Annual Grant Writing & Research Resources Workshop

Hosted by the Office of the Vice Dean, Education & Research
June 23, 2021 – 9:00am to 11:30am
Temerty Faculty of Medicine Annual Grant Writing & Research Resources Workshop

**Agenda**

9:05am   Opening Remarks
         **Professor Justin Nodwell, PhD**, Vice-Dean, Education & Research

9:15am   The Centre for Research & Innovation Support: Resources for U of T faculty
         **Vinita Haroun**, Director, Centre for Research & Innovation Support
         **Professor Leah Cowen**, Associate Vice-President, Research

9:30am   The Art and Science of Grant Writing
         **Professor Tania Watts, PhD**, Department of Immunology and University of Toronto CIHR Delegate

10:00am  Q&A – 15 minutes

10:15am  Core Facilities and Services in the Faculty of Medicine
         **Natasha Christie-Holmes, PhD**, Research Operations Officer

10:35am  Grant Fundamentals and How to Write a Persuasive Research Proposal
         **Golnaz Farhat, PhD**, Grants and Awards Editor

11:15am  Q&A – 15 minutes
Resources and links discussed in the session

Centre for Research & Innovation Support (CRIS)
- https://cris.utoronto.ca/
- Research Roundup; https://cris.utoronto.ca/research_roundup/home/
- Slides https://www.beautiful.ai/player/-Mct3eucMPtrQyrC2qA

Division of the Vice-President, Research & Innovation (VPRI)
- Division Website and Research Services Office (RSO); https://research.utoronto.ca
- RSO Staff Directory; https://research.utoronto.ca/contact-us
- Research Alerts; https://alerts.research.utoronto.ca/content/offcampus_notice
- Funding Opportunity Database; https://research.utoronto.ca/funding-opportunities/db
- PIVOT Funding Database; https://research.utoronto.ca/fr/node/493
- PI Eligibility at UofT; https://research.utoronto.ca/engaging-research/who-can-be-principal-investigator-u-t
- Equity, Diversity and Inclusion; https://research.utoronto.ca/equity-diversity-inclusion/equity-diversity-inclusion

Temerty Faculty of Medicine Research Office
- What’s New in research; https://medicine.utoronto.ca/research/whats-new-research-funding
- Grant Development; https://medicine.utoronto.ca/research/grant-development
- Internal College of Reviewers; https://medicine.utoronto.ca/form/sign-college-internal-scientific-reviewers
- Internal Grants, including Pathways grants; https://medicine.utoronto.ca/internal-funding-opportunities
- Guide for New Researchers (including a link for Faculty of Medicine faculty and learners to access Redcap); https://medicine.utoronto.ca/research/2015-guide-new-researchers

CORE FACILITIES WITHIN THE FACULTY OF MEDICINE
- Microscopy Imaging Lab; https://medicine.utoronto.ca/research/microscopy-imaging-laboratory
- Division of Comparative Medicine (The Animal Facility); https://dcm.utoronto.ca
- Flow Cytometry Facility; https://flowcytometry.utoronto.ca
- Combined Containment Level 3 Unit; https://medicine.utoronto.ca/combined-containment-level-3-unit

CIHR
- College of Reviewers, Become a College Member; https://cihr-irsc.gc.ca/e/49923.html
- Observer-ship Program; https://cihr-irsc.gc.ca/e/52119.html
- Research Net; https://www.researchnet-recherchenet.ca/rmr16/LoginServlet?language=E

NIH
- Sample Applications; https://www.niaid.nih.gov/grants-contracts/sample-applications

Contact Details of Speakers
- Joanna King, Moderator and Manager, Business & Research Administration – joanna.king@utoronto.ca
- Professor Justin Nodwell, PhD, Vice-Dean, Education & Research – medicine.research@utoronto.ca
- Vinita Haroun, Director, Centre for Research & Innovation Support - vinita.haroun@utoronto.ca
- Professor Leah Cowen, Associate Vice-President, Research – leah.cowen@utoronto.ca
- Professor Tania Watts, PhD, Department of Immunology and University of Toronto CIHR Delegate – tania.watts@utoronto.ca
- Natasha Christie-Holmes, PhD, Research Operations Officer - natasha.christie@utoronto.ca
- Golnaz Farhat, PhD, Grants and Awards Editor – golnaz.farhat@utoronto.ca
THE CENTRE FOR RESEARCH & INNOVATION SUPPORT (CRIS)

A RESOURCE HUB FOR U OF T FACULTY

June 23, 2021

Leah Cowen, AVP Research
leah.cowen@utoronto.ca

Vinita Haroun, Director CRIS
vinita.haroun@utoronto.ca
WHAT WE’D LIKE TO COVER...

