# Ehab **Ghabashneh**

Research Scientist · Software Engineer

*West Lafayette, Indiana*

(+1) 765-607-9827 | ehabghab7@gmail.com | ehabghab.github.io | ehabghab


## Education

**Purdue University** — *West Lafayette, IN*
Ph.D. in Electrical and Computer Engineering

**Purdue University** — *West Lafayette, IN*
M.Sc. in Electrical and Computer Engineering

**Uppsala University** — *Uppsala, Sweden*
Exchange Student at Department of Information Technology

**Jordan University of Science and Technology (JUST)** — *Irbid, Jordan*
B.Sc. in Computer Engineering

## Professional Experience

**Meta Platforms** — *Menlo Park, CA*
Research Scientist @ Network and Transport Analytics team — *Aug. 2021 - Jul. 2022*

- Conducted first large-scale characterization of traffic burstiness, contention, and loss
- Shed important insights on the design of many different algorithms including buffer sharing, congestion control, and service placement algorithms

**Meta Platforms** — *Menlo Park, CA*
Ph.D. Software Engineer Intern @ Network Analytics team — *May 2021 - Aug. 2021*

- Validated and enabled synchronized data collection at time scales as low as 100$\mu$
- Diagnosed firmware bugs and large congestion events through measurements over multiple data centers

**Facebook** — *Menlo Park, CA*
Software Engineer @ Network Analytics team — *Nov. 2020 - Apr. 2021*

- Developed highly efficient large-scale system to profile data centers network traffic in order of minutes
- Characterized traffic burstiness, and its impact on congestion and packet loss
- Created a production impact through tuning TCP window to diminish loss in data centers

**Facebook** — *Menlo Park, CA*
Ph.D. Software Engineer Intern @ Network Analytics team — *Jun. 2020 - Aug. 2020*

- Applied state of the art algorithms to detect traffic bursts and atypical network events in data centers
- Uncovered a NIC firmware bug which causes packet loss even at low link utilization

## Skills

| | |
|---|---|
| **Areas of Expertise** | Software and Network Systems, Data Center Networks, Traffic Analysis, Video Streaming, Content Delivery Networks |
| **Programming** | C/C++, Java, Python, Javascript, React Native, Dart |
| **Machine Learning** | PyTorch, TensorFlow |
| **Tools** | Git, FFMPEG, DASH, H264/H265, VP9, Hive, Presto, tcpdump/Wireshark, Docker, Netfilter, Unity |
| **Other** | Cross-functional Collaborator, Speaker and Communicator, Leadership, Creative Designer |

## Research Experience

**Interactive 360 Video Streaming** — *West Lafayette, IN*
ADVISORS: SANJAY RAO, ANTONIO ORTEGA, AND RAMESH GOVINDAN — *Jul. 2020 - Present*

- Designed and built Dragonfly, a 360° video streaming system focusing on interactive continuous playback
- Evaluated Dragonfly over 100's of users trajectories, bandwidth traces, and videos
- Improved the video quality by 1-3X over the state-of-the-art, and reduced the re-buffering events by 96%
- Deployed Dragonfly on Meta Quest, and directed a user study with 30 participants. Users rated 70% of Dragonfly sessions as excellent in comparison to only 20% for state-of-the-art systems with the same rating

**Characterize Data Center Traffic At Fine Time Scales** — *West Lafayette, IN*
ADVISORS: SANJAY RAO AND SRIKANTH SUNDARESAN — *June. 2020 - Oct. 2022*

- Built large-scale infrastructure to characterize DCTCP traffic data across all Meta hosts
- Conducted the first large-scale joint analysis of traffic burstiness, contention, and loss
- Induced multiple production impacts inside Meta, and provided insights to guide the design of many data center algorithms

**Live Video Streaming** — *West Lafayette, IN*
ADVISOR: SANJAY RAO — *July. 2019 - Aug. 2020*

- Conducted and analyzed end-to-end UDP video streaming measurements over LTE network
- Parallelized VP9 encoder to support concurrent encoding and transmission of frame sub-blocks

**CDN Caching and Video Streaming Performance** — *West Lafayette, IN*
ADVISOR: SANJAY RAO — *June. 2018 - Aug. 2020*

- Conducted measurement studies by streaming videos from multiple video publishers
- Introduced a new design point of exposing CDN information to adaptive bit-rate (ABR) algorithm
- Evaluated modified version of MPC (i.e. well-known ABR algorithm). Results showed that 91.5% of sessions had higher QoE, and throughput prediction error was cut-down for 81.7% of sessions

## Publications

1. *"Dragonfly: Higher Perceptual Quality For Continuous 360° Video Playback."* **Ehab Ghabashneh**, Chandan Bothra, Ramesh Govindan, Antonio Ortega, and Sanjay Rao. In Proceedings of ACM SIGCOMM, September 2023 (Acceptance Rate: 22%)

2. *"A microscopic view of bursts, buffer contention, and loss in data centers."* **Ehab Ghabashneh**, Yimeng Zhao, Cristian Lumezanu, Neil Spring, Srikanth Sundaresan, and Sanjay Rao. In Proceedings of ACM IMC, October 2022 (Acceptance rate: 26.4%)

3. *"Xatu: Richer Neural Network Based Prediction for Video Streaming."* Yun Seong Nam, Jianfei Gao, Chandan Bothra, **Ehab Ghabashneh**, Sanjay Rao, Bruno Ribeiro, Jibin Zhan, and Hui Zhang. In Proceedings of ACM SIGMETRICS, June 2022 (Acceptance rate: 19.5%)

4. *"Exploring the interplay between CDN caching and video streaming performance."* **Ehab Ghabashneh** and S Rao. In Proceedings of IEEE INFOCOM, July 2020 (Acceptance rate: 19.8%)

## Honors & Awards

| | | |
|---|---|---|
| 2022 | Bilsland Dissertation Fellowship | *Purdue University* |
| 2015 | Presidential honor list (5 times) and Dean honor list (7 times) | *JUST* |
| 2015 | IAESTE summer internship program | *IAESTE-Spain* |
| 2014 | Dunia Beam scholarship | *European Union* |
| 2010 | Undergraduate scholarship | *Jordan Ministry of Education* |