# Amartya Bhattacharjee

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## Professional summary

- Engineer with research and industrial experience in structural analysis, finite element analysis (FEA), structural dynamics, material modelling, fracture mechanics, and probabilistic methods.
- Adept in using numerical modelling tools: MATLAB, ABAQUS.
- Proficient verbal and written communication skills demonstrated by two first-author publications including two best journal research paper awards; interpersonal and organizational skills demonstrated by participation in graduate organization and co-chairing departmental seminar.

## Skills summary

**Domain**: Structural Analysis, Material Modelling, Fine Element Analysis, Structural Dynamics, Fracture Mechanics, Statistical Analysis.
**Programing Languages**: MATLAB, C++
**Tools**: ABAQUS CAE, COMSOL, AutoCAD, STAAD Pro, Microsoft Office, LaTeX

## Education

**Johns Hopkins University** — Baltimore, U.S.A.
*Doctor of Philosophy in Civil & Systems Engineering* — *Aug. 2015 – May 2021*

**Johns Hopkins University** — Baltimore, U.S.A.
*Master of Science in Mechanical Engineering* — *Aug. 2015 – May 2018*

**Indian Institute of Technology** — Kharagpur, India
*Master of Technology in Structural Engineering* — *July 2013 – May 2015*

**Jadavpur University** — Calcutta, India
*Bachelor of Engineering in Construction Engineering* — *July 2009 – May 2013*

## Experience

**Senior Engineer** — April 2022 – September 2023
*Veryst Engineering Llc.* — *Needham, U.S.A.*

- Helped address client product development needs by providing expert opinion, modelling and simulation support to solve technical problems for different industries and applications such as consumer products, medical devices, logistic, and energy storage. These include areas such as thermo-mechanical modelling, fracture and failure analysis,material modelling, calibration and selection, and providing optimized design solutions.
- Used finite element (FEA) software, ABAQUS to run linear and non-linear mechanical and thermo-mechanical simulations for both static and dynamic problems with contact, including virtual topology cleanup on rough client CAD files, FEM meshing, and post-processing of results.
- Wrote a marketing case study to assess the durability of a caster wheel with a pre-existing axle flaw, moving over an uneven factory floor, and suggested rubber material to enhance life.

**Postdoctoral Fellow, Graduate Research & Teaching Assistant** — Aug. 2015 – April 2022
*Johns Hopkins University* — *Baltimore, U.S.A.*

- Conducted research sponsored by the Army Research Laboratory to understand the behaviour of ceramics in extreme environments, participated in weekly meetings and collaborated with a cross-functional team to discuss modelling strategies.
- Developed a 3D crack coalescence and fragmentation model (MATLAB) to predict granular phase transition and fragment morphology of impacted brittle materials.
- Calibrated and implemented a non-linear integrated ceramics model for explicit Finite Element (ABAQUS) simulations of impact experiments which helped reproduce failure patterns more accurately.
- Studied sensitivity of model parameters using regression analysis for sphere indentation simulations and made recommendations for material design modifications to improve impact performance.
- Developed a probabilistic analytical models for brittle fragmentation and reconciled with numerical fragmentation models.

- Led an interdisciplinary collaborative effort to plan validation/calibration experiments for microstructure dependent brittle fragmentation of carbon varying boron carbide.
- Prepared formal presentations for reviews meetings and conferences, and documented reports analyzing results for journal submissions.
- Teaching Assistant at Structural Dynamics Lab, Probability and Statistics for Engineers, Statics and Mechanics of Materials; Grader at Prestressed Concrete.

**Graduate Research & Teaching Assistant** July 2013 – May 2015
*Indian Institute of Technology* *Kharagpur, India*

- Developed numerical model (MATLAB) for calculating stress intensity factor in inclined corner cracks to estimate energetic size effect in compression testing of concrete cylinders.
- Created and executed implicit finite element (ABAQUS) simulations for compression testing of concrete cylinder using Concrete Damage Plasticity model to verify numerical model.
- Teaching Assistant at Solid Mechanics, Concrete Lab.

**Undergraduate Research Assistant** Nov. 2012 – May 2013
*Jadavpur University* *Calcutta, India*

- Studied the effects of corrosion in reinforced concrete beams by conducting perturbation analysis (changes of natural frequency and mode shapes) in ABAQUS.

**Summer Vacation Trainee** June 2012 – July 2012
*Civil Engineering Department, Metro Railway* *Calcutta, India*

- Construction field training at the under-construction Metro railway Noapara carshed.

## Awards & Fellowship

**Best Paper Award - MS&T** Oct. 2022 – Oct. 2022

- Received best paper awards for two journal publications in the Journal of the American Ceramic Society at the 2022 MS&T Conference.

**Hoomes Rich Fellowship** Aug. 2015 – May 2016

- Received Hoomes Rich fellowship for graduate students in the Civil & Systems Engineering department at JHU.

**Best Poster** | *Judge's choice* Apr. 2019 - Apr. 2019

- Received an award of $500 for best poster, (Judge's choice) at the 2019 MACH Conference, Towson, U.S.A. among 49 presenters

## Publications

**Publications**

- **Bhattacharjee, A.**, Bhaduri, A., Hurley, R. C., and Graham-Brady, L. (February 23, 2021). "Failure Modeling and Sensitivity Analysis of Ceramics Under Impact." ASME. J. Appl. Mech. May 2021; 88(5): 051007.
- **Bhattacharjee, A.**, Hurley, R., and Graham-Brady, L.. "Fragmentation and granular transition of ceramics for high rate loading." J Am Ceram 2022; 00: 1- 19
- Ramesh, KT, Graham-Brady, L, ..,**Bhattacharjee, A.**, .. et al. "Models for the behavior of boron carbide in extreme dynamic environments." J Am Ceram Soc. 2021; 00: 1– 19.

## Leadership & Services

**Graduate Seminar Co-chair** Aug 2017-May 2018
*Civil & Systems Engineering, Johns Hopkins University* *Baltimore, U.S.A.*

- Managed the schedule, itinerary and conduction of the graduate seminar speaker series.

**After-school mentor** Sep. 2016-May 2017
*STEM Achievement in Baltimore Elementary Schools* *Baltimore, U.S.A.*

- Mentored students during after-school hours at the Barclay Elementary School, Baltimore.

**Liaison officer** Sep. 2016-May 2017
*Civil & Systems Engineering Graduate Association, Johns Hopkins University* *Baltimore, U.S.A.*

- Served as an intermediary between graduate students, faculty and the university graduate organization.

## Certification

**AutoCAD with AutoLISP** Aug. 2010-Nov. 2010
*Computer Aided Design Centre, Jadavpur University* *Calcutta, India*