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MEMORANDUM

ATTENTION Senate
DATE November 18, 2021
FROM Wade Parkhouse, Associate Vice-
President, Academic and Vice-Provost
and Chair, SCUP
PAGES 1 of 1
RE: Establishment of the Institute for Neuroscience and Neurotechnology
(SCUP 21-35)

A handwritten signature in cursive script, appearing to read 'W Parkhouse', written in black ink.

At its November 17th, 2021 meeting, SCUP reviewed and approved the establishment of the Institute for Neuroscience and Neurotechnology for a five-year term.

Motion:

That Senate approve the establishment of the Institute for Neuroscience and Neurotechnology as an institute for a five-year term.

C: A. Brooks-Wilson, R. McIntosh

Memorandum

From: Angela Brooks-Wilson, Associate Vice-President, Research *pro tem* Date: Nov 3/2021
Re: Institute for Neuroscience and Neurotechnology (INN)
To: Catherine Dauvergne, Chair, *Ex-officio*, Senate Committee on University Planning (SCUP)

Attached is a proposal for the establishment of an Institute for Neuroscience and Neurotechnology (INN). The proposal is led by Dr. Randy McIntosh, an incoming Professor in the Department of Biomedical Physiology and Kinesiology, and incoming BC Leadership Chair in Neuroscience and Technology Translation Across the Lifespan.

The proposed INN will facilitate extensive multi-Faculty collaborative research in neuroscience and neurotechnology at SFU, using shared infrastructure located in Core Facilities including the ImageTech and WearTech Laboratories. The proposed Institute aligns with two research challenges identified in SFU's Strategic Research Plan (SRP): *Supporting health across the human lifespan*; and *Enhancing our world through technology*. It also fits within two of the SRP's research clusters: *Big data*, and *Health technology and health solutions*. Initial members include nine faculty members from five Faculties. Several members of the proposed INN have a history of collaborative activity.

I recommend approval as a Research Institute according to Policy R40.01.

Motion:

To approve the establishment of the Institute for Neuroscience and Neurotechnology for a 5-year term.

Sincerely,



Angela Brooks-Wilson, PhD
Associate Vice-President, Research *pro tem*

Attachments: Institute for Neuroscience and Neurotechnology application
Support Statement from Dean Paul Kench, Faculty of Science



SFU RESEARCH INSTITUTE APPLICATION

NAME OF INSTITUTE:

Institute for Neuroscience and Neurotechnology (INN)

DESCRIPTION OF PROPOSED INSTITUTE:

Please include a statement of the Research Institute's special purpose and how its work aligns with University priorities and the VPRI Strategic Research Plan.

The brain is central to who we are and what we do. The study of the brain is evolving to span academic disciplines from natural and social sciences to engineering and the arts. The integration of approaches is essential if we are to make meaningful advances in the understanding of our brains and the changes that come from damage and disease. We propose the creation of the Institute for Neuroscience and Neurotechnology (INN) to serve as a hub for neuroscience research and innovation activities at SFU. This SFU hub will also connect with other neuroscience efforts locally, nationally, and internationally, and will foster connections to promote commercialization and clinical translation.

The neuroscience community is growing at SFU and establishing the INN will help build more momentum. SFU has established significant infrastructure for neuroscience research at both Burnaby and Surrey campuses and an evolving connection for technology innovations, such as WearTech Labs and the Digital Health Circle. The INN will bring cohesion to efforts spread across campuses, elevating research and education, and enabling a unified effort to tackling the most salient issues about our brain.

INN will serve three important functions. The first is to provide critical technical support for neuroscience research. This includes support for neuroimaging acquisition and analysis, informatics and data pipelines, and computational modelling. This support will complement an investigator's existing team, enabling their research to advance with additional expertise. The second is to facilitate the formation of teams and research themes for the purpose of increasing collaboration amongst SFU researchers and developing highly competitive research grant proposals aimed at major funding agencies. The third function is to stimulate interdisciplinary research to build a more effective link for the translational aspect of neuroscience to clinical and commercial uses. Cutting across all three functions is an essential role for the INN to educate trainees in neuroscience research and facilitate career development.

