Ayan Haldar

Cardiff, UK
Date of Birth: February 4^{th}, 1988

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Work Experience

Current Jun 2019	Postdoctoral Associate at Cardiff University Supervisor: Prof. Carol Featherston, Prof. Alicia Kim (UCSD) Implemented finite elements for hybrid composite and piezoelectric actuators using in-house finite element code. Topology optimisation and fiber optimisation using level-set method of vibrational-energy harvesters with MFC transducers to enhance power generation.
Dec 2013 - Jun 2019 Jun 2019	Scientific Co-worker at Leibniz Universität Hannover Supervisor: Prof. Raimund Rolfes, Dr. Eelco Jansen Developed semi-analytical and finite element tools to analyse multistable variable stiffness laminates (with curvilinear fiber paths). Extended to include MFC actuators. Writing project proposals, reports and presenting results in project meetings.
Feb-June 2012	Intern at DLR, Stuttgart 3D Finite Element modelling of ceramic matrix composite material
June 2009-August 2011	Structural Engineer at Bharat Heavy Electrical Limited, Noida, Responsible for design of different super and sub structures in thermal power plants

Education

October 2019	Ph.D. in Department of Civil Engineering, Leibniz Universität Hannover awarded Excellent (summa cum laude) Thesis: "Multistable Morphing Structures using Variable Stiffness Laminates" Advisor: Prof. Raimund Rolfes
Oct 2014- Mar 2015	Visiting Scholar at LMT, École Normale Supérieure, Cachan Advisor: Prof. Ollivier Allix
June 2017- Aug 2017	Visiting Scholar at ACCIS, University of Bristol Advisor: Prof. Paul Weaver
Sep 2013	Master in Science Degree in Computational Mechanics (Erasmus Mundus) UPC Barcelona, University of Stuttgart Thesis: "Isogeometric Shape Optimization of Shells with Large Deformations" Computational Structural Mechanics Lab, University of Cambridge Advisor: Dr. Fehmi Cirak
Aug 2009	Bachelor of Engineering with Hons. in Civil Engineering Birla Institute of Technology and Science, Pilani Thesis: "Nonlinear FE analysis of RC structural component accounting for creep and shrinkage", Computational Structural Dynamics Group, SERC-Chennai Advisor: Dr. G.S. Palani

List of Publications

Journals

[1] "Morphing of variable stiffness composite laminates using piezoelectric actuators". By P.M. Anilkumar, A. Haldar, E. Jansen, B.N. Rao, and R. Rolfes. In: Composite Structures (2020), [Accepted].

[2] "EngiO Object oriented Framework for Engineering Optimization". By R. Berger, B.Hofmeister, M. Bruns, A. Haldar, and R. Rolfes. In: Advances in Engineering Software (2020), [Accepted].

[3] "An efficient semi-analytical framework to tailor snap-through loads in bistable variable stiffness laminates". By A. Haldar, R.M.J. Groh, E. Jansen, P.M. Weaver, and R. Rolfes. In: International Journal of Solids and Structures 195 (2020), pp. 91–107.

[4] "Analysis of Novel Morphing Trailing Edge Flap Actuated by Multistable Laminates". By A. Haldar, E. Jansen, B.Hofmeister, M. Bruns, and R. Rolfes. In: AIAA Journal (2020), pp. 1–10.

[5] "Design optimization of multistable variable-stiffness laminates". By P.M. Anilkumar, A. Haldar, E. Jansen, B.N. Rao, and R. Rolfes. In: Mechanics of Advanced Materials and Structures 26 (2019), pp. 48–55.

[6] "Thermally induced multistable configurations of variable stiffness composite plates: Semi-analytical and finite element investigation". By A. Haldar, J. Reinoso, E. Jansen, and R. Rolfes. In: Composite Structures 183 (2018), pp. 161–175.

[7] "Effect of creep, shrinkage and cracking on time dependent behaviour of RC structures". By A. Haldar, S. Gopinath, G.S. Palani, and Nagesh R Iyer. In: Journal of Structural Engineering (JoSE) 36.6 (2010), p. 387.

