Oak Ridge Institute
at the University of Tennessee

RECOMMENDATIONS OF
THE STEERING COMMITTEE

December 31, 2019
Today’s economy is driven by disruptive technologies and swift change. The US is in a global competition for jobs, talent, and investment. To successfully compete, we must develop leadership in research and development, encourage entrepreneurship, and create an educational environment that promotes rapid innovation and attracts skilled professionals.

The time to act is now. Tennessee has a unique opportunity to strategically pair its statewide university system and the country’s leading national laboratory to deliver top-tier talent for industry, government, and academia.

Dr. Alvin Weinberg, ORNL Director from 1955 to 1973 said:

"Over and over again it has been demonstrated that the whole can be greater than the sum of its parts, that good people from diverse fields working together can make major scientific discoveries that are denied geniuses working in isolation."

The Oak Ridge Institute (ORI) represents a new way of thinking about the UT-ORNL relationship. It provides the opportunity to bring people, infrastructure, and collaborative opportunities together in new ways to dramatically increase and accelerate the impact of this long-standing partnership. ORI will align beacons of excellence, expand collaborative graduate programs, and offer unique opportunities for interdisciplinary problem-solving, teamwork, and rapid innovation. ORI promises to bring together the best of what the federal government, state government, and the private sector offer. It promises a network of graduates and job creators across the state who will create the workforce of the future.

The following report represents the work of a fourteen-member Steering Committee charged with developing an initial framework and guiding principles for startup and implementation of ORI. The recommendations are intended to help ensure successful implementation of new initiatives and opportunities within the context of the existing collaborations and programs. The recommendations acknowledge the need to reimagine certain aspects of the relationship and suggest tactics for strategic growth and better performance.

ORI seeks to increase support for researchers and students, improve coordination, and streamline activities to elevate their prominence and success. Working together, with focus and urgency, new levels of collaboration will be achieved, leading to enhanced outcomes and prominence for all.
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The Oak Ridge Institute at the University of Tennessee is an inspired idea that will meet head-on one of the most strategic needs of our country by creating a pipeline of American-trained scientists and engineers to help the United States compete in the global economy.

- Senator Lamar Alexander
INTRODUCTION

The worldwide race for talent is intense, and the United States is facing a shortage of scientists and engineers prepared to help our country compete on a global stage. Higher education must continue to play a critical role in alleviating this shortage. It must foster research excellence and develop future leaders to meet global challenges with innovative, interdisciplinary approaches. Universities must partner with federal and local governments, non-profit organizations, and industry to promote a culture of pioneering inquiry that yields impactful knowledge and ensures students gain hands-on, interdisciplinary research experience and training in innovation and problem-solving.

Because of its close relationship to Oak Ridge National Laboratory (ORNL), the University of Tennessee (UT) is uniquely positioned to meet the opportunity, and indeed, its responsibility, to increase the availability of the Nation’s highest quality talent ready to compete in today’s rapidly changing world.

The State of Tennessee has an exceptional opportunity to contribute to this national need and build the University of the future to propel the state as a leading economic center focused on generating new technologies and industries. The state and its people deserve this bold new innovation and talent development enterprise.

In June of 2019, the UT Board of Trustees approved the creation of the Oak Ridge Institute at the University of Tennessee (Institute or ORI). The pairing of the state’s land-grant university and America’s leading national laboratory brings together world-leading scientists and engineers, distinctive facilities, and exceptional students to provide innovative education, training, and workforce development with a focus on areas of vital importance to Tennessee and our Nation.

ORI strengthens a partnership that has been in place for decades. UT and ORNL have a long and storied history of mutually beneficial collaborative efforts. Together, the two institutions have built joint facilities, hired prominent research teams, developed first-of-its-kind graduate programs, transferred technology to the private sector, encouraged economic development in the Oak Ridge Corridor, and developed interdisciplinary research initiatives that have helped to attract and retain top talent in the region.

While our collaborative programs are individually successful, unexploited opportunities can only be realized through a more strategic framework. ORI represents this framework; it is a new way of thinking about the UT-ORNL partnership that will set the future agenda of research and development to meet the emerging needs of the state and our country. Its establishment will allow us to build on existing strengths to forge a path of increased and strategic collaboration. It will enhance Tennessee’s ability to provide top-tier talent and establish Tennessee as a hub for science, technology, and businesses. ORI will provide a structure that better informs stakeholders and lowers existing barriers to interdisciplinary collaboration by streamlining processes for enhanced and deliberate interactions, while maintaining compliance with UT and ORNL policy.

The University of Tennessee comprises campuses at Knoxville, Chattanooga, and Martin; the Health Science Center at Memphis; the Space Institute at Tullahoma; and the statewide Institute of Agriculture and Institute for Public Service. Because of the research mission of UT Knoxville, UT’s land-grant campus, as well as its proximity to ORNL, existing programs and research collaborations between UTK and ORNL, the majority of the faculty and students working with Oak Ridge Institute, certainly in the early years, will be from the UT Knoxville campus.
MISSION

To strategically align the expertise and infrastructure of the University of Tennessee and Oak Ridge National Laboratory to usher in world-class interdisciplinary research and graduate education.

VISION

To become the coveted home for convergent research and talent development, helping maintain U.S. prominence as a global innovation leader and provide tangible impact to Tennessee.

OVERARCHING GOALS

1. Establish robust partnership platforms that promote industry engagement, entrepreneurship, and technology implementation for economic and community development;

2. Provide flexible mechanisms that promote discovery and innovation especially in, but not limited to, areas related to data science and technology, advanced materials, and outcomes-based applications;

3. Build on and expand existing joint programs to strategically integrate collaborative opportunities between UT and ORNL; and

4. Offer an enriched interdisciplinary educational and research experience for students.
To establish the ORI framework of operation and timeline for implementation, the UT President, the University of Tennessee Knoxville Chancellor, and the Director of Oak Ridge National Laboratory appointed a fourteen-member Steering Committee.