1. About CRIS & Supports Available to Researchers
2. Discussion on Programming Ideas
PARTNERSHIP

Division of Vice-President, Research & Innovation (VPRI)
Libraries (UTL)
Information Technology Services (ITS)

Recognition of the many exceptional resources currently available to support research and innovation
CRIS MANDATE

AMPLIFY - NAVIGATE - RESPOND - FACILITATE
PRIORITY AREAS

Amplify
Increase visibility of research and innovation supports to the tri-campus community

Navigate
Broker access to new and existing supports and resources

Respond
Collaborate with central units and academic divisions to identify gaps and develop services and resources for emerging unmet needs

Facilitate (Collaboration)
Enable opportunities to bring people together, creating space and effective supports for sharing and partnership, within and outside of the University.
OUR VIRTUAL OFFERINGS

https://cris.utoronto.ca

Access existing research and innovation supports across the tri-campus
Find curated content on emerging issues and needs
AMPLIFY

INCREASE VISIBILITY OF EXISTING RESOURCES AND EXPERTISE
AMPLIFY - PROMOTIONS


- **Central Calendar of Training & Events**
  - https://cris.utoronto.ca/featured-events/
  - Integrates event listings into one central calendar

- **Research Roundup**
  - https://cris.utoronto.ca/roundup/home
  - A weekly digest of research and innovation communications
  - Includes new resources, funding calls, administrative updates

- **CRIS Compass**
  - https://cris.utoronto.ca/about-us/cris-compass
  - Bi-monthly newsletter highlighting CRIS core supports and new resources
NAVIATE: RESOURCE HUB

https://cris.utoronto.ca/resource-hub

- Catalogue of resources available across the tri-campus
- Self-serve search and filter
- Includes a variety of tools to support researchers
- Provides quick navigation to central services and offices
VIRTUAL NAVIGATION SERVICE

Goal: Provide virtual navigation service to continue to orient to resources, services, expertise

- Faculty want a consultation service to assist in navigating supports that are available across the university
- Complement our existing web-based self-serve resource hub
- Partner with Experts Across the University
- Formats:
  - Scheduled monthly drop-in virtual sessions will have an ‘ask me anything’ with a key topic
  - Ask me emails responded by email or phone consults

FIRESIDE CHATS WITH OVPI - FORTH THURS NOON

1:1 CONSULTATIONS FOR USE OF TOOLS
REDCap, Project Management, Facilitation Toolkit
DATA REPOSITORIES & ADVANCED RESEARCH COMPUTING

Address FAQs: How and where can I store data?

- Working Securely. Remote Data Collection & Storage
  Spotlight Webpage
- Research Repositories @ U of T
  Information Video
- UTL Dataverse Webinar overviews hosted by UTL
- Advanced Research Computing Spotlight Webpage
- Advanced Research Computing @ U of T Information Video
- Jupyter Hub for Researchers 101 A webinar on interactive computing environments
RESPOND TO EMERGING UNMET NEEDS
WORKSHOPS FOR GRANTS, AWARDS & HIGH IMPACT PUBLICATIONS

Faculty-faculty mentorship approach

NIH 101
NIH Program Officer & Panel of Experienced PI from the U of T Community
Two-page key takeaways

Panel of RSC Adjudicators
Advice from Senior U of T Leaders on putting together a successful application package

Nature Masterclass
Focus on Scientific Writing, Scientific Publishing, and One-on-one Abstract Review with Nature Editor
For thirty mid-career STEM researchers
TRAINING FOR RESEARCH TOOLS

Partner with technical experts to address research use cases

Project Management Tools for Researchers
- Webinar & Hands-on Workshops
- Downloadable Templates

REDCap, data capture tool
- Webinars
- Fall/Winter: Asynchronous Training Videos & Hands-on Workshops

Microsoft 365 for High Performance Collaboration
- Optimizing the use of MS Teams, One Drive and SharePoint for Research Use Cases
VIDEO LIBRARY

Missed one of our workshops, events, or information sessions? Browse the videos below.
FACILITATE

ENABLE FACULTY-LED WORKSHOPS FOR INTERDISCIPLINARY AND TEAM RESEARCH
SUPPORT FOR FACULTY-LED WORKSHOPS & STRATEGIC ENGAGEMENTS

Consultation sessions to provide guidance in the planning and execution of both:
• faculty-led workshops; and
• engagement with faculty leadership, sponsors, and other research and innovation stakeholders of strategic importance.

Facilitation Toolkit
• This interactive toolkit provides guidelines, tools and templates to help research teams to plan and execute highly effective collaborative engagements.