The proposed new Institute aligns with SFU's 2016-2020 Strategic Research Plan (SRP) and our mission to be "the leading engaged university" in Canada. Specifically, INN will facilitate interdisciplinary research and enable collaboration with key stakeholders, including health-technology representatives, clinicians, and community members. The INN's aspirations align with the SRP by supporting diverse disciplinary expertise that will lead to cutting-edge interventions, models, and policies that improve diagnosis, healthcare delivery and outcomes, and ultimately, quality of life. By supporting existing data-driven research strengths and developing new research initiatives, the INN will also ensure SFU neuroscientists have the agility to pivot to strategically focused research funding opportunities that arise in the coming years. Importantly, the research focuses of the INN's members accept two of the six challenges laid out in the SRP: *supporting health across the human lifespan* and *enhancing our world through technology*.

RATIONALE FOR ESTABLISHING THE INSTITUTE:

Please include statements on the added value to the research collaborative and to the University in receiving this designation, as well as, any potential societal impact (beyond what would be accomplished by individual faculty members).

Brain disorders will impact a staggering 1-in-3 Canadians (Brain Canada Foundation's 2015 Annual Report). These disorders greatly reduce a person's quality of life, and the toll it takes on that individual's family is immeasurable. While neuroscientists worldwide have made excellent progress in understanding many of these disorders, a tremendous amount of work remains. This is particularly the case with translating fundamental knowledge gained in the lab to effective interventions and health technologies.

While the multidisciplinary nature of neuroscience is an asset, it means that SFU neuroscientists are spread out across faculties and campuses. The proposed Institute will bring much-needed cohesion to SFU neuroscientists and act as a catalyst for innovative team-based research and the development of new, ground-breaking neurotechnology.

In recent years, neuroscience research and related technology translation have gained great momentum across Faculties at SFU. SFU has several existing and emerging neuroscience "content" strengths as well as "technology or technique" strengths; several neuroscience-related research clusters are also emerging (see Appendix A). The INN can leverage these clusters and strengths and other SFU neuroscience-specific partnerships and facilities (see Appendix B) designed to enhance research and knowledge mobilization. This includes a partnership with Kids Brain Health Network (KBHN), a Canadian Network Centre of Excellence, ImageTech in Surrey Memorial Hospital, which houses state-of-the-art brain imaging facilities for functional brain mapping, and eBrain Lab in Surrey, an SFU core facility focused on innovative solutions for mental health and addiction recovery. The INN can also exploit other SFU partnerships and facilities, whose focus is not specific to neuroscience but would integrate well with current and future neuroscience-related research interests and would facilitate translation of neuroscience knowledge. This includes AGE-WELL (a Canadian Network Centre of Excellence), the CFI-funded WearTech facility, the Digital Health Circle, the Centre for High-Throughput Chemical Biology facility, the cutting-edge microscopy facility housed in the Faculty of Science, the national high-performance computing cluster Cedar, and the SFU Big Data Hub. Importantly, SFU neuroscience educational initiatives continue to grow. For instance, we have a thriving undergraduate program in Behavioural Neuroscience and in 2019, we launched a new Translational and Integrative Neuroscience (TRAIN) Graduate Specialization. The proposed INN will support this cutting-edge neuroscience education and training.

The inaugural director of INN will be Dr. Randy McIntosh, who was just recruited as the LEEF Chair in Neuroscience and Technology Translation Throughout the Lifespan. Dr. McIntosh bring his extensive network of collaborations to SFU. He is co-lead on The Virtual Brain (TVB, <https://thevirtualbrain.org>) platform, an international neuroinformatics initiative that spans North America and Europe. TVB has become a hub for neuroscience research in Europe as it figures prominently in the Human Brain Project and its new derivate EBrains Europe (ebrains.eu). The applications of TVB span healthy aging, stroke, dementia, and epilepsy. Indeed, the epilepsy work has led to the evaluation of TVB for clinical decision support in epilepsy surgery (<http://www.epinov.com/>). The open-source platform has over 35K downloads and is a valuable tool for elevating neuroscience research and translation. Having SFU as the Canadian hub for TVB will increase the profile and capacity of neuroscience at SFU. The INN's mandate to support neuroscience research will be enhanced by TVB's prominence.

