

## Analysis

### Item 43: Oregon Business Development Department

#### Signature Research Centers Report

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**Analyst:** Steve Bender

**Request:** Acknowledge receipt of a report on Oregon's three Signature Research Centers.

**Analysis:** The Oregon Business Development Department (OBDD) submitted a report on Oregon's three Signature Research Centers (SRCs). The SRCs receive Lottery Funds from the Oregon Innovation Council (Oregon InC), an OBDD program. The three SRCs, which are established as non-profit entities, include the Oregon Nanoscience and Microtechnologies Institute (ONAMI), the Oregon Translational Research and Development Institute (OTRADI), and VertueLab (previously called Oregon BEST). The three SRCs work to support research and innovation in Oregon's material science, bioscience, and clean tech sectors, respectively. They help Oregon companies create and commercialize technologies and processes to support their competitiveness and ability to create and retain jobs. Part of this function includes helping companies expand access to capital and providing capital directly. OTRADI also operates a specific facility, the Oregon Bioscience Incubator in Portland, that serves as a business incubator and provides laboratory space at below-market rates for start-ups in the bioscience sector.

During the 2019 session the Joint Committee on Ways and Means approved a budget note directing OBDD to report on specific issues related to SRC operations:

**Budget Note:**

The Oregon Business Development Department, in collaboration with the Oregon Innovation Council, shall evaluate the feasibility and impact of eliminating ongoing state support for the three Signature Research Centers: ONAMI, OTRADI, and VertueLab. The Department shall report its findings to the Emergency Board in September 2020.

State support for SRC operations was initially approved on a single-biennium basis. Each biennium, OBDD would request continued funding in a policy option package. Continued funding was not included in the agency's base or current service level budget. This approach reflected an understanding that the SRC functions involved identifying opportunities that arose in Oregon in each of their sectors of focus, and that these opportunities would not necessarily be constant from one biennium to the next. Some also understood that the SRCs would kick start sector growth and transition to operating without state support. Over time, the way the budget addresses SRC funding has changed. The budget now includes state support for the Oregon InC in the OBDD current service level, however, the distribution of those funds to specific SRCs and other programs is determined by Oregon InC. The current biennium funding of SRCs is approximately \$2,150,000 Lottery Funds each.

The OBDD report includes information and statistics on SRC operations since their inception. It identifies amounts of private and public matching funds awarded to SRC-supported companies and the number of jobs that these companies have created. A number of Oregon companies that have benefited from their association with SRCs are identified, and the agency reports that eliminating state support for SRC operations would dramatically impact the support system for emerging small businesses in the material science, bioscience, and clean tech sectors.

Follow-up information provided by OBDD further clarifies the impact of eliminating state support on each of the three SRCs. ONAMI indicates that over time, its operating budget has moved to almost total reliance on state support, and that if this support were eliminated ONAMI would have to close. OTRADI has a more diversified income base, receiving approximately \$500,000 per year in rent payments from companies in its business incubator. Without state support, however, OTRADI would no longer be able to subsidize incubator rent charges, and the required rent increases would likely keep current and potential occupants from utilizing the space, leading to their failure. OTRADI itself would also have to close under these circumstances. VertueLab, like ONAMI, has transitioned over time to greater reliance on state support for its operating costs. State funds currently comprise approximately 80% of this SRC's revenues. If state support were eliminated, VertueLab could increase its efforts to obtain federal and corporate grants but would be unable to apply for grants that require state funding support as a match. VertueLab would likely be unable to retain most staff and would likely need to wind down operations.

**Legislative Fiscal Office Recommendation:** The Legislative Fiscal Office recommends that the Emergency Board acknowledge receipt of the report from the Oregon Business Development Department on Oregon's three Signature Research Centers.

**Request:** Report on the feasibility and impact of eliminating ongoing state support for the three Signature Research Centers; ONAMI, OTRADI, and VertueLab.

**Recommendation:** Acknowledge receipt of the report.

**Discussion:** In accordance with Senate Bill 5524 (2019), Oregon Business Development Department (OBDD), in collaboration with the Oregon Innovation Council (Oregon InC), was to evaluate the feasibility and impact of eliminating ongoing state support for the three Signature Research Centers (SRC). The OBDD was asked to report its findings at the September meeting of the Emergency Board.

The evaluation by OBDD and Oregon InC made the following findings:

- Feasibility – The state currently provides Lottery Funding to support the three SRCs. In response to the feasibility of eliminating state support for the SRCs, the department and Oregon InC report it is feasible the state could halt funding to these organizations going forward. However, eliminating funding would lead to significant impacts, such as job losses, diminished small business support, etc.
- Impact - With regards to the impact of eliminating state support for the SRCs, there would be real and significant impact for the state if state support for these groups were eliminated. The state's Lottery Funds are the only support for these programs. The SRCs are key service providers for innovative Oregon start-up companies. They have supported well over 300 early-stage companies to date, and without SRCs these companies would not have access to specialized technical assistance.

Based on the impacts the SRCs have in the business sector, OBDD believes support for the SRCs remains vital if Oregon wants to maintain its focus on growing technology and talent in certain, key emerging industry sectors. The OBDD report also found eliminating SRC funding now would cause a dramatic reduction in Oregon's support system for emerging small businesses in these sectors. These programs can provide investments in innovation-based economic development in the post-COVID-19 world, which OBDD reported as even more critical than they were before.

# Oregon Business Development Department, Oregon Innovation Council Budget Note

This report has been prepared in response to the budget note included with the Oregon Business Development Department's (OBDD's) 2019-21 budget. OBDD worked with the Oregon Innovation Council (Oregon InC) and the Signature Research Centers (SRCs) to respond. In addition to this introduction, each SRC has submitted information specific to their work and results.

## The budget note states:

*The OBDD, in collaboration with the Oregon Innovation Council, shall evaluate the feasibility and impact of eliminating ongoing state support for the three Signature Research Centers: ONAMI, OTRADI, and VertueLab. The Department shall report its findings to the Emergency Board in September, 2020.*

## Budget note response:

Innovation is a clear driver of economic competitiveness. It fuels the creation of new technologies, companies and industries. It attracts talent, creates high-wage jobs, and ultimately drives economic growth. States that prioritize sustained investment in innovation and excel across a broad range of indicators are better positioned to compete long-term in the global economy and will be better equipped to recover from the current economic crisis.

