Heshmat A. Aglan, Ph.D., P.E.
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Professional Preparation

Ph.D. in Mechanical Engineering, University of London, England 1982

Honors and Awards

- Appointed by Governor of the State of Alabama and Confirmed by the Alabama Senate to serve on the Alabama Board of Heating, Air Conditioning and Refrigeration, representing Professional Engineers statewide, Term: Aug 2015 – June 2019
- Registered Professional Engineer in the State of Alabama (#17933 since 1990) and Ohio (# 53226 since 1989)
- Editor-in-Chief of the Journal of Elastomers and Plastics, Sage Publishers Ltd
- Associate Director Alabama Math, Science, and Tech. Education Coalition, (AMSTEC)
- Member of ASME, # 2046209, served as Chairman of ASME Chattahoochee Section 1991
- John R. Sheaffer award for excellence in flood-proofing, Association of State Floodplain Managers for the project entitled "Flood Damage Resistance of Building Materials and Systems," June 2007
- Russell W. Brown Distinguish Scientist Research Award, Sigma XI, April 2007
- Long-term Contribution to the 1890 Land-Grant Mission of Teaching, Research and Service, 61st Professional Agricultural Workers Conference, Tuskegee Univ., Dec. 2003
- Sustained Performance by an HBCU, Oak Ridge National Laboratory, (ORNL) March 2003
- Outstanding Minority Institution of the Year Award by the ORNL, February 2001
- Faculty Achievement Award, 2001 Tuskegee University
- USDA group award of Excellence for contribution to the nations space program, June 1996

Patents

1. **Nanostructured thermoplastic polyimide films**
   Patent number: 9034426 Issued: May 19, 2015 Assignee: Tuskegee University
   Inventor: Heshmat Aglan http://patents.justia.com/patent/9034426

2. **Railroad rail head repair**
   Patent number: US 20140166766 A1, **Issued:** June 17, 2016
   Assignee: Tuskegee University **Inventor:** Heshmat Aglan

Publications *(Over 130 book chapters and referred publications)*

Book Chapters

1. Processing Conditions and Durability of Polypropylene Films. H. Aglan and Y.X. Gan, In Handbook of Plastic Films., E. Abdel-bary (Ed.), 1998, Smither Rapra Press.
2. Modifiers for Improved Performance of Asphaltic Mixtures, Heshmat A. Aglan in Asphalt Science and Technology, A. Usmani ed. CRC Press. 1997.
3. High Performance Polymers: Structure, Properties, Composites, Fibers. Moet, A., Aglan, H., & Baer, E. (1991). München Hanser.

4. Engineering Plastics, Moet, A and H. Aglan, in Fatigue Failure, Vol 2 of Engineering Materials Handbook, J Epel (ed.) (1988) 741-750 ASM International

