Joaquin Auzenne

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Education

University of Texas at Austin — Austin, TX
B.S. Mathematics, B.S. Computational Biology, Certificate in Scientific Computation and Data Sciences — *May 2025*

- College of Natural Sciences Polymathic Scholars Honors
- Thesis: *DNA Metabarcoding of Soil Samples from the Magdalena River Valley*
- Relevant Courses: Applied Data Analysis, Bioinformatics, Predictive Analytics, Mathematical Modeling, Systems Biology of Stem Cells, Functional Analysis, Social and Biological Networks, Scientific Computing in Numerical Analysis, Environmental Epigenetics, Microbial Genetics, Language and the Brain

University of North Texas — Denton, TX
Pre-major studies in Biology and Chemistry (transferred to UT Austin) — *Aug. 2019 – May 2021*

Skills

Programming: Python (pandas, scikit-learn, PyTorch, TensorFlow), R (tidyverse, ggplot2, Shiny, MCMCglmm, nlme), SQL, Shell Scripting (Bash), MATLAB (PINNs), High Performance Computing (SLURM), Java, HTML/CSS, C++
Bioinformatics: Illumina (NextSeq, NovaSeq), ONT (MinION, MKICN), QC (Cutadapt, FastQC/MultiQC, NanoPlot), Alignment/Clustering (STAR/Salmon, Kallisto, NGSpeciesID, BWA-MEM2), RNA-Seq (WGCNA, DESeq2), LIMS (Benchling), Variant Calling, AlphaFold2
Data Analysis: SAS, SPSS, Tableau, Statistical Modeling (ANCOVA, MLE, PCA, XGBoost, SARIMA), Visualization (ggplot2, matplotlib, Plotly), NLP, GenAI (LLM RAG), Cloud Computing (AWS), FAIR Data Management
Wet Lab Techniques: DNA/RNA Extraction, PCR/qPCR/ddPCR, SDS-PAGE, Media Preparation, Anaerobic & Microaerophilic Culture (Coy chamber), Light Microscopy, CRISPR/Cas-Mediated iPSC, Plasmid Design (Gibson Assembly), Cleanroom Operations, Plate Preparation, Gram Staining, Centrifugation, Transfection, Blood Gas Analysis
Animal & Field Work: Laboratory Animal Handling (reptiles, amphibians), Behavioral Observations, Physiological Data Collection, Specimen Transport, Animal Restraint, Environmental DNA Sampling
Manufacturing & Engineering: MSSC Certified Production Technician, Lean Six Sigma White Belt, OSHA-10, AutoCAD, SolidWorks, 3D Printing, GD&T, G-Code, CNC Programming (HAAS/DMG Mori), Carbon Fiber/Fiberglass Fabrication
Tools & Platforms: Docker (Bioconductor), Linux, Git/GitHub, VSCode, LaTeX, MS Office (Excel, Word, PowerPoint), Adobe Acrobat, ArcGIS
Languages: English (Native), French (Fluent), Spanish (Conversational), Japanese (Novice)

Research Experience

Bioinformatic Assistant — Austin, TX
DiFiore Lab, University of Texas at Austin — *Dec. 2024 – Present*

- Developed a mammalian metabarcoding pipeline for pre-processing and consensus sequence clustering of Nanopore MinION-sequenced environmental DNA (83 soil samples, 6M reads) in Shell script for taxonomic assignment via BLAST+.
- Integrated multiple public domain databases (NCBI, IUCN) using the GBIF Metabarcoding Data Toolkit API for comprehensive species identification and interactive species-range visualization (ArcGIS).
- Established a curated DNA reference library of mammals identified along the Magdalena River in Colombia, focusing on rRNA genetic markers (12S, 16S).
- Delivered consensus sequences ready for longitudinal population and dispersal analyses using MinION MKICN Nanopore sequencing, MultiQC, NGSpeciesID read clustering, and megaBLAST taxonomic assignment.