The Oregon Innovation Council (Oregon InC) is Oregon's premier entity that prioritizes an innovation economy through development of a State Plan for Innovation and Economic Competitiveness, policy and directing the state's investments in innovation-based economic development. Oregon InC is a public-private partnership that helps create new jobs and new companies, facilitates private investment in Oregon startups, brings federal innovation funding back to the state and contributes to the diversification of Oregon's economy. Investments in innovation are critical for economic health because these investments help new companies grow high-wage jobs. Oregon InC was created in 2005 as the culmination of a statewide call to action and discussion, led by the Governor and Legislature and more than 40 leaders from the private sector, research universities and government. The charge was to create a new way to build innovation into the DNA of how Oregon does business.

Oregon's three SRCs were originally funded by Business Oregon in 2007. They target three sectors in which Oregon has strategic advantages and high-growth potential exists – those being materials science, biosciences and clean technology. Public support for the three SRCs has been a strategic and wise investment, and Oregon is in a stronger economic position because of the accomplishments of SRCs. *Together, the SRCs have helped companies leverage about \$100 million in state funding to bring in approximately \$1.1 billion in federal and private funding for commercialization of technology in Oregon.* This is a return of approximately 10:1 for the state's investment to date. In addition, the SRCs provide specialized and critical support services to entrepreneurs across the state that cannot be replaced by other groups currently in Oregon. SRCs provide cluster-specific mentoring, access to private and federal capital resources, business coaching, go-to market support, and other necessary support for science and research-based startups with high growth potential. The SRCs save these startups countless hours and dollars so that they can focus on developing their technologies and their businesses. They have proven to be a critical piece in Oregon's innovation economy.

With that background in mind, we will now address the *"feasibility and impact of eliminating ongoing support for the three SRCs..."*

Each biennium, as Oregon InC considers the content of the State Plan for Innovation and Economic Competitiveness, Oregon InC reviews goals, progress and analyzes current programs and investments to assess their effectiveness and

recommends programs and budgets for the next biennium. In the 2015-17 biennia, the Council undertook a deep review of its programs, which resulted in changes to most portfolio programs. During this review, the Council determined that materials sciences, biosciences and clean tech were still the most strategic areas to direct sustained Oregon InC resources in order to continue to build off of the three existing SRCs and further facilitate successes that were being achieved in the development of high-growth, high-wage companies.

The effort did include changes to the SRCs' approaches and budgets, however, to better reflect conditions at the time. The Council views this review and optimization process as a key responsibility as it advises the state on the best use of resources. In addition, by statute, Oregon InC utilizes an audit committee to evaluate the performance of SRCs on a quarterly basis and has ensured that SRCs have sufficiently met their goals and benchmarks. The audit committee has the authority to recommend halting funding for programs if the situation warrants.

This year, as part of the Oregon Innovation Plan work that Oregon InC is undertaking, all portfolio programs, including the SRCs, will yet again be evaluated in a broader context of state- and nation-wide competitiveness, economic resiliency and return on investment. The outcome of this Innovation Plan work will be a 10-year statewide plan and roadmap for innovation. The intent is to share this plan with the legislature during the 2021 session.

To address the first question about the "*feasibility*" of eliminating ongoing state support for the SRCs, there are no significant impediments to the feasibility of halting funding to these organizations. Eliminating funding would lead to significant impacts, such as job losses, diminished small business support, etc. as discussed below, but it is feasible to eliminate state funding going forward.

Defunding the SRCs would signal to entrepreneurs that Oregon doesn't view innovation as a critical component of a robust economy, particularly one looking to support the next generation of employers. That said, one of the Council's roles is ensuring the SRCs' activities remain as effective and relevant as possible. The Council regularly looks at the SRCs for ways to adjust their activities to be better at supporting Oregon's innovators. Changes in the SRCs approaches to supporting innovation are reasonable and expected, but the complete defunding of the SRCs would be an indication that the state is retreating from supporting innovation and would remove key players from the overall innovation ecosystem in the state.

Oregon's ability to recover from the current economic crisis will depend in large part upon our capacity to evolve our current programming to meet new demands. The state's ability to foster the formation of innovation-based businesses and sustain their growth as they scale-up and generate new, high-paying jobs for our fellow citizens will in many ways dictate how our economy is positioned for growth in the coming decade.

In terms of the "impact" of eliminating state support, there would be real and significant impact for the State if these groups were eliminated. The SRCs are key service providers for innovative Oregon start-up companies. **They have supported well over 300 early-stage companies to date, and without SRCs these companies would not have access to specialized technical assistance.** In addition, they bolster the capabilities of the State's research universities by supporting researchers who want to translate research into viable products and businesses and by making connections to facilitate technology licensing agreements.

In closing, as stated above, while elimination of the SRCs is feasible, there would be a significant impact of doing so. These programs have provided a significant return on investment and investments in innovation-based economic development in the post-COVID-19 world are even more critical than they were before. Support for the SRCs remains vital if Oregon wants to maintain its focus on growing technology and talent in certain, key emerging industry sectors. Eliminating SRC funding now would cause a dramatic reduction in the support system in the state for emerging small businesses in these sectors. Continuing to support the SRCs will ensure that Oregon is best positioned to grow its

economy at an accelerated rate, just as we did after the Great Recession when the Legislature recognized the importance of maintaining investments in innovation during those difficult budgetary conditions. Oregon's ability to recover from this economic crisis will depend in large part upon its capacity to foster the formation of innovation-based businesses and sustain their growth as they scale-up and generate new, high-paying jobs.

# Budget Response, ONAMI



## Introduction to ONAMI:

ONAMI is a uniquely qualified team of technology and manufacturing executives (ex HP, FEI, Tektronix, Life Technologies, CH2M Hill), startup CEOs/founders of at least 10 companies, and professional investors in dozens of startups focused on disruptive technologies arising from science and research. We can provide, at little or no cost to entrepreneurs, a pre-company and pre-investment consulting/networking/mentoring service that no startup could afford on its own, and can be competent in just about any technical field – critical in a small state/market which nevertheless has great technology diversity.

## History/mission:

ONAMI began its earliest efforts in late 2003 as the OCKED (Oregon Council for Knowledge and Economic Development, predecessor of Oregon Inc) - recommended pilot Signature Research Center for “Multiscale Materials and Devices”, soon renamed “Nanoscience and Microtechnologies”, with the same meaning. This was found to be the biggest overlap among three factors: industry strength (we had global leadership assets in Intel semiconductor manufacturing, HP inkjet, Mentor Graphics, Xerox, and the rest of the “silicon forest” value chain), university research strengths (not nearly as notable or clear in areas with commercial potential) and “line of sight” to future growth markets that would furnish capital and create jobs in Oregon.

