McGill | Faculty of Medicine and Health Sciences | Faculté de médecine et des sciences de la santé

Committee for Oversight of Research Units

Annual Reporting for Faculty Supported Research Centres and Networks

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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 an annual report to the Committee for Oversight of Research Units (CORU)

The reporting period is May 1, 2021 – April 30, 2022.

Please submit your report to the Research Office, Faculty of Medicine and Health Sciences (**riac.med@mcgill.ca**) before the following deadline:

Monday, May 2, 2022

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

Name of the Unit: Centre for Applied Mathematics in Bioscience and Medicine (CAMBAM)

Name of Unit leader & email address: Anmar Khadra and Frédéric Guichard

If the Unit is **a Senate-approved** McGill Research Centre, indicate date of approval: November 16, 2011

Mission statement of the Unit (~ 2 sentences):

The mission of CAMBAM is to take a national and international leadership role in promoting the applications of mathematical and computational sciences to study different aspects of physiological, biological and ecological systems, as well as foster collaborations between the quantitative and experimental life scientists. CAMBAM meets its objectives by promoting and fostering research, teaching and training in applications of quantitative life sciences at all levels ranging from the molecular/genetic through single cell and whole organ physiology and biology to population dynamics and broader ecological questions, at different time and special scales. CAMBAM accomplishes these goals through (i) establishing various training programs that are developed independently or in collaborations with other international and national centers, including workshops and summer schools that involve hands-on training and continuously evolving material that copes with recent advances made in the field; and (ii) building partnerships with industry that can provide internships for CAMBAM trainees. Such training opportunities assist CAMBAM PIs to develop the expertise of their trainees by bringing them up to speed with their research project and connect them with industry. CAMBAM also provides them with funding opportunities to reward exceptional trainees.

Total number of Unit members:

CAMBAM has 164 full members and 13 associate members (see **Appendix 1** for a list of members obtained from the listserv). The core members of CAMBAM include 23 faculty members.

Number of members affiliated with McGill's FMHS:

Close to 50% of CAMBAM members belong to FMHS.

Unit's website:

Please note the website needs to feature:

- 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.

Website address (URL): http://www.crm.umontreal.ca/labo/cambam/en/

Please respect the page limits, where indicated.

(minimum font size of 11 pts, use lay language)

1. **Explain the significance of the Unit's mission at McGill and beyond** (1/2 page max.)

- Maintain international leadership in the emerging field of quantitative biosciences. To accomplish this, CAMBAM has become a partner in an FQRNT-funded multi-center grant headed by the Centre de recherches mathématiques (CRM).
- Connect researchers and students across faculties and institutions by creating interdisciplinary research teams and a framework for scientific and social interactions. That includes bridging complementary research programs together to establish multidisciplinary teams in the quantitative and life sciences. To accomplish this, we organize workshops and retreats and invite known speakers to the seminar series organized by CAMBAM in collaborations with other centers at McGill.
- Support and prepare students and postdoctoral trainees for the expanding career opportunities in quantitative biosciences in both industry and academia. Trainee members of CAMBAM regularly get email announcements about different academic and industry-based job opportunities.
- Establish stronger connections with industry. This is done through the industry partners of MITACS as well as NSERC-CREATE in Complex Dynamics, a partner of CAMBAM since 2018. Several trainees in CAMBAM currently participate in internships with these industry partners of both of these institutions.

2. **Alignment with the Faculty's Strategic Research Plan** (1/2 page max.)

CAMBAM contributes to the Faculty's research mission by developing mathematical and computational tools for understanding how complex biological systems function - from molecular to organismal levels. CAMBAM's contribution was specifically mentioned in the 2017 McGill Faculties of Medicine and Dentistry Strategic Research Plan. In addition, **CAMBAM has close ties with the Initiative in Computational Medicine (MiCM). In partnership with the MiCM, CAMBAM has co-organized online workshops focused on mathematical and statistical methodologies. MiCM also provides seed funding to CAMBAM members with research focused on complex systems and machine learning (e.g., Anmar Khadra and Pouya Bashivan). CAMBAM also collaborates with the Quantitative Biosciences Program, the Ludmer Center and MiCM in organizing a very successful seminar series in computational medicine. These activities will continue in the near future. Finally, CAMBAM is heavily involved in the QLS program with many CAMBAM members teaching in the QLS foundation course QLSC 600 and (co-)supervising many QLS PhD students.**

Bioscience and health research is quickly expanding from being an exclusively data collection endeavor to one that embraces the development of new technologies and quantitative methods. For example, much of the field of genetics is now driven by statistical and computational algorithms. To meet these changing needs, our researchers actively prepare students for life in both academic research and industry with the goal of bridging the "training gap" that exists between students in bioscience and those from mathematics, physics and engineering. Importantly, CAMBAM's interdisciplinary mission directly supports McGill's Strategic Research Plan to create a "convergence of life sciences, natural sciences, and engineering".

