ARYAN DESHWAL

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EDUCATION

Ph.D. Student, Computer Science   **August 2018–Present**
Washington State University   *Pullman, Washington*

MS, Computer Science   **April 2020**
Washington State University   *Pullman, Washington*
Thesis: A Learning to Search Framework for Multi-Objective Optimization of Manycore Systems Design

Bachelor of Technology, Mathematics and Computing   **May 2017**
Delhi Technological University   *New Delhi, India*

RESEARCH EXPERIENCE

Research Assistant   **August 2018–Present**
EECS Department, Washington State University   *Pullman, Washington*
Advisor: Prof. Jana Doppa

Undergraduate Research Intern   **June 2017–August 2017**
Department of Biotechnology, I.I.T. Roorkee   *Roorkee, India*
Advisor: Prof. Pravindra Kumar

TEACHING EXPERIENCE

Teaching Assistant
EECS Department, Washington State University   *Pullman, Washington*

- CptS 570: Introduction to Machine Learning (Fall-2019)

INDUSTRIAL EXPERIENCE

Research and Development Engineer   **October 2017–May 2018**
Works Applications   *Tokyo, Japan*
Researched and developed novel web techniques to build an enterprise system for the Japanese real-estate market.

Software Engineering Intern   **June 2016–August 2016**
Samsung   *Bengaluru, India*
Developed data analytics tools for the printer solutions team.

AWARDS AND HONORS

- Top Reviewer Award, International Conference on Machine Learning (ICML), 2020

- Outstanding Innovation in Technology Award (for my MS Dissertation), WSU, 2020

- Outstanding Teaching Assistant in Computer Science, College of Engineering, WSU, 2020

- Outstanding Teaching Assistant in Computer Science, School of EECS, WSU, 2020

- GPSA Graduate Research Assistant Excellence Award, Washington State University, 2020

- Alfred Suksdorf Fellowship, Washington State University, 2018-2020

- Travel Award from AAAI Conference on Artificial Intelligence (AAAI), 2020

- Travel Award from Conference on Neural Information Processing Systems (NeurIPS), 2019
- Travel Award from International Joint Conference on Artificial Intelligence (IJCAI), 2019

PUBLICATIONS

Papers Under Review and arXiv Preprints

1. Biresh Kumar Joardar, **Aryan Deshwal**, Janardhan Rao Doppa, Krishnendu Chakrabarty. Optimizing CNNs for High-throughput Training on Heterogeneous Manycore Architectures. *Twenty-Fourth IEEE/ACM Design, Automation and Test in Europe Conference (DATE)*, 2021

2. Syrine Belakaria[†], Zhiyuan Zhou[†], **Aryan Deshwal**, Janardhan Rao Doppa, Deuk Heo, and Partha Pratim Pande. Machine Learning Inspired Design for Multi-Output Switched-Capacitor Voltage Regulator with a Dynamic Capacitor-Frequency Allocation. *IEEE Transactions on Very Large Scale Integration Systems (TVLSI)*, 2020. † Equal contribution.

3. Syrine Belakaria, **Aryan Deshwal**, Janardhan Rao Doppa. Output Space Entropy Search Framework for Multi-Objective Bayesian Optimization. *Journal of Artificial Intelligence Research (JAIR)*, 2020

4. **Aryan Deshwal**, Syrine Belakaria, Janardhan Rao Doppa. Scalable Combinatorial Bayesian Optimization with Tractable Statistical models, 2020. `https://arxiv.org/abs/2008.08177`. *Preprint arXiv:2008.08177.*

5. Syrine Belakaria, **Aryan Deshwal**, Janardhan Rao Doppa. Information-Theoretic Multi-Objective Bayesian Optimization with Continuous Approximations, 2020. `https://arxiv.org/abs/2009.05700`. *Preprint arXiv:2009.05700.*

6. Syrine Belakaria, **Aryan Deshwal**, Janardhan Rao Doppa. Max-value Entropy Search for Multi-Objective Bayesian Optimization with Constraints, 2020. `https://arxiv.org/abs/2009.01721`. *Preprint arXiv:2009.01721.*

Journal Papers

1. **Aryan Deshwal**, Nitthilan Kannappan Jayakodi, Biresh Joardar, Janardhan Rao Doppa, Partha Pratim Pande. MOOS: A Multi-Objective Design Space Exploration and Optimization Framework for NoC enabled Manycore Systems. *ACM Transactions on Embedded Computing Systems (TECS), 18(5s): 77:1-77:23*, 2019.

2. Nitthilan Kannappan Jayakodi, Syrine Belakaria, **Aryan Deshwal**, and Janardhan Rao Doppa. Design and Optimization Framework to Trade-off Energy and Accuracy of Inference on Mobile Platforms via Pretrained Neural Networks. *ACM Transactions on Embedded Computing Systems (TECS), 19(1): 4:1-4:24*, 2020.

Conference Papers

1. **Aryan Deshwal**, Syrine Belakaria, Janardhan Rao Doppa, and Alan Fern. Optimizing Discrete Spaces via Expensive Evaluations: A Learning to Search Framework. *Proceedings of Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI)*, 2020. Acceptance rate: 20%. h5-index: 95.

2. Syrine Belakaria, **Aryan Deshwal**, Nitthilan Kannappan Jayakodi, and Janardhan Rao Doppa. Uncertainty-Aware Search Framework for Multi-Objective Bayesian Optimization. *Proceedings of Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI)*, 2020. Acceptance rate: 20%. h5-index: 95.

