

# Ophthalmology at the University of Alberta: Over 8 Decades of People-driven Contributions

Safia A. Nazarali, MSc, Samir Nazarali, BHSc, Judith Friedman, PhD, Karim F. Damji, MD

## ABSTRACT •

The Department of Ophthalmology and Visual Sciences at the University of Alberta has a long history of dedication to outstanding patient-centered eye care for a population of over 3 million, many of whom reside in geographically remote areas. It was established as the Department of Ophthalmology and Rhino-Oto-Laryngology in 1937. By 1946, Dr. Mark Marshall had become director of graduate medical education at the University of Alberta and established the “Marshall Plan”, which led to the development of several residency programs, including ophthalmology, at the University of Alberta. Some ophthalmology residents made extraordinary contributions while still in training while many others obtained valuable training elsewhere, and then returned to serve the Department.

Historical discoveries and developments highlighted in this article captured through research, oral and written interviews, include excellence and innovation in the following areas: education for a variety of learners, patient care locally and in underserved areas regionally and globally, translational vision science research, and leadership including the consolidation of the ophthalmology program at the Royal Alexandra Hospital in 1996, and the launch of the Eye Institute of Alberta identity in 2015. The Department aims to continue its commitment to enhance vision-related quality of life for Canadians and others by maintaining its culture of collegiality and collaboration, continuing to invest in talent and garner philanthropic support, and by further strengthening its institutional foundations and enabling environment.

With a vision to lead patient-centred eye care through outstanding and integrated service, education, and research, the Department of Ophthalmology and Visual Sciences at the University of Alberta (referred to hereafter as the Department) serves over 3 million people residing in Edmonton, Northern Alberta, Northeastern British Columbia, Yukon Territory, Northwest Territories, and Northwestern Saskatchewan. Based on a recent celebration of the Department’s 80th anniversary and research conducted by a historian (including archived and printed sources in addition to oral and written interviews), we have captured key people-driven contributions in education, patient care, research, and leadership, which we hope will be motivational and educational for learners, ophthalmologists, vision scientists, and leaders in the eye care field.

## EVOLUTION OF THE DEPARTMENT

The history of ophthalmology at the University of Alberta dates back to 1923, when the Faculty of Medicine and Dentistry began offering ophthalmology courses to medical students. In 1931, as interest in the field continued to grow, the university listed ophthalmology as a subdepartment in the Department of Surgery and Clinical Surgery. Shortly after, in 1937, the Department of Ophthalmology and Rhino-Oto-Laryngology was established. The Royal College of Physicians and Surgeons of

Canada officially approved a 4-year postgraduate program for ophthalmology at the University of Alberta in 1949. During the first years of the program, University of Alberta residents often left the province to undertake a year or 2 of specialized training at institutions in the United States. After training, many of these residents returned to the province and played key roles in the development of the University of Alberta Hospital’s full residency training program in ophthalmology. The advanced skills that these former residents brought back with them allowed the Department to complete all residency training locally within a decade. The Department grew slowly during the 20th century, gaining minor procedure and outpatient operating rooms in the University of Alberta Hospital.

Adult eye care in Alberta was restructured in the 1990s. As a response to budget deficits, the Progressive Conservative government began planning the regionalization of health care in the province. Discussions on the process of regionalizing ophthalmology began under the leadership of Dr. Henry Wyatt and came to completion under Dr. Ian MacDonald, with contributions from several other ophthalmologists, including Drs. Royce Johnson, Fooklin Leong-Sit, and William “Bill” Pearce. In 1993, a motion to regionalize all adult hospital-based ophthalmology at the Royal Alexandra Hospital (RAH) was officially adopted. In 1996, the Regional Eye Centre officially opened at the RAH.