During the next few years, CAMBAM will continue its leadership role in Quantitative Biology at McGill, within Quebec and internationally. **CAMBAM has regularly organized summer schools on the applications of mathematical sciences to physiology and medicine and helped sponsor several workshops, one of which focused on infectious disease transmission, an urgent topic in this international health crisis of COVID-19 pandemic.** We will continue to sponsor and promote interdisciplinary seminars, workshops, events and summer schools to bring together researchers from across faculties and institutions to solve critical problems in bioscience and medicine.

3. **Major joint publications over the past 12 months** (including shared software, data repositories; with links) co-authored by at least two PI members of the Unit:

As indicated earlier, CAMBAM has 164 full members and 13 associate members. These members are mostly researchers in the quantitative life sciences that pursue collaborations (fostered by CAMBAM) with experimental scientists . Collaborations are not typically expected to be formed between members of CAMBAM. Nonetheless there are many publications that are coauthored by members of CAMBAM that are very difficult to retrieve here. These can be viewed in the websites of core CAMBAM members.

For easy access to these joined publications, please visit the homepages of these core CAMBAM members listed here: http://www.crm.umontreal.ca/labo/cambam/en/members/.

4. **Major joint research projects funded over the past 12 months** (involving at least two PI members of the Unit:

Here are the a list of joint grants that have been obtained or partially used to support CAMBAM programs:

1. NSERC-CREATE in Complex Dynamics (https://cd-create.org/home). PIs: Caroline Palmer (associate CAMBAM member) and Anmar Khadra (CAMBAM co-director).

2. ESTES Fund and the Psychonomic Society (https://www.psychologicalscience.org/members/awards-and-honors/estes-fund).). PIs: Anmar Khadra (CAMBAM co-director) and Caroline Palmer (associate CAMBAM member).

3. Centre de Recherches Mathématiques (http://www.crm.umontreal.ca/en/index.shtml). PIs: Anmar Khadra (CAMBAM co-director) and Fred Guichard (CAMBAM co-director).

5. Major outreach activities (e.g., seminar series, general public events):

Seminar Series (Appendix 2): CAMBAM continues to benefit from its partnership with the Quantitative Life Sciences program in running a weekly seminar series during the Fall and Winter terms in collaboration with the McGill Initiative in Computational Medicine (MiCM) and the Ludmer Centre. This seminar series, which was originally a CAMBAM event prior to this partnership, is still ongoing with 12 talks out of 31 allocated for CAMBAM invited or affiliated speakers during 2021/2022. Due to COVID-19, talks were held virtually with attendees ranging between 40-60. Speakers were also invited to meet the trainees after the talks to interact more closely with them. CAMBAM member Suresh Krishna is taking the lead in organizing this seminar series in collaboration with members of the other partners. No cost was associated with this activity due to COVID-19.

Fellowships (Appendix 3): Due to the fact that CAMBAM managed to get external funding from other sources, including CRM and William K. and Katherine W. Estes Fund and the Psychonomic Society, CAMBAM had enough surplus to award 5 fellowships to research trainees (a total of $50K) on a competitive basis. CAMBAM members Pouya Bashivan and Suresh Krishna served in the selection committee. The application process involved submitting trainees' research descriptions, CV, a statement of interest in qualitative bioscience and a description of past participation in CAMBAM events in the last 12 months by the supervisors and trainees. CAMBAM received 12 applications and 5 were shortlisted for the fellowship, including Mia Brunetti (supervised by Morgan Craig – UdeM), Justin Marleau (supervised by Fred Guichard – McGill), Thomas Bury (supervised by Gil Bub and Leon Glass – McGill), Bianca Granato (supervised by Celia Greenwood and Mathieu Blanchette – McGill) and Lucie Plazen (supervised by Anmar Khadra – McGill). **We would like to emphasize here that, as part of CAMBAM commitment to equity, diversity and inclusion, females were highly represented in this fellowship.** In the coming year, the same fellowships will be offered on a competitive basis with a selection committee (TBA). The fellowship funding will similar to last year.

Membership in the CRM: CAMBAM continues to be part of the CRM, a network of 12 research centers across Quebec and Ontario. This collaboration brings quantitative bioscience to the CRM and connects CAMBAM to the larger community of mathematical and computational researchers. CRM now provides additional funding to CAMBAM (~$12,000 per year). CAMBAM is currently playing a central role in CRM's effort in obtaining funding to support industry-relevant "upskilling" training courses that will be offered by CAMBAM in Biotechnology, Quantitative Biosciences, Quantitative pharmacology and AI. The funding is offered by the federal government: (https://ised-isde.canada.ca/site/upskilling-industry-initiative/en). CAMBAM is playing a central role in pursuing this funding opportunity under the leadership of CAMBAM members: Anmar Khadra, Fred Guichard, Morgan Craig and Fahima Nekka.

CAMBAM Retreat: With the lifting of COVID-19 restrictions, CAMBAM co-director Anmar Khadra is reviving the CAMBAM retreat that used to be held annually prior to COVID. He's organizing one in the summer of 2022 at the Thomson House. Two nonlocal speakers will be invited to give 30 min talks and trainees, especially those previously awarded fellowships, will be requested to present 10 min talks. All CAMBAM members (PIs and trainees) will be invited to the event.

