

**Grigorii Kirgizov**  
**AI Research Engineer**

*location* Bali, Indonesia  
open for remote & reloc  
*e-mail* [gkirgizov@gmail.com](mailto:gkirgizov@gmail.com)  
*telegram* [t.me/iregory](https://t.me/iregory)  
*github* [gkirgizov](https://github.com/gkirgizov)

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I'm a senior AI research engineer with 4+ years in research-driven software development. I'm a systemic multidisciplinary thinker who keeps an eye on convergent technologies & promising theories, looking deeper than present and developing for the future. Open for R&D roles with a focus on hybrid projects that involve neural, metaheuristic, and formal methods with a mission aligned with the planet and society.

## Skills & Knowledge

### *Research & Theories:*

- AI Expertise: Machine Learning, Deep Learning, Reinforcement Learning, Evolutionary Algorithms, AutoML & more
- Strong Computer Science: Graph theory, Formal systems (semantics, type checkers, translators, FSM etc.), Complexity theory
- Language design (LLVM, worked with DSLs)
- Strong architectural thinking
- R&D experience, experiment design

### *Personal:*

- Teaching & public lecture experience
- Communication: conveying findings to any stakeholders in their own language

### *Programming:*

- Python, C++, Kotlin, Java, Haskell, Prolog
- PyTorch, fastai, numpy, Pandas, XArray, Gym, NLP, Transformers, and more
- GLSL, Blender, parametric modeling, GPUs & graphics pipeline
- Design patterns, OOP, SOLID, Agile, TDD, Linux, git, bug-trackers etc. — of course

- Academic English (C2)
- Keen interest in world literature
- Strong creative design skills
- Product thinking

## Education

2014-2018, BSc in Computer Science (with Honours), *Saint Petersburg State University*, [se.math.spbu.ru](https://se.math.spbu.ru)  
2019-2021, MA in Arts (with Honours), *ITMO University*, Saint Petersburg, Art & Science, [art.itmo.ru](https://art.itmo.ru)

## R&D experience

<b>ITMO University</b> <b>AI Research Engineer</b> Feb 2022 - currently	Senior AI Engineer, leading development of GOLEM AI framework for graph optimization with adaptive & hybrid genetic algorithms. <a href="https://github.com/aimclub">github.com/aimclub</a>
<b>JetBrains Co. Ltd.</b> <b>Software Engineer</b> Nov 2018 - Jan 2021	Worked on type systems, incremental type checker & language semantics for MPS — IDE for domain-specific languages (DSL). <a href="https://jetbrains.com/mps">jetbrains.com/mps</a>
<b>Grounding</b> <b>Exhibition Curator</b> Dec 2020 - Oct 2021	Co-curator of international exhibition of technological art dedicated to soils. <b>28</b> artists with <b>20</b> art objects and installations on <b>2</b> venues with over <b>2000</b> offline visitors & almost <b>100</b> publications in media. Web: <a href="https://groundingwith.space/en">groundingwith.space/en</a>
<b>SPbSU</b> <b>Bachelor Thesis</b> Oct 2017 - May 2018	Developed embedded C-like DSL and a library for programming small-scale heterogeneous microcontroller systems. Worked with LLVM IR & dynamic code generation. Paper: <a href="https://doi.org/10.15514/ISPRAS-2018-30(4)-3">doi.org/10.15514/ISPRAS-2018-30(4)-3</a>
<b>JetBrains Co. Ltd.</b> <b>Software Intern</b> July - Aug 2017	Worked on NLP framework for extraction of structured information aimed for Marketing Research, based on entity extraction, web-ontologies and RNNs.
<b>Raidix LLC</b> <b>Data Science Intern</b> Nov 2016 - May 2017	Improved industrial SSD caching algorithms with predictive machine learning methods. Research article & further product integration. Paper: <a href="https://doi.org/10.1145/3166094.3166109">doi.org/10.1145/3166094.3166109</a>

## Project Details

### **ITMO University** **AI in Industry Lab** **AI Research Engineer**

Senior AI Engineer, leading development of AI framework for graph optimization with metaheuristic methods (genetic, swarm etc.)

Outputs:

*Projects:*  
GOLEM, FEDOT

[github.com/aimclub](https://github.com/aimclub)

Feb 2022 - currently

- Led full architectural redesign of the primary Lab's project and integrations with tools of other teams.
- Launched new AI framework GOLEM for graph optimization.
- Initiated & led research direction on Adaptive Evolution with RL.
- Contributed to 3 research papers (currently in process).
- Led a small team of research interns, supervised MSc students.
- Taught classes on Architecture and Graph Optimization.

**Technologies:** Python, NumPy, Pandas, Scikit-learn, PyTorch, Graph Theory, Evolutionary Algorithms, Reinforcement Learning, AutoML, Time-Series.

### **JetBrains Co. Ltd.** **Software Engineer**

MPS is an integrated development environment (IDE) for domain-specific languages (DSL). Its core includes meta-languages for implementing DSLs. I participated in R&D of the meta-language *Coderules* adhering to logical paradigm (Prolog-like) for declarative definition of type systems for DSLs.

*Project:*  
Meta Programming  
System (MPS)

[jetbrains.com/mps](https://jetbrains.com/mps)

[jetbrains.github.io/mps-coderules](https://jetbrains.github.io/mps-coderules)

Outputs:

- Significantly improved meta-language syntax and semantics.
- Implemented typecheckers for Java and Haskell (partially).
- Developed a working prototype for *incremental language-independent* typechecking engine.

Nov 2018 - Jan 2021

**Technologies:** Kotlin, Java, Prolog, Constraint Handling Rules (logical language), Type Systems, Formal Semantics.

**Public talk:** “Coderules, a new typechecking engine”, at MPS Users Conference in Amsterdam, Oct 2019.

### **Grounding** **cultural project**

Co-curator of international exhibition of technological art dedicated to soils. Exhibition comprised **28** artists with **20** art objects and installations on **2** venues with over **2000** offline visitors & almost **100** publications in media and positive feedback from the professionals. Parallel educational program with 10+ events.

V.V. Dokuchaev  
Soil Museum

St Petersburg, Russia

[groundingwith.space](https://groundingwith.space)

Dec 2020 - Oct 2021

- Official partner of *Ars Electronica 2021* international festival.
- Short-listed for *Innovation 2021* government award in the art sphere for the best educational project (<http://artinnovation.ru/>)
- Short-listed for *Kuryokhin award 2022* (primary Russian award in contemporary art, <https://kuryokhin.net/>) for the best exhibition.

## Personal projects

### **Distributed** **Intelligence** **Environment**

June 2022 - ongoing

DIE — is an Artificial Life project aimed at reproducing emergence of distributed intelligence under environmental pressures using neural cellular automata based on Evolution, RL & Active Inference.

[github.com/gkirgizov/die](https://github.com/gkirgizov/die)

### **Invest Patterning**

Sep 2022 - ongoing

Automated formulation of investing ideas with structural AI. Works with evolutionary algorithms by growing graphs of causal connections between companies and uses them for inference.

[github.com/gkirgizov/invest-patterning](https://github.com/gkirgizov/invest-patterning)