The official charge of the committee is as follows:

1. Create a set of guiding principles that will enhance success;
2. Create a timeline for rollout and implementation;
3. Envision a system of accountability that ensures the goals are met; and
4. Identify key implementation tasks and processes for beginning the implementation.

The Steering Committee Charge Letter is included in its entirety as Appendix A.

The Steering Committee is composed of faculty and staff from a variety of areas at UT and ORNL to help provide a wide-ranging, interdisciplinary perspective to the implementation process. UT and ORNL have equal representation on the committee, a foundational principle agreed to by senior leadership at UT and ORNL at the outset of the ORI proposal.

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After appointment, the Steering Committee immediately began its work to establish recommendations to help guide the formation of the Oak Ridge Institute and ensure its long-term success. Initially, the group developed a common understanding of what ORI is envisioned to be and how this new entity will operate within the context of existing programs and enhance their collective impact. The Committee cataloged the formal joint programs in which UT and ORNL currently participate (collectively, with future joint activities, the Joint Programs) including: Joint Institutes, Joint Faculty program, Bredesen Center for Interdisciplinary Research and Graduate Education, Science Alliance, Genome Science and Technology program, and Governor’s Chair program. A description of each of the current Joint Programs is included as Appendix B. A general UT-ORNL opportunities landscape is represented in Figure 1.

A high-level review of the existing Joint Programs revealed that activities within them fall into three broad categories – Infrastructure, People, and Collaboration – with many programs representing efforts in each. Accordingly, the committee recommends ORI serve as the administrative framework to provide stability and coordination to the Joint Programs to help enhance their success and eliminate duplication. The ORI Director should have administrative responsibility over these programs.

1. Create a Set of Guiding Principles that Will Enhance Success

Figure 1. UT-ORNL Joint Program Opportunities Landscape
1. Guiding Principles that Will Enhance Success

Specifically, as shown in Figure 2, ORI should provide the following:

- **Governance** - to develop, implement, and communicate joint policies and encourage continued alignment with both UT and ORNL;
- **Strategy** - to facilitate the creation of shared priority focus and co-funding opportunities;
- **Execution** - to promote streamlined operations and optimal performance of joint collaborations and programs; and
- **Impact** - to support interdisciplinary research, discovery, student experience and success that will enhance outcomes for the state and the Nation.

The following sections outline the committee’s recommendations to achieve alignment and promote a successful operation of ORI within this framework.
1. Guiding Principles that Will Enhance Success

 Governance

ALIGNMENT

A primary goal of ORI is to become a catalyst to strengthen UT and ORNL collaborative research and graduate education prominence. To accomplish this goal, well-understood authority and accountability are needed at all levels of the Institute. A sound operating model with clear roles and responsibilities will help avoid the reality or perception of competing efforts with programs at either institution and help ensure the development of collaborative strategies. ORI should delineate authority in key roles and specify processes to bring people together. The pursuits of the Institute should enhance the Institute, UT, and ORNL, while defining clear decision rights, so stakeholders understand the authority - and the limits of such authority - within the Institute.

ORI should be responsible for working with UT and ORNL to develop and communicate comprehensive policies that promote streamlining and alignment while maintaining compliance with all applicable regulations and policies.

REPORTING STRUCTURE WITHIN UT AND ORNL

ORI’s ultimate success requires the Institute have the appropriate stature and position within each partner organization to fully accomplish its comprehensive goals. To reflect the dual responsibility to UT and ORNL and to ensure continued alignment, the Steering Committee recommends ORI operate within the appropriate administrative units and that the ORI Director maintain a direct reporting relationship at both institutions. This recommendation aligns with the foundational principle set forth by senior leadership at UT and ORNL to maintain equal representation at the outset and throughout the life of the Institute.

Primary considerations for where ORI should report include:

1. ORI is critically important to the system-wide education, research, and outreach missions of the University of Tennessee and its ability to grow UT/ORNL collaborative opportunities;
2. Research, education, and service opportunities through ORI are inclusive of all UT campuses;
3. Due to proximity, the majority of faculty, staff, and students associated with ORI will be directly affiliated with the UT Knoxville campus; and
4. ORNL is bound by its contractual obligations to the US Department of Energy, and thus no special treatment can be given to any one university or partner.

The committee deliberated on several reporting options within UT, including reporting to the UT President, the UT Knoxville Chancellor, the UT Knoxville Provost, or some combination thereof. After careful consideration, the Committee recommends the ORI Director report to the Provost of UT Knoxville, and maintain a strong collaborative relationship with the Vice Chancellors for Research across all UT campuses. The University System President and UT Knoxville Chancellor will have proper visibility into matters related to ORI through the Provost and the ORNL Director. Other campuses’ interests in ORI should be represented through participation on the ORI Advisory Board among the ORI Fellows, and through research and education efforts as they develop.
1. Guiding Principles that Will Enhance Success

The considerations for reporting at ORNL were simpler due to its streamlined organizational structure. The committee recommends ORI report as a line organization through the ORNL Director’s Office. The ORI Director will thus become a member of the Lab Director’s leadership team, working directly with the Deputy for Science and Technology and Associate Laboratory Directors which will provide appropriate visibility and voice at ORNL to establish the connectivity required for success.

An organizational chart illustrating the recommended reporting structure is included as Figure 3.

BROAD STAKEHOLDER ENGAGEMENT

Internal and external perspectives will be critical for long-term success of the Institute. The ORI Director should assemble a Board of Advisors of no more than fifteen members that includes representation from the statewide University of Tennessee System, ORNL, internationally recognized scientists, and key private sector and/or community partners. The interests of UT Martin, UT Chattanooga, UT Health Science Center, and the Locally Governed Institutions in Tennessee should be represented on the Advisory Board with at least three rotating committee seats. The Board of Advisors should work with the ORI Director to recommend goals, and ORI should formally present achievement toward such goals to the Board of Advisors and UT and ORNL leadership at least annually.

