYS events

**There is more about  
TRNSYS in an article  
on page 18**

### **22 February 2002, German TRNSYS meeting, Stuttgart, Germany**

For information see the TRANSSOLAR website at <http://www.transsolar.com/>

### **25 February 2002, International TRNSYS user's day Barcelona, Spain**

This event will present (in English) the latest news for TRNSYS users, applications and related issues of international interest. Topics will be:

- Engineering TRNSYS applications: research or application projects using TRNSYS and related tools
- New models in TRNSYS: free components, commercial components
- Building simulation with TRNSYS and SIMCAD
- The Engineering Equation Solver EES and coupling with TRNSYS

Details of the Barcelona  
TRNSYS user's day

The deadline for registration is **8 February 2002**. [Click here](#) for full details of the User's Day, which are attached to this newsletter, or e-mail enquiries to [trnsys@aiguasol.com](mailto:trnsys@aiguasol.com). You can obtain a registration form at: <http://www.aiguasol.com> or by e-mail from [trnsys@aiguasol.com](mailto:trnsys@aiguasol.com).

### **26 February - 1 March 2002, TRNSYS training course, Barcelona, Spain**

Details of the Barcelona  
TRNSYS training course

The booking deadline for this course has now passed, but [click here](#) to see the full course details, which are attached to this newsletter, or e-mail enquiries to [trnsys@aiguasol.com](mailto:trnsys@aiguasol.com)

### **13 - 14 March 2002, TRNSYS training course, Tokyo, Japan**

For information e-mail [utsumi@miyagi-ct.ac.jp](mailto:utsumi@miyagi-ct.ac.jp).

### **1 - 2 July 2002, EES-TRNSYS Club meeting, Liège, Belgium**

As for last year, the EES-TRNSYS Days 2002 will deal with both teaching and research applications. The first day will deal with EES and the second day will cover TRNSYS. For a registration form for the meeting go to:

<http://www.ulg.ac.be/labothap/regfees.htm>

*Other forthcoming events*

**6<sup>th</sup> – 8<sup>th</sup> November '2002**  
**DMinUCE - The 3rd International Conference on Decision Making in**  
**Urban and Civil Engineering**  
**University of London, Russell Square, London**

**Construction Visualization and Animation Symposium**



DMinUCE website

Decision making is the central theme of this conference, and will be considered in relation to many areas associated with the design, construction, maintenance and demolition of civil and building projects.

Construction Visualization deals with 3D architectural models that are rendered in with finish detail to visualize the design of a building. The general purpose of a rendering is usually design and communication oriented and examples may include imagery for client and internal communication, project funding, and marketing. The Construction Visualization and Animation Symposium can include, but is not limited to digital rendering techniques, color theory in construction illustrations, walkthroughs, lighting and materials, marketing, and imagery for process assemblies.

This conference addresses issues pertaining to decision making in many aspects and fields associated with the design, construction, maintenance and demolition of civil and building projects. The conference provides a medium for the exchange of ideas, thoughts and experiences shared by a host of international researchers and practitioners from a diversity of disciplines within urban and civil engineering, and the built environment in general. The organisers hope it will act as a melting pot for shared ideas and will facilitate a better and more holistic understanding of the challenges faced by participants from different disciplines and the way in which they are approached.

The first conference of this series - Montreal'98 - emerged out of the recognition of the urgent need for a forum dedicated to decision-making tools in all fields relating to urban and civil engineering. The second conference - Lyon'2000 - further expanded this objective into all aspects of decision making methodologies and tools covering both hard and soft issues. For the third conference - London'2002 - the intention is to consolidate the prime objective of the conference by firstly expanding the multi-disciplinary nature of this area of concern, and secondly, by attempting to widen the international dimension of this community.

Please check the conference web site for full details: [www.serenade.org.uk](http://www.serenade.org.uk)

Abstracts (closing date 10 March 2002) may be submitted on-line: see [symposia] folder in the web site. The official conference language is English. Papers will be accepted in French if their Title, Abstract and Keywords are also submitted in English. Presentations will be in English only.

**16 - 18 December 2002**  
**6th International conference on System Simulation in Buildings**  
**Liège, Belgium**



SSB'2002 website

This 6th SSB conference, like the five previous ones, is organized in very close cooperation with the International Energy Agency group "Energy Conservation in Building and Community Systems" (IEA-ECBCS) and with the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). This conference will be, among other things, the occasion to present some final results from the IEA-ECBCS Annex 34 "Practical Applications of Fault Detection and Diagnosis Techniques in Real Buildings" and to deal with some aspects of the new Annex 40 "Commissioning".

The following topics will be considered in priority:

- modeling of HVAC components
- system simulation methods and tools
- application to commissioning
- application to energy management and to maintenance
- application to retrofit

The official conference language is English.

**Important dates to remember**

Abstracts due : **February 15, 2002**

Acceptance of abstracts notified, preliminary program and instructions sent to authors for papers : **March 30, 2002**

Paper manuscripts due : **June 1, 2002**

Notification of paper acceptance and final program : **September 4, 2002**

Final form of papers : **October 15, 2002**

Pre-prints sent to registered participants : **November 30, 2002**

Conference : **December 16-18, 2002**

**Conference Proceedings**

Abstracts of the papers will be available on the web site (<http://ltd27.meca.ulg.ac.be/ssb/>) before the conference. A CD-ROM with the papers will be forwarded to registered participants before the conference. All papers, along with questions and comments that are generated at the presentation, will be included in the CD-ROM of the conference. This CD-ROM will be forwarded to all participants. A printed version will be also available on request.

**Scientific Committee**

The Scientific Committee is chaired by Jean Lebrun (Belgium).



# IBPSA Awards

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## **IBPSA Distinguished Service Award Presented to Professor Edward F. Sowell, Ph.D., P.E.**

*“Professor Sowell has played a crucial role in the formation and development of IBPSA”*

IBPSA President Roger Pelletret was delighted to present the IBPSA Distinguished Service Award to Professor Ed Sowell, IBPSA's Founding President, at the BS'01 conference in Rio. Professor Sowell has had a distinguished career in engineering and computer science over nearly 40 years and has contributed significantly to the advancement of building simulation in two complementary ways — (1) he has developed and promoted innovative technical approaches and methods, and (2) he has played a key role in the evolution of IBPSA from a fledgling body to an established international organization.

Ed's pioneering technical achievements include:

- The **LIGHTS** program: a general purpose network program for modeling the thermal effects of short wave, long wave and air flow in enclosed spaces.
- The **Neutral Model Format**: developed in collaboration with Per Salin, the NMF provides a standard method of describing models in machine-readable format, enabling archiving and porting between simulation environments.
- The **SPARK** program: an equation-based simulation environment that uses graph-theoretic methods to reduce the computational load associated with dynamic non-linear problems. A number of people have made significant contributions to the development of SPARK. However, Professor Sowell both originated the key ideas and has guided, and continues to guide, the development of the program architecture and methods.

In every instance, he applied methods developed in the domain of computer science to expand significantly the capabilities of the simulation tools of the day. The ideas he introduced may ultimately enjoy wider use in implementations other than those mentioned above; this is not uncommon when ideas and approaches are introduced ahead of their time.

