# Mansur Ziiatdinov

**Date of birth:** 15 Mar 1989 | **Phone number:** (+374) 55883287 (Mobile) | **Email address:** gltronred@gmail.com |

**Address:** Sayat-Nova Ave., 23-11, 0001, Yerevan, Armenia (Home)

## WORK EXPERIENCE

1 MAY 2020 – 31 DEC 2023 Kazan
**UNIVERSITY RESEARCH ASSISTANT** KAZAN FEDERAL UNIVERSITY

I worked in the "Quantum Methods for Information Processing" laboratory, and the work was remote since 2022.

Main results:
- used algebraic methods and found original constructions of quantum hashes;
- communicated with physicists to transfer mathematical models to hardware;
- wrote in Matlab, Python, C++ and R to perform numerical experiments;
- wrote in Qiskit and Cirq to model quantum computations.

1 AUG 2014 – 31 JAN 2022 Kazan
**SOFTWARE ENGINEER** LAMBDA LLC

Main responsibilities and results:
- developed an event stream processor in Haskell;
- developed a frontend in Purescript and Elm;
- maintained Java code;
- was responsible for CI/CD and server administration.
Open source contributions can be found on corporate and personal Github, Bitbucket and Sourcehut.

The company closed in January 2022, an archived copy of its website is available here.

**Business or Sector** Information and communication | **Website** https://lambdakazan.github.io/

1 SEP 2010 – 30 JUN 2023 Kazan
**GRADUATE TEACHING ASSISTANT** KAZAN FEDERAL UNIVERSITY

While doing my PhD, I already served as a Lecturer at the Kazan Federal University. My primary responsibilities were to teach and mentor students, evaluate their work and participate in curriculum development.

Courses taught as the main instructor (development of materials and delivery):
- Functional Programming in Haskell (4th year students, group size of 25-30, two times; see tasks for self-testing)
- Quantum Algorithms (hybrid mode course, 4th year students, group size of 20, two times; see online notes and automated testing system)
Courses taught as the main instructor (delivery):
- Information Security: (3rd year students, group size of 20, two times; see online notes)
- Quantum Cryptography (master students, group size of 7-10, one time)
- Algorithms and Data Structures (1st year students, group size of 20, two times; also developed online course)
Courses in which I assisted:
- Programming in Pascal (1st year students, group size of 25-30, one time)
- Programming in C++ (1st year students, group size of 25-30, three times)
- Programming in Java (1st and 2nd year students, group size of 25-30, four times)
I also supervised more than 10 undergraduate student projects.

**Business or Sector** Education | **Department** Institute of Information Technology and Intelligent Systems | **Email** it@kpfu.ru |

**Website** https://kpfu.ru/eng/itis

## EDUCATION AND TRAINING

4 OCT 2022 Kazan
**CANDIDATE OF SCIENCES** Kazan Federal University

I defended my PhD thesis at the Kazan Federal University under the supervision of Prof. Dr. Farid Ablayev in May 2022. My thesis was on the applications of quantum fingerprinting. Quantum fingerprinting is a well-known technique in quantum algorithms. It maps a large classical input to a small quantum state in such a way that essential properties of the input can be recovered from the state, with high probability. For example, given two fingerprints, one can decide whether the corresponding inputs are equal. I used algebraic methods to find original constructions of quantum hash functions and to highlight their composable nature. In particular, I generalised the domain of quantum fingerprinting functions to finite abelian groups and proved that such generalisations can be computed efficiently. The main results of my thesis can be found in a publications:

- Mansur Ziiatdinov. "Attacking Quantum Hashing. Protocols and Their Cryptanalysis". In: Lobachevskii Journal of Mathematics 39.7 (2018), pp. 1039–1045.
- Farid Ablayev, Marat Ablayev, Alexander Vasiliev, and Mansur Ziiatdinov. "Quantum Fingerprinting and Quantum Hashing. Computational and Cryptographical Aspects". In: Baltic Journal of Modern Computing 4.4 (2016), pp. 860–875.
- Mansur Ziiatdinov. "From graphs to keyed quantum hash functions". In: Lobachevskii Journal of Mathematics 37.6 (2016), pp. 705–712.
- Mansur Ziiatdinov. "Quantum Hashing. Group approach". In: Lobachevskii Journal of Mathematics 37.2 (2016), pp. 222–226.

