Avishek Chanda, PhD

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Pullman
WA, USA

PROFILE

Dedicated Research Assistant Professor with a proven track record in product testing, quality control, and expertise in fire studies and mechanical characterization. Demonstrated proficiency in creating value-added products from forest and agricultural by-products, specializing in structural and non-structural applications within the built environment. Skilled in fabricating intricate 3-dimensional lignocellulosic structures and employing innovative techniques to enhance fire resistance and formability. Adept in mechanical and structural design and analysis, with a keen analytical ability to align objectives, teams, and goals for project success.

Noteworthy accomplishments include serving as Principal Investigator (PI) and co-PI for multiple running and finished projects, as well as securing three provisional patents. Engages in national and international collaborations, showcasing a commitment to advancing research on a global scale. Recipient of the prestigious Marie Curie fellowship and mentored twenty graduate and undergraduate students.

Eager to contribute expertise and leadership in an open and collaborative environment focused on sustainable and environmentally friendly initiatives. Committed to driving excellence, brilliance, and impactful actions that benefit the world and mitigate carbon footprint.

PATENTS AND LICENSES

Non-provisional Patent 07/2023 – Co-Inventor

Title - Methods of Preparing Plant-Based Prepregs for Composite Laminates

Status – Non-provisional patent has been filed with the US Patent and Trademark Office.

Provisional Patent 07/2023 – Lead Inventor

Title - Framed Vacuum Bagging Technique for Resin Transfer Molding of Decorative natural Fiber Panels

Status – Licensing and patenting filing options are being discussed with the interested company, who intends to license it by 2024

WORK AND RESEARCH EXPERIENCE

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

Current Projects:

- Framed vacuum bagging technique for resin transfer molding of decorative natural fiber panels (WSU Commercialization Funds, 2023-24) – **Primary Investigator**
- Evaluation of veneer byproducts (veneer clipping waste) to structural composites lumbers (SCL) – Phase I (BIPA with Metsa, 2024) – **Co-Primary Investigator**
- A non-woven bamboo-based strand composite process to manufacture low-cost roofing (NSF STTR Phase II & TECP, 2024) – **Co-Primary Investigator**
- Natural fiber reinforced nylon-based composites for under-the-hood applications - Sustainability Analysis (NSF Center of Bioplastics and Biocomposite, IUCRC, 2022-24) – **Co-Primary Investigator**
- Decorative Architectural Panels from Agricultural Byproducts – Phase II (USDA SBIR Phase-II, 2023-25) - **Co-Primary Investigator**
- Decorative composite panels from agricultural waste byproducts (USDA NIFA AFRI, 2023-27) – **Co-Primary Investigator**
- Climate Smart Forestry linked Mass Timber Military Construction Solution (US DOE and University of Washinton, 2024-26) – **Co-Primary Investigator**

Postdoctoral Research Associate, Composite Materials and Engineering Center, Washington State University, Pullman, Dec 2021 – April 2024

Manager: Prof. Dr Vikram Yadama

- Produce value-added products for various applications in the built environment from forest and agricultural wastes and by-products.
- Help prepare grants, work with industrial partners, and supervise the current PhD, Masters, and Undergraduates.
- Lecture undergraduate courses as and when required.

Projects:

- Development of a Prototype of a Molded Wood Strand Composite Voxel for Metavoxel (BIPA with Metavoxel, 2023-24) – **Primary Investigator**
- Numerical simulation and manufacturability of a bio-based

Provisional Patent 04/2024 – Co-inventor

Title - Design of a Commercial-Size All-Metal Mold for Vacuum Assisted Resin Transfer Molding of Thick Natural Fiber Panels

Status – Licensing and patenting filing options are being discussed with the interested company, with possible licensing in 2025

Provisional Patent 05/2024 – Co-inventor

Title - Bamboo-Based Strand Composite Panels for Construction Applications

Status – Licensing and patenting filing options are being discussed with the interested company, with potential licensing in 2024

HONOURS AND AWARDS

Top Downloaded Article, Wiley 2024

A publication from last year, "A Review of the Synthesis, Properties, and Applications of 2D Materials", received the award from the publication house.

Marquis Who's Who Honored Listee 2023

I was selected and honored with the listing on the world-famous list of influential and reputed people in various fields.

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 paper submitted to Antec 2021 conference, which included AUD$500 cash prize along with other accolades.

