**Abdallah Ramini**

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**OBJECTIVE**

To use many of my MEMS engineering skills in research and development, hands-on experiments, and mechanical simulation, ideally building systems that combine technological and innovative thinking.

EXPERIENCE SUMMARY

Mechanical engineer (Permanent Resident) with over 10 years of experience in research, development, Failure Analysis, and test planning skills with mechanical devices and microstructures and a focus on their linear and non-linear behavior under motion. Broad expertise includes design, analysis, modeling, and simulation, including Finite Element Analysis (FEA) of mechanics of materials, structural designs, and vibrations as well as the design of experiments and hands-on laboratory experience with prototypes, instrumentation, and test stands. Detail-oriented and versatile, having served in a wide variety of different roles: leader of research team projects, lab manager, teaching professor, mechanical engineering researcher, field engineer, and author and presenter of numerous papers and presentations. , verbal, and written communication. Equally effective as an individual contributor or project team leader. Conduct applied R&D within the context of commercial applications. PhD-educated in mechanical engineering.

SELECTED ACCOMPLISHMENTS

* Awarded 2 grants totaling $130K to research MEMS dynamics. (*Penn. State Univ./ HCT.*)
* Characterized MEMS mirror actuated by repulsive force and parallel plate actuating.
* Designed and developed a confident estimate of the capacitive sensor response detection.
* Designed and modeled a new concept of a combined MEMS-based sensor and actuator for earthquake detection. (*Binghamton Univ.*)
* Diminished the effects of shock and voltage on MEMS devices through developing computationally efficient multi-physics reduced-order model of these MEMS devices.
* Designed MEMS mirrors and PDMS structures to harvest energy from the environment.
* Assisted in building and establishing a MEMS and NEMS characterization lab.
* Modeled, analyzed, and experimentally tested sensors and MEMS components used in industry to study the effects of shock and voltage and minimize their damages.
* Designed and modeled a new concept of a combined MEMS-based sensor and actuator for earthquake detection.
* Published 23 journals and 15 conference articles published in Scientific Reports and JMEMS.

**PROFESSIONAL EXPERIENCE**

**IBM, Poughkeepsie, NY March 2020 - Present**

**Shock/Vibration and Acoustic Engineer**

* Use design documentation, such as Functional Specifications and high-level design documents to develop IBM hardware and technology products, including server systems, storage systems, and networking systems.
* Ensure that the components are unit tested and ready to be integrated into the system product. Provide fixes to defects identified by the verification team during the development life cycle.
* Develop designs across the disciplines of mechanical, electrical, and firmware engineering; tests the functional and RAS (reliability, availability, and serviceability) aspects of the implementation; and supports customer environments in providing end-to-end solutions and resolution of issues.
* Work on delivering quality systems to meet market needs. Establishes relations across IBM and with external suppliers/vendors
* Responsibility for assuring and/or validating the quality of the developed product. Responsibilities include systems bring up and integration, systems performance, hardware test, quality, RAS (reliability, availability, and serviceability), production introduction, and product engineering.
* Responsible for design/test execution and evaluation of Structural (Shock and Vibration) and Acoustics solutions for Power products. Product design reviews, testing, level predictions, and producing agency approvals. Interfacing with thermal and mechanical development engineers to develop optimum and cost-effective solutions.

**Penn State University, Middletown, PA August 2018 – Present**

**Assistant Professor**

Responsible for teaching courses in three primary areas of my expertise: Solid Mechanics, Vibrations, and Control: Teaching load is 9 credits/week.

* Published 2 journal articles on MEMS dynamics.
* Awarded $30K to research MEMS dynamics.

**Higher Colleges of Technology, Dubai, UAE August 2017 – August 2018**

**Assistant Professor**

Responsible for teaching courses in three primary areas of my expertise: solid mechanics, Vibrations, and Control: Teaching load is 9 credits/week.

* Assisted in building and establishing a MEMS and NEMS characterization lab.
* Awarded $100K to research MEMS dynamics.

**Gannon University, Erie, PA August 2016 – August 2017**

**Visiting Assistant Professor**

Responsible for teaching courses in three primary areas of my expertise: Solid Mechanics, Vibrations, and Control. Teaching load was 12 credits/week.

* Published 2 articles on MEMS mirrors using repulsive force and PDMS energy harvester.
* Designed MEMS mirrors and PDMS structures to harvest energy from the environment.

**King Abdullah University of Science and Technology, Jeddah, Saudi Arabia Oct 2013 – Aug 2016 Post-Doctoral Engineer/Lab manager**

Responsible for designing, modeling, and experimentally characterizing microstructures with a focus on their mechanical and motion aspects under linear and nonlinear behaviors.

* Led a team of researchers to study the effect of electrothermal actuation for in-plane MEMS structures to study the effect of axial stress on MEMS, straight and arch microbeams.
* Increased the bandwidth of a capacitive resonator and RF MEMS and shifted the resonance frequency and switching the band to desired ranges depending on the application.
* Assisted a team of researchers to increase the bandwidth of the resonator and Micromirror near primary resonance and MEMS using the mixed frequency excitation, which can be promising for resonant sensing and Energy Harvesting applications.
* Increased the bandwidth of the microbeam resonator near its primary resonances using the mixed and multi-frequency excitations, which can be promising for resonant sensing and applications in MEMS-based gyroscopes and energy harvesting applications.
* Assisted in building and establishing MEMS and NEMS characterization lab (shakers, MSA, ZYGO, drop table test, multimeters) and maintained the safety procedures per the standards.

