Consortium Name: Corvallis Microfluidics Technology Hub (CorMic Tech Hub)
Lead Institution and Applicant: Oregon State University (OSU)
PI: Dr. Thomas Weller, School Head, Electrical Engineering and Computer Science (EECS)
Defined Geographic Boundary: Corvallis, OR Metropolitan Statistical Area (MSA)
Designation Geographic Constraints Met: Located in an area covered by the EDA Seattle Regional Office; significantly benefits a small and rural community (population ~97,630).

INTRODUCTION: Microfluidics, the precisely controlled movement of small volumes of liquid, is a keystone technology for devices and systems that are vital to national security and prosperity. CorMic's vision is to establish the Corvallis MSA as the global leader in the development, scaling, and commercialization of *microfluidics technologies*, with sights on the $17B total addressable market opportunity for microfluidics in semiconductor chip and power electronics cooling, microfluidic dispense for the biotech sector, and specialty chemicals markets. CorMic advances the **four Key Technology Focus Areas** (KTFAs) of High-Performance Computing, Biotechnology, Advanced Energy Technologies, and Advanced Materials and Manufacturing. It is **uniquely poised to lead the microfluidics industry** as it **(i)** includes the world-leader in semiconductor-driven microfluidic devices, HP Inc., and three additional Fortune 500 companies (Intel, NVIDIA and Thermo Fisher Scientific (TSF)) committed to advancing microfluidics-enabled applications, **(ii)** leverages experience from workforce development, institutes of higher education (IHEs), and private sector members to deliver programs that prepare rural, underserved and Native American communities for high-wage jobs, and **(iii)** serves a robust innovation ecosystem that has successfully commercialized multiple technologies (e.g., extreme ultraviolet photoresists for leading-edge semiconductor manufacturing (via Inpria, Inc.)).

About the Consortium: OSU leads CorMic based on its strong regional partnerships and its innovation and technology translation successes. In addition to PI Weller, the OSU team includes the Associate Dean for Research in the College of Engineering (COE), the Executive Director of Strategic Partnerships in the COE, the Executive Director of Innovation & Entrepreneurship in the Advantage Accelerator in the Research Office (RO), and the Director of the Advanced Technology and Manufacturing Institute (ATAMI). Tables 1 and 2 list CorMic members. The Executive Advisory Board (EAB) will advise the Regional Innovation Officer (RIO) on policies, programs, and investments. It has representation from all five entities and includes, among others, HP's Chief Technologist for 3D Printing, the Semiconductor Manager in the Office of the Governor, the Chair of the Oregon Workforce Partnership (OWP), and the President of ONAMI. The Corvallis MSA leads MSA partners (Portland-Vancouver-Hillsboro, OR-WA; Salem, OR; Eugene-Springfield, OR and the small rural MSA, Albany-Lebanon, OR) and Native American communities.

1. Technology-based potential for global competitiveness

1.1 CorMic's Asset Base. CorMic will coordinate assets (Table 1) to support technology development across the full spectrum of large and small companies, university spinouts, and private startups. CorMic's foundational asset and globally dominant advantage is the Corvallis HP campus, comprising 2.2M ft^2 of space for microfluidics R&D and manufacturing, including over 100,000 ft^2 in three semiconductor fabs. The site seeded HP's rise to become the $63B global leader in semiconductor-driven microfluidic devices with applications in printing, additive manufacturing, and biotechnology. EDA funding unlocks HP's commitment to dedicate space for open-access microfluidics, chemical, and biotechnology labs-in-fabs. These labs, coupled with 80K ft^2 of user facilities and incubator space in ATAMI and the Advantage Accelerator, will support and attract startups and supply-chain partners. CorMic has assembled an unprecedented syndicate of leading companies focused on microfluidic technology development and markets:

NVIDIA, the world's most valuable semiconductor company by market valuation; Intel, Oregon's largest employer and the nation's leading semiconductor R&D organization/manufacturer; TSF, the nation's ninth most valuable biotech company. Tables 1 and 2 list eight small companies and venture firms. Three regional R1 universities contribute extensive development assets and produce more than 5,700 STEM graduates and >10 startups annually.