The ORI Director, in consultation with UT and ORNL leadership, should also appoint ORI Fellows who represent leading UT faculty and ORNL scientists. The ORI Fellows should have subject matter expertise in the agreed upon, cross-cutting themes of data science and technology, advanced materials, and outcomes-based applications. They will serve the Institute by advising on recruiting, strategy, and opportunity development. These appointments should be limited terms and include partial salary recovery, and the ORI Fellows should be required to collectively meet with the ORI Director at least monthly.

POLICY DEVELOPMENT

ORI will operate within UT and ORNL and should follow all applicable policies. ORI should develop a system of internal controls specific to the Institute that ensures the integrity of financial and accounting information and promotes accountability. ORI should develop policies that ensure diverse areas of thought are represented in strategic matters and manage potential conflicts that may arise.
1. Guiding Principles that Will Enhance Success

Strategy

STRATEGIC PLANNING

ORI requires a strategic framework that balances today's opportunities with tomorrow's, matches opportunities with capabilities, and takes into account risk and reward. Being opportunistic and pursuing existing funding opportunities should be part of ORI's strategy, but ORI also must “play the long game.” ORI’s strategy should consider areas that are currently well-funded and areas in which significant funding will likely be available in the future. The ORI funding strategy must be informed by the strategic plans of NSF, DOD, DOE, and OSTP so that the Institute maintains its ability to move to emerging areas rather than focusing on past trends.

ORI must ensure any opportunity it wishes to pursue (a) matches with existing capabilities, or (b) is part of a strategic plan to build capabilities in a time frame that will allow ORI to capitalize on the opportunity.

Concomitant with the opportunity assessment process, ORI must be careful not to follow the dollars alone. Building capabilities and positioning ORI for as-yet-developed opportunities will necessitate calculated risk-taking. ORI must think boldly and assume some risks, but those endeavors must be balanced with the need to ensure the Institution's long-term sustainability.

We recommend the above considerations be taken into account as the management team develops ORI’s initial five-year Strategic Plan. The Strategic Plan should be a living document that is reviewed and updated at least annually. Annual goals should be established, and reports on progress toward the annual goals and updates to the Strategic Plan should be shared with the Advisory Board. The ORI Strategic Plan should seek opportunities for alignment and synergy with UT and ORNL Strategic Plans and goals.

CONTINUOUS IDEATION

Although the broad themes of data science and technology, advanced materials, and outcomes-based applications have been established, the specific topic areas and opportunities will need to be defined. The initial plan to determine these areas is outlined in Section 4 - Ideation Process. Ideation must be an ongoing process and ORI must find novel ways to develop and encourage creativity and development of new ideas. ORI should develop ways and venues that provide for formal and informal interactions among researchers and provide seed funding or other incentives to encourage collaboration.

TEAM BUILDING

Focusing on team-based interdisciplinary approaches should be a foundational principle of ORI.

ORI Leadership and Institute Fellows must work to build critical mass in specific areas and provide incentives for team building and collaboration. ORI must have both depth and focus.

The ideation process will help scope the specific target areas, and the ORI Capture Team (defined below) will help further focus that effort, identify opportunities for funding, and facilitate the introduction of individuals to form compelling teams for each initiative.

CAPTURE MANAGEMENT

Building on the success of the exceptional capture management processes at ORNL, ORI should employ a robust capture management strategy with ongoing refinement and process improvements. Akin to first-to-market strategies, the capture process at ORI must identify new opportunity areas early to promote higher success rates. Each opportunity must be carefully evaluated based on a practical cost-benefit analysis and likelihood of success.
1. Guiding Principles that Will Enhance Success

The Institute Fellows and Capture Managers (the Capture Team) should develop realistic capture plans and timelines, fully evaluate the agency/client’s needs and requirements, and assess the potential competition. If possible, feedback from the sponsor should be sought.

Once a proposal team is formed and the decision is made to move forward, the Capture Manager, appropriate ORI Fellow(s), and the ORI management team (described in the Management Structure subsection below) should put all required time and resources toward a successful proposal or capture plan. Day-to-day project management should be the responsibility of the Capture Manager and be overseen by the Strategic Development Director. All efforts should be in collaboration with the appropriate campus research office at UT and officials at ORNL.

LEADERSHIP DEVELOPMENT

ORI must be committed to developing leaders not only at the student level, but also at the faculty/researcher level. Institute Fellows must be multifaceted team contributors to help fully achieve the aggressive goals of the Institute. ORI will provide programs that help these already world-class researchers nurture their leadership and soft skills so they are prepared to lead cross-disciplinary teams in developing forward-thinking proposals aligned with current funding opportunities or push boundaries to create new opportunity space. ORI will also offer leadership programming more broadly to interested faculty and research staff.

TECHNOLOGY TRANSFER

ORI must provide mechanisms that facilitate and promote the transfer and commercialization of technologies developed within the Institute. ORI should work to integrate the efforts of the UT Research Foundation, the ORNL Partnerships Directorate, and local, state and regional commercialization and entrepreneurial support organizations. ORI should encourage and incentivize researchers to disclose ideas, mature those ideas with strategic partners, and use all available means to help transfer ideas into products and services for the public. Intellectual Property developed within ORI will follow the existing policies at UT and ORNL, including Joint UT-ORNL Inventions.
1. Guiding Principles that Will Enhance Success

Execution

**Figure 4. Recommended administrative organizational chart for the Oak Ridge Institute**

**MANAGEMENT STRUCTURE**

The ORI Director and his/her management team (recommended organizational chart is shown in Figure 4) will be responsible for the day-to-day operations within the Institute. As such, the team will develop strategy, budgets, course correction plans, recruitment schemes, and performance management plans, set compensation, perform risk management, and establish a network strategy for capture support. The ORI management team will facilitate the development of policies that promote streamlining while maintaining compliance with DOE and other applicable regulations. The management team will also help to facilitate and oversee the annual review processes of the Joint Programs.

