

Debopam Bhattacharjee

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PhD, ETH Zürich

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KEY HIGHLIGHTS

- Known for trend-setting research on broadband low-Earth orbit satellite networks like SpaceX Starlink and OneWeb. *Hypatia* (best paper award at the top Internet measurement conference, IMC'20) serves as a vehicle for networking research in this area.
- Authored the 4th most downloaded (3K+ as of Aug'23) ACM CoNEXT paper (started in 2005) in 2019. This work on satellite network topology design also received IRTF's Applied Networking Research Prize in 2020 (4 awardees across the globe in 2020).
- Exhaustive network of collaborators. In random order: Duke University, UC Irvine, VMware Research, UIUC, Akamai, Harvard, UCSC, VU Amsterdam, Yale, Emerald Technologies, Max Plank Institute, Google, Oracle Labs, Azure Space, IIIT Delhi, IIT Kanpur, ETH Zürich, Linköping University, Aalto University, Airbus, OneWeb, Univ. of Surrey, Telefonica.
- Community contributions: Co-organized [LEOCONN'21](#), [LEOCONN'22](#), IETF-111 side-meeting on SATCOM. Currently co-organizing a Webinar series: [LEOCONN WS](#) which hosts tech-talks from eminent industry players and academic institutions.
- PhD from a top CS school – ETH Zürich CS department ranks (global) #7 on CSRankings (2013 - 2023), #9 on QS World University Rankings (2023), and #4 on Times Higher Education World University Rankings (2023). 7 papers in top networking conferences and workshops during PhD; multiple awards.
- Exhaustive teaching and mentoring experience: 6 different courses, 11 semesters of teaching. 7 bachelor theses, 9 master theses, and 2 internship supervision. Currently mentoring 1 intern and 2 pre-doctoral research fellows at Microsoft Research.

EDUCATION

- PhD Computer Science (Networked Systems)
 ETH Zürich, Switzerland, 2021
Thesis title: Towards Performant Networking from Low-Earth Orbit
Committee: Dr. Ankit Singla (Staff Software Engineer, Google; ex Asst. Prof. ETH Zürich),
 Prof. Adrian Perrig (ETH Zürich),
 Dr. Ranveer Chandra (Managing Director, Research for Industry, Networking Research, Microsoft)
- M.S. Security and Mobile Computing (NordSecMob)
 KTH Royal Institute of Technology, Sweden + Aalto University, Finland, 2016
Thesis title: Stepping Stone Detection for Tracing Attack Sources in Software-Defined Networks
Committee: Prof. Tuomas Aura (Aalto University),
 Prof. Markus Hidell (KTH Royal Institute of Technology),
 Prof. Andrei Gurtov (Linköping University)
- B.E. Computer Science & Engineering
 Jadavpur University, India, 2009

EMPLOYMENT

- 11/2021 – Microsoft Research Lab, India
Senior Researcher
- 10/2016 – 09/2021 Systems Group, Department of Computer Science, ETH Zürich, Switzerland
PhD Candidate, Network Design Lab
PhD supervisor: Prof. Dr. Ankit Singla
- 06/2019 – 08/2019 Max Planck Institute for Informatics, Saarbrücken, Germany
Research Fellow at Internet Architecture group
Supervisor: Prof. Dr. Anja Feldmann
- 06/2015 – 07/2016 Computer Science and Engineering Dept., Aalto University, Finland
Research/Teaching Assistant
Supervisor: Prof. Dr. Tuomas Aura, Prof. Dr. Andrei Gurtov
- 08/2009 – 08/2014 PwC & Deloitte, India
Senior Technology Consultant, Technology Consultant

RESEARCH INTERESTS

Low-Earth orbit satellite networks, Internet architecture, low-latency networks & applications, transport & congestion control, network measurement.

