



## Annual Reporting for Faculty Supported Research Centres and Networks

All Centres (provisional Centres; McGill Centres), Research groups and Networks that receive funding from the Faculty of Medicine are required to provide two components of reporting:

1. an Annual Report of Activities and Outcomes (see below),
2. a Financial Statement (see attached Excel document).

The reporting period is May 1, 2018 – April 30, 2019.

**Both documents are due May 27<sup>th</sup>, 2019 at 5pm**

**Continued support from the Faculty is contingent on:**

1. the receipt of the reporting documents on time,
2. the evaluation of reported activities by the Faculty's Committee for Oversight of Research Units (CORU), and
3. the availability of Faculty funds in the next fiscal year.

Please send both documents to Faculty of Medicine's Research Office ([riac.med@mcgill.ca](mailto:riac.med@mcgill.ca)).

Your strong engagement in the Faculty's mission for continued research excellence and financial stewardship is truly appreciated.

## Annual Report of Activities and Outcomes

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**Please respect the page limits, where indicated, or the report will be returned.**

*(The accepted font is Times New Roman or Calibri regular 11 pts)*

1. Name of the Unit: **McGill University Centre for Structural Biology (CSB)**

2. Director's contact information:

**Director: Dr. Martin Schmeing**

[martin.schmeing@mcgill.ca](mailto:martin.schmeing@mcgill.ca)

Phone: 514-398-2331

**Associate Director: Dr. Alba Guarné**

[alba.guarne@mcgill.ca](mailto:alba.guarne@mcgill.ca)

Phone: 514-398-3265

**Coordinator: Dr. Annick Guyot**

[csb.med@mcgill.ca](mailto:csb.med@mcgill.ca)

514-398-2293

3. If the Unit is a **Senate-approved** McGill Research Centre, indicate date of approval: **May 14, 2014**

4. Number of Unit members: **36 regular members and 3 associate members**

5. Number of members affiliated with McGill's Faculty of Medicine: **18 regular members**

6. **Unit's website:**

URL: <http://csbmcgill.ca>

**Note: The website needs to feature the following:**

- all sources of funding support (including the Faculty of Medicine's logo),
- the List of Members and their institutional affiliation with appropriate links, reference 65 in the initial submission, now reference
- the activities supported by the Unit
- all previous Annual Reports.

7. Summary of past year's **goals and objectives** of the Unit. (**limit: ½ page**)

-Mission and big picture goal:

The mission of the Centre for Structural Biology (CSB) is to promote the expertise of McGill University researchers in structural biology for research in:

- (i) Molecular basis of disease & treatments
- (ii) Leveraging biophysical, chemical & synthetic biology for health.

Three objectives guide the activity of the centre:

1. To support outstanding research programs in structural biology in the areas of conformational diseases, infectious diseases, and synthetic biology.
2. To prepare the new generation of scientists by supporting training programs in structural biology and related areas.
3. To collaborate with clinicians and other scientists to promote the translation of basic science results into new drugs and therapies for diseases and other real-world applications.

### -Specific goals

- Increase membership in CSB to capitalize on synergy between structural biology, biophysics and other biomedical disciplines
- Accomplish a smooth transfer in leadership team and institute new governance structure
- Establish a student council, the Centre for Structural Biology Student Consortium
- Institute a new student-run seminar series as a tool for training and to increase interaction and cross-pollination of ideas between Centre members
- Facilitate the operation of biophysical and structural biology equipment
- Identify and apply to external opportunities for funding of new biophysical equipment, new training programs and infrastructure support

### -Challenges

- Many critical pieces of equipment are no longer under warranty or covered by IOF funding
- There are few opportunities for funds for salaries of important support staff