Workshops: Facilitating Highly Effective Engagements with Your Research Collaborators
• July 22, 2021 | 10:30am - 12:00 pm
CRIS COLLABORATION SPACE

We look forward to inviting you to our newly renovated Collaboration Space when it is safe to do so!

This new space will be a hub for in-person and virtual workshops, and specialized research tool training.
OUR TEAM

Leah Cowen
Academic Advisor
AVP, Research

Vinita Haroun
Director

Christina Kim
Liaison Librarian

Krystyna Kongats
Collaborative Programs Officer

Prisca Obierefu
Research Technology Liaison
DISCUSSION

- How can else can CRIS support faculty researchers?

- What topics would you like us to consider in our Fall/Winter programming?

- What supports and resources are you looking for at the moment?
THANK YOU

Get in touch: cris@utoronto.ca
The Art and Science of grant writing – a writer and a reviewer’s perspective

Tania Watts, Dept of Immunology, University of Toronto

tania.watts@utoronto.ca

June 23, 2021
Source material:
CIHR Institute of Genetics- Guide to New investigators
(2006- Rod McInnes, Brenda Andrews and Richard Rachubinski)

CIHR web pages- application instructions
Before you begin: What is your grant strategy- always plan ahead

How will you divide up your research interests into fundable packages suitable for different agencies?

- NSERC Discovery grant-useful for first grant, harder to get once you have CIHR

- CIHR project grant- make sure you have a good track record in the area, substantive project, collaborators on things that you don’t have a track record in; don’t apply for 2nd CIHR project until you’ve published on the first one!

- Disease specific areas- Cancer (CCSRI, CRS), Heart and Stroke, MS society, Arthritis society

- New areas: pilot projects- catalyst grants, respond to RFAs, local funding-Dean’s funds etc
Be aware of the regular deadlines for agencies of interest-start early!

Plan your internal grant review in advance: peer review committee or colleagues or FoM Research office- make sure you get input from others!

Make yourself a deadline well before the deadline to allow time for review and edits

Your internal reviewer(s) can be in your general area- not necessarily specific experts-make sure its understandable to them

Always have time to write- put aside- get input- re-read – Proof-Proof-Proof!

Always submit a polished document, appealing to look at, grammatically correct

If you start thinking about the grant months in advance-then you have time to do some key preliminary experiments too!
Always follow the guidelines exactly

Correct size font- e.g. Times New Roman 12 point
Don’t try to squeeze more in by changing line spacing or margins

CIHR will reject the application if you don’t obey the rules or simply delete the extra pages making grant unintelligible to the reader
Remember- reviewers are volunteers- your peers-- make their job easy with clear, accurate writing and presentation.

Each reviewer may get 6-12 grants per CIHR panel meeting
Grant review process CIHR

Before registration: Panel members are invited to serve on a panel
After registration: CIHR/CHAIR/SO work together to make sure the panel has all the members it needs

Reviewer conflict of interest and expertise task: Reviewers go online and read the summaries of proposals, list of collaborators and indicate COIs and expertise: High, Med, Low, None

3 Reviewers assigned per grant- CIHR tries to get one with “High” expertise but sometimes just medium level of expertise, reviewer 3 may have “low” expertise
At the CIHR panel

At the beginning of the panel meeting- grants unlikely to be funded due to low preliminary score triaged- but can be rescued for discussion if panelist feels strongly
Triaged if: 2 reviewers have it in their bottom half; scores below a certain cutoff

As each grant comes up for discussion 15-20 minutes:
1. Anyone with COI leaves the room
2. Reviewer 1, 2 and 3 give their initial scores
3. Reviewer 1 gives a summary and critique, Review 2 and 3 in turn add additional points
4. Panel discusses
5. Scientific officer summarizes the discussion, reviews the notes to go back to the grantee
6. Consensus score agreed to, everyone votes(±0.5)  *Ranking is key: top 15-16% only funded*
7. *Budget discussed; any other concerns flagged to CIHR (overlap, ethics etc.)*
Criteria for reviewers from CIHR web pages

Concept:
- Significance and impact of research
- Creative, innovative?
- Sound rationale?
- Well defined goals?
- Will it advance knowledge?
- Substantive contribution relative to gaps?
- Realistic

Feasibility:
- Approaches and methods:
  - Appropriate to the question?
  - Well defined, justified
- Timelines realistic?
- Identifies challenges and mitigation strategies?
- Expertise and resources:
  - Does the applicant have the expertise, track record to get the project done?
- Are the resources needed available to the applicant?
What gets the reviewers’ enthusiasm?