Table 1. CorMic Tech Hub Executive Advisory Board (EAB) members, all located within CorMic MSAs.

Organization	Key Relevant Assets
HP, Inc. (HP)[3]	World-leading microfluidics technology; 2.2M ft2 R&D and manufacturing space in Corvallis
Intel[3]	>1000 person-years experience in chip cooling, including microfluidics; experience in TRL1-TRL9
Office of the Oregon Governor[2]	Business Oregon, Oregon Regional STEM Hub Network
Oregon Nanoscience and Microtechnologies Institute (ONAMI)[4]	Expertise in economic development and moving technological breakthroughs from the lab to the marketplace
Oregon State University (OSU) [1]	Advantage Accelerator; Advanced Technology and Manufacturing Institute (ATAMI); Innovate Collaborate Oregon; >4,000 STEM graduates annually; $200M Collaborative Innovation Complex (CIC) with cleanroom and supercomputer (2025); OSU Extension Services
Oregon Workforce Partnership (OWP)[5]	Expertise in workforce development; access to workforce associations across Oregon
Thermo Fisher Scientific (TSF)[3]	Expertise in biotech/life sciences and microfluidics, development of diverse talent pools
University of Oregon (UO)[1]	$1B Knight Campus with facilities and faculty expertise in biotech/microfluidics; Translational Opportunity Program to commercialize research; Launch Oregon to provide access to capital; Innovate Collaborate Oregon; >700 STEM graduates annually; University EDA Center
Valliscor (**startup**) [3]	Experienced entrepreneurs (OSU spinout); expertise in specialty chemical manufacturing

(1) IHE, (2) Government, (3) Private Sector, (4) Economic Development, (5) Workforce Development.

Table 2. Additional CorMic members.

Cascades West Council of Governments[4]	Lane Community College (LCC)[1]	Oregon Business Council (OBC) [4]	SiCamore[3]
City of Hillsboro[4]	Linn Benton Community College (LBCC)[1]	Oregon Health Sciences University (OHSU)[1]	Siemens[3]
ecosVC[6]	National Renewable Energy Lab (NREL)[8]	Oregon Venture Fund[6]	Technology Association of Oregon (TAO)[4]
Elevate Capital[6]	nexTC (**startup**)[3]	Phosio (**startup**)[3]	Western Oregon University[1]
Greater Portland Inc (GPI) [4]	NVIDIA[3]	Portland Community College (PCC)[1]	Willamette Valley Capital[6]
Inpria, Inc.[3]	Oregon Bio[4]	RAPID[7]	

(1) IHE, (2) Government, (3) Private Sector, (4) Economic Development, (5) Workforce Development, (6) Venture Capital, (7) Manufacturing USA Institute, (8) National Lab.

1.2 Relevant federal investments include a $1M NSF Regional Innovation Engines (RIE) Planning Grant (OSU lead) and an $8.25M ARPA-E *Cooling Operations Optimized for Leaps in Energy, Reliability, and Carbon Hyperefficiency for Information Processing Systems* program (HP & NVIDIA lead). The $250M Oregon CHIPS ACT; $200M Future Ready Oregon biotech and manufacturing workforce program; and $72M for the Huang Collaborative Innovation Complex attest to Oregon's commitment to supporting high tech.

1.3 Economic Opportunity (Table 3). Microfluidics are used to remove heat from semiconductor chips and power electronics as performance and efficiency improve with cooler operating temperatures. In the biotech sector, microfluidic dispense is used for applications that include diagnostics, drug discovery and imaging. The same digital approaches enable rapid, sustainable processes for specialty chemical

Table 3. CorMic-aligned Markets and KTFAs.

