

Umar Amjad (PhD)

Education

Degree: **Doctorate of Philosophy in Engineering**
(**Major:** Civil Engineering and Engineering Mechanics, **Minor:** Physics) 2014
Institute: University of Arizona
Location: Tucson, AZ, USA
Dissertation topic: Multi-component structural health assessment using Guided Acoustic Waves
Grade: CGPA 4.0

Degree: **Master of Science (Physics)** 2008
Institute: University of Leipzig
Location: Leipzig, Germany
Thesis topic: Determination of speed of sound in solid samples by Phase tracking (Institute for Experimental Physics II, University of Leipzig)
Grade: 1.3 (very good)

Degree: **Bachelor of Science (Mathematics, Physics)** 2004
Location: Pakistan

Degree: **Faculty of Science (Mathematics, Physics)** 2001
Location: Pakistan

Work Experiences

- Institute:** Qatar University, Center for Advanced Materials **Aug. 2023 – Current**
Country: Doha, Qatar
Description: I am working as **Research Associate** – NDT (Non-Destructive Testing)
- Institute:** University of Arizona, College of Engineering Nov. 2022 – July 2023
Country: Tucson, AZ, USA
Description: I am working as **Assistant Professor of Practice**
- Institute:** University of Arizona, College of Engineering Aug. 2019 – Oct. 2022
Country: Tucson, AZ, USA
Description: I am working as a **Lead Instructor** for ENGR 102B (Introduction to Engineering design).
- Institute:** University of Arizona, College of Engineering Aug. 2017 – Oct. 2022
Country: Tucson, AZ, USA
Description: I am working as an **Adjunct Instructor** for ENGR 211's courses including Engineering Economics, Dynamics, Statics and Circuits. I developed online lectures for flip-class room environment.
- Company:** Pacific waves NDT LLC. Dec. 2019 – Aug. 2022
Country: Tucson, AZ, USA
Description: I am working as a **Senior Consultant** for Signal processing, Non-Destructive Material Testing and instrumentation development.
- Company:** American Society of Mechanical Engineers (ASME) Aug. 2017 – Current
Country: Tucson, AZ, USA
Description: I am working as a Assistant to Editor in Chief for the ASME Journal for Non-Destructive Evaluation, Diagnostics and Prognostics of Engineering System.
- Institute:** University of Arizona Aug. 2015 – July 2019
Country: Tucson, AZ, USA
Description: I worked as a **Research Associate** for Non-Destructive Material Testing and instrumentation development at department of Civil Engineering and Engineering Mechanics.
- Company:** Intelligent Integrated Structural Health Monitoring (i-ISHM), PLLC Dec. 2015 – June 2017
Country: Tucson, AZ, USA
Description: I worked as **Application Engineer**, duties included: Complex signal processing for Non-Destructive Material Testing and instrumentation development.

Institute: University of Arizona Jan. 2012 – Dec. 2014
Country: Tucson, AZ, USA
Description: I worked as a teaching assistant/instructor/Grader of Mechanics of Solids (**CE-215**), Engineering Mechanics (Statics) (**CE-214**), Mechanics of Fluids (**CE-218**), Fluid Mechanics laboratory (**CE-329**), Numerical Methods (**CE-303**) and Introduction to Finite Element methods (**CE-502**) at Department of Civil Engineering and Engineering Mechanics.

Institute: University of Arizona Aug. 2011 – Dec. 2011
Country: Tucson, AZ, USA
Description: I worked as a **Research Assistant** (Air Force Office of Scientific Research (AFOSR) grant FA9550-08-1-0318) at department of Civil Engineering and Engineering Mechanics.

Institute: Institute of Experimental Physics II Feb. 2009 – May. 2011
Country: Leipzig, Germany
Description: I worked as a **Research Assistant** in the European Union 7th Framework Program Project AISHA – II (Aircraft Integrated Structural Health Assessment – II).

