Ehab **Ghabashneh**

RESEARCH SCIENTIST · SOFTWARE ENGINEER

West Lafayette, Indiana

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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 100μ
- 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 Deliv... 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*