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# Open Source Software Toxicity and CHAOSS

## Abstract

This position statement frames open source software's challenges with online toxic behavior as a long standing issue. Research to date on open source is described as distributed across a number of scholarly communities whose principle focus is the production of software, and a limited, incongruent, and episodic consideration of open source as a large scale sociotechnical system. It then describes an 8 year, engaged field research effort that examines, and is working to address toxicity in open source through a combination of social and technical approaches. The work described takes place in a Linux Foundation project, CHAOSS, cofounded by the author.

## ACM Classification Keywords

[ [5]: 00]Human-centered computing Computer supported cooperative work

## Introduction

Within open source software communities, work is dominantly conducted online and has a long history of toxic behavior [3, 18, 16, 17, 15, 12, 13]. Toxicity in open source is frequently reported as a reason people leave these communities or choose not to engage with them [36, 24, 35, 34]. For individuals who are not part of the 81% of open source contributors who identify as white males, the obstacles to be overcome are even greater and

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reflect aspects of the broader history of technology work [40, 41, 37, 39, 42, 38, 25, 27, 43]. Contributing to, or perhaps enabling toxicity in open source is the belief in meritocracy, a notion that expresses that the most talented people excel in open source communities based solely on their merits as software developers [2, 22, 11].

Research on toxicity in open source software is incommensurate with the specific challenges these communities face. Substantial work on open source communities and how they function exists in the software engineering literature [23, 5, 21, 33, 32, 28, 4, 26, 19, 29, 30, 14, 31], and the early days of social computing research, as well as some management literature [10, 6, 9, 20, 1, 44, 8, 7]. Most of the existing literature on open source looks past well known issues of toxicity because, while open source is arguably one of the largest online work and social computing contexts, research on the subject centers on questions related to distributed work, software engineering, and computer science. All the while, the people and technologies that facilitate the sociotechnical system that open source software are alternately celebrating meritocracy, tolerating toxicity, or exiting open source. The paradox of open source being a highly productive engine that enables online communities of all types, while simultaneously having well known issues of toxic behavior within its own house warrants deeper consideration in social computing research.

### **CHAOSS and ALL-IN**

Since 2015 I have been an embedded field researcher in corporatized open source software within the Linux Foundation. In 2017 I cofounded the 59th Linux Foundation project (There are now several hundred), called Community Health Analytics in Open Source

Software (CHAOSS) <sup>1</sup> and created and maintain software, called "Augur", that measures inclusivity, toxicity, and a taxonomy of over 75 CHAOSS standardized metrics <sup>2</sup>. Augur uses statistical analysis, machine learning, and other computational approaches to provide health metrics for over 100,000 open source software projects. While Augur does identify toxic communication, it is unable to foster a comprehensive environment that works toward reducing toxicity and encouraging more diverse and inclusive communication and behavior. Our principle efforts to mitigate toxicity in open source centers on a peer-reviewed event badging program, education, and a philosophy that puts diversity, equity, and inclusion at the center of open source community organization.

Working to reduce online toxicity is a long road, and demands an unusually long-term research commitment. Beginning in 2021, CHAOSS began partnering with a project, All-In<sup>3</sup> focused on transforming education, and maintenance practices in open source software. Our current collaboration centers on the development of a peer-reviewed, community-level inclusivity badging program that will combine project assertions that they meet a core set of CHAOSS DEI metrics, expressed in a dei.md file within a project repository. With each of these four badges, open source communities will also be provided with a list of goals for improving their inclusivity, which we hypothesize will implicitly reduce toxicity. These goals will be developed using a standardized set of potential recommendations selected for each project through a human-reviewed, computational model-supported process. Attention to the ethical application of computing in this context is our top priority.

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<sup>1</sup><https://chaoss.community>

<sup>2</sup><https://github.com/chaoss/augur>

<sup>3</sup><https://allinopensource.org>

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