OPHTHALMOLOGY
& VISUAL SCIENCES

2017
RESEARCH REPORT

DALHOUSIE UNIVERSITY

nova scotia health authority

IWK Health Centre

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Welcome

A message from the Department Head and Chief: Dr. Marcelo Nicolela

We are pleased to share with you our 2017 Research Report: we had another successful year in research, maintaining a good publication record, attracting new grants and presenting our results nationally and internationally. For a clinical department of our size, our research productivity is very impressive.

I would like to point out that research in our department is not only thriving with our well established research groups, but I am very pleased to see the enthusiasm and productivity of our new staff members, who are having the drive and passion to pursue research while carrying a significant clinical load.

In this report, we are highlight one of our newer research members, Dr. Jayme Vianna, and one of our residents, Dr. Tom Zhao. Congratulations to both of them for the great work they are doing.

I would like to thank our research director, Dr. Balwantray Chauhan, our research manager, Leah Wood, and all the other members of the research committee for their commitment in advancing research in our department and for their efforts in putting together this research report. I am sure that with the guidance of the research committee, our department members and residents will continue to excel in research!

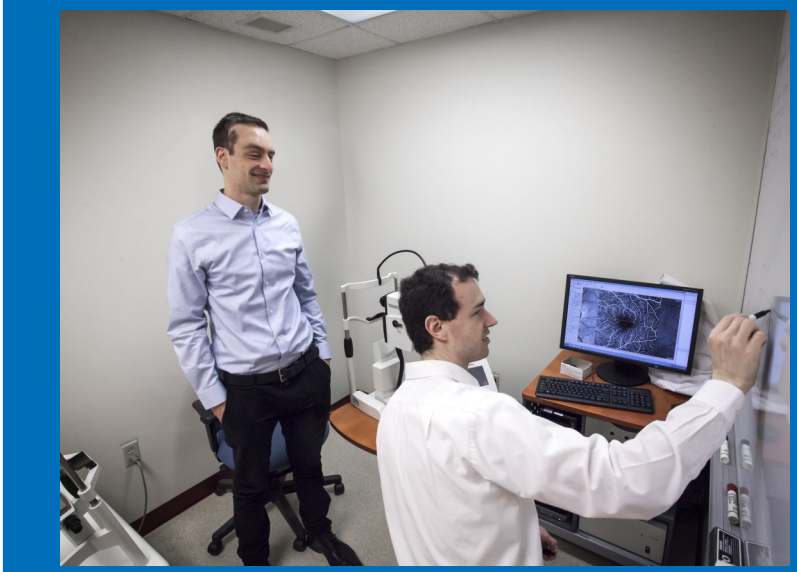
A message from the Research Director: Dr. Balwantray Chauhan

We are pleased to present the Annual Research Report for 2017. The Department of Ophthalmology and Visual Sciences continues to increase its research profile and increase its links with national and international collaborators to produce research of the highest quality with meaningful clinical impact.

I am pleased to welcome Dr. Jayne Vianna as a new faculty member to the department. Jayme is the QEII Foundation Scholar in Glaucoma Research and Assistant Professor in the department. He has been highly productive as a post-doctoral fellow and is well on the path of being a successful independent researcher. Our research grant capture and productivity remains impressive, particularly given the relatively small size of our department. Research projects are funded with grants from the Canadian Institutes of Health Research, National Science and Engineering Council, Atlantic Innovation Fund and numerous private sector sources.

I invite you to explore our achievements in the various research areas, those of our trainees and the facts and figures for this year. I want to thank Leah Wood, our research manager for compiling this document. Do not hesitate to contact us with any questions, queries or comments (contact information is on the back page). Our objective as always is to improve.

Researcher Profile: **Dr. Jayme Vianna**



Prior to joining the Dalhousie University Department of Ophthalmology and Visual Sciences at Dalhousie University as a research fellow in 2014, Dr. Jayme Vianna practiced ophthalmology in his birthplace of São Paulo, Brazil. Although Dr. Vianna had been interested in science and research since childhood, his first real exposure to research occurred during medical school where he developed a passion for it. Despite his keen interest in research, Dr. Vianna did not consider a career in research after graduation from medical school because conducting research was not a common practice for physicians in Brazil due to severely restricted funding and support for research endeavors. Dr. Vianna practiced as a glaucoma specialist for a few years and stayed involved in research and teaching as much as he could during his free time; however, he felt that there was still something missing in his professional life. There were many clinical questions, particularly related to glaucoma, that he was faced with every day and wanted to answer using research. His increasing scientific curiosity and interest in research drove his decision to relocate to Canada and pursue a full-time research fellowship in glaucoma at Dalhousie University on the recommendation of a colleague.

Dr. Vianna joined the Glaucoma Research Group at Dalhousie University and focused his research on optical coherence tomography (OCT), a highly sophisticated technology used to image the layers of the retina, in combination with other diagnostic tests to detect glaucoma in its very early stages.

Early detection of glaucoma is critical in allowing physicians to successfully manage and treat this potentially blinding disease. Currently, Dr. Vianna is heading up an international multi-center study with the goal of validating a standard definition glaucoma in various stages of the disease. Although there has been a significant improvement in tests used to diagnose glaucoma, there is poor agreement among experts as to how to precisely define glaucoma, specifically which criteria from any (or a combination) of these tests to best describe the disease at all stages. Dr. Vianna plans to use-web based tools to obtain and combine the opinion of hundreds of glaucoma specialists globally regarding hundreds of patients with varying stages of glaucoma progression. He will then analyze the responses to determine which diagnostic criteria best approximates the combined assessment of glaucoma specialists, providing an evidence-based validation of a glaucoma definition.