Professor Sowell has played a crucial role in the formation and development of IBPSA. His effectiveness in guiding the organization through a number of difficulties can be attributed to his personal qualities, which include consistency of vision and action, integrity, a willingness to volunteer for arduous and often thankless tasks, and a wry sense of humor. He has also played a significant role in gaining acceptance of simulation-based calculation methods in ASHRAE through over a decade of service to the Energy Calculations and Loads Calculations Technical Committees.



Professor Ed Sowell

*See Roger Pelletret presenting the Award to Ed Sowell on next page!*



*President Roger Pelletret presents  
the Distinguished Service Award  
to Ed Sowell at the Awards  
Banquet*



*Ian Beausoleil-Morrison -  
Outstanding Young Contributor*

## Outstanding Young Contributor Award Presented to Ian Beausoleil-Morrison, PhD

Ian Beausoleil-Morrison studied Mechanical Engineering at the University of Waterloo, Ontario, Canada, gaining B.A.Sc. and M.A.Sc. degrees, and worked at the Walters Consulting Corporation, Toronto, at the University of Waterloo, in the Energy Efficiency Division of Energy Mines and Resources Canada, and in the CANMET Energy Technology Centre at Natural Resources Canada before gaining his PhD from the University of Strathclyde, Scotland in the year 2000. He now works as Team Manager in Building Simulation Software at CANMET.

During his career Ian can claim a number of major scientific achievements:

- in the adaptive coupling of heat and air flow simulation, devising novel methods for characterising internal surface convection heat transfer and integrating detailed air flow and thermal simulation, and a new algorithm for modelling mixed convection caused by the dynamic interaction between buoyancy forces and HVAC system operation,
- in foundation energy transfer modelling, where he co-developed a methodology to characterize the thermal performance of residential foundations using finite-element calculations and led work on software to deliver the new technique to research and industry, developed a physically-based regression algorithm to predict foundation heat transfer within whole-building energy analysis programs, validated it against an Artificial Neural Network approach, and implemented the algorithm within the ESP-r and HOT2000 building simulation programs to make it available to the building industry,
- in development work towards a next generation simulation engine for HOT2000 (HOT3000), where he led the effort to identify appropriate simulation methodologies to characterize the relevant physical processes over the long term (next 15 years). As part of this work Ian devised and implemented methodologies to incorporate air infiltration, ground heat transfer, and innovative HVAC into ESP-r to enable comprehensive and highly resolved energy modelling of Canadian housing,
- in the development of the EE4 simulation software, where he formed a consortium of government agencies and energy utilities, secured \$600k funding, and led a team to develop the EE4 CODE to support Natural Resources Canada's financial incentive program for energy efficient commercial building design.
- in the development of building simulation software as a core expertise within CETC, now recognised nationally and internationally as a prominent player in the building simulation field.



Julia Purdy accepts the award  
on behalf of Ian Beausoleil-  
Morrison

Ian has also served on a number of technical and scientific committees and been an invited speaker at technical meetings and a session co-chairman at BS'99, in addition to having an extensive list of referred publications on energy simulation modelling, thermal algorithms, airflow in buildings, thermal envelopes, building foundations, software tools, neural networks, thermal mass characteristics and solar collector systems.

# Announcements

---

## **IBPSA-USA announces free membership for 2002**

*Rick Strand, IBPSA-USA Secretary*

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IBPSA- USA, at:  
[r-strand@uiuc.edu](mailto:r-strand@uiuc.edu)

The IBPSA-USA Board of Directors has waived the annual membership fee for 2002 and thus joining our organization is easier than ever. If you wish to become a member, please send an email with your name, company, mailing and email address, and phone and fax numbers to Rick Strand [r-strand@uiuc.edu](mailto:r-strand@uiuc.edu). You will receive a confirmation email to indicate that you have been accepted for membership. For more information on IBPSA or IBPSA-USA, please visit the IBPSA web site at <http://www.ibpsa.org>.

The IBPSA-USA Board also wishes to remind you of the following items:

1. Dues are \$0 for 2002, but dues may be reinstated in the future.
2. January 1, 2002 was the beginning of another two-year term for our Board of Directors. If you enroll as a member of IBPSA-USA on or before February 8, 2002, you are entitled to vote in our upcoming elections for the 2002-2003 term. If you have any nominations you would like to make for the Board, please contact Chip Barnaby [cbarnaby@wrightsoft.com](mailto:cbarnaby@wrightsoft.com) as soon as possible. The Board election will be held the week of February 11-15, 2002. Details on the slate of candidates and voting procedures will be forwarded to all members via email around February 11.
3. Reminder: our next meeting is currently scheduled for 4 PM on Saturday, June 22, 2002 in Honolulu. Please save that date and make your travel plans accordingly.

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## **Smithsonian Cooper-Hewitt National Design Awards for 2001**

*Professor Ralph Knowles, University of Southern California*

University of Southern California Professor Pierre Koenig, FAIA, is one of the three finalists for Architectural Design in the Smithsonian Cooper-Hewitt National Design Awards for 2001.

Pierre is one of this century's most influential architects, especially in southern California. He has been a professional architect for nearly 50 years and has worked in the Natural Forces Laboratory at USC since 1964 as well as continuing his practice. He has been Director of the NFL since 1980 and is still involved with teaching and research.

*(USC's website provides an extensive biography of Pierre Koenig's life and work at <http://www.usc.edu/dept/architecture/slide/koenig/bio.html> – Editor)*

# News from IBPSA Slovakia

*Josef Hraska, Slovak University of Technology, Bratislava.*

Contact Josef Hraska at  
[hraska@svf.stuba.sk](mailto:hraska@svf.stuba.sk)

IBPSA Slovakia currently has 32 members (not all are active). The core of IBPSA Slovakia is at the Slovak University of Technology in Bratislava.

Members of IBPSA Slovakia are active mainly in regional conferences where there are usually special sessions on building simulation.

In November 2001 7 members spoke at the International Conference "Sustainable Building & Solar Energy 2001" in Brno (Czech Republic) and 10 members spoke at the International Conference "Indoor Climate of Buildings 2001" in High Tatras (Slovak Republic).

We are now developing a web page.

Our main problem is lack of finance for universities and research in Slovakia. Slovakia has the smallest budget for those purposes of all the OECD countries.

# Software news

## TRNSYS World-wide

Werner Keilholz, CSTB, France

TRNSYS is a complete and extensible simulation environment for the transient simulation of systems, including multi-zone buildings. Available since 1975, TRNSYS has become a reference in the simulation world over the last 25 years. The IISiBat simulation environment driving the TRNSYS engine makes it rapidly accessible to novice users.

Unlike many simulation tools on the market today, TRNSYS allows the user to completely describe and monitor all interactions between system components. In addition, the simulation may be performed at user-specified time-steps ranging from several hours to several seconds (depending on the process being studied). The modularity of the program allows the user to have as many pumps, chillers, cooling coils, solar collectors, etc. as necessary, in any desired configuration.

The modular nature of TRNSYS gives the program tremendous flexibility, and facilitates the addition to the program of mathematical models not included in the standard TRNSYS library. Since version 15, new components can be added using any development environment capable of generating DLLs (FORTRAN, C, C++). It is even possible to use the Engineering Equation Solver EES to specify sub-problems. TRNSYS is able to execute EES at each time step to solve a given set of equations.

TRNSYS also features interfaces with other programs, such as the multizone air infiltration and pollutant transport simulation software COMIS (cf. September issue of AIR) or the CAD tool SimCad (allowing TRNSYS simulations to be run directly from the CAD environment, reusing DXF files for the building description).