In preparation

[1] "A refined analytical model to analyse bistable laminates with piezoelectric actuators". By A. Haldar, P.M. Anilkumar, E. Jansen, B.N. Rao, and R. Rolfes. In: Smart Structures and Systems (2021), [Under Review].

[2] "A review on vibrational based energy harvesters using Macro-Fiber Composites". By A. Haldar, C. Featherston, and A. Kim. In: Journal of Intelligent Material Systems and Structures (2021), [Under Review].

[3] "Topology and fiber optimisation of composite-based broadband energy harvesters". By A. Haldar, C. Featherston, S. Townsend, and A. Kim. In: Journal of Intelligent Material Systems and Structures (2021), [In preparation].

[4] "Asymmetric bistability of unsymmetrical laminate: Numerical and semi-analytical investigations". By A. Phanendra Kumar, P. M. Anilkumar, A. Haldar, S. Scheffler, R. Rolfes, and B. N. Rao. In: Computers and Structures (2021), [In preparation].

[5] "Broadband bistable energy harvesters using variable stiffness laminates". By A. Haldar, C. Featherston, and A. Kim. In: Smart Structures and Systems (2021), [In preparation].

Patent

[1] Combination of several bistable elements for an integrated multistable system. By A. Haldar (40 %), E. Jansen (10 %), J. Riemenschneider (25 %), and M. Pohl (25 %). DE 10 2018 115 476 A1. 2/2020.

Book Chapter

[1] "Snap-through of bistable configurations generated from variable stiffness composites". By A. Haldar, J. Reinoso, E. Jansen, and R. Rolfes. In: Multiscale Modeling of Heterogeneous Structures, Springer International Publishing (2018), pp. 61–82.

Conferences

[1] "Role of thickness variation on the tailored bistability of unsymmetric composite laminates". By P. M. Anilkumar, A. Phanendra Kumar, A. Haldar, and B.N. Rao. In: IOP Conference Series: Materials Science and Engineering, 1^{st} International Conference on Recent Advancements in Design and Manufacturing (ICRADM 2020); SVNIT, Surat 1004 (July 2020), p. 012004.

[2] "Numerical studies on the design of self-resetting active bistable cross-shaped structure for morphing". By P.M. Anilkumar, A. Haldar, S.Scheffler, E. Jansen, B.N. Rao, and R. Rolfes. In: Proceedings on 1^{st} International Electronic Conference on Actuator Technology: Materials, Devices and Applications (IeCAT 2020). Vol. 64. 1. 2020, p. 16.

[3] "Analysis of Morphing Trailing Edge Flap with Embedded Multistable Variable Stiffness Laminates". By A. Haldar, E. Jansen, and R. Rolfes. In: AIAA/ASCE/AHS Structures, Structural Dynamics, and Materials Conference, San Diego, California. 2019.

[4] "Selected results on the development and testing of smart blades technologies for wind turbines". By M. R. Zhuzhell, S. Optiz, J. Riemenschneider, A. Haldar, and R. Rolfes et al. In: Proceedings der ECCOMAS Thematic Conference on Smart Structures and Materials - SMART 2019, Paris. CIMNE. 7, 2019, pp. 102–117.

[5] "Smart Trailing Edges for Wind Turbines". By J. Riemenschneider, M. Pohl, R. Ungurán, V. Petrovi , M. Kühn, A. Haldar, H. Madhusoodanan, E. Jansen, and R. Rolfes. In: Smart Materials, Adaptive Structures and Intelligent Systems. Vol. 51944. American Society of Mechanical Engineers. 2018, V001T04A001.

[6] "Analysis of post-buckled variable stiffness panels using Ritz and Koiter's method". By E. Spigarolo, R. Vescovini, L. Dozio, E. Jansen, and A. Haldar. In: 21^{st} International Conference on Composite Structures (ICCS21). 2018.