## 8. **Major achievements** enabled by the support obtained from the Faculty. **(limit: 1 page)**

- New leadership and governance structure (instituted mid-way through reporting period)
- Leadership committees: Executive Committee (Schmeing, Guarné, heads of each other committee, head admin Guyot); Infrastructure Committee (Nagar – Chair, Schmeing, Guarné, Gehring, Berghuis, Trempe); Awards and Training Committee (co-chaired by Trempe and Thibodeaux); Symposium Committee (Guarné, Ortega, Guyot); Student Consortium Executive Committee (Fortinez – President; Krishnan - VP)
- Organization of CSB scientists and clinician collaborators: CBS members now organized into Theme 1. Molecular basis of disease & treatments (Gehring, Theme Leader), Theme 2. Leveraging biophysical, chemical & synthetic biology for health (Dahma, Theme Leader). The CSB has now formalized our clinician collaborators into the CSB Body of Affiliated Clinicians (Dr. Michael Sebag, Body Leader)
- CSB Annual general meeting held on Feb. 7, 2019, 3:00pm-5:00pm, McIntyre Room 703. Attended by CSB director, co-director, coordinator and 14 regular members. See Agenda in **Appendix 1A**
- Executive committee, infrastructure committee meetings, held twice each
- Faculty recruitment
- Associate Prof. Maureen McKeague: joint recruitment of Pharmacology & Therapeutics and Chemistry
- Full Prof. Nathan Luedtke (recruited to start in August. 2019): Chemistry
- CSB seminar series: The CSB instituted a twice-monthly seminar series, starting Sept 2018. Organized by the CSB Student consortium, each session either had two talks by CSB trainees, or one talk by a top regional structural biologist. The presentations and the informal refreshment time before the talks have led to several new collaborations. ~50 attendees per session. See schedule in **Appendix 1B**. External Speakers: Steve Smith, Queens University, Nov. 9, 2018; Elitza Tocheva, UDM / UBC, Dec. 7, 2018; Jean-François Couture, U Ottawa, Feb. 22, 2019; Sylvie Doublé, University of Vermont, March 22, 2019
- Use of shared resources and facilities: Optimizing booking and billing of use of Centre biophysical equipment by (non-trivial) institution of the Faculty of Medicine – Core Services online calendar booking tool
- Application for Centre funding from new FRQS Centre program (Single biggest initiative in reporting year)
- After cancelling the Groups and Centres programs several years ago, the FRQS launched a new Centre program in 2019, with a schedule in 4 stages: Notice (non-competitive, Sept 2018); LOI (competitive, Nov 2018); Full application (competitive, Apr 2019); Site visit (competitive, May 2019); Decision: July 2019. With strong support of the Faculty of Medicine (including pledging the full \$50K FOM Centre funding if grant is awarded), the CSB were the only McGill Centre to be invited to submit a full application, and we hosted a very well-received site visit. The **FRQS Centre** award is **\$2M** over 4 years, and there are 4 grants to be won by the 6 Centres who hosted site visits. The \$500K/year would allow extensive proposed activities in support of skilled technical personnel, new multidisciplinary collaboration and dynamic multi-pronged training. (**Appendix 1C**).
- Group infrastructure and training funding applications
- CFI10 for cryo-EM**: Ortega (PI), Bui, Vargas, Strauss, Guarne, Sonenberg, Schmeing, Gehring, Berghuis, Bechstedt **\$6.4 M**. Submitted to VPRI with high priority ranking from the FOM.
- CFI10 JELF for Mass Spec**: Lukacs (PI), Trempe, Gehring **\$1.8 M**

-**NSERC CREATE in cryo-EM**, A. Guarné (PI), Ortega, Bui, Vargas, Schmeing. **\$1.65M** LOI supported by McGill and submitted to NSERC.

-**Collaborations with other units**: Obtained commitments to collaborate/coordinate/co-host events with (McGill Groups:) GCRC, MI4, QLS, (non-McGill groups:) IRCM, RQRM, RRSV, IRIC, PROTEO.

-**Outreach activities**: **Experience CSB**: 16 CEGEP students in 2-day visits (Mar 4-8, 2109) to CSB labs; **Research Awareness Day**: Schmeing, Nagar, Berghuis, Guarné (Nov 17, 2018); **10<sup>th</sup> Anniversary of Life Sciences Complex**: Thomas, Guarné presented (Dec 5, 2018) **Appendix 1D**; **CSB Student Consortium 1-day CEGEP hosting** (30 students, Mar 15, 2019). **Mentorship in Win4Science**: Guarné, McKeague (longitudinal, joint with Pharmacology)

-**Collaborations**: 13 publications co-authored by at least 2 Unit PIs: see **Appendix 1E**

-**Communications**: @csbmcmcgill (twitter), <http://csbmcmcgill.ca>, [www.mcgill.ca/lifesciencescomplex/facilities/nmr](http://www.mcgill.ca/lifesciencescomplex/facilities/nmr)

9. **New Members** who joined the Unit in the past year and their **institutional affiliation(s)**.

