



**McGill**

Faculty of  
Medicine and  
Health Sciences

Faculté de  
médecine et des  
sciences de la santé

## 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 and Health Sciences (FMHS) 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, 2020 – April 30, 2021.

**Deadline: Monday, May 3<sup>rd</sup>, 2021**

Please send both documents to the Research Office, Faculty of Medicine and Health Sciences  
([riac.med@mcgill.ca](mailto:riac.med@mcgill.ca))

**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),
3. the availability of Faculty funds.

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),**  
*which also operates as FRQS-funded Centre de Recherche en Biologie Structurale (CRBS)*

2. Director's contact information:

**Director: Dr. Martin Schmeing**

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

Phone: 514-398-2331

**Coordinator: Dr. Annick Guyot**

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

514-398-2293

Associate Director: **Dr. Natalie Zeytuni**

[natalie.zeytuni@mcgill.ca](mailto:natalie.zeytuni@mcgill.ca)

Phone: 514-398-6348

Associate Director: **Dr. Chris Thibodeaux**

[christopher.thibodeaux@mcgill.ca](mailto:christopher.thibodeaux@mcgill.ca)

Phone: 514-398-3637

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

**May 14<sup>th</sup>, 2014 (for CSB)**

4. Mission Statement of the Unit:

The mission of the CRBS is to exploit the power of structural biology and biophysics to produce the next wave of scientific breakthroughs in (i) determining the molecular basis of disease and treatments, and (ii) leveraging biophysical, chemical and synthetic biology for health. At the same time, the CRBS will train a new generation of structural biologists and biophysicists with outstanding expertise in using cross-disciplinary approaches for biomedical research to make structural biology and its many strengths accessible to the broader biomedical research and health community. The long-term objective of the CRBS is to create a premier centre of research in biophysics & structural biology for health that is truly world-class in accomplishments and reputation.

5. Number of Unit members: **41 regular members**

6. Number of members affiliated with McGill's FMHS: **24 regular members**

7. **Unit's website:**

URL: <http://crbsmcgill.ca>

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

- all sources of funding support (including the FMHS logo)
- the List of Members and their institutional affiliation with appropriate links,
- the activities supported by the Unit
- all previous Annual Reports.

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

-Specific goals:

- Facilitate interactions between our members
- Continue the student-run seminar series
- Hold an annual symposium
- Hold a scholarship competition
- Hold an infrastructure competition (direct and RTI)
- Hold a Blue Sky Seed funding competition
- Increase outreach initiatives
- Oversee the operation of biophysical and structural biology equipment

-Challenges: some activities have been disrupted due to the COVID-19:

- Travel awards: since conferences have been either canceled or held virtually

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

- CRBS Executive Committee Meetings: 3 meetings were held during the reporting period: on Aug. 14, 2020 (1:00pm-3:00pm, via Zoom), on Dec. 11, 2020 (3:00pm-5:00pm, via Zoom), on April 8, 2021 (3:00pm-5:00pm, via Zoom). See Agendas in **Appendix 1A**.
- Centre faculty member recruitment: Jackie Vogel: Department of Biology, 1 May 2020 ; Maria Vera Ugalde: Department of Biochemistry, 1 May 2020 ; Lisa Münter: Department of Pharmacology and Therapeutics, 1 January 2021 ; Natalie Reznikov: Department of Bioengineering, 1 January 2021
- 2<sup>nd</sup> CRBS annual symposium: held on November 9, 2020 via Zoom and Fourwaves. International Guest speakers: Eva Nogales, Chris Lima, John Rubinstein. Local speakers: Maria Musgaard, Natalie Zeytuni. ~100 attendees. See program in **Appendix 1B**.
- CRBS seminar series: flagship event of the CRBS student council and features research ~30 minutes presentations from trainees in CRBS labs. Held virtually 2/month from Sept-Apr, with 2 trainees presenting at each session. Talks are being judged by faculty members and cash prizes are presented to the best presenters at the annual symposium. ~50 attendees per session. See schedule in **Appendix 1C**.
- CRBS methods seminar series: a new series launched by the student council to run in parallel with the seminar series. To introduce the CRBS audience to the wide variety of techniques and methods that are employed by different research groups at the CRBS and make them more accessible to everyone. Also to foster scientific collaboration within the CRBS by teaching the audience about the infrastructure and the expertise available at the center Held virtually 1/month with a 60-minute presentation by a trainee or staff member with expertise in a particular technique, covering basic theory and application of the technique and also showing how the technique has been employed at the CRBS in the past to answer important research questions. ~30 attendees per session. See schedule in **Appendix 1D**.
- CRBS students social events: Since October 2020, the CRBS student council has been organizing monthly online games nights over Zoom to provide a social and fun avenue for trainees and faculty members to interact with each other. Featured popular games such as 'Among Us', 'Codenames' and 'Resistance'. ~10 attendees per session. See schedule in **Appendix 1E**.
- EMQ&A: open session where CRBS members have the opportunity to ask Dr. Mike Strauss about the fundamentals and latest developments in EM. Inaugural session (general topics) held via Zoom on Nov. 24, 2020
- CRBS Studentship award competition 2020-2021: held in the Spring, awards for the period Sept. 1, 2020 – Aug. 31, 2021. 30 applications received, 15 awards given, \$10,000 each, for 1 year (6 M.Sc. students including 1 co-supervised, 9 Ph.D. students including 1 co-supervised)

