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

Systems Operator

University of Rhode Island 2011–2015

As systems operator and support technician, I provided technical support and maintained key infrastructure (Windows and Linux servers) for the ~40 staff members of URI's student center.

Course Staff

Brown University, URI 2012–2020

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

Researcher

Brown University 2015–2021

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

Selected Awards

Client Bug Bounty

Mozilla 2019

I 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

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

Safe Transmute Working Group

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

Compiler Development

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

Open Source Libraries

I have authored and contributed to numerous Rust libraries and utilities. I am the lead maintainer of itertools, a popular (>16M downloads) library for ergonomic transformations and summarization of streams of data.

Computing Education

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

Error Message Design

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

Data Science Support

I designed and implemented Pyret's language-level support for manipulating tabular data, used by the Bootstrap Data Science curriculum.

Example-Driven Development

I developed and researched a cloud-hosted IDE for Pyret that encourages students to write input–output examples *before* they begin programming.

Evaluation at Scale

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

Digital Archival

Natural Language Processing

I 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

I am 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.