Ministry of Business Innovation and Entrepreneurship Grant: 2018

The grant was awarded by 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 (Undergrad) 2014

The final year project was selected as the best among

corrugated small-scale sandwiched structural panels – Phase I (BIPA with Neumayr Design, 2023-24) – **Primary Investigator**
- Phase II -- Development of fiberboard from hemp fiber/hurd (BIPA with BS Woodworks) – **Role Co-Primary Investigator**
- Demonstration of Fire Performance of Durable Wood Strand Mass Timber Panels (USFS) – **Role Researcher**
- Liquid molding of wood strand panels with large curvature for automotive applications – a sustainable solution (USDA) – **Role Researcher**
- A Non-Woven, Bamboo-Based Strand Composite Process to Manufacture Low-Cost Roofing (NSF) – **Role Researcher**
- Durable laminated strand-veneer composite panels for mass timber construction (USFS) – **Role Mentor**

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

PhD Research Scholar, *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
- 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

Research Advisor, Investigating the low-velocity response of fiber 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.

Master Research Project, *Impact Analysis of Segmental*

65 projects in the department.

PUBLICATIONS

Book Chapters

Chanda, A., & Bakri, M. K. B. (2024). Effect of Interfacial Bonding Characteristics on Physical, Mechanical and Fire Performance of Bamboo Fibre Reinforced Composites. In Interfacial Bonding Characteristics in Natural Fiber Reinforced Polymer Composites: Fiber-matrix Interface In Biocomposites (pp. 203-230). Singapore: Springer Nature Singapore.

Chanda, A., & Mishra, A. (2023). Graphene membranes and coatings. In Recent Advances in Graphene and Graphene-Based Technologies. Bristol, UK: IOP Publishing.

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 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.

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

Undergraduate Research, 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 behavior

EDUCATION

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

Determine and statistically optimize 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 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.

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.

Shanmugam, V., Mensah, R.A., Babu, K., Gawusu, S., **Chanda, A.**, Tu, Y., Neisiany, R.E., Försth, M., Sas, G. and Das, O. (2022). A review of the synthesis, properties, and applications of 2D materials. Particle & Particle Systems Characterization, 39(6), p.2200031.

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 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.

TEACHING EXPERIENCE

January 2022 to December 2022 (2 semesters): 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. Achieved a score of ~4/5 in Blue Faculty Evaluation.

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. The average size of a 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.

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 was 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

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)

Selective Conference Presentations and Publications

Hoque, MMU., **Chanda, A.**, Bakri, MKB., Yadama, V., & Garcia Perez, M. (2023) Influence of biochar filler on mechanical properties of basalt fiber reinforced polyamide-6 composite for automotive applications. In Bio-Char III: Production, Characterization and Applications, Sept 17 to 22, Tomar, Portugal.

Chanda, A., Bakri, MKB., & Yadama, V. (2023) Decorative Panels Fabricated from Agricultural Waste By-products. In 34th AAIC Annual Meeting - Building sustainable bioeconomies with industrial crops and products, Aug 27 to 30, Corvallis, OR.

Chanda, A., Bakri, MKB., & Yadama, V. (2023) Composite laminates thermoformed into structures with large curvatures from wood-based prepregs for interior automotive applications. In SWST 66th International Convention, June 25 to 30, Asheville, NC.

Chanda, A., Bakri, MKB., & Yadama, V. (2023) Composite Laminates Thermoformed from Wood-Based Prepregs for Interior Automotive Applications. Plastics in Electric & Autonomous Vehicles Conference 2023, April 16 to 19, Troy, MI.

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., 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.

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.

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

department of Mechanical Engineering

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

MECHENG 742: Advanced Materials Manufacturing (2020, August to November) - conducting and accessing presentations of each student, providing feedback, 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 feedback to the students.

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

PROFESSIONAL TRAINING

No8 Retail Group (Caltex Brown's Bay), Customer Service Representative, Feb 2019 – Sept 2021

- 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

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

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.

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

LANGUAGES

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

REFERENCES

Dr Vikram Yadama

Louisiana Pacific Distinguished Professor in Wood Materials and Engineering

Dept. of Civil & Environmental Engineering

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Dr Debes Bhattacharyya

Fellow of Royal Soc NZ, Distinguished Fellow of Eng NZ, MASME
Distinguished Professor

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University of Auckland

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Mob: +64-21245 4751

Email: d.bhattacharyya@auckland.ac.nz

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

Judge in graduate and undergraduate project showcases

Showcase for undergraduate research and creative activities (SURCA), 2023 and 2024

Graduate and Professional Student Association (GPSA) Research Exposition & Academic Showcase, 2024

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 (MDPI), Journal of Sustainability, Journal of Applied Sciences, Bio Resources, Building Materials, Coatings, Polymer Testing, Journal of Renewable Materials, Wood Material Science and Engineering, Fibers (MDPI)

COMPUTER SKILLS AND LANGUAGES

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

HOBBIES

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