The LEEF Chair position derived from a cross-Faculty working group assembled by the VPRI. This working group produced a strategic hiring plan for neuroscience, which has led to two planned Canada Research Chair (CRC) Tier 2 neuroscience positions. Additional recent CRCII hires (Dr Brianne Kent in the Department of Psychology and Dr Lisa Julian in the Department of Biological Sciences) in neuroscience at SFU serve to reinforce the imperative to build INN to act as a hub for SFU neuroscientists. INN will promote research integration across labs where possible and help form research teams to combine resources to address critical research questions in neuroscience.

The combined functions of INN will differentiate SFU neuroscience from other neuroscience efforts and accelerate impact in social and technological realms. In an era where data is paramount, the INN's support for large-scale "Big Data" studies will facilitate population-level investigations that yield more sensitivity to subtle variations in the brain that relate to normative function and changes in the face of pathology. The enhanced informatics capacity will support a comprehensive evaluation of avenues for treatment and prevention of brain disease. The INN can serve to support innovations that arise from these evaluations to accelerate commercial translation by linking members with local innovation hubs such as SFU Venture Labs. This will create a synergy between INN members and the infrastructure needed for research and technological development (e.g., ImageTech, WearTech), and then the mechanisms for validation (e.g., Science and Technology for Aging Research Institute (STAR)).

PRIOR TO APPLYING FOR RESEARCH INSTITUTE STATUS, MEMBER OF RESEARCH INSTITUTES SHOULD NORMALLY HAVE A HISTORY OF COLLABORATIVE ACTIVITY AS A GROUP.

e.g. co-supervision of students, co-publications, or shared research data, funding, and/or projects.

One of the functions of the Institute is to foster collaboration among SFU neuroscientists. Some of the anticipated members of the Institute have a history of collaboration. These collaborations include, for example, Drs. Marigold and Donelan, Drs. Marigold and Cooke, Drs. Doesburg, Iarocci, and Moreno, Drs. Mistleberger and Kent, Drs. Mistleberger and McDonald, Drs. Provençal and Farzan, and Drs. Farzan and Moreno.

In addition, several researchers have created teams and are applying for research grants. This includes Drs. McIntosh, Marigold, Cooke, Doesburg, and Iarocci, and Drs. McIntosh, Kent, and Andrew Sixsmith (STAR).

IF THE OBJECTIVES OF THE PROPOSED INSTITUTE OVERLAP WITH AN EXISTING RESEARCH CENTRE OR INSTITUTE, PLEASE PROVIDE EVIDENCE OF CONSULTATION WHERE A POTENTIAL CONFLICT HAS BEEN IDENTIFIED.

There is no overlap with existing institutes at SFU. The Behavioural and Cognitive Neuroscience Institute is being phased out and the intent is to merge its resources into the INN or another SFU neuroscience entity. The details of this are being discussed with the VPRI's office.

PROPOSED DIRECTOR(S):

Please include a statement on the provision for the appointment of the Director.

The Director and Associate Directors of the Institute shall be tenured or tenure-track faculty members at Simon Fraser University. The following inaugural Director and Associate Directors will serve five-year renewable terms.

Director: Randy McIntosh (incoming LEEF Chair).

In addition to the international research efforts noted above, Prof McIntosh brings extensive administrative experience to the INN, having served as Director of the Rotman Research Institute for 10 years and Vice President of Research at Baycrest Health Sciences,

Associate Director, Strategic Planning and Training: Dan Marigold

Prof Marigold created and Chairs the TRAIN program for graduate students and is an integral part of the Behavioural Neuroscience Undergraduate program, serving as its Co-chair.

Associate Director, Strategic Planning and Innovation: Brianne Kent

Prof Kent's research spanning animals and humans captures the breadth of the INN mandate, with a keen eye on translation and innovation to ensure maximum impact. Prof Kent is also on the Governing Council of CIHR, and was one of 4 members on the working group to develop the 2021-2031 CIHR strategic plan.