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Additional sites include the children's hospital, now called the Stollery Children's Hospital, within the University of Alberta Hospital; Westview Health Center, located in Stony Plain, Alberta; and the Fort Saskatchewan Community Hospital. The regionalization of adult eye care marked a major turning point in the development of the Department because it brought all Edmonton-area ophthalmologists under the umbrella of the Department, which greatly expanded the number of clinical faculty and consolidated all adult ophthalmology care at the RAH. It established a commitment to teaching and unified ophthalmologists, with dedicated operating rooms, inpatient beds, specialized clinics, and Department office space. Pediatric ophthalmology remained at the children's hospital within the University of Alberta. In October 2015, the Regional Eye Centre was renamed the Eye Institute of Alberta with a renewed commitment to strengthening patient care, education, and research.

### EDUCATION: INVESTING IN OUR FUTURE

The Department is committed to excellence in teaching at all levels, including undergraduate medical education, residency training, graduate and postdoctoral training, and clinical as well as research fellowships. Students work closely with ophthalmologists across Edmonton to gain the knowledge and diverse set of skills necessary to provide the highest quality of care to patients. This devotion to quality education began with Dr. Mark Marshall, who enrolled as a medical student at the University of Alberta in 1920. As a fifth-year medical student in 1925, Dr. Marshall earned a class I grade in ophthalmology and rhino-oto-laryngology. Marshall completed his medical training at McGill University and, after receiving his Diploma in Laryngology and Otology in London, as well as additional training in Vienna, Paris, and New York, Dr. Marshall returned to the University of Alberta as a demonstrator in ophthalmology in 1931. He rose through the ranks to become clinical professor of ophthalmology and rhino-oto-laryngology and head of the Department of Ophthalmology and Rhino-Oto-Laryngology in 1940. In 1946, Marshall became the director of graduate medical education at the University of Alberta. During his time as director, he developed and implemented the graduate medical training program, which became known informally as the "Marshall Plan."<sup>1</sup> This training program laid the foundation for ophthalmology residency training at the University of Alberta.

Dr. Don Hassard, who was among many residents who successfully completed Dr. Marshall's training program, performed the first corneal transplant in Western Canada at the University of Alberta Hospital in 1962. After undertaking a fellowship in corneal surgery, Dr. Hassard returned to Edmonton in 1965 and went on to establish the Eye Bank and Corneal Transplant Service. Shortly

thereafter, Dr. Rod Morgan, another former resident, returned to the Department of Ophthalmology and became the director and principal instructor of the University of Alberta Hospital Orthoptic Training Program.

Continuing through the 1970s, 1980s, and 1990s, early advancements of modern cataract surgery and microsurgery were offered to the public and as part of resident training. Several members contributed significantly to establish the Department as a leader in training modern cataract, strabismus, and glaucoma surgeons, who filled the prairies and British Columbia over the years to come. Dr. Jack Rootman, a graduate of the University of Alberta Ophthalmology Residency Program in 1972, went on to become an outstanding orbital surgeon and ophthalmic pathologist, educator, researcher and chair of the Department of Ophthalmology at the University of British Columbia. He received the Canadian Ophthalmological Society Lifetime Achievement Award in 2011.

In the 21st century, educational advancements have transcended borders and cultures through the introduction of numerous capacity-building programs in Africa and India led by several members of the Department, including Drs. Matt Tennant and Mark Greve. The "sandwich fellowship" program was developed by Dr. Karim Damji and colleagues at the University of Ottawa and was also implemented at the University of Alberta. This program involves a fellow from a developing nation who completes rotations in an academic institution in the developed world as well as his or her home nation. Also included in the experience is an emphasis on teaching, leadership, management, and research. The purpose of the endeavour is to train highly skilled clinicians, develop various subspecialty areas, and expand institutional capacity in the fellow's home nation.<sup>2</sup> Through this and a traditional fellowship training model, the Department trains international fellows in a number of subspecialties.

The Department has always sought to provide exceptional educational opportunities to residents and clinicians, from the development of the Department's first surgical teaching laboratory in 1977–1978 to the recent development of the Ophthalmic Surgical Skills Center led by Dr. Morley Kutzner in 2014. This surgical simulation centre enables students and surgeons to develop and refine their techniques with state-of-the-art surgical equipment.