At the time, there was no active early stage venture capital in Oregon (Northwest Tech Ventures was started at the same time and also received economic development funds) and there was very little entrepreneurship activity or culture in the state’s 4 research universities, which also needed better facilities and ambitious new faculty in order to grow into Oregon’s fair share of federally funded research, particularly in the hot/trendy/well-funded area of “nanotechnology”. Out of necessity, ONAMI first focused on accelerating research growth and exploited both the nanotechnology trend and the possibility of securing congressional earmark funding via unprecedented collaboration (including lobbying) among OHSU, OSU, PSU and the Pacific Northwest National Laboratory. The effort was wildly successful (see graphic), as were targeted investments in faculty start-up packages, open (i.e. to all researchers, industry and startups) university core facilities and a competitive proposal matching program that was the first predecessor of the current University Innovation Research Fund.

We used \$15M in state funds to leverage over \$133M in federal funds and at the same time set the universities up for much of the ongoing S&T research funding strength they enjoy today. (Much) more detail can be supplied, but these early efforts 2003-2009 (Microtechnology-based Energy and Chemical Systems; Safer Nanomaterials and Nanotechnology; Nanoelectronics, Nanometrology and Nanomedicine; and Sustainable Materials Chemistry) also set the stage for many start-up companies– including Inpria, VallisCor, DeFunkify, and Pellucere.

*ONAMI’s first Signature Faculty Fellow, Dr. Mas Subramanian of OSU, used start-up funds from ONAMI to discover the first new blue pigment in 200 years. “YInMn blue” also reflects infrared light, and is now approved by the EPA for commercial roofs. Energy savings and carbon reduction potential is very large.*

## Research Financial Summary (FY05-15):

- \$4,380,000 for 12 signature researcher start-up fund awards
- \$7,633,476 research matching funds, leveraging \$78,497,275 in competitive funding
- \$55,000,000 total congressional appropriations for 4 collaborative earmarks
- \$2,874,855 shared facility support

ONAMI started with an aspiration, but not yet an effective method, for commercialization and private sector job creation. We quickly concluded that the essential means of doing this is start-up companies financed by risk capital and/or early revenue. We began our successful and nationally recognized (2012 Excellence in TBED Award from SSTI, numerous presentations for the

National Governors Association) GAP Fund in late 2006. After starting out as a grant fund – like SBIR/STTR but with flexible use of funds, milestone-tranching and intensive engagement from our domain expert EIRs – the ONAMI GAP fund began taking interest/equity in technology and companies once we were sure we could do so without jeopardizing future investment.

The GAP fund results were outstanding and we have often been cited as a national model for what is now standard in most state and large university commercialization programs.

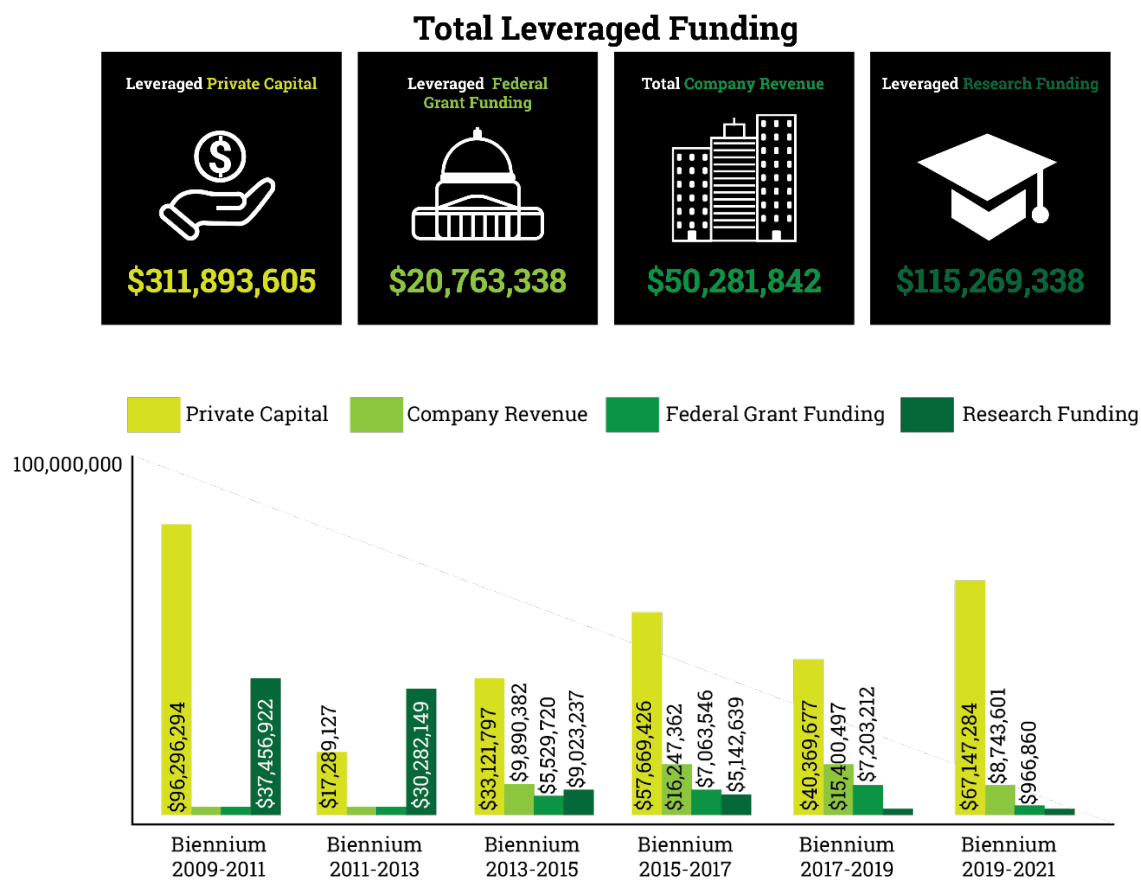
Financial Summary of Commercialization (FY07-present):

- Over **\$383M in leveraged funds** deployed in Oregon
- Creating more than **384 Oregon jobs**.
- **\$10,985,664 gap grants** in support of **52 Oregon startups**
- **\$1,177,312** follow on projects or direct investments **in portfolio companies**
- **\$985,343** for **25 graduate student internships** in 18 portfolio companies
- **\$721,344 in cash returns to ONAMI** as well as significant unrealized equity value in portfolio companies

## ACHIEVING OREGON'S ECONOMIC DEVELOPMENT GOALS

### ONAMI Funding Portfolio:

ONAMI's gap fund portfolio leverage is broken out by biennium as follows, including private capital, product and service revenue, and federal grants (SBIR, STTR, DOE, DOD, etc.) These amounts do not include another ~\$1.1B raised for company operations outside of Oregon.



