# JOHN AITKEN

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## EDUCATION

**University of Florida** Aug 2022 - May 2026
*B.S. Computer Science (3.73), Minors: Chemistry, Statistics* *Gainesville, FL*

- **Relevant Coursework**:
  Linear Algebra for Data Science, Probability, Fundamentals of Machine Learning (Graduate level), Bioinformatics, Organic Chemistry, Biochemistry, Data Structures and Algorithms, Software Engineering

## TECHNICAL SKILLS

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|---|---|
| **Languages** | Python, R, C++, JavaScript, SQL, HTML/CSS, Rust |
| **Frameworks** | React, Next.js, FastAPI, Nest.js, PyTorch, scikit-learn, Tauri |
| **Data & ML** | NumPy, Pandas, Matplotlib, DESeq2, edgeR, Vector databases, RAG |
| **Databases** | PostgreSQL, MongoDB, MySQL, Qdrant, Redis |
| **Cloud & Tools** | AWS (EC2, RDS, S3, Lambda), Docker, Git, PyMol, AMBER, HPC |
| **Bioinformatics** | RNA-seq analysis, Molecular dynamics, Protein modeling |

## EXPERIENCE

**Textile** Mar 2025 – Present
*Full Stack Developer* *Miami, FL*

- Architected cross-platform AI assistant solving document analysis bottlenecks with proprietary retrieval-augmented generation (RAG) capabilities: web app (Next.js, React-Query, TailwindCSS) and desktop app (Tauri) with local inference. **Awarded $30K** at University of Miami's EPIC Pitch Competition
- Built production Nest.js backend with Prisma ORM and PostgreSQL on AWS RDS, designed for scalable API request handling and concurrent user sessions
- Implemented AWS EC2 infrastructure with Docker, FastAPI microservices, and Redis caching to optimize response times and system performance
- Integrated local FastAPI Python binary with Tauri desktop app for offline inference, enabling secure document processing without cloud dependencies for enterprise clients
- Developed document ingestion pipeline processing dozens of documents daily with gigabytes of file uploads, vector embeddings (Qdrant), cited RAG responses, internet search integration, and conversation memory via S3
- Collaborating with engineering team at app.textile.dev on production deployment. Company secured **$150K seed funding**

**University of Florida** Feb 2024 - Present
*Undergraduate Research Assistant* *Gainesville, FL*

- Developed computational kinetics models to analyze Oxalate Decarboxylase (OxDC) enzymatic mechanisms, contributing to metabolic pathway research and drug discovery applications
- Mapped electron hole-hopping pathways across crystal OxDC configurations using EHPath and PyMol for computational chemistry analysis
- Executed molecular dynamics simulations using AMBER suite and Gaussian for binding enthalpy calculations and thermodynamic predictions
- Processed simulation datasets on high-performance computing clusters, optimizing computational workflows for enzyme mechanism studies

**Volunteering Miami** Jul 2019 - May 2022
*Co-founder & Developer* *Miami, FL*

- Architected volunteeringmiami.org from scratch using React and AWS, connecting 300+ students with community service opportunities across Miami-Dade County
- Built RESTful API using AWS Lambda (Node.js) and PostgreSQL on AWS RDS for automated application processing and user data management
- Implemented responsive UI with Bootstrap and HTML5, streamlining application workflows and reducing submission complexity
- Onboarded technical team members and coordinated expansion to additional regions beyond Miami

## PROJECTS

**RNA-Seq Analysis for Schizophrenia Research** Aug 2023 - Dec 2023
*Gainesville, FL*

Performed differential expression analysis on genome-wide RNA-seq data from 355 subjects using R, analyzing 22,892 variables to identify biomarkers

- Applied machine learning clustering (k-Means, PAM, hierarchical) and linear SVM achieving 0.83 AUC for patient classification and biomarker discovery
- Identified **33 statistically significant genes** (p-adjusted < 0.01) with differential expression patterns relevant to psychiatric genomics and potential therapeutic targets
- Processed large-scale genomic datasets using HPC resources and standardized bioinformatics pipelines for transcriptome analysis
- **Slides**: tinyurl.com/johnaitken-rnaseq | **Code**: github.com/rqian239/bioinformatics-project

**Fine-tuning Faster R-CNN for Handwritten Digit Detection** Nov 2024 - Dec 2024
*Gainesville, FL*

Implemented transfer learning to fine-tune Faster R-CNN with ResNet50 backbone on 4,000-image handwritten digit dataset with YOLO format conversion

- Applied data augmentation and custom image transformations achieving best performance of 0.74 IoU and 0.64 mAP-50 on validation set
- Trained models using PyTorch on NVIDIA A100 GPU with comprehensive evaluation of different augmentation strategies
- **Code**: github.com/Johna321/faster-rcnn-iid

**Clips for a Cause** Feb 2024 - May 2024
*Gainesville, FL*

Developed responsive single-page application using Next.js and TailwindCSS for a fictional charity donation platform

- Implemented secure authentication via AWS Cognito with role-based access for donors and service providers
- Built PostgreSQL database on AWS RDS for user account and transaction management with optimized queries
- **Code**: github.com/Johna321/clips-for-a-cause