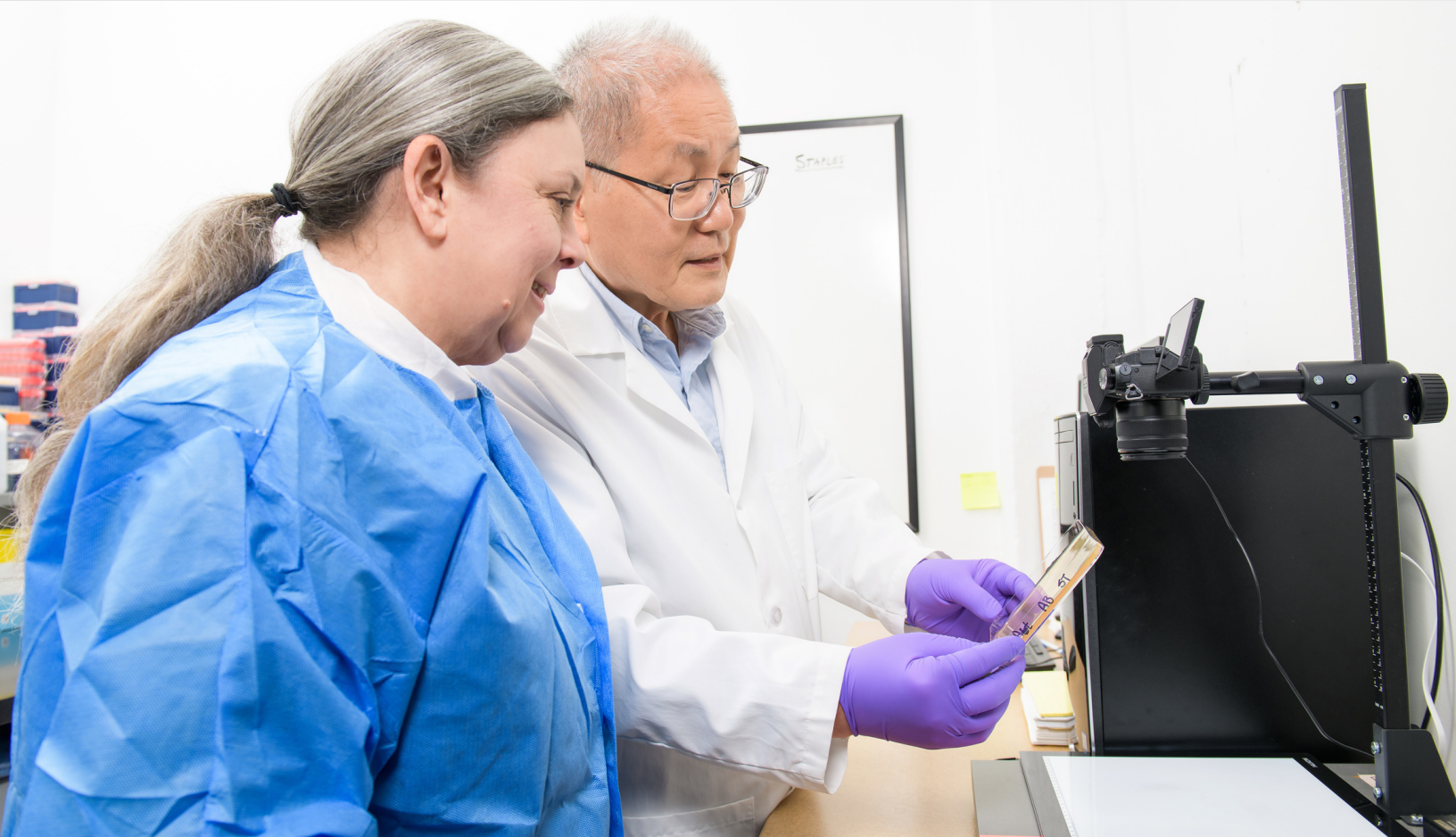




ASSOCIATION OF  
PUBLIC &  
LAND-GRANT  
UNIVERSITIES



THE UNIVERSITY OF  
ALABAMA AT BIRMINGHAM.



CECE

INNOVATION AND ECONOMIC PROSPERITY AWARDS PROGRAM

IEP CATEGORY - INNOVATION

## University of Alabama at Birmingham

**Moon Nahm, M.D. and the Development of  
Advanced and Affordable Pneumococcal  
Vaccines**

2023  
CASE  
STUDY

## ABOUT MOON NAHM, M.D.

The career of Moon Nahm, M.D., has been a testament to the idea that one scientist's research can make an enormous difference to millions.

Nahm, who immigrated to the United States from Korea in 1965, is a world-leading expert in pneumococcal vaccines. He received his M.D. in medicine from Washington University (WashU) in St. Louis, Mo., where he then completed medical residency and postdoctoral training in internal medicine and pathology. He then became a faculty member in the WashU Departments of Medicine and Pathology, pioneering the use of monoclonal antibodies for diagnostic tests.



*Moon Nahm (center) stand with SunFire Biotechnologies employees in the Innovation Depot*

Later, he moved to the University of Rochester to direct the Clinical Immunology Laboratory and the NIH Pneumococcal and H. influenzae Reference Laboratory.

After a five-year stint as a tenured professor at the University of Rochester, he joined the faculty at the University of Alabama at Birmingham (UAB).

In his 22 years of service to UAB, Nahm and his team have worked tirelessly to understand how *Streptococcus pneumoniae* (pneumococcus) evades the immune system and available vaccines.

