



Samiran Kawtikwar

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Interests: Big-graph Algorithms, Discrete Optimization, High-Performance Computing

EDUCATION

**University of Illinois
Urbana-Champaign**
PHD OPERATIONS RESEARCH
2020 - Ongoing | IL, USA

**Indian Institute of
Technology Delhi**
**B. TECH PRODUCTION AND
INDUSTRIAL ENGINEERING**
2014 - 2018 | Delhi, India
Department Rank 3

COURSEWORK

Integer Programming
Applied Parallel Programming
Convex Optimization
Combinatorial Optimization
Large scale Network Opt
Optimization Under Uncertainty

Teaching Assistant

Facilities Planning and Design
Analysis of Data
Production Planning & Control
Intro to Operations Research

FOCUS AREAS

High-Performance Computing
Large-Scale Optimization
Parallel Programming

SKILLS

Programming

C++, CUDA, OpenMP,
Python, CuPy, Java

Tools

Gurobi, AMPL, SQL,
R, Matlab, networkX, CVX,

POSITIONS

at UIUC

Graduate Mentor, UIUC

at Schlumberger

Empowerment team leader, SLB

at IIT Delhi

Undergraduate Secretary, AIC
Publicity coordinator, Literati

INTERESTS

Badminton, Aquatics, Soccer,
and Traveling

PROFESSIONAL EXPERIENCE

ExxonMobil | MATHEMATICAL OPTIMIZATION AND DATA SCIENCE INTERN

Supply Chain and Market Modelling (Houston, USA) | May - Aug 24

- Enhanced Long Term Portfolio Model via reformulation and preprocessing, at same quality
- Converted 3-stage LP solution to 1-stage MILP for better performance and interpretability.
- Built a CPU parallelization framework to simultaneously evaluate multiple pricing forecasts.

Wayfair | OPERATIONS RESEARCH SCIENTIST INTERN

SnOP and 4-Walls (Boston, USA) | Jun - Aug 23

- Devised optimal headcount mix for warehouses through collaboration with stakeholders.
- Designed MIPs to model labor behavior, incorporated worker types, attrition, and overtime.
- Generated valuable insights for workforce planning; tool approved for pilot testing.

Schlumberger | FIELD OPERATIONS ENGINEER

Subsea Landing String Services (India, China, France) | July 18 - July 20

- Delivered efficient offshore production operations for global clients on Asia's deepest wells.
- Received highest ratings from clients for efficient performance, safety, and communication.

RELEVANT PROJECTS

Large-Scale Network Optimization

GPU ACCELERATED BRANCH AND BOUND THROUGH BEST FIRST SEARCH

With Rakesh Nagi, Izzat Al Hajj | Aug 23 - Ongoing

- Developed a single kernel branch and bound framework that performs Best first search.
- Used the framework to solve RCAP to achieve $\sim 200\times$ speedup.

GPU ACCELERATED LARGE LINEAR ASSIGNMENT PROBLEM SOLVER

With Rakesh Nagi | Aug 22 - May 23

- Developed a transformation between Hungarian classical and tree algorithms.
- Only GPU accelerated solver that performs well for dense as well as sparse problems.
- Geomean time speedup of **6.14x** over the previous state-of-the-art implementations.

Big Graphs Analysis

ACCELERATED SUBGRAPH ENUMERATION IN CUDA

With Rakesh Nagi, Wen-Mei Hwu, and IBM C³SR | Jan 21 - Aug 22

- Developed the fastest GPU Subgraph Enumerator using CUDA with **7.8x** improvement.
- Deployed the application on a supercomputer cloud cluster and achieved strong scaling.
- Invented a dynamic load balancing technique to ensure comprehensive GPU utilization.

PUBLICATIONS AND PATENTS

1. **Journal of Parallel and Distributed Computing (JPDC' 23): HyLAC - Hybrid Linear Assignment solver in CUDA.** (*Under Review*)
2. **International Conference on Parallel Processing (ICPP '23): BEEP - Balanced Efficient subgraph Enumeration in Parallel.**
3. **International Conference on Information Fusion (FUSION' 23): Multi-Target Tracking with GPU-Accelerated Data Association Engine.**
4. **Design Patent (2016):** Successfully patented an innovative design of a bike cooling system based on evaporative cooling. (**India Patent #201611005811**)

AWARDS AND ACHIEVEMENTS

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| 2022, 2023 | Awarded excellent teaching assistant at UIUC. |
| 2020-2021 | Recipient of Phil Ryan Graduate Fellowship for excellent academic record. |
| 2017-2018 | Semester Merit Award for outstanding academic performance at IIT Delhi. |
| 2014-2018 | Awarded the prestigious MCM scholarship for all 4 undergraduate years. |