

Evolution of the UT–Oak Ridge partnership described in new book (part 3)

(As published in The Oak Ridger's Historically Speaking column the week of October 7, 2024)

This is the last in Carolyn Krause's series of three articles based on a recent Friends of ORNL talk by Lee Riedinger on a 2024 book he coauthored with Al Ekkebus, Ray Smith and William Bugg on "Critical Connections: The University of Tennessee and Oak Ridge from the Dawn of the Atomic Age to the Present." The \$39.95 hard cover book (\$31.96 on Kindle) is available from UT Press and from Amazon.com.

Oak Ridge National Laboratory, and its predecessor Clinton Laboratories, were overseen and operated for the government by multiple contractors in the 20th century, including the University of Chicago, DuPont, Monsanto, Union Carbide and Carbon Company (later, Union Carbide) and Martin Marietta (later, Lockheed Martin). Union Carbide managed ORNL, the Y-12 Plant and the Oak Ridge Gaseous Diffusion Plant for over 35 years, from 1948 until 1984.

In mid-1982 the Department of Energy, which in 1977 replaced the Atomic Energy Commission and its successor the Energy Research and Development Administration, began considering making a change in the contractor for ORNL and its other government facilities. The reason: in May 1982 Union Carbide announced its decision to end its management of the three government facilities in Oak Ridge.

The University of Tennessee formed a task force to consider a bid on the Oak Ridge contract. But UT dropped out of the competition in January 1983 when DOE announced its plan to hire a contractor willing and able to manage not only the three plants in Oak Ridge but also the gaseous diffusion plant in Paducah, Ky. Martin Marietta won the contract and managed the four plants for 16 years.

In October 1982, Paul Huray (an Oak Ridge High School graduate who played on the varsity football team that won the 1956 state championship and was rated the best in the nation), Ivan Sellin and Lee Riedinger, all members of the UT physics faculty, conceived the Distinguished Scientist Program. Top-notch scientists would each be hired at the outlandish salary of \$100,000 that, along with research support funds, would be equally paid for by UT and ORNL. "It was three times what I made," Riedinger said. Each Distinguished Scientist would teach students as a member of the UT faculty and initiate research projects at ORNL.

UT Chancellor Jack Reese sent the idea to Gov. Lamar Alexander. He conveyed the concept in a meeting he had with U.S. Senate Majority Leader Howard Baker and DOE Secretary Donald Hodel, who both agreed to support the Distinguished Scientist Program. On Feb. 7, 1983, Chancellor Reese and ORNL Director Herman Postma agreed to start the Distinguished Scientist Program "independent of the new contractor decision and without a review by lawyers," Riedinger said in his talk.

One challenge was to fund the program. According to the book, "Huray took the lead on writing the proposal to state government for creation of the Science Alliance, a state center of excellence that would promote greater cooperation between UT and ORNL. Two key parts of this proposal were the hiring of distinguished scientists and the creation of joint institutes in specific fields of common strength. The Science Alliance, directed initially by Huray and later by Riedinger, was awarded the first of the center-of-excellence grants, and, by the fall of 1983, money was suddenly about to appear to finance UT's half of the Distinguished Scientist Program."

The next challenge was to identify prospective recruits, so in June 1983, the first UT-ORNL meeting was held to start considering candidates for the new program. In October that year, Riedinger left UT for Washington, D.C. to work for a year as Sen. Baker's science advisor. In February 1984, the first two joint hires for the program were proposed: George Bertsch, a nuclear physicist at Michigan State University, and Jerry Mahan, a materials physicist at Indiana University.

Bertsch said he would accept the position only if his hiring would be announced in the New York Times. Riedinger spoke about Bertsch's request to Sen. Baker, who agreed to host the June 11, 1984, ceremony in the Mansfield Room at the U.S. Capitol at which the hiring of the first two UT-ORNL Distinguished Scientists would be announced. The ceremony celebrating the unique program and UT's two new hires was covered in the national press, pleasing Bertsch. "So that kicked off this program of hiring the best and brightest scientists at the highest levels," Riedinger said.

