

Aleksey Charapko

Email: aleksey.charapko@unh.edu

Web: <http://charap.co>

RESEARCH INTERESTS

- Distributed systems, distributed databases, distributed consensus, distributed monitoring & debugging, fault tolerance, scalability.

EDUCATION

- **Doctor of Philosophy**, Computer Science & Engineering, 2020
“*Consensus End-to-End: Design, Implementation, and Evaluation of Consensus Protocols*”
Advisor: Dr. Murat Demirbas
University at Buffalo, SUNY, Buffalo, New York
- **Master of Science**, Computer Science, 2015
“*Time Series Similarity Search in Distributed Key-Value Data Stores Using R-trees*”
Advisor: Dr. Ching-Hua Chuan
University of North Florida, Jacksonville, Florida
- **Bachelor of Science**, Computer Science, 2015
University of North Florida, Jacksonville, Florida

EXPERIENCE

- **Assistant Professor**, University of New Hampshire, 2020 - Present
- **Visiting Researcher/Engineer**, Microsoft, 2018 - 2020
- **Graduate Research Assistant**, University at Buffalo, 2016 - 2019
Research Assistant for the project: “*Synchrony-aware Primitives for Building Highly Auditable, Highly Scalable, Highly Available Distributed Systems*”
- **Graduate Teaching Assistant**, University at Buffalo, 2015 - 2016
Teaching Assistant for CSE565 “Computer Security” & CSE341 “Computer Organization”
- **Graduate Research Assistant**, University of North Florida, 2012 - 2015

FUNDED RESEARCH PROJECTS

1. **NSF CSR Program** \$500,000 from 2022 to 2025
Resource-efficient, Strongly Consistent Replication for the Cloud
PI: Aleksey Charapko (50%), co-PI: Abutalib Aghayev

PUBLICATIONS

- **Journal Papers**
 1. *WPaxos: Wide Area Network Flexible Consensus*
Ailijiang A., **Charapko A.**, Demirbas M., Kosar T. *IEEE Transactions on Parallel and Distributed Systems*, 31(1), pp. 211-223, 2020.
 2. *Using Weaker Consistency Models with Monitoring and Recovery for Improving Performance of Key-Value Stores*
Nguyen D., **Charapko A.**, Kulkarni S., Demirbas M. *Journal of the Brazilian Computer Society*, Accepted for publication, 25(10), 2019.
 3. *Retroscope: Retrospective Monitoring of Distributed Systems*
Charapko A., Ailijiang A., Kulkarni S., Demirbas M. *IEEE Transactions on Parallel and Distributed Systems*, 30(11), pp. 2582 - 2594, 2019.

4. *Indexing Musical Sequences in Large Datasets Using Relational Databases*
Charapko, A., and Chuan. C.-H. *International Journal of Multimedia Engineering and Management*, 6(2), pp. 1 - 18, 2015.
5. *Predicting Key Recognition Difficulty in Music Using Statistical Learning*
Chuan, C.-H., and **Charapko, A.** *International Journal of Multimedia Engineering and Management*, 5(2), pp. 54 - 69, 2014.

- **Conference and Workshop Papers**

1. *Scaling Replicated State Machines with Compartmentalization*
Whittaker M., Ailijiang A., **Charapko A.**, Demirbas M., Giridharan N., Hellerstein JM., Howard H., Stoica I., Szekeres A. *47th International Conference on Very Large Data Bases, 2021*
2. *Scalable but Wasteful: Current State of Replication in the Cloud*
Matte V. S., **Charapko A.**, Aghayev A. *The 13th ACM Workshop on Hot Topics in Storage and File Systems (HotStorage '21), 2021. (Acceptance Rate: 37%)*
3. *Metastable Failures in Distributed Systems*
Bronson N., Aghayev A., **Charapko A.**, Zhu T. *The 18th Workshop on Hot Topics in Operating Systems (HotOS '21), 2021. (Acceptance Rate: 26%)*
4. *Read-Write Quorum Systems Made Practical*
Whittaker M., **Charapko A.**, Hellerstein JM., Howard H., Stoica I. *8th Workshop on the Principles and Practice of Consistency for Distributed Data (PaPoC), 2021.*
5. *PigPaxos: Devouring the Communication Bottlenecks in Distributed Consensus*
Charapko A., Ailijiang A., Demirbas M. *ACM SIGMOD/PODS conference, 2021*
6. *Fast Flexible Paxos: Relaxing quorum intersection for Fast Paxos*
Howard H., **Charapko A.**, Mortier R. *22nd International Conference on Distributed Computing and Networking (ICDCN '21), 2021. (Acceptance Rate: 35%)*
7. *Linearizable Quorum Reads in Paxos*
Charapko A., Ailijiang A., Demirbas M. *USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage '19), 2019.*
8. *Dissecting the Performance of Strongly-Consistent Replication Protocols*
Ailijiang A., **Charapko A.**, Demirbas M. *ACM SIGMOD/PODS conference, 2019*
9. *Adapting to Access Locality via Live Data Migration in Globally Distributed Datastores*
Charapko A., Ailijiang A., Demirbas M. *IEEE International Conference on BigData 2018, pp. 3320 - 3329, 2018.*
10. *Using Weaker Consistency Models with Monitoring and Recovery for Improving Performance of Key-Value Stores*
Nguyen D., **Charapko A.**, Kulkarni S., Demirbas M. *Latin-American Symposium on Dependable Computing (LADC), 2018.*
11. *Bridging Paxos and Blockchain Consensus*
Charapko A., Ailijiang A., Demirbas M. *IEEE Blockchain 2018, 2018.*
12. *Lightweight, Incremental, and Retrospective Distributed Snapshots Using Loosely Synchronized Clocks*

Charapko A., Ailijiang A., Kulkarni S., Demirbas M. *The 37th International Conference on Distributed Computing Systems (ICDCS)*, pp. 2061 - 2066, 2017.

