



Ilige Hage

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Biography

Ilige S. Hage is an assistant professor of Mechanical Engineering at Notre Dame University –Louaize (NDU). Dr. Hage received her doctorate degree in Mechanical Engineering (Materials and Manufacturing) from the American University of Beirut, Lebanon in 2015; her master's degree in Mechanical Engineering (Materials and Manufacturing) from Ecole Centrale de Nantes (ECN), France in 2011 and her bachelor degree in Mechanical Engineering from the Lebanese University (ULFG2), Roumieh in 2011. Dr. Hage currently teaches courses in Notre Dame University after joining in spring 2017 as an assistant professor. Her research interests are in the area of materials processing, manufacturing, biomechanics, simulation and modeling with emphasis on biomaterials.

Peer-reviewed Journals

International

- I. Hage, R. Hamade. Segmentation of histology slides of cortical bone using pulse coupled neural networks optimized by particle-swarm optimization. *Comput. Med. Imaging Graphics* 2013;. 37-7 (2013): 466-474.
- I. Hage, R. Hamade: Geometric-attributes-based segmentation of cortical bone slides using optimized neural networks. *2015 Journal of bone and mineral metabolism* (2015): 1-15.
- I. Hage, R. Hamade: Automatic detection of cortical bone's Haversian osteonal boundaries. *Aims Medical Science*, Volume 2 (4): 328–346.
- I. Hage, R. Hamade : Intracortical stiffness of mid-diaphysis femur bovine bone: lacunar–canalicular based homogenization numerical solutions and microhardness measurements. *Journal of Materials Science: Materials in Medicine*. 2017 Sep 1;28(9):135.
- I. Hage, R. Hamade: an experimentally validated combined stiffness formulation for a finite domain considering volume fraction, shape, orientation, and location of a single inclusion. *International Journal of Applied Mechanics*. 10, 1850011 (2018).
- Hage, R. Hamade: Computerized Segmentation of Cortical Porosity's Area Fractions and Aspect Ratios. A study of intracortical porosity's area fractions and aspect ratios using computer vision and pulse-coupled neural networks. *Medical & biological engineering & computing* 57 (3), 577-588
- Hage, R. Hamade: an experimentally validated combined stiffness formulation for a finite domain considering volume fraction, shape, orientation, and location of a multiple inclusions. *Comptes Rendus. Mécanique* 348 (2), 113-135
- C. Seif, I. Hage, R. Hamade. Utilizing the drill cutting lip to extract johnson cook flow stress coefficients for al6061-t6. *CIRP Journal of Manufacturing Science and Technology* 26, 26-40
- C. Ghnatios, RM. Hage, I. Hage. An efficient Tabu-search optimized regression for data-driven modeling. *Comptes Rendus Mécanique* 347 (11), 806-816
- RM. Hage, I. Hage, C. Ghnatios, I.S. Jawahir, R. Hamade. Optimized tabu search estimation of wear characteristics and cutting forces in compact core drilling of basalt rock using PCD tool inserts. *Computers & Industrial Engineering* 136, 477-493

- C. Seif, I. Hage, R. Hamade. Incorporating dual BCC/FCC Zerilli-Armstrong and blue brittleness constitutive material models into Oxley's machining shear zone theory. *Journal of Manufacturing Processes* 50, 663-675.
- C. Seif, I. Hage, RM Hage, R. Hamade. Exploiting The Drill Cutting Lip to Quantify the Contributions of Process Parameters To Cutting Pressures _ A Response Surface Analysis. Accepted. IJMR-37001
- C. Seif, I. Hage, R. Hamade. Extracting HCP Zerilli-Armstrong Material Parameters For Magnesium Alloy AZ31B From Orthogonal Cutting Tests. *Journal of Materials Processing Technology*, Accepted. PROTEC-D-20-01098R1

