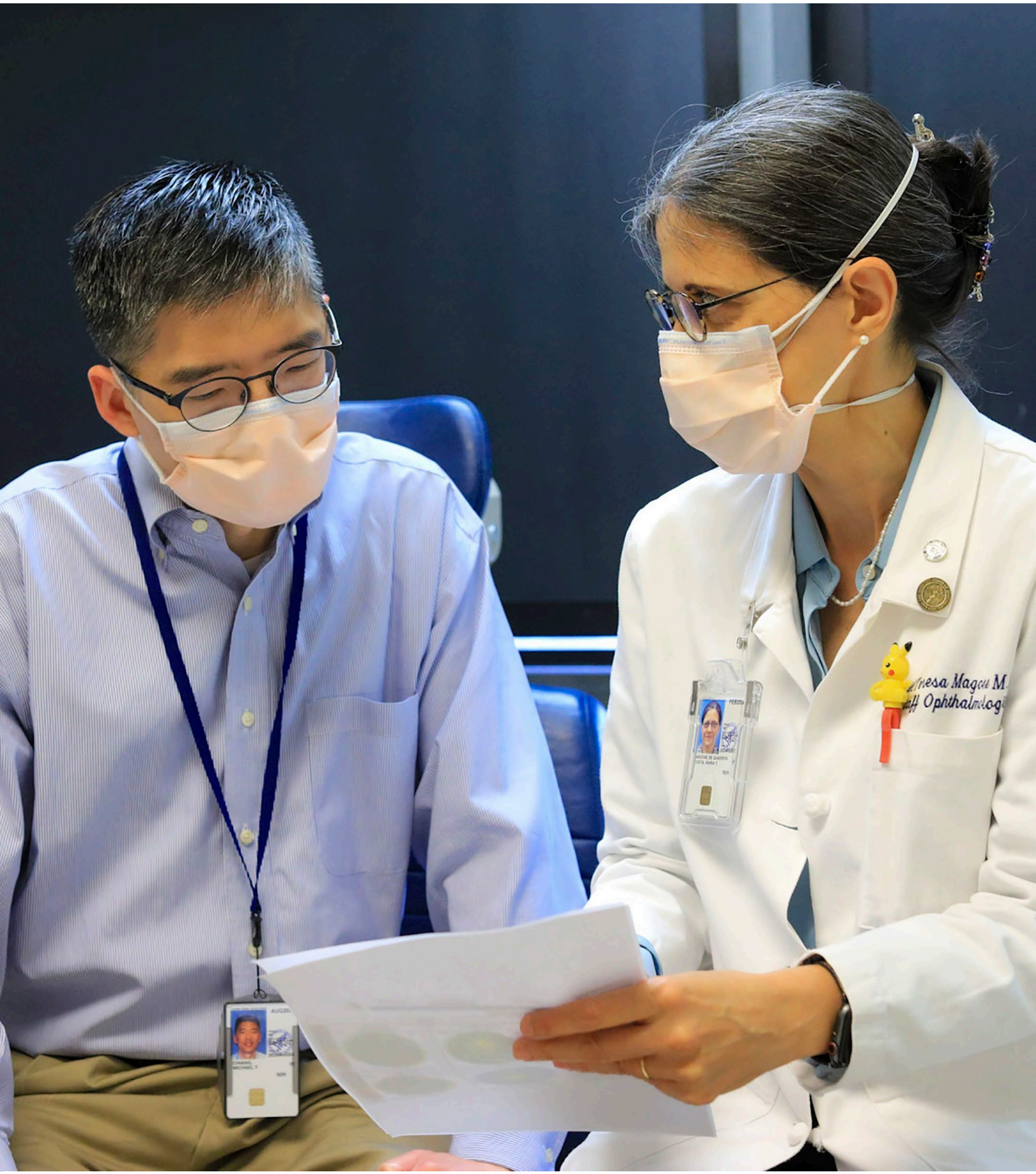

New Direction at the National Eye Institute

A look ahead with Michael F. Chiang, MD.

By Linda Roach, Contributing Writer

AS ONLY THE THIRD PERMANENT director in the National Eye Institute's 53-year history, Michael F. Chiang, MD, plans to build on what came before. But where Carl Kupfer, MD, persuaded Congress to give eye research its own institute, and where Paul Sieving, MD, PhD, capitalized on advances in genetics and molecular biology, Dr. Chiang wants NEI to go even bigger. Big data. Big ideas. The big picture.

A New Mission

One of the first tasks Dr. Chiang tackled after taking the job in November 2020 was leading an effort to put down in words the overarching purpose for spending $824 million a year on vision research. "The mission statement was written in 1968, when the NEI started, and it hadn't been changed since then." With input from many different stakeholders, the mission was revamped, he said.

"Here's the new statement: The mission of the National Eye Institute is to eliminate vision loss and improve quality of life through vision research." Dr. Chiang said that accomplishing this mission will require doing many different types of basic research; finding ways to translate it into clinical care; testing these therapies in controlled trials; and delivering the care equitably to all populations, including underserved groups. "I see each of those steps as being very important," Dr. Chiang said.

COLLABORATION. *Dr. Chiang, NEI director, and Teresa Magone, chief of the NEI consult clinic.*

Dustin Hays, NEI.

Emphasis on Collaboration

Beyond the new mission, the NEI is developing a new strategic plan[1]—its first since 2012—that would conceptualize the institute's research efforts in new ways, Dr. Chiang said. A final version of the new plan is expected to be released this fall, in time for the Academy's annual meeting in New Orleans, he said.