3. Syrine Belakaria, **Aryan Deshwal**, and Janardhan Rao Doppa, Multi-Fidelity Multi-Objective Bayesian Optimization: An Output Space Entropy Search Approach. *Proceedings of Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI)*, 2020. Acceptance rate: 20%. h5-index: 95.

4. Syrine Belakaria[†], Zhiyuan Zhou[†], **Aryan Deshwal**, Janardhan Rao Doppa, Deuk Heo, and Partha Pratim Pande. Design of Multi-Output Switched-Capacitor Voltage Regulator via Machine Learning. *Proceedings of Twenty-Third IEEE/ACM Design, Automation and Test in Europe Conference (DATE)*, 2020. † denotes equal contribution. Acceptance rate: 26%. h5-index: 43.

5. Paul Bogdan, Fan Chen, **Aryan Deshwal**, Janardhan Rao Doppa, Biresh Kumar Joardar, Hai (Helen) Li, Shahin Nazarian, Linghao Song, Yao Xiao. Taming Extreme Heterogeneity via Machine Learning based Design of Autonomous Manycore Systems. *International Conference on Hardware/Software Codesign and System Synthesis Companion (CODES), pp 21:1-21:10*, 2019. Acceptance rate: 25%.

6. Syrine Belakaria, **Aryan Deshwal**, and Janardhan Rao Doppa.Max-value Entropy Search for Multi-Objective Bayesian Optimization. *Proceedings of Thirty-Third International Conference on Neural Information Processing Systems (NeurIPS), pp 7823-7833*, 2019. Acceptance rate: 21%. h5-index: 169.

7. **Aryan Deshwal**, Janardhan Rao Doppa, and Dan Roth. Learning and Inference for Structured Prediction: A Unifying Perspective. *Proceedings of Twenty-Eighth International Joint Conference on Artificial Intelligence (IJCAI), pp 6291-6299*, 2019. Acceptance rate: 17.9%. h5-index: 61.

8. Chao Ma, F A Rezaur Rahman Chowdhury, **Aryan Deshwal**, Md Rakibul Islam, Janardhan Rao Doppa, and Dan Roth. Randomized Greedy Search for Structured Prediction: Amortized Inference and Learning. *Proceedings of Twenty-Eighth International Joint Conference on Artificial Intelligence (IJCAI), pp 5130-5138*, 2019. Acceptance rate: 17.9%. h5-index: 61.

Workshop Papers

1. **Aryan Deshwal**, Syrine Belakaria, Janardhan Rao Doppa, and Alan Fern. Optimizing Discrete Spaces via Expensive Evaluations: A Learning to Search Framework. *ICML Workshop on Real World Experiment Design and Active Learning*, 2020.

2. Syrine Belakaria, **Aryan Deshwal**, and Janardhan Rao Doppa. Max-value Entropy Search for Multi-Objective Bayesian Optimization. *ICML Workshop on Real World Experiment Design and Active Learning*, 2020.

3. Syrine Belakaria, **Aryan Deshwal**, and Janardhan Rao Doppa. Uncertainty aware Search framework for Multi-Objective Bayesian Optimization with Constraints. *ICML Workshop on Automated Machine Learning (AutoML)*, 2020.

GRANT PROPOSALS

- Jana Doppa (PI) and Partha Pratim Pande. *Collaborative Research: Medium: Exploiting Synergies Between Machine-Learning Algorithms and Hardware Heterogeneity for High-Performance and Reliable Manycore Computing.* National Science Foundation (NSF), Core Program. $600K (5/2020–5/2023). Funded.
  - My research work on machine learning for combinatorial design optimization by combining domain knowledge and data from cycle-accurate simulations was a central part of this proposal.

CONFERENCE TALKS

- Learning and Inference for Structured Prediction: A Unifying Perspective @ IJCAI Conference, Macao, China, 2019

- Randomized Greedy Search for Structured Prediction: Amortized Inference and Learning @ IJCAI Conference, Macao, China, 2019

- MOOS: A Multi-Objective Design Space Exploration and Optimization Frame-work for NoC enabled Manycore Systems @ Embedded Systems Week Conference, New York City, 2019

- Optimizing Discrete Spaces via Expensive Evaluations: A Learning to Search Framework @ AAAI Conference, New York City, 2020.

PROFESSIONAL AND OUTREACH ACTIVITIES

Program Committee Member

- Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI), 2021

- International Conference on Learning Representations (ICLR), 2021

- Thirty-Fourth Conference on Neural Information Processing Systems (NeurIPS), 2020

- Thirty-Seventh International Conference on Machine Learning (ICML), 2020

- Twenty-Ninth International Joint Conference on Artificial Intelligence (IJCAI), 2020

Conference and Journal Reviewer

- Reviewer for NeurIPS-2019, UAI-2019, IJCAI-2019, KDD-2019, AISTATS-2019, ESWEEK-2019, AAAI-2020, AISTATS-2020, UAI-2020, KDD-2020

- Journal of Artificial Intelligence Research (JAIR), 2019

- IEEE Journal of Selected Topics in Signal Processing, 2019

Organizer

- Volunteer for International Conference on Machine Learning (ICML), 2019

- Volunteer for International Joint Conference on Artificial Intelligence (IJCAI), 2019

SKILLS

- **Programming Languages.** Python, Bash, C/C++, HTML/CSS, LaTeX, Java, MATLAB

- **Tools/Packages.** Git, SQL, PyTorch, TensorFlow, Python data science tools