



DEPARTMENT OF

Ophthalmology

2020

ANNUAL REPORT

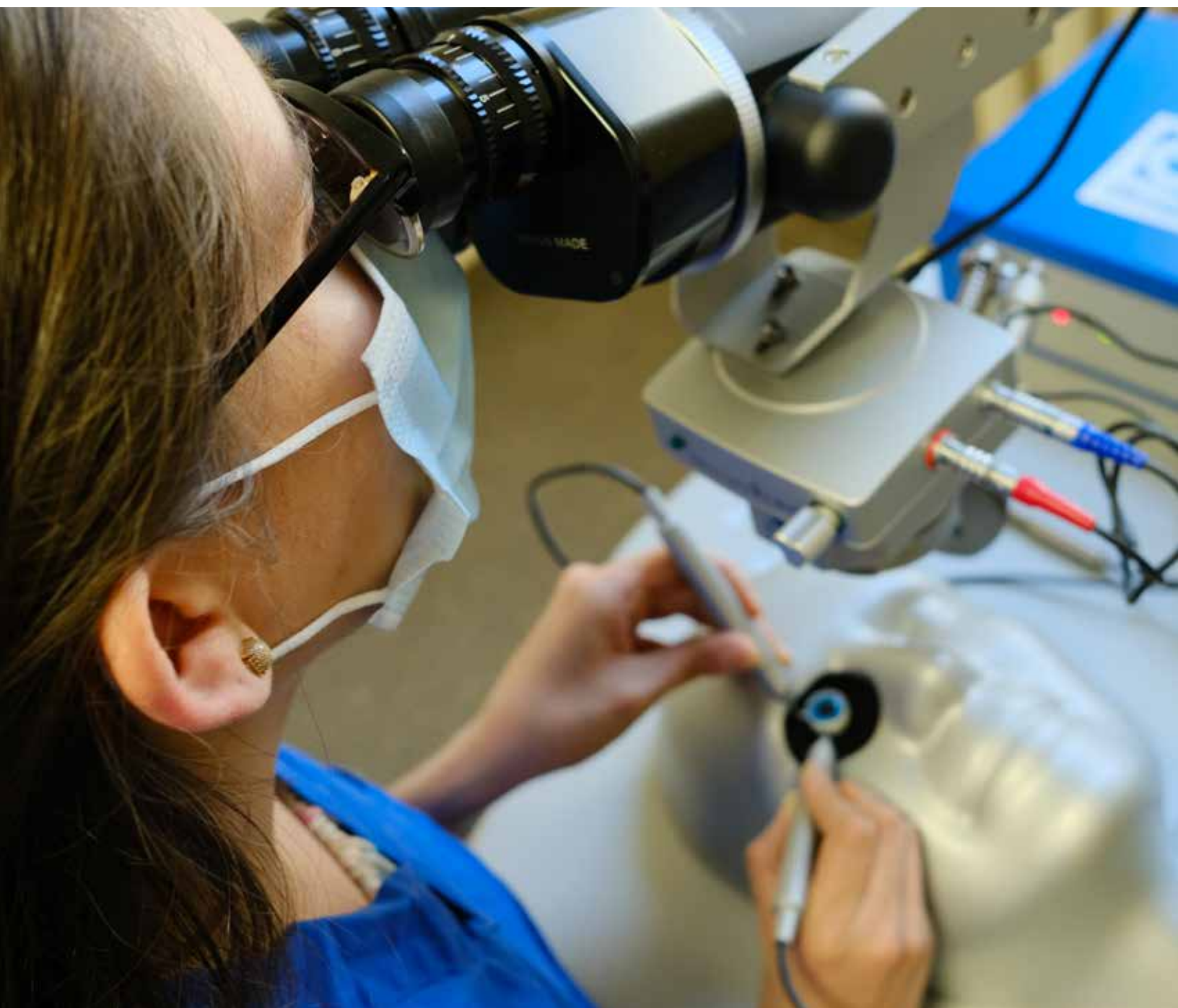


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MESSAGE FROM THE DEPARTMENT HEAD



MARTIN TEN HOVE, MD, M.Eng, FRCSC
Head and Associate Professor
Edna & Ernie Johnson Chair in Ophthalmology

I am very pleased to share the Queen's University Department of Ophthalmology Annual Report for 2020 with you. Each year, I am impressed and humbled by our team of extraordinary clinicians, educators, researchers, scholars, and support staff.

This was an exceptionally difficult and unprecedented year for everyone and yet, as a group, we have accomplished much. The year began with its usual fast-paced clip of growth and success before the world rapidly came to a halt in March. Our response? We pivoted and found innovative ways to continue our mandate and ensure the safety of our patients and ourselves. This report captures the highlights of this remarkable year—from the excellent care we provided our patients during the pandemic, to a rapid shift to virtual education, and many other notable contributions to our healthcare communities.

In the pages that follow you will discover that, in 2020, many of our faculty members received national and international nominations and awards. You will be impressed with our two excellent new faculty members, Dr Sarah Simpson and Dr Jacob Rullo. In 2020, we also welcomed Dr Newton Durante who ably took over as the Co-Director of the Kingston Ophthalmic Training Program and provides key leadership to our research program. You will also read about the exciting leadership changes for the postgraduate and undergraduate programs.

This report also highlights our residents who stepped up and became front-line workers in every respect. They took the disruption of their education in stride with the full knowledge that the faculty were working just as hard to pivot and deliver the curriculum in new and effective ways. The most uplifting story of the year came from our alumni who collectively supported our residents by enabling the purchase of a state-of-the-art surgical simulation device.

In January, we opened the Department's own "not-for-profit" clinic facility. This unique model is designed to leverage clinical activity to support our academic mission. So as we look to 2021, we have every reason to believe that we will emerge from this pandemic stronger and ready to function as a highly productive academic team. I congratulate everyone on that team for their critical roles in responding to the COVID crisis, and I hope you share my enthusiasm for the future.