Since the first resident, Dr. J. Winston Duggan, graduated from the residency program in 1950, 116 ophthalmologists have graduated; many have stayed in Edmonton for some or all of their careers, including Dr. Duggan, who would go on to become head of the Division of Ophthalmology from 1960 to 1964. A number of others have returned after additional training, bringing back their expertise in areas such as glaucoma, pediatrics, plastics, cornea, retina, and neuro-ophthalmology.



*Dr. Don Hassard's corneal transplant patients in 1971. Courtesy of Medical Photography, University of Alberta Hospital.*



*Photo of ophthalmology team from Alberta visiting the glaucoma unit that was developed jointly at Addis Ababa University in Ethiopia. From left to right: Dr. Michael Dorey (glaucoma specialist, University of Alberta), Dr. Girum Gessese (at the time glaucoma specialist, Jimma University, Ethiopia), Dr. Sourabh Arora (at the time teleglaucoma research fellow, University of Alberta), Dr. Abeba Giorgis (glaucoma specialist, Addis Ababa University), Dr. Abiye Mulugeta (glaucoma specialist, Addis Ababa University), Dr. Lisa Heckler (at the time glaucoma fellow, University of Alberta), and Dr. Karim Damji (glaucoma specialist, University of Alberta). Courtesy of Dr. Karim Damji (taken in 2014).*

## PATIENTS FIRST

Through the clinical setting of the Eye Institute of Alberta, the Department of Ophthalmology and Visual Sciences provides specialized adult eye care to over 40 000 outpatients annually. The inpatient service is also a major component of care and includes patients with severe corneal ulcers, endophthalmitis, and eye injuries associated with assaults, trauma, and foreign bodies. Pediatric care is provided through a separate unit at the Stollery Children's Hospital, which is situated within the University of Alberta Hospital.

Since Dr. Marshall's visits to Northern Alberta from the 1940s to 1960s, a key focus of the Department has been to

provide eye care to underserved areas. In 1970, the Department participated in the Arctic Ophthalmological Survey of eye disease in the Canadian North. From 1971, the Department under Chairman Dr. Alastair Boyd began providing care to the "Inuvik Zone" of the Northwest Territories. Drs. Henry Wyatt and Bill Pearce, staff, and residents travelled to several small communities 2 to 3 times annually to provide eye care to patients in this region. In 1992, Dr. Leonard Smith, a former resident of the Department of Ophthalmology who began practicing in Yellowknife in 1985, took over care for patients in the entire Northwest Territories, including those from the former Inuvik Zone.

The Department's involvement in the North sparked an interest in telemedicine. In 1998, Dr. Matt Tenant, who was then a resident at the University of Alberta, initiated a project using telemedicine. Dr. Tenant and the teleophthalmology team, including Dr. Chris Rudnisky, Dr. Mark Greve, Jayson Eppler, Chris Tennant, and Abshir Moalin, developed a program to diagnose diabetic retinopathy in remote locations.<sup>3</sup> Their outstanding efforts to bring better eye care to rural Canadians were recognized with a Canadian Institutes of Health Research National Knowledge Translation Award in 2008. The Department continued its interest in telemedicine by initiating programs in teleglaucoma and teleoncology. In 2016, Drs. Tennant and Rudnisky were awarded a \$1 million grant as part of the Canadian Institutes of Health Research Strategy for Patient-Oriented Research network. The telemedicine programs initiated by the Department have served over 25 000 patients from January 2000 to March 2017, and these numbers continue to increase.

Improving access to cost-effective care for underserved populations outside of Canada through teleophthalmology has also been a major research focus of the Department. In collaboration with Alberta Retina Consultants, the Department initiated teleophthalmology programs at the Sri Kiran Eye Hospital in India in 2005, the Cameroon Baptist Convention Health Services in 2006, and in Congo in 2008. In 2012, the current department head, Dr. Karim Damji was selected as one of Canada's new rising stars in global health by Grand Challenges Canada and was awarded \$100,000 to pilot teleglaucoma in East Africa, as part of an endeavor called 'STOP Glaucoma in Sub Saharan Africa'.<sup>6</sup> The STOP Glaucoma initiative is aimed at creating a self-sustaining system in which eye specialists based in academic institutions can be trained to detect and manage glaucoma in a collaborative environment that fosters international standard patient care, teaching and research.