The program comes with 60 standard components, modelling everything from HVAC equipment and detailed multi-zone buildings to controllers and solar collectors. Also included with purchase are component models for the input of weather information and forcing functions (such as occupancy profiles) and the output of system results. TRNSYS is also one of the few programs in the world where the building model operates in "temperature level control", allowing the true dynamic response of the building to be determined.

TRNSYS distributors organize frequent training courses at a range of locations world-wide; a recent course held in Madison, Wisconsin, USA and organized by TESS, one of the American TRNSYS distributors, (<http://www.tess-inc.com/>, email: [tessinc@tess-inc.com](mailto:tessinc@tess-inc.com)) covered both basic and advanced TRNSYS features and techniques and was geared for both the novice and experienced TRNSYS user. The next course will be in Barcelona, Spain on 26 February to 3 March, organized by Aiguasol (<http://www.aiguasol.com>, e-mail [trnsys@aiguasol.com](mailto:trnsys@aiguasol.com)). Details are attached [here](#). For information about training in your area, please contact the TRNSYS distributor closest to you. A complete list of TRNSYS distributors world-wide can be found at <http://www.trnsys.com>, and a demonstration version of TRNSYS (in English) is available on the website of the French distributor at: <http://software.cstb.fr/soft/form.asp?context=Tmsys&langue=us&imprimer=&destination=download.asp&m=ldo>.

**Upcoming TRNSYS events and courses world-wide are listed on page 10**

*TRNSYS ....  
tremendous flexibility...  
new components can be  
added using Fortran, C  
or C++ or even EES  
..... and TRNSYS  
interfaces with COMIS  
or SimCad*

TRNSYS distributors  
worldwide

Demonstration version of  
TRNSYS (in English)



## VisualSPARK 1.0.1

Now available free of charge from LBNL

Kathy Ellington, LBNL



VisualSPARK website

VisualSPARK 1.0.1 has just been released and is available free of charge from Lawrence Berkeley National Laboratory.

To download the program go to: <http://SimulationResearch.lbl.gov> > VisualSPARK

SPARK is an equation-based simulation environment that allows you to build customized models of complex physical processes by connecting calculation objects that represent system components like walls, fans, heat exchangers, chillers, ducts, mixing boxes, controls, etc. It is aimed at the simulation of innovative and/or complex building systems that are beyond the scope of whole-building programs like DOE-2 and EnergyPlus. VisualSPARK adds a graphical user interface to SPARK to simplify use of the program.

The main elements of VisualSPARK are:

- a user interface
- a network specification language
- graph-theoretic reduction methods to reduce the number of iteration variables
- a solver for solving simultaneous algebraic and differential equations
- a processor for graphically displaying results
- a model library of HVAC components and systems

With the network specification language you create equation-based calculation objects, and link the objects into networks that represent a building's envelope or HVAC components or systems. The solver solves this network for user-specified input parameters. With the results processor you graphically display the results of the calculation. Graph-theoretic reduction techniques automatically reduce the number of iteration variables, allowing VisualSPARK to obtain a solution 10 to 20 times faster than similar programs.

VisualSPARK runs under the Windows 95/98/NT/2000, SunOS, Solaris and Linux operating systems. Improvements in VisualSPARK 1.0.1 include:

### Changes to the graphical user interface

- New examples have been added to the tutorial.
- Version number now appears in all window title bars.
- Balloon messages have been added to the Component Preference Editor.
- Layout of the Component Preference Editor has been changed to a more logical format with parts enabled only when they are allowable.
- Multiple trace files are now allowed, one for each trace type.
- Time units have been added to the X-axis title on graphs.
- Multiple units (e.g. "[W, deg C]" ) have been added to Y-axis titles on graphs.
- Graph lines are now thicker to improve visibility.



- On graph legends, curves that are mapped to the Y2 axis are grouped after curves mapped to the Y1 axis.
- Yellow curve color has been changed to gold for visibility.
- The run.log file now pops up in addition to the error.log file if there is a run-time problem while running the solver

### Changes to documentation

- The separate Windows and Unix Installation and Usage Guides have been combined into a single document called the "VisualSPARK 1.0.1 Users Guide."
- The Users Guide now contains an extended tutorial that shows step-by-step how to set up a SPARK model of an air-conditioned room with a PI temperature controller.

### Changes to input language parser

- The LINK statement now creates a variable without specifying any connections.
- The PORT statement has a new keyword of the form LIKE=anotherPortName. This copies the properties (including the subports) of the port named 'anotherPortName', to the port currently being defined.

### Changes to the setup program

- The format of the problem.cpp file generated by setup has been modified to support the runtime loading scheme. See "Changes to Solver" for more details.

### Changes to the solver

- A runtime loading scheme has been added to solver in order to load the problem description contained in the problem.cpp file at runtime, during startup, as opposed to during the compilation step. This overcomes a compiler limitation that was encountered with large SPARK problems and also provides a faster way of loading problems during the problem testing phase. VisualSPARK can now be used to solve very large problems consisting of a thousand or more equations.
- The scaling scheme was modified to compute the weighted Euclidean norm of the residual function that is displayed to the cout stream in the detailed diagnostic mode. The scale is now the absolute value of the break variable instead of the arithmetic mean of the value of the break variable and of the value returned by the inverse associated with the break variable. Thus, the residual norm is no longer limited to a maximum value of 2. This new scaling scheme also improves the line-search backtracking step control. The time units of the Clock and DT links are now overridden with the corresponding unit strings specified in the problem run file. This allows the correct units to be displayed in the header portion of the output, trace and snapshot files.
- In the computation of the Secant method (based on the Broyden's update

formula), fixed a bug that was returning a constant positive value for any negative partial derivative.

- Input files are now checked at runtime to make sure that the time stamps for the input values are specified in increasing order.
- The SPARK library functions defined in the file spark.h are now declared as part of the SPARK namespace (still in the same header file). This is to avoid potential name collision with user-defined functions in the atomic classes. The atomic classes defined in the globalclass directory and in the hvactk/class directory have been modified accordingly by adding namespace scope resolution before the function names.



If you would like to get an idea of what the program does before you download it, you can review the "SPARK Reference Manual" and the "VisualSPARK Users Guide," which can be downloaded from the VisualSPARK site. To obtain a free copy of the program and/or review the documentation, go to: <http://SimulationResearch.lbl.gov> > VisualSPARK

Note that you do not have to already have VisualSPARK 1.0 to obtain VisualSPARK 1.0.1.

SPARK was developed by the LBNL Simulation Research Group and Ayres Sowell Associates, with support from the U.S. Department of Energy, Dru Crawley, program manager.

## Evaluating Building Energy Analysis Software ASHRAE Standard 140

*Contributed by Ron Judkoff of the National Renewable Energy Laboratory and Joel Neymark of J Neymark & Associates. Ron Judkoff is the Chair, and Joel Neymark the Vice Chair, of the ASHRAE Standing Standard Project Committee responsible for ANSI/ASHRAE Standard 140-2001*

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) in conjunction with the American National Standards Institute (ANSI) has recently published ANSI/ASHRAE Standard 140-2001, Standard Method of Test for the evaluation of Building Energy Analysis Computer Programs.<sup>1</sup> These standard test procedures apply to building energy computer programs that calculate the thermal performance of a building and its mechanical systems. While these standard test procedures cannot test all algorithms within a building energy computer program, they can be used to indicate major flaws or limitations in capabilities.

