



OHSU INNOVATES

# 2022 Impact Report



OHSU Innovates is a collaborative multi-department network supporting innovation and entrepreneurship to improve the health and well-being of the people of Oregon and beyond.



OHSU INNOVATES

# 2022 Impact Report

## Contents

Innovators and Technology Highlights	4
Funding and Development	8
Startup Company Highlights and Milestones	12
Partnership Highlights	18
Making an Impact	22
By the Numbers	23
Our Team	25
Sponsors	26

For OHSU Research and Innovation, the office of the Chief Research Officer, this has been a year for increasing community collaboration and communication, especially in the innovation realm.

One of the key accomplishments this year was to launch OHSU Innovates, with the goal of communicating more effectively with both our internal and external communities. We are confident this will facilitate greater community access to OHSU's network of commercialization professionals and in turn facilitate and promote collaboration, innovation and entrepreneurship at OHSU

The new Innovates [website](#), and our expanded OHSU Innovates [newsletter](#) include more voices and are designed to promote communication, collaboration and the translation of intellectual property.

Another 2022 highlight is Innovate Collaborate Oregon, or ICOregon, which has been revamping the alliance between OHSU, the University of Oregon, Oregon State University and Portland State University. ICOregon is well described in their new [website](#). They will have a major role in the alignment, sharing of resources, and promotion of innovation and entrepreneurial ecosystems of Oregon's major research universities.

We have also expanded our partnerships with the regional innovation community. You will find stories in this report on our collaboration with PSU and other metro region partners to develop a regional Innovation Hub, as well as activities with AOBIO, a premier Pacific Northwest life and bioscience investment program.

Finally, OHSU Innovates continues its work to create a diverse, equitable and inclusive innovation and entrepreneurial ecosystem to improve impact throughout the region. Several activities in the past year have provided tangible evidence of this commitment. One I'm most excited about is the Racial Equity and Inclusion Funding granted to OHSU Innovates for developing a program to encourage and support innovation by BIPOC and women. I look forward to reporting on outcomes of this program next year.

This has been an exciting year for innovation at OHSU, and I expect more excitement to come in the future.



Peter Barr-Gillespie, Ph.D.

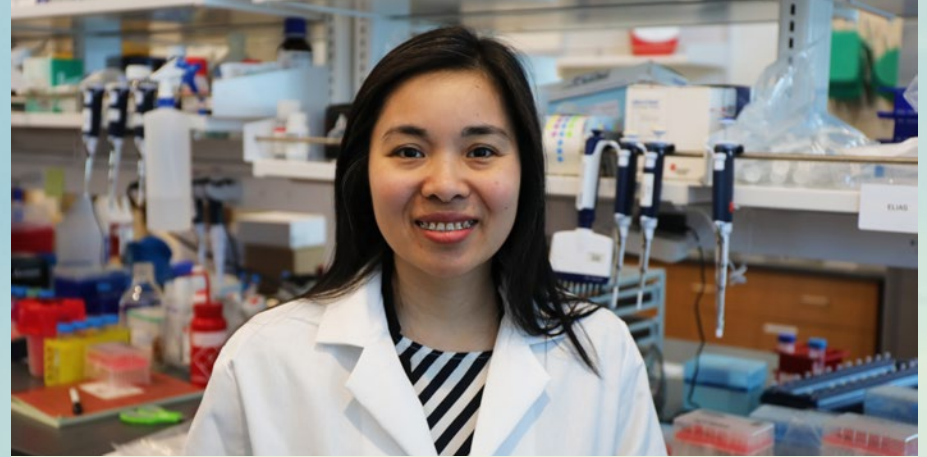
---

A handwritten signature in blue ink that reads "Peter Barr-Gillespie". The signature is fluid and cursive, with a long, sweeping underline.

EXECUTIVE VICE PRESIDENT & CHIEF RESEARCH OFFICER  
OHSU RESEARCH & INNOVATION

# Innovators and Technology Highlights

Every day, OHSU community members advance health through learning, teaching, healing and discovery. These discoveries take many forms, such as therapeutic drugs, diagnostic software, tools to advance research and educational materials. OHSU Innovates is proud to celebrate our talented innovators.



Thuy Ngo, Ph.D. is an assistant professor of molecular and medical genetics in the School of Medicine, and a member of CEDAR, whose interdisciplinary research aims to uncover novel biomarkers of cancer.

## Distinguishing cancer from premalignant disease

Early cancer detection, capable of identifying cancer before it has spread systemically, offers one of the best chances to improve long-term patient survival.

Thuy Ngo, Ph.D., and colleagues at CEDAR have developed a novel set of biomarkers that can be used with minimally invasive liquid biopsy procedures to distinguish certain forms of cancer from premalignant disease.

This technology has the potential to allow for better monitoring of high-risk patients and earlier cancer detection.

Ngo's work embodies the mission of the OHSU Knight Cancer Institute's Cancer Early Detection Advanced Research center, or CEDAR—to develop innovative new method to detect and stop lethal cancers at the earliest stages to save lives.

Read more about this innovation in the 2022 publication in [\*npj Precision Oncology\*](#) and in a recent [\*OHSU News\*](#) article.



### Regenerating nerves to restore function

Nerve regeneration after an injury is critical for proper healing and full restoration of function. But many tissues, such as the heart and spinal cord, lack this capacity when there is extensive scarring.

Beth Habecker, Ph.D., and Michael Cohen, Ph.D., have developed novel small molecules that promote nerve regeneration in scar tissue following injury, allowing nerves to regrow and restore function. In a model of myocardial infarction, these molecules both improve reinnervation of the heart and restore cardiac output.

Detailed work from this research team recently identified the biological pathways targeted by these novel small molecules to gain a better understanding of their therapeutic potential. Read more about these novel molecules in manuscripts in the journals *ACS Chemical Neuroscience* and *JACC: Basic to Translational Science*.