6. **Major training activities** (e.g., summer schools, co-supervision of trainees, practical workshops):

CAMBAM/NSERC-CREATE in Complex Dynamics Summer School (Appendix 4): CAMBAM and McGill's NSERC-CREATE program in Complex Dynamics of Brain and Behavior teamed up to organize a summer school (May 31 – June 11, 2021). Unlike previous summer schools, this event was held virtually via zoom. The school was funded by the William K. and Katherine W. Estes Fund and the Psychonomic Society ($20,000) as well as CRM ($5,000). The summer school received 80 applications and 50 students were short listed for the event (both Canadian and international). The two-week event covered different topics on the applications of nonlinear dynamics and computations to life sciences (ranging from the sub-cellular world to population dynamics) with a special emphasis on neuroscience and psychology. The program included theory-based and application-based lectures taught by 25 internationally recognized researchers in the field including 15 CAMBAM members, as well as tutorial and computer labs that complemented the material covered in these lectures. CAMBAM trainees were involved in assisting with the tutorials. There were also projects assigned to the participants to work on and supervised by the instructors. CAMBAM co-director Anmar Khadra and CAMBAM associate member Caroline Palmer (who is also the director of NSERC-CREATE in Complex Dynamics) were successful in obtaining the funding (**see Appendix 5**). Speakers were each paid $1,000 honorarium for participating. The IT team and TAs (CAMBAM trainees) were also paid.

CAMBAM Summer School (Appendix 6): CAMBAM will solely organize another summer school in Nonlinear Dynamics for the Life Sciences (May 30 – June 10, 2022). As the previous summer school, this year's event will be held virtually via zoom. The school is funded CRM ($15,000) NSERC-CREATE in Complex Dynamics ($5,000) and CAMBAM ($5,000). The summer school received ~100 applications and 50 students are currently being short listed for the event (both Canadian and international). The two-week event will cover different topics on the applications of nonlinear dynamics and computations to life sciences in immunology, molecular and cellular biology, neuroscience and ecology. The program will include theory-based and application-based lectures taught by 23 internationally recognized researchers in the field including 14 CAMBAM members, as well as tutorial and computer labs that will complement the material covered in these lectures. There will be also projects assigned to the participants to work on and supervised by the instructors. CAMBAM co-director Fred Guichard and CAMBAM members Pouya Bashivan and Morgan Craig are organizing the event. Speakers will be paid $1,000 honorarium for participating. The IT team and TAs will be also paid.

7. If applicable, **list new members** who joined the Unit in the past 12 months (indicate: Name, title, full/associate member, affiliation):

Caroline Palmer (associate member)

8. If applicable, **list members who have left the Unit** in the past 12 months (indicate: Name, title, full/associate member, affiliation):

None.

Financial report & forecast

Expenses	**2021/22 report**	**2022/23 budget**
Total salaries	0	0
Training	0	0
Stipends (fellowships)	$50,000	$50,000
Outreach	$8,500	$13,000
Publications	0	0
Other (detail in #9 below)	$30,000	$30,000
Total expenses	$88,500	$93,000

Revenues	**2021/22 report**	**2022/23 budget**
Carryover	0	0
FMHS	$15,000	$20,000
User fees	0	0
Other sources (detail in #9 below)	$73,500	$73,500
Total revenues	$88,500	$93,000

9. Budget justification and details (e.g., itemize if multiple salaries, detail other sources of funding):

Year 2021-2022: Details are listed below.
1. Stipends (fellowships): Five competitive fellowships were awarded, $10,000 each ($50,000).
2. Outreach: CAMBAM retreat in the summer 2022. Two out of town speakers will be invited and lunch will be also provided to participants ($8,500)
3. Other: Summer school in nonlinear dynamics with application to neuroscience and psychology was organized. Speakers, technical support and TAs were paid $1000 each ($30,000).

Year 2022-2023: Details are listed below.
1. Stipends (fellowships): Five competitive fellowships will be offered, $10,000 each ($50,000).
2. Outreach: (i) CAMBAM retreat in the summer 2022. One out of town speaker and a local CAMBAM speaker will be invited and lunch will be also provided to participants ($6,500). (ii) Seminar series speakers. Four out of town speakers will be invited to give talk in the joined Quantitative Life Sciences and Medicine seminar series ($5,500).
3. Other: Summer school in nonlinear dynamics for the Life Sciences will be organized. Speakers, technical support and TAs will be paid around $1000 each ($30,000).

Funding

The funding CAMBAM typically gets each year from other sources is as follows: RQNT/CRM ($14,000), VPR research ($35,000), FacSci/CRM ($2,500), UdeM/CRM ($2,000). CRM and NSERC-CREATE will also provide $25,000 to support the summer school in the 2022-2023 academic year.