The Alberta Ocular Brachytherapy Program, established in 2011, treats patients with uveal melanoma in Alberta, Northern British Columbia, Saskatchewan, the Northwest Territories, and parts of Manitoba. Dr. Ezekiel Weis, a former resident of the Department, spearheaded the formation of the program upon returning to the University of Alberta in 2008 after completing fellowship training in the Netherlands, the United States, and in Canada. The Alberta Ocular

Brachytherapy Program has become the second busiest in Canada, providing access to treatment for patients who once had to travel to Toronto or Philadelphia to seek treatment.



*Photo of Dr. Bill Pearce (right) with a local nurse (middle) and optician Bill Carmichael (left) in Tulita (Fort Norman), NWT. Courtesy of Dr. Bill Pearce (taken in mid 1970's).*



*Photo of Dr. Mark Greve (left) and Dr. Matt Tenant examining a stereoscopic image of the optic nerve and macula as part of the teleophthalmology program. Photo by Richard Siemens. Copyright University of Alberta.*

## FROM BENCH TO BEDSIDE

Translating research advances directly into improved clinical practice has been a key focus of the Department since 1971, when Dr. Bill Pearce set up an ocular genetics clinic at the University of Alberta. For the next 20 years Pearce compiled a database of patients with rare genetic eye diseases. In the early 1990s he was joined by Dr. Ian MacDonald and Dr. Michael Walter, who became the head of the ocular genetics laboratory in 1993. This database proved valuable for future research endeavours. Dr. Walter and colleagues at the University of Alberta used this database to identify mutations of *FKHL7* at 6p25 and *RIEG1* at 4p25 in families with related types of anterior segment dysgenesis responsible for glaucoma.<sup>4</sup> In 2002, Dr. Walter was awarded the Association for Research in Vision and Ophthalmology Cogan Award for his contributions to research in ophthalmology or visual sciences. The database was also used by Dr. Torben Bech-Hansen at the University of Calgary, who cloned the gene for incomplete X-linked congenital stationary night blindness in 1998. Additionally, Dr. Macdonald and colleagues, including Dr. Paul Wong of the Department

of Biological Sciences at the University of Alberta, gained recognition for the cloning of the *ELOVL4* gene based on mapping data from Alberta families with Stargardt-like macular dystrophy.<sup>5</sup> Dr. MacDonald led the clinical research team in carrying out the first Canadian ocular gene therapy trial to treat choroideremia in 2015.

The Department has also been recognized for enabling a research program that integrates clinical and basic science approaches to improve the visual health of patients. In 2004, Dr. Ordan Lehmann was appointed Canada Research Chair in Glaucoma Genetics. In 2006, Dr. Yves Sauvé was the recipient of the CNIB Barbara Tuck MacPhee Award, which supports researchers in the field of macular degeneration. Dr. Lehmann initiated the Team to Prevent Blindness in 2008. This interdepartmental and interdisciplinary team at the University of Alberta, including Drs. MacDonald and Sauvé, investigated ocular disease using clinical, genetic, molecular, and physiological approaches. The Team to Prevent Blindness subsequently broadened its reach to become the Alberta Vision Net in 2014. This is a provincial initiative that encourages links between clinical and basic science researchers from a variety of fields.



