

## **Professor Yehia A. Bahei-El-Din**

**BSc., MSc., PhD.**

Associate Dean of Engineering  
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Professor of Structural Engineering



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### ▪ **Background**

Prof. Bahei-El-Din earned his B.Sc. in Civil Engineering in 1972 from Cairo University with distinction and honours. He earned his M.Sc. in 1976 and Ph.D. in 1979 from Duke University at Durham, NC, USA with a major in Civil Engineering and specialty in Solid Mechanics. While a graduate student Prof. Bahei-El-Din worked in several funded projects in composite materials and structures and his Ph.D. was among the first in the U.S. to contribute to constitutive modeling of advanced composites. Before joining BUE in September 2007, Prof. Bahei-El-Din was a tenured professor at Cairo University and visiting professor at Duke University, Rensselaer Polytechnic Institute, NC State University and the University of Utah in the USA. Prof. Bahei-El-Din is renowned for his work in composite materials and structures which earned him recognitions and awards from the Academy of Scientific Research and Technology in Egypt, and NASA and the National Academy of Sciences in the USA. Prof. Bahei-El-Din is the founding director of the Centre for Advanced Materials at BUE.

### ▪ **Professional Affiliations**

- Member of the Egyptian Engineering Syndicate.
- Member of the American Society of Civil Engineers (ASCE).
- Member of the American Society of Mechanical Engineers (ASME).
- Member of the American Institute of Aeronautics and Astronautics (AIAA).
- Member of the American Society for Composites (ASC).
- Member of the Society of Engineering Science (SES)

### ▪ **External Activities**

- Organizer and chair of International Conference on Advanced Materials at BUE.
- Member of International Scientific Advisory Committee of the International Conference on Condition Monitoring organized by The British Institute of Nondestructive Testing.
- Lecturer at International Centre for Mechanical Sciences (CISM), Udine, Italy.
- Organizer and chair of IUTAM symposium at Cairo, Egypt.
- Member of the Scientific Committees for several international technical meetings.
- Reviewer for several international journals covering materials and structures.
- Member of European Commission review panel for research proposals.
- Frequent lecturer at international meetings and seminars.
- Consultant to Arab Organization for Industrialization and Ministry of Military Production in Egypt, and NASA Langley Research Center, Allied Signal Inc., and Honeywell International in the USA.

▪ **Broad Interests and Expertise**

Prof. Bahei-El-Din's main interest is in solid mechanics and material behaviour. His special expertise is in composite materials and structures where he developed fundamental understanding and constitutive models including computational implementation of the behaviour of PMC, MMC, and CMC composites. His work focuses on end applications in aerospace, automobile, marine, and infrastructures. Recently, Prof. Bahei-El-Din's work serves renewable energy technologies by focusing on the development of innovative composite systems for wind turbine blades.

▪ **Research Interests and Activities**

- Multiscale modelling of composite systems including progression of damage, and the mechanics of multifunctional composites and nanocomposites for health monitoring and energy harvesting.
- Principal investigator of a major research grant funded by the European Commission for development of sandwich structures for wind turbine blades.
- Senior investigator in International Institute on Multifunctional Materials for Energy Conversion, sponsored by US National Science Foundation, consortium leader is Texas A&M University.
- P.I. and co-P.I. of many research projects sponsored by NSF and NASA in the USA, and the Academy for Scientific Research and Technology in Egypt.

▪ **Recent Publications**

1. Yehia A. Bahei-El-Din, "Modeling Electromechanical Coupling in Woven Composites Exhibiting Damage," *Journal of Aerospace Engineering, Structure and Machine Monitoring (SMM)*, accepted, in press.
2. Yehia A. Bahei-El-Din, "Multiscale Transformation Field Analysis of Progressive Damage in Fibrous Laminates," *International Journal for Multiscale Computational Engineering*, accepted, in press.
3. George J. Dvorak, Yehia A. Bahei-El-Din, Alexander P. Suvorov, "Impact and Blast Resistance of Sandwich Plates," in *Major Accomplishments in Composite Materials and Sandwich Structures, An Anthology of ONR Sponsored Research*, Daniel, I.M., Gdoutos, E.E., Rajapakse, Y. (Eds.), Springer, 2009, ISBN: 978-90-481-3140-2.
4. Yehia A. Bahei-El-Din and George J. Dvorak, "The Behaviour of Sandwich Plates Modified for Enhanced Resistance to Blast-Induced Vibrations," *Proceedings of the International Conference on Advanced Materials for Application in Acoustics and Vibration*, Cairo, Egypt, 4-6 January 2009.
5. Y.A. Bahei-El-Din and G.J. Dvorak, "Enhancement of blast resistance of sandwich plates," *Composites: Part B*, Vol. 39, 2008, pp. 120-127.
6. Yehia A. Bahei-El-Din, "Multiscale Modeling of Progressive Damage in Composite Materials and Hybrid Structures," Invited Lecture, *Proceedings of Miscomechanics 2008, The International Conference on Multiscale and Mesomechanics in Relation to Sustainability, Safety and Economy of Materials and Structures: Advanced and Smart*, 28 January – 1 February 2008, Giza, Egypt.
7. Yehia A. Bahei-El-Din and George J. Dvorak, "Wave Propagation and Dispersion in Sandwich Plates Subjected to Blast Loads," *Mechanics of Advanced Materials and Structures*, Vol. 14, 2007, pp. 465-475.
8. Y.A. Bahei-El-Din and G.J. Dvorak, "Behavior of Sandwich Plates Reinforced with Polyurethane/ Polyurea Interlayers under Blast Loads," *Journal of Sandwich Structures and Materials*, Vol. 9, 2007, pp. 261-281.