QUEEN'S OPHTHALMOLOGY FACULTY



**Dr Manpartap Bal,
MD, FRCSC**
Assistant



**Dr Stephanie
Baxter, MD, FRCSC**
Associate Professor



**Dr Mark Bona,
MD, FRCSC**
Assistant Professor



**Dr Rob Campbell,
MD, M.Sc., FRCSC**
Professor



**Dr Newton Duarte,
MD**
Assistant Professor



**Dr James Farmer,
MD, FRCSC**
Adj Assistant Professor



**Julia Foster,
M.Sc.(OT), OT**
Lecturer



**Dr Tom Gonder,
MD, FRCSC**
Assistant Professor



**Dr Vasudha Gupta,
MD, FRCSC**
Assistant Professor



**Dr Delan Jinapriya,
MD, FRCSC**
Assistant Professor



**Dr Davin Johnson,
MD, FRCSC**
Assistant Professor



**Dr Robert Johnson,
MD, FRCSC**
Assistant Professor



**Dr Vladimir Kratky,
MD, FRCSC**
Associate Professor



**Dr Christine Law,
MD, FRCSC**
Assistant Professor



**Dr Krishna Rao,
MD, FRCSC**
Assistant Professor



**Dr Jacob Rullo,
MD, Ph.D., FRCSC**
Assistant Professor



**Dr Sanjay Sharma,
MD, M.Sc., FRCSC**
Professor



**Dr Sarah Simpson,
MD, FRCSC**
Assistant Professor



**Dr Harmanjit Singh,
MD, FRCSC**
Assistant Professor



**Dr Yi Ning Strube,
MD, FRCSC**
Associate Professor



**Dr Mahadeo
Sukhai, Ph.D.**
Assistant Professor



**Dr Martin ten Hove,
MD, M.Eng., FRCSC**
Associate Professor



**Dr Todd Urton,
MD, FRCSC**
Assistant Professor



**Dr Stephanie
Wood, MD, FRCSC**
Assistant Professor

NEW STAFF PROFILES



Dr Sarah Simpson joined our faculty in September of 2020. Dr Simpson attended medical school at Queen's University, graduating in 2013. After completing her ophthalmology residency at Queen's, she stayed on as a locum covering our emergency eye clinic and running a busy comprehensive practice. She then went on to complete an oculoplastics fellowship at the University of Calgary.

Dr Simpson joins us now as a comprehensive ophthalmologist and oculoplastics specialist.



Dr Jacob Rullo joined our department as a clinician scientist in July 2020, with cross-appointments in the Department of Biomedical and Molecular Sciences and the Department of Medicine. Dr Rullo completed an MD/Ph.D. at the University of Toronto in Laboratory Medicine and Pathobiology before completing his ophthalmology residency here at Queen's from 2015 through 2020. During his residency, Dr Rullo also completed a post-doctorate fellowship at Queen's University. You can read more about his research later on in this report.



Dr Newton Duarte joined the department in July 2020 as an international medical graduate. After studying electrical engineering, he pursued medicine at the Universidade Federal do Paraná. He has worked as a comprehensive ophthalmologist and as a glaucoma specialist for 10 years in Brazil before coming to Canada .

He joins our department in the capacity of Research Coordinator and as the Program Coordinator of the Kingston Ophthalmic Training Centre (KOTC).

QUEEN'S OPHTHALMOLOGY ACADEMIC PROOGRAM STAFF



Kaitlyn Caird
*Ophthalmology
Program Assistant*



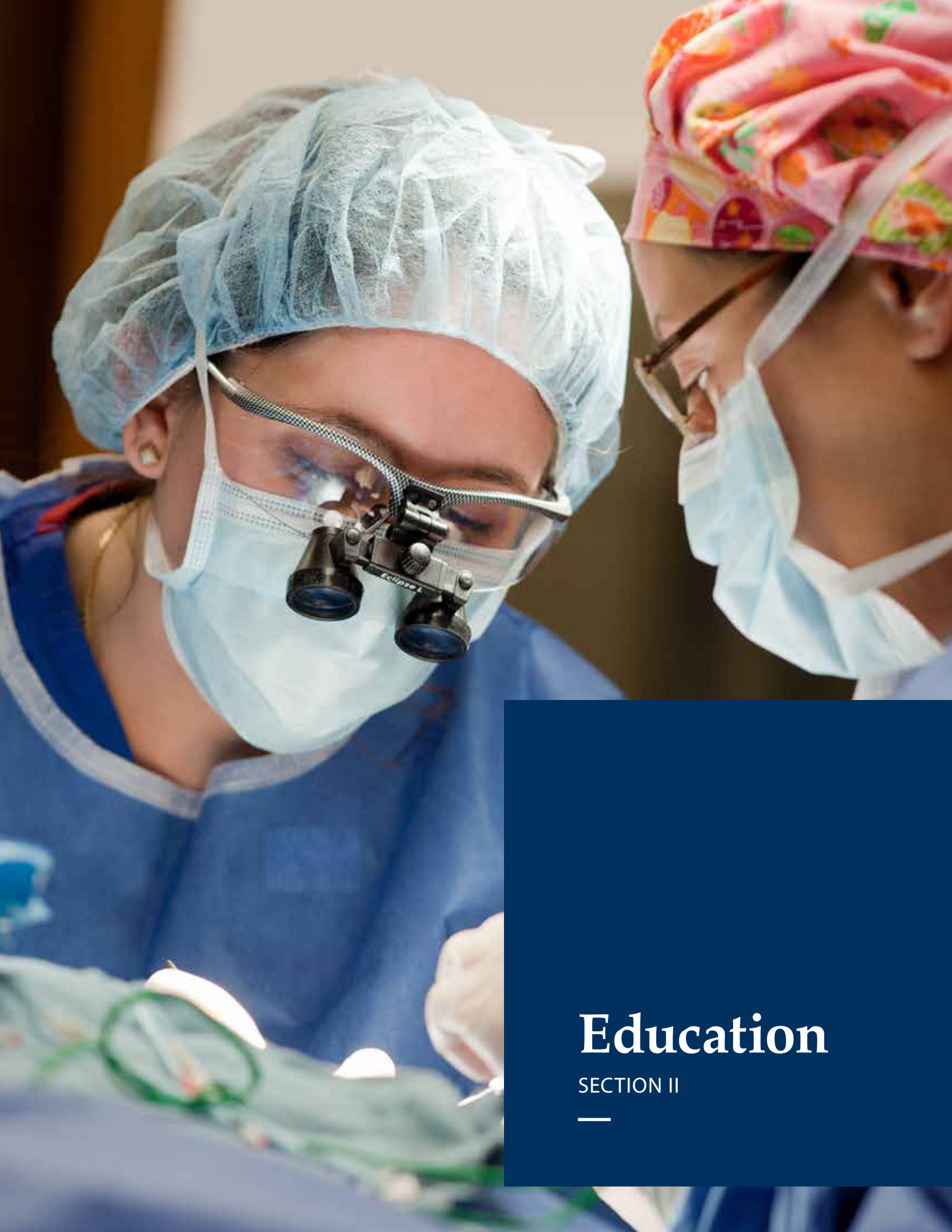
Tess Hanmore, MEd
*Educational
Consultant*