Sector	KTFA	Market Size 2028	Market Share
Chip and Power Electronics Cooling[2]	High performance computing; Advanced energy technologies	$9 B	>30%
Microfluidic Dispense[3]	Biotechnology	$5.8 B	>30%
Specialty Chemicals[4]	Advanced materials and mfg.	$2 B	>75%

manufacturing, such as photoresist. Based on market sizes and shares, CorMic's SOM is approximately $6B with the chip cooling and EUV photoresist markets characterized by >25% CAGRs [1-3]. Efficient chip and data-center cooling is a pain point and gating technology for continued deployment of high-performance computing, and the Semiconductor Industry Association identified microfluidics-based chip cooling as "**the way forward**" for the industry [4] and a key grand challenge. Metal oxide photoresist is the gating technology in EUV-based, leading-edge semiconductor manufacturing.

2. Role of the Private Sector (see LOCs for each entity for details of commitment)

CorMic comprises ten firms, including three on the EAB. They will establish best business practices to manage infrastructure, grow private and public sector engagement, coordinate investments, identify emerging opportunities with IHEs, accelerate technology translation, and actively engage underserved communities in employment opportunities. HP's commitment to create and support labs-in-fab fills a gap in the regional innovation ecosystem by focusing capabilities on TRLs 6 to 9. It reduces the barrier to establishing large-small company joint development agreements by enabling small companies to increase their product TRLs and thus de-risk technology development for Angel, VC, and strategic investors.

3. Regional Coordination and Partnerships

3.1 Alignment, Shared Strategic Vision and History of Working Together. CorMic members have a long history of successful collaboration to create world-class programs and facilities. CorMic is aligned with the economic development plan of the Cascades West Council of Governments [5], which addresses regional technology assets and aligned opportunities for new ventures. The IHEs collaborate in innovation (e.g., anchoring Innovate Collaborate Oregon) and education (e.g., UO-OSU joint bioengineering MS/Ph.D. degree program). Members also partner on the NSF RIE award (OSU, UO, Intel, HP, Inpria, City of Hillsboro, Oregon Governor's office). The City of Hillsboro, PCC and industry collaborate on the Manufacturing Workforce Partnership (MWP) high school apprenticeship program. Oregon's government is strongly committed to CorMic as demonstrated by its advocacy and financial support. HP-OSU collaborations include a $2.25M investment in a Microfluidics Research Fund and a no-cost lease of 80K ft^2 on HP's campus for ATAMI. Intel has a long history of collaboration with OSU that includes over $2.3M in research and curriculum development over the past decade, along with supporting internships. TSF has been a key UO partner for over a decade, supporting biotech research, scholarships, and academic programs. Harnessing the breadth of these collaborations with EDA investment will accelerate Corvallis's path to establishing a self-sustaining, globally competitive microfluidics hub, enabling a consortium that is significantly greater than the sum of its parts.

3.2 Collaboration Model and Leadership. CorMic will institute a comprehensive collaboration model to achieve implicit coordination, wherein consortium members commit to a shared vision and are empowered to assume initiative. It involves defining goals, strategies and expectations that inform resource allocation and the responsibilities of consortium members. Centralized internal communications prevent silos, and a commitment to full transparency cultivates an informed and aligned membership. The consortium's deep expertise is such models is evidenced by examples in 3.1 and TAO's success in establishing strong regional collaborations. The Regional Innovation Officer (RIO) leads all efforts, advised by the EAB. RIO qualifications will include experience in the KFTAs; demonstrated commitment to DEI; experience directing large, multi-partner projects; proficiency in innovation, commercialization, and business development; and excellent communication skills. A national search, following OSU's Search Advocate Model, and outreach via the professional networks of CorMic's 30+ members will ensure a diverse candidate pool.

