

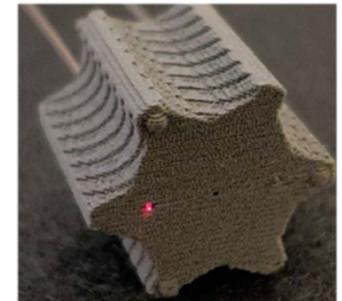
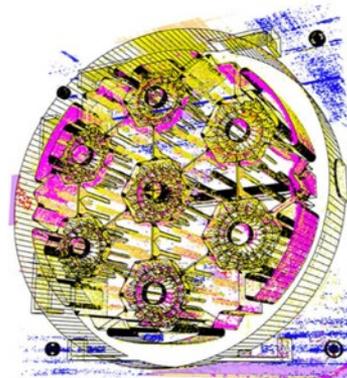
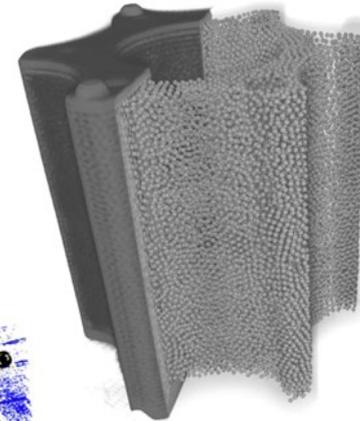
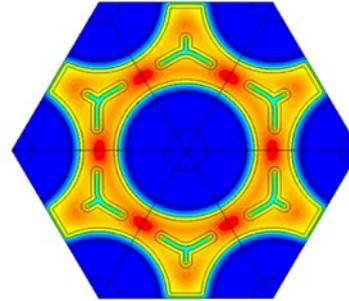


Transformational Challenge Reactor

Tansel Seleklar
Office Of Nuclear Energy Technologies

Transformational Challenge Reactor (TCR)

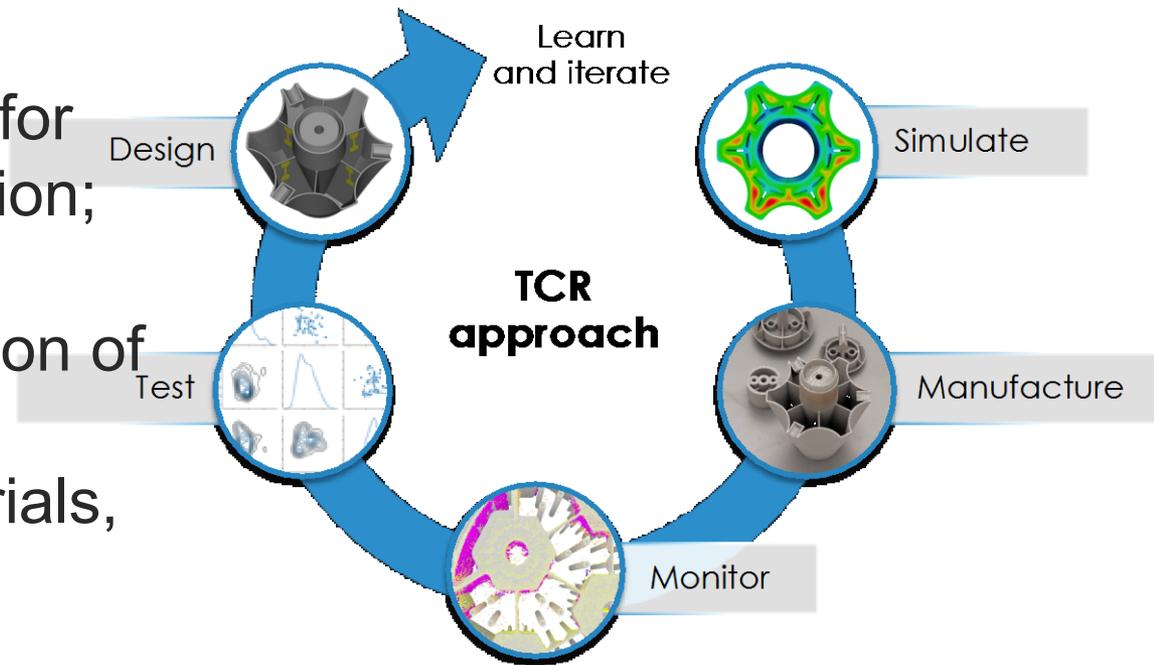
- **Mission:** The TCR program will manufacture and operationally test a fueled microreactor fabricated using additive manufacturing techniques.
- **Vision:** Reduce the cost, schedule and risk in nuclear energy.