Amanda McIntosh
*Departmental
Administrator*



Robert Ewart
Project Coordinator



Education

SECTION II

RESIDENCY PROGRAM DIRECTOR UPDATE



MARK BONA, MD, FRCSC
Assistant Professor
Postgraduate Program Director

This year I had the distinct privilege of succeeding Dr Stephanie Baxter as postgraduate Program Director. Dr Baxter has done a masterful job elevating our program into one of the very best in the country. I am continuously humbled by her efforts and all that she achieved.

Needless to say, this past year has brought considerable challenges with trying to train residents during a pandemic. The program was required to repeatedly adjust in response to the ever-changing landscape. Some of the changes that were instituted include a shift to virtual exams, restructuring of the rotations to minimize reduced clinical exposure, the creation of “on-call teams” composed of resident and faculty during the initial shutdown, and an overhaul of the CaRMS process, to name a few.

One of the greatest challenges, of course, has been gaining enough clinical and surgical exposure in the context of reduced capacity clinics and operating rooms. By striking a working group composed of residents and faculty, we were able to create a multifaceted plan that addressed our programmatic needs. Chief among the strategies employed were reinventing our approach to surgical simulation training, and augmenting our wet and dry lab facilities. Our residents now engage in both longitudinal and in-time surgical training. We were also incredibly fortunate and thankful for the very generous donation of a brand-new virtual reality surgical cataract simulator. I am incredibly proud of how well our residents responded, repeatedly demonstrating versatility, adaptability, and resilience in the face of ongoing changes.

Additionally, this year marks the final year of pre-CBME residents completing their studies; by the time I update you next year, our entire program will be following the CBME curriculum. CBME continues to evolve, undergoing iterative changes. A CBME Committee started meeting this year, addressing curriculum, assessment, and evaluation issues. Other new additions to the resident curriculum include an evolving wellness curriculum, and an Indigenous Health workshop. A Fellowship Advisory Committee was also created to help with the integration of nascent Department Fellowship programs with the Resident Training Program.

I am very grateful for all the support I have received from the residents during my transition to the role of PD. I also want to express my appreciation to all the faculty for their continued commitment to our program and their teaching and mentorship of our residents. It would be impossible to run a resident training program without the generous contributions of time and effort from such talented faculty in our ophthalmology department.

Thank you!

OPHTHALMOLOGY RESIDENTS



**Dr Gabriela Lahaie
Luna, MD**
PGY-5



**Dr Ankur Ralhan,
MD**
PGY-5



**Dr Rachel Curtis,
MD**
PGY-4



**Dr Adrienne
Duimering, MD**
PGY-4



**Dr Matthew Quinn,
MD, Ph.D.**
PGY-4



**Dr Erin Dohaney,
MD**
PGY-3



**Dr Alex Tam,
MD, M.Sc.**
PGY-3



**Dr Alison Banwell,
MD**
PGY-2



**Dr Tiandra Ceyhan,
MD**
PGY-2



**Dr Damien Pike,
MD, Ph.D.**
PGY-2



**Dr Hassan Hazari,
MD**
PGY-1



**Dr Rachel Martin,
MD**
PGY-1



The 2019-2020 cohort of residents and fellows with former Program Director Dr Stephanie Baxter.

OPHTHALMOLOGY FELLOWSHIP PROGRAM



HARMANJIT SINGH, MD, FRCSC
Assistant Clinical Professor
Fellowship Director

I am pleased to share with you an update on the Queen's Ophthalmology fellowship programs in 2020:

Despite the pandemic, we've had a successful year in our different fellowship programs, thanks to our fellows' hard work, and the dedication of our faculty.

Last year, our department launched a new glaucoma fellowship, providing advanced training in medical and surgical glaucoma, as well as research methodology. The fellowship delivers critical experience in the ever-widening spectrum of options in glaucoma management — from traditional glaucoma surgery, to the latest advances in minimally invasive glaucoma surgery. The program's link to ICES and clinical research also provides fellows with a unique perspective and skill set, and positions them for long-term impact in our health care system.

In 2020 we graduated our first glaucoma fellow. Congratulations to **Dr Timothy Ratzlaff** for completing a successful year with us! This year we are training **Dr Salim Korban**. Thank you to **Dr Delan Jinapriya** and **Dr Robert**



Glaucoma Fellowship directors Drs Robert Campbell & Delan Jinapriya

Campbell for initiating such a strong Glaucoma Fellowship program.