*There is nothing more effective for economic development – or more neglected by the private capital markets – than seed and pre-seed capital investment in university spinouts and other deep science startups.* These results show that pairing technology initiatives with gap funding has great leverage.



## Metrics

ONAMI's most consistent, key metric has been financial leverage jobs. Start-up/spinout company jobs are an important metric as well, but a lagging indicator given the time it takes startups to create significant job numbers.

## Success Stories at different stages of company development

ONAMI has generally provided the first money into its portfolio companies, and often involved in team and company formation. We're particularly proud that Inpria of Corvallis, a 2007 OSU spinout for which ONAMI found the CEO and provided gap funding/facility access grants/graduate intern, has raised \$75M in capital and become a globally important semiconductor materials company which owns a technology that is essential for continued Moore's Law scaling. ONAMI also put the first (2012) funding into Energy Storage Systems of Wilsonville, which has raised \$45M in capital to create the world's lowest cost and greenest energy storage technology (iron flow battery). DeFunkify, Nemamatrix, Tomegavax, Valliscor, AbSci, Onboard Dynamics, Agility Robotics, Diatomix, Liquid Wire are also excellent examples of successful startups....see our portfolio and news pages for more examples.

Perhaps Liquid Wire of Beaverton is the quintessential ONAMI success story. We'll let founder/CEO Mark Ronay tell it in his own words:

*"Liquid Wire would not be here if it weren't for both the Launch/GAP funding and the EIR program. In the 4 years since founding Liquid Wire I've met many CEOs of materials and hardware companies. All of them report the same: early stage funding is essentially unavailable and there is not a strong culture of entrepreneurialism in the materials and chemistry fields. The most successful companies come out of a small handful of top ranked R&D universities that have the infrastructure in place to fund development up to the point where its commercially attractive. All of these universities have strong relationships with dedicated incubators. It's a proven system and ONAMI is putting it in place here in Oregon.*

*"ONAMI provides something that no other Oregon accelerator or fund does: Dedicated investment into highly technical businesses that other funders don't have the capacity to evaluate and the EIR program. I cannot overstate how much impact that combination has. John Brewer provided critical guidance and encouragement to what was otherwise an entirely technical team, while the funding provided resources to actually follow through on the business plans that eventually led to our Series A. In 2016 Liquid Wire was an interesting research program at Portland State University. Today we employ 15 people in Oregon and have attracted over \$10 million dollars in out of state funding. That wouldn't have happened without ONAMI and I'm really concerned to hear that the future of the organization is in doubt."*

Liquid Wire and top tier venture investor Deerfield Management approved announcement of the \$10M equity investment on July 3, 2020.

### Geographic and DEI impacts of our work/companies:

Science-based companies are more prevalent in major metro areas and university towns, which is why ONAMI's portfolio is largely found in Washington (5), Multnomah (15), Benton (17), Lane (8), Clackamas (2), Linn (1), Yamhill (1) and Deschutes (3) counties.

One of the most impactful and appreciated things we have done is the Graduate Internships in Startups program, developed to give STEM graduate students a 6-9 month technical internship in an ONAMI portfolio company. 90% of the students became permanent employees and one of them is now the CEO of another portfolio company. Of the 29 interns who participated in the internship program, seven (7) were female and 22 were male. The program included seven (7) minority students and one (1) US veteran.



We were thrilled recently to see one of our female minority (Native American) founder-entrepreneurs, Rachel Dreilinger of OHSU medical device spinout Neuramedica, profiled and celebrated by the NIH National [Institute of Neurological Disorders and Stroke](#).

### University connections:

About two-thirds of ONAMI's commercialization cases and portfolio companies have come from the 4 research universities, and ONAMI's staff are among the best in the US at all aspects of research commercialization, from IP protection strategy to market discovery to company and team formation to financial planning and capital raising. Our staff currently serve on the external advisory board of the UO Knight Campus (A. Sick), OHSU BIP proposal evaluation committee (S. Rung), OSU UVDF proposal evaluation committee (S. Rung) and the PSU UVDF proposal evaluation committee. We also regularly volunteer as mentors and pitch coaches for entrepreneurship classes and accelerator cohorts.

### ONAMI'S CURRENT WORK

#### Current activities and near-term goals:

ONAMI's current work is **discovering and advancing Oregon-based technologies** (from both university and independent inventors across the state) **that have potential to become significant Oregon companies**, measured in terms of leveraged funding (SBIR/STTR, private capital) revenue and Oregon employment. We contribute to these technologies using a four step process of (1) pipeline prospecting (dozens of cases per year), (2) in-depth opportunity evaluation (IP, market need and size, competitive analysis, likelihood to grow and create jobs in Oregon), (3) business planning (market research, target market selection, SBIR/STTR commercialization plan assistance, team formation) and (4) capital fundraising assistance, ongoing mentoring and networking (talent, investors, customers).

The expected outcomes for the FY19-20 biennium are well over 50 pipeline screenings, 9 market opportunity investigations, 4 cases through business planning, at least 2-4 SBIR/STTR applications (with significant ONAMI contribution), at least 1 new company formation, continuing active support (e.g. board service) for at least 3 portfolio companies. We are also providing continuing support for selected companies in our more established portfolio.. Though there is no explicit goal, **we track results and expect these companies to raise many \$10Ms of capital and hire dozens more Oregonians this biennium.**

# Budget Response, OTRADI



## Introduction to OTRADI

OTRADI is a state-funded non-profit innovation center that advances bioscience commercialization, product development and startup business incubation in Oregon. Since its launch in 2007, OTRADI has been dedicated to broad-based bioscience research, with an emphasis on industry growth and job creation in Oregon. OTRADI achieves these goals through strategic partnerships with businesses and universities to discover, develop and commercialize drugs, diagnostics, medical devices, and other bioscience products. OTRADI designed and built-out Oregon's first, and only, bioscience-focused incubator – the OTRADI Bioscience Incubator (OBI) to fill the gap between research and commercialization by providing resources and expertise found nowhere else in Oregon.

The OBI has been at full capacity since opening in 2013, with six bioscience client companies. In response to an ever-growing waiting list of bio startups, the OBI has expanded to 22,000+ square feet and is now home to thirty-one start-up companies working on innovative new health and wellness products, including drugs/therapeutics/treatments, diagnostics, medical devices, wearables, consumer health products and digital health IT products. **OBI companies incubate more than 126 FTE and 32 part-time employees at .5 FTE for a total of approximately 142 full-time equivalent high-quality jobs for Oregon's bioscience sector.**

The OBI serves emerging companies and scientists who want to dedicate their resources to their research rather than investing in build-out and equipment. The multi-client company bioscience complex provides startups and scientists access to entrepreneurial mentoring, state-of-the-art bioscience facilities, meeting space and shared scientific equipment.