<b>Name Last, First</b>	<b>Title</b> PI, Staff or Trainee [Graduate student (GS) or post-doctoral fellow (PDF)]	<b>Type of Membership</b> Full, Associate	<b>Affiliation(s)</b>
<b>Auclair, Karine</b>	<b>PI</b>	<b>Full</b>	<b>Science, Chemistry</b>
<b>Bechstedt, Susanne</b>	<b>PI</b>	<b>Full</b>	<b>Medicine, Anatomy &amp; Cell Biology</b>
<b>Hendricks, Adam</b>	<b>PI</b>	<b>Full</b>	<b>Engineering</b>
<b>Luedtke, Nathan</b>	<b>PI</b>	<b>Full</b>	<b>Science, Chemistry</b>
<b>McKeague, Maureen</b>	<b>PI</b>	<b>Full</b>	<b>Science, Chemistry</b>
<b>Pelletier, Jerry</b>	<b>PI</b>	<b>Full</b>	<b>Medicine, Biochemistry</b>
<b>Reyes-Lamothe, Rodrigo</b>	<b>PI</b>	<b>Full</b>	<b>Science, Biology</b>
<b>Salavati, Reza</b>	<b>PI</b>	<b>Full</b>	<b>Parasitology</b>
<b>Strauss, Michael</b>	<b>PI</b>	<b>Full</b>	<b>Medicine, Anatomy &amp; Cell Biology</b>
<b>Thibodeaux, Chris</b>	<b>PI</b>	<b>Full</b>	<b>Science, Chemistry</b>
<b>Vargas, Javier</b>	<b>PI</b>	<b>Full</b>	<b>Medicine, Anatomy &amp; Cell Biology</b>

10. Members who have **left the Unit** over the reported year.

<b>Name Last, First</b>	<b>Title</b> PI, Staff or Trainee [Graduate student (GS) or post-doctoral fellow (PDF)]	<b>Type of Membership</b> Full, Associate	<b>Affiliation(s)</b>
<b>Hallett, Michael</b>	<b>PI</b>	<b>Associate</b>	<b>Computer Science</b>
<b>Rouiller, Isabelle</b>	<b>PI</b>	<b>Full</b>	<b>Medicine, Anatomy &amp; Cell Biology</b>
<b>Silvius, John</b>	<b>PI</b>	<b>Full</b>	<b>Medicine, Biochemistry</b>

**11. State how the current and forecasted activities of your Unit align with the Education or Research mission (Strategic Research Plan) of the Faculty of Medicine and/or other Faculties at McGill (limit: ½ page):**

The CSB and its forecast activities are in complete accordance with priority areas at McGill and in Quebec, ensuring ongoing support and momentum. The FRQS-CRBS furthers the Stratégie québécoise de la recherche et de l'innovation goals to Develop talents, skills & competencies and Increase research capacity & support innovation in all its forms. Three of McGill's Areas of Research Excellence are central to the mission of the CSB: **1. Capitalize on the convergence of life sciences, natural sciences & engineering:** Structural biology / biophysics is at the very cusp of this convergence. FRQS-CRBS members effectively use it to answer outstanding questions in the key area of Cellular and Molecular Mechanisms – from visualizing the protein networks that shape the cell, to observing the fine mechanistic details of nature's most important enzymes. **2. Support health research:** CSB research is primarily focused on obtaining a better understanding of the role of proteins and protein complexes in the body. Defining the health state /disease state relationship dictated by protein (complexes) is the fundamental basis of the key area of Personalized Medicine. The insights gained from the fundamental science research are helping in the development of new medications, materials, and diagnostic procedures for the key areas of Infection, Immunity, & Inflammation and Aging & Chronic Conditions and Diseases. The health applications that CSB researchers focus on range from bacterial and parasitic infections, to normal and abnormal cellular structures, to the action and dysfunction of the biological processes required for all healthy life. **3. Unlock the potential of the human brain & the entire nervous system.** When vital proteins in the body are misfolded, the result can be a debilitating neurodegenerative disease such as Alzheimer's or Parkinson's. While there are no cures for these conditions at present, biophysical analysis of protein folding will lead to new strategies for treatment and prevention of the key area of Neurological Disease.

Furthermore, the activities of the CSB include bringing research funds and cutting-edge equipment to McGill, and providing the best possible multidisciplinary training to McGill students.

**12. Explain why support from the Faculty of Medicine continues to be crucial to the operations of the Unit (limit: ½ page):**

The CSB has assembled a fantastic hub of biophysics and structural biology. This world-class body of expertise and cutting-edge scientific infrastructure has been assembled by long-term focused recruitment by McGill and FOM, and sustained CFI and NSERC-RTI investments, totaling well over \$40M. CSB members have been consistently successful securing operating grants, being awarded >\$11M per year from CIHR, FRQS, NSERC, FRQNT and others. However, the Centre requires operational funding to be CRBS to better facilitate the existing synergistic expertise of our members, and to enable a suite of exciting opportunities to drive the next generation of breakthroughs in biomedicine and health science and excel at training McGill's students. We hope that the FRQS funding (\$500K per year for 4 years, renewable) will lead to a quantum leap in CSB activities, but with (and especially without it), FOM funding is crucial for all CSB activities. We have provided two budgets, one for the case where we are awarded the FRQS Centre funding and one without (**Appendix 2**).

