

F.Y. eye

A SEMI-ANNUAL NEWSLETTER



Photo courtesy of Jeffrey Farrell

Celebrating a site for sight

New facility is welcoming space where sight-saving research, patient care and outreach can flourish

After several years of careful planning, design and construction, the new Elks Children's Eye Clinic opened its doors to patients on December 8, 2020. The state-of-the-art facility, connected to the Casey Eye Institute building by a striking glass skybridge, is the first free-standing eye institute for pediatric patients in North America.

"I really think of this new building as a 'site for sight,'" said Casey director David Wilson, M.D. "Over the past 20 years, we've had remarkable success in both medical science, community outreach and education. With the aging of the population, the need for eye services becomes even more critical."

The \$50 million, 60,000 square foot building provides youngsters with a full range of comprehensive and subspecialty eye care under one roof, along with services for all ages in retina, ophthalmic genetics and vision rehabilitation. The building reflects the generosity of many donors, and is named in recognition of the Oregon State Elks Association, which generously gave \$20 million for the eye clinic and has supported children's eye care at the OHSU Casey Eye Institute for 70 years.

"This building is going to bring new innovations, new ideas, and new firsts for the people with sight-threatening conditions here and abroad," said Andreas Lauer, M.D., Thiele-Petti Chair, department of ophthalmology, OHSU School of Medicine.



Pediatric ophthalmologist Dr. Allison Loh sees patients in the new facility.

(continued inside)



(continued from cover)

A hub and spoke model

Many programs in the new facility are based on a “hub and spoke” model, enabling them to extend their reach well beyond the building’s walls.

“For example, our vision screening programs – which serve thousands of preschoolers and adults throughout Oregon each year - will be based here, where we can process information gained at the screenings and connect patients that need additional care to appropriate services,” said Wilson, who is the Paul H. Casey Chair, department of ophthalmology, OHSU School of Medicine.

That same arrangement applies to Casey’s renowned ophthalmic genetics program, whose “spokes” reach out to patients throughout the world who suffer from rare inherited eye disease. Its centralized functions in the new Elks Children’s Eye Clinic building, such as advanced diagnostic testing and genetic counseling, provide crucial support.

Defeating retinal disease

“This new building is really about growth and the opportunity to serve more patients with genetic eye disorders that cause blindness,” said Mark Pennesi, M.D., Ph.D., chief of the Paul H. Casey Ophthalmic Genetics Division. “The field of gene therapy to treat these diseases is increasing exponentially right now,” he said, noting that until recently, there was little that could be done for patients with inherited eye disease. “Now we’re starting to have treatments.”

The Paul H. Casey Ophthalmic Genetics Division occupies an entire floor in the new building and has all the unique elements needed for a successful gene therapy program, including a life-size mobility maze to test vision after treatment and rooms specially designed to examine patients in complete darkness.

“Dedicating such expansive space for the maze room shows Casey’s long-term commitment to curing these diseases and puts us in the top tier of institutions conducting the most advanced gene therapy trials,” he said. The division is named for the late Paul Casey, whose longstanding commitment to the eye institute included major support of its leading-edge program in ophthalmic genetics.

The new facility also houses the Wold Family Macular Degeneration Center, which will allow OHSU to accelerate and expand its pioneering work in researching and developing new ways to treat and eventually cure macular degeneration. The center will create a collaborative space featuring today’s most advanced scientific technology and bring together OHSU macular degeneration physicians and researchers with expertise in the areas of genomics, as well as gene and stem cell therapy. The center also will transform patient care, bringing state-of-the-art clinical services together in one building.

Capturing a sense of wonder

The new Elks Children’s Eye Clinic was designed to evoke a sense of playfulness and the wonder of vision, said Wilson. Patients and visitors approaching the building will be struck by its most iconic feature, a glass skybridge that dramatically shifts from blue to gold in response to outdoor lighting conditions.

Special care was taken inside the building to accommodate patients with all visual abilities. For example, a handrail installed along the curved lobby desk serves as a guide to the elevators. And high contrast colors are used on floors, walls and signage to help patients and visitors safely navigate throughout the building.