The current set of test cases included in Standard 140 emphasizes heat transfer associated with the fabric of the building, and are especially useful for testing detailed hourly whole-building energy simulation programs. These test cases are based on *International Energy Agency Building Energy Simulation Test and Diagnostic Method (IEA BESTEST)*<sup>2</sup> published in 1995 by the National Renewable Energy Laboratory (NREL) in conjunction with the International Energy Agency (IEA).

ASHRAE lists the cost of Standard 140 as \$64 for ASHRAE members and \$80 for non-members.

Although Standard 140 is easier to use than IEA BESTEST, the original 1995 version of IEA BESTEST published by NREL contains information not published in Standard 140 including:

- Frontmatter discussion of validation methodologies, theory, and a summary of building energy simulation validation research conducted through 1995
- A full report on bugs found in software tested during the original field trials of IEA BESTEST
- Simulation modeler reports done by all of the IEA Solar Heating and Cooling Programme Task 12 participants who tested software in the field trials
- Interpretation of the simulation results.

Other building energy simulation tests available from NREL are:

- HERS BESTEST<sup>3</sup>: which also tests building envelope heat transfer models, but is designed for testing simplified building energy simulation software such as those designed for use with many Home Energy Rating Systems
- Florida-HERS BESTEST<sup>4</sup>: a version of HERS BESTEST for hot and humid climates
- HVAC BESTEST Volume 1<sup>5</sup>: which is currently designed to test performance-map based models of mechanical equipment – in this case a typical split system air conditioner (scheduled for release during November 2001).

Contact ASHRAE at:  
Tel: 1 800 527 4723 (toll free  
within the U.S.)  
Tel: 1 404 636 8400 (from  
anywhere)  
Web: [www.ashrae.org](http://www.ashrae.org)

To obtain the original IEA  
BESTEST or any of the other  
BESTESTs, simply send a  
request for the specific  
BESTEST procedure you  
wish to have to:  
[ron\\_judkoff@nrel.gov](mailto:ron_judkoff@nrel.gov) and  
[diane\\_littau@nrel.gov](mailto:diane_littau@nrel.gov).

The table below summarizes which tests are appropriate for which kinds of software.

To obtain the original IEA BESTEST or any of the other BESTESTs, simply send a request for the specific BESTEST procedure you wish to have to:  
[ron\\_judkoff@nrel.gov](mailto:ron_judkoff@nrel.gov) and  
[diane\\_littau@nrel.gov](mailto:diane_littau@nrel.gov).

Test Suite	Simulation Software (time-steps of 1 hour or less)	Simplified Software (bin, DD, correlation, etc.)
ASHRAE Standard 140	X	
IEA BESTEST	X	
HVAC BESTEST	X	
HERS BESTEST	X	X
Florida-HERS BESTEST	X	X

The authors of ASHRAE Standard Method of Test 140 would like to hear about your experience in using the test method. They are especially interested in hearing about software bugs that were discovered and/or corrected as a result of applying the test method.

Please email your comments to Ron Judkoff and Joel Neymark at:  
[ron\\_judkoff@nrel.gov](mailto:ron_judkoff@nrel.gov) and  
[neymarkj@qwest.net](mailto:neymarkj@qwest.net).

Standard 140 has been approved by ASHRAE for continuous maintenance. The Standard provides a framework for all elements of an overall building energy software validation methodology including analytical, comparative, and empirical tests. Please send Ron and Joel information about new test suites or empirical data sets suitable for use in the validation/diagnosis of software. These will be considered by the SSPC 140 Standing Committee for inclusion in updates of Standard 140.

## References

- 1 ANSI/ASHRAE Standard 140-2001. (2001). *Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs*. Atlanta, GA: ASHRAE.
- 2 Judkoff, R.; Neymark, J. (1995a). *International Energy Agency Building Energy Simulation Test (BESTEST) and Diagnostic Method*. NREL/TP-472-6231. Golden, CO: NREL.
- 3 Judkoff, R.; Neymark, J. (1995b). *Home Energy Rating System Building Energy Simulation Test (HERS BESTEST)*. NREL/TP-472-7332. Golden, CO: NREL.
- 4 Judkoff, R.; Neymark, J. (1997). *Home Energy Rating System Building Energy Simulation Test for Florida (Florida-HERS BESTEST)*. NREL/TP-550-23124. Golden, CO: NREL.
- 5 Neymark J.; Judkoff, R. (2001). *International Energy Agency Building Energy Simulation Test and Diagnostic Method for HVAC Equipment Models (HVAC BESTEST), Volume 1: Cases E100-E200*. Golden, CO: NREL. Draft. October 2001. (Final publication planned for November 2001.)

# Case study

## Improving thermal comfort in a Thai Buddhist temple

Atch Sreshthaputra, Ph.D. Candidate, Department of Architecture,  
Jeff S. Haberl, Associate Professor, Department of Architecture, and  
Malcolm J. Andrews, Associate Professor, Department of Mechanical Engineering,  
all at Texas A&M University, USA

*“Thai Buddhist temples  
...do not use air-  
conditioning.....(so they)  
.....must rely on  
natural ventilation to  
obtain comfort  
conditions”*

*“...old temple designs  
maintain indoor  
temperatures well  
above acceptable  
comfort ranges for most  
parts of the year.....  
.....these conditions are  
made worse in the new  
temple design, which  
was constructed  
without proper  
insulation or shading”*

In hot-humid climates, particularly in developing countries, the use of air-conditioners is becoming common in residential and commercial buildings. However, there are buildings (e.g., Thai Buddhist temples) that do not use air-conditioning systems for various reasons, including economic hardship and religious constraints. Therefore, the buildings must rely on passive cooling by means of natural ventilation to obtain comfort conditions, even though it is difficult to accomplish because of high levels of moisture in the air, which causes occupant discomfort.

Currently, the authors have been studying the thermal comfort and calculated airflow of a 100-year-old Buddhist temple located in Bangkok. The goal of this research is to improve comfort conditions inside the building by means of new design strategies and improved operating procedures. Two building simulation tools, the DOE-2 program and CFD, have been extensively used in this investigation. In order to validate the

simulation models, local measurements of the indoor and outdoor environmental conditions were obtained during 1999. Then, the heat transfer characteristics of this traditionally designed temple are reviewed and compared with modern designs using measurements. During the course of this study, it was found that the old temple designs maintain indoor temperatures well above acceptable comfort ranges for most parts of the year, due in part to its high-mass construction. Humidity is also a major problem that causes not only human discomfort, but also physical damage to the precious interior decorations due to mold and mildew. Unfortunately, these conditions are made worse in the new temple design, which was constructed without proper insulation, or shading.



Pathumwanaram Buddhist temple,  
Bangkok - “a place of lotuses”

*“DOE-2 .. was used to study the ventilation effect...(in)...the temple space and an ...(adjacent).. attic”*

To simulate this, the DOE-2 program was used to study the ventilation effect by specifying two adjacent unconditioned spaces, which include the temple space and an attic.

