Problem:
The gap in STEM early childhood education affects future pursuit of STEM education and professions.

- Within the early childhood population, female students are being left behind their male counterparts in STEM learning.

There exists gender and age gaps in today's STEM education continuum that require attention to meet the STEM workforce requirements of the twenty-first century. Currently, the budgets for federal, state, and local research and education for STEM curriculum are typically allocated to professional and higher grade level education. Less than 5% of time in formal early childhood education settings is devoted to STEM learning, according to research presented at a recent conference on fostering STEM trajectories. Unfortunately, government's initiatives in the last decade have not translated to more female representation in the engineering and computer science field. In fact, the latest report by a panel of Accenture and Girls Who Code published in October 2016 shows that the share of women in the computing workforce will decline in the next decade from 24% to 22%.

Many research studies have shown that STEM subjects need to be taught consistently from a young age to be effective. Therefore, early childhood educators and parents play a critical role in developing our next generation of STEM professionals and workers. In the absence of early school funding, it is up to the parents to provide the resources and environment to expose children to STEM. American Society for Engineering Education published a report in 2015 showing that there is a significant gender bias in the purchase of STEM-related toys. Parents, grandparents, and other adults overwhelmingly purchased science, engineering, and math based toys that are designed for and appeal more to boys. There is overwhelming evidence indicating that girls are behind on developing interest and confidence in STEM compared to their male counterpart.

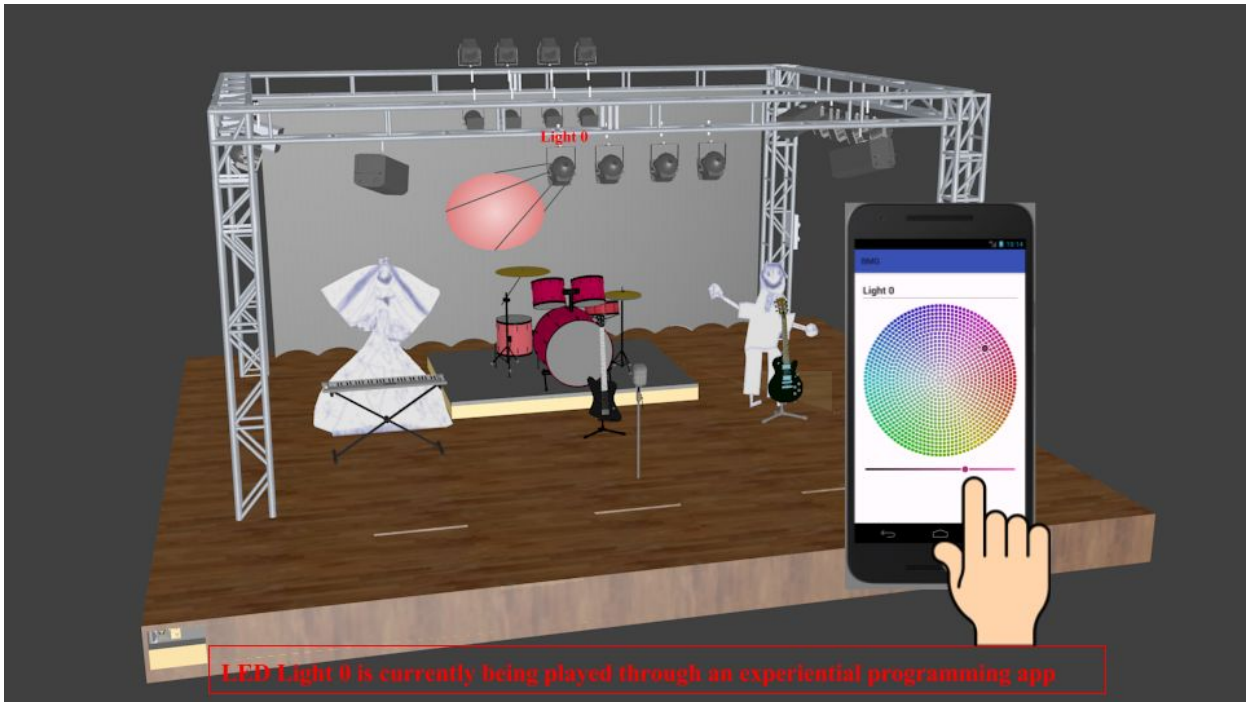
The proposed project is to deliver a STEM learning platform that is expected to address the gender, social, and age gaps in the current STEM learning continuum. The design hypothesis is that activities that entice all elementary students to participate are typically cross disciplinary. By adding STEM learning into their preferred play experience so that by doing what kids naturally enjoy in their after school activities and at home, science and math become intuitive and programming and engineering become second nature. the best way to learn is to get children immersed in play activities they already prefer to do. Moreover, for many young girls, the activity is usually in a form of collaborative role play instead of competitive play.

Therefore, Interactive Stage has become the first project underway to revolutionize STEM technology learning platform from the current toy options in the marketplace. This online and offline stage design and play engages a child's imagination, creativity and collaboration skills while learning about STEM. It consists of three major components that will address K-3's motor and language skills and their patience level for gratification:
1) physical stage devices including individual lights, motors, RFID chips and sensors
2) real-time navigation of the physical stage devices (play while program)
These three components will easily be extended to other variations of future learning platform once Interactive Stage is released.

The invaluable societal impact of this project could include, but is not limited to, the following broad areas:

1) A new generation of girls confident in engineering from early experience playing with STEM technology toys customized to their interest

2) New informal learning frameworks for children, caregivers, and educators - a curriculum that educators and parents can use to engage their children at home, in school, and during after-school activities, helping children learn about science, and doing science
3) Continuous learning through connected toy devices - a platform that can be programmed, when turned on, to continue to better understand how children learn while playing with technology toys through a feedback loop
4) Toys that parents can use to teach their children about science



Open Source

The project will leverage open source.