Extending Python with Rust: a hands-on introduction to PyO3

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Agenda

- Introduce the tools
- Build an extension using PyO3
- Understand what problems Python extensions in Rust solve

About me

- Maintainer of `rustworkx` (peaked at the Top 1% of PyPI packages)
- User of PyO3 since 2021
- Casually contributed features I needed to PyO3 upstream

Why this presentation

Rust has taken over the Python ecosystem!

▶ Popular libraries like `pydantic` and `cryptography` use Rust
▶ Python tooling also uses Rust like:
  ▶ Astral's `uv`
  ▶ Microsoft's Python Environment Tools
  ▶ Facebook's `pyrefly`

But why? Hopefully you'll understand by the end.

note: this presentation was rendered with Tectonic (LaTeX in Rust)

Tools we are going to be using

We don't assume you'll be familiar with all of them. Rust users will know Rust tools, Python users will known Python tools.

- ▶ PyO3
- ▶ maturin
- ▶ cargo
- ▶ pip
- ▶ crates.io
- ▶ PyPI