Undergraduate Researcher & Teaching Mentor — Austin, TX
FRI EvoDevOmics, University of Texas at Austin — *Jan. 2022 – Sept. 2023*

- Designed high-throughput transcriptomic pipelines (preprocessing, quality control, alignment) in R on BRCF HPC clusters to reveal the basis of embryonic diversification in Dendrobatid frogs via differential gene expression analyses (DESeq2, WGCNA, PCA, nearest-neighbors clustering).
- Employed Python tool IdMiner for automated literature searches through the PaperBLAST database (PubMed, NCBI) to functionally annotate 40+ differentially expressed genes.
- Served as Teaching Assistant for a computational biology course of 20+ students, covering next-generation sequencing, omics data analysis, FAIR digital resource stewardship, and career readiness under Rebecca Young, PhD.
- Presented weekly lessons on statistical methods (MANOVA, PCA, WGCNA) to student cohorts, translating complex bioinformatic concepts for undergraduate audiences.

Undergraduate Research Assistant — Denton, TX
Henard Lab, University of North Texas BioDiscovery Institute — *Feb. 2020 – May 2021*

- Awarded $500 competitive grant to design a shikimate biosynthesis pathway in plasmid-modified *E. coli* (Gibson assembly) as a "green chemistry" alternative for nylon precursor production in a scalable methane-fed bioreactor.
- Maintained *E. coli* and methanotrophic cultures; evaluated methane production within continuous-stirred tank reactors; performed qRT-PCR confirmation of engineered shikimate-pathway constructs.
- Conducted daily hood upkeep, sterility checks, liquid chromatography analysis, and detailed laboratory record-keeping.
- Adapted *"Muconic acid production from methane using rationally-engineered methanotrophic biocatalysts"* (Henard et al.) for *Frontiers for Young Minds*, translating advanced metabolic engineering concepts for a younger audience.

Reptile Care & Research Assistant Denton, TX
Crossley Lab, University of North Texas Integrative Biology *Oct. 2019 – Jun. 2020*

- Oversaw daily feeding, tank maintenance, and husbandry for 30+ tanks of large laboratory reptiles (*Alligator mississippiensis*, *Chelydra serpentina*); provided on-call emergency support including animal restraint, transport, and surgical assistance.
- Conducted cardiorespiratory physiological study of alligators and snapping turtles birthed under normoxic and hypoxic conditions via controlled treadmill exercise and blood gas centrifugation.

Professional Experience

Data Analysis Intern Dakar, Senegal
Tanel Health (Heman Sweatt Center for Black Males, UT Austin) *May 2023 – Aug. 2023*

- Implemented gradient boosting and regression (XGBoost, SARIMA) on pharmaceutical sales data to improve back-end inventory forecasting on AWS, with projected waste reduction of up to 20% across 200+ in-network enterprises.
- Created technical reports justifying predictive model selections to shareholders, including associated performance metrics and visualizations (Python: matplotlib, Plotly).
- Digitized prescriptions and integrated a two-factor QR-based prescription authentication system into a 10,000+ customer database, improving compliance and fraud prevention.
- Collaborated with an interdisciplinary team of healthcare providers and software developers in a cross-cultural environment, adhering to strict data privacy standards.

Consultant Machinist Austin, TX
Paradigm Robotics *Jan. 2024 – Aug. 2024*

- Fabricated and assembled mechanical components for fire-resistant robotic systems (FireBot), translating CAD designs into G-code and operating mill/lathe equipment; collaborated with engineers on design iterations and equipment modifications.

CNC Machinist & Programmer Austin, TX
Carr Lane Manufacturing *Aug. 2021 – Nov. 2022*

- Trained new CNC machinists, performed GD&T quality inspections, and maintained 5S standards while machining on HAAS/DMG Mori mills and lathes; programmed overnight production runs increasing weekly machining output by 24+ hours.
- Led evening shift operations, maintaining detailed maintenance logs for tool performance, inventory tracking, and equipment status; documented procedures in SOPs for consistent quality and safety compliance.
- Performed preventive maintenance on CNC equipment including coolant system monitoring, chip evacuation checks, and tool audits to ensure optimal machine performance and prevent unplanned downtime.
- Collaborated with the engineering team to troubleshoot process issues and recommend equipment modifications, communicating technical problems and proposed solutions to improve production efficiency.