- DFW 2020: 3 awarded through GPS
- Blue Sky Funding competition: held in January 2021: 7 applications received, 5 funded for a total of \$180,000 including \$20,000 contribution from GCRC
- Infrastructure competition: 3 applications received, 1 awarded for a total of \$42,109.31
- RTI competition: 2 applications received, 1 funded for a total of \$19,200.00
- Hiring of a Research center Officer: Kim Munro was hired in the Fall 2020 to manage the shared resources and facilities
- Collaborations with other units: coordinate and co-hosts a virtual information seminar with QLS (Jan. 5, 2021) ~15-20 attendees
- Outreach activities: 2 CRBS Bench-to-Bedside events were held via Zoom during the reporting period: June 16, 2020: From bench to patients: how structural biology transforms medicine, 70 attendees ; April 22, 2021: Ion channels and personalized medicine, 58 attendees. See program in **Appendix 1F**.
- Summer Bootcamps: 3 bootcamps were held via Zoom in the Summer 2020: June 30, 2020: Exploring protein structures and interaction using PyMol (~90 attendees).; July 21, 2020: Probing Protein Dynamic Structure with Hydrogen-Deuterium Exchange Mass Spectrometry (HDX-MS) (~60 attendees); August 11, 2020: Learning to do Map Segmentations and Make Movies in Chimera and Chimera X (~40 attendees). See program in **Appendix 1G**
- Covid 19 project: The expertise of a large team of CRBS scientists, led by CRBS director Martin Schmeing, was involved in developing reagents and test kits for RNA extraction and RT-PCR for the specific detection of SARS-CoV-2 in clinical samples. See **Appendix 1H** for several links to press releases.
- Collaborations: 13 publications co-authored by at least 2 CRBS PIs: see **Appendix 1I**
- Students publications: 9 publications from students funded by CRBS: see **Appendix 1J**
- Communications: @crbsmcgill (twitter) ; <http://crbsmcgill.ca>  
[www.mcgill.ca/lifesciencescomplex/facilities/nmr](http://www.mcgill.ca/lifesciencescomplex/facilities/nmr) ;  
[https://www.facebook.com/csbscmcgill/?ref=py\\_c&\\_xts](https://www.facebook.com/csbscmcgill/?ref=py_c&_xts)

10. **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>Ugalde, Maria Vera</b>	<b>PI</b>	<b>Full</b>	<b>FMHS, Biochemistry</b>
<b>Vogel, Jackie</b>	<b>PI</b>	<b>Full</b>	<b>Fac Science, Biology</b>
<b>Münter, Lisa</b>	<b>PI</b>	<b>Full</b>	<b>FMHS, Pharmacology</b>
<b>Reznikov, Natalie</b>	<b>PI</b>	<b>Full</b>	<b>Fac Engineering, Bioengineering</b>

11. 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>Leslie, Sabrina</b>	<b>PI</b>	<b>Full</b>	<b>Fac Science, Physics</b>

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

- The CRBS supports numerous research activities that are central to the Faculty's mission of health science research and provide multidisciplinary training to McGill students.
- The CRBS held its 2<sup>nd</sup> Annual Symposium virtually on Monday, November 9, 2020 with ~100 attendees and 3 internationally renowned speakers. The CRBS also supports a student-run seminar series and several outreach activities (bench to bedside, bootcamps)
- The CRBS has one student stipend program that support the recruitment and retention of high-quality students at McGill.
- The CRBS has several initiatives to support research projects from CRBS members and infrastructure funding
- The CRBS also manages –or contributes to the management of– several equipment platforms in the Bellini, Strathcona (FEMR), McIntyre (Mass Spec) and Otto Maas (QANUC) buildings. These platforms have contributed to the success of faculty members and the large number of high impact publications from CRBS.

13. Explain why support from the FMHS continues to be crucial to the operations of the Unit (limit: ½ page):

- The FMHS support allowed us to leverage funding from FRQS (\$500K per year for 5 years, renewable) which leads to numerous CRBS activities but FMHS funding is still crucial for all CRBS activities.
- The letters of support and funding from McGill, with FMHS the biggest supporting body, were mentioned specifically in the review process and were clearly vital for securing this funding. FMHS generously pledged to continue to fund at the \$50K level for the duration of the awarded FRQS Centre Grant.
- Specific initiatives that rely on FMHS funding include the Annual CRBS Symposium, intensive bootcamp training programs for students, community outreach and networking events, and essential equipment upgrades and maintenance.
- CRBS and its members will continue to win additional grants and apply for program funding and the FMHS funding is required to support additional activities that make us competitive when applying for other sources of funding.
- CRBS holds competitive opportunities for fellowships, seed funding and infrastructure. We are always unbiased and equal-opportunity for all our members, but as our mandate is structural biology and biophysics for health, FMHS members have been recipients of the majority of this funding.
- We have hired a full time Research Center officer, Kim Munro, who manages CRBS equipment and facilitates biophysical experiments for CRBS members, FMHS scientist and McGill colleagues. We require full funding from FRQS and FMHS to support this.
- Please note that there are exceptionally funds remaining in our Faculty of Medicine Fund at the end of 2020/21 which we rolled over to 2021/22. This is in large part because some of our activities (Bootcamp, CRBS symposium, CRBS seminar series) were held virtually this year at reduced costs, and others (biophysics for all mini-grants for use of infrastructure and consumables) were impractical with the density restrictions at McGill. These roll-over funds will be spent in 2021/22 for compensatory activities fundamental to the CRBS.
- The full funding of \$50K as pledged  
.by FMHS at the time of FRQS grant application is required to continue our operations and research facilitation.