10. Explain why continued support from the FMHS is crucial to Unit (½ page max):

FMHS support has allowed CAMBAM to pursue and achieve many of its current programs. Recognizing the fundamental importance of interdisciplinary research, CAMBAM has taken leadership role in promoting collaborations between members from across faculties and disciplines, and established track record of successful Canadian (Fields, NSERC-CREATE in Complex Dynamics) and international partnerships (MBI, NIMBios and MIT). With FMHS funding, CAMBAM has accomplished all of its important objectives and maintains a level of activity (both local and international) that compares favorably with other McGill research centers. Continuing support from FMHS will promote our interdisciplinary support of quantitative bioscience at McGill as well as allow us to maintain our international presence and collaborations with other centers. It is important to emphasize that many CAMBAM members are also members in the Society for Mathematical Biology and took leadership roles in that activities of this society (for example, the annual meeting that took place in Montreal in 2019).

11. Provide suggestions about how the Faculty could do better to support the Unit and research efforts in general (**no page limit but please be specific and unleash your creativity!**)

At this point, CAMBAM has been running its operations without any administrative support. The CRM occasionally provide some help in that front when needed, but support is quite limited to certain activities. CAMBAM intentionally never spends any funding on administrative support and solely relies on the efforts of its co-directors to run all CAMBAM operations in order to save the very limited funding of $15,000 received from FMHS to support the core activities of CAMBAM. Additional funding will come a long way in allowing CAMBAM to have the freedom to expand such programs and rely occasionally in administrative support if necessary.

Logged in as: anmar.khadra@mcgill.ca (Owner) **Basic Mode** | **Edit Page**

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LISTSERV Command Interface (CAMBAM_SEMINARS)

CAMBAM_SEMINARS Home

Select List:
CAMBAM_SEMINARS CAMBAM_Seminars - Department of Physiology

Update

lamees.mahmoud@MCGILL.CA	(No Name Available)
alireza.aghighi@UMONTREAL.CA	Alireza Aghighi
martin.aguilar@MAIL.MCGILL.CA	Martin Aguilar
sameed.ahmed@UWATERLOO.CA	Sameed Ahmed
kehinde.ajibade@MAIL.MCGILL.CA	Kehinde Ajibade
sofia.alfonso@MAIL.MCGILL.CA	Sofia Alfonso
derry.alison@UQAM.CA	Derry ALISON
shaza.alsibaai@MAIL.MCGILL.CA	Shaza Alsibaai
juliatherton@GMAIL.COM	Juli Atherton
hortecgg@CIENCIAS.UNAM.MX	No Name Available
li@CRM.UMONTREAL.CA	No Name Available
doedel@CSE.CONCORDIA.CA	No Name Available
lfarley@CVLF.CA	No Name Available
andyliu1987@GMAIL.COM	No Name Available
eedavid2000@GMAIL.COM	No Name Available
feng.xiongca@GMAIL.COM	No Name Available
fglacoste@GMAIL.COM	No Name Available
jinzhi.lei@GMAIL.COM	No Name Available
krouchen@GMAIL.COM	No Name Available
patrick.mineault@GMAIL.COM	No Name Available
shahedrz@GMAIL.COM	No Name Available
steven.sanche@GMAIL.COM	No Name Available
ysokolov@HEALTH.UCSD.EDU	No Name Available
alexis.dale@MAIL.MCGILL.CA	No Name Available
amandine.bemmo@MAIL.MCGILL.CA	No Name Available
anais.lacoursiere-roussel@MAIL.MCGILL.CA	No Name Available

ashkan.golzar@MAIL.MCGILL.CA	No Name Available
costas.karatzas@MAIL.MCGILL.CA	No Name Available
diana.mitchell@MAIL.MCGILL.CA	No Name Available
ghoncheh.rasoulitezangi@MAIL.MCGILL.CA	No Name Available
jessica.brooks@MAIL.MCGILL.CA	No Name Available
louis.richez@MAIL.MCGILL.CA	No Name Available
megha.kodancha@MAIL.MCGILL.CA	No Name Available
moeed.shahamat@MAIL.MCGILL.CA	No Name Available
mojdeh.golmohammadi@MAIL.MCGILL.CA	No Name Available
nasri.balit@MAIL.MCGILL.CA	No Name Available
xinyue.ma@MAIL.MCGILL.CA	No Name Available
yogesh.murugesan@MAIL.MCGILL.CA	No Name Available
zibo.wang@MAIL.MCGILL.CA	No Name Available
calleja@MATH.MCGILL.CA	No Name Available
lafitte@MATH.UNIV-PARIS13.FR	No Name Available
thomas.bury@MCGILL.CA	No Name Available
jvh@MITACS.CA	No Name Available
patrice.roy@PFIZER.COM	No Name Available
quenelgt@PLATTSBURGH.EDU	No Name Available
andrea.green@UMONTREAL.CA	No Name Available
paul.cisek@UMONTREAL.CA	No Name Available
abrav103@UOTTAWA.CA	No Name Available
nbrod033@UOTTAWA.CA	No Name Available
pouya.bashivan@MCGILL.CA	Pouya Bashivan, Dr
belair@CRM.UMONTREAL.CA	Jacques Belair
mathieu.blanchette@MCGILL.CA	Mathieu Blanchette
fx.brajot@MAIL.MCGILL.CA	Francois-Xavier Brajot
niklas.brake@MAIL.MCGILL.CA	Niklas Brake
grace.brooks@MAIL.MCGILL.CA	Kyla Brooks
claire.brown@MCGILL.CA	Claire Brown, Dr.
gil.bub@MCGILL.CA	Gil Bub
david.buckeridge@MCGILL.CA	David Buckeridge
lucas.santos@MAIL.MCGILL.CA	Lucas Campanari
tyler.cassidy@MAIL.MCGILL.CA	Tyler Cassidy
maurice.chacron@MCGILL.CA	Maurice Chacron
philippe.comtois@UMONTREAL.CA	Philippe Comtois
erik.cook@MCGILL.CA	Erik Cook
coordinator.qls@MCGILL.CA	QLS Coordinator
morgan.craig@UMONTREAL.CA	Morgan Craig
danielcamaradesouza@YAHOO.COM.BR	Daniel Câmara
felipe.dargent@MAIL.MCGILL.CA	Felipe Dargent
nikolaos.dimitriou@MAIL.MCGILL.CA	Nikolaos Dimitriou
sean.duffy@MAIL.MCGILL.CA	Sean Duffy
alan@BIC.MNI.MCGILL.CA	Alan Evans
Frederique.Fenneteau@CERTARA.COM	Frederique Fenneteau
frederique.fenneteau@HIBE.COM	Frederique Fenneteau
paulf@PHYSICS.MCGILL.CA	Paul Francois
francois.bourassa4@MAIL.MCGILL.CA	François Bourassa
fred.guichard@MCGILL.CA	Frédéric Guichard
gregor.fussmann@MCGILL.CA	Prof. Gregor Fussmann

