# SaTC: EDU: Curricula and CTF Exercises for Teaching Smart Fuzzing and Symbolic Execution

Portland State
Computer Science

## Challenges

- Shortage of motivated and skilled students in security
- Teaching advanced security techniques in an engaging manner
- Focusing students on the most meaningful security problems to tackle

## Solution

- Scaffolded CTF exercises to develop confidence and competence
- Polymorphic levels to ensure each student performs work
- Extensible frameworks to allow for crowd-sourced level design
- Hosted to allow any use

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angr CTF
Symbolic execution
(x86 binaries)

Thunder CTF and GCP CTF
Cloud security
(Google Cloud Platform)

AFL codelab/CTF
Smart-fuzzing
(C and x86)

Manticore codelab/CTF
Symbolic execution
(Ethereum smart contracts)

## Scientific Impact

- Developing best practices for producing the highly skilled security practitioners society needs
- Enabling the crowd-sourced development of exercises to keep up with changing security landscape

## Broader Impact

- Leveling up the skills for the next generation of students
- Inclusively designed CTFs to broaden participation
- Offered as workshops to the community (BSidesPDX)
- Development and testing done via high-school internship programs (Saturday Academy ASE)