**Website** https://kpfu.ru/eng ∣ **Field of study** Mathematics , Physics ∣ **Level in EQF** EQF level 8 ∣

**Thesis** Quantum Information Transmission: Effective Cryptographic Protocols

OCT 2017 – OCT 2017 Riga, Latvia
**SHORT-TERM RESEARCH VISIT** Center for Quantum Computing Science, University of Latvia

APR 2016 – JUN 2016 St.Petersburg
**SPECIAL SEMESTER PROGRAM ON COMPLEXITY THEORY** St.Petersburg State University

JUN 2015 Prague, Czechia
**SUMMER SCHOOL ON LOWER BOUNDS** Charles University

MAY 2012 – JUN 2012 Moscow
**TRAINING IN INTERNATIONAL LASER CENTER** Moscow State University

1 SEP 2005 – 30 JUN 2010 Kazan
**SPECIALIST** Kazan Federal University

Applied Mathematics and Cybernetics

**Website** https://kpfu.ru ∣ **Field of study** Information and communication technologies not elsewhere classified ∣

**Final grade** Cum Laude ∣ **Level in EQF** EQF level 7 ∣ **Number of credits** 196 ∣

**Thesis** Computational Capabilities of Alternating Branching Programs

## LANGUAGE SKILLS

Mother tongue(s): **TATAR** ∣ **RUSSIAN**

Other language(s):

| | UNDERSTANDING | | SPEAKING | | WRITING |
|---|---|---|---|---|---|
| | Listening | Reading | Spoken production | Spoken interaction | |
| **ENGLISH** | C2 | C1 | B2 | B2 | C1 |

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user*

## DIGITAL SKILLS

**Programming Languages**

C/C++ | JavaScript | Haskell | Clojure | Python | Rust | Java | C | PureScript | Elm

**Programming Tools**

Linux | bash | Git | Github | Docker | SQL | PostgreSQL | Jira | Confluence | Jenkins

**Programming Techniques**

UML | Relational databases | Design Patterns | REST | RESTful api | Microservices | Unit Testing | Continous Integration | Code Review | Agile (Scrum) | Object-Oriented Programming | Functional Programming

**Other**

HTML | CSS | XML | JSON | Social Media

## PUBLICATIONS

2023
### Noisy Tree Data Structures and Quantum Applications

Kamil Khadiev, Nikita Savelyev, Mansur Ziatdinov, and Denis Melnikov. "Noisy Tree Data Structures and Quantum Applications". In: Mathematics 11.22 (2023).

Kamil Khadiev, Nikita Savelyev, Mansur Ziatdinov, and Denis Melnikov (2023). Mathematics 11.22

2023
### GAPs for Shallow Implementation of Quantum Finite Automata

Mansur Ziiatdinov, Aliya Khadieva, and Abuzer Yakaryılmaz. "GAPs for Shallow Implementation of Quantum Finite Automata". In: Proceedings of the 16th International Conference on Automata and Formal Languages, Eger, Hungary, Sep. 5-7, 2023. Ed. by Zsolt Gazdag, Szabolcs Iván, and Gergely Kovásznai. Vol. 386. Electronic Proceedings in Theoretical Computer Science. Open Publishing Association, 2023, pp. 269–280.

Mansur Ziiatdinov, Aliya Khadieva, and Abuzer Yakaryılmaz (2023)

2023
### Identification of Quantum Hashes: Numerical Experiment

Farid Ablayev and Mansur Ziatdinov. "Identification of Quantum Hashes: Numerical Experiment". In: Lobachevskii Journal of Mathematics 44.2 (Feb. 2023), pp. 667–677.

Farid Ablayev and Mansur Ziatdinov (2023). Lobachevskii Journal of Mathematics 44.2

2023
### Deterministic Construction of QFAs Based on the Quantum Fingerprinting Technique

Aliya Khadieva and Mansur Ziatdinov. "Deterministic Construction of QFAs Based on the Quantum Fingerprinting Technique". In: Lobachevskii Journal of Mathematics 44.2 (Feb. 2023), pp. 707–717.

Aliya Khadieva and Mansur Ziatdinov (2023). Lobachevskii Journal of Mathematics 44.2

2022
### Two-way and one-way quantum and classical automata with advice for online minimization problems

Kamil Khadiev, Aliya Khadieva, Mansur Ziiatdinov, Ilnaz Mannapov, Dmitry Kravchenko, Alexander Rivosh, and Ramis Yamilov. "Two-way and one-way quantum and classical automata with advice for online minimization problems". In: Theoretical Computer Science 920 (June 2022), pp. 76–94.

