Planning for informatics in your grant applications

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THE UNIVERSITY OF CHICAGO MEDICINE & BIOLOGICAL SCIENCES | CENTER FOR RESEARCH INFORMATICS

At the end of this talk, you will…

- Know what parts of a grant need informatics consideration
- Understand how important it is to seek help early
- Feel comfortable reaching out to CRI and asking for help

The idealized process…

- Have an idea
- Get preliminary data
- Write a proposal
- Get funding
- Do work
- Repeat

A more realistic process

- Have an idea or an extension of current work
- Apply for grant using old preliminary data
- Get award for new work
- Figure out how to actually do (and pay for) the work

Scenario #1 - The sequencer

- Researcher gets a pilot grant to study colon cancer patients using ChIP-Seq
- Pilot grant only for cost of sequencing
- No provisions made for analysis and interpretation

Scenario #2 - The multi-center trial

- Researcher gets U grant for testing a new survey tool at 30 cooperative sites
- Grant has no provisions for any research informatics support

Scenario #3 - The Big Data™ user

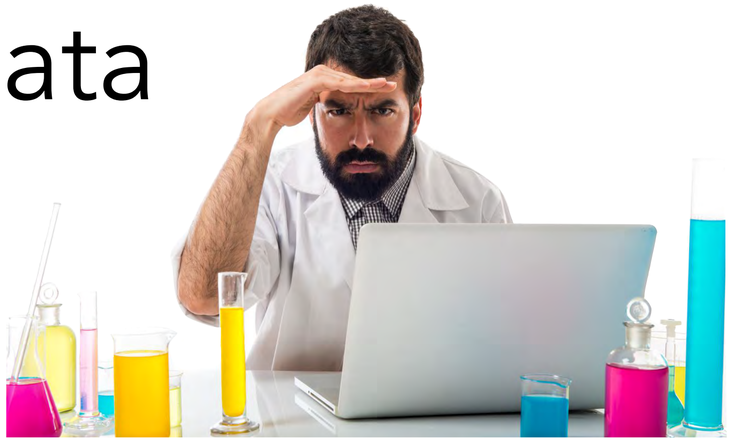
- Researcher gets funding to sequence 1000 whole genomes
- Gets funding for sequencing but then needs 20TB of storage space
- No grant provisions for storage or backup

Scenario #4 - The simulator

- Researcher gets funding to design, perform, and test molecular simulations on millions of drug-target combinations
- Requires millions of hours of HPC usage
- No funding for HPC

Scenario #5 - The analyzer

- Funding secured for pulling a large comprehensive data set from the data warehouse to perform disease modeling
- Data is pulled and given to research team but there is no one to analyze the data