Our Medical Retina Fellowship continues to offer excellent training under the supervision of **Drs Sharma, Gonder, and Bal**. Congratulations to our 2020 graduate, **Dr Yao Wang**. This year, we have welcomed **Dr Laura Reyna Soberanis** and **Dr Annie Ho**.

Dr Lisa Jagan is also completing a mini-Oculoplastics Fellowship under the supervision of **Dr Vladimir Kratky**.



Dr Annie Ho
Retina Fellow



Dr Laura Reyna Soberanis
Retina Fellow



Dr Salim Korban
Glaucoma Fellow



Dr Lisa Jagan
Oculoplastics Fellow



Dr Stephanie Baxter, CBME Lead

Competency-Based Medical Education (CBME)

Four years in and going strong!

We are finishing up our 4th year of CBME, and are cruising along in a comfortable position, making only minor tweaks here and there to our existing Program.

On reflecting about where we have been and where we are going, we can proudly say that the number of assessments performed this year compared to our transitional first year has quadrupled, and all stakeholders (residents, faculty, academic advisors, competence committee) seem to be getting in the swing of things. There continues to exist a variety of tensions within this new way of educating our residents, but everyone's comfort level with them is increasing.

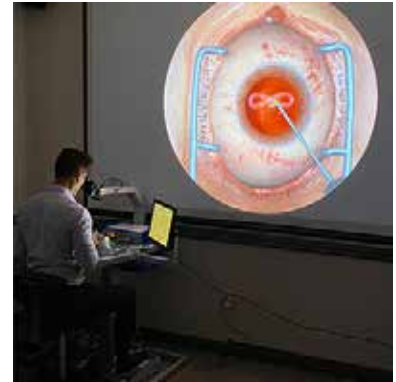
There remains much work to be done, but that will be with a new team with fresh ideas, who will facilitate the next important transition from CBME to the national Royal College CBD Program.

In the coming year, please welcome Dr Sarah Simpson as the new CBME Lead, facilitated by our veteran education consultant Tessa Hanmore and Program Director Dr Mark Bona.



Dr James Farmer observes as a resident in a neighbouring lane in the Emergency Eye Clinic removes a foreign body using the slit lamp.

MOVING TO SURGICAL SIMULATION



Left and Above: The Eyesi surgical simulator in action: above, PGY2 Alex Tam performs some coordination and dexterity exercises.

Below: Rachel Curtis (PGY4) practices some glaucoma procedures at the beginning of her glaucoma block using cadaver eyes in our WetLab.

SURGICAL SIMULATION

2020 was a milestone year for simulation within our department!

In response to decreased OR time relating to the COVID-19 Pandemic, our alumni and faculty rallied together to purchase a brand new Eyesi Cataract surgical simulator.

A very large *THANK YOU* to all who helped make this possible!

While not a substitute for actual OR time, this impressive device affords our residents invaluable additional training on cataract procedures, including for challenging cases and programmed complications.

Early modules in the simulator help train residents in anatomy and basic hand-eye coordination. This introductory training is coupled with direct mentorship to ensure proper technique, and avoiding bad habits.

The graduated curriculum then moves on to developing specific surgical skills of increasing complexity.

Complementing the Eyesi, we continue to make heavy use of our well-equipped wetlab, where residents are able to practice corneal and glaucoma procedures on cadaver eyes, as well as practice cataract and retina procedures on simulation eyes. Our simulation facility also benefits from a novel strabismus eye model that our department has helped develop and validate.

These sessions remain an important side of surgical instruction as they make use of the actual sorts of tools used in the OR.



UNDERGRADUATE MEDICAL EDUCATION DIRECTOR UPDATE



CHRISTINE LAW, MD, FRCSC, DABO
Assistant Professor
Undergraduate Program Director

The Department of Ophthalmology continues to play an active role in Undergraduate Medical Education at Queen's University. Beyond fulfilling our regular duties in instructing the ophthalmic sections of the medical school curriculum, we have also been at the forefront of creating online resources for learners, expanding virtual opportunities and looking at novel collaborations to enhance medical education locally and nationally.

This past year, amidst the challenges brought about by COVID-19, we ramped up our catalog of video-based clinical ophthalmic skills resources. Our clinical skills fair which has traditionally been in-person, transitioned to an online platform through a combination of short educational ophthalmic exam videos and live virtual demonstrations. A virtual low vision patient panel was also implemented to provide more patient experience exposure due to reduced in-person observership opportunities.

In efforts to incorporate an interdisciplinary approach to undergraduate medical education, a number of our faculty and residents have been collaborating with the Agnes Etherington Art Centre, and the Department of Art History and Art Conservation to incorporate visual and creative arts components into medical learning.

Lastly, our local UGME leadership is spearheading a national initiative to create a standard ophthalmology curriculum topics and objectives with associated teaching resources available to all medical students across Canada.

We want to thank everyone for their continued support of the department's UGME activities.

ART AND OBSERVATION

“... diagnosis and management are much more challenging if students don’t know where or how to start looking. Our hope is that the Art of Observation program will help bridge the gap from their visual to medical analysis.”



First-year medical students participate in a life drawing class in studio as part of the program.

A new multi-visit *Art and Medicine* pilot program developed in collaboration with the School of Medicine at Queen’s University took place in the spring. Formatted as a research study, the interactive program taught first-year medical students visual analysis, communication and critical thinking skills. Each week participants were introduced to a different type of observation training using art from Agnes collections and exhibitions along with studio-based creation. The purpose was to explore and evaluate how different approaches to art observation training impact clinical observation skills. “Teaching visual analysis skills in an art museum setting allows students the freedom to experiment with new concepts and ideas in a low-risk environment,” says Heather Parker, Associate Curator, Academic Outreach. “It allows them to think critically about their assumptions.”

Clinical observation is a critical component of the doctor-patient interaction. In many cases, clinical decisions are made based on what a physician sees and how they interpret what

they see. Despite the importance of visual analysis, it is rare for medical trainees to receive formal teaching on the topic. If and when teaching does occur, medical curricula have often focused on teaching learners what to look for in terms of clinical conditions, rather than how to look or engage in the observation process.

