Fellowship Training

March 2025

Table of Contents

Fellowship Opportunities

Overview

The Calgary Stroke Program (CSP) is a joint venture between Alberta Health Services (clinical care) and the University of Calgary (education). Since its beginning in 1996, the CSP has become one of the most recognized international destinations for integrated and cutting-edge training in acute stroke, stroke management, prevention and research.

Calgary offers several different opportunities for fellowships which are briefly summarized below, with more detail provided in this guide.

The Calgary Stroke Program does not currently provide any training for Neurointervention.

Clinical / Research Fellowships

	Elective	Mini-Clinical	Clinical/ Academic
Qualifications	International Medical Trainee, MD	MD with Neurology, Internal Medicine, or Geriatric training	
Duration	30-89 days	4 to 6 months	1 to 2 years
PGME Registration	Required		
Direct Patient Interaction	Yes, with required Medical Education License through CPSA and Medical Liability Insurance through CMPA		
Clinical Exposure	Yes, with required Medical Education License through CPSA and Medical Liability Insurance through CMPA		
Research Opportunities	No	Limited	Yes
Program Funding	Not Available	Not Available	4 positions annually
External Funding Accepted (self-funding not allowed)	Yes	Yes	Yes
Certificate	Not Available	Letter	Certificate
Language Requirements for International trainees (CPSA prerequisite)	None	**One of the Following:** 1. *IELTS, Academic Version*, **minimum score of** 7.0 in each component 2. *OET in Medicine*, **minimum score of** B in each component 3. *CELPIP*, **minimum score of** 9 on each component All test scores must be achieved in one sitting	

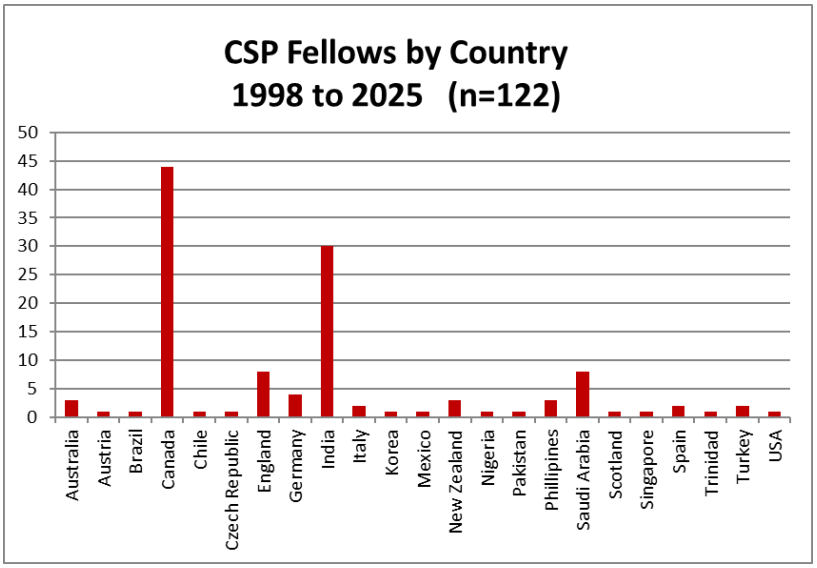
Calgary Stroke Program

The Calgary Stroke Program is one of the largest stroke programs worldwide. With 16 stroke neurologists, including nine academic clinician scientists, we are able to provide comprehensive integrated services in the area of acute stroke, stroke management (with a 35-bed stroke unit), stroke rehabilitation, stroke prevention and stroke research. Our program services the southern half of the province of Alberta, and parts of the provinces of Saskatchewan and British Columbia. Our integrated acute stroke team includes a full-time nurse practitioner, fellow, stroke neurologist, neurointerventionist, and other allied health partners.

Having extensive integrated stroke management faculty, staff and support personnel within one program has been the hallmark of Calgary's continued success. Our program was the first fully accredited comprehensive stroke program in Canada, and we have helped to establish many of the "best practices" for Canadian stroke care, and elsewhere.

Calgary Stroke Fellowship Program

Calgary's Fellowship Program has evolved into one of the premier programs for subspecialty training in stroke internationally. Since 1998, our program has trained over 120 stroke physicians. The global impact of this training is now transforming stroke care throughout Canada and other countries, such as India, Germany, Saudi Arabia, Spain, and the United Kingdom.