As shown in these budgets, the principle expenditures for the CSB will be for infrastructure support (1) Support of excellent equipment and infrastructure, (2) Facilitating impactful structural biology & biophysics for all thought collaborations and support, (3) Training the next generation of leaders in biomedical science. The funding requested is absolutely necessary for the CSB and its members to achieve their ultimate potential excellence, and it is completely distinct from other possible funding sources. Furthermore, there are no other institutional funds available to provide highly skilled support personnel, or to keep our state-of-the-art scientific equipment operational and accessible to the health science community. Specific initiatives that rely on FOM funding include the Annual CSB Symposium, intensive bootcamp training programs for students, community outreach and networking evenings, and essential equipment upgrades and maintenance. Naturally, CSB and its members will continue to win additional grants and apply for program funding, but the FOM funding is unique and required.

**13. List action items that the Unit has taken or will consider taking in the next year towards growth and sustainability of its operations (limit: ½ page)**

- FRQS Centre Application: \$500K/year for 4 years, renewable – application pending
- CFIs applied for CFI10 for cryo-EM, CFI10 JELF for Mass Spec – application pending
- NSERC CREATE in cryo-EM– application pending
- Quebec-Catalonia Network – application pending
- Maintaining CSB equipment platforms remains a high priority. With the implementation of the FOM Core Facilities booking calendar, we are now in position for facile systematic collection of fees for use of CSB equipment
- Increasing industrial use of CSB equipment. The Montreal biotech sector is recovering and demand for biophysical equipment is increasing. For example CSB has new pay-per-use users in MRM Proteomics this year
- Partnering with companies for contracts
- Partnering with GCRC, MI4, QLS, IRCM, RQRM, RRSV, IRIC, PROTEO, CDQM in synergetic initiatives for greater reach and growth

**14. Provide suggestions about how the Faculty could do better to support the Unit and research efforts in general (e.g., centralized data repositories, institutional data management plans, support for software developments, guidance for adopting open-science practices, simplification of administrative procedures, etc)**

The CSB is very grateful for the support of the FOM during the application process to the FRQS Centre application.

Any simplification of administration procedures is always welcome.

In the attached (Excel) **Year-End Financial Report** please detail:

1. Expenditures of funding provided by the Faculty of Medicine and other sources, towards meeting the objectives of the Unit,
2. Any in-kind contributions provided to the Unit by other partners and sponsors,
3. Projected budget for the coming year (including request to the Faculty of Medicine).

The financial support of the Faculty of Medicine is more important than ever. We are very appreciative that we have been assured of \$50K funding from FOM if the CSB is awarded the FRQS Centre grant. If we do not win the grant, we are requesting \$45K in support from the Faculty of Medicine. We have made exciting plans in collaborative and multidisciplinary research, support and training with FRQS funding, but with just the FOM support, we could still build an excellent framework for these activities, and perform exciting research and training. The director stipend and administrative support are essential for seeding new applications for external funding and supporting the equipment platforms. Faculty of Medicine support for the CSB will remain highly leveraged through future CFI and pending NSERC training applications and FRQS new Centre application.

