Niels-Erik Nandal

(647) 625-6430 • niels.erik.nandal@gmail.com

EXPERIENCE

Intern – *SupplyCo* *October – November 2025*
- Refactored production Dagster pipelines from ad-hoc Supabase/SQL scripts into a clean SQLModel-based architecture—typed DAOs for all I/O, pure transformation layers, and an orchestrator—eliminating pandas, reducing regressions, and making the workflow deterministic and testable
- Rebuilt the database layer by replacing manual Supabase schema management with a full Alembic/SQLAlchemy migration system—baseline revisions, whitelists, schema diff tooling, and autogenerate gating—giving the team reproducible, version-controlled schema changes for the first time
- Replaced brittle mock-based tests with an ephemeral Postgres test harness (Alembic-stamped), adding granular tests for migration filters and schema scope—ending silent ORM/DB drift and giving the pipeline real integration coverage

Product Manager – *Mind Brain Behaviour Hive* *December 2018 – June 2020*
- Translated cognitive-neuroscience research into shipped software products—defining specifications, shaping experiments, and working with engineers to deliver browser, mobile, AR, and VR applications.

R&D Consultant – *Mind Brain Behaviour Hive* *October 2015 – March 2016, July 2018 – December 2018*[1]
- Developed detection algorithms across multiple signal channels (physiology, text/speech, facial/gestural cues), transforming raw behavioral data into feature sets, metrics, and visualizations used to model emotional and cognitive states.
- Prototyped applied systems including a VR stress-regulation game and a Bluetooth breathing/HR monitor integrated into research workflows.

Research Assistant – *University of Toronto: Rotman School of Management* *July 2015 – March 2016*
- Designed and ran behavioural experiments on multi-alternative choice (attraction, compromise, dominance effects), analyzing how contextual options shape decision formation.
- Developed a habituation experiment in collaboration with Dr. Colin Camerer, focusing on how repeated exposure alters valuation and choice behaviour.

PROJECTS

Factory Simulator *November 2025*
- Built a multi-agent LLM system wrapped around a fully deterministic factory-scheduling simulator—LLM agents handle interpretation/reporting, while the core EDD scheduler and metrics engine remain pure, auditable computation.
- Designed a 10-stage orchestration pipeline with strict validation (Pydantic schemas, ID-coverage guarantees, no-hallucination rules) and safe fallbacks, exposing full pipeline traces via a debug API and React UI.
- Developed comprehensive tests covering determinism, purity, contract enforcement, agent behavior (LLM-mocked), and end-to-end pipeline invariants.

Nexus *November 2025*
- Designed and implemented a reading-first knowledge management system: ingesting PDFs/EPUBs/HTML into deterministic canonical text, chunking, and embedding content into Postgres/pgvector for semantic search.
- Built a persistent anchoring model where highlights and annotations are stored as byte-offset ranges into canonical text, then remapped on re-ingestion, so annotations survive document updates without breaking.
- Architected the service as a modern web stack (FastAPI + SQLAlchemy/Alembic, Redis/Celery workers, Next.js frontend with generated TypeScript API client), with per-user ACL enforced on all search and document access.
- Implemented LLM-augmented conversations (thread and message models) as the foundation for a RAG-style "chat with your documents and authors" feature.

EDUCATION

Fractal Tech – *Software Engineering Fellowship* – Full-time, six-day weeks, 13-hour days	October 2025 – present
McGill University – BSc. Molecular Biology	2010 – 2014
LSAT – 176 (99.7th percentile)	October 2015
MCAT – 36 (97.5th percentile)	August 2013

SKILLS

Languages: Python, TypeScript, SQL
Backend: FastAPI, Alembic, SQLAlchemy, SQLModel, PostgreSQL, Redis, Celery, Express
AI/ML: Pytorch, Scikit-learn, Pandas, Numpy, RAG, LangGraph, Agent Orchestration
Frontend: React, Next.js, TanStack Query, Tailwind, Vite
Tools: Docker, Git, JSON, Linux, Bash, Make

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[1] Gap due to major concussion in March 2016. Continued in an advisory role during the interim