Calgary Stroke Program fellows are now in most major cities and comprehensive stroke centres across Canada. These trainees are replicating Calgary's philosophy for rapid access to quality care. A similar scenario is evolving in India with many former fellows now working in various areas of India. In many cases these individuals are the only stroke subspecialty trained neurologists for very large regions with populations in excess of 30 million. Having the Calgary stroke care footprint in India is a unique accomplishment for the University of Calgary.

The priority of the Calgary Stroke Fellowship Program is to train the next generation of stroke neurologists. Positions are awarded first to Canadian trained neurologists who have recently completed their FRCPC examinations as mandated by the Canadian Government. Canadian fellows typically choose a one-year fellowship

to learn acute stroke management skills. Some Canadian fellows may choose a two-year term in order to learn or further their academic research skills with the intention of seeking a clinician scientist or clinician instructor track position at a Canadian university. Most Canadian fellows will work in one of the 20 or so comprehensive stroke centres in Canada where a full complement of stroke treatments and investigations are performed (tertiary level care). In some cases, Canadian fellows are able to obtain external funding through academic awards (e.g. Heart & Stroke Foundation of Canada, Canadian Institutes of Health Research, etc.) In these cases, conditions set within their award dictate the amount of clinical workload they can provide. If successful in obtaining an external award, generally 75% of the fellow's time will be protected for academic purposes, with the remaining 25% dedicated to clinical related duties and education.

International fellows may request a one or two-year fellowship. Two-year international fellows are required to engage in academic projects under close mentorship from one of the nine stroke clinician scientists. Those who have had some prior fellowship training or extensive exposure to stroke often choose a one-year term.

Some international fellows are sponsored by their own countries (e.g. Saudi Arabia), or their home institutions while others need to apply for Calgary funded positions.

Fellows cannot be self-funded.

The high demand for training in Calgary has resulted in the tremendous growth of the program with six to eight fellows in training each year. We currently have four paid positions which are necessary to provide care for an average 30 in-patient stroke unit census and 1400 stroke admissions annually. Other funding sources include operating grants, scholarship awards and home country government or institution sponsored funding, which must be approved by the PGME.

The academic productivity amongst stroke fellows is significant with numerous fellow first authored original contributions mostly in medium and high impact journals. The top 20 fellow first-authored publications are listed on our website under the research tab. This is possible because the Calgary Stroke Program has the largest number of stroke clinician scientists working together in one centre.

Calgary's reputation for hands-on quality training has contributed to our growth. Our program now receives several applications per year. This growth has resulted in the need to re-evaluate entrance requirements, create training paths and develop a formalized evaluation/renewal process.

Training Streams

Two different fellowship training options (streams) are available. The fellow is encouraged to select a training path that is right for them prior to program acceptance (when possible). The path chosen will influence the entrance and exit timelines. All paths include a significant service component for hands-on training.

		Average Number of Hours Per Year			
Training Path	**%**	**Acute Mgmt**	**Clinic Hrs**	**On-Call**	**Term (Yr)**
Clinical/Academic	70/30	360-540	192-256	832-1200hrs	1-2
Academic/Clinical	25/75	180	128	832-1200hrs	1-2

Note: On Call Scheduling is 1:n nights & weekends

- Acute Management includes acute stroke management in Emergency Room, on-service rotation, Unit 112 or Unit 100 assignments, which are scheduled on a rotating basis.
- Clinics include assisting stroke neurologists in the out-patient Stroke Prevention Clinic, outpatient triage, Tiara clinic and follow-up clinics. Times and physicians are assigned on a rotating basis.
- On-call refers to overnight coverage. Scheduling is based on the number of fellows within the program at the time the schedule is prepared.
- Education refers to learning opportunities provided through the following educational sessions.

Mandatory Sessions

Stroke Case Rounds:	Thursday morning:	0730 to 0900
Stroke Academic Lectures:	Thursday afternoon:	1200 to 1300
Fellow Academic Half Day:	Wednesday afternoon:	13:30 to 1500

Optional Sessions

Neurology Rounds:	Tuesday mornings – 1 hour
DCNS Grand Rounds:	Friday mornings – 2 hours

Length of Training

The Calgary Stroke Program offers three options for training length including a four to six-month mini fellowship (under special circumstances), and a one- or two-year term. Two different fellowship paths are discussed below.