Institute: Institute of Experimental Physics II Dec.2007 - May 2008
Country: Leipzig, Germany
Description: I worked as a **Teaching Assistant** (Course: Data acquisition and signal processing) at Department of Solid State Optics and Acoustics.

Publications

- Two US- Patent Applications (Pending)

Selected Journal Publications:

Park, Sehyuk, Hamad N. Alnuaimi, Anna Hayes, Madison Sitkiewicz, Umar Amjad, Krishna Muralidharan, and Tribikram Kundu. "NONLINEAR ACOUSTIC TECHNIQUE FOR MONITORING POROSITY IN ADDITIVELY MANUFACTURED PARTS." *Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems*: 1-17.

Nikvar-Hassani, Arash, Hamad N. Alnuaimi, Umar Amjad, Saptarshi Sasmal, Lianyang Zhang, and Tribikram Kundu. "Alkali Activated Fly Ash-Based Concrete: Evaluation of Curing Process Using Non-Linear Ultrasonic Approach." *Journal of Nondestructive Evaluation, Diagnostics and Prognostics of Engineering Systems* 5, no. 2 (2022): 021006.

Alnuaimi, H., U. Amjad, S. Park, P. Russo, V. Lopresto, and T. Kundu. "An improved nonlinear ultrasonic technique for detecting and monitoring impact induced damage in composite plates." *Ultrasonics* 119 (2022): 106620.

Alnuaimi, H. N., S. Sasmal, U. Amjad, A. Nikvar-Hassani, L. Zhang, and T. Kundu. "Monitoring Concrete Curing by Linear and Nonlinear Ultrasonic Methods." *ACI Materials Journal* 118, no. 3 (2021): 61-69.

Alnuaimi, H., U. Amjad, P. Russo, V. Lopresto, and T. Kundu. "Monitoring damage in composite plates from crack initiation to macro-crack propagation combining linear and nonlinear ultrasonic techniques." *Structural Health Monitoring* (2020).

S. K. Yadav, U. Amjad, and P. K. Basudhar, "Reinforcement effect on the static analysis of circular footing resting over winkler elastic foundation," *Geotechnical & Geological Engineering*, vol. 38, pp. 1–17, 2018.

Habib, A., A. Shelke, U. Amjad, U. Pietsch, and S. Banerjee. "Nonlocal Damage Mechanics for Quantification of Health for Piezoelectric Sensor." *Applied Sciences* 8, no. 9 (2018).

Amjad, Umar, Susheel Kumar Yadav, and Tribikram Kundu. "Detection and quantification of delamination in laminated plates from the phase of appropriate guided wave modes." *Optical Engineering* 55 (2016): 011006.

Amjad, Umar, Susheel K. Yadav, and Tribikram Kundu. "Detection and quantification of pipe damage from change in time of flight and phase." *Ultrasonics* 62 (2015): 223-236.

Amjad, Umar, Susheel Kumar Yadav, and Tribikram Kundu. "Detection and quantification of diameter reduction due to corrosion in reinforcing steel bars." *Structural Health Monitoring* 14, no. 5 (2015): 532-543.

Zhao, Jinlei, Tengfei Bao, and Umar Amjad. "Optical fiber sensing of small cracks in isotropic homogeneous materials." *Sensors & Actuators: A. Physical* 225 (2015): 133-138.

Shelke, A., U. Amjad, M. Vasiljvic, T. Kundu, W. Grill, "Extracting Quantitative Information on Pipe Wall Damage in absence of clear Signals from Defect", *ASME Journal of Pressure Vessel Technology*, Vol. 134, pp. 051502-1 to 11, 2012.

Shelke, A., T. Kundu, U. Amjad, K. Hahn, W. Grill, "Mode Selective Excitation and Detection of Ultrasonic Guided Waves for Delamination Detection in Laminated Aluminum Plates", *IEEE Transactions on Ultrasonics, Ferroelectric and Frequency Control*, Vol. 58(3), pp. 567-577, 2011.