elias.gedamu@MAIL.MCGILL.CA	Elias Gedamu
lefebvre.gen@UQAM.CA	GeneviÃ¨ve Lefebvre
navid.sadeghighandehari@MAIL.MCGILL.CA	Navid Sadeghi Ghandehari
glass@CND.MCGILL.CA	Leon Glass
mladen.glavinovic@MCGILL.CA	MladenI Glavinovic
celia.greenwood@MCGILL.CA	Celia Greenwood
tamara.gregg@MAIL.MCGILL.CA	Tamara Gregg
claire.guerrier@UNIV-COTEDAZUR.FR	Claire Guerrier
michael.guevara@MCGILL.CA	Michael Guevara
ben.haller@MAIL.MCGILL.CA	Ben Haller
ian.hatton@MAIL.MCGILL.CA	Ian Hatton
bing@INAME.COM	Bing Huang
tony.humphries@MCGILL.CA	AntonyRaymond Humphries
vincent.jacquemet@UMONTREAL.CA	Vincent Jacquemet
hassan.jamaleddine@MAIL.MCGILL.CA	Hassan Jamaleddine
mohsen.jamali@MAIL.MCGILL.CA	Mohsen Jamali
anmar.khadra@MCGILL.CA	Anmar Khadra
bo-ra.kim@MAIL.MCGILL.CA	Chelsea Kim
claudia.kleinman@MCGILL.CA	Claudia Kleinman
nils.koch@MAIL.MCGILL.CA	Nils Koch
svetlana.komarova@MCGILL.CA	Svetlana Komarova
caolan.kovach-orr@MAIL.MCGILL.CA	Caolan Kovach-Orr
suresh.krishna@MCGILL.CA	Suresh Krishna
darya.kryzskaya@MAIL.MCGILL.CA	Darya Kryzskaya
grigoris.kylafis@MAIL.MCGILL.CA	Grigoris Kylafis
lajoie@DMS.UMONTREAL.CA	Guillaume Lajoie
orsolya.lapohos@MAIL.MCGILL.CA	Orsolya Lapohos
allen.larocque@GMAIL.COM	Allen Larocque
jonas.lehnert@MAIL.MCGILL.CA	Jonas Lehnert
jzlei@MAIL.TSINGHUA.EDU.CN	Jinzhi Lei
vincent514@GMAIL.COM	Vincent Lemaire
joshua.leon@DAL.CA	Joshua Leon
dr.claudialerma@GMAIL.COM	Claudia Lerma
brian.leung2@MCGILL.CA	Brian Leung
juan.y.li@MAIL.MCGILL.CA	juan Yao Li
nicole.li@MCGILL.CA	Nicole Li
alongtin@UOTTAWA.CA	Andre Longtin
etienne.low-decarie@MAIL.MCGILL.CA	Etienne Low-Decarie
flutsche@UOTTAWA.CA	Frithjof Lutscher
jessica.lyda@MAIL.MCGILL.CA	Jessica Lyda
metapfhor@GMAIL.COM	Laurent Mackay
michael.mackey@MCGILL.CA	MichaelC Mackey
jacek.majewski@MCGILL.CA	Jacek Majewski
judith.mandl@MCGILL.CA	Judith Mandl
justin.marleau@MAIL.MCGILL.CA	Justin Marleau
geoffrey.mcgregor@MAIL.MCGILL.CA	Geoffrey McGregor
mahtab.nazari@MAIL.MCGILL.CA	Mahtab Nazari
fahima.nekka@UMONTREAL.CA	Fahima Nekka
laurentiu.oprea@MAIL.MCGILL.CA	Laurentiu Oprea
christopher.pack@MCGILL.CA	Christopher Pack

```
caroline.palmer@MCGILL.CA                Caroline Palmer
michael.pedruski@MAIL.MCGILL.CA          Michael Pedruski
perkins@MCB.MCGILL.CA                    Theodore Perkins
lucie.plazen@MAIL.MCGILL.CA              Lucie Plazen
khoren.ponsin@MAIL.MCGILL.CA             Khoren Ponsin
lpopovic@MATHSTAT.CONCORDIA.CA           Lea Popovic
felix.proulx-giraldeau@MAIL.MCGILL.CA    Felix Proulx-Giraldeau
thomas.rademaker@MAIL.MCGILL.CA          Thomas Rademaker
jalal.alrahbani@MAIL.MCGILL.CA           Jalal Al Rahbani
rodrigo.miguelesramirez@MAIL.MCGILL.CA   Rodrigo Migueles Ramirez
alejandro.rey@MCGILL.CA                  Alejandro Rey
alfredo.ribeirodasilva@MCGILL.CA         Alfredo Ribeiro-da-Silva
moises.santillan@ME.COM                  SantillÃ¡n ZerÃ³n MoisÃ©s
kushagra.sareen@MAIL.MCGILL.CA           Kusha Sareen
amir.shmuel@MCGILL.CA                    Amir Schmuel
alan.schoen@MAIL.MCGILL.CA               Alan Schoen
julian.self@MAIL.MCGILL.CA               Julian Self
pabelshahrear@YAHOO.COM                  Pabel Shahrear
bruce.shepherd@MCGILL.CA                 Bruce Shepherd
jesper.sjostrom@MCGILL.CA                Per Jesper Sjostrom
benjamin.m.smith@MCGILL.CA               Benjamin McDonald Smith
maxsouza@ID.UFF.BR                       Max Oliveira De Souza
Rhalena.thomas@MAIL.MCGILL.CA            Rhalena Thomas
mtyran@US.EDU.PL                         Marta Tyran
younes.valibeigi@MAIL.MCGILL.CA          younes Valibeigi
vassil.dimitrov@MAIL.MCGILL.CA           Dimitrov Vassil
alain.vinet@UMONTREAL.CA                 Alain Vinet
florence.veronneau-veilleux@UMONTREAL.CA Véronneau-Veilleux Florence
zhao.wang3@MAIL.MCGILL.CA                Wendy Wang
yangyang-wang@UIOWA.EDU                  Yangyang Wang
brian.wilhelm@UMONTREAL.CA               Brian Wilhelm
tek.wa.wong@MAIL.MCGILL.CA               Edward Wong
brandon.xia@MCGILL.CA                    Brandon Xia
zhunping.xue@MAIL.MCGILL.CA              Julian Xue
