Alexey Markin

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Education

Ph.D | Computer Science | Fall 2015 – present
Iowa State University (ISU), Iowa, USA
GPA: 4.0/4.0 (33 full course credits)
Advisor: Prof. Oliver Eulenstein

B.S. | Computer Science / School of Software Engineering | Fall 2011 – Spring 2015
National Research University Higher School of Economics, Moscow, Russia
Advisor: Prof. Boris Mirkin

Professional appointments

I was fortunate to obtain both the diversified teaching experience and the pure research experience at ISU.

Research assistant: - Summer 2017 – Spring 2019;
- Fall 2016.
Focusing on Algorithm Design, NP-completeness, and Heuristics for computational problems in evolutionary biology; studying properties of popular distance measurements on phylogenetic tree/network spaces.
Working with Prof. Oliver Eulenstein.

Teaching assistant: - Spring 2017 (Theory of Computation, Com S 331);
- Spring 2016 (Excel/Access, Com S 113);
- Fall 2015 (C/C++ advanced programming, Com S 327).
Conducted recitations, labs, office hours, and substitute lectures; performed grading; developed software to assist the instructor in identifying plagiarism (for Com S 113).

Awards and scholarships

- Research excellence and Teaching excellence awards from ISU, Dept. of Computer Science, April 2017.
- Robert Stewart Early Research Recognition Award from ISU, Dept. of Computer Science, April 2016. Award in the amount of **$2,000**
- NSF travel grants for students for presenting at the ISBRA'16 and ACM-BCB'16 computational biology conferences. In the amounts of **$1000** and **$900** respectively
- Higher School of Economics Scholarship for social and cultural activity, December 2012. Awarded for ACM ICPC semifinal participation and social activities in the amount of **$2,500**
- Government Academic Scholarship for students. Awarded for excellent academic performance while studying at the Higher School of Economics, 2011-2015.

Peer-reviewed publications

Journal publications

- **Markin, A.** and Eulenstein, O., 2018. *Cophenetic Median Trees*. IEEE/ACM transactions on computational biology and bioinformatics, preprint. Invited and extended paper from ACM-BCB'17.
- **Markin, A.** and Eulenstein, O., 2017. *Computing Manhattan Path-Difference Median Trees: a Practical Local Search Approach*. IEEE/ACM transactions on computational biology and bioinformatics, preprint. Invited and extended paper from ACM-BCB'16.
- **Markin, A.** and Eulenstein, O., 2017. *Efficient Local Search for Euclidean Path-Difference Median Trees*. IEEE/ACM transactions on computational biology and bioinformatics, preprint. Invited and extended paper from ISBRA'16.

Conference proceedings (equally valued as journal publications in Computer Science)

- **Markin A.**, Anderson, T.K., Vadali, V.K.S.T. and Eulenstein, O., 2019. *Robinson-Foulds Reticulation Networks*. In Proceedings of the 10th ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics. ACM. bioRxiv preprint.
- **Markin A.** and Eulenstein, O., 2017. *Consensus Clusters in Robinson-Foulds Reticulation Networks*. 19th International Workshop on Algorithms in Bioinformatics (WABI 2019). Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik.
- Górecki, P., **Markin, A.** and Eulenstein, O., 2019. *Feasibility Algorithms for the Duplication-Loss Cost*. COCOON'2019.
- Górecki, P., **Markin, A.** and Eulenstein, O., 2018. *Cophenetic Distances: A Near-Linear Time Algorithmic Framework*. COCOON'2018. The extended version of this manuscript was invited for submission to *Algorithmica* and is under review.
- **Markin, A.**, Vadali, V.S.K.T. and Eulenstein, O., 2018. *Solving the Gene Duplication Feasibility Problem in Linear Time*. COCOON'2018.
- **Markin, A.** and Eulenstein, O., 2017. *Cophenetic median trees under the manhattan distance*. In Proceedings of the 8th ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics (pp. 194-202). ACM.
- Górecki, P., **Markin, A.**, Mykowiecka, A., Paszek, J. and Eulenstein, O., 2017. *Phylogenetic Tree Reconciliation: Mean Values for Fixed Gene Trees*. In International Symposium on Bioinformatics Research and Applications (pp. 234-245). Springer, Cham.
- **Markin, A.** and Eulenstein, O., 2016. *Manhattan path-difference median trees*. In Proceedings of the 7th ACM International Conference on Bioinformatics, Computational Biology, and Health Informatics (pp. 404-413). ACM.
- **Markin, A.** and Eulenstein, O., 2016. *Path-difference median trees*. In International Symposium on Bioinformatics Research and Applications (pp. 211-223). Springer, Cham.

