

# TRNSYS - the TRaNsient SYstem Simulation program

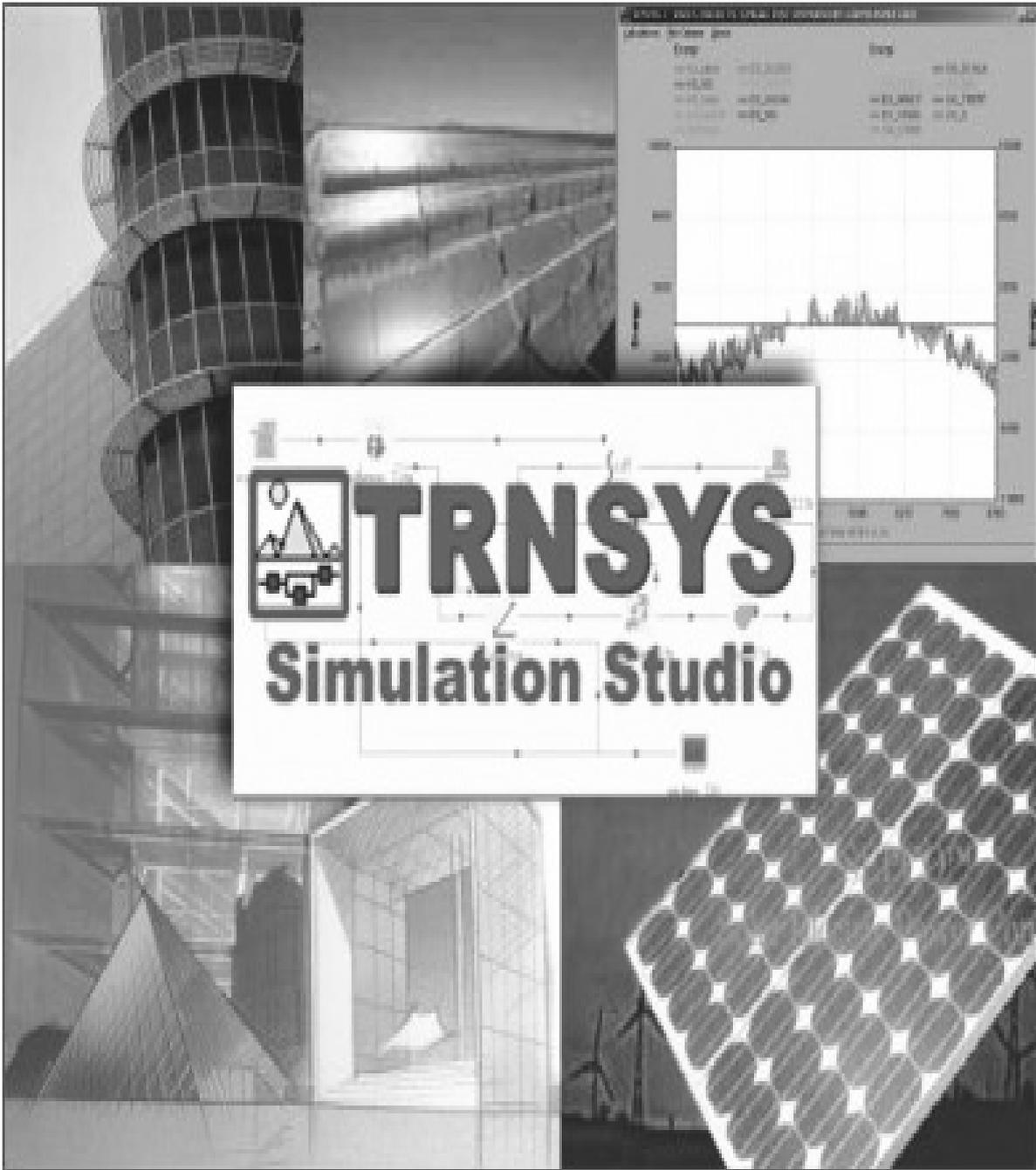


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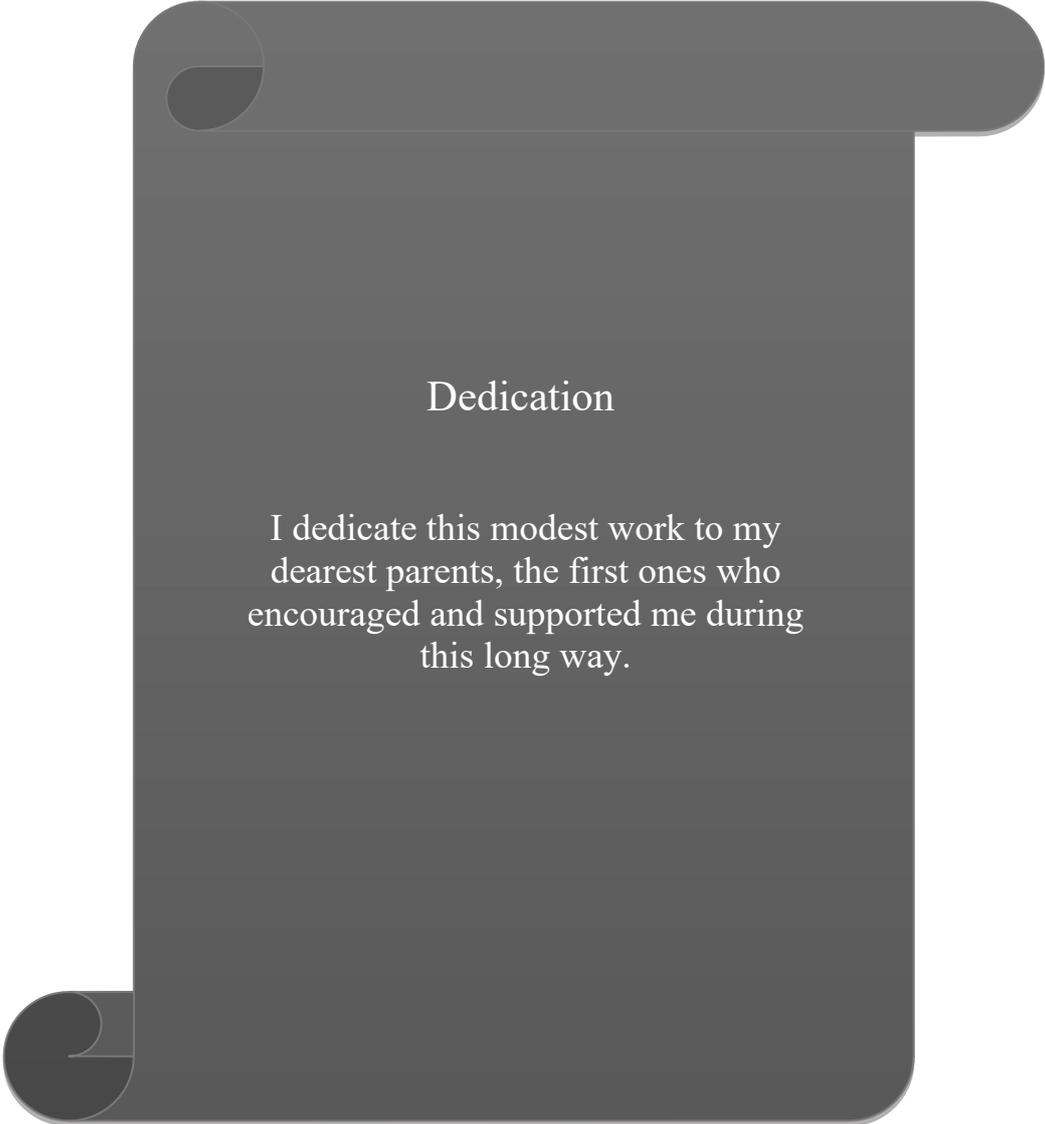


TRNSYS –  
The TRaNsient  
SYstem Simulation  
Program

{Architecture is a wonderful expression of the discovery process. It's like a scientist who doesn't know the answer, but knows the path to it. That's what drives me: the joy of the path, the discovery."}

Glenn Murcutt Architect, winner of the 2002  
Pritzker Architecture Prize

...A My BENACHIR Nouhaila



## Dedication

I dedicate this modest work to my  
dearest parents, the first ones who  
encouraged and supported me during  
this long way.

# Dedication

Thanks

"Praise be to GOD, lord and master of the universes".

I would like to express my thanks to a whole world of people who have made this study possible and who have contributed to its elaboration in any form.

I address myself to GOD, the almighty, to thank him for having given me the courage, the support, the patience to carry out this work.