Clinical Fellowship (1 to 2 years)

Educational Goals:

1. Provide one- or two-year intense stroke training in all areas of stroke management.
2. Expose trainees to several different faculty members for a variety of care approaches.
3. Provide exposure to a clinical model for stroke prevention and follow-up.
4. Exposure to imaging, Transcranial Doppler, and neurointerventionalist stroke techniques
5. Exposure to, and/or focus on, clinical and translational stroke research.
6. Emphasis on acute stroke therapy.

Objectives:

1. Learn to lead an acute stroke team by assisting stroke clinicians on-service, and being the primary contact physician on-call on rotational basis.
2. Learn in-patient management and care in the Emergency Room, Unit 112 (Neuro ICU); and Unit 100 (Stroke Unit) by assisting clinicians and working with other allied health professionals.
3. Learn out-patient management by attending Stroke Prevention Clinic and assisting clinicians.
4. Gain valuable knowledge through educational opportunities including case rounds, academic rounds; in which fellows are regularly scheduled to present stroke and imaging related talks (subject is fellow's choice) to an average audience of 40 attendees interested in stroke.
5. Learn Transcranial Doppler imaging.
6. Work with high caliber neurointerventionists to treat a variety of acute stroke cases.
7. Understand and gain some exposure to academic research and clinical trial management.
8. Understand the role of the physician in clinical trial design, execution and management.
9. Participate in stroke related research projects.

Duties:

- As a clinical fellow, time is spent in clinical situations including acute stroke management, outpatient clinics and on-service/call rotation, clinical trial follow-ups, etc, approximately 36 hrs/week (based on a quarterly estimate below), in addition to educational sessions.
    - Unit Coverage: 15-20 days @ 9hrs (800-1530)
    - Clinics: 10-12 days @8hrs (8am-1600)
    - Night Call: 8-12 nights x 17hrs (1530-0800)
    - Weekend call: 3-4 x 24hrs

Expectations:

- Training sessions are mandatory for all fellows, except post-call.
- Clinical fellows are primarily clinical with research interests attended to in the fellow's remaining available time. Alternatively, fellows are encouraged to participate in other clinics or services as electives, working in a clinical capacity during weekdays, except when post-call.
- Development of abstracts for conferences (research based) are strongly encouraged.
- Travel allowance to attend stroke related conferences can be up to $4,000.00/year maximum of seven days, based on fellow's regular enrollment of clinical trial patients.
- Fellows will use at least three weeks earned holiday during their fellowship term, with the option to use their last week of holidays to help move and settle in their new position elsewhere (subject to approval).

*Clinical/Academic Fellowship** (External Award Required)

Educational Goals:

1. Provide one- or two-year intense stroke training in all areas of stroke management.
2. *Expose trainees to several different faculty members for a variety of care approaches.*
3. *Provide exposure to a clinical model for stroke prevention and follow-up.*
4. *Exposure to imaging, Transcranial Doppler, and neurointerventionalist stroke techniques*
5. *Exposure to, and/or focus on, clinical and translational stroke research.*
6. *Emphasis on acute stroke therapy.*
7. *Understand the role of the physician in clinical trial design, execution and management.*
8. *Concentrated time to work on a specific research program based on external award received, with the assistance of faculty members; and if desired, participate in a stroke related research project, contributing to the field of knowledge in academic journals, stroke conferences, etc.*

Objectives:

1. *Learn to lead an acute stroke team by assisting stroke clinicians on-service, and being the primary contact physician on-call on rotational basis.*
2. *Learn in-patient management and care in the Emergency Room, Unit 112 (Neuro ICU); and Unit 100 (Stroke Unit) by assisting clinicians and working with other allied health professionals.*
3. *Learn out-patient management by attending Stroke Prevention Clinic and assisting clinicians.*
4. *Gain valuable knowledge through educational opportunities including case rounds, academic rounds; in which fellows are regularly scheduled to present stroke and imaging related talks (subject is fellow's choice) to an average audience of 40 attendees interested in stroke.*
5. *Learn Transcranial Doppler imaging.*
6. *Work with high caliber neurointerventionists to treat a variety of acute stroke cases.*
7. *Understand and gain some exposure to academic research and clinical trial management.*
8. *Understand the role of the physician in clinical trial design, execution and management.*
9. *Participate in stroke related research projects.*
10. *Understand the role of the physician in clinical trial design, execution and management.*
11. *Concentrated time to work on a specific research program based on external award received, with the assistance of faculty members; and if desired, participate in a stroke related research project, contributing to the field of knowledge in academic journals, stroke conferences, etc.*