Subsequent Director and Associated Directors will serve 5-year renewable terms and are selected by the Steering Committee after an open call for applications and are subject to a ratification vote by members of the INN (excluding affiliate members). A positive ratification is where the majority of those voting support the appointments and reappointments.

INTERNAL GOVERNING PROCESS:

The INN is governed by an Executive Committee (Director and two Associate Directors) and a Steering Committee. See Organization Structure below.

The Director is responsible for the administration of the Institute and includes the following responsibilities:

- Representing the Institute within Simon Fraser University and the community
- Oversight for strategic direction and goals
- Chairing the Steering Committee
- Oversight for the Institute's finances
- Hiring and supervising personnel dedicated to the Institute

The Associate Directors are responsible for:

- Coordinating educational and training initiatives
- Identifying collaborative opportunities
- Coordinating funding initiatives
- Coordinating R&D initiatives

The Executive Committee is collectively involved in:

- Recruiting members
- Identifying new strategic opportunities
- Preparing the Institute's annual report for the Vice-President, Research
- Communicating with core facilities and initiatives related to neuroscience
- Determining how to allocate Institute funding to the SFU neuroscience community at large, when appropriate

The Steering Committee consists of 6 faculty members. The Steering Committee will normally meet formally once a term, with virtual ad-hoc meetings as needed for new initiatives. All members of the Steering Committee must hold full-time tenured or tenure-track positions within SFU. Both cellular/molecular neuroscience and systems neuroscience faculty must be represented on this committee. Members of the Steering Committee serve two- or three-year renewable terms that are staggered to ensure continuity. Appointments to the Steering Committee will be subject to a ratification vote by members of the Institute (excluding affiliate members). A positive ratification is where a majority of those voting support the appointment. The role of the Steering Committee is to represent the broader interests of neuroscience across SFU, working with the Executive Committee to validate strategic goals and objectives, evaluate barriers to progress, and propose solutions. The Steering Committee members also act to consult with other neuroscientists and bring ideas or concerns to the group.

The INN will also have an Advisory Committee consisting of SFU and external members who serve to advise the Executive Committee on strategic initiatives and evaluate progress on goals. They will meet with the Executive Committee and Steering committees once a year and create a report that will be part of the annual report to the Vice President, Research. The Advisory Committee may also be contacted on an ad-hoc basis for input on new strategic opportunities such as funding and partnerships.

An Annual General Meeting (AGM) will also be held once a year. The AGM will be open to all interested SFU faculty. It will serve as a forum to present an overview of the INN's activities for the past year and plans for the coming year. We will also have an open discussion with AGM attendees of issues and ideas to help support neuroscience research at SFU.

MEMBERSHIP:

Name	Position	Department	Faculty	Institution
Randy McIntosh	Professor	BPK	FoS	SFU
Dan Marigold	Associate Professor	BPK	FoS	SFU
Brianne Kent	Assistant Professor	PSYC	FASS	SFU
Michael Silverman	Professor	BIOL	FoS	SFU
Carolyn Sparrey	Associate Professor	MECH	FAS	SFU
Grace Iarocci	Professor	PSYC	FASS	SFU
Nadine Provençal	Assistant Professor	HS	FHS	SFU
Sylvain Moreno	Associate Professor	SIAT	FCAT	SFU
Faranak Farzan	Assistant Professor	MECH	FAS	SFU

The INN is constituted as a research Institute at SFU and is administered according to Policy R 40.01 and other relevant policies of SFU. Annual reports on all activities, finances, and current membership of the INN are provided to the Vice President, Research. The INN will recognize SFU in all its research, education, and service activities. The INN may use the name of SFU in support of its activities, including in the solicitation of funding. The INN may receive administrative assistance from SFU according to the provisions of Policy R 40.01. SFU and relevant Faculties, Departments, or Schools may also promote the interests of the INN within the University and wider community.

Existing SFU faculty and their trainees who currently work in neuroscience will be invited to become members of the INN (see <http://www.sfu.ca/neuroscience/faculty.html> for neuroscientists at SFU).

