Jack Wrenn

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Education

Brown University

Computer Science

Ph.D.	(Anticipated) 2021
Sc.M.	2018

University of Rhode Island

Computer Science, History

B.A.	2015

Employment

Researcher

Brown University 2015–2021

Contributed to the development of the Pyret programming language, and published five research papers on error reporting, software testing, tooling and human factors.

Course Staff

Brown University, URI 2012–2020

Provided design, instructional, and infrastructure support to various courses in OOP, functional programming, language design, and model-finding.

Systems Operator & Technician

University of Rhode Island 2011–2015

Provided technical support and maintained key infrastructure (Windows and Linux servers) for the ~40 staff members of URI's student center.

Selected Awards

Client Bug Bounty

Mozilla 2019

Discovered a security issue in Firefox's XSLT engine that enabled attackers to indefinitely execute JavaScript and send network requests (even with JS disabled) *after* the exploited tab was closed.

Selected Projects

Rust Programming Language

Passionate about expanding and leveraging Rust's language features to improve the safety and ergonomics of programming.

Safe Transmute Working Group

Co-lead the working group tasked with making bit-reinterpretation casts (e.g., `union`, `mem::transmute`) memory safe. Lead designer and author of the WG's inaugural RFC-2981.

Compiler Development

Implementor of RFC-2363, which permits fine-grained control over the memory layout of complex `enum` types; useful for C-interop and zero-copy parsing of network packets.

Open Source Libraries

Author and contributor to numerous Rust libraries and utilities. Lead maintainer of itertools, a popular (>16M downloads) library for ergonomic transformations and summarization of streams of data.

Computing Education

Contributor to Pyret, a programming language designed by computer science educators, for computer science education.

Error Message Design

Developed Pyret's unique hypertext error messages, which leverage hyperlinks, highlights and in-line code snippets to guide novice programmers towards deeply understanding their errors.

Data Science Support

Developed Pyret's language-level support for manipulating tabular data, used by the data science module of the Bootstrap curriculum, a research-based computer science curriculum for grades 6–12.

Example-Driven Development

Developed a cloud-hosted IDE for Pyret that encourages students to write input–output examples *before* they begin programming, and conducted research to assess its impact.

Evaluation at Scale

Developed infrastructure for assessing the quality of students' Pyret programs and test suites at massive scale on a distributed supercomputing cluster, and developed an analysis to validate the robustness of these assessments.

Digital Archival

Natural Language Processing

Published a digital remix of Brown University's authoritative dead-tree encyclopedia, which leveraged natural language processing to extract timelines and insert hyperlinks.

Digital Asset Management

Currently developing a digital asset management system in Rust and Typescript to catalogue my archive of >5,000 photographs, oral histories and written accounts of Brown University alumni.