**Appendix:**

Appendix 1A: CSB Annual general meeting agenda

Appendix 1B: CSB seminar series schedule

Appendix 1C: Application to FRQS-Centre program

Appendix 1D: 10<sup>th</sup> anniversary of Life Sciences Complex program

Appendix 1E: list of publications co-authored by at least 2 Unit PIs

Appendix 2: Financial reports

## Appendix 1A

### CSB Meeting Agenda – Feb 7, 2019

1. CSB governance:
  - Kalle Gehring stepped down as director of CSB
  - Martin Schmeing now Director, Alba Guarne associate Director
  - Establishment of Equipment Committee, chaired by Bhushan Nagar
  - Establishment of CSB Student Consortium, led by Camille Fortinez and Shreya Krishnan
2. CSB budget:
  - Challenges: GRASP ended; Bionano ended; Equipment coming off warrantee
  - Only source of current funding is Faculty of Medicine, year-to-year, \$35K
3. CSB operations:
  - Transition of bookings and recording of use of all major communal equipment to the Faculty of Medicine - Core Services online booking tool
    - Users will be asked register soon
    - Currently at 100% discount (FRQS Centre Grant would ensure this)
  - External users not at 100% discount – Multilevel pricing structure industry – non-McGill, McGill, CSB
4. 1<sup>st</sup> annual CSB symposium:
  - Alba & Joaquin co-organizers 2019, Annick invaluable
  - Heir of GRASP Symposium; open to wider community
  - Held in New Residence Hall
  - Monday June 17, 2019
  - 2 international speakers (Lorena Beese, Duke University and Dmitry Lyumkis, Salk Institute), oral presentations from graduate students and postdocs.
  - Registration to open fairly soon
5. CSB Friday Pizza Talks:
  - Led by student consortium
  - Twice per month
  - Usually 2 CSB trainees, but 4 driving-distance profs
6. CSB Outreach:
  - a. Pre-university students visiting days
    - Led by Alba
    - Two-day shadowing of pairs of students in CSB labs during March break
    - Students from John Abbott College, Alexander von Humboldt, perhaps Kahnawake Survival School
  - b. Indigenous Awareness Weeks
    - May be able to mobilize CSB resources to support McGill initiative
  - c. Social media presence (Twitter account; web site updating)
7. Grants related to the CSB
  - Joaquin (FEMR) leading a CFI10 application for Glacios cryo-EM
  - MS CFI10 – JF Trempe, co-PI
  - Others at McGill have relevant equipment
  - NSERC CREATE in EM (Alba)
8. Members
  - New members
  - Adjunct / associate members
9. FRQS Centre Grant
  - 3 stages, Notice (non-competitive), LOI (competitive), application (competitive)
  - Will need member input & cooperation to write this grant
10. Close



## Center for Structural Biology – Seminar Series

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**2<sup>nd</sup> and 4<sup>th</sup> Friday of every month.**

**Rm 501 (Karp), Goodman Cancer Research Center.**

**12:15pm – 1:00pm**

**Please join us for Pizza in front of Karp at 12:00pm.**

**No food or drinks are allowed inside the lecture room.**

Date	Speaker	Lab/University
<b>14-Sep-18</b>	Seby Chen	Kalle Gehring, Dr.
	Sami Chaaban	Gary Brouhard, Dr.
<b>28-Sep-18</b>	Diego Alonzo	Martin Schmeing, Dr.
	Mohamed Ghadie	Brandon Xia, Dr.
<b>12-Oct-18</b>	Zixian Li	Bhushan Nagar, Dr.
	Yuting Feng	Youla Tsantrizos, Dr.
<b>26-Oct-18</b>	Jonathan Labriola	Bhushan Nagar, Dr.
	Jaeok Park	Albert Berghuis, Dr. Youla Tsantrizos, Dr.
<b>9-Nov-18</b>	Steve Smith, Dr.	Queens University
<b>23-Nov-18</b>	Yao Shen	Alba Guarné, Dr.
	Pouria Tirgar	Allen Ehrlicher, Dr.
<b>7-Dec-18</b>	Elitza Tocheva, Dr.	Université de Montréal/ UBC





# Center for Structural Biology – Seminar Series

**2<sup>nd</sup> and 4<sup>th</sup> Friday of every month.**

**Rm 501 (Karp), Goodman Cancer Research Center.**

**12.45pm – 1.30pm**

**Please join us for Pizza in front of Karp at 12.30pm.**

**No food or drinks are allowed inside the lecture room.**

Date	Speaker	Lab/University
<b>11-Jan-19</b>	Camille Fortinez	Martin Schmeing, Dr.
	Linda Balabanian	Adam Hendricks, Dr.
<b>25-Jan-19</b>	George Sung	Kalle Gehring, Dr.
<b>08-Feb-19</b>	Claire Edrington	Gary Brouhard , Dr.
	Shafqat Rasool	Jean-François Trempe, Dr.
<b>22-Feb-19</b>	Jean-François Couture, Dr.	University of Ottawa
<b>08-Mar-19</b>	Sam Lee	Jason Young, Dr.
	Shun Kai Yang	Khanh Huy Bui, Dr.
<b>22-Mar-19</b>	Sylvie Doublé, Dr.	University of Vermont
<b>12-Apr-19</b>	Josue Gomez	Javier Vargas Balbuena, Dr.
	Nitin Kapadia	Rodrigo Reyes-Lamothe, Dr.
<b>26-Apr-19</b>	Vaibhav Mehta	Reza Salavati, Dr.
	Thomas McAlear	Susanne Bechstedt, Dr.
<b>10-May-19</b>	Amal Seffouh	Joaquin Ortega, Dr.
	Kevin Uggowitzer	Christopher Thibodeaux, Dr.
<b>24-May-19</b>	Yun Wang	Anthony Mittermaier, Dr.
	Adeola Shobo	Gerhard Multhaup, Dr.