Peer-reviewed Conference Proceedings

International

- I. Hage, R. Hamade: Toward quantifying geometric microstructural differences between primary and secondary osteons via segmentation. In *Biomedical Engineering (MECBME), 2014 Middle East Conference on* (pp. 371-374). IEEE.
- I. Hage, R. Hamade: Observations on the Geometric Distribution of Micro-structural Features in Cortical Bone. In *Proceedings of the World Congress on Engineering (Vol.1)* (2014).
- I. Hage, R. Hamade, S. Mu'tasem: Application of homogenization theory to study the mechanics of cortical bone. In *ASME 2014 International Mechanical Engineering Congress and Exposition*, paper accepted. American Society of Mechanical Engineers.
- I. Hage, R. Hamade: Micro-FEM Orthogonal Cutting Model for Bone Using Microscope Images Enhanced Via Artificial Intelligence. *Procedia CIRP* 2013;8:384-9.
- I. Hage, R. Hamade.: Micro FEM simulations of single-cutting-edge sawing of cortical bone. In *ASME 2013 International Mechanical Engineering Congress and Exposition*, pp. V03AT03A049-V03AT03A049. American Society of Mechanical Engineers.
- I. Hage, R. Hamade: Structural Feature-attribute-based Segmentation of Optical Images of Bone Slices Using Optimized Pulse Coupled Neural Networks (PCNN). In *ASME 2013 International Mechanical Engineering Congress and Exposition* (pp. V03BT03A019-V03BT03A019). American Society of Mechanical Engineers.
- I. Hage, R. Hamade: Smart segmentation of Bone histology slides using Pulse coupled neural networks (PCNN) optimized by particle-swarm optimization (PSO). In *6th ECCOMAS Conference on Smart Structures and Materials 2013*, Politecnico di Torino (pp. 24-26).
- I. Hage, R. Hamade: Statistical and physical micro feature-based segmentation of cortical bone images using artificial intelligence. *Materials Science Forum* (Vol. 783, pp. 222-227).
- C. Seif, I. Hage, F. Ismail, R. Hamade. A Design of Experiment to Study the Effects of Cutting Speed and Feed on the Generated Drilling Thrust and Torque in Aluminum Alloys. *ASME 2017 International Mechanical Engineering Congress and Exposition*, pp. V002T02A005
- I. Hage, C. Seif, R. Hamade: Measuring Compressive Modulus of Elasticity Across Cortical Bone Thickness of Mid-Diaphysis Bovine Femur. *ASME 2016 International Mechanical Engineering Congress and Exposition*, pp. V003T04A071 V003T04A071. 16. , 2016.
- I. Hage, R. Hamade: Segregation of Cortical Bone's Haversian Systems Via Automated Image Segmentation. In *ASME 2015 International Mechanical Engineering Congress and Exposition*, paper accepted. American Society of Mechanical Engineers.
- I. Hage, R. Hamade: Effect of an ellipsoidal void's volume fraction, shape, orientation, and location on the composite's elastic modulus. *ICMCSF 2015*. Paper accepted.
- I. Hage, R. Hamade: Distribution of Porosity in Cortical (Bovine) Bone. In *ASME 2015 International Mechanical Engineering Congress and Exposition* pp. V003T03A085-V003T03A085.
- I. Hage, R. Hamade: Structural micro processing of Haversian systems of a cortical bovine femur using optical microscope and matlab. In *ASME 2012 International Mechanical Engineering Congress and Exposition* (pp. 595-601). American Society of Mechanical Engineers.
- I. Hage R. Hamade, R. Hage, C. Seif,. Statistically validated combined stiffness formulation for a finite composite domain considering volume fractions, shapes, orientations, locations, and number of multiple inclusions. *ASME-IMECE2018-86231- V002T02A038*
- I. Hage, R. Hage, R. Hamade, C. Seif. Relating Energy Dispersive X-ray (EDX) Mineralization Radial Measurements of Cortical Bone to Elastic Stiffness. *ASME- IMECE2018-86233- V003T04A028*
- C. Seif, I. Hage, R. Hamade. Modeling and experimental verification of torque and thrust forces generated by the conventional drill's chisel edge. *ASME IMECE2018-86155 - V002T02A037*
- C. Seif, I. Hage, R. Hamade. Determining cutting pressure coefficients for aluminum 6061-T6 using a small number of drilling experiments. *ASME IMECE2018-86224 - V002T02A002*
- RM. Hage, I. Hage, C. Ghnatos, R. Hamade. Statistically Validated and Optimized Tabu Search Estimation of Cutting Tool Life in Turning. *ASME-IMECE2018-86232 - V009T12A022*

- C. Ghnatios, I. Hage, N. Metni. Modeling the human knee using the Proper Generalized Decomposition. MATEC Web Conf. 261, 2019.
- RM Hage, I. Hage, C. Ghnatios. Advanced tool-life estimation using Tabu search algorithm, Optimization of fitting techniques using Tabu search algorithm. Data-Best 2019.
- C. Seif, I. Hage, A. Baydoun, R. Hamade. Investigation of drilling temperature in relation to machining conditions and cutting time. ASME 2020, IMECE2020-23270. Accepted.
- I. Hage, RM. Hage, C. Ghnatios, A. Bydoun, R. Hamade. An optimized statistical model for predicting composite' modulus of elasticity. ASME 2020, IMECE2020-24560. Accepted.

Chapters in Books

International

- Hage, R. Hamade: Micro-FEM Orthogonal Cutting Model for Bone Using Microscope Images Enhanced Via Artificial Intelligence. Procedia CIRP 2013;8:384-

Exhibitions, Competitions and Creative Work

Local

- I. Hage, R. Hamade: Distribution of Area Fraction of Pores in Cortical Bone's Pericortical and Intracortical Regions. 5th AUB biomedical research day, Saturday, February 21, 2015, American University of Beirut. Award for outstanding poster presentation.
- I. Hage, R. Hamade,: Bone image segmentation using neural networks". 3rd AUB biomedical research day, Saturday, February 16, 2013, American University of Beirut. Poster presentation.
- CNRS research project approved, entitled: Human joints impact measurement and optimization (HJIMO) Total budget in Million LBP 32