

Vitaly Aksenov

Curriculum Vitae

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Research interests

Algorithmics and data structures, Parallel algorithms, Concurrent data structures, Network algorithms, Databases, Combinatorial structures, Number theory.

Education

- 2015-2018 **PhD of Computer Science**, *Team GALLIUM, INRIA and Paris 7, France*
Parallel computation and algorithms
- 2015-2018 **PhD of Computer Science**, *ITMO University, Russia*
Joint PhD program with Paris 7
- 2013-2015 **Masters of Computer Science**, *ITMO University, Russia, GPA – 4.9/5*
With honors
- 2014-2015 Bioinformatics Institute
- 2009-2013 **Bachelors of Computer Science**, *ITMO University, Russia, GPA – 5/5*
With honors
- 2005-2009 Physics-Mathematical Lyceum #239

Professional Experience

- 2023-present **Lecturer**, *City, University of London, UK*
- 2021-2023 **Assistant Professor**, *ITMO University, Russia*
- 2018-2023 **Researcher**, *ITMO University, Russia*
- 2019 **Post-doc**, *Team Alistarh, IST Austria, Austria*
Scalable Machine Learning under the supervision of fabulous Dan Alistarh
- 2013-2018 **Junior researcher**, *Computer Technologies Lab, ITMO University, Russia*
Combinatorics and algorithmics
- 2013, **Software engineer intern**, *Team “Cache Client”, “Facebook, Inc.”, USA*
July-October Maintaining Data Storage, supervisor: Drew Hoskins
- 2012-2013 **Software engineer intern**, *Department of search engine, “Mail.Ru”, Russia*
Language recognition of the phrase

Teaching

- 2023- **Course on Cloud Computing, Lecturer**, *City, University of London, UK, BSc 3, MSci 3, MSci 4, MSc*
1 lecture per week, 2 tutorials

- 2023- **Course on Databases, Lecturer**, *City, University of London*, UK, BSc 1
1 lecture per week, 9 tutorials
- 2021-2023 **Responsible for the Masters Program: Programming and Artificial Intelligence**, *ITMO University*, Russia
- 2021-2023 **Course on parallel algorithms and concurrent data structures, Lecturer**, *ITMO University and MIPT*, Russia, Bachelor 3, Master 1, Master 2
1 lecture per week
- 2020-2023 **Course on algorithms and data structures, Lecturer**, *ITMO University*, Russia, Master 1
1 lecture per week
- 2019-2022 **Course on algorithms and data structures, Assistant**, *ITMO University*, Russia, Bachelor 1-2
- 2018-2023 **Cryptography, Assistant**, *ITMO University*, Russia, Bachelor 3
- 2017 **Full course on algorithmics**, *Paris*, France
ENS Paris team qualified to ICPC World Finals
- 2017 **1-week crash-course on algorithmics**, *ETH Zurich*, Switzerland
ETH Zurich team qualified to ICPC World Finals
- 2016 **1-week crash-course on algorithmics**, *Toulouse University III*, France
- 2015 **1-week crash-course on algorithmics**, *ENS Lyon*, France
- 2015-2023 **Courses on Olympiads in Mathematics**, *ITMO University*, Russia
- 2014-2015 **Mathematical analysis, Assistant**, *ITMO University*, Russia, Bachelor 1
- 2014 **1-week crash-course on algorithmics**, *Harbin University*, China
- 2009-2016 **Courses on Olympiads in Informatics for Schoolchildren**, *ITMO University*, Russia

Grants

- 2022-present Laboratory with VK
- 2022-2023 Huawei CSTT grant
- 2020-2022 JetBrains grant: scholarships for students

