# Karanvir (Karan) Khanna

GitHub | Portfolio | LinkedIn | +1 416-347-3761 | prokaranvir@gmail.com

## Education

**University of Toronto** Toronto, ON

*Bachelor of Science in Computer Science, Minor in Math + Co-op (PEY)* *Sep. 2021 – Apr. 2026*

- Relevant Coursework: Operating Systems, AI, Functional Programming, Unix Tools, Cybersecurity, Algorithm Design, Databases, Software Design, Statistics

## Technical Skills

**Languages**: Java, Python, C/C++, JavaScript, TypeScript, Bash, SQL, PHP, Assembly (x86)
**Frameworks & Tools**: Node.js, Flask, Django, TensorFlow, PyTorch, scikit-learn, pandas, NumPy, Selenium, JUnit, LaTeX, Pyomo, SCIP, CPLEX
**Optimization**: MINLP, nonlinear solvers, multistage model design
**Infrastructure**: NGINX, DigitalOcean, MongoDB, Conda, Ubuntu, WordPress
**DevOps**: Git, Bitbucket, GitHub, GitHub Actions, CI/CD, JSON, REST, Shell scripting
**Cloud & APIs**: AWS, Azure, OpenAI API, Google Apps Script, Amazon Rainforest API
**Security**: CAPTCHA, SQLmap, Ghidra, Burp Suite, Wireshark, WPScan, cryptographic tools

## Experience

**AI Intern: Data Management and Governance** May 2023 – Oct. 2023

*KPMG LLP* *Toronto, ON*

- **Prototyping:** Developed interactive AI demos using ChatGPT to streamline Data Management and Governance workflows
- **System design:** Built prototypes including mock UIs, data pipelines, and automation algorithms for inventory management systems
- **Optimization:** Applied Naive Bayes, Dynamic Programming, and Greedy techniques to optimize sub-tasks in internal tools
- **Tool evaluation:** Assisted in evaluating platforms like Informatica, Microsoft Purview, and Collibra for enterprise data use
- **Cloud strategy:** Outlined potential integrations with AWS and Azure for long-term cloud scalability
- **Playbook:** Authored the firm's internal Data Governance and Data Management Playbook, defining best practices, tooling standards, and architectural guidelines across teams

**E-commerce Software Developer** June 2024 – Present

*IPPINKA* *Toronto, ON*

- **Business model:** IPPINKA is a curated e-commerce retailer with over 5,000 product listings, selling primarily on Amazon and acting as a middle layer between independent designers and global buyers
- **Backend:** Built and maintained backend infrastructure using Node.js, TypeScript, and Google Apps Script to streamline listing management, PO automation, and inventory operations
- **Caching:** Developed a metadata-aware caching system for Google Sheets to reduce API usage and accelerate runtime across distributed update flows
- **Automation:** Built automation scripts in Google Apps Script and Node.js for syncing spreadsheets and managing FBA prep workflows
- **Email integration:** Integrated Flodesk with internal systems to automate email marketing flows and sync customer segments for product-specific campaigns
- **Forecasting:** Designed and deployed a demand forecasting pipeline using 10+ years of sales data, integrating seasonality, holidays, and customer psychology to guide purchasing decisions
- **Data management:** Set up and managed a MongoDB instance to store and query 10+ years of sales and shipment data used across forecasting, PO generation, and FBA tracking pipelines
- **PO automation:** Led full-stack automation of the PO pipeline including:
  - **Solver logic:** PO builder that replicates human-like viability checks using SCIP and CPLEX solvers for nonlinear constraints
  - **Resilience:** Integrated exponential backoff logic to reduce solver timeouts and improve numerical stability

    - **Tracking tools:** Automated supplier communication via invoice upload and box tracking web apps
- **Bundling strategy (CPLEX):** Designed a reallocation model that shifts units between bundles and singles based on post-arrival demand; used CPLEX to minimize variance between projected bundle uptake and live demand multipliers
- **FBA compliance:** Built a Box Content Upload app for Amazon Seller Central to automate shipment data submission
- **Kitting:** Engineered Amazon kitting workflows to efficiently prep and ship bundles with minimal manual effort
- **Review analysis:** Integrated Rainforest API to monitor review velocity and sentiment across top listings
- **Security:** Hardened internal tooling with CAPTCHA to block bots and automated threats
- **Hiring & onboarding:** Led hiring for new developers — screened 500+ candidates and onboarded 2 engineers with custom ramp-up documentation and mentorship
- **Codebase stewardship:** Maintained critical backend modules and created internal documentation for dev workflows, logic, and deployment processes
- **Project management migration:** Migrated task and sprint infrastructure from Pivotal Tracker (sunset) to Jira, including schema conversion and developer training
- **Solver env:** Configured Node.js infrastructure to support conda-based SCIP/CPLEX workflows, including subprocess logic and venv startup
- **Monitoring:** Deployed and monitored services on DigitalOcean using NGINX and custom metrics dashboards

## Projects

Selected projects shown below — more available at `github.com/Karanvir1729`

**Nettoyer (UofT Hacks Runner-up)** | *Cohere AI, Python, Flutter*
- Built a decentralization-focused content filtering platform with real-time toxicity detection using Cohere
- Automated YouTube engagement actions (e.g., liking) to support user mental wellness tags and safe themes
- Delivered production-ready frontend in under 4 hours during hackathon sprint

**Hijacking System Calls** | *Linux Kernel, C*
- Implemented kernel-level modules to intercept and log low-level system calls such as `read()`, `write()`, and `open()`

**Essay Research Bot (Deer Hacks Winner)** | *Python, Flask, UiPath*
- Built an automated essay research tool using Google APIs and web scraping
- Integrated UiPath to handle repetitive research workflows and generate citations
- Project link: definition-finder on Devpost

## Research

**Matroid Theory Research** | *University of Toronto* May 2023 – Sep. 2023
- Explored combinatorial techniques for computing the volume of polar duals of matroid polytopes
- Authored Sage code to test conjectures on uniform matroids using symbolic computation and case analysis
- Contributed to the theoretical framework that enables volume estimation for classes of matroids

## Certifications and Awards

**Certified Data Management Professional (CDMP)** Aug 2023
*Data Management Association (DAMA)*
- Scored in the top 10% of 4,562+ professionals globally on the CDMP foundation exam

**Dean's List** 2021 – Present
*University of Toronto*
- GPA consistently above 3.5; top 10% of the faculty cohort

**Deer Hacks Winner** Apr 2022
*University of Toronto*
- Built an AI-powered academic research assistant and won best overall project