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Lau Family Professor and Chair  
Department of Human Centered Design  
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### **Education**

**Ph.D.** North Carolina State University, Raleigh, NC (1992)

**M.Sc.** Materials Engineering, The American University in Cairo, Egypt (1989)

**B.Sc.** Civil Engineering, Ain Shams University, Cairo, Egypt (1980)

### **Professional Experience**

**Cornell Univ.**, Lau Family Professor and Chair, Department of Human Centered Design (2019- present)

**Auburn Univ.**, Emeritus Professor of Mechanical Engineering (2017-present)

**Auburn Univ.**, Professor of Mechanical Engineering (2015-2017)

**Auburn Univ.**, Assistant, Associate and full Professor, Department of Polymer and Fiber Engineering (1992-2015)

**North Carolina State Univ.**, Research Assistant (1989-1992)

**Howeedy consultants**, Senior Structural Engineer (1980 – 1989)

### **Teaching**

Developed and taught the following courses

#### Cornell University:

FSAD 6860: Mechanics of Fibrous assemblies and their composites (3 cr.)

FSAD 6410: Research Seminar in Fiber Science (1 cr.)

#### Auburn University:

ENGR 1110: Introduction to Polymer and Fiber Engineering (2 cr.)

PFEN 4400: Mechanics of flexible structures (3 cr.)

PFEN 4500: Fiber reinforced materials (3 cr.)

PFEN 4810: Polymer and Fiber engineering design I (3 cr.)

PFEN 4820: Polymer and Fiber engineering design II (3 cr.)

TXEN 3550: Numerical methods in Design (3 cr.)

PFEN 7500: Mechanics of fiber reinforced materials (3cr.)

PFEN 7620: Advanced mechanics of flexible structures (3 cr.)

GLOB 7110&7120: Research Colloquium and Methods (2 cr.)

### Activities and committees to enhance teaching activities

- Design of undergraduate and graduate curriculums
- ABET committee review
- Creation of new M.Sc. and Ph.D. degrees
- Academic Program Review Committee
- Selection of teaching management system
- Graduate program officer

### **Research**

#### Interests

- Mechanics of composite materials with emphasis on deformation mechanisms and structure property relationships
- Use of composite materials in energy storage, turbine engines and nuclear applications
- Time-dependent response of polymer and ceramic matrix composites
- Damage progression and the estimation of life for ceramic matrix composites
- Effect of oxidation kinetics and elevated temperature on the mechanical response of ceramic matrix composites
- Manufacturing and testing of polymer matrix composite structures

### **Patent**

Ojard, Greg, Eaton, Harry, Nair, Shantikumar and Gowayed, Yasser, "Bond layer for silicon containing substrate," US Patent 7,056,574 (2006)

### **Refereed Publications**

Barzoki, P., Hua, T., Fu, O., Gowayed, Y., "The effect of imperfect bonding on stress distribution in composites" which you submitted to the Journal of Composite Materials," Journal of Composite Materials, accepted for publication.

Hua, T., Fu, O., Barzoki, P. and Gowayed, Y., "Mechanical and Chemical Properties of Metakaolin Based Geopolymer Exposed to Elevated Temperature," Journal of the American Ceramic Society 106 [8] (2023) 4921-4930

Gowayed, Y., Ojard, G., Miller, B., Santhosh, U. and Ahmed, J. "Effect of loading frequency on the strain of MI-SiC/SiC Composites," accepted for publication (2022) Journal of Composite materials 5 [11] (2022) 1789–1796

Santhosh, U., Ahmad, J., Ojard, G., Gowayed, Y., "Modeling deformation of a melt-infiltrated SiC/SiC composite under fatigue loading," Ceramic International 48[5] (2022) 6574-6590

Santhosh, U., Ahmad, J., Easler, T., Gowayed, Y., "A polymer infiltration and pyrolysis (PIP) process model for ceramic matrix composites (CMCs)," *Journal of the American Ceramic Society* 104 [12] (2021) 6108–6130