PUBLICATIONS

Refereed Publications

- 2023 *Don't Forget the User: It's Time to Rethink Network Measurements* [ACM HotNets]
Rahul Bothra, Aryan Taneja, DB, Rohan Gandhi, Venkata N. Padmanabhan, Ranjita Bhagwan,
Nagarajan Natarajan, Saikat Guha, Ross Cutler
- 2023 *Boosting Application Performance using Heterogeneous Virtual Channels: Challenges and Opportunities*
[ACM HotNets]
Talal Touseef, William Sentosa, Milind Kumar Vaddiraju, DB, Balakrishnan Chandrasekaran,
Brighten Godfrey, Shubham Tiwari
- 2023 *Exploring Low-Earth Orbit Network Design* [ACM MobiCom LEO-NET]
Suvam Basak, Amitangshu Pal, DB
- 2022 *cISP: A Speed-of-Light Internet Service Provider* [USENIX NSDI]
(DB, Waqar Aqeel), Sangeetha Abdu Jyothi, Ilker Nadi Bozkurt, William Sentosa, Muhammad
Tirmazi, Anthony Aguirre, Balakrishnan Chandrasekaran, P. Brighten Godfrey, Gregory P. Laughlin,
Bruce M. Maggs, Ankit Singla
- 2020 *In-orbit computing: an outlandish thought experiment?* [ACM HotNets]
(DB, Simon Kassing), Melissa Licciardello, Ankit Singla
- 2020 *"Internet from Space" without Inter-satellite Links?* [ACM HotNets]
Yannick Hauri, DB, Manuel Grossmann, Ankit Singla
- 2020 *Exploring the "Internet from space" with Hypatia* [ACM IMC]
(Simon Kassing, DB), André Baptista Águas, Jens Eirik Saethre, Ankit Singla
- Best Paper Award**
- 2020 *A bird's eye view of the world's fastest networks* [ACM IMC]
DB, Waqar Aqeel, Gregory Laughlin, Bruce M. Maggs, Ankit Singla

- 2020 *Untangling Header Bidding Lore* [PAM]
 Waqar Aqeel, DB, Balakrishnan Chandrasekaran, P. Brighten Godfrey, Gregory Laughlin, Bruce Maggs, Ankit Singla
Best Dataset Award
- 2019 *Network topology design at 27,000 km/hour* [ACM CoNEXT]
DB, Ankit Singla
IRTF Applied Networking Research Prize 2020
- 2019 *Watch your step! Detecting stepping stones in programmable networks* [IEEE ICC]
DB, Andrei Gurtov, Tuomas Aura
- 2018 *Gearing up for the 21st century space race* [ACM HotNets]
DB, Waqar Aqeel, Ilker Nadi Bozkurt, Anthony Aguirre, Balakrishnan Chandrasekaran, P Godfrey, Gregory Laughlin, Bruce Maggs, Ankit Singla
- 2017 *A Cloud-based Content Gathering Network* [USENIX HotCloud]
DB, Muhammad Tirmazi, Ankit Singla

Preprints

- 2023 *On viewing SpaceX Starlink through the Social Media Lens* [arXiv:2307.13441]
 Aryan Taneja, DB, Saikat Guha, Venkata N Padmanabhan
- 2019 *Measuring and exploiting the cloud consolidation of the Web* [arXiv:1906.04753]
DB, Muhammad Tirmazi, Ankit Singla
- 2018 *Dissecting Latency in the Internet's Fiber Infrastructure* [arXiv:1811.10737]
 Ilker Nadi Bozkurt, Waqar Aqeel, DB, Balakrishnan Chandrasekaran, Philip Brighten Godfrey, Gregory Laughlin, Bruce M Maggs, Ankit Singla

TALKS

- *Moving Toward the 'New' Space* [International Conference on Space, Bangalore, India, Sep 2023]
- *Low-Earth Orbit Broadband Opportunities and Challenges* [APNIC55, 2023]
- *Towards measuring Low-Earth Orbit network performance* [LEOCONN'22, Oct 2022 & U. Surrey, July 2022]
- *Towards Performant Networking from Low-Earth Orbit* [AINTEC'21, U Cambridge, Dec, 2021 - Jan, 2022]
- *On improving low-Earth orbit satellite network performance* [LEOCONN'21, Microsoft Research, Juniper Networks, Feb - Jun, 2021]
- *In-orbit computing: an outlandish thought experiment?* [ACM HotNets 2020]
- *"Internet from Space" without Inter-satellite Links?* [ACM HotNets 2020]
- *Exploring the "Internet from space" with Hypatia* [ACM IMC 2020]
- *A bird's eye view of the world's fastest networks* [ACM IMC 2020]
- *Network topology design at 27,000 km/hour* [ACM CoNEXT 2019, APNIC-50, IETF-109]
- *Gearing up for the 21st century space race* [ACM HotNets 2018]
- *Speeding up the Internet* [ETH Zürich Systems Group Retreat 2018]
- *A Cloud-based Content Gathering Network* [USENIX HotCloud 2017]
- *Detection of Stepping Stones in Software Defined Networks* [Invited talk at ETH Zürich, 2016]

