Chris Carstens

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Detail-oriented environmental professional seeking to transition to a software developer role. I have experience managing complex, multi-year projects. I enjoy making sense out of complicated technical problems and delivering quality solutions. I love to learn, and would be happy to get up to speed on any technologies or domain knowledge required for your projects.

SOFTWARE PROJECTS

IGC Viewer

- Developed a web map application allowing users to view flight tracks generated by glider flight computers in the .igc file format. The application consists of a Python/Flask backend and a TypeScript/React frontend.
- Python is used on the backend to parse .igc files into GeoJSON objects, which are then served by a REST API.
- Flight tracks are displayed on the frontend in a Mapbox GL JS web map. Additionally, a profile view of altitude during the flight is displayed using a Chart.js visualization. Both the map and chart are interactable.
- The user can hover over either the map or chart to view the corresponding location on the other visualization. This and other flight data are calculated using Turf.js.
- *Tools used*: Python, Flask, TypeScript, React, Mapbox GL JS, Chart.js, Turf.js, Next.js, Tailwind CSS

Issue Tracker

- Developed a web application for software professionals to manage feature development, bug-fixing, etc. using a ticket system. The application consists of a Java/Spring/PostgreSQL backend and a TypeScript/React frontend.
- The application includes OAuth 2.0 authentication and authorization. Role-based access control allows users to submit, modify, and assign other users to issues, provided they have the appropriate permissions.
- Used test-driven development (TDD) to write unit and integration tests for the backend REST API with JUnit, AssertJ, Mockito, and Spring MockMvc.
- *Tools used*: Java, Spring, Spring Boot, PostgreSQL, Auth0, TypeScript, React, Next.js, Tailwind CSS, Docker

Water Quality Dashboard

- Implemented a prototype water quality dashboard showing canal flow rate and salinity data for the Lake Worth Lagoon for use by water management professionals. The application includes data visualizations and a map view. The backend API synthesizes data from multiple sources, transforming API requests into a unified JSON format on the backend.
- The prototype was used by the County's IT department to develop the production application.
- *Tools used*: JavaScript, Node.js, Express, Chart.js, Mapbox GL JS, Webpack

PROFESSIONAL EXPERIENCE

Palm Beach County Dept. of Environmental Resources Management — West Palm Beach, FL
Environmental Analyst — August 2019 – Present

- Implement a prototype dashboard web application which displays canal flow rate and salinity data for the Lake Worth Lagoon for use by water management professionals. The application includes data visualizations and a map view. The backend server synthesizes data from multiple sources and transforms API requests into a unified JSON format.
- Assist team members with requests for data engineering tasks and geoprocessing using ArcGIS Toolbox, Model Builder, and Python scripting. For example, generate a table of property owner contact information for all properties within a certain distance of a planned restoration project, requiring a complex SQL join query for multifamily parcels.
- Using historical and recent aerial imagery, analyze trends in erosion and shoreline recession within the South Palm Beach Shore Protection Project. Create maps and presentation materials using ArcGIS Desktop for a talk given at the Florida Shore and Beach Preservation Association annual technology conference.
- Respond to internal and public inquiries with data, information, maps, and geographic data visualizations related to coastal and estuarine environmental conditions and restoration projects.
- Complete FAA training and certification requirements to establish a departmental unmanned aerial vehicle (UAV) program. Draft an operational plan for the program, and collect aerial photography to support requests for $7M+ in emergency funding from federal and state agencies to repair hurricane-related erosional damage to County beaches.
- Manage environmental restoration construction projects totalling over $3.5M. Secure permits, negotiate easement agreements with private landowners, and coordinate project implementation between internal teams, outside agencies, contractors, members of the public, and other stakeholders.

- Draft technical specifications for two $10M+ dune and beach restoration annual construction contracts. Review bid packages prior to awarding contracts, coordinate with contractors, and supervise work performed under contract.
- Secure $5M+ in grant funding from state and local governmental agencies. Complete all monitoring and reporting requirements, and submit reimbursement requests in a timely manner.

Palm Beach County Dept. of Environmental Resources Management — West Palm Beach, FL
Environmental Technician — July 2018 – August 2019

- Analyzed and interpreted a large complex dataset of over 30,000 septic system permits using Python, NumPy, and pandas to determine which systems were likely to be in active use and highlight areas of high septic system density for potential septic-to-sewer conversion initiatives.
- Created orthophotography and 3D models of county beaches for coastal storm erosion analysis using a DJI Phantom 4 quadcopter and Pix4D photogrammetry software.
- Collected data on seagrass coverage, density, and health in the Lake Worth Lagoon using Collector for ArcGIS.
- Documented methods for ongoing data collection and processing tasks for incoming employees.

Palm Beach County Dept. of Environmental Resources Management — West Palm Beach, FL
Student Field Technician — June 2015 – July 2018

- Digitized and classified over 2,000 acres of nearshore reef along Palm Beach County's 46 miles of coastline using a 5 year dataset of annually collected aerial orthophotography using Adobe Photoshop and ArcGIS Desktop.
- Created maps, data visualizations, and presentation materials using ArcMap.

SKILLS

ESRI ArcGIS, ArcGIS Desktop, ArcGIS Online, ArcMap, Java, Spring (Boot), Maven, PostgreSQL, MongoDB, JavaScript, TypeScript, Node.js, Express, React, Next.js, Python, SQL, REST APIs, CSS, Bootstrap, Tailwind CSS, Webpack, Docker, Git

EDUCATION

FLORIDA ATLANTIC UNIVERSITY — Boca Raton, FL
B.S. Geology, *summa cum laude* — August 2018