Important problem/question, clearly stated

Exciting to the reviewers—likely to have impact

Easy to read, great flow, objectives and how you are going to achieve them clearly stated

Approaches appropriate for the project, with pitfalls and alternatives clearly stated

The reviewers have confidence that you are the person to get it done— or if there are gaps in your background, that you have identified appropriate collaborators

Timeline, approaches, number of personnel and budget are realistic
Great writing - the reverse pyramid structure

Great lead sentence is interesting and says what paragraph is about, the rest follows

Give the Big Picture

Write with simple clarity. Not too many abbreviations.

Don’t drown the reader in details, write for the generalist, with key details for the expert in the room

Why does an experiment need to be done

What do they need to know to follow the logic

(image from Rod McInnes talk)
CIHR Project grant

Summary of proposal
Sex and gender section
Summary of progress
Proposal

Budget and Budget justification
CV- most significant contributions

So you didn’t get funded? What next?
Response to Reviews
Summary of Proposal

First impression to the readers- captures their attention! -tells them what the grant is about

Title and summary can be changed for full grant- but needs to be similar

Used for registration and full grant- for reviewer recruitment and assignment

Need to have your overall grant plans and aims clear in your mind before registration deadline, then will flesh out for full grant.

Need to include enough specifics so that the panel chair can find reviewers who understand the approaches/techniques used
## Summary of Proposal- First impressions count!

<table>
<thead>
<tr>
<th>CIHR instructions:</th>
<th>My advice:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background and importance</td>
<td>First- state the problem, big picture question--importance- capture reviewers’ interest, set the stage for your goals/hypothesis.</td>
</tr>
<tr>
<td>Goals/research aims</td>
<td>List specific aims with a title, and a brief summary of the question you will ask and a brief summary of how you will do it. Human research: <em>Study subjects.</em></td>
</tr>
<tr>
<td>Methods/approaches/expertise</td>
<td>End with a summary of what will we learn from your study and how this will impact the field-why should we care about this?</td>
</tr>
<tr>
<td>Expected outcomes</td>
<td>If room- indicate what you and your collaborators bring to the table to ensure success, time frame.</td>
</tr>
</tbody>
</table>
Background and Specific aims.

Influenza is an important human pathogen that causes significant morbidity and mortality. CD8 T cells are an important component of protective immunity to influenza virus. These resident memory T cells (T RM) are T cells that differentiate in vivo and remain at the site of infection as sentinels to rapidly respond upon re-exposure. Recent work from my group demonstrated the importance of two T RM recently identified in the human population that can be distinguished by their expression of the transcription factor KLRG1 and the cell surface marker, CD103. These two subsets, 4-1BB- and GITR-, in T RM formation. The initial activation of T RM involves the recognition of Ag on MHC class I (signal 1), cytokines (signal 2), and cytochrome P450 (signal 3). Our lab has concentrated on the idea of THRM-1 signaling as a critical new mechanism for T cell activation and memory formation. Although it was thought that classical DC present signal 4 T cells, our recent work has challenged this paradigm. We found that GITR- and 4-1BB+ are preferentially induced on CD69+ TCM-like inflammatory antigen presenting cells (APC) during acute and chronic viral infection. Recently, the ontogeny of these cells has been called into question. In this proposal, we will investigate the transcriptional effects of 4-1BB and GITR on the regulation of influenza specific CD8 T cells as single cell level and in effector and memory stages (Aim 1) and determine the role of a GITR-induced transcriptional regulator, PMHS10, in effector and memory T cells (Aim 2).

Methods and approaches.

Aim 1: Defining the antigen presenting cells that provide signal 4 for CD8 T cell activation and memory formation. Single cell RNA-sequencing has revolutionized our understanding of the monocyte-skewing macrophage lineage, and evaluated the potential for new mechanisms, we will use single cell gene expression (Cit-Seq) of sorted HLA I+ cells from lungs and lymph nodes of influenza infected mice to better define the cellular process occurring. We will use single cell RNA-sequencing (Cit-Seq) of WT and GITR+ 4-1BB+ cells from single cell levels and evaluate the influence specific T cells from competitive bone marrow chimera in vivo after influenza infection. We will investigate the role of PRIM1 in GITR+ T cell subsets (Aim 2).

Aim 3: Investigate the role of PRIM1 in GITR+ T cells. Our bulk RNA-sequencing of effector T cells with and without GITR- identifies the transcriptional regulator PRIM1 as a GITR-dependent gene. Our data show that mice lacking PRIM1 in T cells have lower influenza specific T cell populations. Transcriptional and epigenetic changes will be investigated.