Transformational Challenge Reactor (TCR)

TCR Goals:

- Reduce deployment costs and timelines for new nuclear technologies;
- Integrate digital data for rapid nuclear innovation; and
- Accelerate the adoption of advances in manufacturing, materials, and computational sciences for nuclear applications.



TCR R&D NE-3 FOA Technical Focus Areas

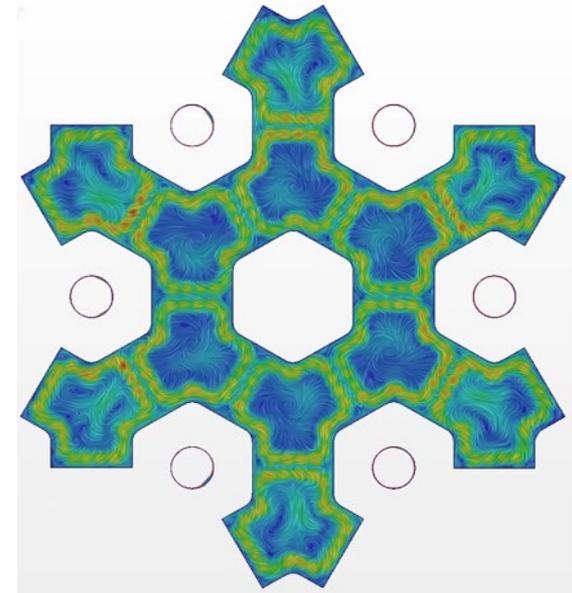
The TCR program seeks proposals:

- NE-3.1: Integrated thermofluidic experimentation and modeling for TCR core components
- NE-3.2: Materials characterization of additively manufactured TCR core structural material

TCR R&D NE-3 FOA Technical Focus Areas

NE-3.1: Integrated thermofluidic experimentation and modeling for TCR core components

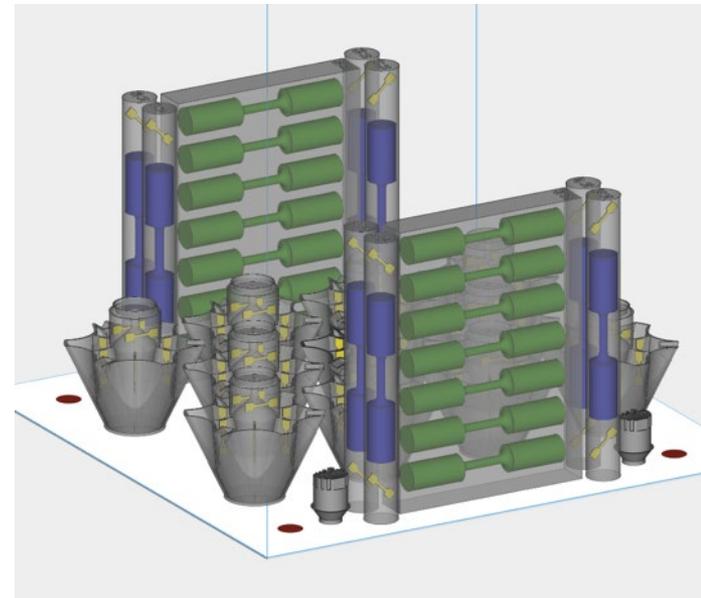
- To provide experimental data on thermofluidic behavior of TCR core components
- To enable measurement of validation grade thermofluidic data for additively manufactured TCR components to benchmark high resolution computational fluid dynamics (CFD) models
- TCR program will supply additively manufactured metallic or ceramic (non-radioactive) specimens (smaller than 20 cm × 20 cm × 100 cm) for testing with gas coolant
- Experimental test data may include pressure drop and temperature



TCR R&D NE-3 FOA Technical Focus Areas

NE-3.2: Materials characterization of additively manufactured TCR core structural material

- To provide experimental data on mechanical and microstructural properties of one or more additively manufactured TCR core materials:
 - laser powder bed fusion derived 316L stainless steel
 - laser powder bed fusion derived Inconel 718
 - 3D printed (binderjet + infiltration) silicon carbide (SiC)
- Bulk additively-manufactured materials with reference fiducial markers will be supplied by the TCR program for these tests
- Testing results need to accompany 3D location data (with at least 1 mm resolution)
- Quality test data may include microstructure, basic mechanical testing, creep, fatigue, fracture, ion irradiation, and environmental effects



Contact Information

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■ TCR Website for more information

- <https://tcr.ornl.gov/>