Dr. Vianna is also researching how to use artificial intelligence to assist clinicians in detecting early-stage glaucoma. Current imaging technologies provide hundreds to thousands of data points. Even for well-trained glaucoma specialists, this amount of information can be overwhelming to analyze, particularly in early-stage glaucoma, causing clinicians to often make sub-optimal assessments. Dr. Vianna is developing tools based on artificial intelligence to combine and analyze this data and help clinicians make more accurate assessments to ultimately lead to better patient outcomes.

In 2017, Dr. Vianna was named the QEII Foundation Scholar in Glaucoma Research, to which he credits as one of his greatest achievements in his career thus far. By devoting his career to research, Dr. Vianna hopes to help advance the body of knowledge related to glaucoma as well as improve the technology used to detect the disease in order to help clinicians best manage and treat their patients. Dr. Vianna ultimately hopes that his research reduces the visual disability and burden related to glaucoma.

Awards & Accolades

2017 Dr. R. Evatt and Rita Mathers Trainee Scholarships

Corey Smith, Sonia Manuchian and Tareq Yousef are the recipients of the 2017 Dr. R. Evatt and Rita Mathers Trainee Scholarships.

Corey Smith is the recipient of the Research Fellowship in Ophthalmology and Visual Sciences. The research carried out by Corey and his supervisor Dr. Balwantray Chauhan will investigate a new diagnostic technique that involves imaging perfusion of blood in a specific regions of the retina. He will determine the amount of short and long-term variability to understand if this technique is reproducible and reliable. If this work is successful, he will test the new imaging method for glaucoma patients with the aim of providing eye doctors with more information for diagnosing and treating glaucoma and other eye diseases.

2017 Awards

Dr. Alan Cruess: Life Fellow of the Academy: 35 Years of Service - American Academy of Ophthalmology

Dr. Claire Hamilton: Hot Topic Poster Presentation Designation - 2017 Canadian Ophthalmology Society Annual Meeting

Dr. Corey Smith: Physiology & Biophysics Best Graduate Student's Publication - Department of Physiology and Biophysics of Dalhousie University

Dr. Jayme Vianna: 2017 Best Glaucoma Paper Award for an Ophthalmologist-in-Training - Canadian Glaucoma Society

Dr. Marcelo Nicolela: 2017 "COMA" Award for Most Relevant Presentation during the 2017 Walter Wright Symposium - Department of Ophthalmology and Visual Sciences, University of Toronto

Dr. Rishi Gupta: 2017 Ophthalmology Clinical Teaching Award - Department of Ophthalmology and Visual Sciences Resident Group

Dr. Rishi Gupta: Royal College of Physicians and Surgeons Continuing Professional Development Award - Royal College of Physicians and Surgeons

Sonia Manuchian was awarded the Master of Clinical Vision Science Scholarship for her research with supervisor Dr. Johane Robitaille. Sonia will study which treatment: laser ablation or anti-VEGF (vascular endothelial growth factor) therapy produces better binocularity (ability to fuse images from both eyes) in children born with an eye disease called retinopathy of prematurity.

The Master of Vision Science scholarship was awarded to Tareq Yousef, who under the supervision of Dr. William Baldridge, is investigating the possible novel connections that intrinsically photosensitive melanopsin retinal ganglion cells (ipRGCs) make within the retina, and the changes they impose on retinal signaling mediated by the important chemical messenger, dopamine.

Resident Research

Resident Research Project Fund Recipient

Dr. Tom Zhao, PGY3, was a recipient of the Dalhousie Department of Ophthalmology and Visual Sciences Resident Research Project Grant for his research project titled: "DENAQ photoswitch as a chemical visual prosthesis in a model of acquired retinal degeneration". Vitreoretinal diseases cause irreversible blindness in the developed world. Many conditions, such as the dry form of age-related macular degeneration, and genetic conditions such as retinitis pigmentosa, currently have no effective treatment. One characteristic of this group of diseases is that the pathology is in the retinal photoreceptors, while the conduction pathway via bipolar and retinal ganglion cells to the brain remain intact. Therefore, there has been great interest in the past few years in salvaging the remaining conductive pathway to improve or even create vision. Tom's research examines whether DENAQ, a recently engineered photosensitive molecule, has the potential to restore visual responses in an animal model of acquired retinal degeneration known as light induced retinopathy which can potentially model different stages and severity of retinal damage such as age-related macular degeneration and retinitis pigmentosa.