14. 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)

- Maintaining CRBS equipment platforms
- Adding cutting-edge infrastructure as it is developed
- Increasing industrial use of CRBS equipment

- Partnering with companies for contracts
- Partnering with GCRC, MI4, QLS, IRCM, RQRM, RRSV, IRIC, PROTEO, CDQM, APPRENTICE in synergetic initiatives for greater reach and growth

15. 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.) **(no page limit but please be specific and unleash your creativity!)**

The CRBS is very grateful for the support of the FMHS.

Any simplification of administration procedures is always welcome.

One of our main goals is to strengthen ties with the medical community. Support to coordinate efforts with other units/groups (both for students and PIs) within the Faculty would be welcome.

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

1. Expenditures of funding provided by the FMHS 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 FMHS).

Agenda: FRQS-CRBS Executive Committee Meeting #4  
August 14, 2020; 1:00pm – 3:00pm - Zoom meeting

1. Attendance; name & position
2. Approval of agenda
3. Approval of minutes of previous meeting of April. 27, 2020
4. Update from the Director
  - a. Retreat week – Bellairs: March 28, 2021 – April 4, 2021
  - b. Registre des Centres (form to be filled by members with % in research)
  - c. Budget: VPRIR contribution extended to match FRQS
  - d. Recruitment of a Facility manager
  - e. Associate Director
  - f. Max Eivaskhani Memorial Fellowship
  - g. Scientific Advisory Board
5. Update from Training Committee and discussion of relevant upcoming initiatives
  - a. Studentships competition 2020-21 – summary
  - b. DFW – to be discussed at the end of the meeting
  - c. Bootcamps: summary (June 30, July 21, August 11)
  - d. FRQS trainee prize 2019-2020 (awarded, email sent) and 2020-2021
6. Update from Outreach Committee and discussion of relevant initiatives
  - a. Social media: new website up and running; twitter
  - e. Bench to bedside initiatives: June 16, 2020 – summary and plan for next
7. Update from Symposium Committee
  - a. Organization of CRBS symposium 2020 (Monday, Nov. 9): go online. All speakers OK. Which platform? Sponsors?
8. Update from Infrastructure Committee and discussion of relevant upcoming initiatives
  - a. RTI competition
9. Update from the Blue Sky Committee
  - a. same (Jan 31 as in 2020) or different deadline (Dec 1 as in proposal)?
  - b. amount of award and success rate (100% at last competition)?
10. Update from the Student Consortium
  - a. Seminar series to resume in the Fall via Zoom?
  - b. Other proposed activities
  - c. 4 new students interested to join the student consortium
11. New Members
  - a. 1 member left: Javier Vargas

**Agenda: FRQS-CRBS Executive Committee Meeting #4**  
**August 14, 2020; 1:00pm – 3:00pm - Zoom meeting**

12. Other business

13. Adjournment

Agenda: FRQS-CRBS Executive Committee Meeting #5  
December 11, 2020; 3:00pm-5:00pm - Zoom meeting

1. Attendance; name & position
2. Approval of agenda
3. Approval of minutes of previous meeting of August 14, 2020
4. Update from the Director – M. Schmeing
  - a. Retreat week – Bellairs: March 28, 2021 – April 4, 2021
  - b. Registre des Centres – Forms with % collected and uploaded. Need to collect CCVs
  - c. Recruitment of a Facility manager – Kim Munro
  - d. Max Eivaskhani Memorial Fellowship
  - e. FRQS Centres forum – not discussed
  - f. Scientific Advisory Board – contact external (M. Bouvier, M. Therien, C. Baron, PI at ULaval)
5. Update from Outreach Committee and discussion of relevant initiatives – S. Bechstedt
  - a. Bench to bedside initiatives
6. Update from Symposium Committee – A. Guarné
  - a. Summary of 2020 symposium
  - b. Plan for 2021 symposium
7. Update from Training Committee and discussion of relevant upcoming initiatives – C. Thibodeaux
  - b. DFW – summary
  - c. 3rd year summer rotation program (proposed by Alba)
  - d. Recruitment events with QLS – Jan. 5, 2021
  - e. NSERC CREATE and other group initiatives (Alba)
8. Update from Infrastructure Committee and discussion of relevant upcoming initiatives – B. Nagar
  - a. RTI competition. Summary and supplementing existing funds
  - b. Equipment competition ongoing. Deadline Dec.15
9. Update from the Blue Sky Committee – J. Ortega
  - a. same (Jan 31 as in 2020) or different deadline?
  - b. amount of award and success rate (100% at last competition)?
10. Update from the Student Consortium – S. Rasool
  - a. Seminar series
  - b. Other proposed activities
11. New Members
  - a. 1 member left: Sabrina Leslie
  - b. We need to recruit more people – vote privately to Annick at [csb.med@mcgill.ca](mailto:csb.med@mcgill.ca)
  - c. Proposed by JF: Lisa Munter (Pharmacology)
  - d. Proposed by Natalie: Natalie Reznikov
12. Other business
  - a. HKL licences (Natalie)
13. Adjournment