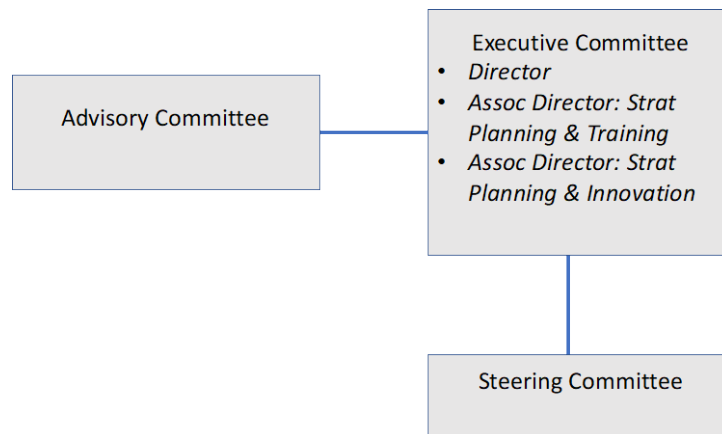
ORGANIZATION STRUCTURE:

Inaugural committee compositions:

Executive Committee = Randy McIntosh (Director), Dan Marigold (Associate Director, Strategic Planning and Training), and Brianne Kent (Associate Director, Strategic Planning and Innovation)

Steering Committee = Michael Silverman, Carolyn Sparrey, Grace Iarocci, Nadine Provençal, Sylvain Moreno, Faranak Farzan

Advisory Committee = Jon Driver (SFU), Clay Braziller (SFU), Susan Fitzpatrick (External, President JS McDonnell Fnd)



Organization Structure for the INN. The executive committee has three members in charge of strategy & communication. The steering committee, made up of SFU neuroscience faculty, help validate strategic activities and consult with other faculty members. The advisory committee provides high-level guidance strategic initiatives and evaluate progress on goals.

PROCEDURES FOR RATIFYING NEW MEMBERS:

Members of the INN will normally be limited to faculty, staff, and graduate students at SFU who make substantive ongoing contributions to neuroscience and one or more of the objectives of the INN including, for example, research, education, service activities, or funding. Members are expected to regularly engage in events and activities related to the INN. Members are eligible to vote to ratify the Director(s) and Steering Committee appointments, governance, and other substantive matters of the INN. To become a member, candidates must submit a half-page letter outlining their relevance to and interest in neuroscience and a CV to the Director for approval by the Steering Committee. At their discretion, the Executive Committee, in consultation with the Steering Committee, can revoke membership if the conduct of a member is not in keeping with INN goals or SFU policies.

AFFILIATES:

Affiliate members include professionals, clinicians, and researchers from other universities and organizations who are engaged in substantive research, education, and/or service activities with the INN and whose main affiliations are with organizations other than the INN and SFU. Affiliate members are not eligible to vote on appointments and other matters related to the INN. Potential affiliate members must submit a half-page letter outlining their relevance to and interest in neuroscience and a CV to the Director for approval by the Steering Committee in consultation with the Executive Committee. Affiliate membership is normally a renewable 3-year term approved by the Director. Renewal requires submission of a half-page letter describing their continued relevance to the INN.

TRAINING AND MENTORSHIP OPPORTUNITIES FOR STUDENTS:

The interdisciplinary nature of neuroscience provides ample opportunity for enrichment. The collaborative nature of research—facilitated by the INN—means trainees will be exposed to different faculty members and their research labs. This will promote transfer of techniques between trainees and hence, labs. The neurotechnology activities for INN provide training opportunities in research and career and technological development through collaboration with Digital Health Circle, STAR, and WearTech labs. These will be supported by INN funds and by training partners such as MITACS.

INN will promote and support activities of the Translational and Integrative Neuroscience (TRAIN) graduate specialization, which offers courses and training to graduate students and involves the Departments of Biological Sciences, Biomedical Physiology and Kinesiology, Molecular Biology and Biochemistry, and Psychology. This will include facilitating TRAIN workshops (NEUR 802) for trainees. INN will also support the Behavioural Neuroscience undergraduate program (a joint major between the Department of Biomedical Physiology and Kinesiology and the Department of Psychology), where possible. INN will engage with and support initiatives of the Behavioural Neuroscience Student Society, and work with said Society to develop yearly Brain Awareness Week initiatives to engage the wider Lower Mainland community. INN-hosted research seminars will expose trainees (both at the undergraduate and graduate level) to cutting-edge research from around the world and provide additional networking opportunities.