Resident Research Projects

Name	Year	Supervisor	Project Title
Dr. Mark Seamone	PGY 5	Drs. Alan Cruess & Melanie Kelly	Intravitreal anti-VEGF therapy reduces ocular inflammation in peptidoglycan and endotoxin induced uveitis
Dr. Amr Zaki	PGY 5	Dr. Rishi Gupta	Assessment of anxiety and pain associated with intravitreal injections
Dr. Claire Hamilton	PGY 5	Dr. Lesya Shuba	Comparison of outcomes of trabeculectomy with subconjunctival injection of mitomycin C versus topical application with cellulose sponge
Dr. William Best	PGY 4	Dr. Daniel Belliveau	Dalhousie medicine undergraduate ophthalmology education: Targeted needs assessment
Dr. Aaron Winter	PGY 4	Dr. Alon Friedman	Traumatic brain injury andretinal vascular pathology
Dr. Wesley Chan	PGY 3	Dr. Jai Shankar	Transverse venous sinuous stenosis on magnetic resonance imaging in patients with idiopathic intracranial hypertension – A pilot study
Dr. Harald Gjerde	PGY 3	Drs. Johane Robitaille & Jason Berman	The utility of a fzd4 knockdown zebrafish model for an efficacious drug screen for FEVR
Dr. Tom Zhao	PGY 3	Drs. Steve Barnes & Francois Tremblay	DENAQ photoswitch as a chemical visual prosthesis in a model of acquired retinal degeneration
Dr. Amit Mishra	PGY 2	Dr. William Baldridge	Cannabinoid-mediated chloride dynamics in mammalian retinal ganglion cells
Dr. Aishwarya Sundaram	PGY 2	Drs. Christopher Seamone and Dan O'Brien	Settle plate testing to measure air quality testing in a tertiary care ophthalmology department
Dr. Danielle Cadieux	PGY 2	Dr. Anuradha Mishra & Mark Goldszmidt	A grounded theory study of self-directed learning approaches to operative education in senior surgical residents at Dalhousie University

Trainee Research

Name	Program	Supervisor(s)	Project Title
Ben Smith	Post-Doctorate Physiology and Biophysics	Drs. François Tremblay & Balwantray Chauhan	Dendritic retraction and associated physiological responses in retinal ganglion cells in experimental glaucoma
Corey Smith	PhD Physiology and Biophysics	Dr. Balwantray Chauhan	Labelling and longitudinal in vivo imaging of retinal ganglion cells
Dan Lafrenière	BSc Biology	Dr. Melanie Kelly	Effects of intravitreal bevacizumab on aseptic models of ocular infection
Dinesh Thapa	MSc Pharmacology	Dr. Melanie Kelly	Cannabinoids in corneal pain and inflammation
Douglas Iaboni	BSc Medicine	Dr. Balwantray Chauhan	Characterization of retinal ganglion cell subtype expression of yellow fluorescent protein in the Thy1-YFP line H transgenic mouse line
Elizabeth Cairns	PhD Pharmacology	Drs. Melanie Kelly & William Baldrige	Strategies for neuroprotection and intraocular pressure modulation in experimental models of glaucoma
Faisal Jarrar	BSc Medical Sciences	Dr. Balwantray Chauhan	Non-retinal nerve fibre layers within the optic nerve head neuroretinal rim
Heather Gerrie	BSc Biological Sciences	Dr. François Tremblay	In-Vivo evaluation of vision restoration with photoswitch BENAQ
Jack Quach	BSc Medical Sciences	Dr. Jayme Vianna	Asymmetry of peripapillary retinal blood vessels positions between right and left eyes
Jacklyn Stewart	BSc Medical Sciences	Dr. Jayme Vianna	The effect of age and descent on retinal layer thickness in normal eyes
Jared Shapiro	BSc Neuroscience	Dr. Steve Barnes	Multielectrode array analysis
John Gobran	BSc Pharmacology	Dr. Balwantray Chauhan	Effects of 3D stratification of retinal ganglion cells in Sholl analysis
Jonah Brodeur	BSc Medical Sciences	Dr. François Tremblay	Change in intrinsic activity of retinal ganglion cells during induced retinal degeneration
Justine Sy	MSc Clinical Vision Science	Dr. Balwantray Chauhan	Functional retinal ganglion cell activity after light induced damage in mice
Lianne Esmores	MSc Clinical Vision Science	Dr. François Tremblay	Short- vs long-term retinal challenges by antiepileptic Vigabatrin
Mairin Hogan	BSc Medical Sciences	Dr. Steve Barnes	Calcium imaging of glutamate response in Thy1-GCaMP3 mouse retinal ganglion cells
Mark Saldhana	BSc Neuroscience	Dr. William Baldridge	Melanopsin in the zebrafish retina

Trainee Research

Name	Program	Supervisor(s)	Project Title
Mike Craig	MSc Clinical Vision Science	Dr. François Tremblay	Interocular inhibition: An opportunity to determine how binocular integration is taking place within various visual areas of the occipital cortex
Ross Porter	MSc Pharmacology	Dr. Melanie Kelly	Cannabinoid 2 receptor signaling during ocular inflammation
Skye McIntosh	BSc Neuroscience	Dr. William Baldridge	Halibut retinomotor movement before and after metamorphosis
Syed Mohammad	BSc Medicine, University of Ottawa	Dr. Balwantray Chauhan	Assessing the Effect of Head Tilt on the Recorded Value of the Fovea-Bruch's Membrane Opening Centre Angle as Assessed by Optical Coherence Tomography
Tareq Yousef	MSc Medical Neuroscience	Dr. William Baldridge	Melanopsin-mediated neuronal signaling in the teleost retina

Research Club

On November 2, 2017 faculty and trainees attended the 3rd Annual Department of Ophthalmology and Visual Sciences Research Club that took place in the Tupper Medical Building Commons. The evening featured short presentations by some of our residents and fellows regarding their research projects that generated lots of discussion and new ideas surrounding the ongoing research in our department.

Research Day

On April 3, 2017, faculty and students attended the 28th Annual Department of Ophthalmology and Visual Sciences Research Day, a full-day symposium at the Lord Nelson Hotel & Suites. This event showcased the current basic science and clinical research carried out in our department and in collaboration with departments both within and outside of Dalhousie.

The Keynote Lecturer, Dr Peter Dolman, from the University of British Columbia, delivered two excellent presentations entitled "Controversies and Research in Endonasal Dacryocystorhinostomy" and "Evaluation and Management of Thyroid Orbitopathy."

