

**Institute of Primate Research**

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**STANDARD OPERATING PROCEDURE (SOP) DOCUMENT**

## **Development and validation of computational tools**

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| **Approvals** |  |  |  |
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**Table of Contents**

[1. PURPOSE 4](#_Toc144316958)

[2. SCOPE 4](#_Toc144316959)

[3. PERSONS RESPONSIBLE: 4](#_Toc144316960)

[4. FREQUENCY 4](#_Toc144316961)

[5. MATERIALS 4](#_Toc144316962)

[6. PROCEDURE 4](#_Toc144316963)

[7. REFERENCES 7](#_Toc144316964)

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# PURPOSE

To provide a framework for developing, validating, and maintaining computational tools (algorithms, software, machine learning models) used in DS&AS research.

# SCOPE

Applies to all in-house developed computational tools and custom modifications of open-source software used in genomics, proteomics, epidemiology, and predictive modelling.

# PERSONS RESPONSIBLE:

* **Computational Biologist / Data Scientist:** Leads tool development.
* **Software Engineer / Data Engineer:** Supports coding, optimization, and deployment.
* **Head of DS&AS:** Approves final tool release and validation.

# FREQUENCY

* Validation required **before deployment**.
* Re-validation upon **major updates** or **methodological changes**.

# MATERIALS

* Coding platforms (Python, R, C++, Java).
* Version control (Git/GitHub/GitLab).
* Test datasets and benchmarking standards.
* Continuous integration (CI/CD) tools.

# PROCEDURE

1. **Development:** Build prototype tools following reproducible coding practices.
2. **Testing:** Evaluate tools against benchmark datasets; check for accuracy, efficiency, and reproducibility.
3. **Validation:** Conduct peer-review within DS&AS and document performance metrics.
4. **Deployment:** Release tool internally (or open-source if applicable) with user manuals.
5. **Maintenance:** Monitor usage, collect bug reports, and implement updates via version control.
6. **Archiving:** Document all versions, validation results, and change logs.

# REFERENCES