Agenda: FRQS-CRBS Executive Committee Meeting #6  
April 08, 2021

1. Attendance; name & position
2. Approval of agenda
3. Approval of minutes of previous meeting held on December 11<sup>th</sup>, 2020
4. Update from the Director – M. Schmeing
  - a. plan of action document for EDI - equality, diversity and inclusion. Guidelines to be provided by FRQS in May
  - b. SQRI 2022
  - c. Registre des Centres – Need to collect CCVs but wait for contract to be signed with FRQS
  - d. Scientific Advisory Board - ask the exec for a recommendation for a PDF to sit on the board. First meeting to be held on April 26<sup>th</sup>, 2021
  - e. Annual report for FoM due May 3<sup>rd</sup>, 2021
  - f. budget surplus to fund service contract/repair. All requests approved \$6,000 each
  - g. Bellairs for 2022? Deadline to apply May 31<sup>st</sup> for next season
  - h. Panel discussion with Roberto Chica (CREATE)
5. Update from Outreach Committee and discussion of relevant initiatives – S. Bechstedt
  - a. Bench to bedside initiatives – Ion channels and personalized medicine. April 22<sup>nd</sup>, 2021
6. Update from Symposium Committee – H. Bui
  - a. Plan for 2021 symposium (November 8<sup>th</sup>, 2021): speakers confirmed: Andrew Carter (MRC-LMB, Cambridge, UK), Susan Lea (NCI-CCR, Frederick, USA), Ben Engel (Germany)
7. Update from Training Committee and discussion of relevant upcoming initiatives – C. Thibodeaux
  - a. Upcoming competition. Update forms (include Max fellowship), deadline? Scholarships and DFWs.
  - b. Summary of recruitment events with QLS – Jan. 5, 2021
8. Update from Infrastructure Committee and discussion of relevant upcoming initiatives – B. Nagar
  - a. Equipment competition summary: 3 applications received, 1 funded
9. Update from the Blue Sky Committee – J. Ortega
  - a. summary of competition: 7 applications received, 4 intra CRBS, 2 with GCRC, 1 with external, 5 funded
10. Update from the Student Consortium – S. Rasool
  - a. Seminar series
  - b. Other proposed activities
11. New Members
  - a. Sabrina Leslie officially left to UBC
  - b. 2 new members approved: Lisa Munter and Natalie Reznikov
  - c. Mehran Dastmalchi (CV submitted)
  - d. New members proposed by Kalle: Jérôme Waldispühl, Corinne Hoesli: to be discussed

**Agenda: FRQS-CRBS Executive Committee Meeting #6**  
**April 08, 2021**

12. Other business

a. PyMol license renewed for 3 years

13. Adjournment

Sunday, November 8, 2020

Séance 1 / Session 1 – on Zoom

18h45 Mots d'Ouverture / Opening Words – Martin Schmeing, *McGill University and CRBS Director*

Sous la Présidence de / Session Chair: Martin Schmeing, *McGill University*

19h00-20h00 Eva Nogales, *Howard Hughes Medical Institute, University of California at Berkeley*  
 Structure-function studies of the gene-silencing Polycomb Repressive Complex 2



20h00-20h30 Natalie Zeytuni, *McGill University*  
 Structural insights into the cytotoxic peptides ATP-driven exporter essential to pathogenicity of drug resistant *Staphylococcal aureus* by hybrid approaches.

20h30-21h00 Maria Musgaard, *University of Ottawa*  
 Unravelling the recovery mechanism from the acid-sensing ion channel desensitized state by combining simulations and electrophysiology

Séance 2 / Session 2 – on Fourwaves

21h00-23h00 Poster Mixer (Get to know the Fourwaves platform, no poster judging)

Monday, November 9, 2020

Séance 3 / Session 3 – on Zoom

Sous la Présidence de / Session Chair: Jean-François Trempe, *McGill University*

9h00-10h00 Chris Lima, *Memorial Sloan Kettering Cancer Center*  
 Architecture and activities of a multi-subunit E3 ligase complex



10h00-10h15 Camille Fortinez, *McGill University*  
 Structural and functional investigations of a dimeric NRPS system involved in the production of bacillamide, a thiazole-containing natural product

10h15-10h30: Nuwani Weerasinghe, *McGill University*  
 Exploring the conformational landscape of a lanthipeptide synthetase using native mass spectrometry

10h30-10h45: Dushyant Jahagirdar, *McGill University* – Prix Annuel Excellence du FRQ-S 2019-2020  
 Alternative conformations and motions adopted by 30S ribosomal subunits visualized by cryo-electron microscopy

Pause / Break

Séance 4 / Session 4 – on Fourwaves

11h00-12h30 Poster session

Séance 5 / Session 5 – on Zoom

12h30-12h45 Gabriella Kiss, *Refeyn Inc*  
Mass Photometry – a new tool to study biomolecules



Diner / Lunch

Séance 6 / Session 6 – on Zoom

Sous la Présidence de / Session Chair: Natalie Zeytuni, *McGill University*

13h00-14h00 John Rubinstein, *Hospital for Sick Children Research Institute, University of Toronto*  
CryoEM of macromolecular machines at energized membranes



14h00-14h15 Thomas McAlear, *McGill University*  
The mitotic spindle protein CKAP2 potentially increases microtubule nucleation and growth

14h15-14h30 Jordan Forbes, *Queen's University*  
Deletion and mutation analyses of an ice nucleation protein reveal its underlying similarity to antifreeze proteins

14h30-14h45 Yao Shen, *McGill University*  
The heptameric assembly of TnsC bound to DNA regulates Tn7 transposition

Pause / Break

Séance 7 / Session 7 – on Fourwaves

15h00-16h30 Poster session

Séance 8 / Session 8 – on Zoom

16h30-16h45 Présentation des Prix & Remerciements / Présentation of Awards & Closing Words  
Alba Guarné, *McGill University*