Dr. McIntosh is a member of the Governing Board of International Neuroinformatics Coordinating Facility (INCF, incf.org), an international body that oversees the development of neuroinformatic standards. SFU will participate in INCF through the INN, and in so doing, have access to the extensive capacity for training scientists in the principles and necessary architecture for open science. This includes on-line workshops and materials in a range of neuroinformatics activities, and on-site meetings that serve to both showcase local achievements and exchange best practices with other researchers. Similar opportunities come from the establishment of TVB hub at SFU, through regular TVB Node meetings. The node meetings have both didactic and collaborative aspects where attendees bring their own dataset suited to their own research questions.

RESEARCH INSTITUTE 5-YEAR GOALS AND KEY PERFORMANCE INDICATORS:

The five-year goals are aligned with the three functions enumerated above in the description of the INN. An annual evaluation will be conducted to examine the progress towards the goals as well as quarterly evaluations where feasible to identify threats

early and enable mitigation. The annual evaluation will be supplemented by an internal mid-term review, which will entail quantitative and qualitative assessments of INN's impact. The qualitative framework is an important complement to typical quantitative measures, particularly for institutes that serve a supporting role where the impact cannot be expressed numerically, but members can attribute their success to their engagement with INN.

Goals for Function 1: technical support for neuroscience research

Once the core staff have been hired for informatics, data analytics, and project management, key performance indicators (KPIs) will be focused on engagement of neuroscience researchers and trainees. In addition to actual numbers of persons and projects that engaged the INN, we will use qualitative metrics on whether the researchers felt engagement with INN facilitated their work. As the financial model for INN evolves, additional KPIs focused on cost recovery will be added.

Goals for Function 2: facilitate the formation of teams and research themes

The KPIs for this will be more quantitative, focused on the number of research groups formed, planning sessions for interdisciplinary research, and success in acquiring funding for research efforts. The KPIs in the initial years of INN will focus more on engagement, memberships, and submission of proposals.

Goals for Function 3: build link for the translational aspect of neuroscience to clinical and commercial uses

This function will be evaluated primarily based on engagement of clinical and commercial partners. Quantitative metrics will focus on planning meetings between basic neuroscience researchers and potential partners. The INN will build a portfolio of neuroscience research on-going and planned to help connect parties. The success of this function will depend on the strength of partnerships with clinical affiliates (e.g., Fraser Health, Dept of Evaluation and Research Services) and translational entities (STAR, Digital Health Circle).

In addition to KPIs linked to functions, there are cross-cutting efforts that serve to support all INN activities:

- 1) Establishment of open science and open innovation principles
- 2) Neuroinformatics hackathons to develop skills and collaborations
- 3) Symposia and workshops
- 4) Clinical and industrial internships

CURRENT RESOURCES AND FUTURE SUSTAINABILITY:

Collaborations:

We have identified an initial list of key collaborators from SFU and abroad that will be important to fulfill the INN strategic initiatives, which include resources, activities, and access to diverse sources of funding.

Internal

Science and Technology for Aging Research (STAR) – focus on technology to support healthy aging acts as a vehicle for INN members to test and validate innovations

Digital Health Circle (DHC)– the emphasis on connecting innovation to end-users acts as a means to disseminate innovation

WearTech Labs – the capacity to support development of mobile technology support prototype development before broader validation through STAR or DHC

Big Data – the core facility expertise in Big Data can support informatics developments necessary to integrate disparate data from neuroscience studies

Complex Systems Modeling Group – an important complement to the local TVB implementation, providing the theoretical grounding to evolve the platform beyond its primary use in neuroimaging to cellular and molecular work and to social neuroscience applications necessary for translation to clinical and policy work

External

Centre for Brain Health at UBC - the neighbouring neuroscience centre that we can leverage for local collaborative and training opportunities

Campus Alberta Neuroscience – the partnership of Alberta universities in training can be expanded to create a partnership with INN to leverage unique training opportunities

TheVirtualBrain Consortium & EBrains Europe – expanded cloud-based capacities for access to brain modelling software, data, and the virtual lab exchanges increase collaborative opportunities

Fraser Health – expand partnerships at Surrey Memorial Hospital to facilitate clinical and evaluative research.