Expected outcomes/Significance. This project will define the ARC, the T cell increases transcriptional changes and the role of PRIM1 in signal 4 for effector and memory T cell activation during influenza infection. Why is this important? Understanding the key cells and signals that contribute to signal 4 for effector and memory T cells is critical if we are to develop and monitor vaccine and therapeutic strategies against respiratory viral infections and to understand how different infections or vaccinations can lead to such vastly different conditions.

Why is it important to do this work?

If room-put in your expertise
Summary of Progress -2 pages- new

Would be more aptly called context

1. Progress –productivity
   - what did you achieve with the previous funding cycle - relevant to this application
   - if a new grant highlight how your previous work leads to this grant
   - if a new investigator chance to show how this grant builds on your PDF expertise
   - could also explain how its different from your PDF mentors work (letter helpful too)

2. Contextualize this application in relation to your other grants
   - if you hold multiple grants, how does this one fit into your overall program
   - chance to address issues of perceived overlap before they arise

3. COVID impact- keep this short – highlight how productivity impacted
Sex and gender task

Sex- biological variable      Gender-socio-cultural factor

It is important not only to fill out the boxes for how sex and gender will be addressed in your research, but also to work it into your proposal as part of your ”research design, methods, analysis and interpretation, and/or dissemination of findings ”

Useful to take the sex and gender online course from CIHR (see CIHR sex and gender page) https://cihr-irsc.gc.ca/e/50836.html

The sex and gender section is now specifically brought up in every review, and grantees who fail to address it or do so in a superficial way without including in the actual grant, may score lower
The Proposal

Should stand alone-don’t assume they have read the summary first

The aims- research plan- should be about half the document- write this first

Then write the background, previous related work, preliminary results section to support it

End with significance

Include figures in the 10-page grant- must be big enough to read
-A graphic abstract summarizing the aims can be helpful on the first page
-Critical unpublished preliminary data
-references not included - add as a separate file
The Proposal -structure

Opening paragraph- Overview or synopsis of the grant- big picture question
-why is it important, context, significant new knowledge to be obtained, introduce the main aims

Background and previous related work:
Review of previous work by you and others-sufficient to understand proposal
Provide the rationale that logically leads to the current proposal, leads into the aims

Research plan: write around the specific aims (~2 to 4, typically 3)
Lead in each aim with the stated goal; then how you will test/investigate
Can have sub-aims
Experimental plan, sequence, techniques and timelines (figures embedded)
Potential pitfalls and alternatives, preliminary data to show feasibility
Expertise- why you are the one to do this, collaborators for technical gaps
(Note this can be reinforced in the progress section and CV (most significant contributions)
Significance- conclude with reiterating the significance of the project
Some pitfalls to avoid

• Your grant rises and falls on aim 1- if aim 1 fails, then there is no point doing aim 2 and 3- if there is any risk to aim 1, reviewers will be less inclined to support the whole grant

• Your grant is too ambitious- way more than can be reasonably done with a team of your size/budget in the time frame; too broad in scope, too many aims

• Grant is too complex to follow- so many alternatives that reviewer can’t figure out what you want to do first- make sure your preferred approach is clear and what is a back up

• Your grant is the obvious next step in a project you started as a post-doctoral fellow and the panel thinks you are competing with PDF mentor- Get a letter from the former mentor clearly stating what is yours to take

• Solid grant, but fails to win the enthusiasm of the panel and rise to the top of the pile-did you drown them in detail? really make sure the significance and impact is clear
Appendices- Reviewers DO NOT have to read these

Up to 5 publications can be added- only add those relevant to the specific proposal and only if you refer to them within the proposal otherwise looks like padding (ref list is already in the CV).

-judicious use of figures- reviewer does not have to look at these. Critical figures must be in the grant, supporting panels in the appendices Don’t use this to get around space limitations; too many appendices puts off reviewers

Useful place to add other key elements: e.g. consent forms and study questionnaires are legitimate additions

There is currently much debate at CIHR about limiting appendices. I don’t read them all, just if I want to look something up. Reviewer can find publications online anyway- although they do not have to do so.
Collaborators or Coapplicants?

Nominated PI and Principal applicants-direct the research

Co-applicant- actively engaged in the research, does not direct it

Collaborator-provides a specific service, technique, reagent, access to equipment or study population, statistical methods.