**JOINT PROGRAMS**

Building on existing programs and successful collaborations to strategically integrate enhanced collaborative opportunities between UT and ORNL is one of the goals of ORI. ORI’s creation presents a unique opportunity to reevaluate UT/ORNL interactions and ascertain what works well and what can be improved. Recommended next steps related to Joint Programs are defined in Section 4 - Joint Program Assessment. In addition to the Joint Programs, there are numerous person-to-person or group-to-group interactions that are very productive that do not fall within a Joint Program. The scope of ORI is to provide structure and coordination to the Joint Programs and efficiencies and services to those outside Joint Programs who request support.
1. Guiding Principles that Will Enhance Success

FINANCIAL MANAGEMENT

ORI should operate as an independent financial unit (like a College/Department/Center) and integrate all Joint Programs. ORI should seek to streamline the administration of these efforts while bolstering the collaborative scientific activities in each.

Budgeting, accounting, and financial management of ORI must occur according to UT and ORNL policy, as appropriate. The ORI Director and management team should review the budget at least quarterly and implement course corrections to ensure solvency of the Institute based on the availability of funds.

The financial model is based on one-time and recurring funds availability, and several key assumptions underlie the aggressive goals towards sustainment, including, but not limited to, the following:

- Program secures $100 million plus in new base funding
- Program maintains current budget support for the Genome Science and Technology Program, Bredesen Center, Science Alliance, and UT System support for JIs and GCs
- For up to fifteen years, the program realizes all new ORI graduate student tuition
- Program realizes all new earned F&A for the duration of the Institute
- Grants/projects assume costs for students by year two of their study
- New scientist/faculty are employed through multiple means available through existing policies at UT and ORNL

SPACE/LOCATION

Team building and streamlined administration will be maximized by physical proximity of interacting units and a centralized location for the Institute. As such, the committee recommends exploring acquisition or development of new collaborative research space. In addition, ORI should leverage the state-supported Joint Institute facilities (three on the ORNL reservation and one at the UT Research Park at Cherokee Farm). UT leases additional space in the Pro2Serve building for projects not requiring wet lab space. ORI should conduct a space inventory and take advantage of any underutilized facilities as well as other available space at UT and ORNL. As ORI reinvigorates existing space or develops new space, considerations should be made for the following:

- Promoting convergence-type research space where teams of students, faculty, and ORNL staff are co-located with access to experimental and modeling infrastructure
- Co-location of collaborators from universities, industries, and non-profit organizations
- Informal gathering places for discussions and events that promote collaboration and mutual respect and support
- Presentations (oral and poster sessions), including a digitally connected seminar room for weekly topical lectures by ORI student/faculty/staff and invited speakers that are broadcast to the wider community

COMMUNICATION

Timely, targeted communications will be critical to the initial and ongoing success of ORI. The ORI management team must communicate with both internal and external audiences with the primary goals of increasing awareness of ORI; informing researchers, scientists, capture managers, students, and campus research offices about collaboration and funding opportunities; and reporting to the public regarding stewardship of public funds. Recruiting faculty and staff and properly onboarding them are other important ORI functions that will lean heavily on a well-designed and well-executed communication plan. The platforms for communications will vary depending on the target audience, but may include newsletters, annual reports, websites, social media, and managed portals. The importance of this endeavor is reflected in the committee’s recommendation that dedicated personnel be assigned this role (see Figure 4).
Our aspirational goal is for ORI researchers and students to be recognized as global leaders in their areas. Excellence in research will be reflected in various metrics, including numbers of high-impact publications, patents issued and licensed to commercialization partners, the ability to attract high-tech partners in emerging areas, and science and technology policy documents that form the basis for future research and development initiatives across the state and federal government.

ORI will help develop a robust talent pool, especially through the training of doctoral students in areas of growing national need and demand. **As a result, Tennessee will become the “go to” destination in the Southeast United States for top-level talent development and discovery** in broad areas including: data science and technology, advanced materials, and outcomes-based applications.

The specific initiatives developed in these broad areas will spur: (1) Research excellence in disciplinary and interdisciplinary topics that provides essential knowledge, tools, and technologies to address local and global problems; (2) Development and deployment across Tennessee and the US of innovations derived from convergent research; (3) Economic development through enhancing existing businesses, launching new businesses, and attracting new industries to the State of Tennessee. With measurable impacts in the above three areas and implementation of concrete Extension efforts, ORI will help usher in a new era in which the State of Tennessee is the hub for scalable and sustaining partnerships across the state, with other states in the region, and with federal agencies. An illustration of a representative group of current private sector partners, UT campuses and institutes, ORNL and other federal partners is shown in Figure 5. In addition, UT has a broad network of Extension and Public Service offices and resources in all of Tennessee’s ninety-five counties.

**INITIAL BROAD THEMES**

**Data Science and Technology, Advanced Materials, and Outcomes-Based Applications**

The current digital and technological age influences every aspect of our daily lives: physical, mental, and environmental health; nutrition; work; social activities; and entertainment, as well as the underlying science, technology, engineering, business, defense, politics, and governance.
Our lives are woven together by data, rely on high performance and energy-dependent technological infrastructure, and are influenced by our relationships with technology and each other. Society is faced with novel challenges surrounding the acquisition, storage, curation, and ethical and innovative use of data and technology toward improving human and environmental health.

ORI has the opportunity to be a leader in meeting these challenges by strategically developing interdisciplinary teams of scholars and researchers who work at the forefront of data science, advanced materials, and outcomes-based applications translating knowledge in these areas to the betterment of humanity and the environment.

An essential ingredient in groundbreaking science and technology is the human element. A primary objective of ORI will be to promote and leverage the individual creativity, intellectual boldness, and collective social responsibility of the individuals and teams it supports. Based on this premise, ORI will leverage the current strengths of UT and ORNL and the collaborative UT-ORNL graduate programs, currently focused on Data Science and Engineering (DSE), Energy Science and Engineering (ESE), and Genome Science and Technology (GST).