Congratulations to the 2017 Research Day Award winners:

Resident Category

1st Prize: Dr. Mark Seamone "The effect of intravitreal bevacizumab in experimental models of ocular inflammation"

2nd Prize: Dr. Claire Hamilton "Comparison of outcomes of trabeculectomy with subconjunctival injection of mitomycin C versus topical application with cellulose sponge"

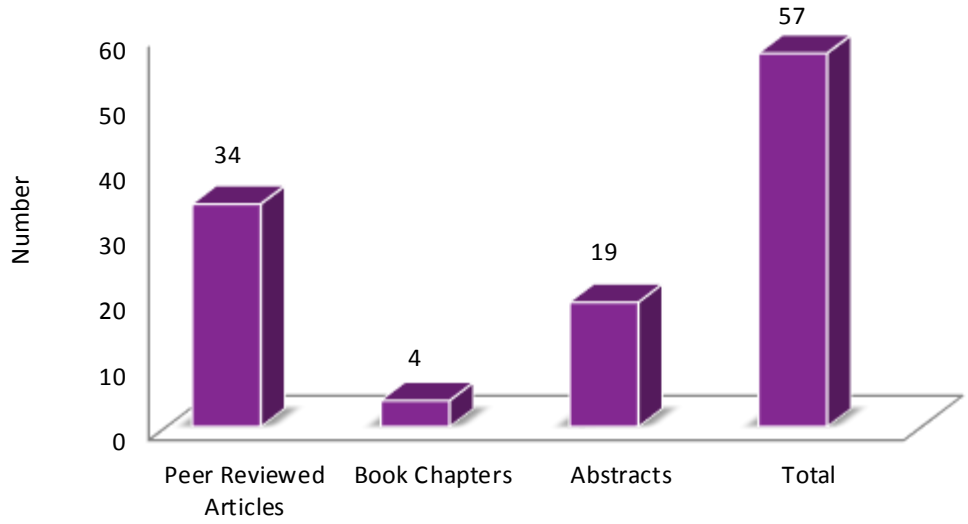
Junior Trainee Category

1st Prize: Delaney Henderson "Characterizing longitudinal *in vivo* changes of RGC dendrites after retinal injury"

Senior Trainee Category

1st Prize: Andrea Nuschke "Axonal transport in retinal ganglion cells following elevated IOP"

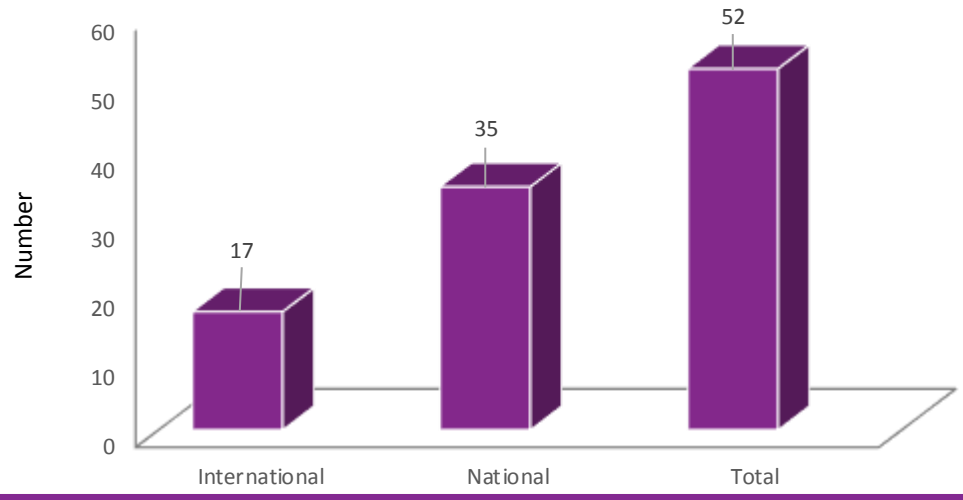
Publications & Presentations



Number of peer-reviewed manuscripts, book chapters, and abstracts published in 2017.

52
Invited presentations by department members

34
Peer reviewed manuscripts published



Number of international and national invited presentations by department members in 2017.

Publications

Peer Reviewed Journal Publications

Hussain A, Oestreicher J, Nijhawan N (2017). Haller cells: A risk factor for spontaneous orbital floor fracture? *Canadian Journal of Ophthalmology,* 52(5), e185-e188.

Yohannan J, Wang J, Brown J, Chauhan BC, Boland MV, Friedman DS, Ramulu PY (2017). Evidence-based criteria for visual field reliability. *Ophthalmology*, 124(11), 1612-1620.

Khan M, Hussain A, Gill H (2017). Fluid leak following deep midfacial laceration. *JAMA ophthalmology*, 135(10), 1115-1116.

Mehta S, Ying GS, Hussain A, Harvey JT (2017). Is gastroesophageal reflux disease associated with primary acquired nasolacrimal duct obstruction? *Orbit*, 1-5.

Cairns EA, Szczesniak AM, Straiker AJ, Kulkarni PM, Pertwee RG, Thakur GA, Baldridge WH, Kelly MEM (2017). The In Vivo effects of the CB1-Positive Allosteric Modulator GAT229 on intraocular pressure in ocular normotensive and hypertensive mice. *Journal of Ocular Pharmacology and Therapeutics : The Official Journal of the Association for Ocular Pharmacology and Therapeutics*, 33(8), 582-590.