Selected Publications

- [1] U A Acar, V Aksenov, A Charguéraud, and M Rainey. “Provably and Practically Efficient Granularity Control”. In: *Proceedings of the 34th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming* (2019), 214–228, Awarded SIGPLAN Research Highlights.
- [2] Evgeniy Feder, Ichha Rathod, Punit Shyamsukha, Robert Sama, Vitaly Aksenov, Iosif Salem, and Stefan Schmid. “Lazy self-adjusting bounded-degree networks for the matching model”. In: *IEEE Conference on Computer Communications (INFOCOM)*. IEEE. 2022, pp. 1089–1098.
- [3] Vitaly Aksenov, Dan Alistarh, Alexandra Drozdova, and Amirkeivan Mohtashami. “The Splay-List: A Distribution-Adaptive Concurrent Skip-List”. In: *34th International*

Symposium on Distributed Computing. 2020, Invited to Special Issue.

- [4] V Aksenov, P Kuznetsov, and A Shalyto. "Parallel Combining: Benefits of Explicit Synchronization". In: *22nd International Conference on Principles of Distributed Systems (OPODIS 2018)* (2018), pp. 143–158.
- [5] Sergey Aganezov, Ilya Zban, Vitaly Aksenov, Nikita Alexeev, and Michael C Schatz. "Recovering rearranged cancer chromosomes from karyotype graphs". In: *BMC bioinformatics* 20.20 (2019), pp. 1–11.
- [6] Vitalii Aksenov, Dan Alistarh, and Janne H Korhonen. "Scalable Belief Propagation via Relaxed Scheduling". In: *Advances in Neural Information Processing Systems* 33 (2020).
- [7] Ali Ramezani-Kebrya, Fartash Faghri, Ilya Markov, Vitalii Aksenov, Dan Alistarh, and Daniel M. Roy. "NUQSGD: Provably Communication-efficient Data-parallel SGD via Nonuniform Quantization". In: *Journal of Machine Learning Research* 22.114 (2021), pp. 1–43. URL: <http://jmlr.org/papers/v22/20-255.html>.
- [8] Mohammed Khalaji, Trevor Brown, Khuzaima Daudjee, and Vitaly Aksenov. "Practical Hardware Transactional vEB Trees". In: *PPoPP 2024, Accepted*.
- [9] Vitaly Aksenov, Nikita Koval, Petr Kuznetsov, and Anton Paramonov. "Memory Bounds for Bounded Queues". In: *PPoPP 2024, Accepted*.

Invited Talks

2015, February **"Combinatorial objects and their algebraic characteristics"**, *University of Geneva, Switzerland*

Professional Activities

- 2023- **Principles of Distributed Computing**
Publicity Chair
- 2022 **OPODIS 2022**
Program Committee
- 2021 **Principles and Practice of Parallel Programming 2022**
External Program Committee
- 2021 **41st IEEE International Conference on Distributed Computing Systems**
Program Committee
- 2019-present **The Industrial Distributed Computing Conference Hydra**, hydraconf.ru
Program Committee
- 2017-present **The Summer School on Practice and Theory of Distributed Computing**, sptdc.org
Co-organizer, Program Committee

Supervision

2023 1 MSc student, 10 BSc students

2022 2 MSc students, 2 BSc students
2021 7 BSc students
2020 2 BSc students
2019 1 MSc student
2018 1 MSc student
2017 1 BSc student

More information is on the personal website: <http://ctlab.itmo.ru/~aksenov>.

Awards

2022 First place on North Countries Universities Mathematical Competition, coach
2021 3rd place on North Countries Universities Mathematical Competition, coach
2015 Best ITMO University masters thesis award
2015 First prize on North Countries Universities Mathematical Competition, 6th place
2014 Student Grant of Saint-Petersburg Government
2014 First prize on International Mathematics Competition for University Students, 27th place
2014 First prize on North Countries Universities Mathematical Competition, 8th place
2008-2009 All-Russian School Olympiad in Mathematics, Prize Winner
2009 All-Russian School Olympiad in Informatics, Prize Winner