“Thanks to the generosity of the Oregon Elks and our many donors, we will be able to grow all our programs and reach the populations we need to serve,” said Wilson.



Adapting eye care during a pandemic

Clinical Care

“Ginger Rogers said, she did everything Fred Astaire did, just backward and in high heels. I think that is the way it felt providing essential eye care services during the pandemic.”



What has the pandemic meant for the delivery of eye care? At first blush, one might think, not much change, as SARS-CoV-2 does not have much effect on the eye. But, when you think of the risk factors for getting COVID – older age, crowded indoor environments, diabetes, other immunocompromising diseases – you have an accurate description of the waiting area for most eye clinics. On top of that, eye exams are conducted in a closed room, with patients and physicians close together for prolonged periods.

This year required us to quickly adopt precautions, enabling us to provide eye care in a safe and timely

manner. To provide this essential care required communication, teamwork, innovation and prioritization.

Dr. Allison Loh and other Casey Eye Institute pediatric ophthalmologists devised a web conferencing platform to examine children. It is hard enough examining a young child in person, but remarkably, during the peak of the pandemic, Dr. Loh was able to see 56% of her patients via Webex, and maintained her clinic at 60% of its' usual volume.

In addition, ocular oncologist Dr. Alison Skalet devised guidelines that were adopted nationally to prioritize the care of patients with eye cancer.

The glaucoma clinic pivoted to a hybrid model, utilizing advanced imaging to accomplish close monitoring of patients, adding a physician call or appointment as needed. This innovative way to care for patients is something we expect to continue to do going forward.

However, we still need to be in the same room with the patient to do surgery. During the past year, we performed 280 retinal detachment repairs, 48 open globe repairs, 183 corneal transplants, 34 orbital tumor removals, and 380 glaucoma procedures. Clearly, severe, acute eye disease did not go into quarantine during the pandemic. As patients and providers, we give a “tip of the hat” to Dr. David Larsen, Bella Almario, Amanda Amling, Dr. Andy Lauer and all of the operating room staff for their enormous commitment to keeping the OR functioning in a safe and timely fashion. This was perhaps the most essential and challenging of tasks, and we are very grateful.

Many of these innovations will carry forward in our post pandemic clinics. We are not there yet, but it is easy to see how some of the efficiency and patient safety innovations of the pandemic will improve our care into the future.

Research

The COVID pandemic posed particular challenges for research activities. Modified operations meant that on-site laboratory functions needed to be reduced to the bare essentials. However, with the restrictions came opportunities in the form of time to work on publications and grant applications.

In fact, the Casey faculty had a remarkable year as shown by the list of selected publications listed in this edition of FY Eye (the list included represents only about half of the total number of publications by Casey faculty). In addition to these noteworthy publications, Casey investigators were successful in securing or renewing the following grant awards:

New:

Yali Jia and John Morrison, NIH/NEI, R01 EY028755, Visible-Light OCT Angiography, Velocimetry, and Oximetry for Characterizing Retinal Vascular Alterations in Glaucoma

Yali Jia, BrightFocus Foundation, Cellular-Resolution Visible-Light OCT for Early Identification of Glaucomatous Neurodegeneration

Yifan Jian, Research to Prevent Blindness Career Advancement Award, Functional Imaging with a Practical Implementation of Ultrahigh-Speed Line-Field Optical Coherence Tomography

Shaohua PI, Knights Templar Eye Foundation, Imaging Retinal Vascular Pathologies in Retinopathy of Prematurity with Visible-Light Optical Coherence Tomography

Phoebe Lin, NIH/NEI, R01 EY032882, Intestinal T Cells and Microbiota as Therapeutic Targets in Autoimmune Uveitis

Renewals:

David Huang, NIH/NEI, R01 EY023285, Functional and Structural Optical Coherence Tomography for Glaucoma

Kate Keller, NIH/NEI, R01 EY019643, Extracellular Matrix and Outflow Resistance

Additionally, Casey's Associate Director, David Huang, M.D. Ph.D. was one of 13 scientists and doctors worldwide recognized with the Greenberg Prize to End Blindness for his role in the invention of optical coherence tomography – an imaging technology widely used to diagnose and monitor eye diseases.