*Meet the exhibitors on Fourwaves on Monday, November 9, 2020:*

*11h00-12h30 and 15h00-16h30*





**Centre de Recherche en Biologie Structurale  
2020-2021 Seminar Series**

2nd and 4th Friday of every month.  
The seminars are held virtually (via ZOOM)  
The meeting link will be provided on the day of presentation.  
12.45pm – 1.30pm

Date	Speaker	Lab
September 25	Yao Shen	Alba Guarné
	Chris Wang	Nicolas Moitessier/Anthony Mittermaier
October 9	Sofia Cruz Tetlalmatzi	Gary Brouhard
	Shafqat Rasool	Jean-François Trempe
October 23	Javier Rodriguez Gonzalez	Alba Guarné
	Micaela Belleperche	Maureen McKeague
November 13	Bruktawit Maru	Maureen McKeague
	Claire Edrington	Gary Brouhard
November 27	Nuwani Weerasinghe	Christopher Thibodeaux
	Ajinka Ghagre	Allen Ehrlicher
December 11	Andrew Bayne	Jean-François Trempe
	Shun Kai Yang	Khanh Huy Bui
January 15	Clayton Molter	Allen Ehrlicher
	Dushyant Jahagirdar	Joaquin Ortega
January 29	Corbin Black	Khanh Huy Bui
	Huan Zheng	Rodrigo Reyes
February 26	Muhammad Ghufraan Rafique	Hanadi Sleiman
	Silvia Armenta Jaime	Rodrigo Reyes
March 12	Amy Sutton	Allen Ehrlicher
March 26	Satinder Kaur	Mike Strauss
	Itai Sharon	Martin Schmeing
April 9	Thomas McAlear	Susanne Bechstedt
	Irem Ulku	Gerhard Multhaup
April 23	Amal Seffouh	Joaquin Ortega
	Suleima Jacob-Tomas	Maria Vera Ugalde

**Centre de Recherche en Biologie Structurale  
2020-2021 Methods Seminar Series**

**3rd Friday of every month.**

**The seminars are held virtually (via ZOOM)**

**The meeting link will be provided on the day of presentation.**

**12.00pm – 1.00pm**

<b>Date</b>	<b>Speaker</b>	<b>Topic</b>
January 21	Marc Hancock	Surface Plasmon Resonance
February 19	Terri Lovell	Single Molecule Fluorescence
March 19	Yao Shen and Dushyant Jahagirdar	Single Particle Cryo-EM – part 1
April 16	Yao Shen and Dushyant Jahagirdar	Single Particle Cryo-EM – part 2

**APPENDIX 1E****Centre de Recherche en Biologie Structurale  
2020-2021 Game nights**

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

**The events are held virtually (via ZOOM)**

**The meeting link will be provided on the day of presentation.**

**6.00pm – 8.00pm**

<b>Date</b>	<b>Game</b>
October 30	Resistance
December 9	Among US
February 12	Among US
March 12	Among US
April 9	Code names



## CRBS Bench-to-bedside workshops

**Inaugural session – June 16<sup>th</sup> 2020, 14:00-16:00**

**From bench to patients: how structural biology transforms medicine**

**Please register and submit your questions/ideas before June 12<sup>th</sup>:**

<https://forms.gle/jw82zqc4Mc2qWzZM6>

Zoom link: <https://mcgill.zoom.us/j/97623754150> (password CRBS2020)

**Chair:** Jean-François Trempe, PhD  
Canada Research Chair in Structural Pharmacology  
Director, Proteomics platform of the RI-MUHC  
Associate Professor, Dept of Pharmacology & Therapeutics  
McGill University



**Guest speaker:** Edward A. Fon, MD, FRCP(C)  
Scientific Director, Montreal Neurological Institute  
Director, FRQS Quebec Parkinson Network  
Canada Research Chair in Parkinson's Disease  
Professor of Neurology and Neurosurgery  
McGill University



### Program:

- |               |   |
|---------------|---|
| 14:00 – 14:20 | Introduction – Dr Jean-François Trempe<br>Title: <i>History of structural biology &amp; biophysics and ties to medicine</i>                             |
| 14:20 – 15:00 | Guest speaker, Dr Edward Fon<br>Title: <i>Insight into Parkin function in biology and disease or why clinicians should care about protein structure</i> |
| 15:00 – 15:35 | Discussion 1<br>Topic: Bridging the gap between clinicians and basic scientists   |
| 15:35 – 15:55 | Discussion 2<br>Topic: Ideas for future bench-to-bedside seminars   |
| 15:55 – 16:00 | Conclusion  |



**CRBS Bench-to-Bedside online workshop**  
**April 22<sup>nd</sup> 2021, 10:00am-noon**  
**Ion channels and personalized medicine.**

Dear colleagues,

The *Centre de Recherche en Biologie Structurale* (CRBS) is proud to announce the second event of the CRBS Bench-to-Bedside workshop series. This initiative seeks to bring awareness of the power of structural biology to the greater biomedical community, as well as to foster collaborations between clinicians and basic scientists.

The event, titled “**Ion channels and personalized medicine**”, will take place online via Zoom on **April 22<sup>nd</sup> 2021 from 10:00 to noon**. First, **Dr. Derek Bowie** (*McGill University, Canada*) will give an introduction of ion channel families and how they give insight into understanding complex diseases. Then **Dr. David Bennett** (*University of Oxford, UK*) will focus on the diagnosis and clinical outcomes of mutations in Nav channels with therapeutic avenues. Finally, **Dr. Steve Traynelis** (*Emory University School of Medicine, USA*) will discuss the translational potential of studying point mutations in NMDA-type ionotropic glutamate receptors towards personalized medicine. The presentations will be followed by a panel discussion with the speakers and CRBS members Jean-François Trempe and Gergely Lukacs.