Funding:

The core budget for the INN will be derived from internal and external funding including sources such as grants, PacifiCan proposals, philanthropy and potentially neuroimaging revenues, with a target annual budget of \$250K. The start-up package for Dr. McIntosh will be used to underwrite the budget in the first year. This amount will support three FTE's: one program manager, one data analyst, and one research support personnel. The remaining funds will be used for seed funding to support collaborations between labs and training opportunities.

Sustainability Plan:

The financial model for INN will be a combination of grant and philanthropic support and fee-for-service charges for data analysis and research support. The latter is modelled after the KL-CARE research unit (<https://bit.ly/3iizrFN>), that Dr. McIntosh established at Baycrest during his tenure as VP-Research. The mandate of KL-CARE is to provide essential support for research, which spans from planning research and evaluation projects, to assisting in data acquisition and analysis. The attraction of the KL-CARE model is that researchers can access the necessary expertise for a project without having to commit a full FTE. This saves the PI's money in the long-run and the collaboration with KL-CARE also serves to educate lab staff. This model will be used for INN, particularly for projects that involve neuroimaging to assist in data processing pipelines and analysis. Support for TVB modelling will also be provided, where models can be created for animal and human research.

Federal and provincial grant programs will also be pursued. We believe the integrative model for INN, deriving from a neuroinformatics core, will yield a compelling case for funding based both on the data analytic stream itself and the application to understanding brain function and dysfunction. Past success predicts future success, and the European TVB team have obtained funding for TVB-Cloud (<https://virtualbraincloud-2020.eu/>), and comprehensive informatics architecture going from data input, to processing and modeling as well as curation of data and models to help combine information in knowledge graphs. Dr. McIntosh recently obtained funds from CIHR to develop a population-based computational model of healthy brain aging (TVB-HAM). Similar applications are envisioned for early development (TVB-Baby), which we will propose to CIHR.

The INN's activities also serve to train HQP that can work in both academia and industry. We will consider an application to Western Economic Diversification Canada to support these efforts. Similar applications to MITACS will be considered for more project targeted activities. The partnership of INN with STAR and Digital Health Circle creates a pipeline from discovery to innovation. This provides financial opportunities through industry funded research and support from Western Economic Diversification.

WOULD THE ESTABLISHMENT OF THIS INSTITUTE ENABLE THE MEMBER RESEARCHERS TO ATTRACT FUNDING BEYOND WHAT THEY WOULD BE ABLE TO DO ON THEIR OWN? PLEASE EXPLAIN.

There is no other neuroscience program in Canada with the integrative potential from TVB embedded in a culture that already fosters innovation needed for translation of fundamental knowledge into technical solutions. INN will be responsible for liaising the discussion among members in planning research that takes advantage of the interdisciplinary approach. Federal programs are more frequently asking for these approaches (e.g., NSERC Alliance, New Frontiers Research Fund). As INN evolves, we envision a truly transdisciplinary approach where boundaries between disciplines are erased, leading to a common motivation to attain research goals and translate to maximum benefit. The transdisciplinary approach will also be attractive for private donors, who will be able to make the connection between their gift, its use, and its impact. We anticipate a similar attraction from industry as the transdisciplinary framework can mobilize the most effective approach to innovation development.

COMMUNICATION PLAN:

Provide a description of a communication plan that is aligned with University Communication policies, including plans for maintaining an up-to-date web/social media presence.

The INN will maintain a website that serves as the University's Neuroscience portal and will replace the existing website. The INN will maintain a social media presence and engage in outreach activities alone or in coordination with Departments, Schools, and/or Faculties at SFU. The INN activities will also be featured on TVB and EBrains Europe sites to ensure more global dissemination.

EVIDENCE OF SUPPORT:

Please include evidence of support from the Dean or Associate Dean, Research of the home Faculty of the proposed Institute Director (mandatory).