Duties:

- As an academic fellow, 75%[1] of the fellow's time is spent on research and the remaining time in clinic and learning opportunities. Quarterly estimates of clinical time include:
- Unit Coverage: 5 days @ 9hrs (800-1530)
- Clinics: 4 days @8hrs (8am-1600)
- Night Call: 8-12 nights x 17hrs (1530-0800)
- Weekend call: 3-4 x 24hrs
- A range of hours per quarter is used as the total number of fellows fluctuates over the year.

Expectations:

- Training sessions are mandatory for all fellows, except post-call.
- Academic fellows will take call in the same amount and rotation pattern as other fellows.
- Development of abstracts for conferences (research based) are mandatory in association with CSP stroke faculty.
- Travel allowance to attend stroke related conferences can be augmented up to $4000.00/year, by the clinical trials office for regular enrollment of clinic trial patients; maximum seven days leave, based on travel allowance (if any) provided by external award.
- Fellows will use at least three weeks earned holiday during their fellowship term, with the option to use their last week of holidays to help move and settle in their new position elsewhere (subject to approval).

[1] The percentage of research time vs clinic time will be dependent on the scholarship award.

Extensions

Extensions are only allowed for one year. All extensions must be for extraordinary reasons and approved by the Associate Dean of Post Graduate Medical Education, University of Calgary.

Electives Opportunities within Fellowship

In addition to the regular training and call schedule, options for electives are available to augment your stroke education. Stroke fellows are responsible for arranging electives on their own.

❒ ***Neuro-cognitive Assessment Clinic*** *(FMC)*

- Cognitively impaired for diagnostic assessment
- Alzheimer's, vascular dementia, mixed dementia, other dementia

❒ ***Neurovestibular Clinic*** *(South Health Campus)*

- **Acute dizziness**
- **Vestibular disorders**
- **Vestibular function and rehab**

❒ ***Neuro ICU Service*** *(FMC)*

- **Vestibular function and rehab**
- **Located at South Health Campus (SHC)**
- **On week neuro ICU with Dr. Phillipe Couillard**

❒ ***Neurovascular Clinic*** *(FMC)*

- **Multidisciplinary stroke, neurology,** interventional radiology and neurosurgery
- **AVM, aneurysms, and carotid aneurysms**

❒ ***Neuro-hematology***

- Coagulopathies

❒ ***Neurointervention Service*** *(FMC)*

- One week rotation support and observership **in the neuro-interventional suite**

❒ ***Pediatric Stroke Clinic*** *(Alberta Children's Hospital)*

- **Perinatal stroke, pediatric CSVT, pediatric stroke**
- **2 pediatric stroke neurologists**

❒ ***Stroke Physiatry Clinic*** *(FMC)*

- **Post stroke rehab care and complications**
- **Botox injections, electrical stimulation, post stroke pain syndromes**
- **3 stroke physiatrists**

❒ ***Stroke TCD Service*** *(FMC)*

- **2 to 5 TCD studies per day (Monday to Friday)**
- **Bedside examination skills and interruption**
- **100 studies needed for Neurosonology certification with the American Society of Neuroimaging, (January exams each year)**

Evaluations

Quarterly evaluations (progress reports) include a self-evaluation by the fellow, with feedback required by a faculty member who is on the fellowship committee. The primary purpose of these evaluations is to ascertain the fellow's personal objectives for training and to ensure that these objectives are met, as well as to identify any areas of concern and/or improvements required to meet the objectives of the fellowship.

Four-Weeks after Arrival:

- A check-in form is used to ascertain the fellow's own objectives
- Selection of stroke related electives (to be arranged by fellow)
- Initial observations (if any) by faculty
- Presentation of research by the fellow enrolled in the academic/clinical stream (2 years). Assignment to a faculty mentor if desired.
- Any major concerns will be identified and relayed by the Director, with suggestions to the fellow for improvement. A probation period of 4 to 6 months has been mandated by the PGME.