**Beth Habecker, Ph.D.**

PROFESSOR, SCHOOL OF MEDICINE  
DEPARTMENT OF CHEMICAL PHYSIOLOGY AND BIOCHEMISTRY  
DEPARTMENT OF ANESTHESIOLOGY AND PERIOPERATIVE MEDICINE  
DEPARTMENT OF MEDICINE, DIVISION OF CARDIOVASCULAR MEDICINE



**Michael Cohen, Ph.D.**

ASSOCIATE PROFESSOR, SCHOOL OF MEDICINE  
DEPARTMENT OF CHEMICAL PHYSIOLOGY AND BIOCHEMISTRY

### New transparency in AI

Artificial intelligence methods have great potential to improve diagnoses and classification of diseases. However, a lack of transparency regarding the AI algorithmic criteria has prevented wide adoption in clinical care.

Yali Jia, Ph.D., and doctoral student Pengxiao Zang, working at the Casey Eye Institute, have developed a novel approach to improve the transparency and clinical relevancy of AI algorithms for image-based disease classification.

This method generates biomarker activation maps for imaging data, allowing for improved clinical interpretation of DL-results and potentially wider-spread use of this methodology in routine clinical care.



**Yali Jia, Ph.D.**

JENNIE P. WEEKS PROFESSOR OF OPHTHALMOLOGY, SCHOOL OF MEDICINE  
ASSOCIATE PROFESSOR, DEPARTMENT OF BIOMEDICAL ENGINEERING,  
SCHOOL OF MEDICINE AND CASEY EYE INSTITUTE



**Pengxiao Zang**

GRADUATE STUDENT, JIA LABORATORY

## INNOVATORS AND TECHNOLOGY HIGHLIGHTS

### Fikadu Tafesse and OHSU awarded an M.J. Murdock Charitable Trust grant to develop a platform for rapid therapeutic development

Current vaccine and viral therapies take years to develop, and the ongoing battle with COVID-19 has highlighted the need for new therapeutic strategies that can be rapidly deployed and easily adapted to tackle emerging viral variants.

In September 2021, Fikadu Tafesse, Ph.D., was awarded a Commercialization Initiation grant from the [M.J. Murdock Charitable Trust](#) with a matching contribution provided by the University Venture Development Fund.

The grant was awarded to develop a rapidly deployable nanobody platform, which could allow for a more rapid response to new bacterial and viral infections. The goal is to develop effective therapeutics and the flexibility to adapt to variants as they arise.

Tafesse is a leader in infectious disease research and over the past year has coauthored [several high impact articles](#) elucidating details of COVID-19 infection and immunity. His research has garnered national media interest.

Established in 1975, the mission of the M.J. Murdock Charitable Trust is to provide grants and enrichment programs to organizations seeking to strengthen the Pacific Northwest's educational, spiritual and cultural base. Support for the development of this grant was provided by OHSU Technology Transfer and the OHSU Foundation. Initial funding for proof-of-concept development of the SARS-CoV-2 nanobody was provided by OHSU's Biomedical Innovation Program: [COVID-19 Rapid Response and Digital Health](#).



Fikadu Tafesse, Ph.D. is an associate professor of molecular microbiology and immunology in the School of Medicine, whose work focuses on understanding the relationship between disease-causing pathogens and host cells.



# INNOVATORS AND TECHNOLOGY HIGHLIGHTS

## 2022 innovative faculty awards and recognition

### 2022 Research and Innovation Awardees



#### EARLY CAREER INNOVATOR

Dhanir Tailor, Ph.D.



#### CAREER INNOVATION EXCELLENCE

Hiroyuki Nakai, M.D., Ph.D.



#### INNOVATOR OF THE YEAR

Marcel Curlin, M.D.



#### PARTNERSHIP AWARD

Fikadu Tafesse, Ph.D.

See the [full awards program](#) for more details

### Early-Stage Technology Awardees



Amy Moran, Ph.D.



Stephen Smith, M.B.B.S., Ph.D.



Timur Tsintsadze, Ph.D.

### National Academy of Inventors

#### SENIOR MEMBER



Yali Jia, Ph.D., was nominated and elected as Senior Member of the NAI.

#### INDUCTEES



The NAI recognizes inventors, innovators and others who promote and support innovation across all disciplines of the university. 2022 OHSU inductees are (L-R) Tania Vu, Ph.D., Richard Maziarz, M.D., Jonah Sacha, Ph.D., Daniel Malouli, Ph.D.

# Funding and Development

For OHSU science to have its greatest impact, promising technologies must be able to bridge the challenging gap between an innovative idea and a product successfully brought to market. Two of these funding and development mechanisms are the Innovation Development and Entrepreneurship Acceleration Fund and the Biomedical Innovation Program.

## IDEA: Innovation Development and Entrepreneurship Acceleration Fund

The donor-supported [IDEA Fund](#) provided targeted and timely support to OHSU investigators, entrepreneurs and startup companies in 2022.

### IDEA startup funding

#### **CENTERM**

CenterM received startup funding to support pilot studies of its digital health intervention for perinatal depression. The company will also use the funding to pursue intellectual property protection, perform market research and develop marketing materials.

#### **PROMEDIX**

ProMedix was awarded startup funds to perform design improvements for its digital capillary refill technology, which enables rapid, accurate and non-invasive diagnosis of sepsis. The funding also supported the completion of a large 600-patient study in the OHSU emergency department.

[Donate to the Innovation Development and Entrepreneurship Acceleration Fund](#)



### IDEA gap funding

#### **Luiz Bertassoni, D.D.S., Ph.D.**

ASSOCIATE PROFESSOR, SCHOOL OF MEDICINE  
DEPARTMENT OF ONCOLOGICAL SCIENCE  
MEMBER, CANCER EARLY DETECTION ADVANCED  
RESEARCH CENTER, KNIGHT CANCER INSTITUTE

Bertassoni received gap funding for his lab's bioprinting platform technology to produce 3D tissue models with single-cell resolution. A huge technological leap forward, these models would enable engineering of scalable tissues for in vitro studies with the ability to match the exact cellular structure of patients, with unrestricted repeatability.