4. Equity and Diversity

4.1 Strategy. CorMic's structure and membership ensures equitable participation from members of underserved communities. OWP on the EAB already engages the Confederated Tribes of Siletz and the Grand Ronde, and small rural communities throughout CorMic's region. The employment rate of Oregon's 600,000 Hispanic and Latino citizens, representing ~14% of the state population, equals that of the general population. This employment, however, comprises a higher concentration in low- and middle-wage occupations, resulting in a 10-15% median household income gap. These statistics are consistent across the CorMic region and underscore our challenge to ensure equitable distribution of benefits. The OWP and DEI Taskforce (see 4.2) with support from the entire consortium membership will actively engage underrepresented groups in STEM, including outreach to Native American communities beyond CorMic's geographical region.

4.2 Increasing access to high-wage jobs. CorMic will create jobs in the high-tech manufacturing sector, which offers high-wage jobs for workers across all levels of educational attainment. The DEI Taskforce will include organizations in CorMic and others such as Centro de Prosperidad and Casa Latinos Unidos that are connected through the City of Hillsboro and OSU COE, to ensure representative participation by women and minorities in technical jobs and leadership positions within the microfluidics ecosystem.

4.3 Evidence-driven equity and inclusion initiatives. CorMic will draw on OWP's experience in building accessible workforce systems; since 2021, OWP local boards have trained 1,020 participants in the technology and manufacturing sectors. We will also leverage partnerships with career and technical programs in the state, such as the WorkSource Oregon Quickstart Program for high-intensity technician training in the four KFTA industries; the MWP (see 3.1); and Portland Youth Builders for helping young people become self-sufficient.

4.4 Historical commitments to equity and diversity. CorMic's private sector partners have robust DEI programs (e.g., Intel aims to increase representation of women in technical roles to 40% by 2030; at HP, 61% of US new hires are women, minorities, veterans or people with disabilities). Likewise, CCs and IHEs are committed to DEI through all facets and have offices dedicated to this mission (e.g., OSU Office of Institutional Diversity). Moxie at OSU and the Women's Innovation Network at UO focus on reducing the common barriers faced by women in innovation. These commitments demonstrate that CorMic members are strongly aligned to ensuring an equitable distribution of benefits from a robust microfluidics ecosystem.

5. Composition and Capacity of the Regional Workforce

5.1 Workforce assets and needs. The Corvallis MSA has an exceptionally strong workforce to support CorMIC with >10% of its ~49,000 labor force in technology-relevant fields. According to the U.S. Bureau of Labor Statistics, the total employment is 3.4% in architecture and engineering (2x the U.S. average); 3.6% in life, physical and social science (4x the U.S. average); and 3.6% in computer and mathematical (above U.S. average). This makeup is reflective across the CorMic MSAs. Oregon has over 37,000 employees in high tech manufacturing (45% BIPOC, 23% women, 67% with a bachelor's degree or higher), leading the U.S in job concentration in this area with a location quotient of 2.74. Assuming a SOM of $6B, CorMic is expected to produce 6,000 jobs. Based on similarities to the semiconductor industry, 60-70% of jobs will be technician level with others at or above bachelor's level.

5.2 Growing and evolving the STEM workforce. CorMic will expand opportunities for underserved populations by advancing preparedness for a labor market demanding innovation-, computation- and sustainability-focused skills. Workforce and IHE members will create K-CC programming for those traditionally underserved in STEM fields with the goal of accelerating

economic mobility. CorMic will target Oregon's fast-growing Hispanic/Latino population, the largest race demographic in CorMic area schools (Eugene, Albany and Corvallis), and Native American communities including the Confederated Tribes of Siletz and the Grand Ronde in the Corvallis MSA; the Oregon Governor's office will facilitate relationships between CorMic and the tribal governments. To strengthen research capacity, we will develop a multi-institutional graduate program in microfluidics, and support internships and outreach programs at our IHEs, e.g., the OSU Migrant Summer Engineering Program.

