Ben Racine

 Apply deep computational and physical science expertise to deliver elegant, verifiable solutions.

EXPERIENCE

SENIOR SOFTWARE ENGINEER, CIMARRON SOFTWARE SERVICES, HOUSTON, TX
3/2023-PRESENT

- Built a human spaceflight-rated crew UI with Tauri, using Rust for network communications.
- Delivered a training UI for the AxEMU DCU (spacesuit display and control unit). Developed a Tauri-based Bolt Joint Analysis app to accelerate simulation and validate mechanical load paths.
- Designed a live SCADA interface with real-time telemetry overlays for systems monitoring.
- Supported Axiom Station UI/UX through SRR, PDR, and CDR milestones.
- Authored the UI test strategy for CDR, covering functional, performance, accessibility, and safety requirements.
- Acted as GNC liaison for mission interface logic and telemetry integration.
- Captured and refined hundreds of UI requirements using Innoslate.
- Implemented a DevSecOps pipeline: linting, testing, accessibility, performance, and security.
- Mentored peers on type systems, software architecture, testing, and debugging.
- Built a DDS message auditing UI for validating mission-critical flight software.
- Migrated legacy JavaScript code to strict TypeScript, resolving all static analysis errors.
- Built a React-based script builder — a domain-specific IDE for flight operations.
- Automated Jira tracking workflows via the Jira REST API.

SENIOR SOFTWARE ENGINEER, WEATHER SOURCE LLC, SALEM, NH
4/2021-3/2023

- Designed and implemented a public API for geographic data communication with DWAS, enforcing strict type adherence in payloads and responses, and documented with OpenAPI specifications. Achieved high efficiency with a concise line count and low infrastructure complexity.
- Implemented type-safe functional programming (using fp-ts) throughout DWAS, enhancing modularity, testing, and extensibility.
- Successfully attracted and retained multiple Fortune 500 companies as DWAS customers.
- Developed the Dynamic Weather Alerting Service web app, enabling users to customize weather rules and locations while sending tailored notifications to teams. The architecture utilized modern cloud technologies for an asynchronous, flexible, and scalable service.
- Developed a suite of microservices, including authentication, authorization, billing, client-side mapping, data transformations, automated invoicing, meteorological processing, and notifications.
- Established a digital portal connecting Snowflake and DWAS for secure access to sensitive client information and a single source of truth.

SENIOR SOFTWARE ENGINEER, RACINE DESIGNS LLC, BOX ELDER, SD
4/2020-3/2021

- Gained valuable business experience as the sole proprietor of Racine Designs LLC.

- Honed excellent project management, QA practices, and DevOps practices while developing online learning software for Relias LLC in collaboration with SkapaTech, LLC, utilizing C#, React, Redux, and Microsoft Azure Cloud Services.
- Played a key role in a highly efficient team, consistently delivering a significant volume of software within tight timelines, demonstrating diligence, and making substantial contributions to project success.
- Enforced robust Test-Driven Development (TDD) practices, maintaining 80-100% test coverage for a large suite of React functional components using Jest and the React Testing Library.
- Conducted biweekly client demos, ensuring a high level of satisfaction with the delivered solutions.

SENIOR SOFTWARE DEVELOPER, CORNERSTONE SYSTEMS NORTHWEST, LYNDEN, WA
04/2011-09/2019
- Modeled the impact of diverse smoking policies on the US population using C++ and Python.
- Enhanced the Smoking History Generator in C++ to support the Cancer Intervention and Surveillance Modeling NETwork (CISNET) lung cancer research program.
- Shipped Daycast.com, a real-time day planner/time tracker for distributed teams utilizing Node.js, Express.js, SQL, WebSockets, Firebase, Electron, Virtual DOM, and an in-house JS framework.
- Constructed a Single Page Application (SPA) with TypeScript, React, Redux, Node.js, Express.js, and SQL to meet the complex requirements of PHMSA regulatory efforts.
- Developed Genetic Simulation Resources for the National Cancer Institute, cataloging and exploring software packages simulating human genome evolution using Python, Django, and JavaScript. This same framework was leveraged numerous times by various CISNET efforts.
- Designed a comprehensive data visualization dashboard using a precursor to PortalJS for Massachusetts General Hospital's cancer surveillance initiatives.