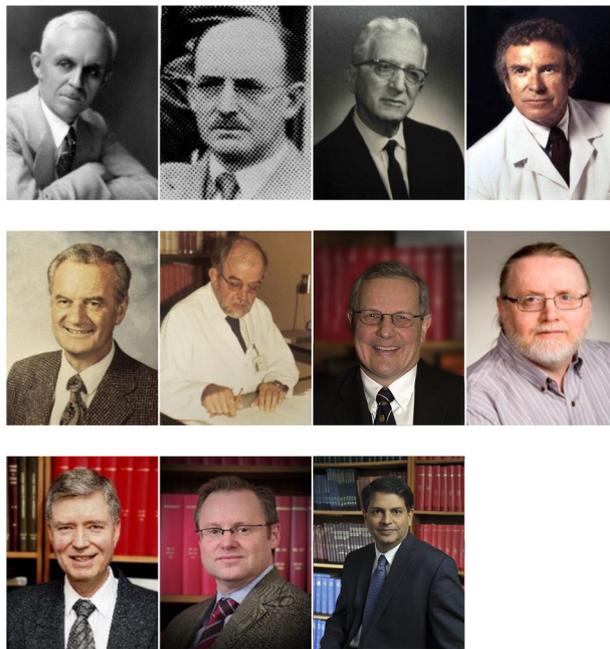
*Photo of Dr. Rizwan Somani performing retinal gene therapy surgery as Dr. Ian MacDonald looks on. Courtesy of Ken Dalton, Medical Photography, Royal Alexandra Hospital.*

## CHIEFS OF OPHTHALMOLOGY

Over the past 80 years, 11 chiefs have led the Division of Ophthalmology and Otolaryngology as it has evolved into the Department of Ophthalmology and Visual Sciences:

- Dr. Robert B. Wells, MB. Head of Ophthalmology (1923–1936). Dr. Wells was the first ophthalmologist at the University of Alberta Hospital. He started the ophthalmology program at the University of Alberta and mentored Mark Marshall.
- Dr. Claude V. Jamieson, MB. Head of the Department of Ophthalmology and Rhino-Oto-Laryngology (1936–1940). Dr. Jamieson started the Ear, Nose, and Throat program at the University of Alberta and became the head of the combined department when Dr. Wells resigned because of ill health.

- Dr. Mark Marshall, MD. Chairman of the Department of Ophthalmology and Rhino-Oto-Laryngology (1940–1960). He established the “Marshall Plan”, which led to the development of several residency programs, including ophthalmology, at the University of Alberta.
- Dr. J. Winston Duggan, MD. Director of the Division of Ophthalmology (1960–1964). Dr. Duggan was the first “Marshall Plan” graduate and became a lecturer at the University of Alberta after his residency.
- Dr. T. “Alastair” Boyd, MD. Director of the Division of Ophthalmology (1964–1969), Chairman of the Department of Ophthalmology (1969–1980). He was the first full-time geographic appointment in ophthalmology and started the Glaucoma Clinic in 1959.
- Dr. Henry T. Wyatt, MD. Chairman of Department of Ophthalmology (1980–1992). He set up the Department of Ophthalmology at the Charles Camsell Hospital and helped to establish the Department’s program to care for patients in the Inuvik Zone.
- Dr. Ian M. MacDonald, MD. Chair Department of Ophthalmology (1992–2006; 2009–2014). Dr. MacDonald oversaw the regionalization of the Department and carried out the first Canadian ocular gene therapy trial to treat choroideremia in 2015. He also served as the branch chief of Ophthalmic Genetics and Visual Function at the National Institute of Health (2007–2008).
- Dr. Michael A. Walter, PhD. Acting Chair of the Department of Ophthalmology (2002–2003). He won The Association for Research in Vision and Ophthalmology Cogan Award in 2002 for his contributions to the understanding of anterior segment developmental disorders, particularly Axenfeld–Rieger syndrome.
- Dr. Garry T. Drummond, MD. Acting Chair of the Department of Ophthalmology (2007). He was the first Geographic Full Time appointment in pediatric ophthalmology and modernized the pediatric ophthalmology service. Drummond also revamped undergraduate ophthalmology education and was the recipient of annual teaching awards over a 10-year period (1988–1998).
- Dr. Mark D. J. Greve, MD. Acting Chair of the Department of Ophthalmology (2008). He was a recipient of the Canadian Institutes of Health Research National Knowledge Translation Award (along with Dr. Matt Tennant, Dr. Chris Rudnisky, Chris Tennant, and Jayson Eppler) in 2008 for his efforts to bring better eye care to rural Canadians.
- Dr. Karim Damji, MD. Chair of the Department of Ophthalmology and Visual Sciences (2014 to present). Since 2006, Dr. Damji has been the lead of the “STOP Glaucoma” program which is aimed at reducing the rate of glaucoma-related blindness in sub-Saharan Africa.<sup>6</sup> He also initiated an interprofessional eye care forum that brings together various stakeholders in a collaborative educational environment centred on best patient care.