[7] "Tailoring snap-through loads in variable stiffness composites". By A. Haldar, E. Jansen, R. Rolfes, and P.M. Weaver. In: AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Kissimmee, Florida. 2018.

[8] "Effect of Actuation Procedure in MFC Actuators for Morphing of Bistable Laminates". By P.M. Anilkumar, A. Haldar, E. Jansen, B.N. Rao, and R. Rolfes. In: 11^{th} Structural Engineering Convention - SEC 2018, At Jadavpur University, Kolkata, India. 2018.

[9] "Design Optimization of Multistable Variable-Stiffness Laminates". By P.M. Anilkumar, A. Haldar, E. Jansen, B.N. Rao, and R. Rolfes. In: International Conference on Composite Materials and Structures- ICCMS, Hyderabad. 2017.

[10] "Investigating Design Space of Variable Stiffness Laminates with Intitial Curvature". By A. Haldar, E. Jansen, and R. Rolfes. In: International Conference on Composite Materials and Structures- ICCMS, Hyderabad. 2017.

[11] "Snap-through of Multistable Variable Stiffness Composites using Piezoelectric Actuators". By A. Haldar, E. Jansen, and R. Rolfes. In: Abstract in Proceedings of ICCS20 - 20^{th} International Conference on Composite Structures, Paris, September 4 – 7. 2017.

[12] "Multistable variable stiffness composites for adaptive structures: a parametric study". By A. Haldar, J. Reinoso, E. Jansen, and R. Rolfes. In: 2^{nd} International Conference on Mechanics of Composites, Porto. 2016.

[13] "Structural Analysis Tools and Concepts for Rotor Blades with Morphing Trailing Edge". By A. Haldar, S. Garmabi, M. Bishara, E. Jansen, and R. Rolfes. In: Online Proceedings of Wissenschaftstag 2016, DLR, Braunschweig, Germany. 2016.

[14] "Multistability of plates through variable stiffness composites using Rayleigh Ritz Method". By A. Haldar, J. Reinoso, E. Jansen, and R. Rolfes. In: 7^{th} ECCOMAS Thematic Conference on Smart Structures and Materials (SMART2015), Ponta Delgada, Azores, Portugal. 2016.

Honours and Awards

Oct 2019	Awarded summa cum laude for Excellent doctoral thesis.
Jun 2018	Best Paper Award SEC-2018, Kolkata.
Jan 2017	Received BmWi grant from SMARTBLADES2.0 project.
Dec 2013	Received IRTG Grant 1627 by DFG for pursuing Ph.D. (selected among 120 students)
Nov. 2011	Erasmus Mundus scholarship from European Commission for pursuing Masters (€48,000).
May 2010	Best employee award at BHEL, Noida.
Nov. 2007	First pize at Civil Engineering Case Study, Contech 07.

Teaching and Service

1. Independent instructor for the course "Composites and Light-weight structures" (2016-17, 2017-18). Gave oral presentations, organized tutorials and exams, introduced a teaching script with working examples, conducted mock exams.
2. Prepared lectures for the class on Composite structures, LUH-Hannover, Instructor: Prof. Raimund Rolfes.
3. Co–advisor for bachelor and master theses in Civil Engineering at LUH Hannover and Cardiff University.
4. Reviewer for Journal of Composite Structures, Journal of Intelligent Materials Systems and Structures, International Journal of Mechanical Sciences.

Languages and Programming Skills

1. Mother tongue: Bengali, Fluent in Hindi, English. C1 in German.
2. Experience programming in C++, Fortran, Python.
3. Experience with mathematical software such as Matlab, Mathematica, LabView, LaTeX.
4. Experience with FE software such as ABAQUS, ANSYS, COMSOL.
5. Experience with Adobe Illustrator, Blender, MeshLab, Paraview and ImageJ.

Interests and Activities

Painting, Sketching, Photography
History of Art, Architecture, World History, Philosophy
Cricket, Badminton, Hiking