## Oregon Opportunity: Why Oregon? Why Now?

The OBI strengthens the industry by eliminating barriers between innovation and market capitalization and aid Oregon in its economic recovery by fueling job growth in the bioscience sector.

**Oregon's bioscience industry has experienced incredible growth in the past 15 years.** In the most recent economic impact survey, in the 15-year period between 2002 and 2017, private bioscience **employment increased 77 percent** (+4,800 jobs), **total wages increased 178 percent** (+\$489.7 million), and **average annual wages increased 57 percent** (+\$25,200). Oregon's 800+ life sciences companies and leading academic and research institutions employed over 19,000 individuals earning \$1.96 billion and directly contributed \$6.5 billion to Oregon's economy in 2017 (see *Economic Impact of Bioscience in Oregon Report* [here](#)). In addition, the recent *Oregon Innovation & Entrepreneurship Benchmarking and Best Practices Report* shows that over the past 25 years, all net new job creation and 20% of gross job growth has come from start-up companies less than five years old, with the majority of those jobs created by a small percentage of high growth firms (see Oregon Innovation & Entrepreneurship Benchmarking and Best Practices Report [here](#)).

## Oregon Bioscience Incubator (OBI) is a Key Driver of the Bioscience Sector in Oregon

OTRADI's mission is to fuel the economic development of Oregon's bioscience/health and wellness/digital health IT industry by translating innovative research into products and companies that benefit human health and create high-wage jobs for Oregon.

The OBI is Oregon's premiere bio/digital health IT incubator and the hub of bioscience entrepreneurship in Oregon. The OBI leverages its extensive advisor network (currently 100+ business and scientific advisors) to provide pro bono expertise and mentorship to bio-entrepreneurs and startups. The OBI also serves as a "first stop shop" for new bio companies forming in Oregon, companies considering moving to Oregon, investors interested in cutting edge technologies and others. OBI developed and curate an interactive and searchable [map of the entire bioscience ecosystem in Oregon](#), including established companies, start-up companies, research universities, investors, incubators/accelerators, suppliers, etc., with more than 300 companies currently working across these sectors today.

In addition to training and networking opportunities, the OBI provides crucial laboratory space for startups that need this specialized physical space to complete experiments and develop successful products ready for VC investment and FDA approval.

OBI is located on Portland's South Waterfront, in the heart of the health and sciences cluster and within walking distance

of OHSU. Regardless of size, bioscience companies flourish when clustered in near proximity to one another and to major research universities, allowing for economies of scale in sharing core scientific equipment and expertise. Bioscience companies produce family-wage jobs and lead to a multiplier effect of suppliers and service providers.

## OTRADI'S CURRENT WORK

### Current Activities

Even during the COVID-19 pandemic, OTRADI continues to provide our bioscience companies with necessary support and services so they can continue their vital work; fulfilling our mandate, promise, and commitment to our contract with the State to keep these burgeoning companies afloat. We have refocused our efforts to continue supporting these companies in this new environment through virtual programming such as Lunch and Learns, virtual CEO roundtable discussions, activating an incubator slack channel, etc. to ensure continued camaraderie within the OTRADI community. **The research done by many of our incubator companies is considered critical and essential.** Most importantly, many of our start-up companies are working toward combatting the COVID-19 virus, some of which are listed below:

- [Hemex Health](#) is working on a fast, low cost and accurate point of care diagnostic for COVID-19. It is built on their miniaturized electrophoresis platform. They are applying for grants to perform the needed work and have received a \$50K Enhanced Innovation Grant from Oregon InC to be used for developing and validating a rapid test on existing Gazelle platform to detect SARS-CoV-2 Infection that targets viral proteins.
- [Nelson Bio Lab](#) is working with other companies to develop COVID-19 diagnostic kits. They already have samples and have obtained samples from other Chinese companies. The FDA has accepted them. If necessary, they can provide kits.
- [Sirona Dx](#) is exploring a COVID-19 project with OHSU / Knight Cancer using their CyTOF system.
- [Sonivate Medical, Inc.](#) is part of a group of institutions (including Duke University Medical School) submitting a White Paper on 3/21 regarding detection of COVID-19 using artificial intelligence (AI) and Sonivate's SonicEye Dual-Array Ultrasound System. The objective is to evaluate a patient's condition on a 20-point scale with a minimally trained clinician. There is no guarantee that this will be accepted and funded.
- [StoneStable, Inc.](#) is working with common cold Coronaviruses (OC43) and recombinant Adenoviruses (Ad5-GFP) for COVID-19 vaccine development.
- [VIR Bio](#) announced that "... laboratory testing showed two of its antibody drugs appeared to neutralize the coronavirus that causes Covid-19 and that it would pursue testing them in people." [Read full STAT article here.](#)

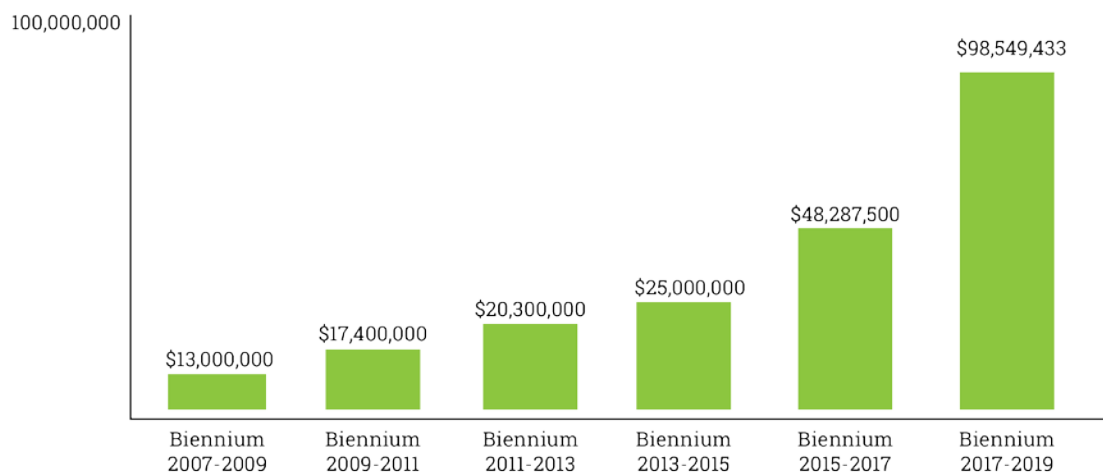
## ACHIEVING OREGON'S ECONOMIC DEVELOPMENT GOALS

### OTRADI's Funding Portfolio:

Financial ROI Summary (2007-2019):