The “good” viruses

The “bad” virus causing the COVID pandemic has partially overshadowed the “good” viruses used to treat a growing number of patients with gene therapy. Remarkably, during the year of the pandemic, the ophthalmic genetics group has treated 16 patients, 21 eyes total, for a variety of inherited eye conditions, bringing new hope to patients who had no options to prevent their worsening vision loss. The life-changing impact of these new therapies is captured in a quote from JoDee Hambricht, who received treatment for Lebers Congenital Amaurosis, the condition for which there is now an FDA-approved therapy.

“Every day I am amazed at the miracle of science. It has been an amazing year experiencing all the visual changes as a result of the gene therapy – my night vision has improved drastically. I was able to see stars with my naked eye for the first time. I'm able to read things I have not been able to since I was a kid. I am eternally grateful to Dr. Pennesi and the team at the Casey Eye Institute for this incredible gift,” Hambricht said.

We look forward to the restoration of full operations of our research activities; but in the meantime, we salute the amazing accomplishments of the CEI faculty during the pandemic.

Community Outreach

The mission of our community outreach program is to reach domestic and foreign communities that have limited access to eye care. This difficult mission was further imperiled by the additional challenges of the pandemic.

Yet our domestic program of outreach is arguably stronger and more ambitious than ever. How is that possible? Credit goes to the passion of those working in and supporting the program. As soon as prohibitions were lifted, Verian Wedeking and his team on the Outreach Van designed a program that permitted safe and effective screening in conjunction with our community partners. The screening van also proved a useful adjunct for outreach associated with relief to populations suffering displacement by the summer wildfires.

The importance of domestic outreach was never more evident than during the pandemic. Thanks to The Roundhouse Foundation, implementation of alternative systems to deliver eye care will be a lasting legacy of 2020. This Foundation recently committed to fund an ambitious expansion of the outreach program to train and equip community health workers throughout Oregon, creating a high-tech screening network to assist in the elimination of preventable blindness. Heather Killough, who consistently supports this program reinforced her support with funding for a second screening vehicle. As Verian says “Go Casey go”.

The worldwide travel restrictions and political events in Myanmar create even greater challenges for our global outreach programs. When we see news of the events in Myanmar, those of us who have been to Myanmar remember peering out the window of a monk driven van, bumping along a one-lane road outside of Mandalay, seeing road crews melting tar in oil drums, painstakingly paving segments of the highway by manual labor. When we see our Myanmar colleagues' names appear on Zoom or Webex conferences, we remember scurrying up the embankment of the Irrawaddy River, assisted by frail five-year-old children, hoping to augment their meager family income with a tip for their efforts.

Nevertheless, even as we see these challenges, we see progress, and that the programs we support continue.

\$3.25 million from donors to support Casey Community Outreach Program

Two generous donations are making it possible to reach more Oregonians, faster, with sophisticated diagnostic testing and treatments. Heather Killough and The Roundhouse Foundation made significant gifts totaling \$3.25 million targeted at enhancing the Casey Community Outreach Program.

“Even the most brilliant scientific breakthrough in diagnosis or treatment is meaningless if it’s not accessible to everyone who needs it. The gifts from Heather Killough, The Roundhouse Foundation and others, make it possible to build upon the momentum we’ve built over the last 10 years and bring the very best services to all Oregonians,” said David Wilson, MD, Paul H. Casey Chair, Department of Ophthalmology, OHSU Casey Eye Institute.