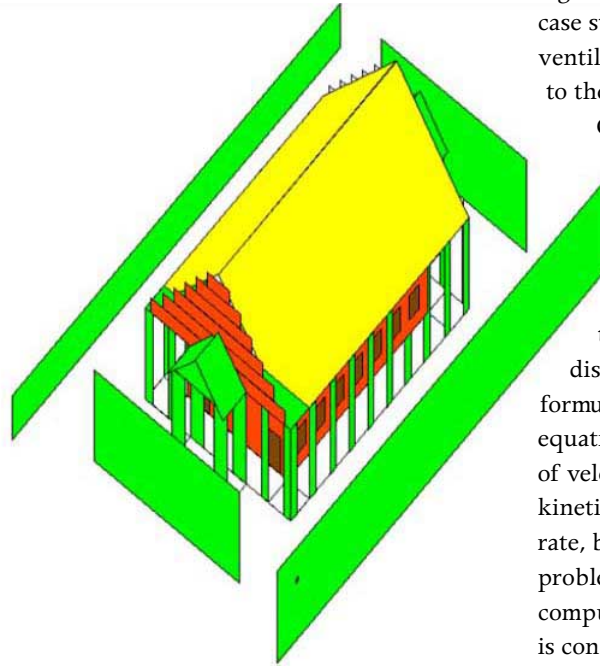


Figure 1: A DRAWBDL plot of the case study temple showing adjacent buildings

Figure 1 shows a DRAWBDL plot of the case study temple. The estimated ventilation/infiltration rates supplied to these spaces were calculated by a CFD program named HEATX, which was developed by one of the authors. The HEATX code employs a modified two-equation k- $\epsilon$  turbulence model with source terms for turbulence generation and dissipation due to buoyancy. The formulation involves solving equations for pressure, 3 components of velocity, temperature, turbulence kinetic energy, and its dissipation rate, both for steady and transient problems. The total number of computational cells is 313,000, which is considered a high number of computational cells by current CFD standards.

*“.....a typical steady state computation takes 2 days of CPU time on a Pentium III PC computer, dedicated solely to this task”*

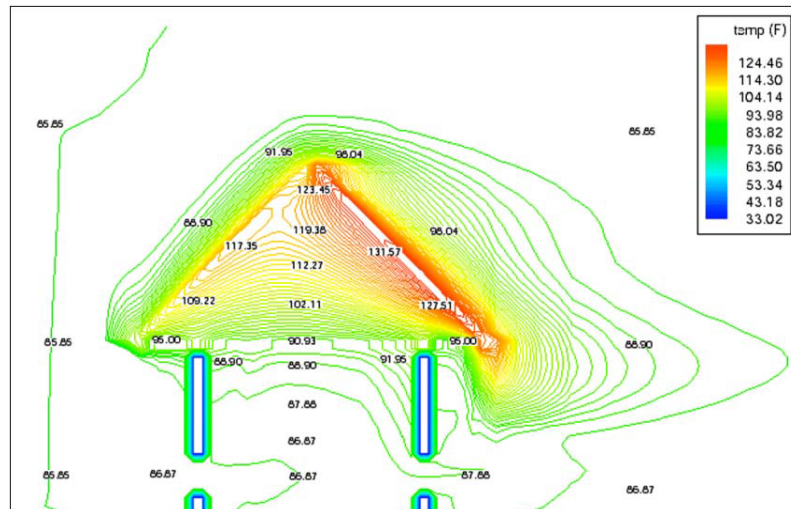


Figure 2: HEATX simulation results showing a temperature distribution plot of the solar heated attic of the case-study temple

For the temperature calculations presented in Figure 2, a typical steady state computation takes 2 days of CPU time on a Pentium III PC computer, dedicated solely to this task.



*“the simulated hourly indoor temperatures have good agreement with measured data throughout the year”*

The overall thermal performance of the case-study temple is presented in Figure 3, which compares the calibrated DOE-2 and CFD simulations with local measurements. It indicates that an effort to combine DOE-2 and CFD to simulate the case-study temple is successful since the simulated hourly indoor temperatures have good agreement with measured data throughout the year. The coefficient of variation in terms of root mean squared error (CV-RMSE) was used as a measurement of error between the simulated and measured values. The CV-RMSE of the simulation model is 1.83 %.

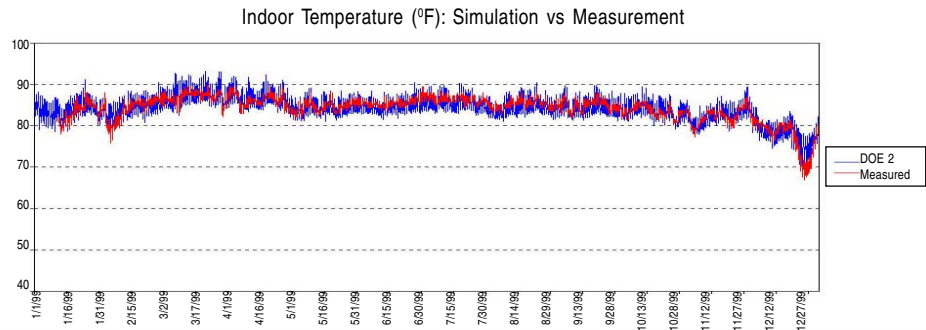


Figure 3: Comparison of hourly-simulated and measured space temperatures for a one-year period

*“comfort conditions can be improved with several design and operation strategies”*

Once a calibrated simulation model has been developed, it will then be used to obtain a better understanding of how the building performs thermally, including new design strategies and changes to operational modes. The effects of various design and operation strategies were then simulated with measured weather data during the same period, and compared with the original design as presented in Figure 4. Preliminary results indicate that the comfort conditions can be improved with several design and operation strategies, including: a low-absorptivity roof surface, ceiling insulation, solar shading, attic ventilation, and night ventilation of the temple space.

SUMMER DAYS: Indoor Temperature, Night Ventilation

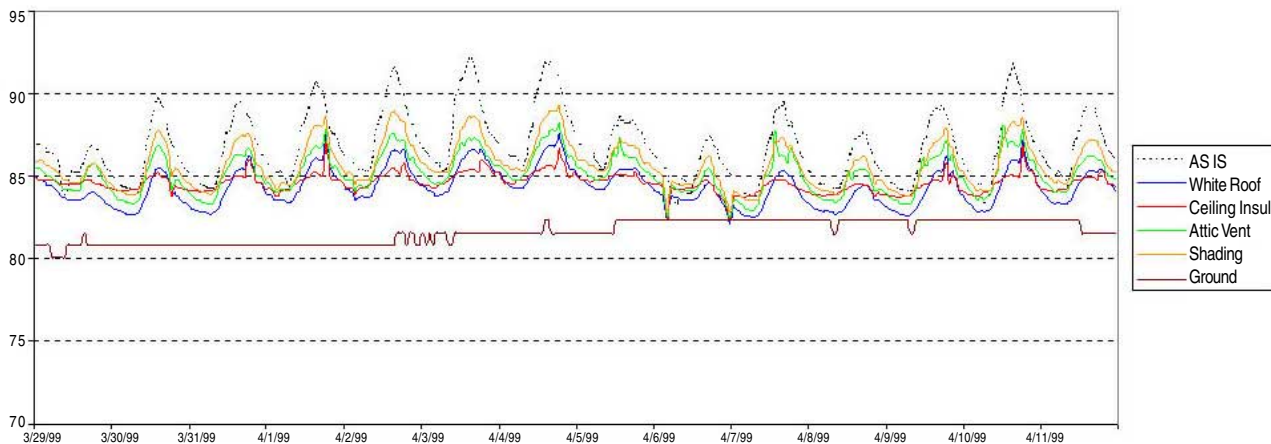
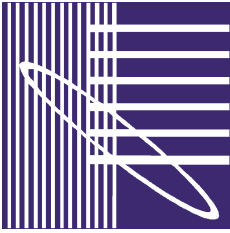


Figure 4: The effects of new design and operation strategies as compared with the original design. This figure shows preliminary results of the DOE-2/CFD simulations including the results of several new design strategies and the measured floor temperatures of the temple



# IBPSA Board business

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## **Forthcoming Board elections and By-laws changes**

Elections of Board officers and changes in by-laws will be announced soon. IBPSA members are asked to watch their e-mails for these.