**Program:**

10:00 – 10:15	Introduction – Dr. Derek Bowie Title: Introduction to ion channel structure and function
10:15 – 10:30	Guest speaker, Dr. David Bennett Title: Human Pain Channelopathies
10:30 – 11:00	Guest speaker, Dr. Steve Traynelis Title: Insight into the glutamate receptor function provided by genetic variation
11:00 – 11:30	Panel Discussion with Dr. Jean-François Trempe and Dr. Gergely Lukacs
11:30 – 11:35	Conclusion

**Registration:** <https://forms.gle/PACfWHq4sYBUuhGMA>

**Zoom link:**

<https://mcgill.zoom.us/j/5150839283?pwd=OHd3M0hMQlVyb1E2ZGZNaXc5SGJCUT09>

Meeting ID: 515 083 9283

Passcode: CRBS2021

Finally, we would like to ask all of you to **distribute this invitation** to whoever you think could be or **SHOULD be involved** in this initiative, or just wants to listen in. If you know a clinician scientist whose work could benefit from structural biology, or conversely if you know a structural biologist who seeks greater interactions with clinicians, please invite them!

We are looking forward to seeing you at the event and hope many participate!

The CRBS Outreach committee:

Jean-François Trempe (CRBS Outreach committee)

Susanne Bechstedt (CRBS Outreach committee)

Annick Guyot (CRBS coordinator)



## **CRBS summer bootcamp**

### **Exploring Protein Structures and Interactions using PyMol**

Instructor: Jean-François Trempe

Date: Tuesday, June 30, 2020

Time: 1 – 4 PM

<https://mcgill.zoom.us/j/96031899180>

Meeting ID: 960 3189 9180

Password: CRBS2020

In this boot camp seminar, you will learn how to use PyMOL to 1) inspect protein structures, with a focus on X-ray crystallography and NMR, 2) analyze protein:ligand interactions, and 3) produce high quality figures and movies.

In preparation for the seminar, please download and install PyMOL. It can be installed on Windows/MacOS/Linux. You can download the latest version (2.4) here:

<https://pymol.org>

The software requires a license, but you can use it in “for evaluation only”. PyMOL 2.4 requires

- 64-bit Windows 10 or newer
- 64-bit macOS 10.12+
- 64-bit Linux, including CentOS 7+, Ubuntu 18.04+, and others (glibc 2.12+)

If you have an older system (Windows 7 or MacOS 10.10+), you can download v2.0 here:

<https://pymol.org/installers/>

The session will take about 2 hours, but it may overflow to 3 hours depending on how many questions we get. We will follow the tutorial slides available here:

[https://www.dropbox.com/s/fkcqxclfvqwhss3/CRBS\\_Bootcamp\\_30june2020\\_PyMol.pptx?dl=0](https://www.dropbox.com/s/fkcqxclfvqwhss3/CRBS_Bootcamp_30june2020_PyMol.pptx?dl=0)

Looking forward to seeing you tomorrow!

Jean-François Trempe



## **CRBS Summer Bootcamp**

### **Probing Protein Dynamic Structure with Hydrogen-Deuterium Exchange Mass Spectrometry (HDX-MS)**

Instructor: Christopher Thibodeaux

Date: Tuesday, July 21, 2020

Time: 1 – 4 PM

<https://mcgill.zoom.us/j/93119203820>

Meeting ID: 931 1920 3820

Password: CRBS2020

In this boot camp seminar, you will learn the fundamentals, practical aspects, and applications of HDX-MS – a powerful emerging tool for characterizing protein structural dynamics. The tutorial will focus on 1) the essential theory of HDX-MS and how the HDX-MS measurement reflects relevant structural properties of the protein of interest, 2) the various experimental formats for performing HDX-MS measurements on proteins, 3) technical aspects related to performing HDX-MS assays and collecting HDX-MS data, 4) methods for evaluating the reproducibility and quality of data, and 5) case studies of how HDX-MS has revealed mechanistically informative properties of proteins. An emphasis will be placed on continuous exchange, bottom-up HDX-MS, as this approach is the most common and most accessible to researchers who are new to the field.

The session will take about 2 hours, but it may overflow to 3 hours depending on how many questions we get.

A recording of the tutorial will be made freely available to those who registered for the Bootcamp.

Looking forward to seeing you tomorrow!

Chris Thibodeaux



## **CRBS Summer Bootcamp**

### **Learning to do Map Segmentations and Make Movies in Chimera and Chimera X**

Instructor: Joaquin Ortega

Date: Tuesday, August 11, 2020

Time: 1 – 4 PM

<https://mcgill.zoom.us/j/92660776266>

Meeting ID: 926 6077 6266

In this bootcamp you will learn to handle molecular models and cryo-EM maps in Chimera and Chimera X programs. You will learn skills in using these programs to prepare figures for presentations and papers. A main focus of the bootcamp session will be on learning to do segmentations of your cryo-EM maps and movies to visualize your structures. It is no necessary to install any program on your computer to follow the bootcamp session. Instructions on installation of Chimera and Chimera X will be provided at the session.

A recording of the tutorial will be made freely available to those who registered for the Bootcamp.

