

**WUFI COMPUTER MODELING WORKSHOP
FOR WALL DESIGN AND PERFORMANCE
(HEAT AND MOISTURE TRANSFER IN BUILDING ENVELOPES)
Tampa, FL, October 4-5, 2012**



Building Technologies Research
and Integration Center



WUFI/ORNL¹ Program made available by the U.S Department of Energy



This symposium and workshop is co-sponsored by the U.S. Department of Energy (DOE) through Oak Ridge National Laboratory (ORNL) in collaboration with the Fraunhofer-Institut für Bauphysik (IBP) and co-sponsored by the National Institute of Building Sciences (NIBS)/ Building Enclosure Technology and Environment Council (BETEC), Owens Corning, and National Building Science Corporation (NBSC) of California. It is endorsed by the Building Enclosure Council (BEC) of Boston.



Strategies for Energy Efficient Building Design – a.k.a. What’s New and Really Works –

This software can be answer questions specific to building type and environment without the time and expense of building numerous test huts or leaving your office. Now you can build it on the computer, using sophisticated modeling software that gives you heat and moisture data and uses weather data files from all over the country. The software



includes analysis to predict mold. Dr. Achilles Karagiozis, André Desjarlais, and Manfred Kehrer convey the latest and best new strategies on building envelope design with an emphasis on heat and moisture transfer. **See how to use WUFI in conjunction with ASHRAE’s New Standard 160, Design Criteria for Moisture Control in Buildings.**

The hands-on training session is for 30 students. Students are trained to use the most powerful computer modeling program available for building envelope design and wall analysis. Each student receives a copy of WUFI software. The US Department of Energy provides WUFI-ORNL for free, and each participant receives WUFI Pro 5.1 with an 8-week license. Join us if you are ready to learn the next generation of building science.



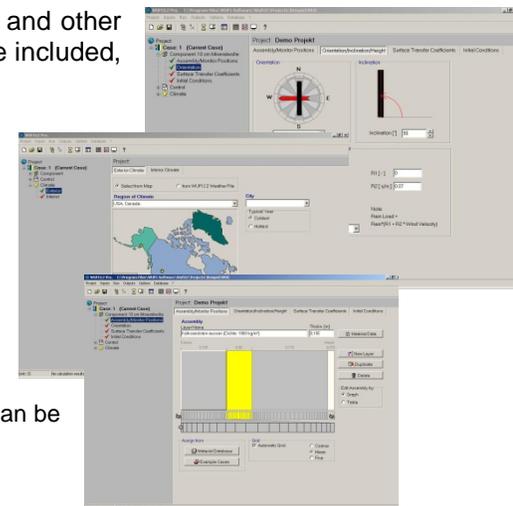
ABOUT WUFI®:

WUFI series software allows the realistic simulation of the transient hygrothermal behavior of multi-layer building walls exposed to natural weather.

The **WUFI series** models can handle contributions from rain, solar radiation and other crucial weather events on an hourly basis. Both vapor and liquid transport are included, along with the sorptive capacity of building construction materials.

WUFI ORNL/IBP, one of the WUFI family software, offers an easy and user-friendly interface for data input and output and is free of charge. **WUFI ORNL/IBP** comes complete with weather data for scores of North-American cities which can easily be selected from a map. The temporal behavior of the computed quantities (temperatures, relative humidities and water contents) can be analyzed with the help

of preconfigured or user-defined diagrams. Furthermore all the computed profiles can be displayed in rapid succession as a film which shows the transient thermal and hygric processes occurring in the envelope. This film is ideal for gaining insights into the hygrothermal processes and for developing a 'feel' for the situation in the envelope. The reactions of the different materials to the changing climatic conditions can be directly visualized.



¹ WUFI = Wärme und Feuchte instationär

ORNL = Oak Ridge National Laboratory

OVERVIEW

The workshop provides:

- Basic building envelope design principles
- Heat and mass transfer fundamentals
- Validation of modern hygrothermal simulation tools
- Necessary input data: where can I get them and what accuracy is required?
- The Do's and Don'ts of WUFI-ORNL
- What do the results tell me – performance predicting
- Mold growth predictions – new post-processing modules
- Development and future extensions of WUFI-ORNL, future standards and guidelines
- See also New Features of WUFI 5, on page 5.

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The instructors walk you through modern and revolutionary new building envelope design concepts. You learn the conditions and remedies of moisture, both liquid and vapor, that have had deleterious effects on modern construction. New techniques are shown, and participants are introduced to new material application to eliminate moisture-related problems in buildings, such as mold and decay. The overview ends with an extensive question-and-answer session that allows the participants to interact informally with the presenters.



Up to 30 students are tutored collectively and personally by our distinguished presenters. Each student must bring with him/her a laptop computer. The student is provided with a complete copy of the program and a licensing agreement to use this powerful modeling program. Every student is walked through every aspect of the modeling sequencing, allowing each individual to create wall or roof designs that would be most appropriate for the geographical location.

The student can integrate weather data that has been collected for generations by NOAA, or import weather data from other sources. The program allows each wall design to be specifically engineered for its intended location and its orientation on the building site.