Letters of support- people who will give advice

Previous supervisor: Better not to have them on your grants pre-tenure-need to establish independence at least on a subset of projects; Can be helpful to get a letter of support acknowledging access to reagents, project continuation
Budget and Budget Justification

Personnel
Keep it reasonable- 1 tech or RA; 1 PDF, 1 or 2 grad students
List by name if already hired
Be specific about what they will do in the grant- assign to specific tasks

Materials, supplies, services
Provide details on the more expensive items - e.g. costs for RNA-seq

Currently, CIHR applies a ~23% ATB cut to allow more grants to be funded
I don’t recommend obvious padding or panelists will cut
But don’t be too modest, as you can expect to get less than asked for.
CV module – most significant contributions

Update/edit your CV for each grant

Tailor the 5 “most significant contributions” section to this grant

What expertise prepares you for success in this grant?
Could be publications, a leadership role, clinical practice, policy development, strategic training- you can mix and match the contributions that best exemplify your qualifications for the specific proposal.
So you didn’t get funded- what next?

Were you triaged? Read the reviews- did they understand your grant? Were you too ambitious? Not ambitious enough, flaws in logic?

Did you just miss? 3.9 very good but not the top tier? Why? If there were fixable flaws- resubmit. Add a collaborator? If there is nothing specific, but you failed to excite the reviewers consider whether you framed your question correctly to illustrate the importance of the problem and how your grant will deliver.

Show your reviews to an experienced colleagues and get some advice!
The response to reviews

Response to reviews- 2 pages allowed

Must upload all the reviews- including SO notes-if you don’t include-reviewers don’t have to read

Response should not require any other document– in responding- quote the specific comment and then indicate your response

Be courteous and brief… do not imply that the reviewer is incompetent- even if they were- just address the criticisms factually and professionally

Consider joining a grant panel (or the observer program) as it can give great insights into what works and does not
So you didn’t get funded- what next?

Do you go back right away- or wait out a cycle? Time between reviews and next grant is short. If you can readily address reviews, by all means, revise and go back. But if additional experiments are required, might be better to sit out next cycle so that you can go back with a stronger grant… avoid reviewer fatigue!

Don’t get discouraged: persistence-with 15-16% success rate may have to try several times

If score isn’t improving after several tries-reconsider the approach

Was it flawed or uninteresting relative to competing grants-rethink? Was it exciting but ahead of its time-too preliminary—try to find short term catalyst or innovation grant to get some preliminary data
Time management

• Give yourself time to write
• Plan your day to do your most important work early in the day
• Block off some time to write uninterrupted
• Ration your time - you need to say yes to important things, don’t get distracted by the unimportant
• When writing - I turn off my email notifications and look at only when I’m ready for a break
Summary

Start early

Organization

Write with simplicity and clarity

Big picture/appropriate details

Preliminary results/track record

Internal review- Revise.revise.revise.revise
Core Facilities and Services

Natasha Christie-Holmes, Research Operations Officer
natasha.christie@utoronto.ca

June 23, 2021
• Dedicated management teams to provide specific technical expertise, training and protocol development assistance for research personnel

• Maximizing the impact of funding success to propel research at a Faculty-wide level and support future grant applications

• Supported through cost-recovery structures and strategic planning of grant-associated operational funding

https://medicine.utoronto.ca/core-facilities-services
Division of Comparative Medicine (DCM)

- Interim Director: David Hanwell, DVM, PhD
- Manager: Frank Giuliano, RMLAT
- [http://www.dcm.utoronto.ca/](http://www.dcm.utoronto.ca/)
- Federally and Provincially accredited Animal Care program at the Faculty of Medicine
- Preeminent veterinary technical staff including 5 Masters level animal technicians
- Over 60,000 ft² dedicated to in vivo research, including germfree, gnotobiotics and SPF+ exclusion
- Multiple full animal imaging modalities on-site supported by dedicated technical expert
Flow Cytometry Facility

- Director: Tania Watts, PhD
- Manager: Natalie Simard, PhD
- http://flowcytometry.utoronto.ca/
- Equipped with 7 analyzers (3 to 5 laser each; up to 18 colour acquisition) and 3 cell sorters allowing for large multiparameter analysis
- Supported by dedicated operators with extensive FCM knowledge and over 20 years of experience
- Comprehensive training program partnership with Expert Cytometry(ExCyte™) and SickKids Hospital for research personnel
Diet, Digestive tract and Disease (3D) facility

- Director: Herb Gaisano, PhD
- Manager: Alexandre Hardy, PhD
- Multiple analytic platforms to facilitate molecular investigations
- Various imaging platforms from molecular level to full small animal scans
- Partnership with DCM to provide technical expertise in animal imaging
Microscopy Imaging Lab (MIL)