#### **Peter Schulman, M.D.**

PROFESSOR, SCHOOL OF MEDICINE  
DEPARTMENT OF ANESTHESIOLOGY AND PERIOPERATIVE  
MEDICINE

Schulman and his team received follow-on gap funding to transform their proof-of-concept "smart digital stethoscope" into a working prototype and to refine its heart murmur detection algorithm. Prior to receiving IDEA Fund support, Schulman received a Biomedical Innovation Program award, which was critical for collecting and analyzing patient data, laying the groundwork for developing the algorithm.

#### **Ellen Tilden, Ph.D., CNM, FACNM**

ASSOCIATE PROFESSOR, SCHOOL OF NURSING AND  
SCHOOL OF MEDICINE  
DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Tilden is developing a digital health intervention that uses telehealth, group mindfulness cognitive behavioral therapy sessions and smart phone technology to bridge the care delivery gap to prevent perinatal depression. IDEA gap funding is being used to define the final product and reimbursement strategy. The technology led to the formation of the OHSU startup company CenterM. Prior to receiving IDEA Fund support, Tilden received a Biomedical Innovation Program award, which was used to recruit patients and focus group participants, and to iterate versions of the CenterM digital health platform.

### Biomedical Innovation Program

For 10 years, the Biomedical Innovation Program (BIP) has been making innovation and entrepreneurship a natural and expected academic behavior.

BIP supports the development and commercialization of novel and innovative technologies that address unmet clinical needs by guiding their path to market. From idea to impact, BIP's support accelerates innovations in devices, diagnostics, software, drug development and digital health.

In addition to funding, BIP provides project management, customized mentoring and a portfolio of innovation and entrepreneur education opportunities.

The program is funded by the Oregon Clinical and Translational Research Institute, or OCTRI, the University Venture Development Fund and the OHSU IDEA fund.

### OUTCOMES 2013-2022



FOLLOW-ON FUNDING



ACTIVE PATENT APPLICATIONS



ISSUED PATENTS



PUBLICATIONS



STARTUP COMPANIES FORMED

### PROGRAM STATISTICS 2013-2022



APPLICATIONS



PROJECTS AWARDED



TOTAL AMOUNT AWARDED



Five projects in two tracks received 2022 BIP funding.

### Drug Discovery Track

---

Small molecule restoration of the UBA5 gene to treat early-onset neurodegenerative disease

 Sanjay V. Malhotra, Ph.D., FRSC

 Ruth Napier, Ph.D.

 Jonathan Pruneda, Ph.D.

---

Developing a novel drug to combat triple-negative breast cancer progression through metabolic modulation

 Sanjay V. Malhotra, Ph.D.

### Device, Diagnostic, Software Track

---

COOL-ART-DR: A comprehensive diabetic retinopathy reading platform based on optical coherence tomography angiography

 Yali Jia, Ph.D.

---

Smart Socket: A novel and dynamic microprocessor-controlled pneumatic socket that optimizes prosthetic fit via a smartphone application

 Gregory Landry, M.D.

---

Development of Activity MRI, or aMRI: Direct comparison to positron emission tomography, or PET

 Martin Pike, Ph.D.

OHSU is grateful to members of our community who provided countless hours of volunteer service reviewing applications and mentoring applicants and awardees. The BIP would not be possible without their support.

 Jennifer Akeroyd

 Terri Butler

 Ann Demaree

 Rachel Dreilinger

 Peter Galen

 Linda Hansen

 Doug Kawahara

 Bill Newman

 Aneesh Ramaswamy

 Skip Rung

 Reneé Shirley

 Sandra Shotwell

 Brie Stoianoff

 Barbara Wexler

[Read more](#) about the 2022 drug discovery track winners

[Read more](#) about the 2022 device, diagnostic and software track winners



# Startup Company Highlights and Milestones

When OHSU intellectual property is the basis for a new company, OHSU Innovates' goal is to maximize the chances of successfully developing the technology, taking it to market and improving lives.

While launching a company can be challenging, our network aims to support and engage early entrepreneurs to make their visions reality. The quality of OHSU's ground-breaking discoveries and the hard work of our faculty, staff, students and entrepreneurs is highlighted by the growing number of startup companies making an impact in Oregon and beyond.

## Biomechanically driven stent design

### **AUXETICS** - [AUXETICSINC.COM](https://www.auxeticsinc.com)

In 2017, three OHSU School of Medicine physicians, Ramsey Al-Hakim, M.D., John Kaufman, M.D., M.S. and Khashayar Farsad, M.D., Ph.D. observed that the conventional venous stent designs caused narrowing in adjacent veins. In response, they developed a novel stent design that elongates during expansion. This innovative work was performed at the OHSU Dotter Institute and is the foundational technology for the OHSU spinout company Auxetics, which was founded in 2019. The company recently closed its initial financing round, a \$1.285 million Series Seed to finalize device design and complete animal studies. Auxetics successfully completed its first animal study nine months after closing the Series Seed financing.

Most recently, Auxetics extended the Series Seed financing (\$2 million capital raised to date) to continue to build the team and progress the technology. They now have successfully recruited a highly experienced chief technology officer. The company will soon begin its Series A fundraising with the goal of initiating first in human trials in 2023 and obtaining investigational device exemption approval from the Food and Drug Administration.



