Joe Flack – Software Engineer

Seasoned software engineer and biomedical data engineer with focus on semantic engineering, ontologies, and privacy-preserving data pipelines. Experienced across Python, Spark, Postgres, and modern OSS workflows.

experience JHU Biomedical Informatics and Data Science team 2021-06

~ 2025-07 Software Engineer TermHub Web app to create and manage biomedical / terminological value sets, primarily for virtual cohort selection. Involved complex PostgreSQL expressions, joins, views, and indexing, utilizing Jinja templates. github.com/jhu-bids/termhub. {

: [Python(FastAPI, networkx, Pandas, SQL Alchemy), JS(React, Jest, Playwright, Typescript, Node, NPM, Material UI), PostgreSQL, GH Actions, Azure, Apache Parquet, Agile/Scrum, Kanban], Roles: [Primary backend dev, Full stack dev, Project management]} CompLOINC Rendered LOINC as a proper ontology. Managed data processing pipeline. Performed semantic similarity analyses. github.com/loinc/comp-loinc {Skills: [Python (Poetry, black, networkx, Pandas, PyTorch, Sentence Transformers, LinkML, Matplotlib, Plotly, Dash), SPARQL, OWL, Makefile, GitHub Actions, Render.com, TDD, Kanban, Data engineering], Roles: Developer, Project Management} Mondo Disease Ontology Managed ingest stack. Coordinated several repos & data sources. github.com/monarch-initiative/mondo-ingest {Skills: [Python (Pandas), Docker, GitHub Actions, SPARQL, RDF, OWL, awk, Biomedical Ontologies, Semantic Engineering, Data Visualization, Data pipelines, Data engineering, ShellScript, awk, Makefile, Agile/Scrum, Kanban], Role: Developer} TIMS (Terminology Infrastructure Management Systems) Deployed and maintained web servers. Helped write custom extensions in Java. Wrote data processing pipelines and libraries. {Skills: [Python, JavaScript, ReactJS, Java, Azure, HL7 FHIR, Biomedical Terminology, REST, API, Docker, OWL, RDF, Linux, Ubuntu, Bash, Zsh, ShellScript, Agile, Kanban], Roles: [Developer, Project Management]} Hire Available Python ReactJS Data Engineering Full stack github.com/joeflack4 Python Ontology engineering ReactJS Biomedical Informatics Full stack TCCM (Terminology Core Common Model) Maintained terminology service framework, used by CCDH Terminology Service. {Skills: [Python, Flask, FastAPI, API, REST, Neo4J, Cypher], Role: Developer} CCDH (Center for Cancer Data Harmonization) Helped develop and maintain codebase and servers. {Skills: [Python (Flask, FastAPI), REST, Neo4J, Cypher, Docker, RDF, OWL Linux, Ubuntu, Bash, Zsh, ShellScript, , AWS EC2, Semantic Engineering, Linked data], Role: Software engineer} JH K-Anonymity Made Johns Hopkins OMOP patient anonymity analyses viable, increasing memory performance by ~100x. {Skills: Python (Pandas, PySpark, Matplotlib), Databricks, Data obApache Spark, Apache Parquet, Virtualization, Data obfuscation, GitHub actions[, Roles: Developer} N3C (National COVID Cohort Collaborative) Wrote ValueSet tools library. Assisted w/ various ETL and analysis. {Skills: [Palantir Foundry, OMOP, Python, REST, API], Role: Software Engineer} LinkML (Linked data Modeling Language) Contributed to open source library for a data metamodeling. Biggest contributions: Enumerations and FHIR ValueSets. {Skills: [Python, Markdown, Data Modeling, Git, FHIR], Role: Developer} SSSOM (Super Simple Standard for Ontology Mappings) Open source contributions, e.g. FHIR ConceptMap format. {Skill: [Python, Data modeling, Data standards, RDF, OWL, Ontology engineering, Semantic engineering, HL7 FHIR], Role: Developer} Zulip Analysis Analyzed community activity for Zulip-based HL7 chat.fhir.org. Skills: [Python, Google API, Zulip API, Pandas, Matplotlib], Roles: Lead dev} JHSPH Tuberculosis Modeling and Translational Epidemiology Group 2019-10

~ 2021-06 Sr. Programmer Analyst JHEEM (Ending HIV) Implemented front-end and integrated various back-end services for a web application related to HIV modeling. {Skills: [R, Shiny, ggplot, JavaScript, CSS, HTML, RDBMS, S3, SMTP], Role: Web development Impaact4TB Co-authored on a project related to preventative therapies for Tuberculosis (TB). Provided help with code structure and debugging. Assisted with sensitivity analyses", Skills: R, Role: "Programmer Analyst} COVID NAT-RDT R Python C++ Shiny HPC Data visualization Modeling Implemented the front-end for COVID-19 related model for optimizing lab testing throughput and cost effectiveness. Translated MATLAB model into R. {Skills: [R, Shiny, CSS, HTML, MATLAB], Role: Web development} Ghana Lab Network Created web application. Did data visualizations, multi-format data harmonization (APIs, CSVs, PDFs), lexical analyses, data analyses. {Skills: [Python, Pandas, R, Shiny, Plotly, GoogleMaps API, Tableau, GIS, Data visualization], Roles: [Data engineering, Data management, Web development]} MDRTB agent-based Modeling Implemented parts of epidemiological model for MDRTB (Multidrug Resistant Tuberculosis) in C++. Calibrated models by tuning parameters and modifying structural code. Executed simulations of model using HPC cluster. Analyzed model fitness by analyzing simulation experimental data in R. Communicated with epidemiological experts to guide model iteration. {Skills: [C++, R, Valgrind, Conan, HPC, SLURM, CMake], Role: Model implementer} Kampala Enumerator Map Tool Created a GIS tool to help interviewers with household survey activities in Kampala, Uganda. {Skills: [JavaScript, HTML, CSS, Bootstrap, GoogleMaps API, Open Data Kit, GoogleSheets], Role: Web development} REDCap Operations Costing Database Used advanced REDCap features to create a novel kind of template database which can be customized and deployed in various countries for our operations costing team. The database includes a front-end with interconnected forms for various phases/kinds of data collection. {Skills: [SQL, REDCap, Excel], Role: System architect} OneDrive Report Automation Automated a reporting aggregation process involving Excel reports hosted on OneDrive. {Skills: [Python, MS GraphAPI, OneDrive, Excel], Role: Software engineer} General Technical Support Worked with small data science and software engineering team to improve existing codebases for various agent-based epidemiological models written in C++. Guided team on software best practices, including version control in Git/GitHub/GitFlow, agile methodologies and related project management, automated testing, pair programming, code style guidelines, and package management, build systems, etc. Created knowledge base of developer and analyst documentation on various aspects of agent-based model codebases using GitHub wiki. Deployed HPC cluster using AWS pcluster. Provided support and technical assistance related to version control, R, and C++. Solved problems using HPC tech such as Slurm. BioViva 2019-05