“A large part of medicine often involves rote memorization and pattern recognition. However, diagnosis and management are much more challenging if students don’t know where or how to start looking” says Principal Investigator **Dr Christine Law**, Department of Ophthalmology. “Our hope is that the Art of Observation program will help bridge the gap from their visual to medical analysis.” Arts-based training enables physicians to use a holistic approach when diagnosing patients. The research on this pilot program will allow the School of Medicine and the Agnes to implement new evidence-based arts programming for students.

A woman with brown hair tied back is smiling and looking down at a child. The child is looking through a large, black and silver phoropter. The phoropter has a black frame with silver accents and a large lens. The child is wearing a red and white striped shirt. The background is a clinical setting with a white wall and some papers.

Clinical

SECTION III

CLINICAL UPDATE



DEANNA ABBOTT-McNEIL,
Program Operational Director, Ophthalmology

The Department of Ophthalmology continues to be the largest ambulatory service at the Kingston Health Sciences Centre, with 70,000 to 80,000 registrations per year.

In March 2020, as a result of provincial orders, we were required to ramp-down all non-essential surgical and ambulatory activity. The workload impact of integrating the new COVID protocols and scheduling processes was naturally significant:

- Physicians and Secretaries systematically reviewed clinic and OR lists to see what patients could safely be rescheduled or have their in-person clinic visits converted to a virtual appointment;
- Our residents and staff quickly pivoted to remote triaging for our emergency eye clinic, and we deployed a number of remote resources to help patients communicate their eye health so that we could better gauge who needed to be seen in person.
- In the clinics, staff quickly designated a COVID lane and initiated contact/droplet precautions for patients who did not pass screening, and adopted enhanced and continuously evolving IPAC processes such as universal face masks and eye protection;
- Pre-screening COVID calls were made to all patients, and pre-surgical swabs were coordinated, and eligible caregiver accompaniment was identified and communicated to patients and screening stations.

Needless to say, clinical and clerical resources were under unprecedented strain. Considering all of these factors, it would be reasonable to expect a synopsis of 2020's clinical activity to be a bleak one; but the stories of our department are much more positive—tremendous leadership, resilience, innovation, collaboration, patience, and optimism. You can find a few highlights from 2020 in the following pages.

Leadership

Throughout the pandemic there have been many examples of outstanding leadership in the Program. I would like to specifically convey our deepest gratitude and appreciation for two members of our team.

Hailey Simpson took over Charge Technologist duties at the peak of the First Wave and has been a rock-solid quarterback for the Clinics Team, keeping clinics flowing smoothly, leading team huddles and communication and being a force for positivity within the team. She also plays a key role in improving or launching any surgical or clinical care process or initiative.

Marie Pitcher, Manager of the Ophthalmology Clinics, worked tirelessly to protect the safety of patients, staff, physicians and learners alike. Marie was the central figure in our department's clinical successes this year. With her can-do attitude, work ethic and dedication to the program's success and the wellness of all within its walls, she is a respected leader credited with leading us to this point and trusted to lead us beyond.



Marie Pitcher
Program Manager



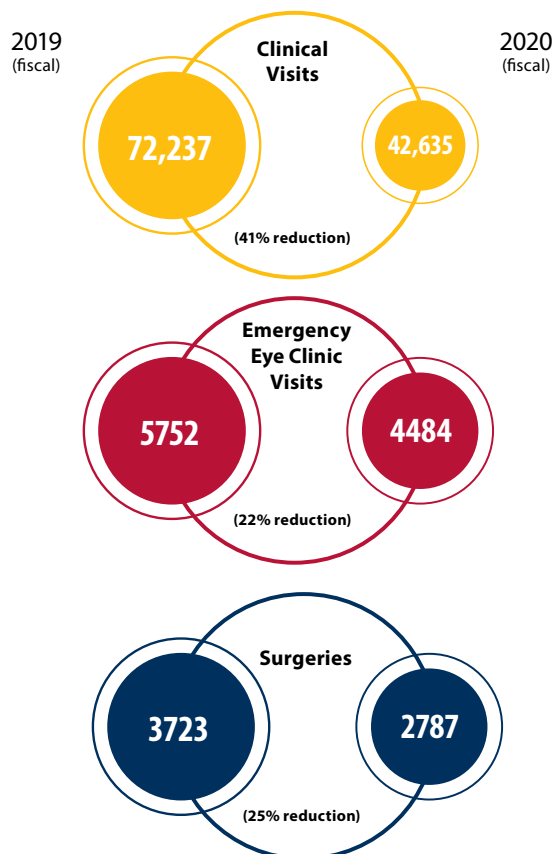
Hailey Simpson
Charge Technologist

CLINICAL UPDATES

Clinical Volumes

Overall volumes for emergency and non-urgent clinics, inpatient consults, and the OR show significant reductions from the previous year due to the Ministry ramp-down directive, weekly allocation cap, and hospital avoidance behaviours in the general public.

However, the volume of activity that was accomplished is a testament to the tremendous diligence and dedication of all physicians, learners and staff members in overcoming pandemic-related obstacles in order to deliver necessary care to our patients.



South East Ontario Vision Rehabilitation Service (SOVRS) Funding Extension

Ontario Health East announced an additional year of funding, and an optimistic outlook for permanent funding, for this tremendously important diagnostic and rehabilitative service lead by Dr Mark Bona. Although we were hoping for the permanent funding to take effect in Fiscal 2020, the impact of COVID on healthcare spending resulted in many of these conversions being deferred. The ongoing operational funding supports the three part-time staff who work there: an Occupational Therapist, an Ophthalmology Technologist and a Research Assistant.



Equipment

Thanks to a combination of the hospital Capital Equipment fund, and the generosity of UHKF donors to whom we remain continuously indebted, we have added to our fleet of diagnostic and therapeutic equipment or replaced valuable items. This year we added the Clarion IntegrePro Scan laser and Ellex Eye Cube Ultrasound machine among other items.