**GROW AND SUSTAIN INNOVATIONS**

ORI should make every effort to facilitate the transfer of knowledge and align the outcomes of the research projects to focus on impending public-private technology investments. ORI will support the uptake of innovations in Tennessee by launching a hub and spoke model through UT Extension and other outreach networks across the state. ORI should also work with the UT Research Foundation, the ORNL Partnerships Directorate, and regional support organizations to promote the transfer of ideas to the market.

**ECONOMIC DEVELOPMENT**

ORI will be relevant to the existing, future, and emerging businesses and industries who call Tennessee home. ORI will encourage economic development in the following ways:

- Facilitate research and education in both disciplinary and interdisciplinary programs relevant to companies through various programs (e.g., ReVV from state of Tennessee and Cooperative Research and Development (CRADA) or strategic partnership programs with federal agencies)
- Help attract new industries to the State of Tennessee
- Provide incubation space and services to help start businesses
- Provide space within ORI for visiting industry researchers to encourage industry collaboration
- Facilitate the rapid transfer of technologies being developed by ORNL and UT

ORI will leverage the services of the ORNL partnership office and the UT Research Foundation to develop new opportunities and growth. ORI also should serve as a conduit for the Locally Governed Institutions of Tennessee to access the science and technology expertise and infrastructure at ORNL and UT to contribute to the interdisciplinary topics that fit within the ORI mission space. ORI will become a trusted entity for local, federal, and global partnership development.

The Steering Committee believes ORI can deliver tangible and measurable impacts through close collaboration across the University, Oak Ridge National Laboratory, industry partners, and non-profit organizations across the state. ORI will become a beacon for democratization of science and technology that is locally relevant and helps set the future global research directions.

**REACH INTO ALL 95 COUNTIES**

In addition to its economic impacts, ORI will enhance and extend existing efforts by both UT and ORNL to provide statewide education opportunities at both the K-12 and collegiate levels.

Students and faculty from other academic institutions across the state will be invited to explore summer experiences and remote study/professional development. Perhaps more importantly, through UT Extension offices and regional outreach centers, ORI students and faculty can reach into our most rural communities with activities such as talent sharing programs. This kind of initiative could place “technology talent” with a local government to resolve tech issues like cyber security and teach technology classes to residents and in K-12 classrooms. Sharing innovation beyond the walls of UT and ORNL will be a major component of the program and will benefit future generations of Tennesseans as they compete on a global stage.
2. Timeline for Rollout and Implementation

**CONCEPT DEVELOPMENT**
*June - August 2019*
- Establish ORI@UT by action of the UT Board of Trustees.
- Create mission and vision with UT and ORNL leadership.
- Appoint Steering Committee.

**STEERING PROCESS**
*September - December 2019*
- Develop common understanding of Mission, Vision, and Objectives.
- Develop and prioritize work plan.
- Deliver recommendations of the Steering Committee to senior leadership.

**PROGRAM REVIEW & PLANNING**
*December 2019 - June 2020*
- Assess Joint Programs.
- Create plan to maximize Joint Programs within the framework of ORI@UT.
- Appoint or recruit Director and initial management team.

**LAUNCH**
*July 2020 - June 2021*
- Conduct the initial ideation process.
- Appoint/recruit ORI Fellows.
- Begin recruitment of new faculty/researchers.

**GROWTH**
*July 2021 - July 2025*
- Hire 60 new faculty/researchers, matched by 60 complementary hires at ORNL.
- Grow the collaborative graduate programs to 500 students.
- Attract large, interdisciplinary program funding.
3. A System of Accountability that Ensures Goals Are Met

ACCOUNTABILITY AND AUTONOMY

To allow ORI to prosper and grow, a certain level of autonomy and accountability to the Joint Programs must be achieved. The Institute must be able to set goals within its approved mission, make decisions required to meet those goals, set performance metrics, and evaluate faculty and staff according to their role in ORI, and it must be steadfast to the notion that UT and ORNL can accomplish more together within ORI than either institution could accomplish on its own. The efforts within the Institute must also find ways to become accountable to the “jointness” that makes this opportunity unique and transformative. This will require continuous monitoring of activities and course corrections.

ORI MEMBERSHIP

Faculty/researcher assignments within the Institute will be made in two ways, through direct full or partial funding from ORI (Institute Members) or by “opting in” to participate in research projects (collaborators). Defining the rights and privileges of Institute Members is critical and will facilitate completing collaborative work within and beyond the Institute. The rights and privileges of collaborators will be determined by their home institution and the contracts that govern their work within ORI.

To achieve and maintain the required flexibility and agility, the Steering Committee recommends ORI use multiple employment options already available at UT and/or ORNL. We recommend establishing the Institute with several potential appointment types for Institute Members including, but not limited to: tenure/tenure track faculty appointments, rolling contract appointments, soft funded research appointments, and combinations thereof. In some cases, it will be necessary to grant tenure to a faculty member assigned to ORI, and in such cases, tenure will reside in an academic unit and will follow all UT policies and procedures, including those related to Promotion and Tenure and annual evaluation protocols. Tenured faculty will be accountable to his/her academic unit and ORI based on effort allocation outlined in his/her appointment letter and through annual evaluations thereafter. ORI management will work with appropriate academic units to deliver annual evaluations and ensure the academic unit and/or affiliated department(s) are able to “count” research expenditures and graduates.

ORNL and UT will follow their established hiring practices. ORI assignments will be made as appropriate and based on funding from the Institute.