Looking forward to seeing you tomorrow!

Joaquin Ortega

**In-house production of Covid 19 tests**

The following press reports are the best indication of the impact our initiative is having and could have:

- [McGill Reporter](#)
- [Government of Canada](#) (National Research Council)
- [Canadian Health Care Technology](#)
- [La Presse](#)
- [MUHC News](#)
- [MI4 Newsletter](#)
- [Pharmabio](#)
- [COVID Kindness](#) (Canadian Medical Association)
- [Association de patients immunodéficients de Québec](#)
- [Coexisting with COVID](#) (MUHC Foundation Health Matters Webinar Series YouTube)

## Co-authored publications

1. Design, synthesis and biological evaluation of novel SARS-CoV-2 3CLpro covalent inhibitors.  
Stille J, Tjutrins J, Wang G, Venegas FA, Hennecker C, Rueda AM, Sharon I, Miron CE, Pinus S, Labarre A, Plescia J, Patrascu MB, Zhang XC, Wahba AS, Vlaho D, Huot M, **Schmeing TM, Mittermaier AK**, Moitessier N.  
ChemRxiv 2021 chemrxiv.13087742.v2.  
**No impact factor**
2. The multifaceted eukaryotic cap structure.  
**Pelletier J, Schmeing TM, Sonenberg N.**  
*Wiley Interdiscip Rev RNA*. 2021 Mar;12(2):e1636. doi: 10.1002/wrna.1636. Epub 2020 Dec 9. PMID: 33300197  
**Impact factor: 4.928**
3. Crystal structure of human PACRG in complex with MEIG1 reveals roles in axoneme formation and tubulin binding.  
Khan N, Pelletier D, McAlear TS, Croteau N, Veyron S, Bayne AN, Black C, Ichikawa M, Khalifa AAZ, Chaaban S, Kurinov I, **Brouhard G, Bechstedt S, Bui KH, Trempe JF.**  
*Structure*. 2021 Jan 25:S0969-2126(21)00001-0. doi: 10.1016/j.str.2021.01.001. Online ahead of print. PMID: 33529594  
**Impact factor: 4.862**
4. Functional mimicry revealed by the crystal structure of an eIF4A:RNA complex bound to the interfacial inhibitor, desmethyl pateamine A.  
Naineni SK, Liang J, Hull K, Cencic R, Zhu M, Northcote P, Teesdale-Spittle P, Romo D, **Nagar B, Pelletier J.**  
*Cell Chem Biol*. 2021 Jan 5:S2451-9456(20)30515-8. doi: 10.1016/j.chembiol.2020.12.006. Online ahead of print. PMID: 33412110  
**Impact factor: 7.739**
5. SARS-CoV-2 RBD Neutralizing Antibody Induction is Enhanced by Particulate Vaccination.  
Huang WC, Zhou S, He X, Chiem K, Mabrouk MT, Nissly RH, Bird IM, **Strauss M, Sambhara S, Ortega J**, Wohlfert EA, Martinez-Sobrido L, Kuchipudi SV, Davidson BA, Lovell JF.  
*Adv Mater*. 2020 Dec;32(50):e2005637. doi: 10.1002/adma.202005637. Epub 2020 Oct 28. PMID: 33111375  
**Impact factor: 27.398**
6. The mTORC1/S6K/PDCD4/eIF4A Axis Determines Outcome of Mitotic Arrest.  
Moustafa-Kamal M, Kucharski TJ, El-Assaad W, Abbas YM, Gandin V, **Nagar B, Pelletier J**, Topisirovic I, Teodoro JG.  
*Cell Rep*. 2020 Oct 6;33(1):108230. doi: 10.1016/j.celrep.2020.108230. PMID: 33027666  
**Impact factor: 8.109**
7. Identification and characterization of hippuristanol-resistant mutants reveals eIF4A1 dependencies within mRNA 5' leader regions.

Steinberger J, Shen L, J Kiniry S, Naineni SK, Cencic R, Amiri M, Aboushawareb SAE, Chu J, Maïga RI, Yachnin BJ, Robert F, **Sonenberg N**, Baranov PV, **Pelletier J**.

*Nucleic Acids Res.* 2020 Sep 25;48(17):9521-9537. doi: 10.1093/nar/gkaa662.PMID: 32766783

**Impact factor: 11.501**

8. RNA-tethering assay and eIF4G:eIF4A obligate dimer design uncovers multiple eIF4F functional complexes.

Robert F, Cencic R, Cai R, **Schmeing TM**, **Pelletier J**.

*Nucleic Acids Res.* 2020 Sep 4;48(15):8562-8575. doi: 10.1093/nar/gkaa646.PMID: 32749456

**Impact factor: 11.501**

9. Alternative Splicing of a Receptor Intracellular Domain Yields Different Ectodomain Conformations, Enabling Isoform-Selective Functional Ligands.

Brahimi F, Galan A, Jmaeff S, Barcelona PF, De Jay N, Dejgaard K, **Young JC**, Kleinman CL, **Thomas DY**, Saragovi HU.

*iScience.* 2020 Aug 10;23(9):101447. doi: 10.1016/j.isci.2020.101447. Online ahead of print.PMID: 32829283

**Impact factor: 4.447**

10. Amplified Self-Immolative Release of Small Molecules by Spatial Isolation of Reactive Groups on DNA-Minimal Architectures.

Prinzen AL, Saliba D, Hennecker C, Trinh T, **Mittermaier A**, **Sleiman HF**.

