

RISHI SHARMA

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EDUCATION

École Polytechnique Fédérale de Lausanne (EPFL) Doctor of Philosophy (Ph.D.) Computer Science	<i>September 2021 - Present</i> Expected Graduation: December 2025 Advisor: Prof. Dr. Anne-Marie Kermarrec
RWTH Aachen University Exchange Semester, Computer Science	<i>October 2019 - February 2020</i> Grade: 1.0 (Best Grade: 1.0)
Indian Institute of Technology Mandi Bachelor of Technology Computer Science and Engineering	<i>August 2017 - June 2021</i> Grade: 9.38 (Best Grade: 10.0) Class Rank: 1/146

WORK EXPERIENCE

MIT MEDIA LAB <i>Visiting Doctoral Assistant</i>	<i>October 2024 - Present</i> <i>Prof. Ramesh Raskar</i>
· Working on robust and privacy-preserving self-orchestrating AI systems.	
SCALABLE COMPUTING SYSTEMS LAB, EPFL <i>Doctoral Assistant</i>	<i>September 2021 - Present</i> <i>Prof. Dr. Anne-Marie Kermarrec</i>
· Working on designing scalable, resource-efficient, and privacy-preserving systems for collaborative AI.	
D. E. SHAW INDIA PRIVATE LIMITED <i>Associate Developer Intern</i>	<i>April 2020 - May 2020</i>
· Refactored <i>Resize and Reorder</i> functionalities of the React-JS based <i>fixed-data-table-2</i> project into a more customizable and maintainable Plugins module and obviated the use of Redux.	
RWTH AACHEN UNIVERSITY <i>Research Assistant (HiWi)</i>	<i>November 2019 - February 2020</i> <i>Prof. Dr. Ulrike Meyer & Prof. Dr. Erika Ábrahám</i>
· <i>IT Security Group</i> : Investigated the robustness of Deep Neural Networks to adversarial attacks and evaluated iterative adversarial training as a defense against gradient-based adversarial attacks.	
· <i>Theory of Hybrid Systems Group</i> : Represented the train scheduling problem in the German railway network in Boolean logic problem and pruned the search space to optimize run time.	

AWARDS

- **EPFL Doc.Mobility Award 2024-2025** to support the research visit at MIT Media Lab.
- **Top Reviewer** recognition for academic service to NeurIPS 2024.
- **Teaching Assistant Award 2023** for exceptional contribution to teaching excellence at EPFL.
- **Travel Grants** for NeurIPS 2023 and ICDCS 2023.
- **President of India Gold Medal (2017-2021)** for the best grades across all schools at IIT Mandi.
- **Institute Silver Medal (2017-2021)** for the best grades in the CS department at IIT Mandi.

PUBLICATIONS¹

- [1] Sayan Biswas, Anne-Marie Kermarrec, Alexis Marouani, Rafael Pires, **Rishi Sharma**, and Martijn de Vos. Boosting Asynchronous Decentralized Learning with Model Fragmentation. In *Proceedings of the ACM Web Conference (WWW)*, 2025.
- [2] Sayan Biswas, Mathieu Even, Anne-Marie Kermarrec, Laurent Massoulié, Rafael Pires, **Rishi Sharma**, and Martijn de Vos. Noiseless Privacy-Preserving Decentralized Learning. (*To appear*) *Proceedings on Privacy Enhancing Technologies*, 2025.
- [3] Sayan Biswas, Davide Frey, Romaric Gaudel, Anne-Marie Kermarrec, Dimitri Lerévérénd, Rafael Pires, **Rishi Sharma**, and François Taïani. Low-Cost Privacy-Aware Decentralized Learning. (*To appear*) *Proceedings on Privacy Enhancing Technologies*, 2025.
- [4] Akash Dhasade, Anne-Marie Kermarrec, Erick Lavoie, Johan Pouwelse, **Rishi Sharma**, and Martijn de Vos. Practical Federated Learning without a Server. In (*To appear*) *Proceedings of the 5th Workshop on Machine Learning and Systems*, EuroMLSys '25, 2025.
- [5] Sayan Biswas, Anne-Marie Kermarrec, **Rishi Sharma**, Thibaud Trinca, and Martijn de Vos. Fair Decentralized Learning. In (*To appear*) *3rd IEEE Conference on Secure and Trustworthy Machine Learning (SaTML)*, 2025.
- [6] Youssef Allouah, Akash Dhasade, Rachid Guerraoui, Nirupam Gupta, Anne-Marie Kermarrec, Rafael Pinot, Rafael Pires, and **Rishi Sharma**. Revisiting ensembling in one-shot federated learning. In *Advances in Neural Information Processing Systems*, volume 37, 2024.
- [7] Martijn De Vos, Akash Dhasade, Paolo Dini, Elia Guerra, Anne-Marie Kermarrec, Marco Miozzo, Rafael Pires, and **Rishi Sharma**. Energy-Aware Decentralized Learning with Intermittent Model Training. In *2024 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW)*, pages 1172–1174. IEEE, 2024.
- [8] Martijn De Vos, Sadegh Farhadkhani, Rachid Guerraoui, Anne-marie Kermarrec, Rafael Pires, and **Rishi Sharma**. Epidemic learning: Boosting decentralized learning with randomized communication. In *Advances in Neural Information Processing Systems*, volume 36, 2023.
- [9] Akash Dhasade, Anne-Marie Kermarrec, Rafael Pires, **Rishi Sharma**, Jeffrey Wigger, and Milos Vujanovic. Get More for Less in Decentralized Learning Systems. In *43rd IEEE International Conference on Distributed Computing Systems (ICDCS)*, Hong Kong, China, 2023.
- [10] Akash Dhasade, Anne-Marie Kermarrec, Rafael Pires, **Rishi Sharma**, and Milos Vujanovic. Decentralized Learning Made Easy with DecentralizePy. In *3rd European Workshop on Machine Learning and Systems (EuroMLSys)*, Rome, Italy, 2023.
- [11] **Rishi Sharma**, Shreyansh Kulshreshtha, and Manas Thakur. ZS3: Marrying Static Analyzers and Constraint Solvers to Parallelize Loops in Managed Runtimes. In *32nd Annual International Conference on Computer Science and Software Engineering (CASCON)*, Toronto, Canada, 2022.