Kamil Khadiev, Aliya Khadieva, Mansur Ziiatdinov et al. (2022). Theoretical Computer Science 920

2020
### Universal Hash Functions from Quantum Procedures

Farid Ablayev and Mansur Ziiatdinov. "Universal Hash Functions from Quantum Procedures". In: Uchenye Zapiski Kazanskogo Universiteta. Seriya Fiziko-Matematicheskie Nauki 162.3 (2020), pp. 259–268.

Farid Ablayev and Mansur Ziiatdinov (2020). Uchenye Zapiski Kazanskogo Universiteta 162.3

2020
## Persistent Homology: Application To Monitoring Hydraulic Fracturing

Kirill Erofeev, Mansur Ziiatdinov, and Evgenii Mokshin. "Persistent Homology: Application To Monitoring Hydraulic Fracturing". In: Rssian Digital Libraries Journal (2020).

Kirill Erofeev, Mansur Ziiatdinov, and Evgenii Mokshin (2020). Rssian Digital Libraries Journal

2018
## Quantum-Assisted Blockchain

Farid Ablayev, Dmitry Bulychkov, Dmitry Sapaev, Alexander Vasiliev, and Mansur Ziiatdinov. "Quantum-Assisted Blockchain". In: Lobachevskii Journal of Mathematics 39.7 (Sept. 2018), pp. 957–960.

Ablayev, F.M. et al. (2018). Quantum-Assisted Blockchain. Lobachevskii J Math 39, 957–960

2018
## Attacking Quantum Hashing. Protocols and Their Cryptanalysis

Mansur Ziiatdinov. "Attacking Quantum Hashing. Protocols and Their Cryptanalysis". In: Lobachevskii Journal of Mathematics 39.7 (2018), pp. 1039–1045.

Ziatdinov, M.T. (2018). Lobachevskii J Math 39, 1039–1045

2016
## Quantum Fingerprinting and Quantum Hashing. Computational and Cryptographical Aspects

Farid Ablayev, Marat Ablayev, Alexander Vasiliev, and Mansur Ziiatdinov. "Quantum Fingerprinting and Quantum Hashing. Computational and Cryptographical Aspects". In: Baltic Journal of Modern Computing 4.4 (2016), pp. 860–875.

Farid Ablayev et al. (2016). Baltic Journal of Modern Computing 4.4

2016
## From graphs to keyed quantum hash functions

Mansur Ziiatdinov. "From graphs to keyed quantum hash functions". In: Lobachevskii Journal of Mathematics 37.6 (2016), pp. 705–712.

Ziatdinov, M. (2016). From graphs to keyed quantum hash functions. Lobachevskii J Math 37, 705–712

2016
## Quantum Hashing. Group approach

Mansur Ziiatdinov. "Quantum Hashing. Group approach". In: Lobachevskii Journal of Mathematics 37.2 (2016), pp. 222–226.

Ziatdinov, M. (2016). Quantum Hashing. Group approach. Lobachevskii J Math 37, 222–226

2013
## Using frequency analysis and Grover's algorithm to implement known ciphertext attack on symmetric ciphers

Mansur Ziiatdinov. "Using frequency analysis and Grover's algorithm to implement known ciphertext attack on symmetric ciphers". In: Lobachevskii Journal of Mathematics 34.4 (2013), pp. 313–315.

Ziatdinov, M. (2013). Lobachevskii J Math 34, 313–315

## CONFERENCES AND SEMINARS

29 MAY 2023 – 31 MAY 2023 online
**QScience Days 2023**

Speaker: Automated Testing of Students Solutions for Quantum Algorithms Courses. M. Ziiatdinov

**Link** https://qworld.net/qscience-days-2023/

20 JUN 2023 – 24 JUN 2023 online
## Discrete Mathematics and its Applications

Speaker: Lower Bounds for Query Complexity of Radix Sort. M. Ziiatdinov

JUN 2019 Tokyo, Japan
## Workshop on Quantum Computing and Quantum Information

Co-author (non-presenting) of poster: Deterministic Construction of QFAs based on the Quantum Fingerprinting Technique. A. Khadieva, M. Ziiatdinov

JUN 2018 Kazan
## 14th Conference IQSA "Quantum Structures"

Speaker: The Structure of Quantum Hash Functions for Groups. M. Ziiatdinov

MAY 2018 Moscow
## Discrete Models in Theory of Control Systems

Co-author (non-presenting): On Quantum Online Algorithms with Limited Memory and Advice, K.Khadiev, A.Khadieva, A.Rivosh, D.Kravchenko, M.Ziiatdinov, I.Mannapov, R.Yamilov