THÈSE PRÉSENTÉE EN VUE DE L'OBTENTION DU  
DIPLOME DE DOCTORAT EN PHYSIQUE  
INGÉNIERIE :

# SCIENCES POUR L'INGÉNIEUR



By: Benachir Nouhaila  
Soutenu publiquement le : 2023

Scientific

production

# Publication



## Publication

Benachir Nouhaila (2022). Paper ID APEN-MIT-2022\_7337 JOURNAL Applied Energy Symposium:Journal. Improving the energy performance of the building envelope using phase change materials.

Benachir Nouhaila 2022 Paper ID APEN-MIT-2022\_8017 Applied Energy Symposium:Effect of solar ventilation on thermal improvement and energy efficiency of buildings using phase change materials.

Benachir Nouhaila Journal of Pharmaceutical Negative Results | Volume 13 | Special Issue 1 | 2022: Role of solar mechanical ventilation and phase change materials on thermal comfort and electrical energy of building envelope.

Benachir Nouhaila Benachir , J Nucl Ene Sci Power Generat Technol 2022, 11:9 August 29, 2022, manuscript no. JNPGT-22-73579; Publisher's Date of Assignment: August 31, 2022, pre QC no. JNPGT-22-73579 (PQ); Date of Revision: September 14, 2022, QC no. JNPGT-22-73579; Revision date: September 21, 2022, manuscript no. JNPGT-22-73579 (R); Publication date: September 28, 2022, DOI: 10.4172/2325-9809.1000292 Nuclear Journal Énergie Science & Poù Genrestion Ttechnologie.

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Copyright © 2023, Université Mohammed Premier Oujda Maroc .Maghr. J. Pure & Applied Sci, 2022, Vol. 8, Issue 2, Page 63- 81 <https://revues.imi> .

Received November 24, 2022, revised December 12, 2022, accepted December 30, 2022. Benachir et al, Maghr. J. Pure & Appl Sci, 2022, Vol. 8, Issue 2, Page 1-19. CREATING AN ENERGY-EFFICIENT BUILDING ENVELOPE BASED ON PHASE-CHANGE MATERIALS (PCM).

Benachir Nouhaila International Journal of Engineering and Applied Physics (IJEAP) Vol. 2, No. 3, September 2022. ISSN : 2737-8071. Simulation of solar mechanical ventilation with phase change materials in building envelope with 2 software TRNSYS and DESIGNBUILDER. Received June 9, 2022 Revised November 20, 2022 Accepted January 11, 2022. Int J Eng & App Phy, Vol. 2, No. 3, September 2022.

## International Communications :

Benachir Nouhaila The organizing committee of the 2022 MIT Applied Energy A+B Symposium, which is organized by the International Journal of Applied Energy and the Massachusetts Institute of Technology (MIT)2022. MIT Applied Energy A+B Symposium July 5-8, 2022. Effect of solar ventilation on thermal improvement and energy efficiency of buildings using phase-change materials.

Benachir Nouhaila (2022) The organizing committee of the MIT Applied Energy A+B Symposium 2022, which is organized by the International Journal of Applied Energy and the Massachusetts Institute of Technology (MIT)2022. MIT Applied Energy A+B Symposium July 6-8, 2022. Improving the energy performance of building envelopes using phase-change materials.

Benachir Nouhaila (2021) Project with Schneider Electric: PAWA PLANT: A PLANT-BASED CELL GREENHOUSE SYSTEM Application of Aloe Vera-derive.

Benachir Nouhaila (2022 ) 41st World Conference on Applied Science, Engineering and Technology (WCASET 2022) August 24 & 25, 2022. The role of solar mechanical ventilation and phase-change materials on thermal comfort and electrical energy in building envelopes.

BOOK 41st World Conference on Applied Science, Engineering & Technology (WCASET 2022) 24th & 25th August 2022. The role of solar mechanical ventilation and phase-change materials on thermal comfort and electrical energy in building envelopes.

Benachir Nouhaila (2020 ) Fraunhofer-Institut für Bauphysik Standort Holzkirchen. CONFERENCE ON THE TRANSYS PROGRAM.

## NATIONAL COMMUNICATION

The 3rd International Congress on Process Engineering for Sustainable Development 2022 (3rd ICPESD22) - June 29, 2022.

The 6th International Conference on Wireless Technologies, Embedded and Intelligent Systems (WITS-2020 FES).

Benachir Nouhaila 2020 "7th International Renewable and Sustainable Energy Conference -IRSEC'19" Agadir . Improving the energy performance of the building envelope using phase-change materials