



# Samiran Kawtikwar

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**Interests:** Operations Research, 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  
Advanced network analysis  
Applied Parallel Programming  
Optimization of Large Systems  
Convex Optimization  
Combinatorial Optimization  
Large scale Network Opt

### 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

### 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 safe and efficient offshore production operations for multinational clients.
- Completed Asia's deepest production wells with water depths greater than 2100m.
- Received highest ratings from clients for efficient service delivery and communication.

## RELEVANT PROJECTS

### Large-Scale Network Optimization

#### ACCELERATED RESOURCE CONSTRAINED ASSIGNMENT PROBLEM SOLVER

With Rakesh Nagi | Jun 23 - Ongoing

- Solved the lagrangian relaxation of the problem with LAP solver for optimum multipliers.
- Developing a GPU-based branch and bound framework to fully utilize all parallelism.

#### 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.

#### ACCELERATED TRAVELLING SALESMAN PROBLEM SOLVER

With Samhita Vadrevu, and Rakesh Nagi | Aug 20 - May 21

- Developed a staged integer programming formulation for TSP with tighter LP bounds.
- Implemented GPU accelerated subgradient procedure on the Lagrangian dual problem.
- Improved the gap using parallel column generation technique with GPUs.

### Big Graphs Analysis

#### ACCELERATED SUBGRAPH ENUMERATION IN CUDA

With Rakesh Nagi, Wen-Mei Hwu, and IBM C<sup>3</sup>SR | Aug 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 <b>excellent teaching assistant</b> at UIUC.                             |
| 2020-2021  | Recipient of <b>Phil Ryan Graduate Fellowship</b> for excellent academic record. |
| 2017-2018  | <b>Semester Merit Award</b> for outstanding academic performance at IIT Delhi.   |
| 2014-2018  | Awarded the prestigious <b>MCM scholarship</b> for all 4 undergraduate years.    |