**Ramsey Al-Hakim, M.D.**

VASCULAR AND INTERVENTIONAL RADIOLOGIST  
SCRIPPS HEALTH



**Khashayar Farsad, M.D., Ph.D.**

ASSOCIATE PROFESSOR, SCHOOL OF MEDICINE  
DEPARTMENT OF INTERVENTIONAL RADIOLOGY



**John Kaufman, M.D., M.S.**

PROFESSOR, SCHOOL OF MEDICINE  
DEPARTMENT OF INTERVENTIONAL RADIOLOGY

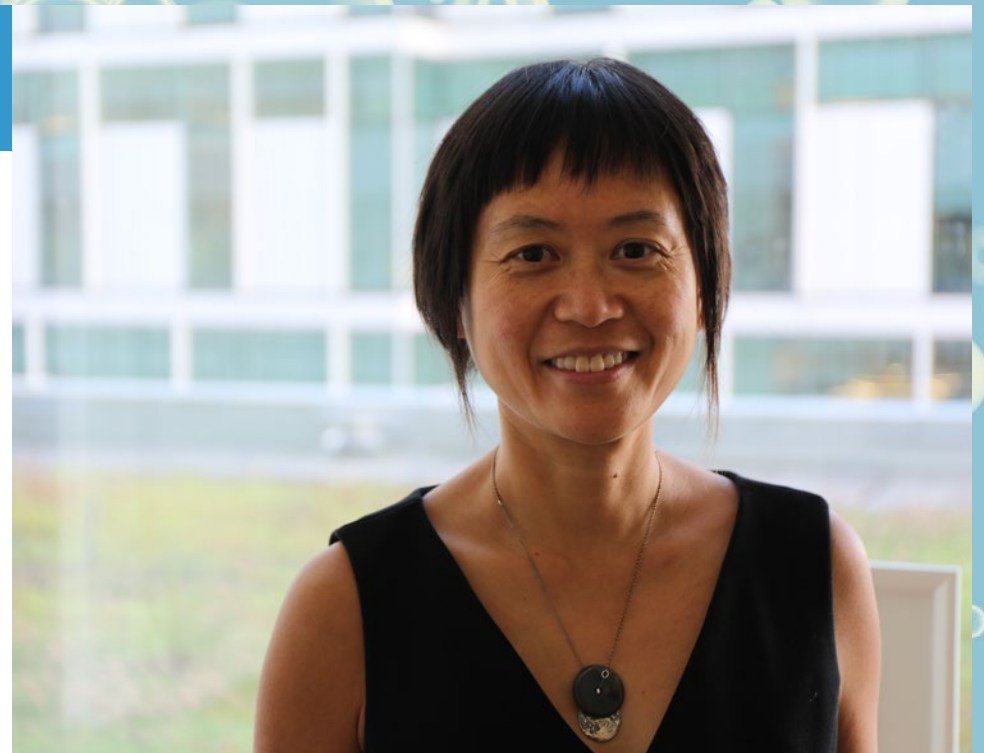
## STARTUP COMPANY HIGHLIGHTS

### Enabling the expanded universe of cancer therapy

#### [CYTOIMAGE - CYTOIMAGE.BIO](https://www.cytoimage.bio)

Tania Vu, Ph.D. develops and applies nanoparticle imaging technologies to study cellular signaling in health and disease. Vu's lab—in collaboration with Thomas Jacob, Ph.D., a senior research associate in the lab and the Knight Cancer Institute—developed a miniaturized ultrasensitive imaging platform to enable single-cell functional precision medicine drug screening in cancer and infectious disease. This technology is the foundation behind OHSU spinout company CytoImage.

The technology enables rapid identification of potent cancer drug combinations in patient-derived tumor samples. To date, the company has raised \$500,000, including investment from the Elevate Capital Gap Fund, Willamette Valley Capital, Ideaship, the Oregon Nanoscience and Microtechnologies Institute, or ONAMI, and the Portland Seed Fund. In 2022, the company also recruited a new chief executive officer, Dan Snyder, M.B.A., and chief operating officer, Sandra Shotwell, Ph.D.



Tania Vu, Ph.D., is an associate professor of biomedical engineering in the School of Medicine and co-founder of the OHSU startup company Cytolmage.

## STARTUP COMPANY HIGHLIGHTS

### Improving sepsis identification and resuscitation

#### **PROMEDIX - [PROMEDIXINC.COM](https://www.promedixinc.com)**

Sepsis is the leading cause of death in U.S. hospitals, resulting from an inflammatory response to infection. One of the earliest indicators for sepsis is a worsening peripheral blood flow as your body steals all the oxygenated blood it can for vital organs. This manifests as a prolonged capillary refill time, a subjective observation to assess peripheral blood flow. To provide clinicians with a better diagnostic solution, OHSU emergency room physicians [David Sheridan, M.D.](#), and [Matt Hansen, M.D., MCR](#), developed a digital capillary refill, or DCR, technology. It is a point-of-care device to enable rapid, accurate and noninvasive measurement of capillary refill time.

The Biomedical Innovation Program supported initial development for the DCR device at OHSU. The initial prototype was developed and used on human subjects in 2018, after which Sheridan and Hansen founded ProMedix. Over the past three years, the ProMedix team has published seven manuscripts in peer-reviewed journals and this year completed a large 600-patient study in the OHSU emergency department that shows the potential of its technology to improve outcomes through early sepsis detection.

“Our recent clinical data is really exciting and confirms the hopes Matt and I had when we started this project,” Sheridan says. “Mainly that a simple technology like we have can significantly impact patient care in the hospital and even home environment.”



David Sheridan, M.D., and Matt Hansen, M.D., MCR., are both associate professors of emergency medicine in the School of Medicine and co-founders of the OHSU startup company ProMedix.

In 2021, ProMedix was selected to participate in the inaugural cohort of the mHUB Accelerator Program for Medical Devices in Chicago. ProMedix was selected as one of nine companies from a pool of nearly 120 applicants “based on their ability to address large, unmet needs with innovative solutions that will transform patient care,” according to mHUB. The mHUB program, underwritten by Baxter Ventures and Edwards-Elmhurst Health Ventures, provides access to state-of-the-art 3D printing, technical/engineering, and a fabrication facility.

To date, ProMedix has raised \$812,000, including a \$250,000 investment from Elevate Capital’s Innovation Gap Fund, sponsored by Business Oregon, the state’s economic development agency. ProMedix has also received investment from mHUB, Baxter Ventures, and Edwards-Elmhurst Health Ventures, along with grants from BIP and IDEA funds. The company also recruited Scott Filer, M.B.A., to join as chief executive officer.

“The ability for clinicians to take actual problems we face at the bedside and turn them into a commercialized product is an amazing opportunity the support OHSU has allowed,” Sheridan says. “ProMedix is currently in a fundraising round that will really accelerate the development of the technology, secure regulatory clearance and expand clinical trials outside of OHSU.”