Three-Month Reviews

- Fellows are required to fill in a Progress Report/Review *every three months,* prepared by both fellow and Fellowship Committee member (with input from stroke faculty and staff) and discussed face-to-face.
- These evaluations will provide the fellow with constructive criticism on all areas of stroke management, patient care, and working relationships.
- Presentation/update of research by a fellow enrolled in the academic/clinical stream.
- For academic/research fellows, a review of their research progress and goals is required, with emphasis on the fellow's educational needs to successfully complete their research project.
- Fellow's progress, concerns, future focus and continuation of the fellowship term are reviewed.

Midterm Reports Due to PGME (for 1 and 2 year term)

- The program must submit a midterm report for each fellow during their fellowship.

Probation

As of July 1, 2019, Post Graduate Medical Education (University of Calgary), has instituted a formal probation process for all fellows. Fellows with a one-year term will be on probation for 4 months, and fellows with a two year term will have a longer probation period of 6 months.

Fellows will be monitored by faculty and staff for the first 4 to 6 months to ensure that their skills (including English Language proficiency) are sufficient to complete the remainder of their fellowship. A form is required by the PGME, from the Program Director and prior to the probation deadline, either recommending the fellow continue with the program or be terminated due to unsuccessful performance. Termination is a rare occurrence in our program.

Funding

Currently, our program has funding for four fellow positions per year, with a salary of $70,000/yr. While our program has several positions available, we receive over several applications each year for these few funded positions.

When possible, applicants should try to obtain funding through their own government, institution, or grant. Self-funding is not permitted.

There are no additional stipends or funding available for relocating expenses.

Expected Fees

Fellows are responsible for a non-refundable administration fee in the amount of $265.00 to the Calgary Stroke Program; and $500.00 fee for PGME, payable prior to initiating the registration process. In addition, fellows can expect to pay the following estimated additional fees related to their fellowship including:

- College of Physicians and Surgeons of Alberta Practice Permit $400.00
- Canadian Medical Protective Association $200.00 (plus ~$100/mth)
- Approximate University of Calgary Tuition (12 Months) $1,100.00 (Canadians)
  $3,990.00 (Internationals)
- Visa fees (depends on the country)

Program Limitations

While the Calgary Stroke Fellowship Program provides fellowship training positions, we do not provide a position placement service. Our goal is to accept international trainees who will return to their home country and use their stroke training to treat patients and teach others.

