AVISHEK CHANDA

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PROFILE

I am currently working as a Postdoctoral Research Associate at the Composite Materials and Engineering Center, Washington State University, Pullman, WA, USA. I am a skilled researcher with a good background and knowledge in various product testing and quality control works, along with fire studies and mechanical characterization. My current research involves mass timber structures, renewable materials and biodegradable composites for structural, decorative and architectural applications. I have experience in fabricating various specific geometric structures from lignocellulosic materials including developable surfaces and testing the effect on flammability due to formability. Fire resistance and fire retardancy also lie within the boundaries of my expertise, while having quite a bit of experience in CAD and Finite Element Analysis. I have a strong ability to focus critically on the overall objective, teams, requirements, limitations and goals. My work has enabled me to gain significant knowledge in forming, processing, CAD designing, numerical and experimental fire-performance analysis and statistical evaluation of critical parameters. I can efficiently work both as a team player in lead roles and as an individual to achieve goals.

HONOURS AND AWARDS

Marie Curie Fellowship 2022

Recipient of the Marie Curie Fellowship and the Seal of Excellence Award with Lulea University of Technology.

3rd Best Paper Award at ANTEC ® 2021: Australia-New Zealand Chapter 2021

The award was given on the conference paper submitted to the prestigious Antec 2021 conference, which included AUD$500 cash prize along with other accolades.

WORK AND RESEARCH EXPERIENCE

Postdoctoral Research Assistant, Composite Materials and Engineering Center, Washington State University, Pullman, WA Dec 2021 - Present

Manager: Director and Prof. Dr Vikram Yadama

- ❖ Work on the running industrial and government funded projects, while maintaining a cordial relationship with all the industrial partners
- ❖ Prepare grants and supervise the current PhD, Masters, and Undergraduates
- ❖ Lecture CE 215 every Spring and Fall semesters

Current Projects:

- ➢ Framed vacuum bagging technique for resin transfer molding of decorative natural fiber panels – ***Role Primary Investigator***
- ➢ Numerical simulation and manufacturability of a bio-based corrugated small-scale sandwiched structural panels – Phase I – ***Role Primary Investigator***
- ➢ Phase II -- Development of fiberboard from hemp fiber/hurd – ***Role Co-Primary Investigator***
- ➢ Natural fiber reinforced nylon-6 composites for under-the-hood applications – ***Role Co-Primary Investigator***
- ➢ Liquid molding of wood strand panels with large curvature for automotive applications – a sustainable solution – ***Role Researcher***
- ➢ A Non-Woven, Bamboo-Based Strand Composite Process to Manufacture Low-Cost Roofing – ***Role Researcher***
- ➢ Durable laminated strand-veneer composite panels for mass timber construction – ***Role Researcher***
- ➢ Demonstration of Fire Performance of Durable Wood Strand Mass Timber Panels – ***Role Researcher***

Research Assistant, Centre for Advanced Composite Materials, University of Auckland, New Zealand, 2021

Manager: Dist. Prof. Dr Debes Bhattacharyya

- ❖ Work and coordinate with industrial partners and participate in scientific conferences
- ❖ Increase the research outlook of the department through publications and patents

Effect on flammability due to formability of plywood structures, University of Auckland, New Zealand, 2016-2021

Supervisor: Dist. Prof. Dr Debes Bhattacharyya

- ❖ Creating standard geometric structures from plywood for possible applications in structural and building purposes

Ministry of Business Innovation and Entrepreneurship Grant: 2018

The grant was awarded from MBIE in collaboration with CACM for pursuing my doctorate

Australian Research Centre Grant 2016

The grant was awarded from ARC in collaboration with The University of Auckland for my doctorate project

Best final year project (Bachelor's degree) 2014

The final year project was selected as the best among 65 projects in the department

PUBLICATIONS

Book Chapters

Das, R., Chanda, A., Brechou, J., & Banerjee, A. (2023). Impact behaviour of fibre– metal laminates. In Dynamic Deformation, Damage and Fracture in Composite Materials and Structures (2nd Edition), pp. 535-598. Woodhead Publishing

Chanda A., Kim NK., & Bhattacharyya D. (2020). A Study of the Fire Performance of Timber-Walled Compartments. In: Makovicka Osvaldova L., Markert F., Zelinka S. (eds), Wood & Fire Safety. WFS 2020. Springer, Cham.

