## Graduate Research Assistant Position

Looking for graduate students who would like to work on the challenging and multidisciplinary areas of microelectronic packaging and heterogeneous integration.

In the era of big data applications like cloud computing, artificial intelligence, autonomous driving, internet of things, etc., heterogenous integration appears as a new and promising microelectronic packaging paradigm, to meet the ever-increasing demand for high bandwidth, fast, low power, and low latency channels. Current market trends show that heterogeneous integration will be the main microelectronic packaging approach for the next generation high performance computing systems. In heterogeneous integration, instead of a monolithic approach, multiple functional blocks are connected on the same package via very fine pitch interconnects, which comes with several signal integrity challenges. To address these challenges and decrease the time to market with efficient design cycles, accurate and fast electromagnetic modeling of the interconnects is very crucial. The main focus of this project is to apply machine learning modeling methods on the electromagnetic modeling of interconnects to improve the design cycles of various problems related to the heterogenous integration.
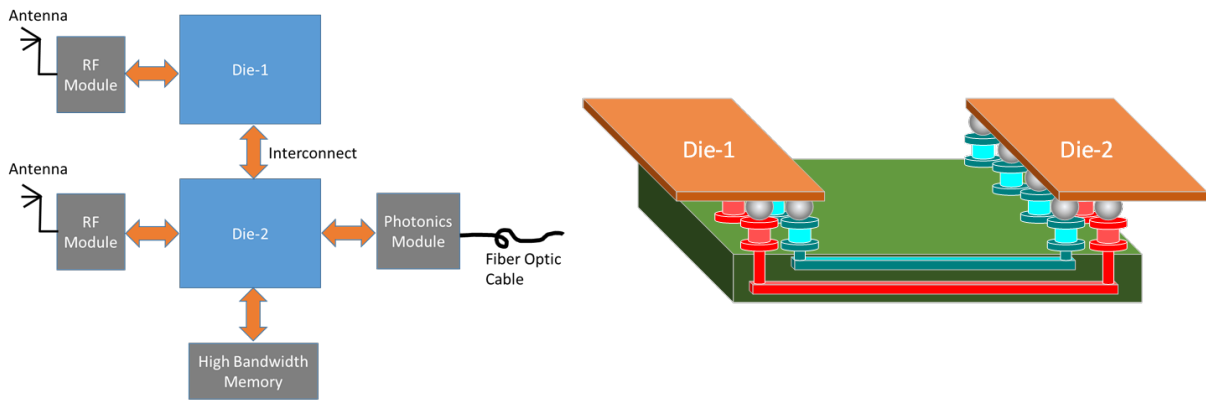
Heterogeneous integration enables the connection of different functional blocks on the same microelectronic package with cost-effective bandwidth scaling solutions.

Connection of the dies is maintained by silicon or organic material based very fine pitch interconnects.

Interconnect Geometry   Neural Network   Channel Performance
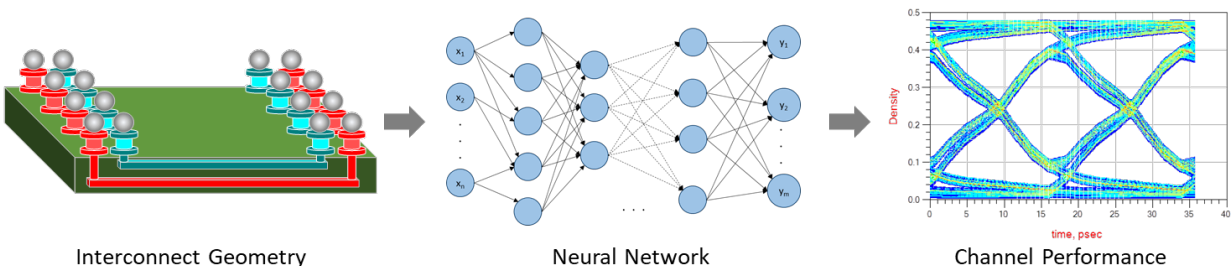
The key responsibilities of the researchers will be:

- Electromagnetic modeling of silicon and organic material based interconnects, including very fine pitch transmission line structures and through silicon vias, antennas on packages, and passive silicon photonics components like waveguides, micro-ring resonators and couplers
- Development and implementation of machine learning algorithms for fast and accurate modeling of these interconnects
- Experimental validation of the developed models through design, manufacturing, and measurement of the interconnects

Total duration of the project is 36 months and scholarships will be provided by TUBITAK in the amounts given below:

- MSc Students: 3500 TL/month for 24 months
- PhD Students: 4500 TL/month for 48 months
- Post-Doctoral Researcher: 6000 TL/month for 36 months

Qualifictions:

- Bachelors degree from an Electrical Engineering Department
- Strong background in electromagnetics (Experience with computational electromagnetic tools like HFSS is preferred)
- Programming experience with MATLAB (Knowledge of Python and Pytorch is preferred)
- Ability to do independent research
- Willing to collaborate with other team members and groups
- Strong interpersonal and written communication skills

If you are a highly motivated graduate student and willing to work on the challenging research topics in the intersection of the areas of electromagnetics, microelectronic packaging and machine learning, please send your resume along with a one-page research statement to acdurgun@gmail.com.