Santhosh, U., Ahmad, J., Ojard, G., Gowayed, Y., "A Synergistic Model of Stress and Oxidation Induced Damage and Failure in Silicon Carbide-Based Ceramic Matrix Composites," *Journal of the American Ceramic Society*, 104 [8] (2021) 4163-4182  
Santhosh, U., Ahmad, J., Ojard, G., Smyth, I., Gowayed, Y., and Jefferson, G., "Effect of porosity on the nonlinear and time-dependent behavior of Ceramic Matrix Composite," *Composites Part B* 184 (2020) 107658

Gowayed, Y., Pierce, J., Buchanan, D., Zawada, L., John, R. and Davidson, K., "Effect of microstructural features and properties of constituents on the Thermo-Elastic Properties of Ceramic Matrix Composites," *Composites Part B*, Volume 135, no. 15 (2018) 155-165

Santhosh, U., Ahmed, J., Kalarikkal, S., Ojard G. and Gowayed, Y., "Time-Dependent Deformation and Damage Modeling of a SiC/SiC Composite," *Journal of Aerospace Engineering*, Volume 31, no. 6 (2018)

Santhosh, U., Gowayed, Y., Ojard, G., Smyth, I., Kalarikkal, S., and Jefferson, G., "Quantification of Porosity in Ceramic Matrix Composites Using Thermography," *Journal of Nondestructive Evaluation*, Volume 37, no. 2 (2018) 1-14

Mohamed, E., Buschle-Diller, G. and Gowayed, Y., "Solution-Based Synthesis of a 4-Arm Star-Shaped Poly(L-lactide)," *Journal of Designed Monomers and Polymers*, Volume 19, no. 2 (2016) 180-192

Unni Santhosh, Jalees Ahmad, Greg Ojard, Robert Miller, Yasser Gowayed, "Deformation and damage modeling of ceramic matrix composites under multiaxial stresses," *Composites Part B: Engineering*, Volume 90, no. 1 (2016) 97–106

Gowayed, Y., Abouzeida, E., Smyth, I, Ojard, G., Ahmad, J., Santhosh, U. and Jefferson, G., "The role of oxidation in time-dependent response of ceramic matrix composites," *Composites Part B*, Volume 76 (2015) 20–30

Gowayed, Y. Ojard, G., Santhosh, U. and Jefferson, G., "Modeling of Crack density in Ceramic Matrix Composites," *Journal of Composite Materials*, *Journal of Composite Materials*, Volume 49 no. 18 (2015) 2285-2294

Gowayed, Y., Ojard, G. Prevost, E., Santhosh, U. and Jefferson, G., "Defects in ceramic matrix composites and their impact on elastic properties," *Composites: Part B* 55 (2013) 167–175

Santhosh, U., Ahmad, J., John, R., Ojard, G., Miller, R., and Gowayed, Y., "Modeling of stress concentration in ceramic matrix composites", *Composites: Part B* 45 (2013) 1156-1163

Gowayed, Y., Ojard, G., Miller, Morscher, G., R., Santhosh, U., Ahmad, J., John, R., "Accumulation of time-dependent strain during dwell-fatigue experiments of iBN-Sylramic Melt Infiltrated SiC/SiC composites with and without holes", *Composites Part A* 42 (2011) 2020-2027

Eldessouki, M., Buschle-Diller, G. and Gowayed, Y., "Poly(L-lysine)/microcrystalline cellulose biocomposites for Porous Scaffolds", *Polymer Composites*, Volume 32, 12, (2011) 1937–1944

Shady, E., and Gowayed, Y., "Interlaminar shear stress distribution between nested layers of plain weave composites", *Polymer Composites*, Volume 31, Issue 11, (2010) 1838–1845

Gowayed, Y., Ojard, G., Miller, R., Santhosh, U., Ahmad, J., John, R. "Correlation of elastic properties of melt infiltrated SiC/SiC composites to in situ properties of constituent phases", *Composites Science and Technology* 70 (2010) 435–441

Shady, E., and Gowayed, Y., "Effect of nanotube geometry on the elastic properties of nanocomposites", *Composites Science and Technology*, Volume 70, Issue 10, (2010) 1476-1481

Turel, T., Shady, E., Farag, R., Eldessouki, M., Gowayed, Y., Burtovvy, O., Luzinov, I., "A probabilistic model for the permeation of gases through microporous membranes", *The Journal of the Textile Institute*, Vol 101, No. 7, (2010) 583-594