Applicants may feel free to submit additional supporting documents such as letters of support and constitutions (if available).

Date: 04-Nov-2021
Click or tap to enter a date.

Applicant Signature: *Randy McIntosh*

By signing this form, the applicant confirms they have reviewed [SFU Policy R40.01](#) and [related Procedures](#) and agrees to conduct its activities in accordance with University policies.

Appendix A

SFU has several existing/emerging neuroscience **content** strengths and **technology or technique** strengths. There are also several emerging **research clusters**.

Existing neuroscience content strengths:

1. *Sensorimotor neuroscience*
 - Research on understanding how the nervous system controls movement in health and disease and ways to improve function through targeted interventions.
2. *Cellular & molecular mechanisms of neurodevelopmental & neurodegenerative disorders*
 - Research on fundamental mechanisms of disease (e.g., Alzheimer's, rare diseases, ALS, addiction) and neurodevelopment (e.g., axon pathfinding or neural "wiring," synaptic function).
3. *Cognitive and behavioural neuroscience*
 - Research to understand brain mechanisms underlying cognitive, affective, and social processes and associated disorders across the lifespan. Areas of special strength include behavioural endocrinology, chronobiology and sleep, and attention and its disorders.

Existing neuroscience technology/technique strengths:

1. *Neuroimaging*
 - Research on understanding brain function and disease through MRI, MEG, or EEG. A strong focus of this area is neuroinformatics (brain signal processing, classification, and big data analyses).
2. *Neurotechnology*
 - Research to develop new brain health technology.
3. *Neuromodulation*
 - Research using a variety of brain stimulation techniques (e.g., TMS, tDCS, tACS, tRNS, GVS) to better understand brain function and to treat neurological disorders.
4. *Molecular and cellular analysis tools*
 - Research using technical tools including neuronal cell culture, neural gene identification and manipulation, nerve cell imaging in culture, and model systems (e.g., *C. elegans*).
5. *Animal models of disease, behaviour, and neurophysiology*
 - Research using genetic models of disease, neuroanatomy, cortical mapping, immunohistochemistry, and behavioural assessment.

Emerging neuroscience technique strength:

1. *Computational neuroscience*
 - Research that models the nervous system to understand development, structure, and physiology, from cells to neuronal networks to cognition and behaviour.

Emerging neuroscience-related research clusters:

1. Sensorimotor control and neuroplasticity/neurorehabilitation
2. Aging and neurodegeneration
3. Autism and neurodevelopmental disorders

Appendix B

Neuroscience and related Infrastructure

- ImageTech (SFU Core facility)
 - i. Housing state-of-the-art MRI and MEG for functional brain mapping
- eBrain Lab (SFU Core facility)
- WearTech (SFU Core facility)
- Centre for High-Throughput Chemical Biology facility
- Cutting-edge microscopy facility

Neuroscience and related Initiatives

- AGE-WELL (a Canadian Network Centre of Excellence)
- Kid's Brain Health Network (KBHN) (a Canadian Network Centre of Excellence)
- Digital Health Circle

Dr AR McIntosh
Proposed Director
Institute of Neuroscience and Neurotechnology

4 October 2021

Re: Support Statement for Proposed Institute of Neuroscience and Neurotechnology

The Faculty of Science (FoS) is delighted to support the formation of the Institute of Neuroscience and Neurotechnology (INN) under your directorship. The Faculty of Science is home to a number of faculty, in BISC and BPK, who actively contribute to the teaching program and undertake leading research in neuroscience. These faculty members are very keen to actively contribute to the success of the proposed new institute under your leadership.

I anticipate that the INN will initiate and further foster collaborations among our researchers, leading to greater funding opportunities and ultimately a stronger intellectual climate for neuroscience research at SFU. Moreover, the INN will expand the training opportunities for our undergraduate and graduate research students. Finally, the INN is an excellent mechanism to build neuroscience research across campus along with other universities and industry partners worldwide.

I wish you every success with this exciting new institute and the Faculty will continue to support its success where practicable.

Yours sincerely



Dr Paul Kench
Dean of Science,
Simon Fraser University
Burnaby, BC
Canada