qianyi.zhang@MAIL.MCGILL.CA              Qianyi Zhang
zhugechj@GMAIL.COM                       Changjing Zhuge
yujing.zou@MAIL.MCGILL.CA                Yujing Zou
dani.zysman@GMAIL.COM                    Daniel Zysman [concealed]
*
* Total number of "concealed" subscribers:          1
* Total number of users subscribed to the list:   164
* Total number of local host users on the list:     0
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CAMBAM_SEMINARS

(Clear Command)

New Command: REVIEW CAMBAM_SEMINARS (NOH MSG ALL TOPICS BY NAME Enter Command

Useful Commands:
Review CAMBAM_SEMINARS | Query CAMBAM_SEMINARS | Confirm CAMBAM_SEMINARS | Free CAMBAM_SEMINARS | Hold CAMBAM_SEMINARS | Count Subscribers | Count by Country | Count by Topic | Reindex CAMBAM_SEMINARS Archives

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Appendix 2

McGill Seminar Series in Quantitative Life Sciences and Medicine

QLS has joined efforts with the Centre for Applied Mathematics in Bioscience and Medicine (CAMBAM), the McGill initiative in Computational Medicine (MiCM) and the Ludmer Center to offer weekly interdisciplinary seminars.

Seminars are held on Tuesdays from 12-1pm EST.

Zoom Link: https://mcgill.zoom.us/j/85428056343 (https://mcgill.zoom.us/j/85428056343)

For recordings of the 2021-22 seminars please visit the QLS YouTube Page (https://www.youtube.com/playlist?list=PLCCQ0xdlWGLBz-kHpBctI5NWCWep86RO6).

Winter 2022	Speaker	Topic

Winter 2022	Speaker	Topic
Jan. 11	Jun Ding (McGill University) Sponsored by QLS	**Decoding cellular dynamics from single-cell data for more effective cell fate manipulation** (//www.mcgill.ca/qls/channels/event/qls-seminar-series-jun-ding-335695)
Jan. 18	Pouya Bashivan (McGill University) Sponsored by QLS	**Artificial neural networks in visual neuroscience: towards a quantitative explanation of visual object recognition in the brain** (//www.mcgill.ca/qls/channels/event/qls-seminar-series-pouya-bashivan-336008)
Jan. 25	Gary Bader (University of Toronto) Sponsored by CAMBAM	**How is cell diversity generated during development?** (//www.mcgill.ca/qls/channels/event/qls-seminar-series-gary-bader-336047)
Feb. 1	Becca Asquith (Imperial College London) Sponsored by CAMBAM	**Immune cell dynamics and human health** (//www.mcgill.ca/qls/channels/event/qls-seminar-becca-asquith-337309)
Feb. 8	Caroline Colijn (Simon Fraser University) Sponsored by QLS	**Genomic Epidemiology in SARS-CoV-2: new tools and challenges** (//www.mcgill.ca/qls/channels/event/qls-seminar-series-caroline-colijn-337163)

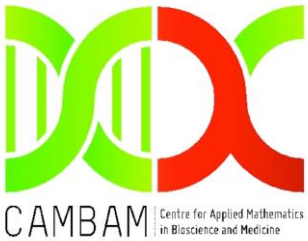
Winter 2022	Speaker	Topic
Feb. 15	Laura Pollock (McGill University) Sponsored by QLS	Rescheduled to Mar. 29: **Promise and pitfalls in predicting biodiversity** (//www.mcgill.ca/qls/channels/event/qls-seminar-series-laura-pollock-337517)
Feb. 22	Josh McDermott (MIT) Sponsored by CAMBAM	**New Models of Human Hearing via Machine Learning** (//www.mcgill.ca/qls/channels/event/qls-seminar-josh-mcdermott-337762)
Mar. 1	Reading Week	No Seminar
Mar. 8	Lucien Weiss (Polytechnique Montreal) Sponsored by QLS	**Capturing cell-population dynamics at subcellular resolution in flow** (//www.mcgill.ca/qls/channels/event/qls-seminar-series-lucien-weiss-337616)
Mar. 15	Maria Vera-Ugalde (McGill University) Sponsored by QLS	**Imaging single mRNA molecules to investigate neuronal protein homeostasis** (//www.mcgill.ca/qls/channels/event/qls-seminar-maria-vera-ugalde-337818)
Mar. 22	Antoine Allard (University of Laval) Sponsored by CAMBAM	**Contact Network Epidemiology: Heterogeneity and Stochasticity of Disease Spread** (//www.mcgill.ca/qls/channels/event/qls-seminar-series-antoine-allard-338507)

Winter 2022	Speaker	Topic
Mar. 29	Laura Pollock (McGill University) Sponsored by QLS	**Promise and pitfalls in predicting biodiversity** (//www.mcgill.ca/qls/channels/event/qls-seminar-series-laura-pollock-337517)
Apr. 5	Allison Shaw (University of Minnesota) Sponsored by CAMBAM	**Parasites, animal migration, and how perspective shapes science (//www.mcgill.ca/qls/channels/event/qls-seminar-series-allison-shaw-338750)**