Other activities

- 2023-present **Judge**, *UKIEPC*
- 2017-present **Chief Judge**, *Bioinformatics Contest*
`contest.bioinf.me`
- 2016 **Scientific Committee**, *IOI*
- 2015-2022 **Software engineer**, *ICPC Live team on ICPC World Finals*
<https://github.com/Aksenov239/icpc-live-v2>
- 2012-present **Jury member**, *ICPC, North Eurasia Regionals*
- 2011-2017 **Jury member**, *"Russian Code Cup"*
- 2010-present **Jury member**, *All Russian School Team Olympiad in Informatics*
- 2009-present **Jury member**, *St Petersburg School Olympiad in Informatics*
- 2010-2015 **Jury member**, *"Codeforces.ru"*
- 2013-2014 **Jury member**, *"Kotlin Cup"*

Languages

Russian	Native	
English	Intermediate	<i>FCE Certificate, Grade B</i>
French	Basics	

Publications

- [1] V Aksenov and K Kokhas. "Domino tilings and determinants". In: *Journal of Mathematical Sciences* 200.6 (2014), pp. 647–653.
- [2] V Aksenov and K Kokhas. "Chip removal. Urban Renewal revisited". In: *Journal of Mathematical Sciences* 209.6 (2015), pp. 809–825.
- [3] V Aksenov and K Kokhas. "Calculation of Pfaffians by a Chip Removal". In: *Journal of Mathematical Sciences* 215.6 (2016), pp. 631–648.
- [4] U A Acar, V Aksenov, and S Westrick. "Brief Announcement: Parallel Dynamic Tree Contraction via Self-Adjusting Computation". In: *Proceedings of the 29th ACM Symposium on Parallelism in Algorithms and Architectures*. ACM. 2017, pp. 275–277.
- [5] V Aksenov, V Gramoli, P Kuznetsov, A Malova, and S Ravi. "A concurrency-optimal binary search tree". In: *European Conference on Parallel Processing*. Springer. 2017, pp. 580–593.
- [6] U A Acar, V Aksenov, A Charguéraud, and M Rainey. "Performance challenges in modular parallel programs". In: *Proceedings of the 23rd ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*. ACM. 2018, pp. 381–382.
- [7] V Aksenov, D Alistarh, and P Kuznetsov. "Brief-Announcement: Performance Prediction for Coarse-Grained Locking". In: *Proceedings of the thirty seventh annual ACM Symposium on Principles of distributed computing (PODC)* (2018), pp. 411–413.
- [8] V Aksenov, P Kuznetsov, and A Shalyto. "On Helping and Stacks". In: *Proceedings of NETYS* (2018).
- [9] V Aksenov, P Kuznetsov, and A Shalyto. "Parallel Combining: Benefits of Explicit Synchronization". In: *22nd International Conference on Principles of Distributed Systems (OPODIS 2018)* (2018), pp. 143–158.
- [10] U A Acar, V Aksenov, A Charguéraud, and M Rainey. "Provably and Practically Efficient Granularity Control". In: *Proceedings of the 34th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming* (2019), 214–228, Awarded SIGPLAN Research Highlights.
- [11] Sergey Aganezov, Ilya Zban, Vitaly Aksenov, Nikita Alexeev, and Michael C Schatz. "Recovering rearranged cancer chromosomes from karyotype graphs". In: *BMC bioinformatics* 20.20 (2019), pp. 1–11.
- [12] Vitalii Aksenov, Dan Alistarh, and Janne H Korhonen. "Scalable Belief Propagation via Relaxed Scheduling". In: *Advances in Neural Information Processing Systems* 33 (2020).
- [13] Vitaly Aksenov, Dan Alistarh, Alexandra Drozdova, and Amirkeivan Mohtashami. "The Splay-List: A Distribution-Adaptive Concurrent Skip-List". In: *34th International Symposium on Distributed Computing*. 2020, Invited to Special Issue.