9. R. Khire , P. Hajela and Y. Bahei-El-Din, "Handling Uncertainty Propagation in Laminated Composites Through Multiscale Modeling of Progressive Failure," AIAA-2007-1913, Proceedings of the 48th AIAA/ASME/ASCE/ AHS/ASC Structures, Structural Dynamics, and Materials Conference, Honolulu, Hawaii, 23-26 April 2007.
10. R. R. Valisetty, D. J. Grove, R. Namburu, A. M. Rajendran and Y. A. Bahei-El-Din, "Scalable RVE Pre-Processor for TFA Analysis of Armor Composites," Proceedings of the International Conference on Computational & Experimental Engineering and Sciences, Miami, Florida, 3-8 January 2007.
11. R. Valisetty, A. M. Rajendran, D. Grove, and R. Namburu, Y. Bahei-El-Din, A. Hody and L. Seever, "Modeling Damage Modes in 3-D Woven Armor Composite Systems," Proceedings of the 25th Army Science Conference, Orlando, Florida, 27-30 November 2006.
12. A. Mullur, P. Hajela and Y. Bahei-El-Din, "Uncertainty Management in Design Optimization of Coupled Systems," AIAA-2006-7036, Proceedings of the 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Portsmouth, Virginia, 6-8 September 2006.
13. Yehia A. Bahei-El-Din, George J. Dvorak and Olivia J. Fredricksen, "A Blast-Tolerant Sandwich Plate Design with a Polyurea Interlayer," International Journal of Solids and Structures, Vol. 43, 2006, pp. 7644-7658.
14. G.J. Dvorak and Y.A. Bahei-El-Din, "Enhancement of Blast Resistance of Sandwich Plates," In Proceedings of the III European Conference on Computational Mechanics Solids, Structures and Coupled Problems in Engineering, C.A. Mota Soares et.al. (eds.), Lisbon, Portugal, 5–8 June 2006.
15. Y.A. Bahei-El-Din, A.A. Mullur, P. Hajela, J. Peters and G.J. Dvorak, "Nondeterministic Modeling of Progressive Failure in Laminated Composites," AIAA-2006-2144, Proceedings of the 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Newport, Rhode Island, 1-4 May 2006.
16. G.J. Dvorak and Y.A. Bahei-El-Din, "Enhancement of Blast Resistance of Sandwich Plates," In Proceedings of the 7<sup>th</sup> International Conference on Sandwich Structures, 29-31 August 2005, Aalborg University, Aalborg, Denmark.
17. S.B. Munro, D. Walczyk, Y.A. Bahei-El-Din and G. Dvorak, "Forming of Stretch Broken Carbon Fiber (SBCF) Prepreg Material Over Fixed Shapes - Material Characterization & Modeling," Proceedings of SAMPE'05, Long Beach, CA, 1-5 May, 2005.
18. A. Rajendran, R. Valisetty, R. Namburu and Y.A. Bahei-El-Din, "A Representative Volume Element Based Micromechanical Constitutive Modeling of Woven Composites," Proceedings of the 2005 Materials Research Society Spring Meeting, San Francisco, CA, 28 March – 1 April, 2005.
19. R. Valisetty, R. Namburu, A. Rajendran and Y.A. Bahei-El-Din, "Scalable Coupling of TFA and PARADYN Analysis for Impact Modeling of 3-D Woven Composites," Proceedings of the International Conference on Computational & Experimental Engineering and Sciences, Madeira, Portugal 26-29 July 2004.
20. Y.A. Bahei-El-Din, A.M. Rajendran and M.A. Zikry, "A Micromechanical Model for Damage Progression in Woven Composite Systems," *International Journal of Solids and Structures*, Vol. 41, No. 9-10, 2004, pp. 2307-2330.