PROJECTS

SHATTER

Privacy-Preserving Collaborative AI, Decentralized AI

To appear at PETS '25

EPFL — INRIA

- Developed an efficient decentralized AI system that preserves privacy while retaining convergence. *To appear at PoPETS 2025*.
- Evaluated the privacy-utility tradeoff of correlated-noise-based differential privacy and sparsification-based secure aggregation for decentralized learning. *To appear at PoPETS 2025*.

¹Authors are listed in alphabetical order of last names except for [11].

EFFICIENT-DL

Published at NeurIPS '23 and EuroMLSys '25

Decentralized AI, Time-to-Convergence, Peer Sampling

EPFL

- Through a decentralized peer sampling scheme and client sampling, developed a resource-efficient decentralized learning system for large networks and intermittent availabilities. *EuroMLSys 2025*.
- Demonstrated the effectiveness of random peer sampling on the time-to-convergence in heterogeneous settings through Epidemic Learning. *NeurIPS 2023*.

JWINS

Published at ICDCS '23 and EuroMLSys '23

Communication-Efficiency of Decentralized AI

EPFL

- Designed a scalable decentralized learning system for real-world data distributions to reduce the total communication by up to 4× by cherry-picking important parameters to share.
- Developed DecentralizePy: an open-source framework for implementing decentralized ML systems.

ADVERSARIAL TRAINING

November 2019 - February 2020

Security for ML

RWTH Aachen

- Implemented white-box and black-box adversarial attacks on Deep Neural Networks with frozen embeddings for classifying malicious domain names.
- Investigated iterative training on white-box adversarial examples to improve the robustness of the classifier against adversarial attacks.

PROGRAMMING SKILLS

Languages

Python, C++, Java, Go, Scala

Machine Learning

PyTorch, Tensorflow, Keras, Scikit-Learn

Familiar Technologies

Git, Bash, Docker, MySQL, Apache Spark, ZeroMQ, CUDA

RELEVANT COURSES

Distributed Algorithms

Principles of Computer Systems

Topics in Machine Learning Systems

Modern Natural Language Processing

Machine Learning

Computational Differentiation

Information and Database Systems

High Performance Computing

Operating System and Networks

Satisfiability Checking

Compiler Design

Program Analysis

TEACHING ASSISTANTSHIP

Systems for Data Management and Data Science, EPFL

February 2024 - July 2024

Distributed Algorithms, EPFL

September 2023 - January 2024

Systems for Data Management and Data Science, EPFL

February 2023 - July 2023

Decentralized Systems Engineering, EPFL

September 2022 - January 2023

Systems for Data Science, EPFL

February 2022 - July 2022

Paradigms of Programming, IIT Mandi

February 2021 - June 2021

Data Science 3, IIT Mandi

September 2020 - December 2020

Information and Database Systems, IIT Mandi

February 2020 - August 2020

Project Co-Supervision:

5 Master Theses, 9 Master Research Projects, 4 Internship Projects, and 3 Bachelor Research Projects.

Academic Services:

PC@TMLR'25, NeurIPS'24 (Top reviewer); Assistant reviewer@OSDI'24, NETYS'24, SRDS'24.

REFERENCES

Prof. Dr. Anne-Marie Kermarrec, EPFL

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Prof. Dr. Rachid Guerraoui, EPFL

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Prof. Dr. Manas Thakur, IIT Bombay

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