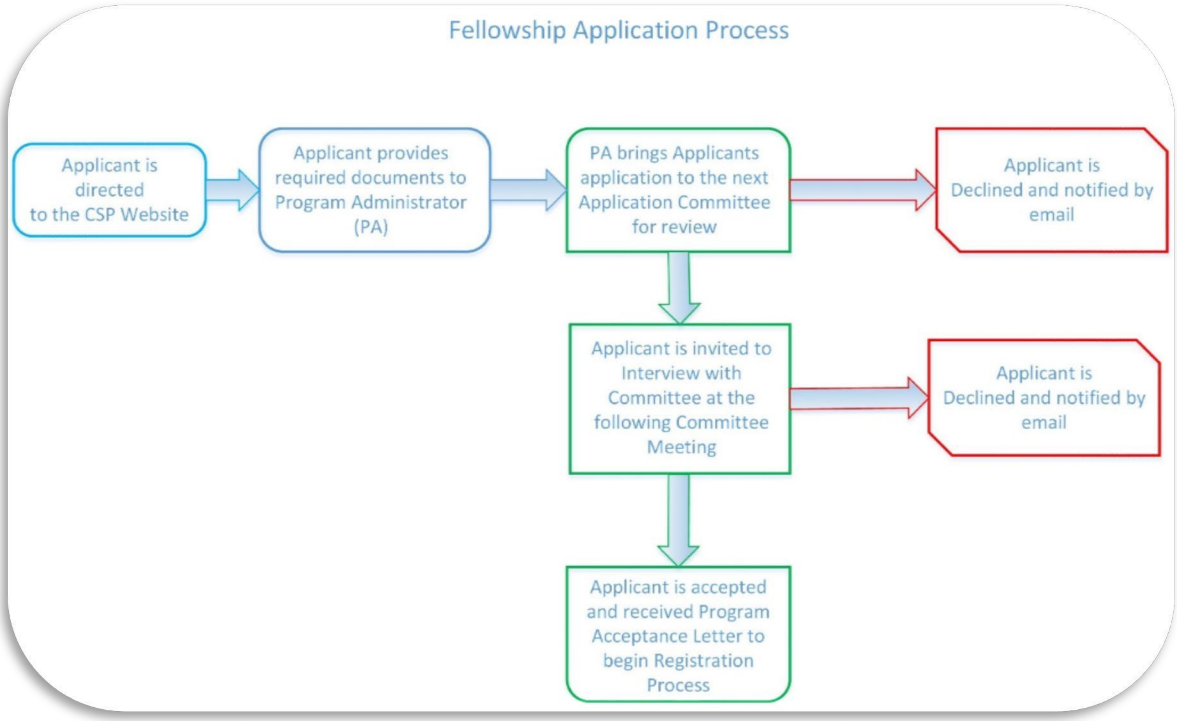
Applications

Deadlines and Start Dates

Applications are accepted all year round, with start dates staggered throughout the year to meet the scheduling needs of the program first and the fellow. One exception to this are fellows with external funding, who, once their funding source is approved by PGME, may start their fellowship at their own convenience.

Process

The following diagram demonstrates the application process



Please note:

- Apply as early as possible; funded positions are often scheduled 1 ½ to 2 years in advance
- Highest consideration will be given to Canadians, then individuals early in their career; having just completed residency training; or early into their faculty appointment or clinical practice.
- One- or two-year terms available with one year extension available under special circumstances.

English Language Proficiency Requirements

The CPSA provides a list of countries in which English is considered their primary language (http://www.cpsa.ca/language-proficiency/), fellows from these countries are exempt from ESL proficiency requirements. ESL proficiency requirements and possible CPSA exemptions apply to all others.
As of October 19, 2021, the PGME at the University of Calgary will accept a single test result from any of the three English Language Proficiency Tests as mandated by the College of Physicians and Surgeons of Alberta.

The tests that are accepted to satisfy the requirement for ELP are the following:

1. **IELTS Academic Test** – the test must be completed within 24 months prior to submitting their application to CPSA and must achieve of minimum score of 7.0 in each of the four components in a single test.
2. **OET Medicine Test** (Occupational English Test) – completed within the 24 months before submitting their application to CPSA achieving a minimum grade of B in each component in a single test.
3. **CELPIP General Examination** – completed within the 24 months before submitting their application to CPSA, achieving a minimum score of 9 in each component in a single test.

For information on which test might be right for you, refer to the following two websites for information about the different tests. https://www.british-study.com/en/blog/oet-ielts-difference/ and https://www.englishforcanada.com/blog/which-test-is-easier-the-ielts-or-the-celpip/. Our program has found that fellows seem to have better results using the OET as the content is related to the healthcare industry.

Please note: PGME will no longer accept more than one test result for any of the accepted tests to satisfy the ELP requirement.

In addition, the CPSA provides the following Exemptions[1]:

- "[If an individual's] undergraduate or postgraduate medical experience is in a country where English is the first and native language,
- If more than 50% of their undergraduate and postgraduate medical education was taken in a country where English is their first and native language OR,
- if they are in independent practice in Canada or in a country where English is the first and native language and have already met ELP requirements before registering with their regulatory body."
- "If a candidate has been accepted into a postgraduate training program in Alberta but does not meet one of the exemptions above, the College will accept confirmation from their university that they have successfully completed the university's ELP evaluation and is competent in English." "Visiting elective trainees are exempt from ELP testing for the first 90 days.
- Candidates will be exempt from any requirement for future testing if the College receives university confirmation that they have successfully completed the university's process to evaluate competency in ELP."

[1] "New English Language Proficiency Requirements After July 1, 2019", www.cpsa.ca/language-proficiency/

Research

Calgary's Research Philosophy

The research philosophy for Stroke Fellows is to train physicians to become leaders in future stroke medicine. Training in research methodology and techniques is a critical element of this philosophy.

The Program has an internationally recognized interdisciplinary field of researchers and clinicians known for its transformative approach to stroke care. In addition, to support Calgary's ongoing national and international research, we also have a dedicated stroke clinical trials office with two nurse coordinators, and four research assistants to support the faculty, fellows, and numerous patients involved in many ongoing research studies. The Program provides fellows with an unique opportunity to participate in a multitude of research projects ranging from stroke diagnosis, imaging and care to rehabilitation.