The new funding will expand the Community Outreach Program by:

- Building expertise at the local level
- Using technology to deliver instant expertise anywhere
- Purchasing a new mobile clinic
- Refurbishing the original mobile clinic



The team of ophthalmologists who received advanced training from the Casey Eye Institute continue to care for their patients, shifting their workplaces from now closed government hospitals to charity hospitals, where they provide free care to patients. Preparation for a broad-reaching child eye health screening in the Irrawaddy river valley continues, as the pediatric vision health technicians and doctors pursue coursework and planning work, in anticipation of launching this program later this year. The Myanmar ophthalmologists are amazingly committed, and with our established relationship we can assist them remotely. Current circumstances reinforce our goal of assisting with and learning from the implementation of screening and public health programs in this country in which 10% of the population is blind.



In 2020, the Casey Community Outreach Program examined its 10,000th participant.

Highlighted Publications and Honors, September 2020 – April 2021

Predictive Value of Excellent Uncorrected Visual Acuity Post-Operative Day One After Cataract Surgery.

Young JW, Law NW, Tu DC. Clin Ophthalmol. 2020 Sep 23;14:2777-2782. PMID: 33061261

The new landscape of retinal gene therapy.

Ku CA, Pennesi ME. Am J Med Genet C Semin Med Genet. 2020 Sep;184(3):846-859. PMID: 32888388

Infant Rhesus Macaque Brain α -Tocopherol Stereoisomer Profile Is Differentially Impacted by the Source of α -Tocopherol in Infant Formula.

Kuchan MJ, Ranard KM, Dey P, Jeon S, Sasaki GY, Schimpf KJ, Bruno RS, Neuringer M, Erdman JW. J Nutr. 2020 Sep 1;150(9):2305-2313. PMID: 32614402

Evolution and visual outcomes of outer foveolar lucency after surgery for large idiopathic macular hole.

Qi B, Yu Y, You Q, Wang Z, Wang J, Liu L, Liu W. Graefes Arch Clin Exp Ophthalmol. 2020 Oct;258(10):2117-2124. PMID: 32607661

Tele-Neuro-Ophthalmology During the Age of COVID-19.

Lai KE, Ko MW, Rucker JC, Odel JG, Sun LD, Wings KM, Ghosh A, Bindiganavile SH, Bhat N, Wendt SP, Scharf JM, Dinkin MJ, Rasool N, Galetta SL, Lee AG. J Neuroophthalmol. 2020 Sep;40(3):292-304. PMID: 32604249 Review.

Prevalence and Causes of Visual Impairment and Blindness among Adult Chinese in Hong Kong - The Hong Kong Eye Study.

You QS, Choy BKN, Chan JCH, Ng ALK, Shih KC, Cheung JJC, Wong JKW, Shum JWH, Ni MY, Lai JS, Leung GM, Wong TY, Wong IYH. Ophthalmic Epidemiol. 2020 Oct;27(5):354-363. PMID: 32310706

Implantable anti-angiogenic scaffolds for treatment of neovascular ocular pathologies.

Sarkar B, Siddiqui Z, Kim KK, Nguyen PK, Reyes X, McGill TJ, Kumar VA. Drug Deliv Transl Res. 2020 Oct;10(5):1191-1202. PMID: 32232681 Review.

Radiologic imaging shows variable accuracy in diagnosing orbital inflammatory disease and assessing its activity.

Lee MJ, Hamilton BE, Pettersson D, Ogle K, Murdock J, Dailey RA, Ng JD, Steele EA, Verma R, Planck SR, Martin TM, Choi D, Rosenbaum JT. Sci Rep. 2020 Dec 14;10(1):21875. PMID: 33318556

KCNV2-Associated Retinopathy: Genetics, Electrophysiology, and Clinical Course-KCNV2 Study Group Report 1.

Georgiou M, Robson AG, Fujinami K, Leo SM, Vincent A, Nasser F, Cabral De Guimarães TA, Khateb S, Pontikos N, Fujinami-Yokokawa Y, Liu X, Tsunoda K, Hayashi T, Vargas ME, Thiadens AAHJ, de Carvalho ER, Nguyen XT, Arno G, Mahroo OA, Martin-Merida MI, Jimenez-Rolando B, Gordo G, Carreño E, Carmen A, Sharon D, Kohl S, Huckfeldt RM, Wissinger B, Boon CJF, Banin E, Pennesi ME, Khan AO, Webster AR, Zrenner E, Héon E, Michaelides M. Am J Ophthalmol. 2020 Dec 11;225:95-107. PMID: 33309813

Biologics, spondylitis and COVID-19.