### OCTRI Phase 0 Program leads the way to SBIR/STTR funding

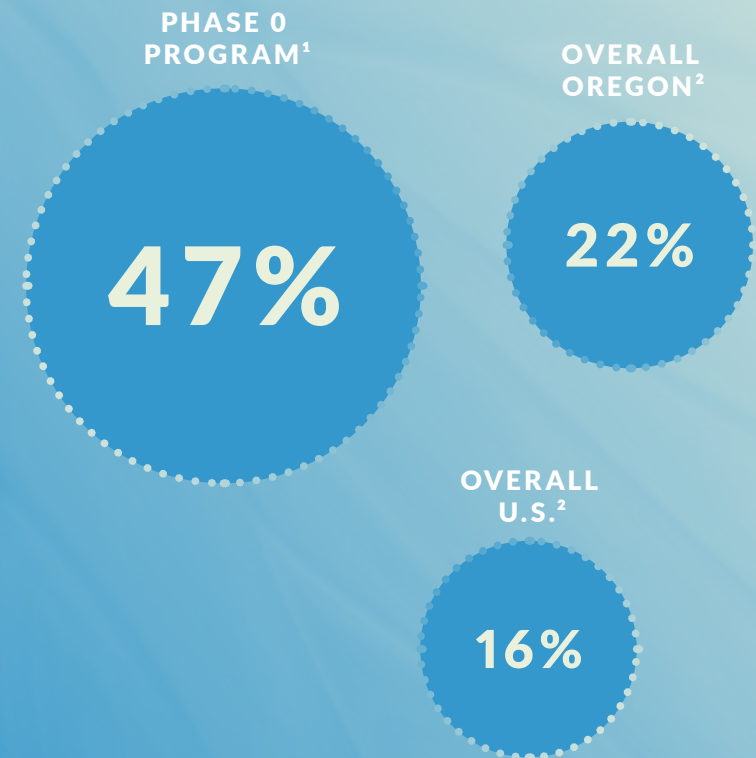
Unique and important sources of funding for early-stage technology-based small businesses are the federal government's Small Business Innovation Research and Small Business Technology Transfer, or SBIR and STTR, programs.

Since 2015, the Phase 0 application support program, funded by Business Oregon and administered by the Oregon Clinical and Translational Research Institute, or OCTRI, has provided OHSU start-ups and Oregon small businesses an impressive advantage for winning SBIR/STTR funding. This source of early-stage, non-dilutive funding has provided key support for technology-based small businesses, particularly academic-born, life science-based start-up companies.

Participants in the Phase 0 Program boast a success rate of 47%, well above the 22% average for Oregon and the 16% U.S. average. The Phase 0 program is a proven resource for increasing companies' competitiveness for these desirable grants. Five OHSU-affiliated startup companies went on to receive additional SBIR matching grant awards in 2022 from Business Oregon and the Oregon Innovation Council, including Trace Biosciences (formerly Inherent Targeting), Nzumbe, OmnEcoil, PDX Pharmaceuticals and NeuvaRx.

Phase 0 funding is limited to eligible small businesses actively pursuing an SBIR/STTR award, and available until all program funds are awarded. For more details about the Phase 0 program, please see the [request for applications](#).

### Success rates



<sup>1</sup> Based on NSF, NIH, DoD, Phase 1, Phase 2 and Fast-track applications from 2014–2022

<sup>2</sup> Based on NIH Phase 1 SBIR/STTR applications from 2012–2021

## STARTUP COMPANY MILESTONES

📍 **Aronora, Inc.** announced clinical data from its Phase 2 study of AB002, a first-in-class protein C activator enzyme. The results of this study support further clinical evaluation of AB002 as a novel drug candidate to limit thrombus development or device-initiated clotting in patients with elevated bleeding risk. This would include end-stage renal disease patients on chronic heparin-free hemodialysis. Aronora, a clinical-stage biotechnology company developing innovative therapies for hematologic diseases, was co-founded by Erik Tucker, Ph.D., an adjunct professor of biomedical engineering in the School of Medicine.

📍 **Autobahn Therapeutics** was granted Orphan Drug Designation by the FDA for the company's investigational product candidate, ABX-002. ABX-002 is a thyroid hormone receptor beta agonist being developed for the treatment of several central nervous system diseases, including treatment-resistant depression, multiple sclerosis and adrenomyeloneuropathy, a rare genetic disorder. Autobahn, a biopharmaceutical company developing the next generation of regenerative medicines for people affected by central nervous system disorders, was co-founded by Ben Emery, Ph.D., associate professor of neurology, Dennis Bourdette, M.D., professor emeritus of neurology and Tom Scanlan, Ph.D., professor of chemical physiology and biochemistry, all in the School of Medicine.

📍 **Fennec Pharmaceuticals** announced that the FDA has accepted for filing the company's resubmitted New Drug Application for PEDMARK™. PEDMARK is a unique formulation of sodium thiosulfate for the prevention of platinum-induced ototoxicity in pediatric patients one month to less than 18 years of age with localized, non-metastatic, solid tumors. PEDMARK has received both the Breakthrough Therapy and Fast Track Designation by the FDA. Fennec, a specialty pharmaceutical company, has a license agreement with OHSU relating to OHSU research developed in the laboratory of Edward Neuwelt, M.D., professor of neurological surgery in the School of Medicine.

📍 **GoCheck** raised an investment round of \$10 million to grow its team, platform and customer partnerships. GoCheck Kids serves pediatric teams in their quest to prevent vision impairment, the most prevalent disabling condition among children in the U.S. and many countries. GoCheck, a digital health company and creator of GoCheck Kids, was founded by David Huang, M.D., Ph.D., professor of ophthalmology in the School of Medicine.

## STARTUP COMPANY MILESTONES

🌀 **Gamma Diagnostics** joined the September 2021 healthcare accelerator program of Expert Dojo, an international early-stage startup accelerator. Gamma Diagnostics is a company that specializes in developing novel diagnostics that are better quantitative indicators of the inflammatory response in infectious and chronic diseases to determine the right course of treatment, improve efficacy of care and thereby save more patient lives. The company was founded by [David Farrell, Ph.D., FAHA](#), professor of surgery in the School of Medicine.