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In the next 15 years, 20 more Distinguished Scientists were hired. Lamar Alexander, who served as Tennessee governor from 1979 through 1987, helped build the UT-ORNL partnership and state investments for the Science Alliance were continued by the next four consecutive governors.

Between 1982 and 1984, \$350,000 of state funds supported the construction of the first joint institute built at ORNL. Called the Joint Institute for Heavy Ion Research, it served the nuclear physics programs of ORNL, UT and Vanderbilt University for 35 years. It was also the first state-funded building located at a federal facility and at a DOE lab.

Two days after President George H. W. Bush's delivery of his State of Union address on Jan. 31, 1990, President Bush visited North Carolina State University and UT to promote his plan to double the National Science Foundation (NSF) budget. The Science Alliance between UT and ORNL was mentioned during the Bush visit to UT. On Feb. 19, 1992, the president visited the High Temperature Materials Laboratory at ORNL for the signing of a cooperative R&D agreement between the ORNL, the Oak Ridge Y-12 National Security Complex and Coors Structural Ceramics Company.

In May 1998, after hearing a rumor that DOE would not renew the Lockheed Martin management contract for ORNL, UT decided to enter the competition. UT President Joe Johnson formed a task force chaired by UT Vice President Homer Fisher and Riedinger.

In October and November 1998, the task force interviewed 15 possible bid partners. In late November Bill Madia, director of the Pacific Northwest National Laboratory (which has long been managed by Battelle Memorial Institute in Columbus, Ohio) visited UT in late November, and a limited liability partnership named UT-Battelle LLC was formed to bid on the ORNL contract.

On July 22, 1999, Riedinger said, Gov. Don Sundquist committed \$12 million of construction funds for new joint institutes should UT-Battelle win the DOE contract; the state turned down a similar request for funding from Lockheed Martin. On Aug. 16, 1999, the DOE Source Evaluation Board heard oral presentations of proposals by prospective contractors; on Oct. 20, 1999, a phone call announced that UT-Battelle had won the contract.

"It was a huge victory for UT some 60 years after being a university that could not confer any Ph.D. degrees and that supported very little research," Riedinger said. On Apr. 1, 2000, UT-Battelle, led initially by Madia and UT's Riedinger, Billy Stair and Frank Harris, started managing ORNL, DOE's largest science and energy laboratory, and it has held the contract for 24 years.

Despite the rapid turnover of UT presidents in the 2000s owing to scandals that forced them to resign early, the management of ORNL, including the construction of new laboratory buildings, proceeded relatively smoothly. Riedinger attributed the lab's success in meeting DOE missions largely to a seamless transition of excellent ORNL directors working for UT-Battelle: Bill Madia (2000-2003), Jeff Wadsworth (2003-07), Thom Mason (2007-17), Thomas Zacharia (2017-2022) and Stephen Streiffer (2023-).

Riedinger noted that Zacharia "took the lead through UT to obtain an NSF grant for a UT petaflop supercomputer that was operated at ORNL. That was a huge win for the university because of our partnership."

Ironically, the UT president scandals were covered in the Knoxville News-Sentinel by David Keim, now director of ORNL's Communications and Community Engagement Directive and its chief communications officer.

Riedinger acknowledged the huge contributions made to the UT-ORNL partnership by Gov. Phil Bredesen (2003-11), Chancellor Jimmy Cheek (2009-17) and ORNL Director Thom Mason (2007-17). In 2005 Bredesen provided new funds to hire Governor's Chairs. This UT-ORNL program brings exceptionally accomplished researchers from around the world to Tennessee. Funded by the state, UT and ORNL, the program is managed through the UT-Oak Ridge Innovation Institute (UT-ORII).

Bredesen suggested that a UT center of excellence be established to offer joint UT-ORNL Ph.D. programs related to energy. Cheek and Mason proposed an interdisciplinary center at UT that hosts a joint UT-ORNL Ph.D. program in energy

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science and engineering. The state provided \$6 million to start in 2010 the Bredesen Center for Interdisciplinary Research and Graduate Education, of which Riedinger was the founding director until he retired at the end of 2019. It is now called UT-ORII's Bredesen Center, and its purpose is to meet local workforce needs in energy science and engineering and since 2014 in data science.