**Binghamton University, State University of New York, Binghamton, NY Jan 2008 – Oct 2013**

**Post-Doctoral Engineer (**May 2012 – Oct 2013)

* Developed a confident estimate of the system response and detected the parameter ranges where reliability is practically strong and where it becomes weak.
* Led research to maximize the energy harvested from the environment using MEMS and a PDMS device.
* Characterized theoretically and experimentally the behavior of MEMS devices for modeling and design purposes and reported recommendations for the industrial partners using ZYGO and MSA.
* Diminished the effects of shock and voltage on MEMS devices through developing computationally efficient multi-physics reduced-order model of these MEMS devices.
* Assisted in getting early detection of falling that may lead to saving people who fell not only from injuries but also from death and simulated the stability of the switch response.
* Introduced dynamic integrity concepts (safe basin and Local Integrity Measure) to have quantitative information about the loss of structural safety.

**Research & Teaching Assistant** (Jan 2008 — May 2012)

Teaching load was 20 hours/ week. Undergraduate courses were: Control, Vibrations, Dynamics, Statics, Strength of Material, and Mechatronics.

* Designed and modeled a new concept of a combined MEMS-based sensor and actuator for earthquake detection and low-g seismic applications to avoid significant damages.
* Improved the reliability of MEMS devices, gyroscope, and inertia sensors.
* Diminished the effects of shock and voltage on MEMS devices by developing a computationally efficient multi-physics reduced-order model of these MEMS devices.
* Modeled, analyzed, and experimentally tested sensors and MEMS components used in industry to study the effects of shock and voltage and minimize their damages.

**Weatherford, Oil Field Services, Hassi Messaoud, Algeria Jan 2005 – Jan 2008**

**Underbalanced Drilling (UBD) Engineer**

Supervised field trials, performed oil well surveys and managed the UBD crew

* Solved technical issues using different drilling fluids to accelerate the drilling process
* Introduced the PID controller to control the N2 pump unit and simulated its performance.

**EDUCATION**

* Ph.D. Mechanical Engineering, State University of New York, Binghamton, NY. 2012

Thesis: “The Dynamics of Microstructures under Shock and Acceleration”

* M.S. Mechatronics Engineering, Jordan University for Science & Technology, Jordan. 2007

*Thesis: “Optimizing Fuzzy C-Mean Algorithm using GA.”*

* B.S. Mechatronics Engineering, Jordan University for Science & Technology, Jordan. 2004

**SKILLS & STRENGTHS**

• Complex problem solving • Statistics • MEMS • Project Management • Mentorship • Team Leader

• Hands-On • Self-motivated • Work Well Under Pressure • Root Cause Failure Analysis • Oscilloscope

• Mathematica • MATLAB • Finite Element Analysis-FEA • ANSYS • 3D modeling • JMP • SIMULINK

• L-EDIT • Mechanical Desktop • Thermo-Mechanical simulations • LabView • Data acquisition systems

• Electrical and optical characterization • PLC • Micro System Analyzer-MSA • Planar Motion Analyzer

• Ultra-High Frequency • Laser Doppler Vibrometers • Wyko Surface Profilometer • Drop Tables • TP3

• Shakers, Inertia Sensors • Actuators • Optical interferometry • ZYGO interferometer • Optical Analysis

• Function generators • Wafer Probe for MEMS • Design validation testing • Laser interferometer

• Reliability and durability Data analysis and reporting of data • Reliability Data Modeling and Lifetime

• Solid written/verbal skills • Creating and delivering presentations • MS Word • MS EXCEL • BK Connect

• Reports to the executive level audience • MS PowerPoint • Solidworks • AutoCAD • Control systems

• ASME codes & standards • ICD coding • Jira • System architecture • GD&T • Industrial equipment

**RESIDENCY STATUS:** Permanent Resident (Green Card)

**SELECTED PUBLICATIONS**

1. **Experimental and theoretical investigation of an impact vibration harvester with triboelectric transduction**”, *Journal of Sound and Vibration* **416**, 111-124, 2018. A Ibrahim, **A Ramini**, and S Towfighian.
2. “**Tunable resonators for nonlinear modal interactions**” *Scientific Reports* 6*, Nature*, 34717, 2016. **A. Ramini** *et al.*
3. “**Efficient primary and parametric resonance excitation of bistable resonators**” *AIP Advances* 6, 095307, 2016. **A. Ramini** *et al.*
4. "**Theoretical and experimental investigation of the nonlinear behavior of an electrostatically-actuated in-plane MEMS arch**”, *JMEMS* 25(3), 570 – 578, 2016. **A. Ramini** *et al.*
5. “**Multifrequency excitation of a clamped-clamped microbeam**” *Microsystems & Nanoengineering, Nature* (2) 16002, 2016. N. Jaber, **A. Ramini,** and M. I. Younis.