Refereed Journals

- Surface Morphology Analysis of Ti –6Al-4V, V-4Ti-5Cr, and Molybdenum Exposed to Low Power Nd: YAG Laser, H. Aglan, A. Kumar, K. Muir, and A. Hassanein, Microsc. Microanal. 23 (Suppl 1), 2017.
- Effect of Build Orientation on the Mechanical Properties and Fracture Behavior of ABS Produced by Additive Manufacturing - Fused Deposition Mode, F. Akasheh and H. Aglan, Microscopy & Microanalysis, 2017.
- Microscopic Analysis of Tin Whisker Growth on Tin Plated Copper Microchip Leads, A. Rochester, D. Burdick, and H. Aglan, Microscopy & Microanalysis 2017.
- Producing A615 / A615M High Strength Construction Re-Bars Without Use of Microalloys: Part 2, I. Okafor, K. Prayakarao, H. A. Aglan, Mechanics, Materials Science & Engineering, October 2015.
- Effect of Preheating Temperature on the Microstructural Features of Welded Rail Head, K. Prayakarao and H. Aglan, (2015) Microsc. Microanal. 21 (Suppl 3), pp 1761-1762.
- Microscopic Origin of Strength and Microhardness of titanium Alloy at Elevated Temperature, M. Islam, C. Fermin and H. Aglan, (2015) Microanal. 21 (Suppl 3), 287-288.
- Effect of fumed silica nanoparticles on the proton conductivity of polyimide–phosphoric anhydride membranes. (2014), Sharmin, K., Abdalla, M. A., & Aglan, H. A. Journal of Elastomers & Plastics, 46(1), 43
- Noise Removal in Speech Processing Using Spectral Subtraction. Karam, M., Khazaal, H., Aglan, H. and Cole, C. (2014) Journal of Signal and Information Processing, 5, 32-41.
- Impact of Enhanced Drying and Remediation on Mold in Flooded Buildings (2014), Aglan, H.A., Sept./Oct 2014. http://www.homeenergy.org/show/article/id/1990.
- Effect of Long-Term Exposure and Delayed Drying Time on Moisture And Mechanical Integrity of Flooded Homes. (2014) Aglan, H., et al. Journal of Flood Risk Management 3 (2014): 280.
- Impact of Oil-Contaminated Floodwater on Building Materials. (2014) Aglan, H. A. Home Energy, 31(4), 26-33.
- E-Learning and Instructional Management System Based on Local Computer Networks and Internet, (2014) H. Khazaal, M. Karam and H. Aglan, Journal of College Teaching & Learning – Third Quarter 11(3).
- Fungal Populations in Air and Materials in a Flood Simulation Study,(2014) Skrobot (III), F, H. Aglan, S. Kitchens, A. Ludwick, T. Amburgey, H. Borazjani, and S. Diehl, Wood & Fiber Science, 46 (4).
- Development of Gelatin Films with Designed Antimicrobial Peptide and Silver Nanoparticles. (2013). Abdulla, M. A., Harding, H. G., Samuel, T., Jayne, J., & Aglan, H. A. International Journal of Biomaterials Research & Engineering, 1(2), 13.
- Effect of Preheating Temperature on the Mechanical and Fracture Properties of Welded Pearlitic Rail Steels, H. Aglan, S. Ahmed, K. Prayakarao and M. Fateh, Engineering Journal, Vol. 11, 2013.
- Effect of Zinc Galvanization on the Microstructure and Fracture Behavior of Low and Medium Carbon Structural Steels. Ignatius C., O., Ronald J., O., Kaushal R., P., & Heshmat A., (2013). Engineering, 8, 656.

- Green anti-scalant for cooling water systems. Abdel-Gaber, A., Abd-El-Nabey, B., Khamis, E., Abd-El-Rhmann, H., Aglan, H., & Ludwick, A. (2012), International Journal of Electrochemical Science, 7(12), 11930-11940.
- Evaluation of the Corrosion Barrier Properties of Nano-Reinforced Vinyl Chloride/Vinyl Acetate Coatings, M. Calhoun, A. Ludwick, M. Mahmoud and H. Aglan, Journal of Applied Polymer Science, pp. 15–22, 5 January 2011.
- Effect of Micro-Silica Loading on the Mechanical and Acoustic Properties of Cement Pastes, S.S. Shebl, H.S. Seddeq and H.A. Aglan, Construction and Building Materials 25 (2011) 3903–3908.
- Microstructure-Fracture Behavior Relationships of Slot-Welded Rail Steels, (2011) A. Allie, H. Aglan and M. Fateh, Metallurgical and Materials Transactions A, pp. 1-10.
- Modeling and validation of the thermal performance of an affordable, energy efficient, healthy dwelling unit. (2011) Hassan, M. A., Shebl, S. S., Ibrahim, E. A., & Aglan, H. Building Simulation, (3), 255.
- Fatigue crack growth of bainitic rail steel welds." (2011) Allie, A, H Aglan, and M Fateh. Science & Technology of Welding & Joining 16, no. 6: 535-540
- Mechanical and Fracture Analysis of Welded Pearlitic Rail Steels, (2010) A. Allie, H. Aglan and M. Fateh, Journal of Mechanics of Materials and Structures, Vol. 5, No. 2. 263-276.
- Characterization of Nanostructured Phenolic and Epoxy Composites Under Pulse Laser Degradation. (2010). Young, S., Kumar, A., Ludwick, A., & Aglan, H. Nanotech, 2, 107-110.
- Mechanical and Moisture Resistance Performance of Silver Nanoparticle Reinforced Fish Skin Gelatin Films. (2010) Harding, H., Ludwick, A., Samuel, T., Young, S., & Aglan, H. Nanotech, 1, 897-900.
- Effect of Mechanically Induced Ventilation on the Indoor Air Quality of Building Envelopes, T Paul, D. Sree and H. Aglan, Energy and Buildings 42 (2010), 326-332.
- Influence of Natural Inhibitor, Pigment and Extender on Corrosion of Polymer Coated Steel, A. Abdel-Gabera, B. El-Nabeya, E. Khamisa, O Abdelattefa, H. Aglan, A. Ludwick, Progress in Organic Coatings 69 (2010) 402–409.
- Temperature and Power Consumption Measurements as a Means for Evaluating Building Thermal Performance, D. Sree, T. Paul and H. Aglan, Applied Energy, V. 87, Issue 6, June 2010, Pages 2014-2022.