Total Leveraged Funding by Biennium



### Connections with universities

OTRADI has **worked with over 150 researchers** from Oregon universities across the state (OHSU, OSU, PSU, U of O) since our inception in 2007, OTRADI affiliated researches have **generated \$50 million in licensing revenue for universities in Oregon and >\$615 million in private, federal and foundation funding for Oregon.**

Twenty-one of the OBI's forty-seven retrospective companies are university spinoffs. With \$1.2 billion of new investment into OHSU's Knight Cancer Institute and more than \$500 million of philanthropic investment into U of O's Knight Campus for Accelerating Scientific Impact, **demand for incubator space from spinoffs and startups will grow exponentially in the near future.**

The start-up bioscience business sector in Oregon is growing, spurred on by strong university research spinoff company formation. The majority of bioscience startups in Oregon are "spinoff" companies whose technology is driven by university-derived scientific research. These start-up companies, which are generally funded by federal small business (SBIR/STTR) grants and have on average 1-8 employees, can sublease small lab spaces at the Portland State Business Accelerator (PSBA) and larger/more bio-focused lab and office space at OBI.

## Success stories

### Aronora

#### [Portland biotech inks \\$9M+ deal for drug royalties](#)

Aronora Inc., a Portland biotech startup developing a new kind of blood clot treatment, has inked a deal with Xoma Corp. (NASDAQ: XOMA) for royalty rights related to five drug candidates.

Founded in 2009, Aronora has collected \$25 million in NIH Small Business Innovation Research grants.

### Hemex Health

#### [Diagnostic Platform for Low Resource Settings Integrates Miniaturized Technologies with AI](#)

[Hemex Health](#), Portland, Ore, has launched the Gazelle Diagnostic platform, designed for use at point of need in low-resource areas. Available tests include one for sickle cell disease, which delivers results in 8 minutes and is approved for use in the Europe Union as well as Ghana and India. A malaria diagnostic delivers results in 1 minute and has the CE mark. Neither are currently FDA approved. [Hemex is currently developing additional tests for covid-19 and anemia.](#)

### Vir Biotechnology

#### [Vir Biotechnology and Biogen Execute Agreement to Manufacture SARS-CoV-2 Antibodies for Potential COVID-19 Treatment](#)

Vir's SARS-CoV-2 antibody development candidates, VIR-7831 and VIR-7832, have demonstrated high affinity for the SARS-CoV-2 spike protein and the ability to neutralize SARS-CoV-2 in live-virus cellular assays. The execution of this definitive agreement allows Vir to advance the development of its antibody candidates and complements its existing manufacturing agreements with WuXi Biologics (stock code: 2269.HK) and Samsung Biologics Co., Ltd. (207940.KS).

### OBI Alumni – AbSci

#### [AbSci Closes \\$15.4 M in Series D Funding to Accelerate Growth and Scale Disruptive Protein Printing™ Technology, Announces Exclusive Co-Marketing Partnership with KBI Biopharma](#)

[AbSci](#), the Protein Printing™ company with a best-in-class *E. coli* cell line for rapid and low-cost biomanufacturing of complex biotherapeutics, announced the completion of a \$10.4M Series D financing led by KBI Biopharma and JSR Life Sciences. Existing investors Phoenix Venture Partners, Oregon Venture Fund, WRF Capital, and Columbia Ventures Corporation also participated in the financing. The financing also includes \$5M in term debt. The proceeds from the financing will be used for expansion of AbSci facilities and team in order to meet commercial demand for AbSci's technology.

#### [Sanofi turns to high titer E. Coli platform in AbSci deal](#)

The SoluPro E.coli manufacturing platform will be applied to two of Sanofi's biologic candidates under a partnership deal with AbSci. Financial details of the deal have not been divulged, but the French Big Biopharma firm will use AbSci's SoluPro expression platform on two of its molecules. The work will be undertaken at AbSci's facilities in Vancouver, Washington, USA.

Click here to see our full list of [2018 Client Company Wins](#) and [2019 Client Company Wins](#).

### **Near-term goals**

In addition to the metrics included in our [OTRADI Scope of Work and Performance Metrics for 2019 – 2021](#), OTRADI is actively seeking HIOP funding to expand the incubator with the goal of retaining and growing generations of promising, lab-based, bioscience start-up companies in Oregon. The OBI has an ever-growing waiting list of fledgling start-up companies eager to move into our facility. The increasing numbers of bio start-up companies in Oregon, and therefore the high demand for lab space, has left these companies stranded. This expansion will allow the OBI to engage additional companies on our waiting list.

OTRADI has been working with our current landlord to negotiate OBI's continued expansion within the building, which was capped prior to now. To continue expanding within our current building, OTRADI has signed a 12-year lease term that now allows us the option to grow and expand at our current location, which had been halted until now.

Lastly, the digital health sector in Oregon has more than doubled in the past biennium. OTRADI has determined there are currently 130+ Digital Health companies in the State of Oregon, and this number continues to grow as adoption of connected devices and personalized medicine skyrockets. This sector will also continue to grow more rapidly given the current COVID-19 pandemic. OTRADI is working toward being recognized as the Digital Health Center of Excellence in Oregon and beyond. Given the circumstances the entire world is experiencing, OTRADI will continue to defend what we have, grow, and diversify to continue supporting health innovation in the State of Oregon.

### **Feasibility and impact**

To address the budget note question regarding feasibility of eliminating ongoing state support for the SRCs, OTRADI has committed to a 12-year lease term, and we have individual leases with each of our 31 incubator companies. The OBI has an ever-growing waiting list of fledgling start-up companies eager to move into our facility. The increasing number of bio startups in Oregon, and therefore the high demand for lab space, has left these companies stranded. Oregon has no pre-built-out laboratory space available for these smaller start-up companies to lease other than the OBI or the Portland State Business Accelerator, leaving companies with two options: 1) participate in a bioscience focused incubator and utilize the shared resources and equipment they provide, or 2) invest upfront in building out their own capital-intensive lab facilities and purchasing shared equipment as they are striving to grow their company.

