Science Culture and Accountability Plan

The science culture and accountability plan (SCAP) at BIAC is designed to enhance and protect our mission in scientific innovation and translation. We build a conducive environment for our state-of-the-art imaging research, while ensuring full accountability in <u>scientific conduct</u>, <u>professional ethics</u>, and <u>data security</u>.

We require our faculty and staff to adopt best practices in our scientific investigations. Specifically, all faculty research projects are reviewed by a peer group within BIAC (the BIAC scientific review committee) for merit, feasibility, and scientific conduct. If approved, the research projects will enter a centrally-managed BIAC research pipeline that integrates research credentials, access, training, funding, and data flow. All related research policies and procedures are published on our website for our investigators. In addition, BIAC has a unique educational program that trains all research assistants on data acquisition, image analysis, and professional ethics through our post-baccalaureate fellowships.

In addition to our research mission, we also provide imaging service to the Duke community as a service center. We have made standard operating procedures (SOPs) focused on digitally signed data entries at every point, starting from the origin, transfer computers, analysis computers, and archive computers. Our current electronic pipeline authenticates, digitally signs, and archives all data acquired and processed in our center. As a result, we will be able to monitor and ensure the authenticity of the data, and fully ensure data accountability and compliance.

To further ensure data integrity, we have invested significant funds and resources to install and manage a central data processing and storage facility (which now houses ~300 TB active data online at the Fitzpatrick Data Center): all data acquired and processed through our center are authenticated by our automatic computer daemons, without user interventions, to ensure integrity at every step and facilitate a rigorous scientific investigation. There will be digitally signed entry points for any given datasets, demonstrating all entry points of data creation and modification. Users have the freedom to choose from a large menu of processing and analysis strategies; should they have new tools to test and validate, BIAC central technical staff would help implement the technique and enable it in the automatic processing pipeline. Our data tracking and management system is available to all users through password-protected access to our website.

In addition to the various SCAP measures implemented centrally at BIAC, we also require our faculty and staff to follow best practices in our data acquisition, analysis, and publication, as part of our SCAP:

Best practices in data acquisition:
- Complete all necessary training and approval for acquiring data at BIAC
- Design sound experimental plan with scientific merit review by the BIAC review committee

- Eliminate all possible bias (including subject selection) in experimental procedures

Best practices in data analysis:
- Adopt BIAC approved or peer-published analysis procedures
- Carry out rigorous statistical analysis with consultation from biostatistics experts
- Characterize in full detail all relevant experimental effects
- Ensure replicability of experimental findings
- Report objective procedures for data attrition or subject exclusion

Best practices in publication:
- Report all the details on experimental design and data analysis, with the general rule that an independent group should be able to replicate the same findings if the same procedure is followed
- Avoid exaggeration of the significance of the results
- Obtain approval from all co-authors and confirm their contributions to the manuscript

Reporting on misconduct: All faculty and staff can bring concerns to the attention of the Director's office in confidence, without fear of retaliation or retribution. Staff should also be aware of the Duke Integrity Line to report concerns anonymously.