Rosenbaum JT, Hamilton H, Choi D, Weisman MH, Reveille JD, Winthrop KL. Ann Rheum Dis. 2020 Dec;79(12):1663-1665. PMID: 32522741

Baseline Visual Field Findings in the RUSH2A Study: Associated Factors and Correlation With Other Measures of Disease Severity.

Duncan JL, Liang W, Maguire MG, Audo I, Ayala AR, Birch DG, Carroll J, Cheetham JK, Esposti SD, Durham TA, Erker L, Farsiu S, Ferris FL 3rd, Heon E, Hufnagel RB, Iannaccone A, Jaffe GJ, Kay CN, Michaelides M, Pennesi ME, Sahel JA; Foundation Fighting Blindness Consortium Investigator Group. Am J Ophthalmol. 2020 Nov;219:87-100. PMID: 32446738

Tools for Responding to Patient-Initiated Verbal Sexual Harassment: A Workshop for Trainees and Faculty.

Hock LE, Barlow PB, Scruggs BA, Oetting TA, Martinez DA, Abràmoff MD, Shriver EM. MedEdPORTAL. 2021 Feb 11;17:11096. PMID: 33598539

Putative Pathobionts in HLA-B27-Associated Spondyloarthropathy.

Gill T, Rosenbaum JT. Front Immunol. 2021 Jan 18;11:586494. PMID: 33537028 Review.

Firearm-associated ocular injuries: analysis of national trauma data.

Truong T, He CH, Poulsen DM, Parsikia A, Mbekeani JN. Arq Bras Oftalmol. 2021 Jan-Feb;84(1):58-66. PMID: 33470343

Disease Expression and Familial Transmission of Fuchs Endothelial Corneal Dystrophy With and Without CTG18.1 Expansion.

Xu TT, Li YJ, Afshari NA, Aleff RA, Rinkoski TA, Patel SV, Maguire LJ, Edwards AO, Brown WL, Fautsch MP, Wieben ED, Baratz KH. Invest Ophthalmol Vis Sci. 2021 Jan 4;62(1):17. PMID: 33444430

Expression of Cytokines in Porcine Iris, Retina and Choroidal Tissues Stimulated by Microbe-associated Molecular Patterns.

Han YS, Rivera-Grana E, Rosenbaum JT, Schleisman M, Davin S, Martin TM, Furst AB, Asquith M (deceased). Curr Eye Res. 2021 Feb;46(2):255-262. PMID: 32589043

Tofacitinib as a Steroid-Sparing Therapy in Pulmonary Sarcoidosis, an Open-Label Prospective Proof-of-Concept Study.

Friedman MA, Le B, Stevens J, Desmarais J, Seifer D, Ogle K, Choi D, Harrington CA, Jackson P, Rosenbaum JT. Lung. 2021 Apr;199(2):147-153. PMID: 33825964

Reactive astrocyte nomenclature, definitions, and future directions.

Escartin C, Galea E, Lakatos A, O'Callaghan JP, Petzold GC, Serrano-Pozo A, Steinhäuser C, Volterra A, Carmignoto G, Agarwal A, Allen NJ, Araque A, Barbeito L, Barzilai A, Bergles DE, Bonvento G, Butt AM, Chen WT, Cohen-Salmon M, Cunningham C, Deneen B, De Strooper B, Díaz-Castro B, Farina C, Freeman M, Gallo V, Goldman JE, Goldman SA, Götz M, Gutiérrez A, Haydon PG, Heiland DH, Hol EM, Holt MG, Iino M, Kastanenka KV, Kettenmann H, Khakh BS, Koizumi S, Lee CJ, Liddelow SA, MacVicar BA, Magistretti P, Messing A, Mishra A, Molofsky AV, Murai KK, Norris CM, Okada S, Oliet SHR, Oliveira JF, Panatier A, Parpura V, Pekna M, Pekny M, Pellerin L, Perea G, Pérez-Nievas BG, Pfrieger FW, Poskanzer KE, Quintana FJ, Ransohoff RM, Riquelme-Perez M, Robel S, Rose CR, Rothstein JD, Rouach N, Rowitch DH, Semyanov A, Sirko S, Sontheimer H, Swanson RA, Vitorica J, Wanner IB, Wood LB, Wu J, Zheng B, Zimmer ER, Zorec R, Sofroniew MV, Verkhratsky A. Nat Neurosci. 2021 Mar;24(3):312-325. PMID: 33589835 Review.