Ziemssen F, Cruess A, Dunger-Baldauf C, Margaron P, Snow H, Strain WD (2017). Ranibizumab in diabetic macular oedema – A benefit–risk analysis of ranibizumab 0.5 mg PRN versus laser treatment. *European Endocrinology*, 13 (2), 91–98.

Loureiro MM, Vianna JR, Danthurebandara VM, Sharpe GP, Hutchison DM, Nicolela MT, Chauhan BC (2017). Visibility of optic nerve head structures with spectral-domain and swept-source optical coherence tomography. *Journal of Glaucoma*, 26(9), 792-797.

Leung VC, Hussain A, Krings T, DeAngelis D (2017). Endovascular management of a traumatic infraorbital pseudoaneurysm causing orbital compartment syndrome. *Ophthalmic Plastic and Reconstructive Surgery*, 33(5), e110-e112.

Mishra A, Browning D, Haviland MJ, Jackson ML, Luff D, Meyer EC, Talcott K, Kloek CE (2017). Communication skills training in ophthalmology: Results of a needs assessment and pilot training program. *Journal of Surgical Education*, Advanced online publication. https://doi.org/10.1016/j.jsurg.2017.08.011

Hussain A, Oestreicher J (2017). Clinical decision-making: Heuristics and cognitive biases for the ophthalmologist. *Survey of Ophthalmology*, 63(1):119-124

Araie M, Iwase A, Sugiyama K, Nakazawa T, Tomita G, Hanagai M, Yanagi Y, Tanihara H, Burgoyne CF, Chauhan BC (2017). Determinants and characteristics of Bruch's membrane opening and Bruch's membrane opening minimum rim width in a normal Japanese population. *Investigative Ophthalmology & Visual Science*, 58(10), 4106-4113.

Pollmann AS, Seamone ME, Gupta RR (2017). Heavy metal: Not just hard on the ears. *Canadian Journal of Ophthalmology,* https://doi.org/10.1016/j.jcjo.2017.07.001

Sun X, Hirano AA, Brecha NC, Barnes S (2017). Calcium-activated BKCa channels govern dynamic membrane depolarizations of horizontal cells in rodent retina. *The Journal of Physiology*, 595(13), 4449-4465.

An D, House P, Barry C, Turpin A, McKendrick AM, Manners S, Graham S, Yu DY, Morgan WH, Chauhan BC (2017). The association between retinal vein pulsation pressure and optic disc haemorrhages in glaucoma. *PLoS ONE*, 12 (7).

Hussain A, Sidiropoulos M, Das S, Munoz DG, Nijhawan N (2017). Orbital cellular blue nevus complicated by malignant melanoma. *Canadian Journal of Ophthalmology*, 52(3), e111-e113.

Publications

Peer Reviewed Journal Publications (continued)

Torres LA, Vianna JR, Nicolela MT (2017). Long-term outcome of surgical treatment for late intraocular lens dislocation associated with high intraocular pressure: A Case Series. *Journal of Glaucoma*, 26(9):e210-e213.

Reis ASC, Zangalli CES, Abe RY, Silva AL, Vianna JR, Vasconcellos JPC, Costa VP (2017). Intra- and interobserver reproducibility of Bruch's membrane opening minimum rim width measurements with spectral domain optical coherence tomography. *Acta Ophthalmologica*, 95(7):e548-e555.

Hussain A, Nduka C, Moth P, Malhotra R (2017). Bell's facial nerve palsy in pregnancy: A clinical review. *Journal of Obstetrics and Gynaecology : The Journal of the Institute of Obstetrics and Gynaecology*, 37(4), 409-415.

Chan W, Drummond A, Kelly M (2017). Deep vein thrombosis in a transgender woman. *Canadian Medical Association Journal*, 189(13), E502-E504.

Iaboni DSM, Seamone ME, Stairs MS, O'Brien DM, Bisson S, Gupta RR (2017). Novel patient positioning apparatus for retinal surgery in a case of severe kyphosis. *Retinal Cases and Brief Reports*, Advanced online publication. https://doi.org/10.1097/ICB.0000000000000609

Kalevar A, Dollin M, Gupta RR (2017). Opacification of scleral-sutured akreos AO60 intraocular lens after vitrectomy with gas tamponade: Case Series. *Retinal Cases and Brief Reports*, Advanced online publication. https://doi.org/10.1097/ICB.0000000000000634

Cadieux DC, Goldszmidt M (2017). It's not just what you know: Junior trainees' approach to follow-up and documentation. *Medical Education*, 51(8):812-825.

Vianna JR, Lanoe VR, Quach J, Sharpe GP, Hutchison DM, Belliveau AC, Shuba LM, Nicolela MT, Chauhan BC (2017). Serial changes in lamina cribrosa depth and neuroretinal parameters in glaucoma: Impact of choroidal thickness, *Ophthalmology*. 124(9):1392-1402.

Iaboni DSM, Seamone ME, Choudhry NC, Gupta RR (2017). Torpedo maculopathy presenting with fovea plana in a 21-year-old female, *Journal of VitreoRetinal Diseases*, 1 (6), 424-427.

Seamone ME, Lewis DR, Almeida D, Choudhry N, Gupta RR (2017). Massive subretinal gas after vitrectomy surgery: Mechanism and management, *Retinal Cases & Brief Reports*. Advanced online publication. https://doi.org/10.1097/ICB.0000000000000576

Lee S, Gjerde H, Gubitz G (2017). Retinal and choroidal haemorrhage after tissue plasminogen activator administration, *Canadian Journal of Neurological Sciences*, 44(4), 461-462.

