

Guidance on Management of Research Data at Nagoya Institute of Technology (NITech Method)

For Students

What should be done to prevent irregularities in research?

From time to time illegal actions such as data fabrication in research papers and theses become a major controversy in society. Once such improprieties are detected, the life of the individual researcher is greatly changed. Trust in the whole organization to which that individual belongs is damaged, and its evaluation is greatly reduced. In addition, there is the possibility that the public will develop doubts regarding science and technology as a whole.

There is no foolproof policy to completely prevent improprieties in research. However, various illegal actions can easily occur if they cannot be seen by others, and do not occur easily if they can be seen. For example, if others know what kind of test is being carried out and can see what data can be obtained, it is not possible to fabricate graphs that are not based on the data and publish them in research papers. Conversely, if the data completely cannot be verified by others, it is difficult to detect fabrication if it occurs, and as a result research improprieties can easily occur.

At Nagoya Institute of Technology, the Guidelines for Proper Handling of Research Information and Data at Nagoya Institute of Technology were produced in 2016. These guidelines stipulate that data including research records such as test notes, measurement and calculation results etc. must be stored for 10 years. The objective of this is to prevent research improprieties by enabling the research process and results to be verified.

At present almost all data is in electronic format. Many research laboratories retain research records as electronic files, not as paper notes. Storage of research records and results is the storage of these electronic files on some medium. However, in this case there are a few caveats. If one wishes to check certain measurement data stored on a hard disk, if the name of the folder (directory) that the data is stored in is unknown, it will not be possible to find the relevant files. In other words, in order that data can be verified, it is necessary that the relevant files can be found by a third party. Furthermore, it is necessary that the files be stored and managed in accordance with defined rules.

Nagoya Institute of Technology has provided integrated guidelines for the storage of electronic research data in the University based on these concepts. These Guidelines are disclosed as University policy. It is expected that each individual will abide by the intent of these Guidelines through their actions in research.

(I) Rules for compartmentalization into folders and files

(1) Raw data such as test and analysis data

The data obtained in research is the ultimate basis of the evidence for the contents of

research reports. It is also a record that indicates when and what activities the researcher has carried out.

In order to facilitate the acquisition and verification of the data by a third person, data folders and files shall be prepared in accordance with defined rules within the research group.

The following two are basic forms of the rule.

A Graduation year folder -> Student name folder -> Test method name folder -> Date folder -> Test specimen name file

B Graduation year folder -> Student name folder -> Test specimen name folder -> Test method folder -> Date file

(It is not necessary to be uniform throughout the whole research group, but it is desirable that the person responsible for the data (the individual student) selects one of the rules.)

(If an abbreviation or serial number is used for the test specimen name, a file indicating the correspondence between the test specimen name and the test specimen information shall be prepared and stored.)

Main points:

*** It shall be possible for a third party to determine 4 items from the names of the folder and file: The person that acquired the data, the test method, the test specimen name, and the date the data was acquired (the sequence does not matter).**

As long as this is possible, the method can be flexibly changed in accordance with the nature of the research. For example:

- In the case of theoretical analysis, the above 'test method' can be read as 'analysis method', and 'test specimen name' can be read as 'setting conditions'.

Example Graduation year folder -> Student name folder -> Analysis method name folder -> Date folder -> Conditions name file

- If necessary, folders can be divided and the number of layers increased. For example, in the case of A in (1) above, the test specimens can be divided into groups and folders produced as follows.

Example -> Date folder -> Test specimen group folder -> Test specimen name file

- In the case of questionnaire survey results, the above 'test method' can be read as 'questionnaire survey method'.
- When common data is managed for all research groups, or for sub-groups within that research group, the above 'student name' can be read as '(sub)group name'.

Example (Graduation year folder ->) Sub-group name folder -> Test method name folder -> Date folder -> Test specimen name file

- If data is stored in accordance with a different rule to this, a text file shall be prepared indicating the rules for applying folder and file names, and stored in the Student name folder with the title 'File Name Rules'. In this case also it shall be possible to obtain the necessary information noted above from the folder and file names.

(2) Data for Research Papers, Oral Presentations, and Poster Presentations

When results are made public at a research presentation, it is considered that there is a high possibility that there will be a demand for verification. Therefore, to enable the content of the presentation to be easily verified, folders shall be prepared as described below, and the manuscript document, presentation slides, posters, and all the raw data files shall be stored there.

For the Research Group as a Whole Papers

Year folder -> Journal name folder -> First author name folder -> Paper title name folder

Presentations

Year folder -> Conference name folder -> First author name folder -> Presentation title name folder

(If the raw data size is extremely large, store a file stating the storage location of the raw data, instead of the raw data.)

(II) Methods of Storing Data

Each research group shall adopt either of the following two methods. Store your data by the method adopted in accordance with the instructions of the faculty member.

A A hard disk for storage of data (as a rule, storage on a single device) shall be installed for each research laboratory.

B CDs or DVDs that store the data for each student (in this case, the disks must be stored together at a single location).

* In either method, the data shall be collected at a single location (single disk or a single cabinet).