Shady, E., Gowayed, Y., "Mapping of stress distribution in woven-fabric composites", *Polymer Composites*, Vol. 29, No. 8, (2008) 861-868

Morscher, G., Ojard, G., Miller, R., Gowayed, Y, Santhosh, U., Ahmed, J., and Reji, J., "Tensile Creep and Fatigue of Sylramic-iBN Melt-Infiltrated SiC Matrix Composites:

Retained Properties, Damage Development, and Failure Mechanisms,” *Composites Science and Technology*, Vol. 68, (2008) 3305-3313

Buschle-Diller, G., Ahmed, A., Gowayed, Y., Turel, T., Rifki, R. and Bangash, Z., “Assessment of continuous and aerated fabric pressure-washing”, *Journal of the Textile Institute*, Vol. 98, No. 4, (2007) 319-326

Lee, D. and Gowayed, Y., “Determination of Mode-I Stress Intensity Factor of Edge Notched Fabric-Reinforced Composites”, *Polymer Composites*, Vol. 27, No. 2, (2006) 213-220

Shady, E., Abou-iiana, M., Gowayed, Y., and Pastore, C., “Detection and Classification of Defects in Knitted Fabric Structures”, *Textile Research Journal*, Vol. 76, (2006) 295 – 300

Chen, J., Gowayed, Y., Moreira, A., and Flower, G., “Damping of polymer composite materials for flywheel applications”, *Polymer Composites*, Vol. 26, No. 4, (2005) 498-508

Abdel-Hady, F., Baaklini, G., Gowayed, Y., Creighton, R., Lee, D., and Trudell, J., “Manufacture and NDE of multi-direction composite flywheel rims,” *Journal of Reinforced Plastics & Composites*, Vol. 24, No. 4 (2005)

Hristov, K., Armstrong-Carroll, E., Dunn, M., Pastore, C. and Gowayed, Y., “Mechanical behavior of circular hybrid braids under tensile loads”, *Textile Research Journal*, Vol. 74, No. 1 (2004)

Chen, J., Gowayed, Y., and Broughton, R., “Quasi-static behavior of polymer composite flywheel rims”, *Polymer Composites*, Vol. 25, No.5 (2004)

Abou-iiana, M., Youssef, S., Pastore, C., and Gowayed, Y., “Assessing structural changes in knits during processing”, *Textile Research Journal*, 73 (6), (2003) 535-540

Gowayed, Y. and Barowski, L., “A design procedure for textile composite materials,” *Journal of Composites Technology & Research*, Vol. 24, No. 1, (2002) 24-29

Gowayed, Y., Abdel-Hady, F., Flowers, G., and Trudell, J., "Optimal design of multi-direction composite flywheel rotors", *Polymer Composites* Vol. 23, No. 3, (2002) 433-441

Gowayed, Y., and Fan, H., "Fatigue behavior of textile composite materials subject to tension-tension loads", *Polymer Composites* Vol. 22, No. 6, (2001) 762-769

Gowayed Y., Zou, W. and Gross, S., "An analytical approach to evaluate the coefficients of thermal expansion of textile composite materials", *Polymer Composites*, Vol. 21, No. 5, (2000) 814-820

Lin, W., and Gowayed, Y., "The effects of acid dyes on the crystallization and mechanical properties of melt-reprocessed nylon 66", *Journal of Applied Polymer Science*, Vol. 74, (1999) 2386-2396

Vaidyanathan, R., Gowayed, Y. and El-Halwagi, M., "Computer Aided Design of fiber reinforced polymer composite products", *Computers in Chemical Engineering*, Vol. 22, No. 6, (1998) 801-808

Lin, W., Gowayed, Y. and Kotha, S., "The influence of acid dyes on the thermal behavior of nylon 66", *Journal of Applied Polymer Science*, Vol. 67, (1998) 371-382

Gowayed, Y., "The effect of voids on the elastic properties of textile composites", *ASTM Journal of Composite Technology & Research*, Vol. 18, No. 2, (1997) 168-173

Gowayed, Y. and Yi, L., "Mechanical behavior of textile composite materials using a hybrid finite element approach", *Polymer composites*, Vol. 18, No. 3, (1997) 313-319

