

# Arshika Lalan

Google Research India

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🎓 [Google Scholar](#)

## EDUCATION

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**Birla Institute of Technology And Science (BITS), PILANI**

*B.E. (Hons.), Computer Science and M.Sc. (Hons.), Economics*

2017 - 2022

**GPA: 8.75/10**

## WORK EXPERIENCE

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**Google Research India**

*Pre-Doctoral Researcher in MASSI Lab*

Advisors: Prof. Milind Tambe & Dr. Aparna Taneja & Dr. Manish Jain

Worked on developing bandit algorithms for delivering health information to underserved communities in India.

Aug 2022 - Present

**Harvard University**

*Research Assistant in Kreiman Lab*

Advisors: Prof. Gabriel Kreiman & Dr. Mengmi Zhang

Worked on adopting continual learning algorithms for continuous domain adaptations.

Aug 2021 - Jul 2022

**Microsoft**

*Software Development Intern in Cloud+Artificial Intelligence team*

Worked on adding to the reporting services of the Playwright tool by providing User Insights.

May 2021 - Jul 2021

## PUBLICATIONS

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### Conference Publications

\* - equal contribution

2. **Improving Health Information Access in the World's Largest Maternal Mobile Health Program via Bandit Algorithms.**

A Lalan\*, S Verma\*, P Diaz, P Danassis, A Mahale, K Sudan, A Hegde, M Tambe & A Taneja.

*Under Review @ Innovative Applications of Artificial Intelligence Conference (IAAI) 2024.*

[IAAI'24]

1. **Sparse Distributed Memory Using Spiking Neural Networks on Nengo.**

R Ajwani, A Lalan, B Bhattacharya & J Bose.

*Bernstein Conference 2021.*

[Bernstein'21]

### Workshop Publications

2. **Analyzing and Predicting Low-Listenership Trends in a Large-Scale Mobile Health Program: A Preliminary Investigation.**

A Lalan, S Verma, K Sudan, A Mahale, A Hegde, M Tambe, & A Taneja

*Oral Presentation @ Data Science for Social Good Workshop, KDD 2023.*

[KDD-WS'23]

1. **Adherence Bandits.**

J Killian\*, A Lalan\*, A Mate\*, M Jain, A Taneja, & M Tambe

*Artificial Intelligence for Social Good Workshop, AAAI 2023.*

[AAAI-WS'23]

### Preprints

3. **Continual Learning and Out of Domain Generalization in Continuous Domain Adaptation**

A Lalan, S Mandan, M Zhang and G Kreiman.

*preprint 2022*

[Preprint-3].

2. **Epigraphiology: A Graph Network driven Measure for Influence Diffusion of Scientific Articles.**

S Dey, S Kotian, S Saha, A Agarwal, A Lalan, and G Sampatrao.

*preprint 2021*

[Preprint-2].

1. **Stock Price and Job Growth: A Causal Influence Study.**

A Lalan, A Agarwal, S Saha, & S Kar.

*preprint 2021*

[Preprint-1].

## TEACHING EXPERIENCE

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Designed assignments, lab problems, quizzes and conducted tutorials as a teaching assistant (TA) for the following courses.

- **Object Oriented Programming (CS F214)**, Instructor: Dr. Neena Goveas
- **Database Systems (CS F212)**, Instructor: Dr. Swati Agarwal
- **Econometric Methods (ECON F241)**, Instructor: Dr. Aswini Kumar Misra

## RESEARCH PROJECTS

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### MASSI Lab at Google Research

Advisors: Prof. Milind Tambe & Dr. Aparna Taneja & Dr. Manish Jain

*Pre-Doctoral Researcher*

*Aug 2022 – Present*

- **Adherence Bandits**

- Devised "Adherence Bandits," a specialized Restless Multi-Armed Bandits (RMABs) subclass designed to address the complexities of adherence within the domain of public health. . [AAAI-WS'23]

- **Time Series Restless Bandits for increasing listenership in mHealth programs**

- Demonstrated the existence of non-Markovian behavior in Kilkari, posing challenges for adopting SOTA Markovian RMAB systems. Instead, developed non-Markovian time-series restless bandits (TSBs) for optimizing multiple interventions to enhance listenership.
- Designed the CHAHAK system for Kilkari, the world's largest maternal mHealth program with over 32 million active users. CHAHAK is designed to minimize automated dropouts and enhance engagement by strategically allocating multiple interventions to beneficiaries.
- Demonstrated the ability for CHAHAK to increase content exposure of the cohort by 57% and preventing dropouts by 33% of a random policy. [IAAI'24]
- Conducted large-scale Randomized Control Trials (RCT) involving 1M+ beneficiaries and field tested TSB algorithm's effectiveness in Public Health.

### Kreiman Lab at Harvard University

Advisors: Prof. Gabriel Kreiman & Dr. Mengmi Zhang

*Undergraduate Thesis*

*Aug 2021 – Jul 2022*

- Examined the interplay between catastrophic forgetting (CF) and model's generalization capabilities on OOD tasks.
- Examined the adaptability of various state-of-the-art continual learning methods, such as EWC, SI, GEM and GSS, to the continuous domain adaptation setting.
- Illustrated the model's saturation pattern with additional tasks in relation to CF and generalization ability to out-of-domain tasks as it accumulated transferable features within the continuous domain. [Preprint-3]

### APCAIR Lab at BITS Pilani, Goa campus

Advisors: Prof. Snehanshu Saha

*Undergraduate Research Assistant*

*Oct 2020 – Feb 2021*

- **Epigraphiology**

- Conducted cross-validation on Influence-Diffusion scores using statistical methods to validate a distinctive citation scoring model named "Epigraphiology." [Preprint-2]

- **Causal Influence Study**

- Employed causal influence and transfer entropy analysis to determine the relationship between stock prices and job growth and to establish the direction of information exchange. [Preprint-1]

### BINN Lab at BITS Pilani, Goa campus

Advisor: Prof. Basabdatta Sen Bhattacharya and Dr. Joy Bose

*Undergraduate Research Assistant*

*Mar 2020 – Mar 2021*

- Showcased that a biologically inspired spiking neural network(SNN)-based sparse distributed memory (SDM), utilizing N-of-M encoding, exhibits comparable memory capacity performance to conventional Sparse Distributed Memories .
- Established that the SNN-based SDM architecture was agnostic to the type of SNN chosen. [Bernstein'21]

## RELEVANT COURSES

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<b>Computer Science</b>	Data Structures and Algorithms, Machine Learning, Artificial Intelligence, Logic in Computer Science, Object Oriented Programming, Database Systems, Operating Systems, Computer Networks, Compiler Construction.
<b>Mathematics</b>	Probability and Statistics, Calculus, Linear Algebra and Complex Analysis, Differential Equations, Discrete Structures for Computer Scientists.
<b>Economics</b>	Applied Econometrics, Econometric Methods, Game Theory, Microeconomics.

## ACHIEVEMENTS

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- Cleared the regional qualifier exam (RMO) and qualified for the Indian National Mathematics Olympiad.
- Accepted to the Brains, Minds and Machine Summer School 2020, organized by Harvard and MIT, which accepts approximately 5% of all applicants.
- Selected for HackMIT and shortlisted under the "Microsoft Azure: Cause for social good" track.

## POSITION OF RESPONSIBILITY

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- **Campus Representative** | *Women in Machine Learning and Data Science (WiMLDS)* *May 2020 - May 2021*
- **Chief Coordinator** | *Department of Journalism and Media Affairs (DoJMA), BITS Goa* *May 2019 - May 2020*