Das, R., & Chanda, A. (2016). Fabrication and Properties of Spin-Coated Polymer Films. In Nano-size Polymers (pp. 283-306). Springer, Cham.

Das, R., Chanda, A., Brechou, J., & Banerjee, A. (2016). Impact behaviour of fibre– metal laminates. In Dynamic Deformation, Damage and Fracture in Composite Materials and Structures, pp. 491-542. Woodhead Publishing.

Shaw, M. C., Das, R., & Chanda, A. (2016). Damage Tolerance, Reliability and Fracture Characteristics of Multilayered Engineering Composites

Journal Publications

James, A. A., Rahman, M. R., Huda, D., Rahman, M. M., Uddin, J., Bakri, M. K. B., & Chanda, A. (2023). Optimization of novel nanocomposite powder for simultaneous removal of heavy metals from palm oil mill

- ❖ Generating developable surfaces from plywood materials both theoretically and experimentally
- ❖ Observing the flammability effects on plywood due to the introduction of formability
- ❖ Manufacturing different sandwich cores and hybrid veneer composites and testing their mechanical and fire-reaction properties
- ❖ Significant publications and experience in technical writing and test documentations as per standard requirements

Impact Analysis of Segmental Curved Bridge incorporating Unilateral Contact, The University of Auckland, New Zealand, 2015 to 2016

Supervisor: Dr Raj Das

- ❖ Developing a numerical framework through MATLAB to simulate the impact analysis of curved bridge segments during seismic vibrations
- ❖ Develop and apply a unique impact response model based on Unilateral Contact to various types of curved segment interactions

Investigating the low-velocity response of fibre metal laminates, The University of Auckland, New Zealand, 2016

Role: Advisor

- ❖ Help the intern students in understanding and approaching the various experimental studies on low-velocity impact of fiber metal laminates.
- ❖ Guide them to use Abaqus software in numerically representing experimental studies on the impact response and present the same in an international conference.

To Study the Tribological Properties of Industrial Mineral Oil with Cuo Nanoparticles as Additives, SRM University, Chennai, India, 2013 to 2014

Advisor: Dr Shubrajit Bhaumik

- ❖ Study and observe the Tribological properties of different oils systems and modify a high viscosity oil with CuO nanoparticles to increase the Tribological behaviour

EDUCATION

PhD in Mechanical Engineering
University of Auckland: Nov 2016 to Jan 2021

Determine and statistically optimise the parameters responsible for forming thin-walled veneered structures, including analytical representation. Eventually, observe the effects of formability on flammability in various formed structures including corrugated and honeycomb sandwiches and introduce a novel fire-retardant hybrid veneer-composite.

Project: Formability and flammability of thin-walled veneer structures

Masters in Engineering Studies (Mechanical Engineering)
University of Auckland: March 2015 to Feb 2016

Perform analytical studies in MATLAB to simulate and report the

effluent (POME) by response surface methodology (RSM). Environment, Development and Sustainability, 1-27.

Chanda, A., & Bhattacharyya, D. (2022). Introduction of the developable surface concept in fibrous composite materials. Composites Part A: Applied Science and Manufacturing. 157, 106910

Chanda, A., Kim, N. K., & Bhattacharyya, D. (2022). Effects of adhesive systems on the mechanical and fire-reaction properties of wood veneer laminates. Composites Science and Technology, 109331.

Chanda, A., Kim, NK., & Bhattacharyya, D. (2021). Manufacturing and characterisation of wood-veneer sandwich panels with flame-retardant composite cores. Composites Communications, 27, 100870.

