

General Electric Global Research Microfabrication Highlights 2022

CNF Project Number: 2993-21

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Website: <https://www.ge.com/research/electronics-sensing>

Primary CNF Tools Used: SÜSS Bonder/Aligner, STPS uEtch HF Vapor Release,

Schott IR Inspection Microscope

Abstract:

Developments in analog computing have led to an interest in mechanical computing elements. We are pursuing research in this field using small resonators and switches built in silicon.

Summary of Research:

We are developing analog computing elements out of mechanical structures. The structures are fabricated in silicon, so called 'NEMS', or nano electromechanical systems. The structures consist of resonant elements where computation is mapped to phase, frequency or amplitude. We fabricated these structures at our facility in Niskayuna, New York. We use the CNF as a backup for certain tools. In addition, we plan on using CNF to extend our capabilities to build smaller structures than we are capable of building in our own facility. We have not yet published our results in this area, with publications expected in 2023.

Our work is based on our GE 'Polaris' process, a foundry process which we offer commercially. Polaris has been used to fabricate accelerometers and gyroscopes, with future projects slated for timing, pressure and strain sensing.

Conclusions and Future Steps:

We expect to publish results in 2023 on our mechanical computing devices, when we will have more data to report.