PROJECT OCEAN ENGINEER, GLOSTEN, SEATTLE, WA
11/2006-04/2011
- Predicted dynamic hydro-elastic loads on the floating SR520 Bridge (connecting Seattle and Bellevue) for the Washington State DOT using Femap, NEi Nastran, Matlab, and Python.
- Conducted anemometer performance analysis on the SBX Radar for Boeing using CFD (OpenFOAM and MPI). Procured and configured a Linux Beowulf cluster to support this effort.
- Analyzed and designed underwater transducer fairings for NOAA research vessels using CFD.
- Authored a tool for mapping global Finite Element Analysis (FEA) results from MAESTRO to NASTRAN for detailed Structural Fatigue Analysis.
- Successfully authored proposals securing over $85k in engineering services.

EDUCATION
MS in Mechanical Engineering (CFD), Pennsylvania State University, State College, PA

BS in Naval Architecture and Marine Engineering, Webb Institute, Glen Cove, NY

SKILLS AND TOOLS

- Meshing Tools: Pointwise Gridgen, Femap, ANSYS
- CFD/FEA Tools: ANSYS CFX, OpenFOAM, CFDSHIP, NEi Nastran
- Client Technologies: TypeScript, React, Redux, WebSockets, Radix, Vite/ViTest, Jest, Playwright, React Testing Library
- Servers: Rust/Axum, Node.js/Express, Python/Django, C#
- Databases: Snowflake, PostgreSQL, Cosmos, SQLite, Firebase, Microsoft SQL Server
- Numerical and Scientific Computing: C++, Fortran, Python, NumPy, SciPy, Pandas, Julia, MATLAB
- DevOps: Containerization (Docker), Version Control (Git, GitHub, GitLab, Bitbucket), Cloud Providers (AWS, GCP, Azure), CI/CD (GitLab, Jenkins), Monitoring (Datadog), Logging (Logentries)
- Planning Tools: Jira, Confluence, Daycast, Pivotal Tracker, Agile/Scrum/Kanban
- Data Visualization: Nivo, D3.js, Matplotlib, Tecplot, ANSYS
- Operating Systems: Linux, macOS, Windows
- Functional Programming Languages: Hobby projects with Elm, Elixir, PureScript, Haskell, Scala
- Selected APIs: Stormpath (authentication), Stripe (billing), Twilio (messaging), Mailchimp
- Office Tools: Microsoft Office, Google Docs, with VBA and JavaScript scripting

REFERENCES

Mark Gibbas (Weather Source), Shawn Freeman (Weather Source), Stephen Schutt (CSNW), John Cross-Whiter (Glosten), and Dr. Eric G. Paterson (PSU-ARL)

PUBLICATIONS

Holford, T. R., Levy, D. T., McKay, L. A., Clarke, L., Racine, B., Meza, R., … Feuer, E. J. (2014). Patterns of birth cohort-specific smoking histories, 1965-2009. American journal of preventive medicine, 46(2), e31–e37. doi:10.1016/j.amepre.2013.10.022

Peng, B., Chen, H. S., Mechanic, L. E., Racine, B., Clarke, J., Clarke, L., … Feuer, E. J. (2013). Genetic Simulation Resources: a website for the registration and discovery of genetic data simulators. Bioinformatics (Oxford, England), 29(8), 1101–1102. doi:10.1093/ bioinformatics/ btt094

Peng, B., Chen, H. S., Mechanic, L. E., Racine, B., Clarke, J., Gillanders, E., & Feuer, E. J. (2015). Genetic data simulators and their applications: an overview. Genetic epidemiology, 39(1), 2–10. doi:10.1002/gepi.21876

Application of the Free Wave Spectrum to Minimize and Control Wake Wash, Justus Heimann, Bruce L. Hutchison and Benjamin J. Racine, Paper No. SMTC-049-2008, SNAME Annual Meeting and Expo, 15-17 October 2008, Houston, TX

CFD-Based Methods for Simulation of Marine-Vehicle Maneuvering, B. Racine and E. Paterson, AIAA 2005-4904, 35th AIAA Fluid Dynamics Conference and Exhibit, June 2005, Toronto, Canada