Chanda, A., & Bhattacharyya, D. (2021). A parametric study to minimise spring-back while producing plywood channels. Journal of Cleaner Production, 304, 127109.

Chanda, A., Kim, NK., Wijaya, W., & Bhattacharyya, D. (2021). Fire reaction of sandwich panels with corrugated and honeycomb cores made from natural materials. Journal of Sandwich Structures & Materials.

Vasudevan, A., Shanmugam, V., Balasubramanian, N.K., Krishnamoorthy, Y., Ganesan, V., Försth, M., Sas, G., Berto, F., Chanda, A., & Das, O. (2021). Impact Response and Damage Tolerance of Hybrid Glass/Kevlar-Fibre Epoxy Structural Composites. Polymers 13, no. 16, 2591.

Chanda, A., Dutta, S., & Bhattacharyya, D. (2020). Shape conformance via spring- back control during thermo-forming of veneer plywood into a channel section. Materials and Manufacturing Processes, 35:7, 859-868.

Chanda, A., & Bhattacharyya, D. (2018). Formability of wood veneers: a parametric approach for understanding some manufacturing issues. Holzforschung, 72(10), 881- 887.

Chanda, A., & Bhattacharyya, D. (2018). Understanding the applicability of natural fibre composites in hybrid folded structures. Advanced Materials Letters, 9(9), 619-623.

Banerjee, A., Chanda, A., & Das, R. (2017). Historical origin and recent development on

impact response of curved bridge segments with the aid of a novel non-smooth model. Academic courses on Composite Materials, Risk Management, Industrial Automation, Medical Devices and Manufacturing and Industrial Processes were also completed.

Project: Impact analysis of curved bridge segments

Bachelor in Technology (Mech. Eng.)
SRM University: June 2010 to May 2014

Major courses studied - Machine Design ‖ Material Science ‖ Fluid Dynamics ‖ Mechanics of Materials ‖ Kinematics and Dynamics ‖Thermodynamics ‖ CAD and CAE software.

Project: Study the Tribological Properties of Industrial Mineral Oil with CuO Nanoparticles as Additives.

TEACHING EXPERIENCE

January 2022 to Present: Independent Lecturer for CE 215: Mechanics of Materials

Teach the entire course both Spring and Fall semesters, with a class of 55 students. The main aspects of the course include making students of Junior and Senior years how stresses are applied, beam design. Combined loading applications and to successfully understand bending, shear force and buckling in beams. My workload included 100% lecturing, assignment and exam preparations, while coordinating with the Tas every semester.

March 2016 to June 2021: Graduate Teaching Assistant for MECHENG 334: Design Engineering 3M

Taught 25% of the course where the 3rd year undergraduate students were introduced to the good practice and standard methods in mechanical engineering design. Average size of class over the years can be estimated at 50 students. The students are tasked with making a detailed conceptual and working design with machine elements, engineering science and engineering mechanics through advanced CAD, CAM and CAE tools. My main role was to introduce the students to Ansys Workbench and work with CREO and AutoCAD Inventor for mechanical analysis. The work also involved teaching the aspects of CAM in CREO and Inventor CAM to generate the G-code of their designs, which were further manufactured and tested.

March 2017 to June 2021: Graduate Teaching Assistant for MECHENG 235: Design and Manufacturing 1

Taught 30% of the course where the 2nd year undergraduate students learnt the engineering design process through teamwork and problem solving with activities involving design, analysis, optimization, synthesis, production and fabrication. The class strength per GTA was 30. Various aspects such as design reliability, safety measurement, required tolerances and the basic principles of designing were taught in a practical way through real-life projects in the form of Warman Robot and Window Washer Design.

normal directional impact models for rigid body contact simulation: A critical review. Archives of Computational Methods in Engineering, 24(2), 397-422.

Banerjee, A., Chanda, A., & Das, R. (2017). Seismic analysis of a curved bridge considering deck-abutment pounding interaction: an analytical investigation on the post-impact response. Earthquake Engineering & Structural Dynamics, 46(2), 267- 290.