- Director: Stephen Girardin, PhD
- Manager: Lindsey Fiddes, PhD
- Consolidated microscopy core including confocal, fluorescence, scanning (SEM) and transmission (TEM) electron microscopes
- Expanding Cryo-EM capabilities
- Expert technical team trains research personnel in microscopy techniques and development of protocols
- Dedicated preparatory lab for SEM/TEM samples, Equipped for Cryo-TEM preparation
- Providing full-service microscopy (prep and scanning)
Combined Containment Level 3 (C-CL3) Unit

- Director: Scott Gray-Owen, PhD
- Manager: Betty Poon, MSc
- Federally licensed facilities for research involving RG3 pathogens
- Dedicated regulatory team providing guidance, validation and oversight
- Facilities for small animal *in vivo* studies and molecular *in vitro* research
Virology Core Lab and Biobank

- Director: Scott Gray-Owen, PhD
- Manager: Betty Poon, MSc
- New, adaptive CL2+ space for viral research
- Foundational work on seasonal coronaviruses, HIV
- Extends TFoM infectious disease expertise to support other Faculties
- Leveraging opportunities for collaboration and building foundation for future studies on COVID-19 samples
Central Sterilization Service (CSS)

- Providing glass-washing, laundry and sterilization services
- Centralized stock of glass and plasticware for all MSB researchers to access
- Multiple sterilization cycles daily allowing flexibility for lab schedules
- After-hours autoclaves available to trained users
Core Facilities add value in grants

Build the foundation for early-stage investigators
  • Established infrastructure, expertise and support

Show sustainability for established investigators
  • Requested infrastructure can be well implemented
  • Ongoing support for maintenance/operations

https://medicine.utoronto.ca/core-facilities-services
How to Write a Persuasive Grant Proposal

June 23, 2021

Golnaz Farhat, PhD

Grants & Awards Editor, Office of the Vice Dean, Education & Research
Proposal writing is different from academic writing

- The facts are not enough
- You must persuade your reader
- A well-crafted and strategic sales pitch
Proposal writing is a skill that can be learned

There is no magic formula for a successful proposal

• Fundamental building blocks
• Practice
Considerations for a persuasive proposal

- Audience
- Context
- Clarity
- Specificity
- Feasibility
- Logic

Persuasive Proposals
Start early

Successful proposal writing takes TIME
Understand your audience

• They are busy, distracted, tired, and bored
• They are reviewing many proposals
• They are skeptical
• What are their area and level of expertise?
• What are their goals?
Convince the reviewer from the first page

- Is the problem important?
- What is the overall goal?
- What specifically will be done?
- What is the payoff?
Context

“the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood and assessed”

• Helps the reviewer understand the problem
• Helps the reviewer relate to the problem
• Helps the reviewer focus on the problem
• Makes your work relevant
• Makes your work current
• Through story-telling, plays on the reviewer’s emotions
The bacterium *Coxiella burnetii* can spread from farm animals to humans, causing the flu-like illness, Q fever, and a chronic form of the disease commonly manifested as endocarditis. *C. burnetii* is found worldwide, and can cause epidemics, such as the recent one in the Netherlands where thousands of people were infected. It has also been detected among U.S. military personnel and is highly prevalent in US environmental samples. Chronic Q fever, if left untreated, is associated with a high mortality rate (>60%). Chronic *Coxiella* infections are very difficult to treat because they require a prolonged antibiotic regimen lasting up to 4 years. Moreover, antibiotic resistant strains are prevalent. The inhospitable environment within a lysosome-derived vacuole is the preferred growth medium for *C. burnetii*. The unique ability of *C. burnetii* to thrive in this acidic vacuole is the key to its virulence. However, metabolic pathways critical to the pathogen’s intracellular growth are unknown, mainly due to the unavailability of appropriate genome-scale approaches. This gap in knowledge is an important problem because it has hindered both the understanding of *C. burnetii*’s basic biology and pathogenesis, and the development of better therapies.
Context is not just for the introduction

- Methods
- Collaborations
- Human resources
- Timeline
- Budget

WHY?
Logic: Your proposal should be **logical** and **consistent**

- Logic is a tool of persuasion
- Appeal to the reader’s sense of what is reasonable and logical
- Each part of the argument should flow logically into the next
- Check for inconsistencies or gaps in your arguments
Define your goals in a logical way

LONG-TERM GOALS
- “Big picture”

OBJECTIVE (S)
- Purpose of the proposal
- Fills the knowledge GAP

HYPOTHESIS
- Helps focus the research
- Ensures you achieve your aims
Define your goals in a logical way

Our long-term goal is to understand the molecular details of *Coxiella burnetii*’s distinctive physiology, and to apply this knowledge to developing novel therapeutic strategies. Towards attaining this goal, the overall objective of this application is to identify metabolic pathways that are vital to *C. burnetii*’s intracellular growth. Our central hypothesis is that *C. burnetii* evolved from a tick-associated ancestor by acquiring critical metabolic genes through horizontal gene transfer (HGT).
How to write your specific aims

• Aims should communicate **WHAT** you are going to do and **HOW** you are going to do it
• Give each aim an active title
• Aims should be related but independent
• Aims should be specific and should have a clear endpoint
• Aims should test a hypothesis or accomplish an objective
• Aims should be feasible within the time frame of the grant
Example of specific aim

Aim1. Identify metabolic pathways that distinguish *C. burnetii* from tick-associated Coxiella.