13. *WANKEEPER: Efficient Coordination at WAN scale*
Ailijiang A., **Charapko A.**, Demirbas M., Turkkan B., Kosar T. *The 37th International Conference on Distributed Computing Systems (ICDCS)*, pp. 1575 - 1585, 2017.
14. *Consensus in the Cloud: Paxos Systems Demystified*
Ailijiang A., **Charapko A.**, Demirbas M.
The 25th International Conference on Computer Communication and Networks (ICCCN), pp. 1 - 10, 2016.
15. *Indexing and Retrieving Continuations in Musical Time Series Data Using Relational Databases*
Charapko, A., and Chuan. C.-H. *IEEE International Symposium on Multimedia*, pp. 341 - 346, 2014.
16. *Predicting Key Recognition Difficulty in Polyphonic Audio*
Chuan, C.-H., and **Charapko, A.** *IEEE International Symposium on Multimedia*, pp. 421 - 426, 2013.

- **Technical Reports**

1. *FleetDB: Follow-the-workload Data Migration for Globe-Spanning Databases*
Charapko A., Ailijiang A., Demirbas M.
2. *Does the Cloud Need Stabilizing?*
Demirbas M., **Charapko A.**, Ailijiang A.
<https://arxiv.org/pdf/1806.03210>

SELECT PRESENTATIONS

- Red Hat Tech Exchange & Demo Tuesdays
December 2020.
Invited Presentation: *Flexible Quorums in Distributed Consensus*
- USENIX Workshop on Hot Topics in Storage and File Systems
Renton, Washington, July 2019.
Workshop paper presentation: *Linearizable Quorum Reads in Paxos*
- IEEE International Conference on BigData
Seattle, Washington, December 2018.
Workshop paper presentation: *Adapting to Access Locality via Live Data Migration in Globally Distributed Datastores*
- The 37th International Conference on Distributed Computing Systems (ICDCS)
Atlanta, Georgia, June 2017.
Conference paper presentation: *Lightweight, Incremental, and Retrospective Distributed Snapshots Using Loosely Synchronized Clocks*
- Seminar on Current Trends in Computing Technology
University of North Florida, Jacksonville, FL, February 2017.
Invited presentation: *Lightweight, Incremental, and Retrospective Distributed Snapshots Using Loosely Synchronized Clocks*
- 4th annual College of Computing, Engineering and Construction (CCEC) Dean's Leadership Council Showcase
University of North Florida, Jacksonville, FL, April 2015.
Invited presentation: *Mobile Applications for gFPS and eDHR2*

- The 9th IEEE International Workshop on Multimedia Information Processing and Retrieval, Anaheim, USA, December 2013.
Conference paper presentation: *Predicting Key Recognition Difficulty in Polyphonic Audio*
- CCEC Research Colloquium
School of Computing, University of North Florida, October 2013.
Collaboration in Interdisciplinary Research: Experiences and Challenges

TEACHING

- **CS 722/822: Cloud Computing Systems**
Fall 2021
- **CS 780/880: Special Topics. Cloud Computing Systems**
Fall 2020
- **CS 980: Special Topics. Planetary-Scale Systems**
Spring 2021

PROFESSIONAL SERVICE

- **Editorial Board**
 - Journal of Systems Research (JSys), Distributed Consensus Area, 2021
- **External Journal Reviewing**
 - IEEE Transactions on Parallel and Distributed Systems (TPDS) (2019, 2020)
 - IEEE Networking Letters (2020)
 - Distributed and Parallel Databases (2020)
 - International Journal of Parallel, Emergent and Distributed Systems (2020)
 - Acta Informatica (2020)
- **Outreach**
 - DistSys Reading Group - a weekly paper reading group and blog attracting wide participation from academia and industry

SCHOLARSHIPS & AWARDS

- SUNY Buffalo CSE Best Dissertation Runner-up, 2020
- SUNY Buffalo Presidential Fellowship, 2015 - 2019
- University of North Florida Presidential Scholarship, 2009 - 2013
- Florida Bright Futures, 2009 - 2015

INDUSTRY EXPERIENCE

- **Software Engineer**, Microsoft, April 2019 - July 2020
- **Visiting Researcher**, Microsoft, July 2018 - March, 2019
- **Independent Consultant**, 2015 - 2019
 - Software engineering consulting and training
 - Ongoing maintenance of existing software systems
- **Applications Developer**, Elyk Innovation, Inc., 2012 - 2015
 - Designed and developed web, mobile and desktop applications for the clients in the medical, financial, construction and retail businesses.
 - Maintained existing software systems.
- **Student Consultant**, Vistakon, a division of Johnson & Johnson, Inc., 2014

- Designed and prototyped mobile versions of the production scheduling and quality control software systems.

TECHNICAL SKILLS

- **Programming Languages:** Java, PHP, C, C++, Go, JavaScript, Python, Scala, C#, Visual Basic, MATLAB, bash.
- **Databases:** Apache Cassandra, Azure Cosmos DB, MySQL/MariaDB, Microsoft SQL Server, HBase
- **Miscellaneous:** TLA+, LaTeX, ZooKeeper, Android, LAMP/WAMP stacks, Linux, HTML.