*Chiefs of Ophthalmology at the University of Alberta. Top row (left to right): Drs. Robert B. Wells, Claude V. Jamieson, Mark Marshall, and J. Winston Duggan. Middle row (left to right): Drs. T. “Alastair” Boyd, Henry T. Wyatt, Ian M. MacDonald, and Michael A. Walter. Bottom row (left to right): Drs. Garry T. Drummond, Mark D. J. Greve, and Karim Damji. Courtesy of the University of Alberta Archives (Wells and Jamieson) and the University of Alberta Faculty of Medicine and Dentistry.*

## VISION FOR THE FUTURE

Over the past 80 years, the Department has remained dedicated to providing excellence in patient care, teaching, and research. The University of Alberta ophthalmology residency program has provided the majority of ophthalmologists practicing in Western Canada, some of whom have gone on to become world leaders in specialized fields of ophthalmology. Its leading graduates have introduced new advancements in strabismus, glaucoma, cornea, cataract, retina, and other subspecialty areas. Moving forward, the Department will continue its commitment to improve vision-related quality of life for Canadians through excellence in clinical care, education, research, and leadership.

The Department’s goals for the next decade include the following: (i) Clinical goals—to renovate and further develop infrastructure for the Eye Institute of Alberta at the Royal Alexandra Hospital as well as within the Edmonton zone, to recruit outstanding talent and to improve cost-effective access for local and select global under-served populations; (ii) educational goals—to further enhance residency, fellowship and global health programs, and introduce an ophthalmic technician

training program; and (iii) research goals—to develop a clinical trial center and strengthen strategic areas in translational vision science through a focus on recruitment, mentorship, and collaboration.

## REFERENCES

1. Marshall MR. Graduate medical training: its organization and administration. *Can Med Assoc J.* 1961;84:695-7.
2. Kassam F, Damji KF, Kiage D, Carruthers C, Kollmann KH. The Sandwich fellowship: a subspecialty training model for the developing world. *Acad Med.* 2009;84:1152-60.
3. Tennant MT, Greve MD, Rudnisky CJ, Hillson TR, Hinz BJ. Identification of diabetic retinopathy by stereoscopic digital imaging via teleophthalmology: a comparison to slide film. *Can J Ophthalmol.* 2001;36:187-96.
4. Mirzayans F, Gould DB, Héon E, et al. Axenfeld-Rieger syndrome resulting from mutation of the FKHL7 gene on chromosome 6p25. *Eur J Hum Genet.* 2000;8:71-4.
5. Lagali PS, MacDonald IM, Griesinger IB, Chambers ML, Ayyagari R, Wong PW. Autosomal dominant Stargardt-like macular dystrophy segregating in a large Canadian family. *Can J Ophthalmol.* 2000;35:315-24.
6. Damji KF, Nazarali S, Giorgis A, et al. STOP glaucoma in Sub-Saharan Africa: enhancing awareness, detection, management, and capacity for glaucoma care. *Expert Rev Ophthalmol.* 2017;12:197-206.

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## Footnotes and Disclosure:

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From the Department of Ophthalmology and Visual Sciences, University of Alberta, Edmonton, Alta.

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Correspondence to Dr. Karim F. Damji, MD,  
Royal Alexandra Hospital, 2320, 10240 Kingsway Avenue,  
Edmonton, Alberta, Canada, T5H 3V9; Tel.: (780) 735-4200;  
fax: (780) 735-5242; kdamji@ualberta.ca