All UT and ORNL employees assigned to ORI will have a funded joint appointment at one of the other institutions or through ORI-funded projects specific to the work they will perform within the Institute. Options will be explored to increase opportunities for ORI student development at ORNL in projects, including establishing one or more umbrella ORI SPPs with application to designated areas of research. Access to ORNL resources (such as equipment, laboratories, computers, and user facilities) for work that is unrelated to ORNL will continue to require DOE approval.
3. Accountability that Ensures Goals Are Met

EVALUATION AND REPORTING

As outlined in Section 1 - Governance - Reporting Structure at UT and ORNL above, to reflect the dual responsibility to UT and ORNL and to ensure continued alignment, the Steering Committee recommends the ORI Director report to both the Provost of UT Knoxville and the ORNL Lab Director. The ORI Director’s annual performance and compensation review will be conducted by the ORNL Director and UT Knoxville Provost, in consultation with the UT Knoxville Chancellor and the UT President.

As shown in Figure 4, the management team will report to the ORI Director, and the Director should be responsible for leading the development of the Strategic Plan and be accountable for the overall performance of the Institute. The ORI Director should report progress monthly to ORNL Director and UT Knoxville Provost and regularly communicate to the broader stakeholder population.
Key Tasks and Processes for Beginning the Implementation

Starting in early 2020, the following implementation tasks and processes should begin:

- Establish the initial financial support for ORI
- Assess all Joint Programs between UT and ORNL and develop plans for how they will integrate within ORI
- Conduct ideation process to help define specific targeted opportunities
- Develop a plan for how to expand collaborative graduate programs between UT and ORNL toward optimal impacts on workforce and economic development in Tennessee
- Develop and communicate an initial set of rules and guidelines for ORI that are fully aligned with the policies that govern UT and ORNL
- Develop a plan for how to meet the space requirements of ORI
- Recruit and hire the initial ORI management team
- Recruit and hire or appoint initial Institute Fellows

As discussed in the previous section, the timeframe for these initial tasks will be 12-18 months, with full implementation over five years.

Financial Support

Securing significant state and federal investment is critical for the successful launch of ORI. The Institute will leverage existing funding sources and is ultimately envisioned to produce financial returns to sustain and grow its operations. However, its establishment requires an initial state and federal investment for startup and operations. These investments will leverage existing one-of-a-kind facilities, ORNL programmatic funding to support new students and hire scientists who will complement UT faculty, and targeted university investment from earned revenues and system support. This initial funding is critically important for catalyzing the formation of ORI, providing an important opportunity for Tennessee to lead the Nation in preparing for the jobs of tomorrow, creating a workforce ready to take on our national security and economic challenges, and growing American competitiveness.

Joint Program Assessment

To better understand where current strengths and overlap exists, ORI should review the Joint Programs in a stepwise fashion beginning early Spring of 2020. The review should catalog projects, infrastructure, and staff within each program. The current Director or Lead in each Joint Program should provide an overview of streamlining plans as well as ways to expand joint efforts and make operations as efficient as possible. After the reviews are completed, the Steering Committee (or subcommittee) will make recommendations to bring programs to their optimal potential, efficiency, and impact within ORI.

During the implementation phase of ORI, every effort should be made to ensure continuity of operation and minimal disruption to programs. In areas where realignment or redirection is identified, timelines and rollout plans should be developed. Operations that impact current student support must not be affected. Current collaborations should be expanded where possible, and redirection or realignment should seek to improve the possible collaboration opportunities and encourage forward-thinking proposals that will impact the grand challenges we face as a Nation.
4. Beginning Implementation

IDEATION PROCESS

ORI will focus on establishing research teams in a few key areas of opportunity who will become national and international leaders in their respective fields. Initially, the focus will be on 1-2 areas of opportunity. To better understand where current strengths and overlap exist, ORI will establish an interactive process to help build collaborative teams and encourage forward-thinking proposals that address our Nation’s grand challenges.

The ORI management team should facilitate multiple ideation sessions to identify potential concepts and initial focus opportunities. These sessions should lead to proposal ideas for projects that promote the following:

• Solutions to grand challenges and answers to questions of national significance;
• Collaborative work that benefits from the partnership of UT and ORNL;
• Development of expertise that builds on our collective strengths, but does not duplicate them;
• Identification of funding opportunities that exist or are expected to exist to potentially support the work;
• A focus on opportunities outside the DOE core mission space;
• An emphasis on interdisciplinary work and team science; and
• An identification of gaps in our current resources that limit our success in a critical area.

The ideation sessions should generate three to five short proposals and teams with clear technical leadership that integrate existing expertise. The Institute Fellows and the Steering Committee will review and sort the proposals and make recommendations for seed funding and recruitment of external/internal researchers. ORI should then facilitate discussions and help further develop project teams, including recruitment of top students. The Capture Teams will then facilitate the process to prepare, go after and win project funding in the agreed upon area(s).

STAKEHOLDER ENGAGEMENT

From its outset, ORI will be committed to initiating new and innovative methods for developing top talent to meet Tennessee’s future needs. ORI’s focus must be on the most innovative and impactful initiatives. These efforts will require significant collaboration and buy-in from multiple constituent groups. To help facilitate this, the Committee recommends that ORI work with a subcommittee of the Board of Advisors to help develop an initial work plan to better engage external stakeholders, including industry, entrepreneurial support organizations, and other universities to maximize the impact of the innovative resources ORI will provide.

COLLABORATIVE GRADUATE EDUCATION PROGRAMS

UT and ORNL have enjoyed successful collaborative graduate education programs, formal and informal, for several decades. These programs have had remarkable success leveraging the educational expertise at UT with the extraordinary research both at UT and ORNL. The two novel interdisciplinary educational programs of the Bredesen Center in Energy and Data Science currently have a combined graduate student population of approximately 125 students, and the GST program has approximately 40 students. ORI plans to expand these collaborative UT-ORNL graduate programs up to 500 graduate students of the highest possible quality. Such expansion will likely have a significant impact on the region. Many of the students will establish companies or will become leaders in our Nation. However, such an expansion may also create several potential issues that will need to be carefully addressed including: how can the program expand by a factor of 4 and still attract a sufficient number of highly qualified students; what will be the impact on existing graduate programs at UT; should all the students be part of interdisciplinary programs or should there be a mixture of students in interdisciplinary programs housed in the Bredesen Center and GST as well as students in graduate programs housed within already existing UT departments; who will provide
4. Beginning Implementation

the didactic portion of students’ training and develop and implement a robust curriculum. To help resolve these initial concerns, a Joint Education Expansion subcommittee of the Advisory Board should be established with the charge to develop a detailed plan for how Joint Education programs should grow in a way that “growth spurt” issues will be minimized and long-term synergy with UT graduate programs is achieved.