In pneumococcal disease (PD), pneumococcus can invade the lungs, causing pneumonia; the blood stream, causing bacteremia; and the brain, causing meningitis. PD results in significant hospitalizations and deaths worldwide in children under 2, adults older than 65, and children and adults with certain medical conditions. Pneumococcal pneumonia alone causes 150,000 hospitalizations in the U.S. and a mortality rate of 5-7 percent. Nahm's research at UAB has led to the discovery of several unique polysaccharide capsules, which shield pneumococcus from the host immune system and are the principal target of pneumococcal vaccines that sensitize the immune system to "recognize" an infection.



## LOCAL AND GLOBAL IMPACT

Nahm's investigation of immunity to existing pneumococcal vaccines led to the development of the World Health Organization-sponsored ELISA and Multiplexed Opsono-Phagocytosis Assay (MOPA).

MOPA is currently the benchmark for quality testing of pneumococcal vaccines across the industry, and the assay permits the development of vaccines that are both advanced and affordable.

His research and innovation at UAB has led to 23 intellectual property disclosures, which are protected by the UAB Research Foundation (UABRF) and licensed to several companies. His inventions have resulted in 7 U.S. and 29 foreign patents, and the UABRF has granted about 150 licensing agreements pertaining to those inventions. Those agreements – some with major pharmaceutical companies engaged in pneumococcal vaccine development in the United States and abroad – have brought in more than \$4.5 million of revenue and counting.

One such agreement is especially significant, as it is with a new but leading U.S. vaccine manufacturer currently working on developing the next generation of pneumococcal vaccines. This company's lead vaccine is VAX-24, a 24-valent vaccine that targets 24 pneumococcal strains. This vaccine, which is in a phase 3 clinical trial involving adults and has received a Breakthrough Therapy Designation from the U.S. Food and Drug Association, uses Nahm's intellectual property.

The company also plans to use Nahm's inventions to develop the next generation of pneumococcal vaccine, VAX-31.

## SUNFIRE BIOTECHNOLOGIES

In 2019, Nahm founded SunFire Biotechnologies in Birmingham, Alabama. SunFire is a contract research organization providing clinical stage MOPA services for companies engaged in pneumococcal vaccine development. SunFire also offers other analytical assays for pneumococcus and other pathogens.

When SunFire opened operations in January 2020, the company had one full-time employee and 850 square feet of lab space at the Innovation Depot, a local biotechnology incubator. SunFire has expanded to 1,700 square feet of lab space plus office space and currently employs six full-time and three part-time employees. The company plans to expand its lab space and hire three or four additional employees this year.



SunFire has been able to grow so rapidly because it immediately attracted clients and obtained grants, including a \$1 million SBIR Phase II grant and \$250,000 from the Innovate Alabama Supplemental Grant Program, which awards funds to Alabama-based companies that have been granted Phase I or Phase II awards through the SBIR or STTR programs.

SunFire continues to be an integral part of the UAB and Birmingham economic ecosystem, hiring locally and from a pool of UAB graduates in the life sciences.

## CONTINUED RECOGNITION AND IMPACT

Nahm makes it a priority to share resources with nonprofits across the world for pneumococcal vaccine research and development, making it possible to decrease costs and increase accessibility.

His research lab at UAB is the World Health Organization's Pneumococcal Serology Reference Laboratory. Federal funding to that lab has totaled close to \$20 million in direct costs. While Nahm retired from UAB last year at 75, he is an emeritus professor and still helps lead in the development of affordable pneumococcal vaccines.

In 2023, he was inducted as a Senior Member of the U.S. National Academy of Inventors. He is a Fellow in the American Academy of Microbiology and the Infectious Diseases Society of America. The National Institutes of Health has referred to Nahm and his lab as a “national treasure.”

## LINKS TO FURTHER INFORMATION

### Supporting Information:

- [Pneumococcal Disease](#)
- [SunFire Biotechnologies](#)

### Articles:

- [Saving lives by making pneumonia vaccine affordable](#)



## ABOUT APLU

The Association of Public and Land-grant Universities (APLU) is North America's oldest higher education association. APLU is a research, policy, and advocacy organization dedicated to strengthening and advancing the work of public universities in the U.S., Canada, and Mexico. The association's membership consists of public research universities, land-grant institutions, state university systems, and affiliated organizations.

APLU's mission is to expand access and improve student success to deliver the innovative workforce of tomorrow; advance and promote research and discovery to improve society, foster economic growth, and address global challenges; and build healthy, prosperous, equitable, and vibrant communities locally and globally.

Based in Washington, DC, the association's work is furthered by an active and effective advocacy arm that works with Congress and the administration as well as the media to advance federal policies that strengthen public universities and benefit the students they serve.

## ABOUT THE IEP PROGRAM

APLU and its [Commission on Economic and Community Engagement \(CECE\)](#) established the Innovation and Economic Prosperity (IEP) Program to help higher education institutions codify, elevate, and advance their campus enterprise supporting economic and community development.

The **IEP Designation Program** recognizes institutions that have demonstrated a meaningful, ongoing and substantial commitment to economic and community development, growth, and economic opportunity.

The **IEP Awards Program** recognize exemplary and innovative projects in university-based economic and community engagement:

- Talent and workforce development
- Innovation, entrepreneurship, and tech-based economic development
- Place development through public service, outreach, and community engagement

Learn more at: [www.APLU.org/IEP](http://www.APLU.org/IEP)