# Budget Response, VertueLab



## Introduction to VertueLab:

VertueLab's mission is to unleash innovation and entrepreneurship that will solve environmental challenges and catalyze shared economic prosperity. VertueLab provides funding and entrepreneurial support to Oregon clean tech startups, helping them to scale and create jobs, generate revenue, and attract new capital to the state. VertueLab was created in 2007 with funding from the State of Oregon as part of the first round of funding recommendations from the Oregon Innovation Council. During VertueLab's 12-year history, its seasoned team has developed unique expertise to deliver best-in-class support to Oregon companies providing critical solutions to major environmental challenges. As envisioned by the original Oregon Innovation Council members and legislators, the investment in the signature research centers was a long-term investment and the results today reflect that. The hundreds of jobs and tens of millions of dollars of follow-on investment and revenue secured by VertueLab's portfolio companies in the past 2-3 years reflect funding and support provided 5-8 years ago. The work VertueLab is doing in the current biennium will pay economic development dividends throughout the coming decade.

## ACHIEVING OREGON'S ECONOMIC DEVELOPMENT GOALS

### Attracting Capital to Oregon

VertueLab has utilized a portion of its Business Oregon grant funds to secure 11 federal grants for providing expanded VertueLab services in Oregon from the US Small Business Administration and the US Economic Development Administration. These federal grants all required matching dollars equal to 75%-100% of the federal amount, and would not have been secured without the Business Oregon funds. The SBA grant dollars have enabled us to provide assistance to more than 170 Oregon small businesses in learning about, applying for, and securing over \$7 million in federal grants from numerous agencies including the Department of Energy, Department of Agriculture, National Institutes of Health, and National Science Foundation.

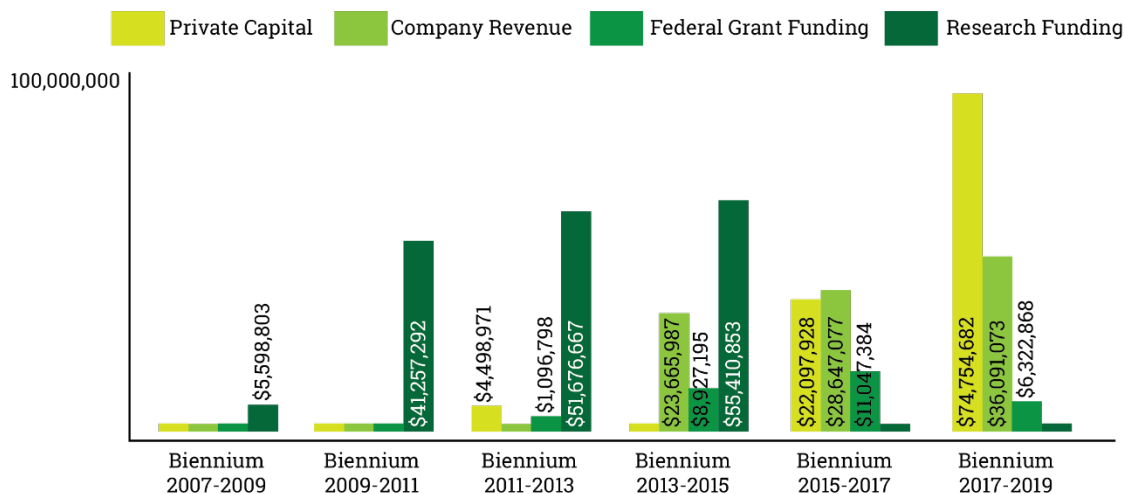
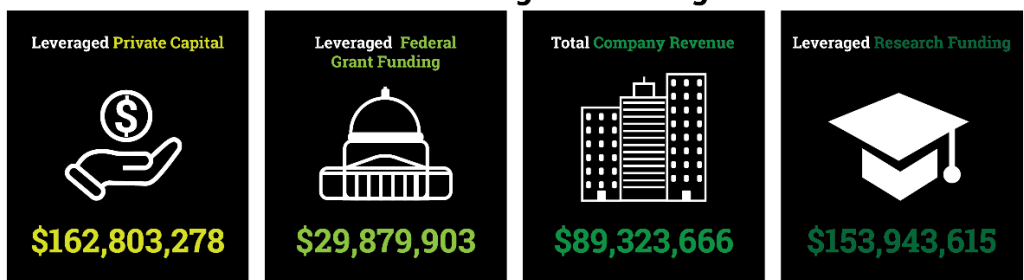
### Financial Summary:

- Over **\$441M in leveraged funds** deployed in Oregon
- Creating and retaining more than **500 Oregon jobs**.
- **\$7,540,144 awards** in support of **Oregon companies**
- **\$1,177,312** follow on projects or direct investments **in portfolio companies**



## VertueLab's Funding Portfolio:

### Total Leveraged Funding



### Improving Access to Capital for Underserved Populations:

- Percent of Portfolio Companies that are located outside of Portland metro: 45%
- Percent of Portfolio Companies with Women on Founding Team: 28%
- Percent of Portfolio Companies with Minorities on Founding Team: 20%

### Stimulating Oregon Manufacturing:

Clean tech creates white collar jobs (such as in science & technology) as well as blue collar jobs making hard goods. The Brookings Institution's report, *Sizing the Clean Economy*, confirms that the clean economy is manufacturing and export intensive, with about 26% of all clean economy jobs offered by manufacturing establishments, as compared to just 9% in the broader economy.

Number of VertueLab companies that are actively manufacturing in and shipping from Oregon today: 16, over 50% of which are outside the Portland Metro region.

### OUTCOMES EXPECTED FROM THE 2019-2021 BIENNIUM

In the 2019-21 biennium, VertueLab is working towards achieving outcomes consistent with its decade-long track record described above: supporting companies that create jobs, earn revenue, and attract follow-on investment, all while creating wealth-creation opportunities for Oregonians who have historically had less access, and reinforcing Oregon's reputation as a leader in innovating solutions to environmental challenges.

By the end of this biennium, we will have launched, fundraised for, and made investments from its Climate Impact Fund I. In addition, through our support programs, it is working to achieve a target of helping its companies attract at least \$60 million in additional investment and grant funding to the state. VertueLab's SBIR/STTR support program has a target of helping at least 5 Oregon companies to success in securing federal grant funding with its grant-writing assistance. In addition, our accelerator

program will graduate at least 6 emerging Oregon clean-tech startups and will award 2 accelerator alumni companies with prototype grants to get them further along the path to market. These outcomes are only possible with the financial support of the State of Oregon.

Currently, three federal grants and one corporate grants fund portions of all 10 our staff positions (9 FTE), but the majority (75%) of the team's payroll expenses are covered by Business Oregon funding and all of the federal grants are dependent on the Business Oregon grant as the source of required matching dollars. If Business Oregon funding was withheld entirely, we would not be able to secure or retain federal grants and virtually all staff positions would be at risk of being eliminated.

## OUTCOMES TO DATE

VertueLab has provided grants and investments to 47 Oregon companies over time, and assisted over 200. This work providing funding and support to clean-tech innovators over the past decade plus has resulted in valuable outcomes for the State of Oregon.