Under the plan, instead of research projects addressing only a single structure in the eye, they would encourage interdisciplinary collaborations more actively. These would include NEI scientists from various ocular disciplines, plus scientists doing related research who are associated with other parts of the National Institutes of Health. "It's absolutely true that traditionally the NEI portfolio is organized anatomically, so it happens to be retina, cornea, glaucoma, lens, low vision/rehabilitation, strabismus/amblyopia/visual processing," Dr. Chiang said. "The new areas are more cross-cutting and methodological.

"I see enormous opportunities for collaboration and for leveraging the expertise that's here at NIH," Dr. Chiang said. "Philosophically, that's one of the things I really want to do—to bring as much of a collaborative spirit as I can to vision

MICHAEL F. CHIANG, MD

Past position. Dr. Chiang was Knowles Professor of Ophthalmology & Medical Informatics and Clinical Epidemiology and associate director of the Oregon Health & Science University Casey Eye Institute in Portland, where his clinical practice focused on pediatric ophthalmology and adult strabismus. He is board-certified in clinical informatics.

Education. He earned his bachelor's degree in electrical engineering and biology from Stanford University; his master's degree in biomedical informatics from Columbia University College of Physicians and Surgeons; and his MD from Harvard Medical School and Harvard-MIT Division of Health Sciences and Technology. He did his residency in ophthalmology and fellowship training in pediatric ophthalmology at the Johns Hopkins Wilmer Eye Institute.

Academy service. Formerly on the Academy Board of Trustees (2016-2019), Dr. Chiang has been an active member of the Academy for many years, serving as chair of the IRIS Registry Analytics Committee, chair of the Task Force on Artificial Intelligence, chair of the Medical Information Technology Committee, and program director for 2020 Pediatric Ophthalmology Subspecialty Day. He also served on the IRIS Registry Executive Committee and on the editorial boards of *Ophthalmology* and *EyeNet*.

Eye care's new Fauci? Dr. Chiang was the subject of a November 2020 *EyeNet* editorial written by David W. Parke II, MD. Find it at aao.org/eyenet/article/ophthalmologys-new- fauci.

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Financial disclosures. Dr. Chiang is an employee of the NEI.

and ophthalmology. Throughout my career, I have seen that when you get different people from different academic backgrounds and different perspectives to solve the same problems together, that's when the most innovative solutions come up."

Collaboration in action. For an NEI online symposium last summer about the ocular microbiome, the organizers invited presentations by scientists who study the microbiota in other organ systems. In his opening remarks to symposium attendees, Dr. Chiang said that a key goal was to determine "what we can learn from studying the microbiome in domains outside the eye, and also about research methodologies . . . and that's really going to facilitate an exchange of ideas."

Strategic specifics. The strategic plan is organized into seven cross-cutting "areas of emphasis:"[2]

- From Genes to Disease Mechanisms
- Biology and Neuroscience of Vision
- Immune System and Eye Health
- Regenerative Medicine
- Data Science
- Individual Quality of Life
- Public Health and Disparities Research

New offices. In preparation for implementing this new framework, Dr. Chiang has created two new offices. One is the Office of Vision Health and Population Sciences, which will be charged with addressing quality-of-life issues and persistent inequities in vision care. The other is the Office of Data Science and Health Informatics, which will address emerging efforts in areas such as big data and artificial intelligence (AI) to enhance vision care—a field in which Dr. Chiang is a widely recognized expert. (His pre-NEI research group designed and validated an AI algorithm that the group reported can evaluate infant retinal images for retinopathy of prematurity [ROP] as accurately as ROP experts can. In 2020, the FDA granted the system breakthrough status, a step toward commercial development.)

Dr. Chiang noted that AI algorithms created from large numbers of fundus images or—as with the Academy's IRIS Registry or other large-scale datasets—from data on millions of office visits will play an important part in the future of medical and ophthalmic care. "One of the strengths of information technology is that we can gather information at a scale that we were never able to do before. The computational and overall technological power that we have is obviously unprecedented," he said.

But in ophthalmology there are a few barriers to overcome—and the NEI can help, he said. For example, "One of the things we really need is an infrastructure for data sharing. There is no consistent language for electronic health records [EHRs]. Imaging devices don't always talk to each other either. And it's not always straightforward to get information from your [imaging] machine into the EHR." Thus, when the Academy released

a report last April calling on industry to standardize image formats, Dr. Chiang released a similar NEI statement, which said, in part: "Failing to standardize ophthalmic imaging devices risks leaving the eye care field behind as the health care industry increasingly relies on data analytics based on diagnostic imaging."[3,4]

A Personal Note

After two decades as a pediatric ophthalmologist and informatics researcher, Dr. Chiang feels like he has come full circle in his career journey. This is because it was NEI Director Dr. Kupfer who gave him the encouragement to pursue his interest in biomedical informatics.

"As a senior resident at John Hopkins, I was trying to figure out what I wanted to do with my career. I knew that I wanted to do informatics, and that the NEI had no portfolio—people weren't doing this at the time," Dr. Chiang said. "One of the people I wrote to was Carl Kupfer, because I wanted to figure out whether this was something that NEI could support, having an academic career in informatics." Dr. Kupfer invited him to spend an afternoon visiting the NEI campus. "I drove to his office. He introduced me to some people, and we talked. It was career changing for me."

1 Strategic Planning. www.nei.nih.gov/about/strategic-planning.

2 Draft NEI Strategic Plan. www.nei.nih.gov/sites/default/files/2021-05/NEI%20Strategic%20Plan%202021%20DRAFT%20FOR%20PUBLIC%20COMMENT.pdf.

3 Statement by Michael F. Chiang, April 8, 2021. www.nei.nih.gov/about/news-and-events/news/nei-joins-call-standardization-ophthalmic-imaging-devices.

4 aao.org/newsroom/news-releases/detail/american-academy-of-ophthalmology-leads-call-ophth.

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