FRONTIERS IN OPHTHALMOLOGY
“The pace and progress of vision science is hurtling forward at momentous speed, spurred on by a host of exciting new research discoveries, an unprecedented culture of collaboration, and the unflagging efforts of our clinicians, scientists, and educators.”
— Joan W. Miller, MD

MESSAGE FROM THE CHAIR
Welcome colleagues, friends and supporters to the Harvard Medical School (HMS) Department of Ophthalmology’s inaugural edition of Frontiers in Ophthalmology.

I am proud and excited to share with you this first report, which highlights significant clinical, scientific, and educational milestones of the department’s world-class affiliated hospitals and research institutions. Our report reflects on two decades of discovery and progress in the field of vision science, and the tools and technologies that are transforming the lives of people and patients across the globe.

From Boston to Bangladesh, improving ophthalmic care and its delivery to millions of people worldwide is a shared vision and singular goal of the HMS ophthalmic community. Advancing technology, expanded global connections, and thriving new alliances among HMS affiliates and across the broader scientific community are fueling gains in vision science, education, and medicine. As you’ll read in the following pages, HMS scientists, physicians, and academics from all ophthalmic disciplines and across every subspecialty are brainstorming in the lab, the classroom, and the clinic. Their shared knowledge is driving ideas forward and, ultimately, improving care to patients.

Educating the next generation of leaders
The HMS Department of Ophthalmology has a proud history of teaching, training, and mentoring generations of students who become leaders in their field. In the last several years, we’ve reinvigorated, refined and retooled our educational program to challenge and inspire students at every level of their medical education.

Our training program features a newly restructured surgical curriculum for residents, which now integrates lectures and customized wet lab sessions supervised by attending physicians. Groundbreaking faculty efforts are reshaping resident education with the development of revolutionary, computer-simulated technologies that fine-tune surgical knowledge and skills outside the operating room. Innovative courses and conferences—including our nationally recognized cataract course and new vitreoretinal course—offer students added venues of scientific inquiry and learning, and attract prominent, international speakers. We continue to forge strong alumni ties through our expanded lecture series, a robust visiting professors program, a new AMD symposium, and a newly revamped and expanded three-day Annual Meeting & Alumni Reunion. Across the HMS community and abroad, our expanded alliances with affiliates and partners have sparked unprecedented opportunities for surgical, clinical, and research training. All of these endeavors offer an unparalleled educational experience for our brilliant young trainees.

Advancing science
Thanks to a paradigm shift in collaboration among basic researchers and clinician scientists, insights gained in the lab are accelerating bench-to-bedside discoveries faster than ever before. The last decade has seen groundbreaking advances in human genetics, regenerative medicine, and inflammation and immunology; these, in turn, have led to a host of new treatments, technologies, and therapies aimed at alleviating the suffering associated with eye diseases and blindness.

HMS researchers have focused intensely on these areas, and are beginning to unravel some of the mysteries surrounding disease processes, and the biological mechanisms or environmental influences that may cause them to go awry.

For example, you’ll read about advances in age-related macular degeneration (AMD) pioneered by the HMS Angiogenesis Research Group. The foundations of the group’s work not only illuminated how new blood vessel formation in the eye (neovascularization) contributes to severe forms of AMD, but also spurred revolutionary clinical treatments that halt and sometimes reverse pathological blood vessel growth. Today, anti-VEGF inhibitors and therapies developed in our labs have saved or improved the sight of nearly a million people around the world. Recent and exciting results from a large-scale, phase 3 clinical trial for treating macular edema in diabetic patients showed dramatic visual improvement using the anti-VEGF drug Lucentis®. These groundbreaking efforts represent a quantum leap in treatment for patients with diabetes—the first in 25 years—and are rapidly establishing new standards of care.

In cornea, HMS faculty members are pursuing novel translational research that has shed new light on the roles of angiogenesis and inflammation in ocular disease. Clinical trials in these areas are providing a robust baseline of data—facilitating the development of therapies to combat these diseases. HMS cornea scientists are also leading industry efforts to harness powerful, new imaging technologies that more precisely target,
Pursuing excellence in patient care
The cornerstone of our mission is the quality of care we provide to patients. Significant efforts by HMS faculty are impacting our full spectrum of patient care—from prevention to treatment of blindness. For example, cutting-edge technologies are giving us better prognostic tools to diagnose and treat eye diseases faster and more efficiently. More targeted and less invasive drug treatments and therapies are preventing, saving, and sometimes restoring sight in people young and old. Recent and exciting developments in lens technology—already helping to improve Kpro outcomes—may soon offer great therapeutic benefits across a broad range of eye disorders and diseases. Pioneering advancements in rehabilitative medicine are enabling patients to maximize their vision—sometimes even restoring sight—with new tools, technologies, and therapies that improve their quality of life.

Physicians and faculty across the HMS ophthalmic community have a long tradition of collaborating on patient care, research, and academic activities. We’ve recently forged critical new alliances that have enabled unprecedented expansions in service to our patients and expanded our impact worldwide. For example, we’ve boosted our presence in the Longwood Medical Area by unprecedented expansions in service to our patients and by adding emerging educational and training venues, new research initiatives, and the establishment of new healthcare alliances that have all contributed to the department’s strong growth and increasing national and international presence. In 2008, Dr. Miller created five HMS Vice Chair positions to lead the areas of basic research, academic programs, centers of excellence, medical education, promotion, and reappointments. This new leadership structure has helped integrate the efforts of HMS affiliated institutions and partners—promoting communication and multidisciplinary collaborations in all three mission critical areas. Dr. Miller is empirically committed to supporting the incredible talent and dedication of HMS faculty. She has championed numerous seminal advancements that have created a progressive and rewarding 21st century work environment. Dr. Miller has vigorously promoted superb faculty funding and mentoring programs, a renewed emphasis on promotions and appointments, and new venues for professional advancement and recognition; she also received national recognition for her strong advocacy efforts as the 2010 recipient of the Women in Ophthalmology (WIO) Suzanne Veronneau-Troutman Award. WIO president, Jennifer L. Lim, lauded Dr. Miller as a “pioneer in enhancing the position and involvement of women in ophthalmology locally and nationally. Women have achieved parity guided by your gender-neutral policies, efforts to encourage women...to leadership positions in patient-care, teaching, research and administration and your support of their academic achievement. You stand out as a strong female voice in the ophthalmology community.”

A committed and visionary leader, Dr. Miller has supervised more than fifty clinical and research fellows, most of whom now hold positions in academic ophthalmology around the world. Her outstanding contributions to ophthalmic research make her a sought-after lecturer in the United States and abroad. She has published more than 140 peer-reviewed papers and book chapters and review articles. She is co-editor of Albert and Jakobiec’s Principles and Practice of Ophthalmology, 4th edition, and a named inventor on nine U.S. patents. She has been honored with numerous awards, including the Rosenthal Award and Donald J. Gass Medal of the Macula Society, the Retina Research Award from the Club Jules Gonin, the Alcon Research Institute Award, the ARVO/Pfizer Ophthalmic-Translational Research Award, the Founder’s Award from the American Society of Retinal Specialists, the HMs 2010 Joseph B. Martin Dean’s Leadership Award for the Advancement of Women Faculty, the Suzanne Veronneau-Troutman Award, and the Paul Henkind Memorial Award from the Macula Society.