



Scientific Software Engineering Center

Prototype vs. Production Software

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Agenda



About Me



About the Scientific Software Engineering Center



Traits of Prototype Software



Traits of Production Software



Prototype Software Requirements



Production Software Requirements



Georgia Tech College of Computing
**Center for Scientific
Software Engineering**

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About Me



Head of Engineering at the Scientific Software Engineering Center at Georgia Tech



25 Years of industry experience

Worked at Microsoft, Amazon, Blue Origin, startups, and was an independent consultant



Passionate about software correctness and quality



Strive to build highly cohesive teams that consistently execute with excellence



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About the Scientific Software Engineering Center



Team of 4 engineers...

...with over 60 years combined industry experience

...who are passionate about accelerating the pace of scientific discovery



Made possible by a grant from the [Virtual Institute for Scientific Software](#)

Part of [Schmidt Futures](#)

One of 4 inaugural centers at:

[Georgia Tech](#)

[Johns Hopkins University](#)

[University of Cambridge](#)

[University of Washington](#)



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About the Scientific Software Engineering Center

(continued)



First project in April of 2023



We work on a variety of different projects that span 6-month engagements

Performance Enhancement for Molecular Dynamics Simulations

Conversion of Prototype- to Production-code for Python Glaciology library

Data-mining techniques used to detect the presence of new mathematical constants

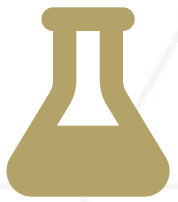
New Functionality for Laboratory Management Software



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Traits of Prototype Software



Short development cycle (< 3 months)



Answers a question

Functionality to test a hypothesis

Resolve an unknown

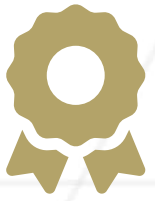


Never turns into Production Software

Code is archived once the question is answered

Code is rewritten (often in a different programming language) if necessary





Traits of Production Software



Not prototype software



Likely...

...adheres to FAIR principles

Findable

Accessible

Interoperable

Reusable

...has multiple users

...is extended or maintained over time



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Prototype Software Requirements



Infrastructure

Source Control System (e.g. git)



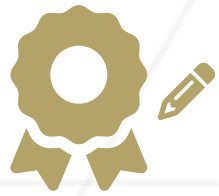
Functionality

Support the happy path

Fail fast

Include enough information to indicate to the developers where and why the failure happened





Production Software Requirements



Infrastructure

Source Control System (e.g. git)

Automated Dependency Management

Automated Build

Automated Tests

Automated Deployment (if necessary)

Continuous Integration / Delivery (CI/CD)

The Return on Investment for these items is realized within the first 3 months; resulting in an increased velocity and quality for the lifetime of the project.



Functionality

Support the [happy path](#) and **error conditions**

Fail gracefully