Research is hands-on. Fellows have the opportunity to directly participate in research projects of their choice. Learning research methodologies is primarily done "on the job". The Fellowship Program expects Fellows to achieve the following during their training:

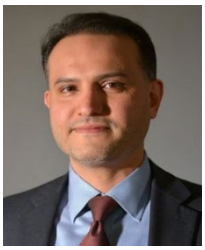
1. At least two abstracts/year at International meetings. These abstracts have to be the primary work of the Fellow concerned where the Fellow comes up with the research question, is primarily responsible for data collection, management and analysis and writes up the abstract. Thus for a two year fellowship, the expectation is to have presented at least four abstracts before completion of fellowship.

2. At least one original manuscript submitted/in press/published a year. These manuscripts have to be the primary work of the Fellow concerned where the Fellow comes up with the research question, is primarily responsible for data collection, management and analysis and writes up the abstract. Thus for a two year fellowship, the expectation is to have presented at least two original research manuscripts submitted/in press/published before completion of fellowship.

Please note, reviews, letters or opinions are not included in research work noted above, but are encouraged in addition to core research.

Academic Faculty

Calgary is home to sixteen adult stroke neurologists, with 9 of these also being stroke scientists. Below are our clinican scientists and their specific research interests.



Dr. Mohammed Almekhlafi

Dr. Almekhlafi's interests are in clinical trials and systematic reviews related to neurointerventional procedures. He is particularly interested in studying techniques and methods to reduce the risk of silent and overt infarcts associated with some of these procedures.

Dr. Philip Barber

Dr. Barber's research interests are: "the detection of predementia using biomarkers and cognition (PREVENT Study), acute MRI of stroke (REPERFUSE NA1), and CT perfusion (The SPIRAL Stroke Registry)".

Dr. Shelagh Coutts

Dr. Coutt's research interests include the use of acute imaging in triage and treatment of stroke and TIA patients in the Emergency Department. Her research interests include better diagnosis, triage and treatment of TIA and minor stroke patients. She recently completed a provincial study to improve TIA care throughout Alberta.

Dr. Andrew Demchuk

Dr. Demchuk's primary research interests focus on vascular imaging, where he is trying to establish target populations for new stroke treatments by selecting patients based on imaging tests performed in the emergency setting.

Dr. Dukelow's research interests include: 1) the development of robotic assessment tools to accurately quantify sensory, motor and cognitive function and recovery after stroke 2) improving understanding of brain function and neuroplasticity after stroke using tools such as robotics and neuroimaging techniques 3) the development of novel robotic rehabilitation techniques for therapies for individuals with neurologic disorders and 4) the use of non-invasive brain stimulation to enhance sensory, motor and language recovery after stroke. 5) The conduct of clinical trials to enhance recovery after stroke

Dr. Sean Dukelow

Dr. Ganesh's research program is focused on understanding the prevention and treatment of stroke and dementia using imaging studies, cohorts, clinical trials, and mixed-methods research. Current projects include: 1) developing innovative AI tools for carotid imaging and imaging guided stroke trial enrolment, 2) testing a remote ischemic conditioning device to treat vascular dementia, 3) studying cognitive sequelae of iatrogenic brain infarcts, and 4) informing the acute stroke care of patients with pre-morbid disability/dementia.

Dr. Aravind Ganesh

Dr. Hill's research interests include stroke thrombolysis, stroke epidemiology, and surveillance and clinical trials.

Dr. Michael Hill

Dr. Menon's primary research interest is in developing easy to use imaging tools that aid in selecting patients with acute ischemic stroke for revascularization therapies. His research also involves improving processes around hyper-acute stroke treatment, epidemiology of stroke, clinical trials methodology and using imaging to understand leptomeningeal collateral physiology.

Dr. Bijoy Menon

Dr. Smith investigates the causes of vascular cognitive impairment and their treatment, with a focus on cerebral small vessel diseases. The main research themes are:

1. a randomized controlled trial of remote ischemic conditioning for prevention of cognitive decline in patients with vascular mild cognitive impairment due to cerebral small vessel disease;
2. natural history study of outcomes in vascular mild cognitive impairment;
3. a prospective cohort study of biomarkers of cerebral amyloid angiopath, and 4. a global study of the prevalence of dementia, cognitive decline, and MRI evidence of cerebrovascular disease

Dr. Eric Smith