Seamone ME, Golding J, Choudhry N, Gupta RR (2017). Diagnostic and therapeutic challenges, *Retina*, 38(3):639-642.

Jackson M, Mishra A, Mogk L (2017). Vision rehabilitation. *American Academy of Ophthalmology Focal Points Clinical Practice Perspectives*, 35 (4).

Iaboni DSM, Seamone ME, Gupta RR, Vila N, Kapusta MA (2017). Silicone oil removal from the anterior chamber using dispersive viscoelastic. *Retina*, Advanced online publication. https://doi.org/ 10.1097/IAE.0000000000001667

Low SA, Hussain A, Gill HS, Monteiro E, Liu ES (2017). Pott's puffy tumour presenting as a necrotic eyelid lesion. *Canadian Journal of Ophthalmology*, 52(1), e25-e28.

Mishra A, Heathcote JG, Laroche R (2017). Optic nerve choristoma causing vision loss in an adolescent. *Canadian Journal of Ophthalmology*, 52(4):e138-e140.

Smith CA, Vianna JR, Chauhan BC (2017). Assessing retinal ganglion cell damage. *Eye*, 31 (2), 209.

Publications

Peer Reviewed Journal Publications (continued)

Seamone ME, Lewis D, Haidl I, Gupta RR, O'Brien D, Dickinson J, Samad A, Marshall J, Cruess A (2017). VEGF-A is increased in exogenous endophthalmitis. *Canadian Journal of Ophthalmology*, 52(3), 277-282.

Smith BJ, Cote PD, Tremblay F (2017). Contribution of Nav1.8 sodium channels to retinal function. *Neuroscience*, 340, 279-290.

Book Chapters

LaRoche R (2017). Examination, history, and special tests in pediatric ophthalmology [Book Chapter]. In: Lambert S.C., Lyons C.J. (Eds), *Taylor & Hoyt's Paediatric Ophthalmology and Strabimus* (pp. 50-59). Elsevier: Philadelphia, PA.

Hirano AA, Barnes S, Brecha, NC (2017). Information processing: Horizontal cells. In: John Stein (Ed), *Neuroscience and Biobehavioral Psychology*. Oxford: Elsevier: United Kingdom.

Hirano A, Liu X, Brecha N, Barnes S (2017). Analysis of feedback signaling from horizontal cells to photoreceptors in mice. In: Tanimoto C (Ed), *Mouse Retinal Phenotyping -Methods and Protocols, Methods in Molecular Biology*. Springer: New York, NY.

Burgoyne CF, Ivers K, Yang H, Chauhan BC, Fortune B (2017). OCT anatomy for glaucoma: Emerging relationships of interest. Iester M, Garway-Heath D and Lemji H: Savona Italy.

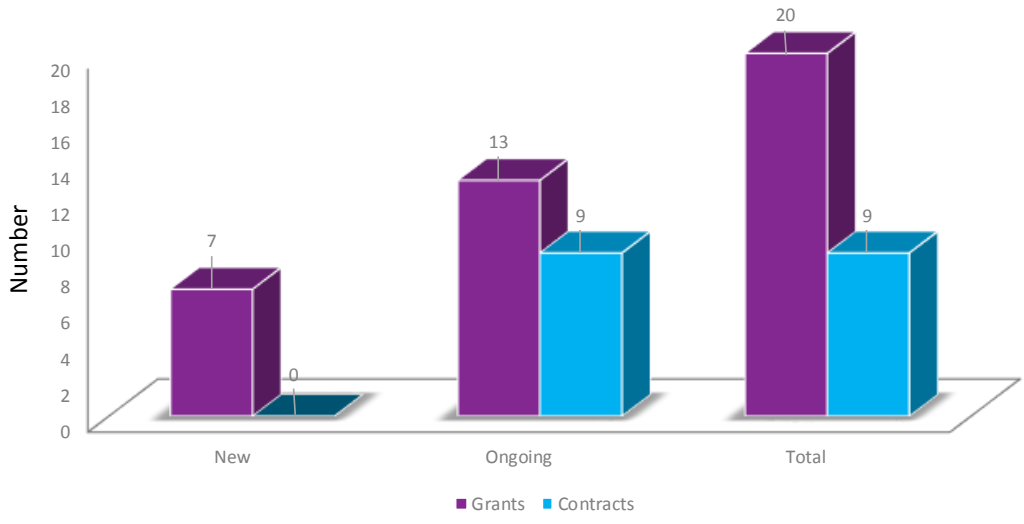
Other Publications

Gupta RR, Lewis D (2017) *Bridging the Gap: An added dimension to coloboma repair* - American Society of Retina Surgeons [Video]

Kalevar A, Baig K, Gupta RR (2017) *Don't fear the reper: Gore-tex scleral fixation of the reper artificial iris implant in a patient with aniridia* - American Society of Retinal Specialists [Video]

Cruess AF (2017) *Blinded by the promise of stem cell treatments* - Impact Ethics