Shelke, A., S. Banerjee, T. Kundu, U. Amjad, W. Grill, "Multi-Scale Damage State Estimation in Composites using Nonlocal Elastic Kernel: An Experimental Validation", *International Journal of Solids and Structures*, Vol. 48, Issue 7-8, pp.1219-1228, 2011.

Selected Conference proceedings:

- Park, SeHyuk, Imraan Bokhari, Hamad Alnuaimi, Umar Amjad, Robert Fleischman, and Tribikram Kundu. "Inspection of steel tube welded joint using nonlinear ultrasonic technique." In *Health Monitoring of Structural and Biological Systems XVI*, vol. 12048, pp. 269-274. SPIE, 2022.
- Park, SeHyuk, Hamad Alnuaimi, Umar Amjad, and Tribikram Kundu. "Evaluating the Degree of Nonlinearity by Applying the Nonlinear SPC-I Technique in the FEM Simulation of Materials With Breathing Cracks." In *2021 48th Annual Review of Progress in Quantitative Nondestructive Evaluation*. American Society of Mechanical Engineers Digital Collection.
- Park, SeHyuk, Hamad Alnuaimi, Anna Hayes, Madison Sitkiewicz, Umar Amjad, Krishna Muralidharan, and Tribikram Kundu. "Linear and Nonlinear Analysis of Additively Manufactured Material With Different Porosity Induced by Varying Material Printing Speed Using Guided Acoustic Waves." In *2021 48th Annual Review of Progress in Quantitative Nondestructive Evaluation*. American Society of Mechanical Engineers Digital Collection.
- Amjad, Umar, Saptarshi Sasmal, Hamad Alnuaimi, and Tribikram Kundu. "Linear and nonlinear ultrasonic techniques for investigations of cement composites of different ages." *Review of Progress in Quantitative Nondestructive Evaluation* (2019).
- Alnuaimi, H., U. Amjad, P. Russo, V. Lopresto, and T. Kundu. "Linear and non-linear analysis of composite plates using guided acoustic waves." *Health Monitoring of Structural and Biological Systems XIII* 10972 (2019): 109720X.
- Alnuaimi, H., U. Amjad, P. Russo, V. Lopresto, and T. Kundu. "Feasibility of a new nonlinear ultrasonic technique for monitoring damage in composite plates." In *12th International Workshop on Structural Health Monitoring: Enabling Intelligent Life-Cycle Health Management for Industry Internet of Things (IIOT), IWSHM2019*, pp. 2231-2238. DEStech Publications Inc., 2019.
- Amjad, Umar, Christopher Blase, Hamad Alnuaimi, Cac Dao, and Juergen Bereiter-Hahn. "Effects of transducers on guided wave based structural health monitoring." In *Proc. of SPIE Vol.*, vol. 10600, pp. 106000F-1.
- Blase, Christopher, Umar Amjad, Tribikram Kundu, Juergen Bereiter-Hahn, Maximilian Blume, and Robert Sader. "Characterization of dental tissue by reflection and transmission ultrasound microscopy." In *Health Monitoring of Structural and Biological Systems XII 2018*, p. 106000W. SPIE, 2018.
- Amjad, U., S. K. Yadav, Cac M. Dao, K. Dao, and T. Kundu. "Advanced signal processing technique for damage detection in steel tubes." In *SPIE Conference on Health Monitoring of Structural and Biological Systems Conference Location Las Vegas, NV*. SPIE-INT SOC OPTICAL ENGINEERING Location BELLINGHAM, 2016.
- Amjad, Umar, Susheel K. Yadav, Chi H. Nguyen, Mohammad, and Tribikram Kundu. "Guided wave technique for non-destructive testing of StifPipe." *Health Monitoring of Structural and Biological Systems 2015* 9438 (2015): 943805.
- Habib, A., M. Pluta, U. Amjad, A. Shelke, U. Pietsch, T. Kundu, R. Wannemacher, and W. Grill. "2E4-1 Vector contrast imaging of surface acoustic waves by local electric field probes (Piezoelectric devices)." In *Proceedings of Symposium on Ultrasonic Electronics*, vol. 35, pp. 203-204. Institute for Ultrasonic Electronics, 2014.
- Mahmoudabadi, E., U. Amjad, T. Kundu, and H. Saadatmanesh. "Effect of applied load on the nondestructive measurement of concrete strength." *Health Monitoring of Structural and Biological Systems 2014* 9064 (2014): 90641R.
- Amjad, U., Chi Hanh Nguyen, S. K. Yadav, E. Mahmoudabadi and T. Kundu. "Change in Time-of-Flight of Longitudinal (axisymmetric) wave modes due to Lamination in Steel pipes." In *Proc. of SPIE Vol.*, vol. 8695, pp. 869515-1.
- Amjad, Umar, Susheel Kumar Yadav, and Tribikram Kundu. "Guided Wave Technique for Corrosion Detection in Reinforced Steel Bars." In *ASNT 22nd Research Symposium 2013*, pp. 69-73. 2013.