OPERATIONAL GUIDELINES

UT and ORNL operate differently and are governed by different rules and regulations. The two institutions also have different missions that lead to a divergence in the way problems are approached and solutions are developed. The diversity of the two institutions can be a positive asset that leads to innovative approaches to problems, often better than what each institution could do alone. The coordination of joint efforts can be difficult, and ensuring compliance with both institutions’ rules and regulations is a must.

UT and ORNL have 75 years of experience working together productively. Through our work on the Steering Committee, we have learned how important it is to openly discuss our differences and similarities and develop a set of principles that guide our interactions. We are therefore proposing that an ORI Bylaws subcommittee be established with the members selected from the community of people in both institutions who have experience in how to handle our interactions. The charge for this committee will be to develop an initial set of bylaws for ORI, so that the operation of ORI can run as smoothly as possible.

ORI SPACE REQUIREMENTS

ORI is envisioned to become a large organization responsible for the majority of the formal collaborations between UT and ORNL. The plan calls for adding 120 new faculty/staff over a 5-10 year period, and, ideally, research teams would be co-located. In addition to office space, laboratory space will also be in demand. As discussed in Section 1 - Execution - Space/Location earlier, UT owns three large buildings at the ORNL campus, and some of this space can initially house a large part of ORI. More detailed space plans will need to be developed over time by the ORI Director in consultation with UT and ORNL leadership.

ORI MANAGEMENT TEAM

The ORI Director must be a visionary leader who is involved from the beginning of the implementation process. Additionally, the Director must be someone who is very familiar with both UT and ORNL. Therefore, the committee recommends the first Director be selected through a joint process of UT and ORNL.

The ORI Director will be responsible for developing a final organizational structure that meets the needs for implementation and budget. The Director will work to recruit and hire members of his/her team as appropriate.

ORI FELLOWS

The ORI Director, in consultation with UT and ORNL leadership, will recruit or appoint four to eight ORI Fellows who represent leading UT faculty and ORNL scientists. The ORI Fellows should serve a limited term and have subject matter expertise in the broad themes of data science and technology, advanced materials, or outcomes-based applications. They will serve the Institute by advising on recruiting, strategy, and opportunity development.
Date: August 30, 2019

To: Moody Altamimi  
Suresh Babu  
Michelle Buchanan  
Heidi Goodrich-Blair  
Moe Khaleel  
David Manderscheid  
Jeff Nichols  
Robert Nobles  
Stacey Patterson  
Janis Terpenny  
Xin Sun

From: Randy Boyd, President  
Donde Plowman, UTK Chancellor  
Thomas Zacharia, ORNL Director

Re: Steering Committee for the Oak Ridge Institute at the University of Tennessee

On June 21, 2019, the UT Board of Trustees approved the creation of the Oak Ridge Institute at the University of Tennessee “to foster a stronger and more coordinated relationship” between the University of Tennessee and Oak Ridge National Laboratory.

The overarching goals of ORI are to:

- Establish robust partnership platforms that promote industry engagement, entrepreneurship and technology implementation for economic and community development;
- Provide flexible mechanisms that promote discovery and innovation especially in, but not limited to, areas related to data science and technology, advanced materials, and outcomes-based applications; and Build on existing joint programs to strategically integrate collaborative opportunities between UT and ORNL;
- Offer an enriched interdisciplinary educational and research experience for students.

To achieve long-term success, we want to:

- Work toward a strategic alignment of the expertise and infrastructure of UT and ORNL to usher in world-class interdisciplinary research and graduate education;
Appendix A - Steering Committee Charge Letter

• Promote the growth and recruitment of top-tier faculty and graduate students
• Identify trends and support opportunities for large, multidisciplinary collaborations and funding;
• Develop and support programs to enhance the collaborative culture of UT and ORNL;
• Create an administrative home that provides support and guidance for partnering opportunities;
• Serve as a repository and develop reports that describe the joint efforts and their impact and return to the University, ORNL, Department of Energy, Tennessee and our country.

The general concept of ORI has been approved by the board, and now it is time to get our teams together to begin to design the institute. We need big thinkers from the faculty and leadership at UT and ORNL to help us build this out. For that reason, we have asked you to serve on this inaugural steering committee.

Michelle Buchanan, David Manderscheid and Stacey Patterson have agreed to serve as co-chairs of the committee team. As you work together it will be critical that you share ideas with the groups you represent and create appropriate opportunities for feedback. We want to develop a thoughtful plan yet keep the project moving.

In getting started it will be important to review existing programs, identify opportunities for growth, and identify processes that enhance the collaborative opportunities. With these goals in mind, the charge to the committee is to develop recommendations for the following:

• Create a set of guiding principles that will enhance the success of ORI
• Create a timeline for rollout and implementation of ORI
• Envision a system of accountability that ensures the goals of the institute are met
• Identify key implementation tasks and process for beginning the implementation

We look forward to attending the first meeting to provide the charge for the Steering Committee and answer any questions you may have.

We could not be more excited to launch Oak Ridge Institute, which offers the opportunity to take the university to the next level, enhance ORNL’s mission, and create unparalleled opportunities for students, faculty and scientists in this Oak Ridge Corridor. Thank you for helping shape an institute that will promote our institutions and Tennessee as the “go to” destination for convergent research and talent development in areas of national need. By elevating our joint efforts and capitalizing on this opportunity before us we create a new and exciting future for our university, ORNL, Tennessee, and our Nation. Thanks for your leadership.

