

# Mission of NEXT Lab

The mission of Nuclear Energy eXperimental Testing (NEXT) Lab is to provide global solutions to the world's most critical needs. This will be accomplished by advancing the technology of molten salt reactors while educating the next generation of leaders in nuclear science and engineering.



# Molten Salt Reactor



# acunextlab.org

safe

# NEXT Lab: Mission, Achievements, and Mo-99 Interest

# Diego Zometa of Abilene Christian University and the NEXT Lab

# NEXT Lab Reactor Details

- \$23 M Reactor building under construction (completion 2023)
- Located on the campus of ACU, Abilene, Texas, USA
- Construction permit application submitted to the US Nuclear Regulatory Commission (NRC) August 2022
- Begin operation of the 1 MW<sub>t</sub> molten salt reactor in 2025
- University research reactor; \$0 license application fee
- HALEU fuel provided by US DOE
- Fuel dissolved in FLiBe salt provided by US DOE



Gayle and Max Dillard Science and Engineering Research Center



- Useful isotopes found among the fission fragments of the fuel such as <sup>99</sup>Mo and 131
- This research seeks methods to extract useful isotopes like <sup>99</sup>Mo from the molten salt
- Some <sup>99</sup>Mo appears in the off gas as  $MoF_6[1]$
- Known purification and concentration techniques for Mo [2-5]

# Acknowledgments





### Works Cited:

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- *Chem.* **1961**, 33 (2), 237-238.
- Laboratory. 2016, 1-138.
- Engineering and Design 379 (2021) 111243



# Radioisotope Interest



# Future Work

• Finish the construction of the SERC • Assembly of NEXT Lab's research reactor • Test of Mo extraction from fluorinated molten salt

1. Chuvilin, D. Yu et al. New method of producing <sup>99</sup>Mo in Molten-Salt Fluoride Fuel. *Atomic Energy* 

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4. O. Zekri et al. Reactivity of α-Benzoin Oxime with Molybdenum (VI), Synthesis and Reactivity in Inorganic and Metal-Organic Chemistry. **2000** 30 (10), 2009-2028, DOI: 10.1080/00945710009351885 5. Youker, Amanda. et al. Compendium of Phase-I Mini-SHINE Experiments. Argonne National

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