Pluta, Mięczysław, Umar Amjad, Hermann Klinghammer, Diwaker Jha, Khurram Tarar, and Wolfgang Grill. "Stress dependent dispersion relations of acoustic waves travelling on a chain of point masses connected by anharmonic linear and torsional springs." In INTERNATIONAL CONGRESS ON ULTRASONICS: Gdańsk 2011, vol. 1433, no. 1, pp. 471-474. AIP Publishing, 2012.

Abdelrahman, U. Amjad, D. Jha, Tarar, K. S.; Grill, W., "Zero order mode selective excitation and highly resolved observations of lamb waves", Proceedings of SPIE Vol. 7984, 798413 (2011)

Amjad, U.; Jha, D.; Tarar, K. S.; Grill, W., Determination of the stress dependence of the velocity of Lamb waves in aluminum plates, Proceedings of SPIE Vol. 7984, 798410 (2011)

Shelke, A.; Habib, A.; Amjad, U.; Pluta, M.; Kundu, T. Pietsch, U.; Grill, W, Metamorphosis of bulk waves to Lamb waves in anisotropic piezoelectric crystals, Proceedings of SPIE Vol. 7984, 798415 (2011)

Tarar, K. S.; Pluta, M.; Amjad, U.; Grill, W., Lattice dynamics approach to determine the dependence of the time-of-flight of transversal polarized acoustic waves on external stress", Proceedings of SPIE Vol. 7984, 79842R (2011)

Habib, A.; Amjad, U.; Pluta, M.; Pietsch, U.; Grill, W, Surface acoustic wave generation and detection by Coulomb excitation, Proceedings of SPIE Vol. 7650, 76501T (2010)

Hahn, K., Amjad, U.; Tarar, K. S.; Jha, D.; Grill, W., Mode selective excitation and detection of Lamb waves, Proceedings of SPIE Vol. 7650, 76500D (2010)

Amjad, U.; Tarar, K. S.; Shelke, A.; Kundu, T.; Pluta, M.; Grill, W., Generalized representations and universal aspects of Lamb wave dispersion relations, Proceedings of SPIE Vol. 7650, 76502F (2010)

Tarar, K. S.; Amjad, U.; Grill, W., Lumped circuit mechanical models and lattice dynamics approach to the dependence of the time-of-flight of bulk and guided acoustical modes on elongation, Proceedings of the SPIE, Vol. 7650, 76500I (2010)

Habib, A.; Amjad, U.; Pluta, M.; Pietsch, U.; Grill, W, Determination of the velocity of surface acoustic waves with excitation and detection by local electric field probes, Proceedings of 20th International Congress on Acoustics (ICA 2010, Refereed conference proceeding)

Wolfgang Grill, Khurram Shahzad Tarar, Umar Amjad, Amit Shelke, Diwaker Jha and Albert Kamyani, "Novel methods for structural health and load monitoring by high Resolution ultrasonic time-of-flight detection", 1st EASN (European Aeronautics Science Network) Association Workshop on Aerostructures, October 7-8, Suresne (Paris), (2010)

Amjad, U.; Hahn, K.; Tang, T. G.; Grill, W., Non-inertial ultra-wideband acoustic transducers, Proceedings of the SPIE, Volume 7295, pp. 72951U-72951U-8 (2009).