Research Funding

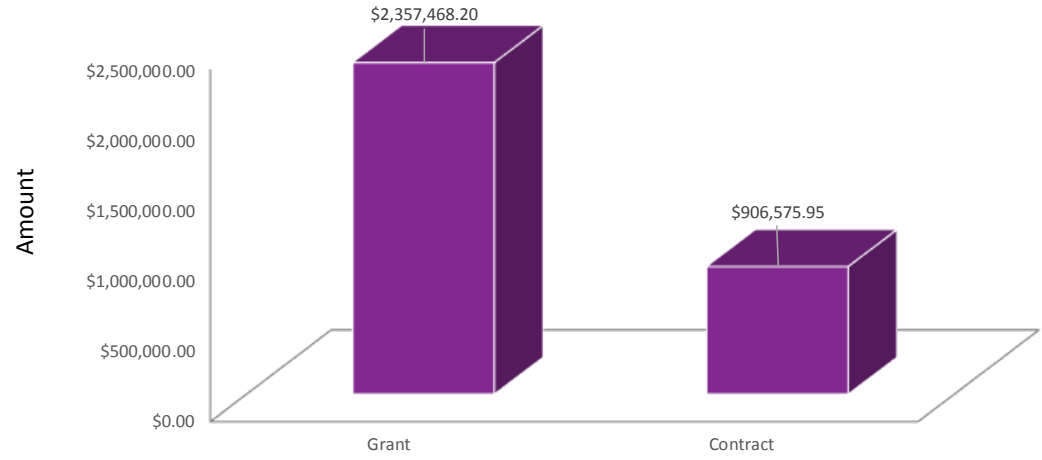


Number of newly acquired and continuing research grants and contracts in 2017. All research projects in which a department researcher is a team member are included.

0.9
million
in new and ongoing research contracts

2.4
million
in ongoing and new research grants

3.3
million
in research funding



The value of research funding including revenue from all awards generating funds in that year (for multi-year awards, the revenue is reported the year it is budgeted).

Research Funding

***Note: The amounts listed are the total value of the award whereby annual departmental amounts are provided in the figures.**

New Research Grants and Contracts

Tremblay F**,** Chauhan BC (2017 - 2018). Dendritic retraction and associated physiological responses in glaucomatous neuropathy: An CSLO and MEA study - *Glaucoma Research Foundation of Canada* - $19,947.

Chauhan BC (2017 - 2019). Modelling the deep optic nerve head of patients with glaucoma – *Nova Scotia Health Research Foundation* - $24,927.

Baldridge WH (2017 - 2022). Modulation of horizontal cells in the vertebrate retina – *Natural Sciences & Engineering Research Council* - $130,000.

Chauhan BC (2017 - 2022). Calcium dynamics in retinal ganglion cells - *National Science and Engineering Council* - $140,000.

Chauhan BC (2017 - 2020). Feasibility of optical coherence tomography angiography - *Alcon Research Institute* - $230,000.

Tremblay F, Bardouille T, Craig M (2017). Interocular inhibition: An opportunity to determine how binocular integration is taking place within the various visual areas of the occipital cortex - *IWK* - $5,000.

Manuchian S, Robitaille J, Vincer M (2017). Binocularity outcomes following treatment with laser versus anti-VEGF therapy for retinopathy of prematurity - *IWK* - $3,000.

Continuing Research Grants and Contracts

Tremblay F, Barnes S, (2016 - 2017). Multi electrode array headstage replacement - *Dalhousie University* - $17,684.

Robitaille JM, Berman J (2016 - 2017). Familial exudative vitreoretinopathy zebrafish model development for gene discovery and therapeutics development - *Canadian Rare Diseases Models and Mechanisms (RDMM) Network* - $25,000.

McMaster C, Robitaille JM (2016 - 2021). A treatment for the inherited childhood blinding disorder familial exudative vitreoretinopathy – *Canadian Institutes of Health Research* - $750,000.

Chauhan BC (2016 - 2021). Structural and functional changes in the retina and optic nerve in experimental glaucoma – *Canadian Institute of Health Research* - $672,760.

Vianna JR, Nicolela MT, Chauhan BC (2016 - 2017). Changes in Lamina Cribrosa depth as an early marker of glaucoma progression - *Glaucoma Research Society of Canada* - $19,530.

McMaster C, Robitaille JM, Berman J, Hoffman E, Kanneboyina Nagaraju (AGADA Biosciences Inc), Dalhousie University Industry Liaison and Innovation, the Centre for Drug Research and Development and AGADA Biosciences Inc (2016 - 2021). A scientific and clinical hub for orphan drug development - *Atlantic Innovation Fund* - $4,505,000.

Research Funding

Continuing Research Grants and Contracts (continued)

Shuba LM, Nicolela MT (2016 - 2017). A prospective, double-masked, randomized, multi-center, active-controlled, parallel-group, 3-month study assessing the safety and ocular hypotensive efficacy of PG324 Ophthalmic Solution 0.02% and Latanoprost Ophthalmic Solution 0.005% in subjects with elevated intraocular pressure - *Aerie Pharmaceuticals Inc.* - $118,475.

Cruess A, Gupta RR (2016 - 2020). Safety and efficacy of Abicipar Pegol (AGN-150998) in patients with neovascular age-related macular degeneration. (SEQUOIA) – *Allergan Inc.*- $506,315.

Nicolela MT (2015 - 2021). The efficacy and safety of Bimatoprost SR in patients with open-angle glaucoma or ocular hypertension - *Allergan Inc.* - $404,862 (USD).

Nicolela MT. (2015 - 2018). Additive effect of twice-daily brinzolamide 1% /Brimonidine 0.2% fixed dose combination as adjunctive therapy to a prostaglandin analogue - *Novartis Inc.* - $173,000.

Chauhan BC (2015 - 2020). Alcon research institute award and matching funds from QEII Foundation - *Alcon Research Institute* - $225,800.

Cruess A, Gupta RR (2015 - 2020). Peripheral Diabetic Retinopathy (DR) lesions on ultrawide-field fundus images and risk of DR worsening over time. (Protocol AA) - *National Eye Institute/National Institutes of Health (NEI/NIH)* - $124,700.