Apr.12	Sam Gershman (Harvard University) Sponsored by CAMBAM	**The riddle of dopamine** (//www.mcgill.ca/qls/channels/event/qls-seminar-sam-gershman-338909)
Apr. 19	SueYeon Chung (Columbia University) Sponsored by QLS	**Structure, Function, and Learning in Distributed Neuronal Networks** (//www.mcgill.ca/qls/channels/event/qls-seminar-sueyeon-chung-339100)
Apr. 26	Naeha Subramanian (University of Washington) Sponsored by QLS	TBD

Winter 2022	Speaker	Topic
May 3	Herve Abdi (University of Texas at Dallas) Sponsored by Ludmer	**Mega-Meta with covSTATIS: or How to Perform Multivariate Factor Meta-Analysis** (//www.mcgill.ca/qls/channels/event/qls-seminar-herve-abdi-339134)
May 17	Lluis Quintana-Murci (Institut Pasteur) Sponsored by QLS	**From Neanderthals to COVID-19: genetic and evolutionary sources of immune response variation in humans** (//www.mcgill.ca/qls/channels/event/qls-seminar-lluis-quintana-murci-339135)

QLS would like to thank Dr. Jesse Shapiro, Dr. Suresh Krishna, and Dr. Celia Greenwood for their help with organizing the seminars.

ApApendix 3



CAMBAM 2021 Fellowship Application
Due 15 June 2021

Please include this form plus trainee's CV in a single PDF document to frederic.guichard@mcgill.ca

Fellowships/amounts are awarded/determined based on the quality of the applicant, past participation in CAMBAM, past CAMBAM support received by applicant, funds available, number of applications received by CAMBAM, and number of applicants from the same lab.

Name and level of trainee (MSc, PhD or PDF):

Name of supervisor(s) and department:

List previous CAMBAM fellowships received by applicant (if any):

Brief statement (short paragraph) about the interdisciplinary nature of the trainee's research across biology, mathematics and computation:

Brief description of the trainee's and/or supervisor's participation in CAMBAM sponsored events during the last year:

 Appendix 4

ORGANIZERS

Anmar Khadra
(McGill University)

Caroline Palmer
(McGill University)

Overview

GUEST SPEAKERS

See the list

[Français]

Summer School in Nonlinear Dynamics for the Life Sciences with Applications to Neuroscience and Psychology
May 31-June 11, 2021

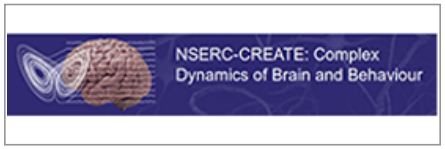
Hosted by CAMBAM and NSERC-CREATE in Complex Dynamics

Living systems are typical examples of dynamical systems with many interrelated parts or subsystems, ranging from small-scale cellular relationships to large-scale population relationships. Nonlinear dynamics appears when the behavior of a subsystem, with its own dynamics, becomes the input of another subsystem, imposing certain constraints on its dynamics. Mathematics, physics and computer science have provided important theoretical developments in understanding how nonlinear dynamics explain behavior in a wide range of disciplines in the natural sciences, social sciences and life sciences, based on common principles arising from differential equations. Nonlinear dynamics underlie the developmental trajectory of living organisms, the diffusion of information in neural networks and disease in populations, as well as the prediction of the evolution of ecosystems in changing environments. Although the challenges are different in each area of research, the quantitative models required are shared between the different areas. These models, along with statistical and computational tools, provide young scientists with a platform to understand the dynamics of their systems and to guide new experiments. evolution of ecosystems in changing environments. Although the challenges are different in each area of research, the quantitative models required are shared between the different areas. These models, along with statistical and computational tools, provide young scientists with a platform to understand the dynamics of their systems and to guide new experiments. evolution of ecosystems in changing environments. Although the challenges are different in each area of research, the quantitative models required are shared between the different areas. These models, along with statistical and computational tools, provide young scientists with a platform to understand the dynamics of their systems and to guide new experiments.

