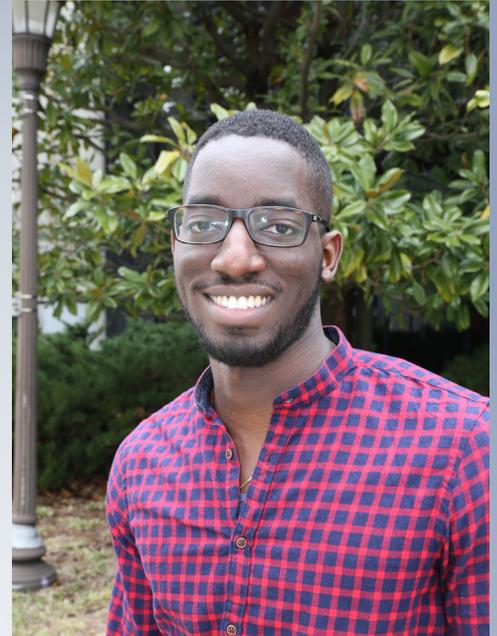


# Ground-Level Integrated Diverse Energy Storage (GLIDES) - Development and Value

Tuesday, August 22nd @ 4 PM Room: BB W250

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## Abstract:

Due to the increasing generation capacity of intermittent renewable electricity sources and an electrical grid ill-equipped to handle the mismatch between electricity generation and use, the need for advanced energy storage technologies will continue to grow. Currently, pumped-storage hydroelectricity and compressed air energy storage are used for grid-scale energy storage, and batteries are used at smaller scales. However, prospects for expansion of these technologies suffer from geographic limitations (pumped-storage hydroelectricity and compressed air energy storage), low roundtrip efficiency (compressed air energy storage), and high cost (batteries). Furthermore, pumped-storage hydroelectricity and compressed air energy storage are challenging to scale-down, while batteries are challenging to scale-up. A novel compressed gas energy storage technology was developed by Oak Ridge National Laboratory/Georgia Tech. In common with compressed air energy storage, the novel storage technology described in this paper is based on air compression/expansion. However, several novel features lead to near-isothermal processes, higher efficiency, greater system scalability, and the ability to site a system anywhere. The enabling features are utilization of hydraulic machines for expansion/compression, above-ground pressure vessels as the storage medium, spray cooling/heating, and waste-heat utilization. This presentation will provide a comprehensive overview of related research activities, including physics-based system simulations, experimental evaluation of the first-in-kind prototype system, as well as proposed enhancements to improve storage roundtrip efficiency and energy density. The presentation will conclude with cost/market value analysis for just one potential use case of the GLIDES technology.



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