🌀 **Luciole Pharmaceuticals** entered into a research collaboration with Cyclica to identify small molecule agonists of OGG1, the key enzyme in initiation of base excision repair of both nuclear and mitochondrial DNA, or mtDNA. Luciole also announced a sponsored research agreement with OHSU to test those compounds for the treatment of neurodegenerative and other diseases of aging. The company also recruited new additions to its Scientific Advisory Board. Luciole Pharmaceuticals, a therapeutics company focused on accelerating the repair of oxidative damage to mtDNA, was co-founded by [Stephen Lloyd, Ph.D.](#), and [Amanda McCullough, Ph.D.](#), professors of molecular and medical genetics in the School of Medicine.

🌀 **PDX Pharmaceuticals** had three new U.S. patents, jointly owned with OHSU, issued in early 2022. This therapeutics company is focused on developing functionalized nanomaterials to deliver drugs, was founded by [Wassana Yantasee, Ph.D.](#), professor of biomedical engineering in the School of Medicine.

🌀 **SurgiVance Inc.** received a \$256,000 National Science Foundation Small Business Innovation Research, or SBIR, grant to conduct research and development work on digitizing the pathologist in the operating room. SurgiVance, a technology company that has developed a novel imager that produces high-resolution, 3D digital pathology images of biopsied or surgically-removed tissue specimens at the point of care, was founded by former OHSU faculty member Daniel Gareau, Ph.D.

🌀 **Trace Biosciences** was awarded a \$244,000 National Science Foundation Small Business Technology Transfer, or STTR, grant to perform lead optimization and testing. The company, formerly Inherent Targeting, was also a finalist in the Oregon Entrepreneurs Network's Angel Oregon Life & Bioscience, or AOBIO, investment program. The company developing nerve-targeted fluorescent contrast agents to improve surgical outcomes, was co-founded by [Summer Gibbs, Ph.D.](#), associate professor of biomedical engineering in the School of Medicine, postdoctoral fellow Lei Wang, Ph.D., and research scientist Connor Barth, Ph.D.





# Partnership Highlights

Collaborations are a critical component of carrying out OHSU's mission, and provide important opportunities like access to new tools and resources, patient care, and education and training experiences. The OHSU Innovates network aspires to develop strategic partnerships to advance OHSU's cutting-edge research and improve care for our communities within the region and beyond.

## Department of Medical Informatics and Clinical Epidemiology

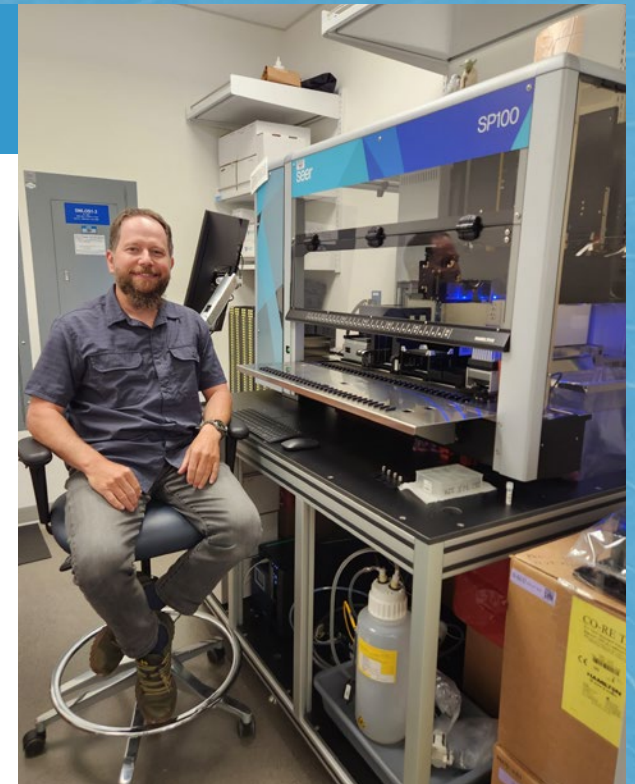
Rare diseases, despite the name, are actually not that rare. Approximately one in 10 people in the United States are affected by a rare disease at any given time. However, rare diseases often go undiagnosed for years due to their infrequent occurrence and presentations that may resemble common diseases. Artificial intelligence, or AI, algorithms using machine learning applied to electronic health record data present a unique way to help determine the presence of rare diseases. Recently, there has been a focus on discovering new, more effective treatments for rare diseases. AI-based methods can be especially helpful in identifying patients who may be candidates for these improved therapeutics.

Professors of medical informatics and clinical epidemiology in the School of Medicine, Aaron Cohen, M.D., M.S., and William Hersh, M.D., have partnered with several pharmaceutical companies focused on rare disease therapeutics—including Alnylam Pharmaceuticals and PTC Therapeutics—to apply their expertise in electronic health record-based machine learning for early detection of rare diseases. These studies, including a 2022 joint publication from OHSU and Alnylam in *JAMIA Open*, aim to identify potential rare disease patients for whom disease-specific diagnostic testing is appropriate or treatment is available but may be overlooked. This can improve the quality and completeness of care for these patients.

### Cancer Early Detection Advanced Research center and Seer partnership

In 2020, OHSU Knight Cancer Institute's Cancer Early Detection Advanced Research center, or CEDAR, proteomics team, led by scientist Mark Flory, Ph.D., collaborated with San Francisco Bay Area company Seer to implement the company's proprietary Proteograph™ Product Suite. The Proteograph Product Suite leverages proprietary engineered nanoparticle technology to enable unbiased biomarker discovery. In combination with mass spectrometry analysis, Seer's Proteograph Product Suite for the first time enables deep proteomic sampling of highly complex liquid biopsy specimen types, including plasma and serum, to be feasibly performed in highly scaled, large cohort studies. Notably, CEDAR was the first client in the world to deploy the Seer Proteograph Product Suite and its automated workflow. As an early technology adopter, CEDAR has now initiated multiple studies using the technology and has presented several posters and oral presentations in collaboration with Seer at major conferences. Those conferences include the American Society of Mass Spectrometry and the Human Proteome Organization. The collaboration also provided an opportunity for Flory and colleagues to co-author with Seer a 2022 peer-reviewed publication in the *Proceedings of the National Academy of Sciences*.