Adapting to a pandemic

3D-printed Faceshields

Ophthalmology requires very close proximity examination of our patients, a reality incompatible with the realities of a pandemic demanding social distancing. The World Society of Pediatric Ophthalmology and Strabismus (WSPoS) developed some open source instructions for the 3D-printing of face shield holders that could couple to major brands of retinoscopes and ophthalmoscopes. We worked with the medical student program at Queen's to print these cleverly designed shields for use in clinic.



Registration Desk Re-Configuration

The main registration desk in our Johnson 6 clinic was also redesigned to allow for greater spacing between patients attending clinic, and separating registration staff. The updated desk also permits greater patient privacy while registering. Plexiglass shields were installed between waiting room chairs which has also introduced an extra layer of protection for our patients.



KINGSTON OPHTHALMOLOGY & VISION SCIENCES CENTRE (KOVSC)

Kingston Ophthalmology & Vision Sciences Centre

Last Year, the department opened up a new clinic in our community's west end—the **Kingston Ophthalmology and Vision Sciences Centre**. The new clinic is a not-for-profit community-based eye care service, and works in partnership with the Queen's Department of Ophthalmology.



The new clinic offers a number of services, including comprehensive ophthalmology, glaucoma and cataract screening, retinal consults, and a wide range of diagnostic testing, with room for expansion. This clinic provides some much-needed additional patient capacity in the community.

Additionally, thanks to a dedicated team of hospital strategic and operational leadership, project managers, clinical systems professionals, and the department, a Master Hosting Agreement between KHSC and KOVSC was ratified, resulting in the ability for KHSC physicians to see diagnostic imaging completed at KOVSC, and for KOVSC-based physicians to be able to see imaging that had been completed at KHSC.

This was a huge win for the significant number of patients who receive care in both locations and contributed substantially to decanting clinical activity away from HDH to help in physical distancing and load-leveling activities.

Visit <https://www.kovsc.ca>

Kingston Ophthalmic Training Centre (KOTC)

The Kingston Ophthalmic Training Centre is in its 11th year of training ophthalmic technicians and technologists. The program continues to go strong, attracting more students than we can accept every year, and has branched out to offering remote instruction to learners based in Toronto through the Kensington Eye Clinic.

The program needed to take a hiatus from accepting new students in the spring when the pandemic hit, as we could not be certain about the needed patient exposure to successfully train technicians. Since clinical volumes started to normalise, the program was relaunched under new leadership; Dr Newton Duarte has assumed the role of Program Director. Hailey Simpson, the department's charge technologist has also joined the program as co-Director, assisting with the hands-on portion of the training.

The program boasts a staggering 100% placement rate for graduates, and we routinely field recruitment inquiries from ophthalmology clinics across the country.

Current students:



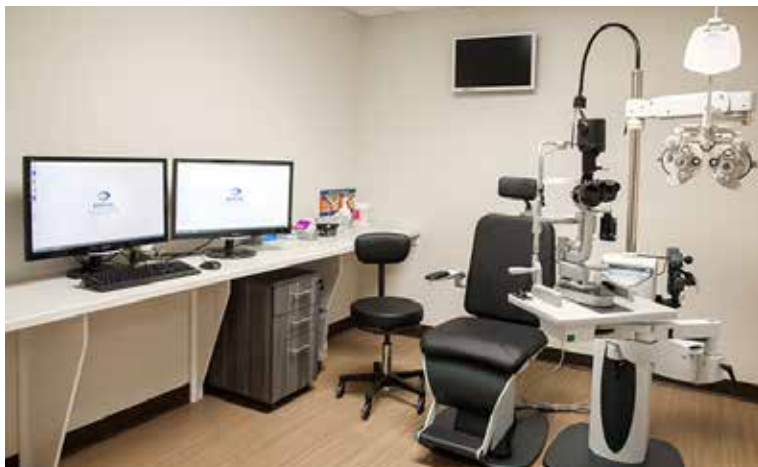
Stacey Djaković



Sadi Grant

To learn more about the KOTC program, see

<https://ophthalmology.queensu.ca/academics/kotc>



A clinical lane at the Kingston Ophthalmology & Vision Sciences Centre



Research

SECTION IV

RESEARCH DIRECTOR UPDATE



ROB CAMPBELL, MD, M.Sc., FRCSC
Deputy Head , Research Director, & Professor
David Barsky Chair in Ophthalmology & Visual
Sciences

2020 was another year of success for research within the Queen's University Department of Ophthalmology. Despite ongoing challenges, we have excelled across the spectrum of inquiry – from basic sciences to education research, and from translational research to population-based studies.

This past year we were exceptionally pleased to welcome Dr Jacob Rullo as a new Clinician Scientist and Dr Newton Duarte as our new Research Administrator and Coordinator. Their expertise and enthusiasm for research will be a great step forward for our research program.

Our research capacity has also been expanded through the growth of our research support staff and new research examination space. The impressive growth of our team bodes well for our future!

Our residents continue to gain wide recognition for their research work and have published many high-impact papers, and presented at an impressive array of meetings. Congratulations on gracefully balancing the many challenges of residency, including the academic demands

Our department continues to build strong ties with collaborators in other departments and universities, further expanding our impact and reach. We have also been highly successful in promoting intra-departmental mentoring and collaborations that have provided important synergies.

Thanks to the efforts of so many, we can take pride in our department's continuing success in research publications, policy reports and grant competitions. Congratulations to all and best wishes for another great year ahead.