Projects

COVID-19 Spatiotemporal Network Dynamics Austin, TX
Department of Integrative Biology, University of Texas at Austin *Oct. 2024 – Dec. 2024*

- Built spatial network time-series models of U.S. COVID-19 spread (32M cases, 04/2020–04/2021) with Shiny interactive maps, dashboards, and statistics to identify transmission hubs from weighted network centrality to inform public-health intervention strategies.

Mammalian Metabarcoding & Species-Range Visualization Platform Austin, TX
DiFiore Lab, University of Texas at Austin *Dec. 2024 – Present*

- Developed an interactive web application presenting Nanopore eDNA genomic analyses as user-friendly interfaces for both scientific and public audiences, integrating sequencing results with geospatial species-range data for the Magdalena River Valley.

IdMiner — Bioinformatic Literature Search Tool Austin, TX
FRI EvoDevOmics, University of Texas at Austin *2022*

- Co-developed a Python-based academic literature search application querying PubMed and NCBI repositories for gene-associated publications to aid researchers in functional annotation of gene lists at scale.

Longhorn Racing — Composites Division Austin, TX
LHR Combustion Team, University of Texas at Austin *Sep. 2021 – May 2022*

- Fabricated carbon fiber and fiberglass structural components for Formula SAE race cars, developing precision handling techniques under strict quality and safety standards.
- Designed a lightweight carbon fiber steering wheel and other structural components optimized for weight reduction and heat dissipation.

Methanotroph Metabolic Engineering Denton, TX
Henard Lab, University of North Texas BioDiscovery Institute *Feb. 2020 – May 2021*

- Awarded $500 to design a shikimate biosynthesis pathway for plasmid-modified *E. coli* (Gibson assembly) for "green chemistry" alternative nylon production in a scalable methane-fed bioreactor.
- Adapted *"Muconic acid production from methane using rationally-engineered methanotrophic biocatalysts"* (Henard et al.) for *Frontiers for Young Minds*, translating advanced metabolic engineering concepts for a younger audience.

Leadership, Mentorship & Service

EvoDevOmics Peer Mentor (UT Austin FRI, 2022–2023): Mentored 20+ undergraduates in computational biology, omics data analysis, NGS methods, and FAIR data stewardship; fostered independent research skills and career readiness.

Sweatt in Senegal Program (UT Austin, Summer 2023): Selected for inaugural cohort; led cross-cultural data science collaboration in Dakar, Senegal, contributing to healthcare informatics projects in a resource-limited international setting.

SIAM Directed Reading Program (2022–2023): Engaged in advanced independent study in applied mathematics under faculty mentorship, culminating in a formal literature review presentation.

Science Communication: Adapted peer-reviewed metabolic engineering research for *Frontiers for Young Minds*; developed interactive genomic web applications for public and scientific audiences.

Certifications & Training

MSSC Certified Production Technician
Lean Six Sigma White Belt
OSHA-10 General Industry Safety Certification

Publications & Presentations

Auzenne, J. (2021). Science communication adaptation of *"Muconic acid production from methane using rationally-engineered methanotrophic biocatalysts"* (Henard et al.) — *Frontiers for Young Minds.* [In preparation]

COVID-19 Spatiotemporal Network Dynamics — Course presentation, Department of Integrative Biology, UT Austin, December 2024.

References

Available upon request. Faculty and supervisor references available from: Dr. Anthony Di Fiore (UT Austin), Dr. Rebecca Young (UT Austin), Dr. Calvin Henard (UNT BioDiscovery Institute).