CEDAR's collaboration with Seer continues with a focus on proteomic biomarker discovery to improve early cancer detection. In one ongoing study, CEDAR is using a combination of the Seer Proteograph platform and a Bruker timsTOF mass spectrometry system, another proteomic capability recently implemented in CEDAR and overseen by Flory. The CEDAR team is using the system combination to interrogate over 900 patient serum specimens for identification of new proteomic blood signatures in a major cancer indication. This discovery-mode study is one of the largest of its kind in the proteomics field, and is anticipated to reveal candidate signatures for clinical translation to improve patient care and therapeutic outcomes.



Mark Flory, Ph.D., is a senior scientist at CEDAR, who leads a collaborative research team that uses leading-edge technologies, including Seer's novel Proteograph Product Suite, to perform large-scale proteomics studies, which are expected to reveal unique signatures for early cancer detection.



### Knight Cancer Institute and Kronos Bio partnership

Kronos Bio, a clinical-stage biotech company with three investigational compounds, started working with the OHSU Knight Cancer Institute in the summer of 2021. Kronos Bio is dedicated to the discovery and development of therapeutics that target the dysregulated transcription that causes cancer and other serious diseases. The collaboration initially focused on a Knight Cancer Institute-developed assay to measure biologic response to Kronos Bio's investigational anti-leukemia drugs in blood and bone marrow. Data from this collaboration was presented in an abstract at the 2022 European Hematology Association Congress.

OHSU and Kronos Bio expect this assay and other OHSU proprietary drug sensitivity assays will soon be deployed to analyze the effects of Kronos Bio's investigational therapies in patients with acute myeloid leukemia in clinical trials. Kronos Bio has also established a relationship with the OHSU Knight Cancer Institute's Immune Monitoring and Cancer Omics Program to gather complementary data using the NanoString Digital Spatial Profiler platform on respective formalin-fixed paraffin-embedded patient tissues.

The collaborative efforts between the Knight Cancer Institute and Kronos Bio offer insight into how drugs work in patients, and also help identify which patient may benefit from a particular drug. The hope is that these assay systems can ultimately serve as a predictive proxy to help researchers better understand how patients may experience treatment with a particular therapy. The Knight Cancer Institute's Hematologic Malignancies group is committed to exploring these methods as a pathway to offering better care to patients.



## PMedIC: collaborative innovation

The Pacific Northwest Biomedical Innovation Co-laboratory, or PMedIC, is an ongoing collaborative research and educational program between OHSU and Pacific Northwest National Laboratory. Established in 2018, the partnership has led to several collaborative grants and the establishment of the large joint National Institutes of Health Pacific Northwest Cryo-EM center.

PMedIC demonstrates the powerful impact collaboration can have on science—including through joint publications such as two high-impact papers on SARS-CoV-2 cowritten by Fikadu Tafesse, Ph.D., associate professor of molecular microbiology and immunology in the School of Medicine, and Pacific Northwest National Laboratory scientists Jennifer Kyle, Ph.D., and Joon-Yong, Ph.D., that received national media attention. PNNL scientist Ying Zhu, Ph.D., and Peter Barr-Gillespie, Ph.D., OHSU executive vice president and chief research officer, are continuing a partnership, initially funded as part of an R01 federal research grant, using leading edge mass spectrometry to investigate sensory hair cells with PNNL's Liljana Pasa-Tolic, Ph.D., heading the R21 federal research grant funded in 2021.

The partnership also continued to support innovation through cross-institutional educational opportunities. In 2021 and 2022, OHSU received funding for two T32 training grants that include the opportunity for OHSU graduate students and postdoctoral fellows to get hands-on experience at PNNL. PMedIC also held a quarterly seminar series to provide cross-institutional training and promote collaboration.



**Beth Habecker, Ph.D.**  
OHSU PMEDIC CO-DIRECTOR



**Bobbie-Jo Webb-Robertson, Ph.D.**  
PNNL PMEDIC CO-DIRECTOR



### Quickly facilitate new collaborations

- ★ Internal funding to develop preliminary data
- ★ Quick RFA submissions for large center grants (eg. PNCC)
- ★ Flexibility to shift focus quickly

### Deploy new methods

- ★ nanoPOTS
- ★ Cutting-edge lipidomics
- ★ Artificial intelligence/machine learning
- ★ Big data analysis

Access to new forms of funding for team science

# Making an Impact



Connor Barth, Ph.D., of OHSU startup company Inherent Targeting (now Trace Biosciences) presenting at the AOBIO finale.

## Business Oregon grant awarded to support the development of a metro-region innovation hub

OHSU Innovates is proud to partner with Portland State University and other regional partners on a recently awarded grant from Business Oregon to support the development of a regional innovation hub to maximize the success of local entrepreneurs. PSU will serve as the host organization and work with regional partners, including OHSU, to create an inventory of existing regional entrepreneurial resources and programming.

