

Hussien A. Hussien, Ph.D.

Curriculum Vitae

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EDUCATION

- Doctor of Philosophy of Mechanical Engineering, July 1998
University of Illinois at Chicago, Chicago Illinois.
- Master of Science of Mechanical Engineering, December 1992
Bradley University, Peoria, Illinois.
- Bachelor of Science (Honors) of Mechanical Engineering, November 1989
University of Khartoum, Khartoum, Sudan.

RESEARCH INTERESTS

- Multi-Body System Dynamics applications to ground vehicles and machineries
- Full vehicle simulation accuracy to reduce cost and time in prototypes testing and evaluate vehicle attributes trade offs.
- Explore new ways to shorten the product design cycle to meet market demand without affecting product quality and performance.
- Improve product design for manufacturability, serviceability, and reduced fuel consumption.
- Reduce physical testing and measurements by using semi-analytical simulations

PROFESSIONAL AFFILIATES

- Member of the SAE Society of Automotive Engineers and served as technical papers reviewer
- Member of the PMI project management institute. I am also certified PMP

HONORS & AWARDS

- North American Product Programs Award for " Truck Durability Road to lab Migration Achievement" Ford Motor Company (Dearborn Michigan July 2009)
- World Wide Proving Grounds Vehicle Engineering Achievement Award for "Non-Destructive PT Mount Load Transducer" Ford Motor Company (Dearborn Michigan June 2008)
- Product Analysis & Verification Achievement Award " Analytical Body Mounts Loads Prediction for Durability" Ford Motor Company (Dearborn Michigan 2001)

RESEARCH

Currently working in moving partial durability routes from proving ground to lab simulator to reduce timing and cost and improve reliability

A- RESEARCH FUNDING

- *Study The Wheel Base and Track Width effect on Cars and Trucks Wheel Force Transducer Loads*" Funded by Vehicle Prototypes Group at Ford Motor Company (US\$1,000,000) from 2001- 2003.

B- PUBLICATIONS

1. A. A. Shabana, **Hussien A. Hussien**, J. L. Escalona, 'Absolute Nodal Coordinate Formulation,' ASME Design Engineering Technical Conference September 1997, Sacramento, California, 1997.
2. A. A. Shabana, **Hussien A. Hussien**, J. L. Escalona, 'Application of the Absolute Nodal Coordinate Formulation to Large Rotation and Large Deformation Problems,' ASME Journal of Mechanical Design, March 1998, Vol. 120.
3. A. A. Shabana, **Hussien A. Hussien**, J. L. Escalona, 'Application of the Absolute Nodal Coordinate Formulation to Multi-Body System Dynamics', the Journal of Sound and Vibration (1998) 214(5), 833-851 Article No. sv981653
4. **Hussien A. Hussien**, A. A. Shabana, ET AL, 'Dynamics and Vibration Analysis of a Vehicle Rear Axle System', International Journal Of Vehicle Mechanics and Mobility, Volume 33, Number 4 April 2000 pp. 205-231

C- THESIS:

1. Ph.D. thesis, 'Small and Large Deformation of Multi-Body System Components', University of Illinois at Chicago, Chicago Illinois, 1998
2. MS. Thesis, 'Design and analysis of a Particulate Bed Fixture, 'Bradley University, Peoria Illinois, 1992.

D- PRESENTATIONS

1. Many presentations at Ford Motor Company internal forums that includes:
 - a. Newly developed technologies promotions
 - b. Root Cause Diagnosis
 - c. Design reviews
 - d. Technical reviews
 - e. Training & Technology roll out
2. These forums were chaired by various Ford Motor Company management levels which include:
 - a. Manager Level
 - b. Chief Engineer Level
 - c. Director Level
 - d. Vice President Level

A-FRESH COLLEGE GRADUATE ENGINEERS SUPERVISION

- This a program developed at Ford Motor Company to make the transition from college to auto industry smoother and more beneficial for both the company and the young engineers. I supervised 7 engineers in the last ten years. This duty involved developing training plans based on their interests, teach them the techniques and skills they need to do their future jobs as automotive engineers, and then assess their achievements.

TEACHING

Course	Institution	Semester
Mechanics of Machines I & II	Sudan University for Science and Technology	Fall 2011
Applied Statistics for Engineers	Sudan University for Science and Technology	Spring 2011
Academic Advisor for Sophomore Students	Sudan University for Science and Technology	Spring & Fall 2011
Research & Graduate Programs Committee	Sudan University for Science and Technology	Spring & Fall 2011
Computer Aided Analysis of Multi-body Systems I & II (ME 504& 505) Teaching Assistant	University Of Illinois At Chicago	Spring & Fall 1997
Dynamics of Mechanical Systems (ME 413) Teaching Assistant	University Of Illinois At Chicago	Fall 1996
Statistics For Engineers Teaching Assistant	University Of Illinois At Chicago	Fall 1995
Finite Element Methods in Engineering (ME 577) Teaching Assistant	Bradley University	Spring 1991

SERVICE

Professional Service:

- Served as technical papers reviewer For SAE technical papers
- Served in a committee to develop a new undergraduate program in Mechatronics
- Also Served in a committee as partner with The Solar Energy Reach Center to develop a car that uses solar energy as driving power

Academic Community Service:

- Academic secretary of the mechanical engineering society (MES) at the University Of Khartoum, Sudan 1987 - 1988.