Tarar, K. S.; Meier, R.; Amjad, U.; Grill, W., Stress detection with guided acoustic ultrasonic waves by non-linear elastic and geometric effects, Proceedings of the SPIE, Volume 7295, pp. 729518-729518-8 (2009).

Amjad, U.; Ndop, J.; Twerdowski, E.; Grill, W., Determination of the velocity of sound with high resolution by ultrasonic imaging of wedge shaped objects in transmission with vector contrast, Proceedings of the SPIE, Volume 6935, pp. 69351C-69351C-7 (2008).

For more information and latest updates, please visit:

[Umar Amjad - Google Scholar](#)

Professional Society Memberships (Past and Present)

- Member of IEEE-UFFC Society (IEEE Ultrasonics, Ferroelectrics, and Frequency Control)
- Member of ASME (American Society of Mechanical Engineers)
- Member of ASNT (American Society of Non-Destructive Testing)
- Member of SPIE (International Society for Optics and Photonics)

Awards and Honors

- ❖ Received Alexander Von Humboldt Foundation, (Germany) Junior Researcher Fellowship July 2017
- ❖ Best Poster and Presentation award, Department of Civil Engineering & Engineering Mechanics, University of Arizona, 2012.
- ❖ Annual student show case 2012, University of Arizona, 2nd Award (Poster and Presentation)
- ❖ American Society of Non-destructive Testing ASNT, Graduate student Travel Grant Award, 2013.
- ❖ Served as a Judge at the Annual Student Showcase of 2013 at the University of Arizona.

Leadership Experience

- Lead Instructor and Coordinator for ENGR 102A/B (Introduction to Engineering Design) teaching team (2021-July 2023).
- Interim Chief Technology Officer, Pacific Waves NDT LLC. (2019-2021)
- Participated in Board of Editors meeting of American Society of Mechanical Engineers to represent / discuss Structural Health Monitoring research (2018)
- Representative of Department of Civil Engineering and Engineering Mechanics at Summer Engineering Academy University of Arizona (2014).
- Member of Graduate Advisory Council at the University of Arizona.
- Elected Representative of College of Engineering at Graduate and Professional Student Society of the University of Arizona (2013-2014).
- Mentored undergraduate student for the SHM and NDT related research projects funded by Honors College at the University of Arizona.
- Participated and organized technical consortium meetings at the University of Leipzig, Germany for the European Union Seventh Framework Program (EU-FP7)

Expertise and Skills

Expertise: Teaching and curriculum development for engineering design courses
3D Printing of complex structures and material characterization
Non- destructive testing using ultrasound, Non – linear Acoustics
Signal Processing (Phase, Magnitude and Time-of-Flight)
Phase contrast acoustic microscopy

**Computational
-Skills:**

Intermediate Computer Programming skills efficient in working with multiple operating systems environment (Linux, UNIX, MSDOS and Windows). Proficient in Microsoft Office Suite programs and related applications.

User skills:

Data analysis and processing using technical software's like, MatLab, Origin and LabView.

General:

Project and Group Management - ability and patience to plan/organize work and set priorities to meet established deadlines on short notices and motivate and lead a team with confidence.

Exceptional Perspective and Communication skills - pleasant personality, tactful and strong communication skills including effective oral, written presentation, organizational and listening skills
Language skills – English, Urdu, Hindi, German and Punjabi