Tremblay F (2015 - 2020). Determinants of signal characteristics in a retinal network: Contribution of local field potentials and spike trains – *Natural Sciences & Engineering Research Council* - $120,000.

Dickinson J, Cruess A, Gupta RR (2015 - 2020). A multicenter, prospective epidemiologic study of the progression of geographic atrophy secondary to age–related macular degeneration (PROXIMA B) - *F. Hoffmann-La Roche Ltd.* - $169,812.

Tremblay F (2015 - 2017). Short - vs long-term retinal challenges by antiepileptic Vigabatrin - *IWK* - $14,689.

Dickinson J, Cruess A, Gupta RR (2015 - 2017). Open-label phase-4 study to examine the change of vision-related quality of life in subjects with diabetic macular edema (DME) during treatment with intravitreal injections of 2 mg aflibercept according to EU label for the first year of treatment. (AQUA) - *Bayer* - $257,072.

Cruess A, Gupta RR (2015 - 2019). A two-year, randomized, double masked, multicenter, three-arm study comparing the efficacy and safety of RTH258 versus Aflibercept (Eylea®) in subjects with neovascular age-related macular degeneration (HAWK) - *Alcon* - $488,774.

Cruess A, Gupta RR, Dickinson J (2015 - 2018). A phase III, multicenter, randomized, double-masked, sham-controlled study to assess the effiacy and safety of lampalizumab administered intravitreally to patients with geographic atrophy secondary to age-related macular degeneration. (CHROMA GX29176) - *Hoffmann-La Roche Ltd.* - $348,680.

Research Funding

Continuing Research Grants and Contracts (continued)

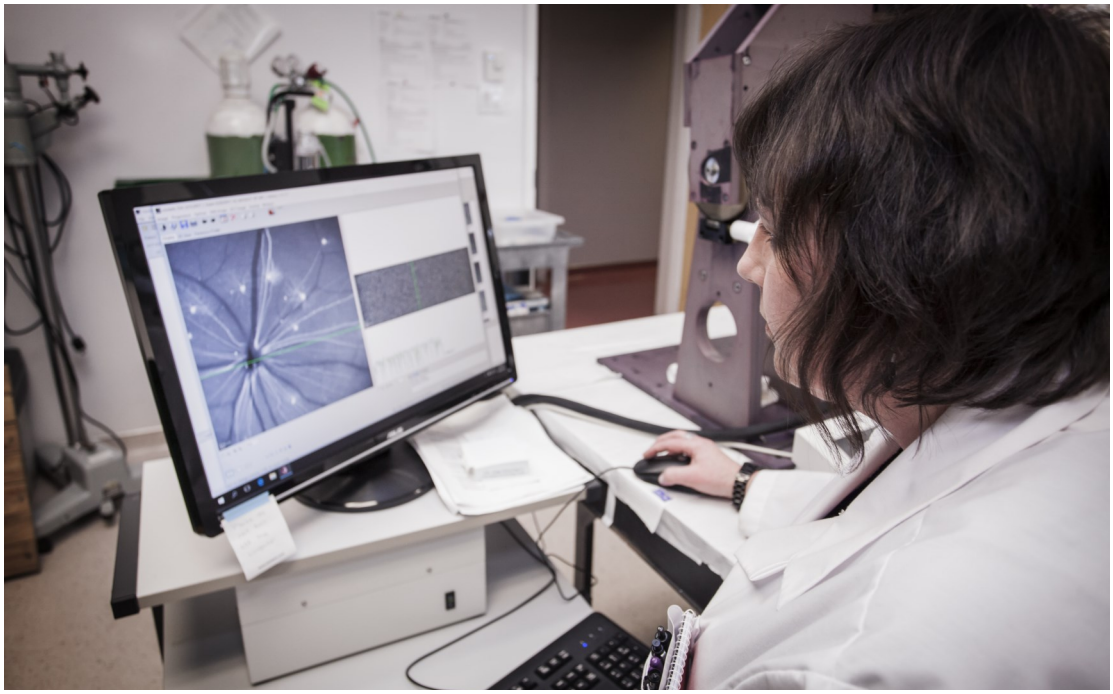
Nicolela MT (2014 - 2017). A double-masked, randomized, mutlicentre, active-controlled, parallel, 12 month study assessing the safety of AR-13324 Ophthalmic Solution, 0.2% q.d.and b.i.d. compared to Timolol Maleate Ophthalmic Solution, 0.5% b.i.d. in patients with elevated intraocu - *Aerie Pharmaceuticals Inc.* - $152,140.

Burgoyne CF, Yang H, Fortune B, Demirel S, Gardiner SK, Chauhan BC, Mansberger SL, Reynaud, JF (2014 - 2018). Optic nerve head SDOCT imaging in glaucoma - *National Institutes of Health/National Eye Institute* - $2,604,636 (USD).

Chauhan BC (2013 - 2018). Optic nerve changes in glaucoma (unrestricted funding) - *Heidelberg Engineering* - $677,500.

Nicolela MT (2012 - 2019). A randomized clinical trial of selective laser trabeculoplasty (SLT) in open angle glaucoma who have been previously treated with complete SLT – *Canadian Institutes of Health Research* - $90,200.

Barnes S (2011 - 2017). The formation of receptive fields in the retina: Dual inhibitory output pathways from horizontal cells – *Natural Sciences & Engineering Research Council Discovery Grant* - $155,000.



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