- President of the Sudanese society of North America, Chicago 1994 - 1998.
Organized and supervised 3 annual meetings for members of the Sudanese society in the US. Raised \$ 14000 to fund schools in Sudan

WORK EXPERIENCE

Assistant Professor, Mar 2011-Present

Sudan University for Science & Technology, Khartoum, Assahafa (South Campus)

Developed a new course in applied statistics utilizing Minitab statistics package to get the students hands on training in statistical tools to be used in their final year projects and master and Ph.D. Thesis's. Gave academic advising to the 3rd year students to help them make the right choice that help enhancing their career in the future. Served in a committee to develop a new undergraduate program in Mechatronics. Also served in the graduate programs and researches committee. Also Served in a committee as partner with The Solar Energy Reach Center to develop a car that uses solar energy as driving power

Product Development Engineer, June 2002-Present

Ford Motor Company, Road Loads Tough Trucks, Dearborn, Michigan

Developed & Improved methods and processes to enhance efficiency & quality to meet the high competitive auto industry market. Trained new & less experienced engineers on the methods and tools that needed to do the job. Vehicle program support to Design & Release Engineers and CAE with Road Loads inputs to design Suspension, Body, Frame, and Power Train vehicle components to meet or exceed durability requirement. Provided route cause analysis to durability problems that affect production launch in a timely fashion. Participated in attributes (such as NVH, Safety, Vehicle Dynamics, and Durability) trade off decisions as a subject matter expert in durability. Integrated & coordinated program requirements for road loads through PAT (Product Activity Team) meetings. Multi-Body Dynamics cascade of roads loads inputs to Suspension, Body, Frame, and Power Train components. Vehicle instrumentation with force transducers, torque transducers , and accelerometers for road load data acquisition

Product Development Engineer, April 2000-June 2002

Ford Motor Company, Analytical Road Loads, Dearborn, Michigan

Develop analytical methods for Road Load cascading to Suspension, Body, Frame, and Power Train using Multi-Body Simulation with structural flexibility. Pilot newly developed methods in real vehicle program timing, Identify methods deficiencies and improve it to meet vehicle program support. Rollout the method as standard practice for vehicle program support

Product Development Engineer, Sep 1998-April 2000

Altair Engineering, Inc, Analytical Road Loads, Troy, Michigan

Develop analytical methods for Road Load cascading to Suspension, Body, Frame, and Power Train using Multi-Body Simulation with structural flexibility. Pilot newly developed methods in real vehicle program timing. Identify methods deficiencies and improve it to meet vehicle program support. Rollout the method as standard practice for vehicle program support

Graduate Internship, July 1998-Sep 1998

Motorola, Automotive & Industrial Electronic Group, Northbrook IL.

Developed a computer procedure to evaluate the stresses and fatigue life of the Leads of the electronic components due to the vibration of the board (PCB). Developed a finite element model for the lead using ANSYS to correlate the results.

Research/ Teaching Assistant, May 1995-July 1998

Worked on a project supported by University of Illinois at Chicago and the Spicer Axle Division of DANA Corporation.

Built and tested a finite element model for a rear axle system of a sport utility vehicle. Developed a FORTRAN code based on the finite element model to analyze the forces, displacements, velocities and accelerations of the axle system. Compared the results using a finite element model that is build using ANSYS, and plotted and animated the mode shapes of the rear axle system. Correlated the numerical results with the experimental results. Worked with junior members of the research group and teach them new computer methods related to the research area. Taught Statics & Dynamics and Statistics & probability sessions class

Research/Teaching Assistant, August 1990 - 1992

Worked on a project supported by Bradley University and the Tool Engineering & Fabrication Division of the Boeing Commercial Airline Company.

Investigated and analyzed a work piece fixture called the Particulate Bed Fixture for all types of loading. This fixture is good for variable geometry and size of the work piece. Built a finite element model for the Bed Fixture using ANSYS and correlated the results with the experimental analysis. Conducted a parametric study for the Particulate Bed Fixture by changing the dimensions and the mesh using ANSYS. Taught Finite element sessions

Maintenance Engineer, January 1990 - August 1990

Mercedes Clinic, Khartoum South, Sudan. The job responsibility includes the following:

Automobile maintenance planning and management. Supervising 20 mechanics and technicians.