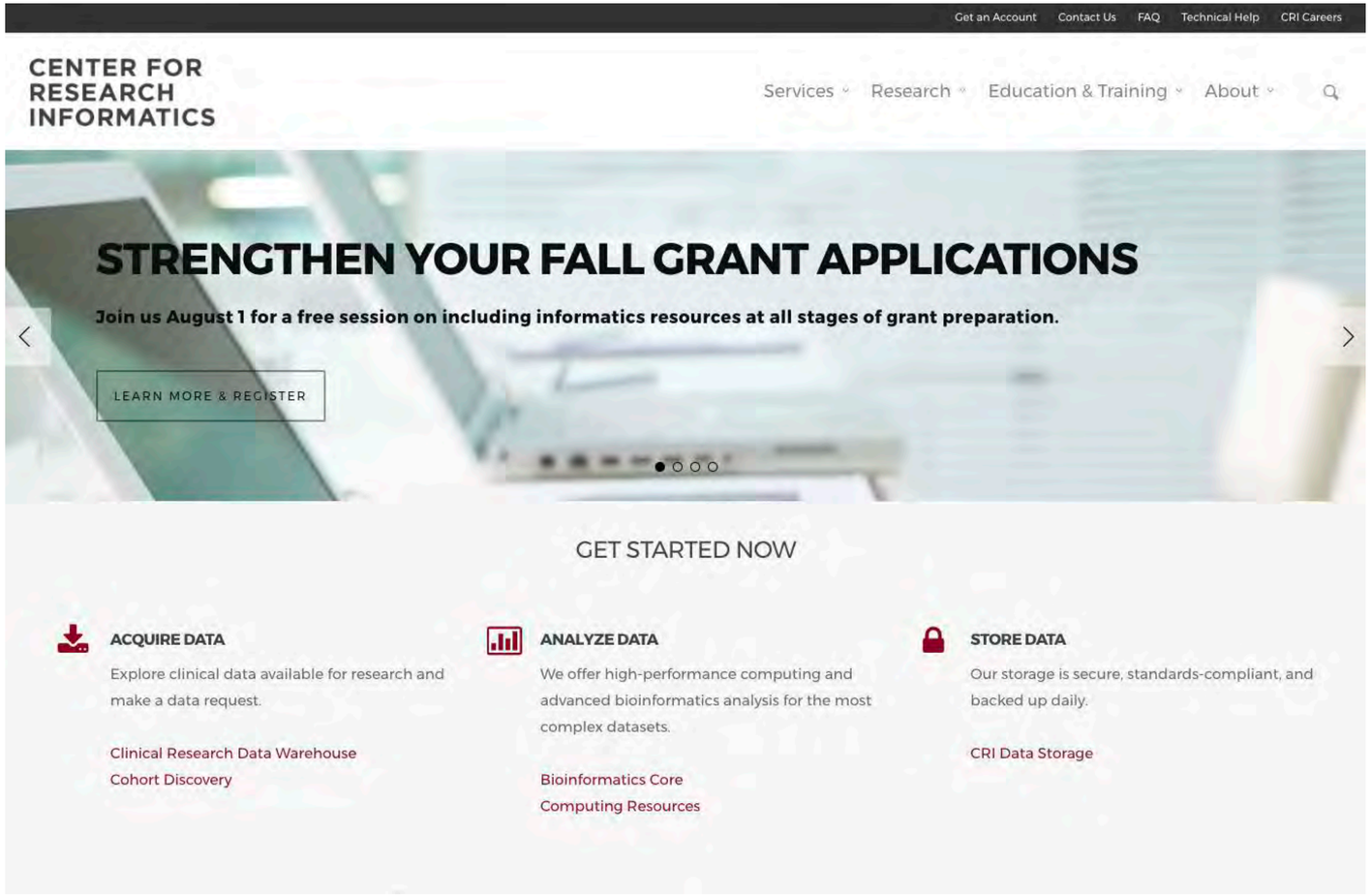


There are many opportunities to consider informatics resources

The best time is when you're just thinking about a project or writing about it.

Getting informatics help

http://cri.uchicago.edu



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Common to all proposals

- IRB writing and positioning
- Contracts, data use agreements
- Data storage, movement, backup
- Letters of support
- Facilities and resources documentation
- Data governance and stewardship
- Data sharing / software dissemination

IRB writing / positioning

- CRI has extensive experience in writing IRB protocols and shepherding them through the process
- Many of the issues have already been encountered for other proposals
- Engage the CRI early on in the process

Contracts and data use agreements

- Sharing data outside the BSD requires an agreement
- Contracts may be needed for IP, data use, etc.
- Monthly meeting with CRI, OCR, IRB, legal, and security to discuss and address these issues **proactively**

Data storage, movement, backup

- CRI has extensive storage and backup capabilities
- Every investigator gets 2TB storage and backup for “free” as a lab share
- More extensive data usage needs to have a budget

A word about storage

These aren't good places to store your data.

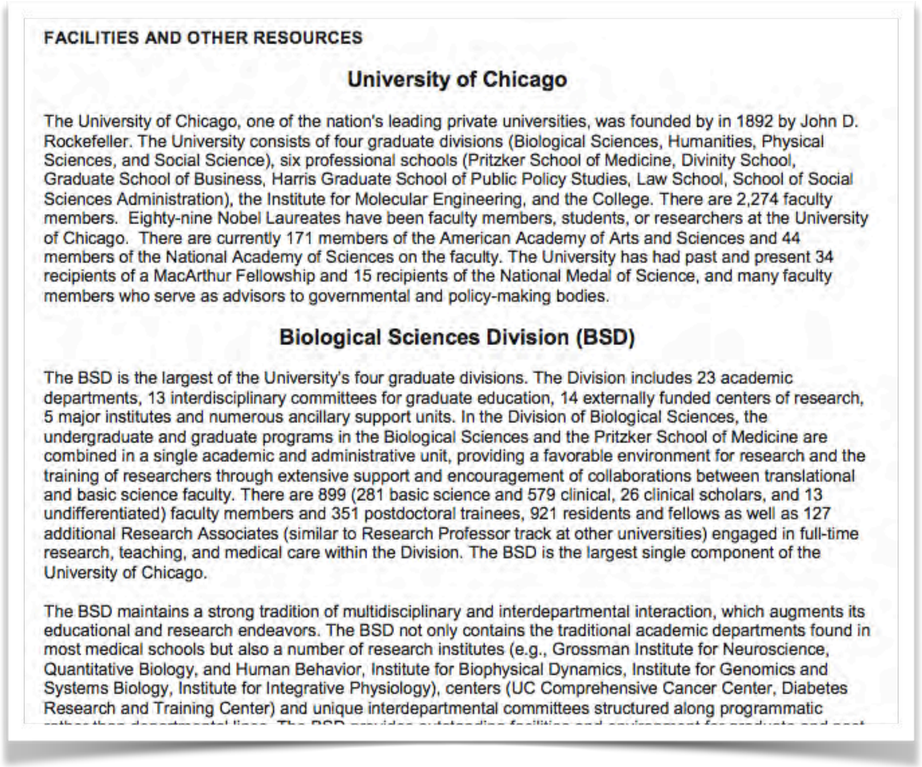
Why?

- Not HIPAA compliant
- Insecure
- No redundant backup
- Little chance of recovery if loss

Letters of support

- General letter from CRI
- Specific support for project from CRI leadership
- Contact the CRI director service line director for any LoS issues
- Do this early. A draft is always appreciated.

