

# Parsa Kamalipour

Montréal, QC – Canada

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## Research Interests

- Design & Analysis of Algorithms
- Graph Theory & its applications
- Combinatorial Optimization
- Approximation & Randomized Algorithms
- Complexity Theory & Online Algorithms
- Social Networks Analysis

## Education

### Concordia University

Master of CS. Thesis-based in Computer Science, advised by Prof. Hovhannes Harutyunyan

Montreal, QC, Canada

Sep 2024–Present

○ GPA: 3.53/4.0

○ Research Topics: Community Detection, Social Networks Analysis, Algorithms Design, Graph Theory

### Vali-e-Asr University of Rafsanjan

B.Sc. in Computer Engineering, advised by Dr. Fahimeh Dabaghi-Zarandi

Rafsanjan, Iran

Sep 2018–Jun 2023

○ GPA: 16.26/20.0 *\*Graduated with Honors*

○ Research Topics: Community Detection, Algorithms Design, Machine Learning, Software Refactoring

## Publications

- *From Dense Graphs to Meaningful Communities: Assessing Community Quality Using Geodesic Distance Modularity on Metric Backbone-Sparsified Networks*
  - Parsa Kamalipour and Hovhannes Harutyunyan [Submitted to The 12th International Conference on Social Networks Analysis, Management and Security (SNAMS 2025)]
- *LLM-Based Code Translation for Cross-Language Refactoring Mining*
  - Iman Hemati Moghadam, Mohammad Mehdi Afkhami, Vadim Zaytsev, Mohammad Hossein Ashoori, Hossein Bazmandegan, and Parsa Kamalipour [In Revision at Empirical Software Engineering journal (EMSE)]
- *Extending refactoring detection to Kotlin: A dataset and comparative study*
  - Iman Hemati Moghadam, Mohammad Mehdi Afkhami, Parsa Kamalipour, and Vadim Zaytsev [The 31st IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER 2024), doi. ]
- *Community detection in complex network based on an improved random algorithm using local and global network information*
  - Fahimeh Dabaghi-Zarandi, Parsa Kamalipour [Journal of Network and Computer Applications (JNCA), vol.206, p.103492, Aug 2022, doi. ]

## Experiences

### Research Experience

#### Algorithms & Complexity Lab, Concordia University

Graduate Research Assistant, Supervisor: Prof. Hovhannes Harutyunyan

Montreal, QC, Canada

Aug 2024 – Present

- Conducting research in **algorithm design, graph theory, and social network analysis**, with emphasis on large-scale social networks.
- Investigating **Geodesic Distance Metric** and **parameter-free sparsification** methods to evaluate and enhance community detection.
- Developing new **theoretical frameworks and algorithms** to advance the study of community quality in networks.

#### Formal Methods and Tools (FMT) Group, University of Twente

Research Collaborator (Remote), Supervisor: Dr. Iman Hemati Moghadam

Enschede, The Netherlands

Aug 2023 – Mar 2024

- Implemented the **"KotlinCode2Text"** parser and integrated it into the **"RefDetect"** tool for automated refactoring detection.
- Built two refactoring datasets supporting empirical evaluation of refactoring detection techniques.
- Improved tool performance via systematic testing, debugging, and algorithmic optimizations.
- Explored **prompt engineering with large language models (LLMs)** to enhance software translation tasks.

#### Department of Computer Engineering, Vali-e-Asr University of Rafsanjan

Undergraduate Research Assistant, Supervisor: Dr. Fahimeh Dabaghi-Zarandi

Rafsanjan, Iran

Aug 2021 – Mar 2024

- Investigated algorithmic approaches for solving complex problems in **graph theory**.
- Implemented and validated graph algorithms in **MATLAB** and **Python**.
- Curated datasets and evaluated algorithmic performance through experimental studies.
- Drafted preliminary manuscripts and contributed to research publications.

## Teaching Experience.....

**Gina Cody School of Engineering and Computer Science, Concordia University**

**Montreal, QC, Canada**

*Graduate Teaching Assistant*

*Sep 2024 – Present*

- Led tutorials, graded assignments and exams for core undergraduate courses, including **Algorithms, Programming Languages, and Data Systems**.
- Supported student learning through **Programmer On Duty (POD)** [Q&A Sessions], assignment guidance, and evaluation.
- Courses:
  - COMP 233: Probability and Statistics for Computer Science (Summer 2025)
  - COMP 348: Principles of Programming Languages (Winter 2025, Summer 2025)
  - COMP 465: Design and Analysis of Algorithms (Winter 2025)
  - SOEN 363: Data Systems for Software Engineers (Winter 2025)
  - COMP/MATH 339: Combinatorics (Fall 2024)
  - COMP 335: Introduction to Theoretical Computer Science (Fall 2024, Summer 2025)