Should you have questions or comments, please feel free to contact us.

cc: Chancellors
    Provosts
    UTK Vice Chancellors
    UT System Vice Presidents
    ORNL Deputy Directors
    ORNL Associate Laboratory Directors
    David Keim, ORNL Director of Communications
    Theresa Lee, Dean, College of Arts and Sciences

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Appendix B - List of Current Joint Programs

Bredesen Center
• Date Formed - Legislation passed authorizing Center’s creation in 2010; ESE program launched in 2011; DSE program launched in 2017
• Mission - The Bredesen Center creates opportunities for exceptional students to engage in interdisciplinary research and education in collaboration with UT and ORNL and to attain a doctoral degree in either Energy Science and Engineering (ESE) or Data Science and Engineering (DSE).
• Director - Dr. Sudarsanam Suresh Babu
• Review Plan - Academic program review completed November 2019

Governor’s Chairs
• Date Formed - Funding received in July 2005
• Mission - The mission of the Governor’s Chair program is to attract distinguished scholars in the sciences and engineering. These joint UT-ORNL appointments to these positions will be focused on neutron, biological, computational, and materials sciences. This multi-year initiative aims to upgrade the research strength of UT so that the 1,800 members of the National Academy of Science and the 1,900-member National Academy of Engineering will recognize distinguished achievement among UT faculty.
• Review Plan - Review of the program will occur in Spring 2020; each appointment is reviewed every five years

Joint Institute for Advanced Materials (JIAM)
• Date Formed - Formed in 2005; construction of its research facility at the UT Research Park at Cherokee Farm was completed in 2016
• Mission - The mission of JIAM is education of next generation materials innovators and discovery, synthesis, characterization and application of complex new materials to enable future electronic, energy, defense and medical products.
• Director - Dr. Alan Liby
• Review Plan - Spring 2020

Joint Institute for Biological Sciences (JIBS)
• Date Formed - 1997
• Mission - JIBS will have a positive, measurable impact on health outcomes of relevance to Tennessee and the Appalachian region. ORNL and UT will anchor a robust, world-renowned biomedical research presence, forging strong partnerships with academic, medical, pharmaceutical, and government organizations across Tennessee, within the southeast region, and throughout the nation.
• Director - Dr. Marti Head
• Review Plan - Spring 2020

Joint Institute for Computational Science (JICS)
• Date Formed - 1991
• Mission - JICS advances scientific discovery, state-of-the-art engineering, and computational modeling and simulation. JICS contains UT’s NSF-funded National Institute for Computational Sciences (NICS), which directs operations for XSEDE, through which NSF manages
its national cyberinfrastructure. JICS also manages UT’s System-wide Advanced Computing Facility, which provides both open and secure computing to four of UT’s campuses across the State, and serves as a bridge for UT faculty to the Department of Energy’s National Center for Computational Sciences (NCCS) and the leadership-class supercomputers it manages.

- **Director** - Dr. Anthony Mezzcappa
- **Review Plan** - Spring 2020

**Joint Institute of Nuclear Physics and Applications (JINPA)**

- **Date Formed** - Predecessor institution formed in 1983; renamed in 2013
- **Mission** - JINPA links UT, ORNL, and Vanderbilt University research to promote and support basic nuclear physics research and nuclear and radiological applications of common interest to the participants by providing an intellectual center and support for researchers working in the Joint Institute, to the mutual benefit of the sponsors and participants.

- **Director** - Dr. Robert Grzywacz
- **Review Plan** - Spring 2020

**Science Alliance**

- **Date Formed** - 1984
- **Mission** - The Science Alliance is composed of four divisions: the original three being Biological Sciences, Chemical Sciences, and Physical Sciences. A fourth division, Mathematics and Computer Science, was added in 1986.

- **Objectives:**
  - Create a strong formal bond between UT and ORNL
  - Hire joint UT-ORNL distinguished scientists
  - Create joint UT-ORNL institutions
  - Share resources and build areas of common strength at UT and ORNL as well as with industry and other institutions
  - Contribute to technology transfer
  - Provide incentives to attract and retain high-quality faculty
  - Strengthen graduate and undergraduate opportunities
  - Increase public and professional awareness of UT-ORNL partnerships

- **Director** - Dr. Shawn Campagna
- **Review Plan** - Spring 2020

**Shull Wollan Center: a Joint Institute for Neutron Sciences**

- **Date Formed** - 1998
- **Mission** - The Shull Wollan Center is dedicated to promoting excellence in advancing the application of neutrons to the forefront of science and industry, and to the training and education of future researchers.

- **Director** - Dr. Alan Tennant
- **Review Plan** - Spring 2020

**UT-ORNL Graduate School of Genome Science and Technology**

- **Date Formed** - 1998
- **Mission** - The UT-ORNL Graduate School of Genome Science and Technology (GST) is a cross-disciplinary, degree-granting, graduate program in the life sciences that links the campuses of Oak Ridge National Lab (ORNL), The University of Tennessee, Knoxville (UTK), and the UT Institute of Agriculture (UTIA).

- **Director** - Dr. Albrecht von Arnim, Professor and Associate Head, Department of Biochemistry and Cellular and Molecular Biology

- **Review Plan** - Ten year academic program review completed September 2013; mid-cycle academic program review scheduled for February 2020
ACKNOWLEDGMENT

The Committee Co-Chairs wish to thank the Steering Committee and others within the stakeholder community for their efforts and input. We are excited by the opportunities presented by the creation of ORI. Working together, with focus and urgency, we believe Tennessee can become a more powerful economic contributor to the Nation. The Oak Ridge Institute will create a knowledge and innovation hub in a business-friendly state that will produce world-class capabilities and a highly educated workforce here in the Oak Ridge Corridor. Let us move forward!