*This edition of ibpsaNEWS was designed and produced by David Bartholomew Associates, U.K., [marion.dba@btinternet.com](mailto:marion.dba@btinternet.com)*

*© International Building Performance Simulation Association 2002*

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## **INTERNATIONAL TRNSYS USER'S DAY**

### **February, the 25<sup>th</sup> 2002, Barcelona**

#### **Announcement and Call for contributions**

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**AIGUASOL ENGINYERIA** is very pleased to announce the holding of the **INTERNATIONAL TRNSYS USER'S DAY** in Barcelona, Spain.

The exciting and comprehensive Day program will present the latest news for TRNSYS's users, applications and related issues of international interest. Topics will be:

- Engineering TRNSYS applications: research or application projects using TRNSYS and related tools
- New models in TRNSYS: free components, commercial components
- Building simulation with TRNSYS and SIMCAD
- The Engineering Equation Solver EES and coupling with TRNSYS

#### **AGENDA**

Provisional program is:

<b>INTERNATIONAL TRNSYS USER'S DAY</b>		
<b>Monday, February, 25<sup>th</sup> 2002</b>		
09:00 – 11:00	SESSION 1	<b>News in TRNSYS</b>
11:00 – 11:30	COFFEE BREAK	
11:30 – 13:30	SESSION 3	<b>TRNSYS Applications</b>
13:30 – 15:00	LUNCH	
15:00 – 16:00	SESSION 4	<b>Building Simulation</b>
16:00 – 16:30	COFFEE BREAK	
16:30 – 17:30	SESSION 5	<b>EES and coupling with TRNSYS</b>

The language of the Conference is English (no translation facilities will be provided)

#### **PARTICIPANTS**

Participants which has confirmed their contribution to the Conference are:

- **Prof. William A. Beckman**, Director of the Solar Energy Laboratory (SEL), University of Wisconsin- Madison, USA
- **Michael Kummert**, TRNSYS Engineer, SE, USA.
- **Dr. Werner Keilholz**, CSTB, France
- **Torsten Welfonder**, TRANSSOLAR GmbH, Germany
- **Prof. Jean Lebrun**, Laboratoire de Thermodynamique, Université de Liège, Belgium
- **Dr. Hans Schweiger**, AIGUASOL Enginyeria, Spain

## REGISTRATION

The registration fee is 120 € (Euros).

The fee includes registration, refreshments, lunch and proceedings of the conference.

Deadline for registration is **February The 8<sup>th</sup> 2002.**

Registration form can be found in the web page: <http://www.aiguasol.com> or it can be requested sending an E-mail to [trnsys@aiguasol.com](mailto:trnsys@aiguasol.com).

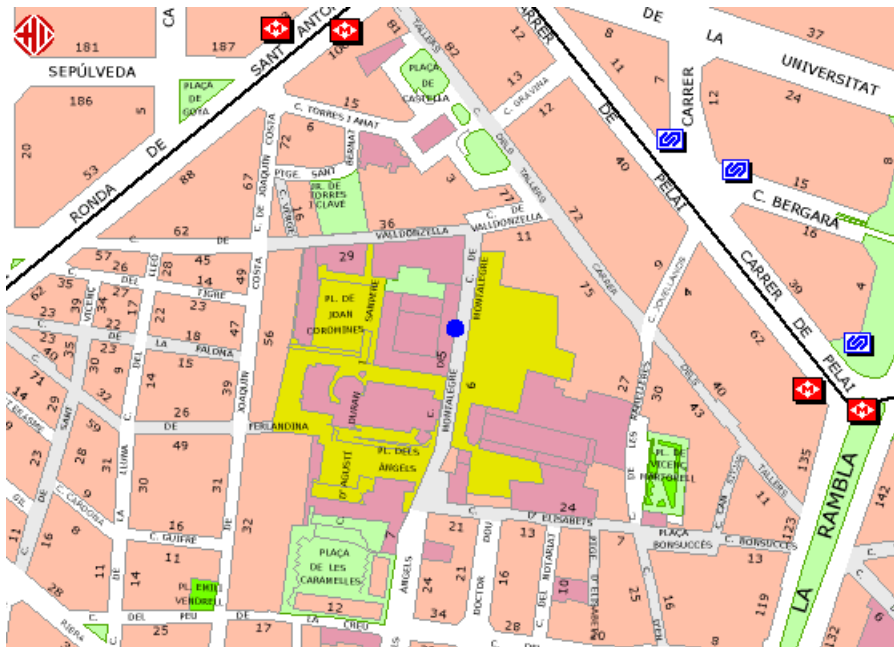
## CONTRIBUTIONS

If you are TRNSYS user, your contribution is welcome. Please, send your contribution proposal **before January the 25<sup>th</sup>, 2002** to: Dr. Jaume Salom, ([trnsys@aiguasol.com](mailto:trnsys@aiguasol.com))

## CONFERENCE VENUE

The **INTERNATIONAL TRNSYS USER'S DAY** will take place in Barcelona.

The exact location is **Pati Manning, C/ Montealegre, 7** in downtown, very close of the famous Rambla. The blue dot shows the location of the centre.



## ACCOMMODATION

The participants are to arrange their own accommodation. You will find all the information at the following web site: <http://www.bcn.es/english/ihome.htm>.

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## INTERNATIONAL TRNSYS & EES TRAINING COURSES

### From 02/26 to 03/01, 2002 in Barcelona, Spain

#### Announcement

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**AIGUASOL ENGINEYERIA** is very pleased to announce that the International TRNSYS & EES crew will be offering comprehensive TRNSYS & EES training courses in Barcelona, Spain. Two days are addressed to TRNSYS's users allowing them to go in deep on building simulation, creation of new TRNSYS components and creation of TRNSYS distributable programs. Other two days will cover both basic and advanced EES (Engineering Equation Solver) features and techniques and have been geared for both novice and experienced TRNSYS or EES users.

Participants are encouraged to attend the entire four days but are welcome to attend some of the days according their interest. Discounts will be given for multiple days and for multiple attendees from the same organization.

#### EXTENSIVE DOCUMENTATION

Training courses attendees will receive comprehensive documentation of the teaching sessions.

#### COMPUTERS

Each participant will have access to a computer throughout the course for hands on training. Programs will be installed on all the course computers.

#### TEACHING STAFF

Teaching staff is composed by a group of members of the International group of developers and distributors of TRNSYS & EES programs.