~ 2019-05 Contractor, Web application development Bioinformatics Portal Mockup Created static ReactJS web application for patients to perform basic CRUD operations on their contact information and biometric data, and visualize data over time Created backend API for storing patient data, as well as interacting with cloud storage for medical records. PMA 2016-09

~ 2019-10 Programmer Analyst PMA API RESTful API for programmatic access to PMA2020 data. {Skills: [Python (Flask, SqlAlchemy, Sphinx, Celery), JavaScript (jQuery), R, SQL, PostgreSQL, Heroku, AWS S3, RabbitMQ, Celery, Redis], Role: Developer} Datalab A web app for visualizing PMA2020 data. {Skills: [JavaScript (jQuery, Selenium, Node, NPM), AWS S3, CircleCI], Role: Dev team lead} XFormTest A CLI tool & lirary for creating and running automated tests to ensure the quality and stability of XForms, an M&E industry standard for creating electronic surveys. {Skills: [Java, Python], Roles: [Product lead, Lead developer]} PPP A tool for converting XForms into printable, editable forms such as Word documents., Technologies: [Python (Flask, Argparse, PyPi, JavaScript, Linode, Heroku, CircleCI], Roles: [Product lead, Lead developer, Dev team lead]} PMA2020 DHIS2 PMA2020's deployment of DHIS2, a data warehouse and BI solution for governments and M&E organizations to store medical health and public health data. {Skills: [Python, Bash, SQL], Roles: [Project lead]} pmix A mixed bag of CLI tools for working with XForms., Technologies: Python, Role: Contributor} QTools2 A tool for converting XLSForms to XForms, both of which are specs for creating M&E surveys. {Skills: Python, Role: Contributor} ReactJS Python Flask S3 Python Java Cloud Full stack SQL ReactJS jQuery Open Data Kit forms development This is what I was originally hired to do as my primary job function at PMA2020. It involves using Excel and coding XPath logic into spreadsheet cells. These documents are the source code for survey forms that can run on the Open Data Kit (ODK) platform and other tools in that ecosystem. {Skills: [XPath, XForms, XML, Excel, Bash, ShellScript, Makefile, Google Cloud, Digital Ocean], Role: Programmer} Business Intelligence Dashboard Created dashboard for reporting personnel technical capacity levels in various countries of operation, using mock data, {Skills: [Microsoft Power BI, Azure], Role: Co-Implementer} Viffer Alpha CLI tool for diffing XLSForm spec M&E survey Excel files. A sub-package of the "pmix" library for various XForms related tools., {Skills: Python, Roles: [Product lead, Lead developer]} PMA Survey Hub Alpha development phase project that is a combination of various PMA2020-created survey tools in one web app. Currently implementing own proprietary app, but in talks with KoBoToolbox team, to add our tools as plugins. {Skills: [Docker, Python, JavaScript, Node, Linode, Heroku], Role: Product lead} PMA Translation Hub A pre-release project of a web application for doing translation management of M&E survey content, Skills: [JavaScript (React, Redux, Node), Python (Flask), Heroku], Role: Lead developer} Sonshine Companion Care 2014-09

~ 2016-09 Caregiver, Administrator, Staff Accountant Sonshine Companion Care 2014-09

~ 2016-09 IT Team Lead Just-a-Dash Light-weight combined HRM+CRM tool. {Skills: [Python (Flask, SqlAlchemy, Alembic), JavaScript (Angular, Bootstrap), PostgreSQL, Heroku, Twilio], Role: Lead developer} Automation Finance reporting tools: Scripts and spreadsheets to create custom reporting not otherwise available in our accounting software. Wrote scripts to rename and move files. {Skills: [PowerShell, ODBC, Excel, GoogleSheets], Role: Software lead} SonshineCompanionCare.com QuickBooks Excel Access GoogleSheets Python AngularJS Flask WordPress Bootstrap PowerShell Excel Company website. {Skills: WordPress, Roles: [Design lead, Web admin]} Several schools 2009-03

~ 2014-08 English Teacher Details available upon request. Several companies 2008-10

~ 2009-04 Various titles Details available upon request. (Skills used throughout jobs &

## Education

* **University of Florida** — B.A. Philosophy (Sep 2004 – Dec 2008)
* **Pensacola State College** — A.A. (Aug 2002 – Jun 2004)

## Projects

* Project 1: Description needed
* Project 2: Description needed