Operation Engineer, November 1989 - January 1990

Borri Steam Power Station, Khartoum, Sudan. The job responsibility includes the following:

In charge of the shift operation staff. Decision-making concerning the under going operation.

Inspection Engineer Internship, September 1988 - 1989

Sudanese Civil Aviation Khartoum, Sudan. The job responsibility includes the following:

Aircraft maintenance and safety checks. Aircraft accidents investigation from technical point of view.

Basic Engineering Training, February 1985 - May 1985

Sudanese Railway Corporation, Khartoum, Sudan. The job responsibility includes the following:

Welding, Forging, Casting, Metal Cutting, Carpentry, Electric Network...etc.

Personal Statement of Research and Teaching

Dear Sir/Madam,

My interest in research first illuminated during my senior year of undergraduate study (1988). Where I applied research methodology to practical mechanical problems such as investigating Aircraft Accidents and found from engineering perspective what was the root cause of the accident. Hence my research interest enhanced during my M.S. thesis at Bradley University where I investigated and analyzed a work piece fixture called the Particulate Bed Fixture for all possible types of loading. This fixture is good for variable geometry and sizes of the work piece. I built a finite element model for the Bed Fixture using ANSYS software and correlated the results with the hardware experiments results. I also conducted a parametric study for the Particulate Bed Fixture by changing the work piece and bed dimensions and the mesh to study the effect on the fixture grip forces. This research was sponsored by Boeing Company.

My research interest is enhanced more during my Ph.D. thesis at UIC where I developed the mathematical formulation of the Absolute Nodal Coordinate Formulation which imposes great computational advantages over the conventional Floating Frame of Reference Formulation. I also applied this new formulation on practical problems that involve large deformations & rotations. I also applied multi-body system and vibration concepts to the design analysis of a rear axle system manufactured by Dana Corporation.

My research skills continued to flourish and excel through out my industrial experience starting from Motorola through Altair Engineering, Inc, to Ford Motor Company. During this time I was challenged with really complex problems that utilized my multi-disciplinary knowledge in Multi-Body systems Dynamics, Linear and non-linear Vibration, Vehicle Dynamics, Stress & Damage analysis, statistics, Vehicle Durability, Computer Aided Design, and Problem Solving Techniques, to solve them. Due to the sensitivity of the products that we work on at Ford Motor Company, only internal technical reports are allowed to publish. Hence I have no public technical papers to report the findings of the research work I conducted in the auto industry.

My future research plans are to work on design methods to reduce the weight of mechanical system components to reduce cost and increase fuel efficiency, and to explore solar energy use in driving heavy mechanical machinery, and to develop enhanced mechanical components modeling techniques to help reducing prototypes and evaluate design before testing.

I am currently serving in a committee to develop light vehicle that utilizes solar energy as driving power. This project is partnership with the Solar Energy Research Center in Sudan, Soba.

My teaching experience includes teaching courses in mechanical engineering at the School of Mechanical Engineering at Sudan University for Science & Technology, Khartoum Sudan. Where I developed and taught a course in Applied Statistics using statistical package Minitab to provide statistical tools to student to use in their senior project and/or MS and Ph.D. thesis. I am also acting as academic advisor for junior year students. I am also serving at a committee to develop undergraduate program for Mechatronics discipline under the School of Mechanical Engineering.

I also served as research/teaching assistant at Bradley University and University of Illinois at Chicago. The job duties included but not limited to computer lab instructor for finite element modeling using ANSYS software, tutoring students and explaining unclear concepts and helping with projects assigned in some of these classes. The classes included Finite Element Methods in Engineering, Statistics for Engineers, Dynamics of Mechanical Systems, and Computer Aided Analysis of Multi-body Systems I & II.

Yet it worth mentioning that during the last 10 years I have been developing and improving methods and processes to fulfill engineering tasks in more disciplined and smooth way

to achieve cost and efficiency. Then roll out these methods & processes in the form of trainings, seminars, workshops, and one to one discussion, to be implement in the product development environment. In these seminars, and workshops I explained the fundamental engineering concepts behind these methods and it is practical applications in the auto industry. I also used these educational tools to help in streamline the transition of the fresh graduate engineers that hired by Ford Motor Company into the workforce.

I am interested in teaching Mechanical System Dynamics & Statics, Kinematics, Mechanical Vibration, Engineering Mathematics, and Statistics for Engineers, Mechanical Controls, Mechanical Engineering Design, Mechanics of Materials, Mechanics of Machines, and Finite Element Analysis for grad and undergrad courses.

I am also capable of developing new courses that uses the basic knowledge of Engineering applied to practical needs of the industry. Such as Experimental Design, System Engineering Fundamentals, Design for Durability, Six Sigma design, Project Management, and Parameter Design. These courses can be part of the senior year elective or MS. Program.

I am open to new challenges and willing to learn and share what I know. I am very confident that, with my skills, knowledge, experience, and personal qualities, I will be able to contribute to your university's success and advancement.