5.3 Workforce development programs for non-degree positions. The OWP oversees the state-wide association of workforce development organizations that targets specific sectors and focuses on individuals experiencing access barriers. OWP will align its efforts with the labor needs and opportunities of CorMic. Working with OWP and our CC partners, we will develop technician-level training and continuing education programs to prepare members of the surrounding rural communities for employment in the microfluidics industry.

6. "Lab to Market" Proven Programs – Scaled Approaches

CorMic couples new and proven scaled-up programs to grow the regional innovation pipeline: (**i**) OSU national leadership in advancing innovation as a core component of faculty promotion and tenure through PTIE.org, and (**ii**) OSU and UO adoption of Lens of the Market® (LoM) innovation training to create business cases and up-skill researchers for commercialization work. CorMic will extend this training to corporate partners, expanding a market-pull, start-up mindset among incumbent employees. To scale validated market opportunities, ONAMI will lead and expand a successful commercialization model seminally enabled in 2010 by an EDA i6 grant for overcoming commercialization barriers. Entrepreneurs in Residence, with relevant domain expertise and successful-startup and early-stage investing experience, guide founders through the early stages of company formation and fundraising. Since 2010, this model has leveraged >$2.5B in investments, primarily through private capital. To underpin economic competitiveness and cooperation among university and corporate partners, CorMic will deploy intellectual property (IP) terms captured in the HP-OSU Master Agreement, which define up front independent and shared IP rights based on technology development contributions. Such terms heighten technology and IP value as demonstrated by the significant HP licensing agreement with Apple, based on joint HP-OSU IP on display backplane technology. These practices will help prime CorMic companies for investments by our Angel, VC, and corporate partners.

7. Impact on Economic and National Security of the Entire United States

CorMic's microfluidics product map directly addresses Chips and Science Act goals of securing leadership in semiconductor manufacturing, building new and resilient supply chains, and creating economic value. The combination of HP, NVIDIA and Intel brings unprecedented resources for developing microfluidics-based chip-cooling technologies. Further, the Department of Energy estimates that a transition from central processing units to graphics processing units – which is critically dependent on chip cooling – will save the U.S. 10 TWh of energy annually and yield concomitant reduction in fossil fuel pollutants.

CorMic member Inpria is the world's leading supplier of photoresists for leading-edge chip manufacturing. As semiconductor manufacturers march through more advanced exposure tools, Inpria and CorMic partners will secure a critical technology for national defense and grow a high-value supply chain to fend off Asian competition. Beyond photoresist, CorMic will secure domestic production of critical chemical components for semiconductor and pharmaceutical manufacturing. *CorMic's location in the temperate Willamette Valley carries limited climate- and weather-related risks, and it adds no additional environmental burden to the region.*

APPENDIX: References Cited

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2. Life Science Instrumentation Market by Technology (Spectroscopy, Chromatography, Immunoassay, NGS, PCR, Microscopy), Application (Diagnostic, Clinical), End User (Pharma, Agriculture & Food Industry, Hospitals, Diagnostic Labs) - Global Forecasts to 2028.
3. Market data from Inpria, Valliscor, nexTC, and Phosio based on customer engagement and market reports. Markets include EUV metal oxide photoresist for semiconductor manufacturing, active ingredients for pharmaceuticals exemplified by Flonase, transparent conductor precursors for solar, and high-index film precursors for AR/VR markets. Each company maintains a patent portfolio and trade secrets that enable dominant market shares. Market Reports: EUV Photoresists Market, Precision Reports 2023; Transparent Conducting Oxide (TCO) Glass Market Size, Share, Growth, And Industry Analysis By Type (ITO Coated Glass, FTO Coated Glass, AZO Coated Glass) By Application, Business Research Insights 2023; High Refractive Index Resins Market, Industry Arc 2023-2028. CorMIC projects three additional anchor chemical manufacturing firms will join the hub by 2030, thereby adding additional market value.
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5. https://www.ocwcog.org/wp-content/uploads/2022/12/CWEDD-2020-25-CEDS-Main-Plan-and-Appendices_FINAL_February-2022.pdf