Preprints and prospective publications

- Under review: **Markin, A.**, 2018. *On the Extremal Maximum Agreement Subtree Problem*. 10 pages, arXiv preprint. Submitted to Discrete Applied Mathematics, Elsevier.
- Under review: Górecki, P., **Markin, A.** and Eulenstein, O., 2019. *Cophenetic Distances in Near-linear Time*. Algorithmica (invited paper).
- Under review: Tabaszewski, P., Górecki, P., **Markin, A.**, Anderson, T.K. and Eulenstein, O., 2019. *Consensus of all Solutions for Intractable Phylogenetic Tree Inference*. IEEE/ACM transactions on computational biology and bioinformatics (invited paper).

Other publications

- **Markin, A.**, 2015. *Bicluster Analysis over Unstructured Text Data from the Internet*. Thesis work for B.S. Available here (in Russian). Project advisor: Prof. Boris G. Mirkin.

Conference presentations

- ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM-BCB'17), Boston, MA, USA, August 2017.
- ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM-BCB'16), Seattle, WA, USA, October 2016.
- 12th International Symposium on Bioinformatics Research and Applications (ISBRA'16), Minsk, Belarus, June 2016.

Reviewing experience

- A sub-reviewer for RECOMB Comparative Genomics 2019 (RECOMB-CG'19).

- A reviewer for BMC Bioinformatics Special Issue of ISBRA'19 and ISBRA'18 invited papers.
- A sub-reviewer for International Symposium on Bioinformatics Research and Applications 2018 (ISBRA'18).
- A sub-reviewer for International Conference on Bioinformatics and Computational Biology 2018 (BICOB'18).
- A sub-reviewer for IEEE International Conference on Computational Advances in Bio and Medical Sciences 2017 (ICCABS'17).

Other professional experience

- Software Engineering PhD Intern | Summer 2018| **Google, CA, USA**
  Worked on an open-ended and research-dependent augmented/virtual reality project
- Junior Java developer, half-time position | October 2013 – July 2014 | **FORS, Moscow, Russia**
- Intern | Summer 2012| **ROSA company, Moscow, Russia**
- Intern | Summer 2013| **PMSOFT, Moscow, Russia**
- Intern | Summer 2012| **ROSA company, Moscow, Russia**

Selected software projects

Distributed web service for processing of biological data (junior year)
- Optimized a sequence alignment tool for Hadoop, enabled it to handle a whole human genome assembly
- Developed a web-interface for a user to submit custom sequence alignment jobs (Python Flask, JQuery)
- Part of a larger team effort to build a large-scale distributed Big Data service

Cluster analysis of scientific publications with web-based as well as desktop GUI (bachelor thesis work)
- The program enabled smarter 2-dimensional analysis of collections of texts, such as paper abstracts
- Developed a web crawler of topic-based scientific abstracts
- Implemented iterative bi-clustering methods, Natural Language Processing techniques
- Developed a novel method for interactive visualization of results for desktop as well as for web

Tools for computing large-scale evolutionary trees using state-of-the-art heuristics
- Designed scalable Python and Java software implementing sophisticated but efficient algorithms
- Several publications with refereed conferences and invited journal papers

Programming skills

- Java
- Python
- C/C++
- C#
- R
- SQL
- JavaScript
- F#

Tools and frameworks (extensive experience)

- Java EE, Hibernate
- Flask (Python framework), SQLAlchemy
- Version control (Git, SVN)
- Hadoop, Spark, Apache Pig
- Android
- OpenCV (computer vision library)