Facilities and resources pages



FACILITIES AND OTHER RESOURCES

University of Chicago

The University of Chicago, one of the nation's leading private universities, was founded by in 1892 by John D. Rockefeller. The University consists of four graduate divisions (Biological Sciences, Humanities, Physical Sciences, and Social Science), six professional schools (Pritzker School of Medicine, Divinity School, Graduate School of Business, Harris Graduate School of Public Policy Studies, Law School, School of Social Sciences Administration), the Institute for Molecular Engineering, and the College. There are 2,274 faculty members. Eighty-nine Nobel Laureates have been faculty members, students, or researchers at the University of Chicago. There are currently 171 members of the American Academy of Arts and Sciences and 44 members of the National Academy of Sciences on the faculty. The University has had past and present 34 recipients of a MacArthur Fellowship and 15 recipients of the National Medal of Science, and many faculty members who serve as advisors to governmental and policy-making bodies.

Biological Sciences Division (BSD)

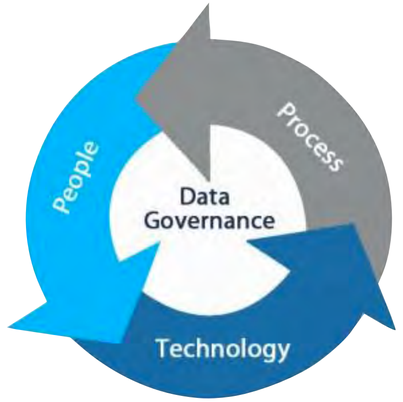
The BSD is the largest of the University's four graduate divisions. The Division includes 23 academic departments, 13 interdisciplinary committees for graduate education, 14 externally funded centers of research, 5 major institutes and numerous ancillary support units. In the Division of Biological Sciences, the undergraduate and graduate programs in the Biological Sciences and the Pritzker School of Medicine are combined in a single academic and administrative unit, providing a favorable environment for research and the training of researchers through extensive support and encouragement of collaborations between translational and basic science faculty. There are 899 (281 basic science and 579 clinical, 26 clinical scholars, and 13 undifferentiated) faculty members and 351 postdoctoral trainees, 921 residents and fellows as well as 127 additional Research Associates (similar to Research Professor track at other universities) engaged in full-time research, teaching, and medical care within the Division. The BSD is the largest single component of the University of Chicago.

The BSD maintains a strong tradition of multidisciplinary and interdepartmental interaction, which augments its educational and research endeavors. The BSD not only contains the traditional academic departments found in most medical schools but also a number of research institutes (e.g., Grossman Institute for Neuroscience, Quantitative Biology, and Human Behavior, Institute for Biophysical Dynamics, Institute for Genomics and Systems Biology, Institute for Integrative Physiology), centers (UC Comprehensive Cancer Center, Diabetes Research and Training Center) and unique interdepartmental committees structured along programmatic

CRI has boilerplate language for grants

Data governance and stewardship

- Grant readers are now looking for documentation of data governance procedures
- CRI can help document these procedures for your proposal



Examples of data governance considerations

- Why controls access to data?
- How is security documented?
- Will people have encrypted laptops?
- Is the storage HIPAA compliant?
- Are data being backed up regularly?
- How is data being moved securely between researchers?

Failure to address these questions adequately can doom a proposal.

Data sharing plan

- Data sharing
  - Discussion of how data will be deposited in common repositories and shared
- Software dissemination
  - How will software be shared?
  - What kind of license will be used?
- CRI will help with this

Bioinformatics considerations

- Methods and study design
- Budget planning for data generation
- Grant writing - preliminary data, methods, research plan
- Data storage, movement, backup
- Analysis and interpretation
- Integration of multiple data sources
- Manuscript preparation and submission

Bioinformatics - Methods and study design

- What kind of analysis?
  RNA-Seq? ChIP-Seq? WGS? WES?
- What depth of coverage?
- Power calculations: How many samples?
  Technical replicates? Biological replicates?

Bioinformatics - Budget planning for data generation

- How many chips? What cost to run?
- How about sample collection and preparation?
- CRI can help broker this process

Bioinformatics - Grant writing

- CRI can help with all phases of grant writing
  - Background
  - Preliminary data
  - Methods
  - Research plan

Bioinformatics - Data storage, movement, backup

- How much storage is needed?
- How will data be transferred between investigators?
- Is data being redundantly backed up?
- CRI can help ensure that all phases are secure

Bioinformatics - Analysis and interpretation

- Best to involve a bioinformatician from the start
- Partnership is key for a successful collaboration
- Project time is charged on an hourly basis or through dedicated time on grants
- Co-authorship is expected, where appropriate

Publications

2015

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Bioinformatics - Data integration

- Consider both phenotype and genotype data
- How will the clinical data be collected?
- Who is integrating these data into the analysis?
- CRI can get the clinical data **and** integrate it with the genomics information - this may require engaging the CRDW