RESIDENT RESEARCH

Resident

Title of Project

Dr M. Quinn PGY-3	Association Between Topical Glaucoma Medication Use and Disorders of the Eyelid and Nasolacrimal System.
Dr G. Lahaie Luna PGY-4	Botox as an Alternative Treatment for Structural Lacrimal Outflow Obstructions, Functional NLDO and Gustatory Reflex Hyperlacrimation.
Dr A. Ralhan PGY-4	Quantification of Eye Rubbing Related Corneal Topographic Changes Among Healthy Adults.
Dr A. Duimering PGY-3	Machine Learning in Cataract Surgery Training.
Dr E. Dohaney PGY-2	Strabismus Surgery Curriculum Design for Ophthalmology Resident Training in the Simulation Lab.
Dr R. Curtis PGY-3	Tablet-Based Portable Low Vision Assessment Toolkit Compared to Standard In-Clinic Assessment: A Randomized Tele-ophthalmology Study.
Dr A. Tam PGY-4	Establishing Novel Medications to Improve Structure and Function of Surgical Glaucoma Blebs Using a Rabbit Model.
Dr J. Rullo PGY-5	Characterizing how the Eye Shapes our Local and Systemic Immune Responses to Novel Respiratory Virus.

NEW RESEARCH COORDINATOR



It is a great pleasure to take this opportunity to warmly welcome **Dr Newton Duarte** as our new Research Coordinator and Administrator. Many of you will have had the pleasure of meeting Dr Duarte already.

Dr Duarte brings rare qualifications to the position, having previously worked as an ophthalmologist in Brazil. His expert knowledge on the clinical aspects of care and disease, in combination with his enthusiasm for research will be a great addition to our team. Dr Duarte also brings an enthusiastic commitment to guiding growth in all types of research within our department and across the spectrum of career paths and stages, from students and residents, to allied healthcare and attending physicians and surgeons.

Dr Duarte replaces **Dr Isabella Irrcher**, who stepped down from the role in July. Isabella's enthusiastic leadership and dedication to our department were a tremendous asset, allowing research, and in particular resident research to flourish during her tenure.



Dr Duarte is already having an important impact within our department and is making new links throughout the university and hospital system that will benefit the department for years to come. I know he would be more than pleased to meet with you to discuss ways he can facilitate your research!

On behalf of the department, I wish you the warmest of welcomes, Newton!

Rob Campbell

Director of Research

ONGOING RESEARCH PROJECTS

Dr Stephanie Baxter	Zoster Eye Disease Study (ZEDS)
	Review the change in assessment culture over a three-year transition to CBME
Dr Robert Campbell	Comparative effectiveness of newer oral diabetes medications in preventing advanced diabetic retinopathy (CIHR)
	Comparative effectiveness of prostaglandin analogue therapy versus laser trabeculoplasty as initial glaucoma treatment Comparative Safety of Aflibercept and Ranibizumab in the Treatment of Retinal Diseases
	Improving the Effectiveness of Diabetic Retinopathy Treatment
	Diabetes Care in Aboriginal Population
Dr Vladimir Kratky	Randomized Clinical Trial in the Surgical Treatment of Basal Cell Carcinoma of the Eyelid
Dr Christine Law	A Randomized Trial of Bilateral Lateral Rectus Recession versus Unilateral Lateral Rectus Recession with Medial Rectus Resection for Intermittent Exotropia
Dr Sanjay Sharma	COVID-END (COVID-19 Evidence Network to support Decision-Making)
Dr Yi Ning Strube	Phase 1/2, Open-Label Clinical Study to Evaluate the Safety and Efficacy of Intracranial TSHA-101 Gene Therapy for Treatment of Infantile Onset GM2 Gangliosidosis
	Validation of a Novel Strabismus Surgery 3D Printed Eye Model and Curriculum Design for Ophthalmology Resident Training in the Simulation Lab
	<i>Use of Tissue Adhesives with Rectus Muscle Hang-back Recession</i>
Dr Jacob Rullo	Coronavirus infection of the ocular mucosa to model infection and systemic immunity (COVID-19)



RESEARCH PROFILE: DR JACOB RULLO

The eye is one of the most specialized organs in the human body, allowing humans the ability to interact with their external environment in a highly complex manner. It accomplishes this by processing externally derived cues in the form of light, transforming these stimuli into electrical signals which then travel along visual pathways throughout the brain for interpretation. The intricate regulation of local ocular microenvironments is fundamental to ensuring a clear visual axis—unimpeded light traveling from the tear-corneal interface all the way to the retina.



Intraocular environment

The eye possesses well-regulated intraocular environments, separate from the systemic circulation of the rest of the body. It is filled with low-protein, plasma-like fluid known as the aqueous and vitreous humours. These substances act as specialized microenvironments working to ensure clear vision can be maintained. The constituents of these “humours” are different from plasma, and are regulated by well-controlled blood-ocular barriers. Under conditions of disease, these microenvironments undergo states of disequilibrium, resulting in local changes in small biomolecules within, but undetectable through classical systemic investigation.

The detection and characterization of these molecules as potential biomarkers of, and therapeutic targets for disease would have monumental potential in understanding disease pathophysiology, and in the development of novel ophthalmic drugs. We currently have identified four distinct biomolecule targets which preferentially accumulate in human eyes and exhibit unique profiles under states of disease. Understanding how these targets interplay in the pathophysiology of neuro-retinal degenerative disease, their potential to act as biomarkers, and ability to be manipulated as a therapeutic target are one area of focus in the Rullo Laboratory.

Extraocular environment

A unique microenvironment is also present on the external eye surface: the cornea and conjunctiva. The surface of the eye is covered by a mucous membrane which is in constant flux as it is exposed to pathogens and pathogenic debris. How the eye is able to deal with this prodigious amount of antigenic material while remaining quiescent is a fundamental process for the eye. In fact, the eye must be capable of



modulating both local and systemic immune responses in order to keep the eye free from inflammatory pathways that may damage vision-generating structures. For over a century it has been known the eye is an immune privileged site, capable of reduced immune responses to both allo- and auto-genic material. The practice of corneal transplantation is an excellent example of how non-HLA-matched (human leukocyte antigen) tissue can survive in the eye in the absence of any systemic immune suppression.