**Department of Computer Engineering, Vali-e-Asr University of Rafsanjan**

**Rafsanjan, Iran**

*Undergraduate Teaching Assistant*

*Mar 2021 – Jan 2024*

- Served as **Head TA and Tutorial Leader** for multiple foundational CS courses, mentoring students and overseeing grading.
- Collaborated with faculty to design assignments, run labs, and support student projects in algorithms, data structures, and software engineering.
- Courses:
  - Data Structures (Spring 2021–2023, Fall 2021–2023)
  - Algorithms Design (Spring 2021–2023, Fall 2021–2022)
  - Discrete Mathematics (Fall 2021, Spring 2022)
  - Operating Systems (Spring 2022)
  - Introduction to Information Retrieval (Spring 2022–2023)
  - Software Engineering (Spring 2023)
  - Database Systems (Fall 2022)
  - Fundamentals of Programming (Fall 2022)
  - Artificial Intelligence (Fall 2022)
  - Introduction to Data Mining (Spring 2023)

## Industry Experience.....

**Null References: Game Development Team**

**Kerman, Iran**

*Team Co-Founder & Indie Game Developer*

*Feb 2020 – Sep 2021*

- Co-founded an indie game development team, collaborating on all stages of game design and implementation.
- Applied **Design Patterns** and **SOLID principles** to develop a demo of the video game *Uncertainty*.
- Released the project as an **open-source game** on GitHub, contributing to community-driven development.

## Honors and Awards

**2024: DRW Graduate Scholarship in Computer Science** – Concordia University & DRW Company

**2024: Concordia Merit Scholarship (Entrance Scholarship Award)** – Concordia University, School of Graduate Studies

**2024: Financial Research Support (FRS)** – Concordia Faculty of Engineering and Computer Science

**2023: Distinguished Student Award** – Awarded among all students of Vali-e-Asr University

**2023: Undergraduate Researcher Award** – Awarded among all undergraduate students of Vali-e-Asr University

**2023: Top Researcher Award** – Earned this prestige award among all undergraduate students of Kerman Province

## Selected Projects

**Introduction to Data Mining** [↗](#)

*Multiple assignments regarding to the Intro to Data Mining course*

*Spring 2022*

Data Pre Processing, Apriori Algorithm, Data Visualization, K-Means, Agglomerative Clustering, DBSCAN, K-Nearest Neighbors Algorithm, Decision Tree, Support Vector Machines, Multi-Layer Perceptron

**Uncertainty: an action-adventure space-shooter game built with Unity3D** [↗](#)

*Null References* [↗](#)

*Spring 2021*

- Uncertainty is an action-adventure space-shooter game, and currently It's under development.
- We have utilized the beta version of this game as our "Software Engineering Lab" course project.

**Multiple projects regarding to Design and Analysis of Algorithms course** [↗](#)

*Designing and implementation of:*

*Fall 2020*

The Closest Pair of Points Problem, Sudoku Solver, Tournament Scheduler, Huffman Coding, Bellman–Ford, Matrix Chain Multiplication, N-Queens Solver Traveling Salesman Problem

**Multiple projects regarding to Data Structures and Algorithms course** [↗](#)

*Designing and implementation of:*

*Fall 2019*

the Red-Black Tree, the AVL Tree, the Trie Dictionary, Threaded Binary Tree, the Sparse Matrix via Linked List, the Rat in the maze problem

## Skills

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**Programming Languages:** C, C++, Python, MATLAB, C#, **Frameworks & Libraries:** Qt, NumPy, Pandas, Matplotlib, Java, SQL, NetworkX, Scikit-learn, PyTorch, Unity

**Algorithms & Data Science:** Graph Algorithms, Community Detection, Social Network Analysis, Machine Learning **Software Engineering:** Refactoring, Debugging, Unit Testing, Agile Methodologies, Design Patterns, SOLID Principles

**Tools & Platforms:** Linux, Git, Jupyter, L<sup>A</sup>T<sub>E</sub>X, Markdown, Microsoft Office, Obsidian **Soft Skills:** Teamwork, Leadership, Collaboration, Teaching, Research, Problem Solving

## Selected Relevant Coursework

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**Graduate:** Algorithm Design Techniques, Advanced Analysis of Algorithms, Combinatorial Algorithms, Machine Learning

**Undergraduate:** Design and Analysis of Algorithms, Data Structures, Discrete Mathematics, Programming Language Design, Artificial Intelligence, Software Engineering, Fundamentals of Data Mining, Compiler Design, Operating Systems, Computer Architecture

## Test Scores

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**TOEFL:** 99/120 - Reading: 26/30, Listening: 29/30, Speaking: 23/30, Writing: 21/30

## Languages

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**Persian:** Native

**English:** Proficient

**French:** Beginner (A1)

## Volunteer Experience

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**Vali-e-Asr University Scientific Association of Computer Engineering**

*Director, Research Assistant Committee*

*Nov 2022 – Sep 2023*

**Vali-e-Asr University Scientific Association of Computer Engineering**

*Director, Teaching Assistant Committee*

*Jul 2022 – Sep 2023*

**Vali-e-Asr Collegiate Programming Contest (VCPC)**

*Teaching Staff Member*

*Sep 2021 – Jun 2022*

## References

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Available upon Request