Chanda, A., Banerjee, A., & Das, R. (2017). Oblique Frictional Unilateral Pounding Analysis in Two Successive Curved Bridge (S Type) Segments. Fluid Mechanics Research International Journal, 1(2), 00006.

Banerjee, A., Chanda, A., & Das, R. (2016). Oblique frictional unilateral contacts perceived in curved bridges. Nonlinear Dynamics, 85(4), 2207-2231.

Chanda, A., Banerjee, A., & Das, R. (2016). The Application of the most suitable Impact Model (s) for simulating the Seismic Response of a Straight Bridge under Impact due to Pounding. International Journal of Scientific & Engineering Research, 7(2)

Conference Papers

Chanda, A., Kim, NK., & Bhattacharyya, D. (2021) An introduction to the possible combinations of veneer composites. In Antec ® 2021, May 11 to 21, Denver, CO.

Chanda, A., Dutta, S., & Bhattacharyya, D. (2020, May). Experimental Investigation on the Fire-performance of corrugated Sandwich Panels made from Renewable Material. In 23rd International Conference on Laminar Composites and Sandwich Structures, Feb 15-16, 2020, Istanbul, Turkey.

Dutta, S., Chanda, A., Rahman, M. Z., Das, R., & Bhattacharyya, D. (2019). A numerical model to simulate the impact response of flax-PP composites. ICCM22 2019, 3529.

Banerjee, A., Chanda, A., & Das, R. (2016, November). A Simplified Exact Compliance Normal-Directional Contact Model. In ASME 2016 International Mechanical Engineering Congress and Exposition. American Society of Mechanical Engineers Digital Collection.

Chanda, A., Banerjee, A., & Das, R. (2015). Sensitivity analysis of the impact parameters on the seismic response of straight bridges.

August 2017 to November 2017: Graduate Teaching Assistant for ENGEN 204: Professional Skills and Communications

Taught 80% of the course where the 2nd year undergraduate students were introduced to a system wide role of engineering professionals in society and business. The class comprised of 45 students. The students were familiarized with the skills of advocacy, individual and group-based communications, scenario presentations and working in group-projects where the various aspects were needed to be addressed through team participation and problem solving. Academic writing also formed an integrate part of the course.

May 2017 to June 2021: Teaching Assistant in the department of Mechanical Engineering

MECHENG 747: Manufacturing and Industrial Processes (2017 to 2020, August to November) - exam invigilation, marking test scripts, providing feedbacks and answering various queries.

MECHENG 742: Advanced Materials Manufacturing (2020, August to November) - conducting and accessing presentations of each student, providing feedbacks, doing general supervision, conducting exams and marking.

MECHENG 242: Mechanics of Materials 1 (2018 to 2020, March to July) - providing lab demonstrations and helping the students with the various aspects of the lab, marking lab submissions and providing feedbacks to the students.

MECHENG 795: Final Year Project (2018 to 2019, August to November) - conducting presentations, setting up, marking preliminary presentations, and providing feedbacks and final marks to the students.

PROFESSIONAL TRAINING

No8 Retail Group (Caltex Brown's Bay), Customer Service Representative, Feb 2019 - Present

- Customer service
- Independent station management
- Financial calculations and banking
- Newly hired staff induction and training

SkyCity Convention Centre, Conventions and Outcatering Attendant, Convention Centre, July 2016 – July 2019

- Impeccable customer service
- Event management, pack in and pack out
- Cash management and bartending, with the complete responsibility of the bar including alcohol and financial book-keeping and banking

Eden Park (Spotless), Cashier, Catering, July 2015 – July 2018

- Proving 5-star hospitality and customer service
- Cash handling and maintaining the proper flow of people in and out with fast and efficient customer handling and pos handling capabilities.

In 2nd Australasian Conference on Computational Mechanics, Brisbane, Australia (Vol. 30).

Chanda, A., Bhattacharyya, D. (2021) Chemical-free modification process of plywood to achieve a novel developable surface. In Forrest Products Society Virtual International Conference, 2021, June 15-17.