Synergistic Research and Education Activities

- **Pioneering Flood Damage Research that Impacts Codes and Standards** - In the early 2000s Tuskegee University (Dr. Heshmat Aglan) began research into the impact of floods on building materials. This pioneering work was sponsored by the US Department of Housing and Urban Development (HUD), the Federal Emergency Management Agency (FEMA), and the US Department of Energy (DOE). The Tuskegee flood research is frequently cited in the field (including in the United Kingdom) and has served as a "starting point" for several subsequent research activities. In 2010, the Tuskegee research provided a "scientific basis" for the revision of FEMA's Technical Bulletin 2 (TB-2). Previously this Bulletin had been based solely on expert opinions. The 2015 revision process of the International Residential Code (IRC) has also cited the Tuskegee research as the basis for proposed current changes. These changes are expected to be codified in the 2015 edition of the IRC. http://www.ibsadvisorsllc.com/_library/ORNL_Field_Testing_of_Energy_Efficient_Flood_Damage_Resistant_Residential_Envelope_Systems.pdf.

- **Development an Affordable-Energy-Efficient-Healthy House** - Sponsored by the Department of Energy through Oak Ridge National Laboratory, an affordable, energy efficient and healthy house was designed and demonstrated. The primary objective in the design and construction of the Tuskegee prototype-housing unit was the maintenance of a holistic and synergistic view of the three design criteria: low cost (affordability), energy efficiency, and healthy indoor air quality (IAQ). This affordable, energy efficient healthy house has received national recognition and is featured on the Homes-Across-America.org.
- **Development of Nanostructured Thermoplastic Polyimide Coatings -** The main objective of this research was to formulate and evaluate nanotructured polyimide coatings for erosion and corrosion protection of graphite epoxy composites and metallic structures. Coatings from these systems were formulated using multi walled carbon nanotube (MWCNTs) as reinforcement. Corrosion and sand erosion tests were performed to evaluate the performance of these coatings. *(A patent describing the formulation of these coating systems (Patent* number: US 9034426) *was granted on May 19th, 2015).*
- **Development of In-situ Repair Technology for Railhead Defects -** Slot welding via a multi-pass gas metal arc weld (GMAW) approach for in-situ repair of railhead defects was developed by Dr. Aglan. A defect is removed via machining a perpendicular slot in the railhead leaving the web and base unaltered. A sufficient number of GMAW passes are used to fill the slot using a weld material suitable for the particular type of parent steel. Pre and post-weld heat treatment can be used to cause austenization and/or quenching of the weld. The weld heat inputs and other parameters are controlled to avoid ductile and brittle fracture related morphologies. *(A patent describing the technology (*Patent number: US 20140166766 A1) was issued: June 17, 2016).
- **NUCOR –Education and Research Center (NERC) -** The Nucor Center of Excellence at Tuskegee University, developed by Aglan, is comprised of three main components; Education, Research, and Outreach. The education component consists of the development and implantation of several courseware modules, short courses, and technical seminars. Each semester several undergraduate students are hired and mentored by faculty and graduate students to conduct research of interest to Nucor. In addition, local middle and high school students through linkage and outreach programs participate in key research and applied activities. It provides engineering graduates with basic and applied knowledge of steels and their related technologies. In addition to the major funding provided by Nucor, synergistic research activities, funded by the Federal Railroad Administration, NSF, Missile Defense Agency, and Raytheon, are leveraged to provide extra resources for the center.

Thesis Advisor and Postgraduate Scholar Sponsor

Dr. Aglan has supervised about 40 MS students and 6 PhD students.

Postgraduate scholars (a total of 20 postgraduate scholars supervised)