Because Coxiella species present in ticks do not replicate within a lysosome-derived vacuole, our working hypothesis is that genes critical to *C. burnetii*'s unique intracellular physiology will not be present in tick-associated Coxiella.

We will sequence the complete genome of *C. burnetii*'s closest known relative—a Coxiella species present in the soft tick *Ornithodoros rostratus*, and by comparative genome analyses, we will identify metabolic genes and pathways unique to *C. burnetii*. 
Don’t forget to include an **impact statement**

The proposed research will be impactful because once metabolic processes important to C. burnetii’s intracellular growth are identified, new pharmacological agents that block these pathways can be developed to treat chronic Q fever more effectively.
Feasibility

PROJECT
- Goals
- Preliminary data
- Methods
- Timeline

BUDGET
- Reasonable
- Aligns with methods

PEOPLE
- Expertise
- Track record
- Synergy

ENVIRONMENT
- Infrastructure
- Resources
Specificity adds credibility

The more specific you are in your arguments, the more credible your arguments will be.

“This research will have a meaningful impact on….”

“Identifying the metabolic genes unique to *C. burnetii* will allow us to identify new therapeutic targets……”
Specificity: Give concrete examples

“We have built a highly synergistic research team…”

Examples of past productivity: publications, patents, awards, grants, etc.

“Uncontrolled type 2 diabetes can lead to significant complications…”

Examples of complications: heart disease, nerve damage, vision loss, etc.
Specificity: Use hard facts and numbers

“…an impressive publication track record…” VS “…23 peer-reviewed publications in 10 years…”

“…cancer is a significant health problem…” VS “…cancer will affect 1 in 3 Canadians in their lifetime…”
Specificity: Avoid intensifiers

They immediately invite skepticism
### Specificity: Use strong verbs

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What follows will necessarily be specific
Clarity: Make your proposal easy to read

Communicate your ideas in the simplest and most precise way possible.
Clarity: Write clearly, plainly, and concisely

- Short words
- Short sentences
- Short paragraphs
- Avoid jargon and highly technical terms
- Limit your use of acronyms to 2 or 3
- Use strong verbs and the active voice

“I am writing a longer letter than usual because there is not enough time to write a short one.”

Blaise Pascal, *Lettres Provinciales* (ca. 1657)
Clarity: Keep it simple – short words, short sentences

Using phosphorescence imaging as a form of biological oximetry, we confirmed the oxygen poor environment of the gut lumen and demonstrated the existence of a dynamic equilibrium with an established gradient whereby the mammalian gut releases oxygen into the gut lumen.

We used phosphorescence imaging to characterize oxygen gradients in the gut lumen and found higher levels near the gut wall.
“Moreover, we show that sharks are larger than otters. Thus, sharks should be considered in ocean management plans. Finally, sharks are also faster swimmers than otters.”

“We show that sharks are larger than otters and should be considered in ocean management plans. Sharks also swim faster than otters.”

“In a recent study in 2015, Smith et al. showed that giraffes are larger than squirrels.”

“Giraffes are larger than squirrels (Smith et. al., 2015)”
Clarity: Turn nouns into verbs

“During DNA damage, recognition of Protein 1 by Protein 2 results in recruitment of Protein 3 and repression of cell proliferation genes.”

“During DNA damage Protein 1 recruits Protein 2 and Protein 3, which together repress cell proliferation genes.”
NASA continues to work on the International Space Station astronaut living-quarters module development project.

NASA is still developing the module that will provide living quarters for the astronauts aboard the International Space Station.
Cocoa, from which chocolate is made, *contains flavonoids*. The *flavonoids* present in cocoa have been shown to relax blood vessels and lower blood pressure. When *blood pressure is lowered*, there is a reduced risk of health problems such as stroke and coronary heart disease.
Clarity: Break up text with headings, bullets, and figures

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Final tips

• Start early
• Consider your audience
• Engage the reviewer on the first page
• Revise, revise, revise
Thank you!

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