As part of this two-week online summer school, organized by the Center for Applied Mathematics in Biosciences and Medicine as well as the NSERC-CREATE Program in Complex Dynamics at McGill University (Montreal), we aim to providing a new generation of internationally recruited trainees with the fundamental tools of this field as well as giving lectures on recent advances in the field of nonlinear dynamics, including: machine learning applications; developments in computational neuroscience; the implications in cellular physiology; and infectious diseases (COVID-19) and transmission of communications.

Financial partners:

William K. and Katherine W. Estes Fund



Appendix 5

The William K. and Katherine W. Estes Fund is jointly overseen by
the Association for Psychological Science and the Psychonomic Society

February 8, 2021

Anmar Khadra
Department of Physiology
McGill University
3655 Promenade Sir William Osler
Montreal QC H3G 1Y6 Canada

Dear Dr. Khadra:

On behalf of the Association for Psychological Science and the Psychonomic Society, I am writing regarding your full submission for the William K. and Katherine W. Estes Fund advanced training program, entitled "Nonlinear Dynamics in Life Sciences: Applications in Psychology and Neuroscience." I am happy to inform you that your proposal has been approved for funding in the amount of $15,204.

A brief word about the logistics: The Estes Fund account is being managed by the Association for Psychological Science (APS). Sarah Schroeder (sschroeder@psychologicalscience.org) will serve as your liaison. Please contact her to arrange for disbursement of the funds. Our preference is that the grant be disbursed as a wire transfer to you or to your institution. After completion of the event, we request that you submit a final accounting of how the funds were spent and a brief narrative report (not to exceed one page). Please don't hesitate to get in touch as any questions arise.

The Estes Fund Committee asks that in all materials advertising the summer school you acknowledge the support of the William K. and Katherine W. Estes Fund.

We on the committee are truly excited about this summer school. Thanks so much for putting together a stellar proposal, and for the commitment of yourself and your colleagues to the development of mathematical and computational approaches to the mind.

Yours sincerely, on behalf of the Estes Fund committee,

Alice F. Healy

Alice F. Healy, Chair
Estes Fund Committee

Appendix 6

ORGANIZERS

Pouya Bashivan
(McGill University)

Morgan Craig
(CHU Sainte-Justine Research Center & University of Montreal)

Frédéric Guichard
(McGill University)

Overview

GUEST SPEAKERS

See the list

[Français]

Summer School in Nonlinear Dynamics for the Life Sciences (CAMBAM-CRM-CREATE) May 30-June 10, 2022 (online)

The summer school will cover a wide range of topics on the applications of nonlinear dynamics and computations to life sciences, ranging from the sub-cellular world to population dynamics. The program will include theoretical and practical courses taught by internationally renowned researchers in this field, as well as tutorials and computer labs that will complement the course content. The instructors will also supervise the group projects carried out by the participants.

The Center for Mathematics Applied to Biosciences and Medicine (CAMBAM), in collaboration with the Center for Mathematical Research (CRM) and with the support of the CRSNG-CREATE program in complex dynamics, is organizing an online summer course entitled "Summer School in Nonlinear Dynamics for the Life Sciences", from May 30 to June 10, 2022. This summer school is part of the long-standing biannual summer schools organized by CAMBAM as part of its training program