TEACHING

- *Future Internet*, Spring 2021, Spring 2020, Spring 2019, ETH Zürich [Graduate]
- *Computer Networks*, Spring 2021, Spring 2020, Spring 2019, ETH Zürich [Undergraduate]
- *Advanced Computer Networks*, Spring 2018, Spring 2017, ETH Zürich [Graduate]
- *Big Data*, Autumn 2016, ETH Zürich [Graduate]
- *Network Security*, Autumn 2015, Aalto University [Graduate]
- *Information Security*, Autumn 2015, Aalto University [Graduate]

SUPERVISION (COMPLETED)

Internship/ Research Fellowship (RF)

- 2023 *Enabling LEO network experiments at scale*, S. Tiwari (RF), MSR - India
- 2023 *Enabling LEO network experiments at scale*, A. Taneja, MSR - India
- 2022 *Mining social media to quantify network performance and user perception*, A. Taneja, MSR - India
- 2022 *Detecting wind and solar parks with multi-modal data*, P. Singh, MSR - India

Master Thesis

- 2021 *BBR congestion control in LEO satellite networks*, C. Ettl, ETH Zürich
- 2021 *Routing over dynamic Low Earth Orbit satellite networks*, D. B. Irani, ETH Zürich
- 2021 *Analyzing the Impact of GEO Arc Avoidance on LEO Constellation Performance*, F. Zafar, ETH Zürich
- 2020 *Routing for a satellite mega-constellation*, M. Grossmann, ETH Zürich
- 2020 *Simulating LEO satellite networks*, B. A. André, ETH Zürich
- 2019 *Fast Web Browsing Over The Tor Network*, A. Isac, ETH Zürich
- 2019 *Web browsing with privacy-enhanced MITM*, T. Krebs, ETH Zürich
- 2018 *Assessing unfairness in the Internet/Web ecosystem*, O. Butz, ETH Zürich
- 2018 *Turning Web page delivery upside down*, J. Purtschert, ETH Zürich

Bachelor Thesis

- 2021 *Sun synchronous low Earth orbit satellite constellation design*, P. Eigensatz, ETH Zürich
- 2020 *Internet from space without inter-satellite laser?*, H. Yannick, ETH Zürich
- 2019 *Simulations of Satellite-based low-latency Internet*, J. E. Saethre, ETH Zürich
- 2019 *Performance of fetching web pages on mobile devices*, A. Köpe, ETH Zürich
- 2019 *Customizing QUIC/HTTP2 for Web servers*, A. Benelli, ETH Zürich
- 2018 *Optimizing a Smart Proxy*, J. Gallmann, ETH Zürich
- 2018 *Customizing QUIC for Web servers*, C. Neukom, ETH Zürich

COMMUNITY SERVICE

- 2024 ACM CoNEXT'24 TPC Member
- 2024 [ACM MobiCom'24](#) Publicity Co-Chair
- 2023 [The Networking Channel](#) (Panel discussion on LEO networks) Co-organizer
- 2023 [LEO-NET \(MobiCom'23\)](#) Advisory Board Member, TPC Member
- 2023 [LEOCONN WS](#) (Webinar Series on LEO satellite networks) Co-organizer
- 2022 [LEOCONN'22](#) (1-day tutorial on satellite-based networking) Co-organizer
- 2021 IETF-111 side-meeting on SATCOM activities Co-organizer
- 2021 [LEOCONN'21](#) (Webinar on satellite-based networking) Co-organizer
- 2018 ACM IMC Shadow PC member

AWARDS AND HONORS

- 2020 Best Paper Award at ACM IMC, *Exploring the “Internet from space” with Hypatia*.
- 2020 Best Dataset Award at PAM, *Untangling Header Bidding Lore*.
- 2020 IETF/IRTF Applied Networking Research Prize.
- 2019 Selected for PhD Workshop on Next-Generation Cloud Infrastructure organized by Microsoft Research, Cambridge.
- 2014 Awarded NordSecMob (Erasmus Mundus Master’s program) Consortium Scholarship.
- 2005 Ranked 60/70,000 in West Bengal Joint Entrance Examination (WBJEE).
- 2003 Awarded National Merit Scholarship by Government of India [2003 – 2009].

SELECTED MEDIA COVERAGE

Complete listing and links available at <https://bdebopam.github.io>

- 04/2022 *Wireless Microwave Internet could mean the end of lag*. SYFY Wire.
- 12/2019 *Laser-Linked Satellites Could Deliver ‘Internet from Space’*. Washington Daily Report.
- 12/2019 *A new network design for the “internet from space”*. TechXplore.
- 08/2017 *A cloud-based content gathering network*. The morning paper.