"The Bredesen Center has had excellent graduate students, most of whom have been working on dissertation research at ORNL and taking courses in UT departments that include faculty from ORNL as well as UT," Riedinger said. "The center's graduate students have started nine companies, and 12 graduates with Ph.D.'s work in policy roles in the Washington, D.C., area."

ORNL and UT researchers, led partly by Governor's Chairs, have worked together on additive manufacturing research and production at the Manufacturing Demonstration Facility (MDF), which opened in 2012 adjacent to the National Transportation Research Center on ORNL's Hardin Valley Campus. Riedinger noted that in January 2015 MDF researchers showed their 3D-printed Shelby Cobra car to President Barack Obama and Vice President Joe Biden on their visit to the Knox County campus.

In 2011, UT and the Oak Ridge Y-12 National Security Complex renewed their partnership through a memorandum of understanding (signed by UT Chancellor Jimmy Cheek and Y-12 General Manager Darrel Kohlhorst). The MOU led to partnerships between Y-12 and nine UT colleges, engineering management graduate courses taught in Oak Ridge and graduate research assistantships for 30 UT students working at Y-12.

In addition, UT faculty have collaborated with Y-12 employees in nuclear forensics, testing of radioactive shipping containers, archiving Manhattan Project documents, strengthening nuclear-science education in K-12 curricula and launching Y-12's Total Health Risk Intervention and Education initiative.

The Oak Ridge Innovation Institute at UT (UT-ORII), which was started in 2020, received in February new funds from DOE and the state of Tennessee for novel areas of joint research. They include development of low-carbon agriculture and manufacturing technologies and of radiopharmaceutical drugs and imaging techniques for treating and diagnosing diseases, including cancer.

Riedinger said that the UT-ORNL partnership over many decades has worked well, thanks to support from governors, ORNL directors and UT presidents and chancellors, as well as key people like himself willing to sacrifice making accomplishments in their fields.

"Sharing of people, resources and facilities and interdisciplinary research and education are crucial to growing the next generation of scientists and engineers for our workforce," Riedinger said, noting that the UT-ORNL partnership is a model that other university and national lab groups have studied.

Important areas of joint research in the future, he added, will be supercomputing, electric vehicles (Volkswagen runs an EV research lab on UT's Cherokee Farm), quantum information science, neutron science, direct capture of climate-altering carbon dioxide from the atmosphere, isotope production and separation, as well as next-generation nuclear and fusion reactors for production of electricity later in the century.

Thanks, Carolyn. Really appreciate you doing this series on Critical Connections. Our book launches in Knoxville and Oak Ridge have gone well. It is rewarding to see a good bit of interest in the book. Our thanks go out to UT Press for publishing the book and for arranging the events of the past month.

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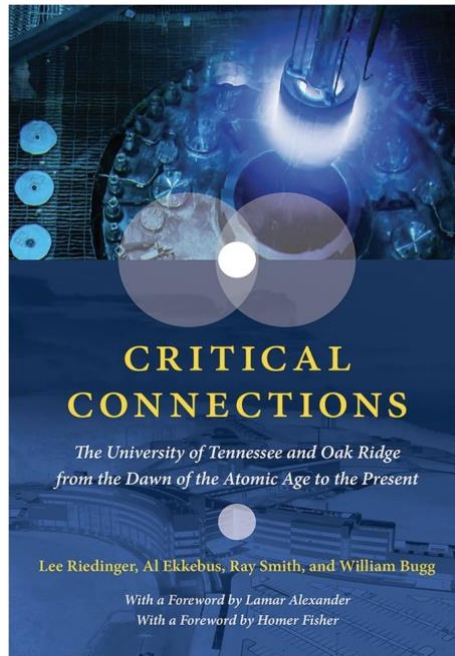
Lee Riedinger speaks to the Friends of ORNL audience (Courtesy of Carolyn Krause)



Lee Riedinger autographs the Critical Connections book for members of Friends of ORNL (Courtesy of Ray Smith)

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Critical Connections book (Courtesy of Ray Smith)