COVID-19 pandemic management and the rheumatology patient.

Varley CD, Ku JH, Winthrop KL. Best Pract Res Clin Rheumatol. 2021 Mar;35(1):101663. PMID: 33536145 Review.

Presumed cancer-associated retinopathy (CAR) mimicking Sudden Acquired Retinal Degeneration Syndrome (SARDS) in canines.

Grozdanic SD, Lasic T, Kecova H, Mohan K, Adamus G, Kuehn MH. Vet Ophthalmol. 2021 Mar;24(2):125-155. PMID: 33369040

Bringing Ophthalmic Graduate Medical Education into the 2020s with Information Technology.

Cole E, Valikodath NG, Maa A, Chan RVP, Chiang MF, Lee AY, Tu DC, Hwang TS; American Academy of Ophthalmology Medical Information Technology Committee. Ophthalmology. 2021 Mar;128(3):349-353. PMID: 33358411



1121 S.W. Salmon Street, Suite 100
Portland, OR 97205

503 228-1730 or 800 462-6608
www.ohsufoundation.org
www.ohsu.edu/casey-eye-institute

Non-Profit Organization
U.S. Postage
PAID
Permit No. 2888
Portland, Oregon

From the Director



“If you put all colors together does that give you black or white?” That was the question I was discussing with my childhood friend on the way to an amusement park. I contended that all colors together gave you black. I knew from using my box of 64 Crayolas that the more colors I layered on top of one another the closer I got to black. He argued that white contains all the colors. He pointed out that when white light goes through a prism, you get all the colors. Ironically, my friend is now an artist, and some of his signature pieces (see inset) are created by layering Crayola colors and scratching off layers to create images. I went on to specialize in a field where we often break up light into different wavelengths for imaging or therapeutic purposes.

Perspectives on color have never been more evident than they are today. In this edition of FY Eye we feature several stories about broad areas of Casey’s programs: Community Outreach, Clinical Care, and Research. Running through all of these stories is the universal theme of eliminating preventable visual impairment and blindness. Vision is one of the most important social determinants of health. As such, equitable access to and delivery of eye care affects the health of all Oregonians.

It is easy to make the connection of community outreach, clinical care, and research to this important social determinant of health. But, how will we measure our progress? We recently established a measure of the “Visual Acuity of Oregon” (see inset). We look at the range of vision for patients throughout Oregon with leading causes of blindness. Each year on C-Day (June 6 or 6/6), we will report Oregon’s visual acuity. Using Casey data alone, this year it is 20/90, so we have a ways to go to improve on this population-based metric of vision health.

We have worked with the American Academy of Ophthalmology’s Iris Registry Database to look at this measure of population visual health, throughout all of Oregon, and over time. This is a massive database, so there is a lag in the data available for analysis. As you can see from the graphic, Oregon’s visual acuity has improved incrementally from 2014 to 2017, but then worsened slightly. Following these trends will help us assess how our active efforts towards new treatments, vision screening and access are affecting the vision of people living in Oregon. During the pandemic, we have all watched as we tried to “flatten the curve”. Now, we want to steepen the curve of visual improvement, and hope you will join with us as we strive to improve the vision of all Oregonians.

– David J. Wilson, M.D., Paul H. Casey Chair, Director, Casey Eye Institute

VISUAL ACUITY