*Angew Chem Int Ed Engl.* 2020 Jul 27;59(31):12900-12908. doi: 10.1002/anie.202001123. Epub 2020 May 26.PMID: 32277788

**Impact factor: 12.959**

11. Dynamic actin cross-linking governs the cytoplasm's transition to fluid-like behavior

Chaubet L, Chaudhary AR, Heris HK, **Ehrlicher AJ**, **Hendricks AG**

*Mol Biol Cell,* 2020 Jul 21;31(16):1744-1752, doi: 10.1091/mbc.E19-09-0504. Epub 2020 Jun 24. PMID: 32579489

**Impact factor: 3.791**

12. Single-molecule methods in structural DNA nanotechnology.

Platnich CM, Rizzuto FJ, **Cosa G**, **Sleiman HF**.

*Chem Soc Rev.* 2020 Jul 6;49(13):4220-4233. doi: 10.1039/c9cs00776h.PMID: 32538403

**Impact factor: 42.846**

13. Effect of 2'-5'/3'-5' phosphodiester linkage heterogeneity on RNA interference.

Habibian M, Harikrishna S, Fakhoury J, Barton M, Ageely EA, Cencic R, Fakh HH, Katolik A, Takahashi M, Rossi J, **Pelletier J**, Gagnon KT, Pradeepkumar PI, **Damha MJ**.

*Nucleic Acids Res.* 2020 May 21;48(9):4643-4657. doi: 10.1093/nar/gkaa222.PMID: 32282904

**Impact factor: 11.501**

## Publications from CRBS funded students

1. Pattern-Based Contractility Screening, a Reference-Free Alternative to Traction Force Microscopy Methodology.  
Ghagre A, Amini A, Srivastava LK, **Tirgar P**, Khavari A, Koushki N, Ehrlicher A.  
*ACS Appl Mater Interfaces*. 2021 Apr 22. doi: 10.1021/acsami.1c02987. Online ahead of print.  
PMID: 33884863  
**Impact factor: 8.758**
2. HPV-Associated Tumor Eradication by Vaccination with Synthetic Short Peptides and Particle-Forming Liposomes.  
He X, Zhou S, Quinn B, **Jahagirdar D**, Ortega J, Abrams SI, Lovell JF.  
*Small*. 2021 Mar;17(11):e2007165. doi: 10.1002/smll.202007165. Epub 2021 Feb 19. PMID: 33605054  
**Impact factor: 11.459**
3. Mutations in Dynamic Structural Elements Alter the Kinetics and Fidelity of the Multifunctional Class II Lanthipeptide Synthetase, HalM2.  
Uggowitz KA, **Habibi Y**, Wei W, Moitessier N, Thibodeaux CJ.  
*Biochemistry*. 2021 Feb 9;60(5):412-430. doi: 10.1021/acs.biochem.0c00919. Epub 2021 Jan 28. PMID: 33507068  
**Impact factor: 2.865**
4. Crystal structure of human PACRG in complex with MEIG1 reveals roles in axoneme formation and tubulin binding.  
Khan N, Pelletier D, **McAlear TS**, Croteau N, Veyron S, Bayne AN, Black C, Ichikawa M, Khalifa AAZ, Chaaban S, Kurinov I, Brouhard G, Bechstet S, Bui KH, Trempe JF.  
*Structure*. 2021 Jan 25:S0969-2126(21)00001-0. doi: 10.1016/j.str.2021.01.001. Online ahead of print. PMID: 33529594  
**Impact factor: 4.862**
5. Structural basis of sequestration of the anti-Shine-Dalgarno sequence in the Bacteroidetes ribosome.  
Jha V, Roy B, **Jahagirdar D**, McNutt ZA, Shatoff EA, Boleratz BL, Watkins DE, Bundschuh R, Basu K, Ortega J, Fredrick K.  
*Nucleic Acids Res*. 2021 Jan 11;49(1):547-567. doi:10.1093/nar/gkaa1195. PMID: 33330920  
**Impact factor: 11.501**
6. Alternative conformations and motions adopted by 30S ribosomal subunits visualized by cryo-electron microscopy.  
**Jahagirdar D**, Jha V, Basu K, Gomez-Blanco J, Vargas J, Ortega J.  
*RNA*. 2020 Dec;26(12):2017-2030. doi: 10.1261/rna.075846.120. Epub 2020 Sep 28. PMID: 32989043  
**Impact factor: 4.32**
7. A Highly Fluorescent Nucleobase Molecular Rotor.  
**Karimi A**, Börner R, Mata G, Luedtke NW.  
*J Am Chem Soc*. 2020 Aug 26;142(34):14422-14426. doi: 10.1021/jacs.0c05180. Epub 2020 Aug 17. PMID: 32786749

**Impact factor: 14.612**

8. Dynamic actin cross-linking governs the cytoplasm's transition to fluid-like behavior  
Chaubet L, **Chaudhary AR**, Heris HK, Ehrlicher AJ, Hendricks AG  
*Mol Biol Cell*, 2020 Jul 21;31(16):1744-1752, doi: 10.1091/mbc.E19-09-0504. Epub 2020 Jun 24.  
PMID: 32579489

**Impact factor: 3.791**

9. A Hydrogen-Deuterium Exchange Mass Spectrometry (HDX-MS) Platform for Investigating Peptide Biosynthetic Enzymes.

**Habibi Y**, Thibodeaux CJ.

*J Vis Exp*. 2020 May 4;(159). doi: 10.3791/61053.PMID: 32420996

**No Impact factor**