- **Prof. William A. Beckman**, Director of the **Solar Energy Laboratory (SEL)**, University of Wisconsin- Madison, USA. It was at the SEL where TRNSYS was born in 1975. The textbook **Solar Energy Thermal Processes**, by Beckman and emeritus chemical engineering Professor J. A. Duffie, is an outgrowth of research conducted in the Solar Energy Laboratory.
- **Michael Kummert**, TRNSYS Engineer, **SEL**, USA. Experienced user of TRNSYS
- **Werner Keilholz**, **CSTB**, France. Responsible for the graphical interface IISiBat for TRNSYS and also for the other programs as SIMCAD, CAD interface for building simulation. CSTB is French Distributor of TRNSYS and EES
- **Torsten Welfonder**, **TRANSSOLAR GmbH**, Germany. TRANSSOLAR is responsible of the development of TYPE 56 component of TRNSYS (Multi-zone building model) and Graphical Interface PREBID. TRANSSOLAR is an expertise company in the field of Thermal and Energetic analysis of buildings. TRANSSOLAR is German Distributor of TRNSYS & EES.
- **Jean Lebrun**, Laboratoire de Thermodynamique, **Université de Liège**, Belgium. Experienced TRNSYS & EES user. Distributor for TRNSYS & EES.
- **Jeff Thornton**, Thermal Engineering System Specialists, **TESS**, USA. Jeff has over 15 years experience using TRNSYS as a consulting tool. He was TRNSYS coordinator from 1991 to 1993. TESS is Distributor of TRNSYS in USA
- **David Bradley**, Thermal Engineering System Specialists, **TESS**, USA. He was TRNSYS coordinator during the past three years.



- **Jaume Salom, AIGUASOL Enginyeria**, Spain. Person in charge for TRNSYS Distribution and Technical Support for Spain and Portugal. AIGUASOL Enginyeria activities are centred in solar active systems and thermal building simulation.

## AGENDA

The courses will be organized with the following structure.

<b>Tuesday, February, 26<sup>th</sup> 2002</b>	
<b>ADVANCED BUILDING SIMULATION TRAINING COURSE</b>	
09:00 – 13:30	<b>ADVANCED FEATURES IN BUILDING SIMULATION</b> Torsten Welfonder
13:30 – 15:00	LUNCH
15:00 – 18:00	<b>BUILDING SIMULATION USING SIMCAD</b> Werner Keilholz

<b>Wednesday, February, 27<sup>th</sup> 2002</b>	
<b>ADVANCED TRNSYS FEATURES TRAINING COURSE</b>	
09:00 – 13:30	<b>COMPILERS &amp; CREATION OF NEW TRNSYS COMPONENTS</b> David Bradley / Jaume Salom
13:30 – 15:00	LUNCH
15:00 – 18:00	<b>TRNSED – CREATING TRNSYS DISTRIBUTABLE PROGRAMS</b> Jeff Thornton / Michael Kummert

<b>Thursday, February, 28<sup>th</sup> 2002</b>	
<b>EES BASIC FEATURES AND COUPLING WITH TRNSYS</b>	
09:00 – 13:30	<b>EES BASIC FEATURES</b> Jean Lebrun
13:30 – 15:00	LUNCH
15:00 – 18:00	<b>TRNSYS / EES COUPLING</b> Jean Lebrun / William Beckman

<b>Friday, February, 28<sup>th</sup> 2002</b>	
<b>EES ADVANCED FEATURES</b>	
09:00 – 13:30	<b>EES ADVANCED FEATURES (Part 1)</b> William Beckman
13:30 – 15:00	LUNCH
15:00 – 18:00	<b>EES ADVANCED FEATURES (Part 2)</b> William Beckman

The language of the Courses is English (no translation facilities will be provided)

## REGISTRATION

Details of the registration fees are in the table below.

The fees include registration, lunch and documentation for the teaching sessions.

Registration could be made for one day, two days, three days or the four days. Discounts for multiple days will receive a discount.

Second attendees from the same institution will receive a 30% discount and the single attendee costs.

Deadline for registration is **January The 25<sup>th</sup> 2002**.

Registration form can be found in the web page: <http://www.aiguasol.com>

Registration Fees:		
Number of days	Single attendee	Two attendees
One day, each attendant	500 €	850 €
Two days, each attendant	850 €	1445 €
Three days, each attendant	1250 €	2125 €
Four days, each attendant	1500 €	2550 €

Places are limited. Final registration to the courses will depend on the availability of free places.

Minimum registration of 10 persons by course should be accomplished to effect the courses.

## COURSE VENUE

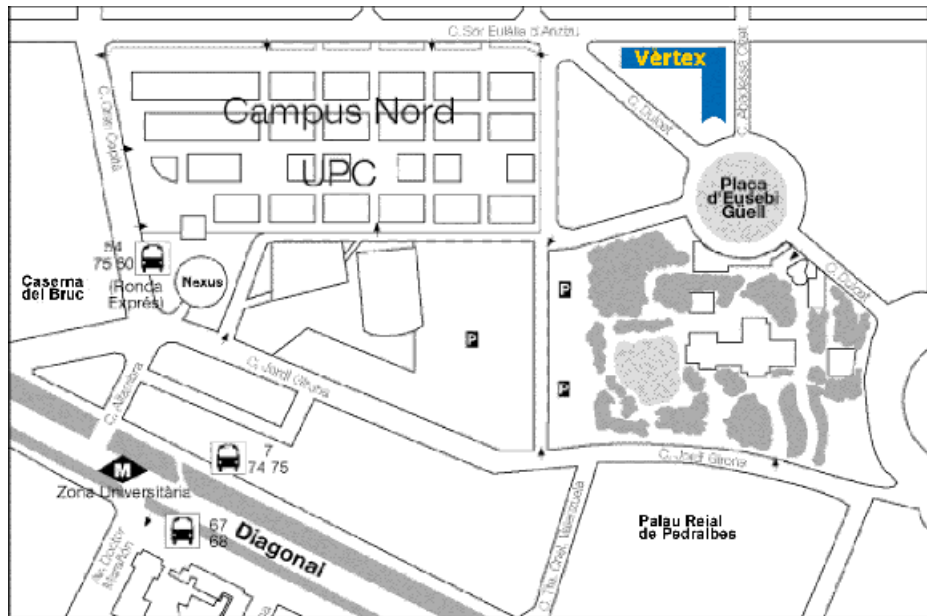
The **TRNSYS & EES TRAINING COURSES** will take place in Barcelona.

The course will take place in the **Edifici Vertex**, of the **Politechnical University of Catalonia (UPC)**.

The place is well communicated by bus or subway from any place in the city.

In the following maps, you can see the exact location of the building.





## ACCOMMODATION

The participants are to arrange their own accommodation. You will find all the information at the following web site: <http://www.bcn.es/english/ihome.htm>.

**MEMBERSHIP APPLICATION ..... For IBPSA Central.....**

Membership Classification Desired (check one): Effective date: Sept. through Aug.

\_\_\_ Sustaining member..        US\$ 500/year  
An individual, company, or institution in related practice.

\_\_\_ Member..                    US\$ 75/year  
A graduate from a college or university, or a registered professional engineer or architect.

\_\_\_ Student Member..        US\$ 25/year  
An individual who is a full-time student (Include copy of current enrollment i.d.).