In contrast, exposing the surface of the eye to microbial by-products and immunogenic agents can protect mammals from downstream respiratory-tract virus induced disease. The eye therefore acts as a site capable of inducing systemic immunity that both regulates anti- and pro-inflammatory pathways, ultimately to protect itself from damage. This novel immune-inductive, microbe-enriched site has enormous potential for understanding how the local environments of the eye can shape our systemic landscape.

We have begun to characterize the importance of native ocular surface microbe::host interactions in the context of disease initiation in patients, the role of microbial environments on intraocular disease, and, more recently, how the eye may be used as a site to model host::pathogen interactions and shape protective systemic immune responses.

RESEARCH PROFILE: DR ROBERT CAMPBELL

Currently leading a CIHR-funded multi-disciplinary research program focusing on the assessment of vision health care quality, access and safety.

One of our sub-themes involves the evaluation of first-line glaucoma care at a population level. This includes the type of care and success rates, as well as predictors of type of care and type of provider.

As an example, in recent years, optometrists in much of North America have expanded their scope of practice to include the provision of glaucoma therapies. This has coincided with an increasing burden of important causes of vision loss, including glaucoma.



Our team has been studying the impact of optometric scope expansion on the distribution of care for new glaucoma patients among ophthalmologists and optometrists, and the factors that predict the type of eyecare provider delivering glaucoma care.



We have also been investigating trends in first-line therapy to better understand and improve care, and found that laser trabeculoplasty is overtaking medication therapy as the most common first-line therapy in Ontario. Our studies have also been evaluating the predictors of receiving each type of therapy and success rates of the options.

Our aim is to provide real-world, highly generalizable evidence to help foster efficient models of care to improve outcomes for patients with glaucoma.

COLLABORATION SPOTLIGHT

Glaucoma is the second leading cause of vision loss (behind cataracts) around the world. With the current practice of only measuring the intraocular pressure using tonometry during in-office patient visits, physicians get limited data on IOP fluctuations that are occurring throughout the day. A continuous IOP monitoring system would be able to provide the ophthalmologist with a much more vivid picture of a patient's glaucoma progression, helping to guide treatment.

Queen's Ophthalmology researcher Dr Robert Campbell has teamed up with the Micro-Electro-Mechanical systems (MEMs) Team in the Department of Mechanical Engineering at Queen's University to help develop such a sensor.

Ph.D. candidate Angelica Campigotto, under the supervision of Dr. Yongjung Lai, Ph.D P.Eng, has developed an IOP monitoring contact lens. The soft, silicone contact lens utilizes embedded microfluidic channels to provide a continuous visual output of the fluctuations in IOP. An indicator fluid is able to shift in position in a direct response to the change in curvature of the eye as the IOP fluctuates. A cell phone app can then be used to capture the location of the fluid within the embedded microchannels and record the shifts in IOP throughout the day.



An early prototype of the IOP-monitoring contact lens.

The microfluidic contact lens showed a consistent linear responsiveness to changes in intraocular pressure and proved robust to the effects of anatomic differences among eyes. The indicator fluid had an average fluid movement of 28 $\mu\text{m}/\text{mmHg}$ for both the porcine eye trials and cadaver eye trials conducted. Additionally, the devices showed the ability to measure both increases and decreases in IOP during cyclical fluctuations.

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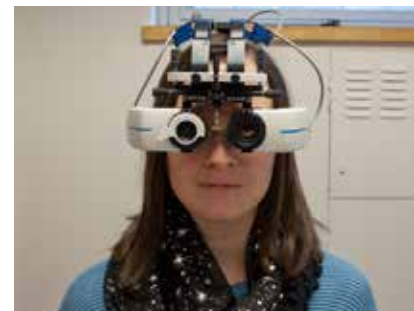
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POSTERS

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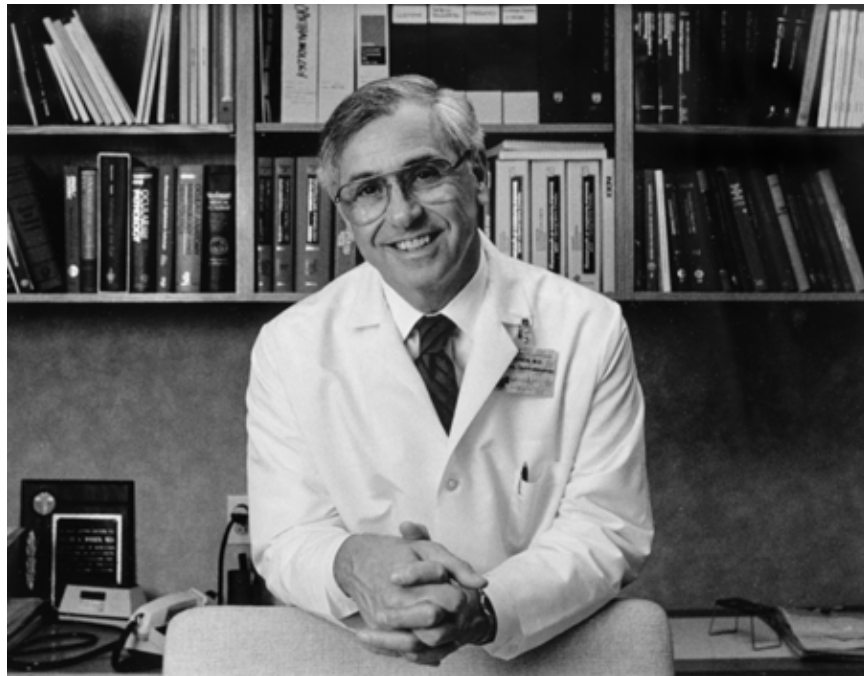


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<https://ophthalmology.queensu.ca/academics/rosen>

IN MEMORIAM



Dr David A. Rosen

Founder of the Queen's Department of Ophthalmology

April 18 1926–April 30 2019



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