MAY 2018 Moscow
## Discrete Models in Theory of Control Systems

Co-author (non-presenting): Quantum Blockchain. F.Ablayev, D.Bulychkov, D.Sapaev, A.Vasiliev and M.Ziiatdinov

MAY 2018 Moscow
## Discrete Models in Theory of Control Systems

Speaker: Quantum hash functions for message authentication, M.Ziiatdinov

FEB 2018 Krems an der Donau, Austria
## 44th International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM 2018)

Poster: Attacking Quantum Hashing. Protocols and their Cryptanalysis. M.Ziiatdinov

JAN 2018 Delft, Netherlands
## 21th Annual Conference on Quantum Information Processing (QIP)

Co-author (non-presenting) of poster: Quantum Online Algorithms with Advice Bits and Restricted Memory. K.Khadiev, I.Mannapov and M.Ziiatdinov

OCT 2017 Erlangen, Germany
## 3rd International Conference for Young Quantum Information Scientists (YQIS)

Poster: The Security of the Quantum MAC. M.Ziiatdinov

JUL 2017 Moscow
## IV International Conference on Quantum Technologies

Co-author (non-presenting) of poster: Quantum Fingerprinting and Quantum Hashing. F.Ablayev, A.Vasiliev, M.Ziiatdinov

JUN 2017 Penza
## Problems of Theoretical Computer Science

Speaker (plenary talk): Quantum Hashing Method. F.Ablayev, M.Ablayev, A.Vasiliev, M.Ziiatdinov

JUN 2017 Penza
**Problems of Theoretical Computer Science**

Speaker: On Authenticating Messages with Graph-based MACs. M.Ziiatdinov

APR 2017 Rostov-on-Don
**Programming Languages and Compilers**

Speaker: Free Bi-Arrows, or How to generate students' programming assignments. A.Marchenko, M.Ziiatdinov

JUN 2015 Kazan
**IV International Symposium "Current Trends in Cryptography" (CTCrypt)**

Speaker: Minimizing collisions for quantum hashing, M.Ziiatdinov

MAY 2015 Moscow
**Discrete Models in Theory of Control Systems**

Co-author (non-prsenting): Minimizing collisions of quantum hashing. A.Vasiliev, M.Ziiatdinov

JUN 2014 Kazan
**Problems of Theoretical Computer Science**

Speaker: On one construction of quantum hash function. Algebraic approach. M.Ziiatdinov

## PROJECTS

1 JAN 2020 – 31 DEC 2021
**Analysis and construction of quantum algorithms in different models of computing**

I participated as a named researcher in the Russian Foundation for Basic Research grant "Analysis and construction of quantum algorithms in different models
of computing" (RFBR 20–37–70080)

1 JAN 2017 – 31 DEC 2019
**Development of a quantum cloud platform**

I participated as a named researcher in the Russian Foundation for Basic Research grant "Development of a quantum cloud platform" (RFBR 17-07-01606)

1 JAN 2014 – 31 DEC 2016
**A physical and mathematical model of quantum digital signature based on quantum hashing in multi-atom systems states**

I was a named researcher in the Russian Foundation for Basic Research grant "A physical and mathematical model of quantum digital signature based on quantum hashing in multi-atom systems states" (RFBR 14-07-00878)

## HONOURS AND AWARDS

2017
**Kazan Federal University rector's stipend – Kazan Federal University**

## VOLUNTEERING

2022 Ekaterinburg
**AtomSkills-2022 championship, expert (jury member) in "Quantum Technologies" discipline**

2021 online
**"Ya Professional" olympiad ("I am Professional"), Jury member for "Quantum Technologies" discipline**

2020 online
**"Ya Professional" olympiad ("I am Professional"), Jury member for "Quantum Technologies" discipline**

JUN 2017 Kazan
**Local organiser of "Computer Science in Russia-2017" symposium**

JUN 2014 Kazan
**Local organiser of "Problemy teoreticheskoj kibernetiki" (Problems of theoretical computer science) conference**

JUN 2010 Kazan
**Local organiser of "Computer Science in Russia-2010" symposium**

*I hereby declare that all the information contained in this resume is in accordance with facts or truths to my knowledge. I take full responsibility for the correctness of the said information.*

Yerevan, Armenia , 20 Sep 2024

Mansur Ziiatdinov