Gowayed, Y., Wu, J., Barowski, L. and Westphall, W., "Mapping of preform architecture for textile reinforced composite products", *Composites Part A - Applied Science and Manufacturing*, Vol. 27A, (1996) 1023-1032

Gowayed, Y., Schreibman, D. and Roberts, M., "Surface inspection of textile composite materials using image analysis techniques", *ASTM Journal of Composite Technology & Research*, Vol. 18, No. 1, (1996) 3-14

Gowayed, Y., Pastore, C. and Howarth, C., "Modification and application of unit cell continuum model to predict the elastic properties of textile composites", *Composites Part A - Applied Science and Manufacturing*, Vol. 27A, (1996) 149-155

Vaidyanathan, R. and Gowayed, Y., "Optimization of elastic properties in the design of textile composites", *Polymer Composites*, Vol. 17, No. 2, (1996) 305-311

Gowayed, Y., Vaidyanathan, R. and El-Halwagi, M., "Synthesis of composite materials from waste fabrics and plastics", *International Journal of Elastomers and Plastics*, Vol. 27, No. 1, (1995) 79-90

Gowayed, Y., Hwang, J. and Chapman, D., "Thermal conductivity of textile composites with arbitrary preform structures", *ASTM Journal of Composite Technology & Research*, Vol. 17, No. 1, (1995) 56-62

Wang, Y., Gowayed, Y., Kong, X., Li, J., and Zhao, D., "Properties and analysis of composites reinforced with E-glass weft knitted fabrics", *ASTM Journal of Composite Technology & Research*, Vol. 17, No. 4, (1995) 283-288

Gowayed, Y. and Hwang, J., "Thermal conductivity of composite materials made from plain weaves and 3-D weaves", *Composites Engineering*, Vol. 5, No. 9, (1995)

El Mogahzy, Y. and Gowayed, Y., "Theory and practice of cotton fiber selection: Part I: fiber selection techniques and bale-picking algorithms", *Textile Research Journal*, Vol. 65, No. 1, (1995) 32-40

El Mogahzy, Y. and Gowayed, Y., "Theory and practice of cotton fiber selection: Part II: sources of cotton mix variability and critical factors affecting it", *Textile Research Journal*, Vol. 65, No. 2, (1995) 75-84

Pastore, C. and Gowayed, Y., "A self-consistent fabric geometry model: modification and application of a fabric geometry model to predict the elastic properties of textile composites", *ASTM Journal of Composite Technology & Research*, Vol. 16, No. 1, (1994) 32-36

El Mogahzy, Y., Gowayed, Y. and Elton, D., "Theory of soil/geotextile interaction", *Textile Research Journal*, Vol. 64, No. 12 (1994) 744-755

Gowayed, Y., El Mogahzy, Y. and Mayo, L., "The frictional behavior of nonwoven geotextiles in granular soils", *INDA International Nonwovens Journal*, Vol. 6, No. 4, (1994) 66-71

Pastore, C., Bogdanovich, A. and Gowayed, Y., "Application of a meso-volume based analysis for textile composite structures", *Composite Engineering*, Vol. 3, No. 2, (1993) 181-194

Masters, J., Foye, R., Pastore, C. and Gowayed, Y., "Mechanical properties of tri-axially braided composites: experimental and analytical results", *ASTM Journal of Composite Technology & Research*, Vol. 15, No. 2, (1993)

Gowayed, Y. and Pastore, C., "Analytical techniques for the prediction of elastic properties of textile reinforced composites", *Mechanics of Composite Materials*, Vol. 5, (1992) 579-596

Gowayed, Y. and Russ, J., "Geometric characterization of textile composite preforms using image analysis techniques", *Journal of Computer Assisted Microscopy*, Vol. 3, No. 4, (1991) 189-199

#### **Books and book chapters**

"A Perspective on Ceramic Matrix Composites," DesTech Publications, Gowayed, Y. and Ojard, G., 2020

"Immigrant Faculty in the Academy," Book chapter, edited by Maysaa Barakat, Routledge, New York , 2020

"High performance textiles and their applications," Book chapter, edited by C. Lawrence, Woodhead Publishing Co., 2014