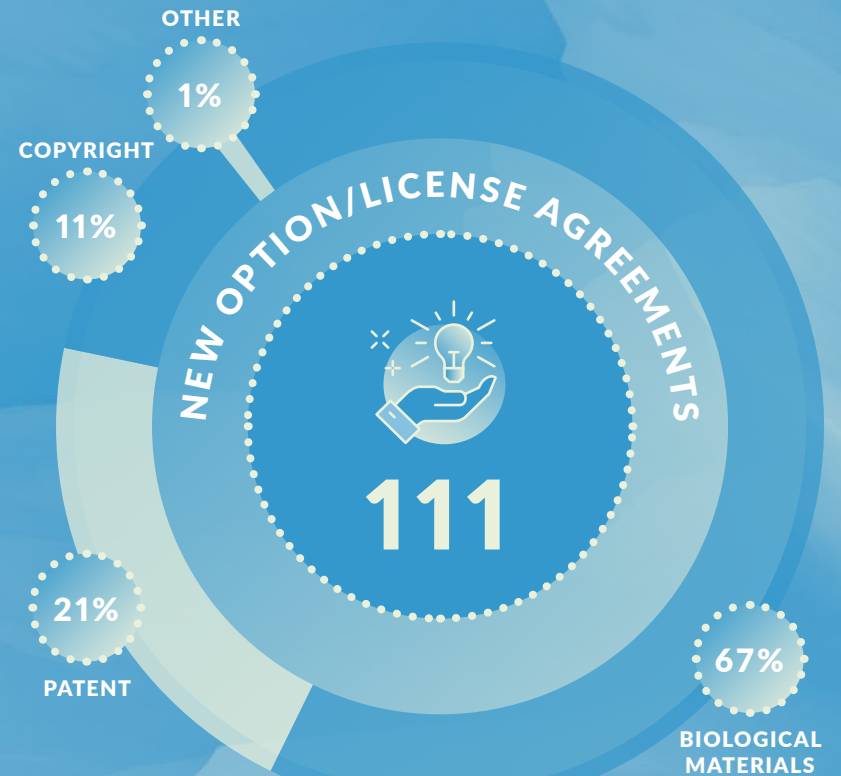
These programs will also be evaluated by an assessment of engagement among ecosystem participants and a survey of regional entrepreneurs. That evaluation will identify strengths and gaps in services. This activity will inform the creation of new resources, and the synergizing of existing resources, to better serve regional entrepreneurs—whatever their industry sector. When the innovation hub launches, its goal will be to incentivize regional collaboration to support and grow the innovation ecosystem in Multnomah, Washington and Clackamas counties.

## Angel Oregon Life & Bioscience event

OHSU Innovates was proud to partner with regional bioscience organizations this year to support the Angel Oregon Life & Bioscience, or AOBIO, event. Hosted and led by the Oregon Entrepreneurs Network in partnership with Oregon Bioscience Association and Oregon Bioscience Incubator, AOBIO was the first life science angel investment event of its kind in Oregon. It provided both an educational training series and an investment competition that awarded \$300,000 in startup funding. Eight OHSU startup companies participated in the four-part education series that focused on effective fundraising strategies for life science startups. Two OHSU companies, Gamma Diagnostics and Inherent Targeting, participated in the investment round. Inherent Targeting (now known as Trace Biosciences) went on to be selected as one of four finalists for the event, which culminated with CEO Connor Barth, Ph.D., presenting at the finale. OHSU Innovates members were also busy behind the scenes participating in the seminar series, performing diligence evaluations and sponsoring the finale event. The latter was an exciting evening that brought together local entrepreneurs and regional biotech leaders for networking and discussions about how to keep momentum building for life science innovation in our region for years to come.

# By the Numbers

## FY22





180

TOTAL PATENT APPLICATIONS FILED

93

US PATENT APPLICATIONS FILED

48

PATENT APPLICATIONS FILED ON NEW MATTER  
PROVISIONALS, US UTILITY,  
NON-US



555

MATERIAL TRANSFER AGREEMENTS



78

INDUSTRY-SPONSORED RESEARCH AGREEMENTS



181

NON-DISCLOSURE/CONFIDENTIALITY AGREEMENTS



345

OTHER RESEARCH AGREEMENTS<sup>1</sup>

# Our Team



Darcie Babcock



Sri Balakrishnan



Philip Barish



Teresa Bennett



Brandy Burtis



Anne Carlson



Marilynn Chow-Castro



Daniel Coleman



Travis Cook



Nicole Durchanek



Steve Eck



Ruth Epling



Laura Erker



Nicole Garrison



Emma He



Joseph Hill



Justin Isla



Jonathan Jubera



Margaret Kubat



Jim Lagowski



Ronn Leon



Terry Lo



Lisa Lukaesko



Aditi Martin



Melissa Mudd



Arvin Paranjpe



Michael Roberts



Julia Ronlov



Chris Sagar



Astralena (Star) Sharp



Liz Sturgill



Cristina Tognon



Ann Trione



Cadence True

# OHSU Innovates

🔗 [www.ohsu.edu/innovates](http://www.ohsu.edu/innovates)

✉ [innovates@ohsu.edu](mailto:innovates@ohsu.edu)

OHSU Innovates is a collaborative multi-department network supporting innovation and entrepreneurship at OHSU, within the regional community and beyond. Thank you to each contributing department and others who have supported our efforts.

## OHSU Technology Transfer

🔗 [www.ohsu.edu/innovates/technology-transfer](http://www.ohsu.edu/innovates/technology-transfer)

✉ [techmgmt@ohsu.edu](mailto:techmgmt@ohsu.edu)

## OHSU Collaborations and Entrepreneurship

🔗 [www.ohsu.edu/innovates/collaborations-and-entrepreneurship](http://www.ohsu.edu/innovates/collaborations-and-entrepreneurship)

✉ [OCE@ohsu.edu](mailto:OCE@ohsu.edu)

## Oregon Clinical and Translational Research Institute

🔗 [www.ohsu.edu/octri](http://www.ohsu.edu/octri)

👤 Aditi Martin, Ph.D., Director of Innovation Programs and Awards

✉ [martiad@ohsu.edu](mailto:martiad@ohsu.edu)

## Strategic Alliances, OHSU School of Medicine

🔗 [www.ohsu.edu/school-of-medicine/strategic-alliances-ohsu-school-medicine](http://www.ohsu.edu/school-of-medicine/strategic-alliances-ohsu-school-medicine)

👤 Laura Erker, Ph.D., Director of Strategic Partnerships

✉ [erkerl@ohsu.edu](mailto:erkerl@ohsu.edu)

## Strategic Alliances, Knight Cancer Institute

👤 Julia Ronlov, M.B.A., Director of Strategic Partnerships

✉ [ronlov@ohsu.edu](mailto:ronlov@ohsu.edu)



OHSU is an equal opportunity, affirmative action institution.

# Sponsors

## PLATINUM



## SILVER



## BRONZE