Amount Enclosed: US\$ \_\_\_\_\_

\_\_\_\_\_  
Name: \_\_\_\_\_

Title: \_\_\_\_\_

Organization: \_\_\_\_\_

Street Address: \_\_\_\_\_

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Country: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

e-mail address: \_\_\_\_\_

Please pay by Check or International M.O. to:

Terry Williamson

twilliam@arch.adelaide.edu.au

The University of Adelaide

Faculty of Architecture and Urban Design

ADELAIDE SA 5005, Australia

P: +61-8-8303-4591 F: +61-8-8303-4377

or by Purchase Order, by faxing this signed form to

IBPSA c/o Terry Williamson +61-8-8303-4377

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BS'91	85 / 675	\$50	Nice, France	20-22 Aug. '91
BS'93	71 / 570	\$50	Adelaide, Aus.	16-18 Aug. '93
BS'95	81 / 717	\$50	Madison, WI (USA)	14-16 Aug. '95
BS'97	119 / 976	\$50 (CD-ROM)	Prague, Czech Republic	08-10 Sep. '97
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# IBPSA Regionalization Guidelines

## IBPSA's Mission

The International Building Performance Simulation Association (IBPSA) is a non-profit making organization that was first incorporated in January 1987. The Association's principal mission is to promote and advance the practice of building performance simulation in order to improve the energy and environmental performance of new and existing buildings worldwide.

IBPSA seeks to achieve its goals through the establishment of a range of products and services aimed at informing and equipping those who are involved in the construction industry and who seek to utilize computer-based tools to good effect. To this end, the **IBPSA Strategic Plan** identifies nine specific areas that encompass the organization's activities. These are:

1. **Strategic Alliances** with professional organization such as the engineering and architectural societies. The intention is to engender a better understanding of the profession's requirements and the technology's potential.
2. **International Conference Series** to periodically collate and preserve those developments that comprise the current state-of-the-art.
3. **Technical Development Program** aimed at influencing the direction the technology of building simulation might take at any given point in time.
4. **Educational Initiatives** concerned with the teaching of building simulation in the higher education institutions and in the context of continuing professional development.
5. **Harmonization Activities** in an attempt to regularize the application of the different modeling systems through the definition of standard methods for performance assessment and the provision of standard support data.
6. **Member Recruitment** aimed at extending the IBPSA products and services to those practitioners who can most benefit from the new technology.
7. **Products and Services** devised in response to the profession's evolving needs.
8. **Technology Transfer** concerned with the delivery of training in all aspects of computer-based performance assessment at all stages of the building life cycle.
9. **Regional Development** to subject the foregoing activities to appropriate regional influences and enable their effective delivery.

This document addresses the last area concerned with regional development in order to more effectively address local needs and create a mechanism for an international exchange of know-how and best practice.

## Rationale

IBPSA has achieved significant success at the international level - largely through its biannual conference program (Vancouver '89, Nice '91, Adelaide '93, Wisconsin '95 and Prague '97) and worldwide electronic mailing facility. IBPSA has also recognized the difficulties surrounding the development of products and services that are appropriate to the day-to-day needs of its members.

The underlying causes of these difficulties are twofold. Firstly, the geographical spread of IBPSA members is wide and gives rise to a requirement to cover disparate work practices, technologies and professional needs. Secondly, IBPSA's organizational structure is such that the coordination of activities at the local (regional) level is problematic. At the same time like-minded, but regional, organizations are making significant progress at the local level through their seminar, workshop, publications, training and software development activities.

If the construction industry were to be well supported in its attempts to harness effectively the emerging IT and simulation technologies then the establishment of regionally based support organizations was essential. Equally essential was the creation of a structure by which these organizations could affiliate in order to disseminate their know-how and promote their local best practice. Only in this way could the benefits of the new technology be understood and future standardization enabled. It was with the view of a network of autonomous regional organizations that IBPSA has turned to regionalization and is encouraging existing or newly formed groups to become IBPSA affiliates.

### **Structure and Operation**

Under the existing structure, IBPSA affiliates are financially and administratively independent. In practice, this means that they raise and deploy their funds as long as these funds are under the control of elected officers and are used in pursuit of aims and objectives that are consistent with those of IBPSA. IBPSA-Central concentrates its resources on issues such as inter-region communication, international conferences and product standardization. In this way IBPSA complements and empowers the regional affiliates in their attempts to inform and support their members in the context of local design issues and concerns. The entire IBPSA network is represented by a 15-member Board comprised of an executive and regionally elected officers.

The following guidelines have been devised to assist with the establishment and operation of an IBPSA regional affiliate.

1. Organizers of a new regional affiliate should prepare a brief proposal for the IBPSA Board of Directors. This should outline the proposed name, geographic territory, organizational structure and goals and objectives (if different from those included in the IBPSA charter statement). Affiliation depends only on the organization having a purpose and mission consistent with those of IBPSA. The Affiliate and IBPSA then enters into a specific agreement by defining their working relationship based on regional considerations prevalent at the time.
2. Regional affiliates may be named "**IBPSA <region>**" or they may use any other appropriate name. Their letterhead and other publicity material should indicate that they are "an affiliate of IBPSA".
3. For regions with limited financial resources, IBPSA can provide a limited amount of **matching start-up funds** (see below) to aid the initial set-up of the affiliated organization. A case for support should be submitted to the IBPSA Secretary for consideration by the Board. (See attached proposal guidelines.)
4. The financial structure of a regional affiliate is independent from IBPSA. This means that affiliates will retain all member dues or other funds raised by their activities.
5. IBPSA will provide affiliates with a list of operational guidelines (see attached by-laws), contact information for persons available to assist the local organizer and electronic images of the IBPSA logo.
6. The regional affiliate will provide membership data to IBPSA for use in mailing IBPSA materials.

7. Members of the regional affiliates will automatically be full members of IBPSA. Any given individual or organization will pay dues directly to IBPSA only if there is no regional affiliate operating in their area.
8. IBPSA will make newsletters and other IBPSA materials available to all members of the regional affiliates either in printed form or in downloadable electronic format from the IBPSA web page. This will be at no cost or at a nominal cost depending on the circumstances. Other services may be provided by IBPSA to the regional affiliates for a fee.

### **Start-up Proposal Guidelines:**

It has been the IBPSA Board's policy to grant start-up funds to regions that are in need of matching funds to get the organization officially registered and/or to purchase initial office support equipment. The proposal should be submitted to the IBPSA board and should contain the following elements:

1. Name of Affiliate: i.e., **IBPSA-<region>**.
2. Geographic territory covered.
3. Organizational structure – The IBPSA Charter is founded on a set of board- and member-approved by-laws (see attached). Each Affiliate's organizational structure is therefore expected to adhere to the same or similar principles of operation.
4. Officers -- i.e., Specify the officers that will be constitute the board (e.g., Chairperson, secretary, treasurer, etc. – see IBPSA by-laws)
5. List of goals and objectives – Must be consistent with the mission statement and objectives of the IBPSA Charter.
6. Minutes of the first organizational meeting, indicating organizational business transacted.
7. List of initial members and their affiliations (can be those attending the first meeting).
8. Proposed activities of the affiliate.
9. Proposed amount of annual membership dues.
10. Breakdown of costs associated with set-up of the Affiliate organization.
11. Amount of matching funds provided by the Affiliate.
12. Amount of the requested support from IBPSA. \*

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\* Please note that IBPSA's policy is to provide start-up funds with the expectation that the Affiliate will return the granted amount once the region reaches financial stability. The Affiliate is therefore asked to return the funds on a voluntary basis, so other regions can be assisted in the same fashion.

## **Becoming an IBPSA Affiliated Organization**

If you would like to become an affiliated organization then please write to the IBPSA Secretary at the address given at <http://www.ibpsa.org> . Alternatively, you may wish to discuss the matter further with one of the IBPSA office bearers or a representative of one of the existing affiliates whose addresses can also be found at <http://www.ibpsa.org>.