- [14] Nikita Koval and Vitaly Aksenov. "Restricted memory-friendly lock-free bounded queues". In: *Proceedings of the 25th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming*. 2020, pp. 433–434.
- [15] Vitaly Aksenov, Ohad Ben-Baruch, Danny Hendler, Ilya Kokorin, and Matan Rusanovsky. "Execution of NVRAM Programs with Persistent Stack". In: *International Conference on Parallel Computing Technologies*. Springer. 2021, pp. 117–131.
- [16] Vitaly Aksenov, Vincent Gramoli, Petr Kuznetsov, Di Shang, and Srivatsan Ravi. "Optimal Concurrency for List-Based Sets". In: *International Conference on Parallel Computing Technologies*. Springer. 2021, pp. 386–401.
- [17] Evgeniy Feder, Ichha Rathod, Punit Shyamsukha, Robert Sama, Vitaly Aksenov, Iosif Salem, and Stefan Schmid. "Brief-Announcement: Lazy Self-Adjusting Bounded-Degree Networks for the Matching Model". In: *ACM Symposium on Parallelism in Algorithms and Architectures* (2021).
- [18] Ali Ramezani-Kebrya, Fartash Faghri, Ilya Markov, Vitalii Aksenov, Dan Alistarh, and Daniel M. Roy. "NUQSGD: Provably Communication-efficient Data-parallel SGD via Nonuniform Quantization". In: *Journal of Machine Learning Research* 22.114 (2021), pp. 1–43. URL: <http://jmlr.org/papers/v22/20-255.html>.
- [19] Evgeniy Feder, Ichha Rathod, Punit Shyamsukha, Robert Sama, Vitaly Aksenov, Iosif Salem, and Stefan Schmid. "Lazy self-adjusting bounded-degree networks for the matching model". In: *IEEE Conference on Computer Communications (INFOCOM)*. IEEE. 2022, pp. 1089–1098.
- [20] Vitaly Aksenov, Michael Anoprenko, Alexander Fedorov, and Michael Spear. "Brief Announcement: BatchBoost: Universal Batching for Concurrent Data Structures". In: *37th International Symposium on Distributed Computing (DISC 2023)*. Schloss Dagstuhl-Leibniz-Zentrum für Informatik. 2023.
- [21] Vitaly Aksenov, Trevor Brown, Alexander Fedorov, and Ilya Kokorin. "Unexpected Scaling in Path Copying Trees". In: *Proceedings of the 28th ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming*. 2023, pp. 438–440.
- [22] Vitaly Aksenov, Ilya Kokorin, and Alena Martsenyuk. "Parallel-Batched Interpolation Search Tree". In: *International Conference on Parallel Computing Technologies*. Springer. 2023, pp. 109–125.
- [23] Vitaly Aksenov, Anton Paramonov, Iosif Salem, and Stefan Schmid. "Self-adjusting linear networks with ladder demand graph". In: *International Colloquium on Structural Information and Communication Complexity*. Springer. 2023, pp. 132–148.
- [24] Vitaly Aksenov, Nikita Koval, Petr Kuznetsov, and Anton Paramonov. "Memory Bounds for Bounded Queues". In: *PPoPP 2024, Accepted*.
- [25] Evgeniy Feder, Anton Paramonov, Pavel Mavrin, Iosif Salem, Stefan Schmid, and Vitaly Aksenov. "POSTER: Toward Self-Adjusting k-ary Search Tree Networks". In: *IPDPS 2024, Accepted*.

- [26] Zakhar Iakovlev and al. "Trigram-Based Persistent IDE indices with Quick Startup". In: *1st IDE Workshop on ICSE 2024, Accepted*.
- [27] Mohammed Khalaji, Trevor Brown, Khuzaima Daudjee, and Vitaly Aksenov. "Practical Hardware Transactional vEB Trees". In: *PPoPP 2024, Accepted*.
- [28] Ilya Kokorin, Dan Alistarh, and Vitaly Aksenov. "Wait-free trees supporting asymptotically efficient range queries". In: *IPDPS 2024, Accepted*.