### Portfolio Company Impact:

VertueLab's portfolio companies (those who have received grants or investments from us) have reported:

- **Follow-on funding** attracted: Over \$180 million
- **Oregon jobs created:** Over 440
- **Revenue earned** (over the past four years, since Q1 FY15-16): \$75.5 million

*Notably, the companies responsible for the lion's share of these outcomes are ones that VertueLab began supporting between 6 and 7 years ago on average. This validates the thesis established by Oregon InC at its start that **state innovation investments require long-term commitments to achieve the targeted outcomes.***

A few examples of companies thriving after receiving our funding and support:

**Energy Storage Systems (ESS)** – We provided funding twice to this large-scale energy storage company, including money that was used as part of a required match for a multi-million dollar federal grant. In addition, we introduced ESS to the venture arm of chemical company BASF and the Pangaia Fund in which BASF is a limited partner. That introduction led to a relationship that included being a lead investor in ESS in their last three funding rounds, including the most recent, Series C round in 2019 totaling \$30 million dollars from 10 investors including Breakthrough Energy Ventures (the Bill Gates-backed fund focused on climate innovation).

**DR Johnson/Cross Laminated Timber** - Starting in 2015, we collaborated with a diverse set of partner organizations and state agencies to encourage the development of the first CLT plant in Oregon by DR Johnson (Riddle Laminators) of Riddle, OR, which has grown and added to the employment in a rural community. Our financial support for DR Johnson's CLT product testing and product line development was the first step, followed by a federally-funded study of the market potential for Cross Laminated Timber production in Oregon and SW Washington. We led the multi-stakeholder collaborative study, which has been used to inform Clackamas County's economic development strategy, and the emergence of new producers including Freres Lumber in Lyons and Sauter Timber in Estacada.

**Gadusol Labs** – Mimicking the biology that marine organisms use to protect themselves from the sun, Oregon State University spinout Gadusol Labs is developing ingredients for natural sunscreens that are safe for the environment, unlike most sunscreen products on the market. We awarded a grant to OSU in 2017 which helped support the spinout of a new company in which we invested in 2018. In addition, our SBIR/STTR Assistance program has helped the company secure federal grant funding for R&D.

All three of these companies have a female founder or chief executive, including one person of color.

## VERTUELAB'S CURRENT WORK

The capital gap for early stage hard technology companies remains the primary barrier to traded-sector clean-tech companies achieving scale. Research from Scruggs & Associates has found – and VertueLab’s past decade of experience reflects – that startups benefit from support programs and funding being delivered together in a coordinated fashion. Our strategy to address the capital gap, therefore, is to bring more clean tech-friendly capital to Oregon, and to prepare Oregon companies to be more attractive to those investors through mentorship and training, mitigating both technology risk and market barriers.

### **Bringing additional and new capital to clean tech innovation in Oregon**

Many startups and entrepreneurs found their way to VertueLab because it had funding available. Whether or not we funded them, it was often able to offer them other support via a range of programs or connect them to other valuable resources. It is our objective to secure new sources of funding to enable it to directly offer commercialization funding to clean-tech startups in the near future, in part to ensure that companies continue to seek out the organization as a first stop resource. We are currently raising capital for a new VertueLab Climate Impact Fund which will make investments in early clean-tech startups. This funding will backfill funding provided by the State of Oregon prior to the 2017-19 biennium, when state funding was reduced by about 60%.

We also work to support efforts to attract more capital into early stage investing, including supporting other venture fund managers in the region in launching triple (economic, social, and environmental) bottom line clean-tech venture funds as opportunities arise and connecting our portfolio companies to sources of funding. Our annual conference includes an invitation-only event (Ecocapital Connections) making curated connections between clean-tech investors from outside of Oregon with the state’s most promising clean-tech startups. This event is financially sustainable by partnering with Prosper Portland.

### **Improving access to Capital**

We increase companies’ ability to secure capital by providing them with expert support including the following:

*Cascadia CleanTech Accelerator:* This program is a collaboration with the CleanTech Alliance, a peer organization based in Seattle. Through the accelerator, we deliver clean tech-specific training in business modeling, customer discovery, manufacturing and sustainability planning to participating companies over the course of 15 weeks. Graduates of the program receive one-on-one mentorship, expert advice, investor and business connections, weekly webinars with expert panelists, and visibility – plus they exit the program with a polished pitch deck and financial projections. Accelerator alumni are eligible to apply for prototype grant funding offered with financial support from the US Economic Development Administration, thanks to matching funds from Oregon InC/Business Oregon.

*Entrepreneur in Residence support:* We employ seasoned entrepreneurial experts to provide mentoring and coaching to Oregon startups, including pitch coaching to prepare them for meetings with potential investors, customers, and partners.

*Grantwriting support:* We assist companies in pursuing government funding (from the federal government’s SBIR/STTR program or from Business Oregon’s Phase 0 commercialization funding) for R&D to advance their technology development. The SBIR/STTR support is provided in part with funding from the US Small Business Administration, thanks to matching funds from Oregon InC.

*Funded Internships:* We place and fund 2-4 full-time Oregon university interns each summer at Oregon start-up companies to work on high-impact projects. Each project addresses a hurdle, milestone or similar objective that supports the company’s product development and/or overall company growth. The program provides support to resource-constrained clean-tech startups while providing college students with the opportunity to apply their learned skills to advancing clean technologies in an entrepreneurial environment.

*Impact Measurement & Management Methodology:* Impact investors, the rapidly growing community of funders interested in more than just a financial return, expect to be provided with evidence that their money is having the measurable impact they seek. Our early impact measurement and management coaching of clean-tech startups will equip them to credibly pitch to such investors with a rigorous set of impact forecasts and evidence. Through this work we will help them tap into a newly emerging pool of capital ideally suited to clean tech.

*EcoCapital Connections:* Over the past 5 years, we have made over 450 curated introductions between highly targeted out of state investors and promising clean-tech companies through its EcoCapital Connections events. In 2019, one out of four of those introductions resulted in investors seeking follow-up with companies curated for them by us.

*Catalyzing markets:* We use our convening capability to bring public and private entities together to capitalize on unique opportunities to help launch new industries or markets, such as current and past projects with the cross laminated timber, aquaculture, and biochar industries. Oregon InC funding enables us to continue to seek out and engage in preliminary convening and fundraising activities around these types of initiatives. In all cases where we play a convening role, we seek opportunities in which we can be a catalyst to launching an initiative or industry with great potential for economic impact and where the organization doesn't see that happening already.