Chanda, A., & Bhattacharyya, D. (2018, July). Formability Study of Plywood for Specific Geometric Formations. In 11th Asian-Australasian Conference on Composite Materials, Cairns.

Chanda, A., Goutagny, E., & Das, R. (2017, January). Investigating the low velocity response of fibre metal laminates. In Twenty-fifth International Conference on Processing and Fabrication of Advanced Materials (PFAM XXV), Auckland, New Zealand.

PRESENTATIONS

- "Chemical-free modification process of plywood to achieve a novel developable surface", Forrest Products Society International Conference, 18 June 2021.
- "An introduction to the possible combinations of veneer composites", Antec ®, 20 May 2021.
- "A Study of the Fire Performance of Timber-Walled Compartments", International Scientific Conference on Woods & Fire Safety, 2nd-4th Nov 20.
- "Formability Study of Plywood for Specific Geometric Formations", 11th Asian-Australasian Conference on Composite Materials, 29th July to 1st August 2018.
- "Understanding the applicability of natural fibre composites in hybrid folded structures", Advanced Materials World Congress, 4th to 8th February 2018.
- "Investigating the low velocity response of fibre metal laminates", Twenty-fifth International Conference on Processing and Fabrication of Advanced Materials (PFAM XXV), 22nd to 25th January 2017.
- "The Application of the most suitable Impact Model(s) for simulating the Seismic Response of a Straight Bridge under Impact due to Pounding", International Conference on Modern Engineering, Science & Technology, 28 November 2016.

LANGUAGES

Bengali: Mother Tongue
Hindi: Native Language
English: Advanced Proficiency

CADD Centre Private Limited, Graduate Engineer Trainee, Mechanical Engineering, August 2014 – March 2015

- Reviewed design drawings, specifications and customer requirements for newly engineered components and processes.
- Provided hands-on technical support, advice and mentoring to all levels of personnel.
- Taught Mechanical Engineering Software such as Ansys Workbench, CREO Parametric, Solid Works and AutoCAD 2D and 3D.
- Ensured fully satisfied students with a constructive feedback process.

Certification in "Basics of MATLAB Programming", UDEMY, 2020
Description: Learnt how to develop independent codes and the various functional applications in MATLAB.

Certification in "Basics of Hypermesh, ProCAE, Hyperworks ATC, 2013
Description: Learnt the use of the software and possible applications in the field of CAE

Professional in painting, Pracheen Kala Kendra, 2008
Description: Gained knowledge and experience in using various styles of painting

Aeromodelling Workshop, Yogiki, Chennai, 2010

PROFESSIONAL SERVICES

Symposium Organizing Committee

6th International Conference on Computational Methods, Auckland, New Zealand, 2015

Peer-Reviewed Articles for:

European Journal of Wood and Wood Products
Forests, Materials
Journal of Sustainability
Journal of Applied Sciences
Bio Resources, Building Materials
Coatings
Polymer Testing
Journal of Renewable Materials
Wood Material Science and Engineering

COMPUTER SKILLS AND LANGUAGES

- **Microsoft office suite**: Expert proficiency
- **AutoCAD 2D and 3D**: Intermediate to expert proficiency
- **CREO Parametric**: Intermediate proficiency
- **Pyrosim and Fire Dynamic Simulator**: Intermediate to expert proficiency
- **Ansys Workbench**: Intermediate proficiency
- **Abaqus CEA**: Intermediate proficiency
- **MATLAB**: Basic to intermediate proficiency
- **SolidWorks**: Basic to intermediate proficiency
- **AutoCAD Inventor CAD and CAM**: Basic proficiency

German: Beginner

REFERENCES

Available on request

HOBBIES

I love playing cricket and currently play for WSU Cricket Club. Previous clubs include Papakura Cricket Club in Premiere Division, Birkenhead Cricket Club and Cornwall Cricket Club. Other hobbies include traveling and collecting foreign currencies.