"Advanced composites in Civil Engineering Applications," Book chapter, edited by Nasim Uddin, Woodhead Publishing Co., 2013

"Sustainable composites and advanced materials," Book chapter, edited by Chris Pastore and Anil Netravali, DEStech Publications, 2012

G. Ojard, Y. Gowayed, G. Morscher, U. Santhosh, J. Ahmad, R. Miller, R. John, "Creep and Fatigue Behavior of MI SIC/SIC Composites at Temperature," in *Mechanical Properties and Performance of Engineering Ceramics and Composites IV* (eds D. Singh, W. M. Kriven and J. Salem), John Wiley & Sons, Inc., Hoboken, NJ, USA, 2009.

"Fatigue of polymer matrix textile composite materials", Book chapter, edited by Mohsen Mirafteb, Woodhead Publishing, 2009

“Creep and Fatigue Behavior of MI SIC/SIC Composites at Temperature,” Book Chapter G. Ojard, Y. Gowayed, G. Morscher, U. Santhosh, J. Ahmad, R. Miller, R. John in Mechanical Properties and Performance of Engineering Ceramics and Composites IV (eds D. Singh, W. M. Kriven and J. Salem), John Wiley & Sons, Inc., Hoboken, NJ, 2009.

“Polymeric membranes: surface modification by "grafting to" method and fabrication of multilayered assemblies,” Book chapter, Burtovyy, O., Klep, V., Turel, T., Gowayed, Y., Luzinov, I., in Nanoscience and Nanotechnology for Chemical and Biological Defense, Ramanathan Nagarajan editor, ACS Symposium Series, Washington DC, 2008

“Mechanics of Fibrous Assemblies”, Book chapter, Structure and mechanics of 2D and 3D textile composites, in cooperation with Christopher Pastore, edited by Peter Schwartz, Woodhead Publishing, 2008

“Surface Characteristics of Fibers and Textiles - Part III”, Book chapter, edited by Christopher Pastore, Marcel Decker, 2000

“Proceedings of the International Conference on Advanced Composites (icac98)”, editors: Gowayed, Y. and Abdel-Hady, F., ISBN 977-10-1202-9, 1998

#### **Sabbatical activities**

**Columbia University**, Dept. of Civil & Eng. Mech. (F2012)

**Philadelphia University**, School of Design and Eng. (F2000 and S2001)

#### **Service and Outreach**

##### Memberships and service to professional organizations

Reviewer for a large number of journal articles and books

Reviewer for proposal for funding agencies including NSF, USDA, NTC, DoE, EPSCoR.

Member of ASEE

Member of the American Institute of Aeronautics and Astronauts (AIAA) Committee on Flywheel Rotor Safe-Life Standards

Editorial Board member of Journal of Composites

Member, SAMPE

Member, Fiber Society

Phi Psi, honorary member

The honor society of Phi Kappa Phi, member

Reviewer for NSF, USDA, NTC, DoE, EPSCoR.

External evaluator for tenure and promotion for faculty from other universities

Session chair for various conferences

Conducted workshops on composites and mechanics for the aerospace and space industries for Rolls-Royce, NASA Glenn, Pratt & Whitney, GE, Sikorsky Helicopters, NASA Marshall, etc.

Conducted international workshops and seminars in Taiwan, Brazil and Egypt

Reviewed and assessed feasibility of a new masters programs for Philadelphia University

### University

Faculty Committee on Program Review, member

Human Ecology Partnership program, faculty mentor

Administrator Evaluation committee, Chair

University computing committee, Chair

Academic program Review committee, Chair

Member of the faculty senate

Selection committee for a new Learning Management System, member

Campus planning committee, member

Presidential symposium committee, Chair

Advisory board to Multicultural Center, member

Committee on assessment of student learning, member

World food program, member

Committee on selection of a Dean for the libraries, member

### College

Faculty council, member

Research Initiative committee, member

Graduate Faculty committee, member

Computing advisory committee, member

### Department

Search committees for faculty members and department head, Chair (3 committees)

ABET committee, member

Site Director – National Textile Center

Supervisor of physical testing laboratory

Director of protective materials lab

Graduate Program Officer

Mentor to junior faculty

Curriculum Committee, member

Graduate students' handbook, Chair