Point-and-click, and you can pick a material. Point and click again, and layer your wall with a huge variety of building materials that can be selected and evaluated simultaneously for the most energy- and thermally-efficient walls. Point and click, and change walls using your evaluation instead of materials. Each student will understand liquid water, vapor transfer, thermal transfer, the effects of humidity, drying, and the cause and elimination of vapor and condensation within walls. Whether the student is building in a hot, humid environment or cold and dry, or mixed because of seasons, this powerful modeling tool uses modern hygrothermal science to model every wall and roof condition in the contiguous USA.

Students are encouraged to interact and exchange ideas with the professors/instructors, exploring the possibilities of the programs' depth and multiple uses. Aspects of modeling for new products are demonstrated by both group and individual interaction.

Agenda

Class hours Thursday 8:00 a.m. to 5:00 p.m., Friday 8:00 a.m. to 5:00 p.m.

- Registration
- Installation of WUFI-ORNL/IBP Software
- History of WUFI-ORNL/IBP
- Practical Application of Simulation Tools
- Thermal Performance of Walls and Roofs (Cool Roofs)
- The Importance of Modeling for Heat and Moisture Transport in Building Envelopes
- Mold Perspectives and Design Perspective
- Fundamentals and Requisites
- Boundary Conditions / Surface Conditions
- WUFI-ORNL Group Modeling Project & Competition
- Group Modeling Project & Presentation of Results
- Analysis of Material Properties
- Assignment and Examples
- Review of Example Cases by all trainers
- Evaluation of Results
- Features of WUFI-PRO
- Assignment of More Examples of WUFI-PRO
- WUFI-2D and WUFI Plus overview
- Future Standards and Guidelines and Mold Growth
- Limitations of Modeling
- Q & A

Attendees receive a certificate of completion and a copy of the WUFI-ORNL/IBP Software and software keys. You will have an 8-week temporary license for WUFI Pro.

WORKSHOP REGISTRATIONS: You may register and pay online through this link:

<http://events.constantcontact.com/register/event?llr=lbqjbbab&oeidk=a07e6bqtu7ee359e8f0>

or go to the next page to register if you cannot get online and are sending a check.

WORKSHOP Location:

**Embassy Suites Hotel – Tampa Airport/Westshore
555 N. Westshore Blvd. – St. James Room
Tampa, FL 33609**

HOTEL REGISTRATION:

**Embassy Suites Hotel – Tampa Airport/Westshore
555 N. Westshore Blvd.
Tampa, FL 33609**

Phone: 1-800-EMBASSY. Ask for the group rate of \$121/night (plus tax) for the WUFI Workshop event, before the Cut-off date 9/12/2012.

WORKSHOP REGISTRATION
WUFI Pro Workshop TAMPA, FL – OCTOBER 4-5, 2012

To register and pay online with most credit cards:

<http://events.constantcontact.com/register/event?llr=lbiqjbbab&oeidk=a07e6bqtu7ee359e8f0>

Other ways to reserve:



1. E-mail this page to jackiebh@section08.com
2. Mail to National Building Science Corp.
 1220 Rosecrans Street #119
 San Diego, CA 92106-2674
 Office phone (619) 450-6446
 Mobile phone-Jackie (951) 265-1501

Included:

- WUFI Pro & WUFI/ORNL instruction October 4-5, 2012 w/software & 8-week license,
- Lunch, mid-morning & afternoon breaks

Price: \$945.00 *

* Payment Method:

Check payable to National Building Science Corp.

**1220 Rosecrans St. #119
 San Diego, CA 92106-2674**

Register online:

<http://events.constantcontact.com/register/event?llr=lbiqjbbab&oeidk=a07e6bqtu7ee359e8f0>

WORKSHOP RESERVATION:

Last Name	First Name	Middle Initial
Title:		
Company/Organization:		
Business Street Address:		
City:	State:	Zip:
Business Phone:	Fax:	
E-Mail Address:		



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* You will be notified promptly of any cancellations or schedule changes. If a program is cancelled or postponed we will refund registration fees but cannot be held responsible for any other related costs, charges, or expenses, including cancellation/change charges assessed by airlines or travel agencies. Refunds of registration fees, when cancelled by the registrant, are 90% refundable if notice is given via fax or e-mail by March 18, 2012.

New Features of WUFI-ORNL and WUFI Pro 5 are visually demonstrated in the following link:

<http://www.section08.com/WUFI/New Features in WUFI 5.pdf>:

Summary of New Features in WUFI Version 5:

General

- New XML-based saving structure will facilitate backward compatibility with future program versions.
- Customer can include pictures to the WUFI project.
- New languages: Italiano and Español

Material Database

- New data sources are available – MASEA (see www.masea-ensan.de) and DIN 4108-4 (German standard, but only thermal properties and μ -Value).
- Products are available within the database.

Material Properties

- Thermal dependency of heat conductivity can be taken into account.
- Phase-Change Material (PCM) can be modeled by using a thermal dependent enthalpy.
- Products can have a thermal conductivity design value.
- Additional products information are provided – material must be unlocked first to make any changes.
- XML-Import/Export provides quick exchange of material data.

Climate

- Temperature shift according to EN 15026
- German test reference years from 2004 are completely included (but they do not have precipitation).
- New climate files for Italy
- New maps and climate files for South America and Ozeania

Sources and Sinks

- Air Change Source: Origin can be set to the indoor climate.
- Source Term Clipping option for moisture sources.
- Air infiltration model included.

Numerics

- Constant design value of the heat conductivity can be used.
- Radial Symmetry can be used.

Help System

- Updated.