



High Performance Computing Enables Rapid Medical Treatments for the Warfighter

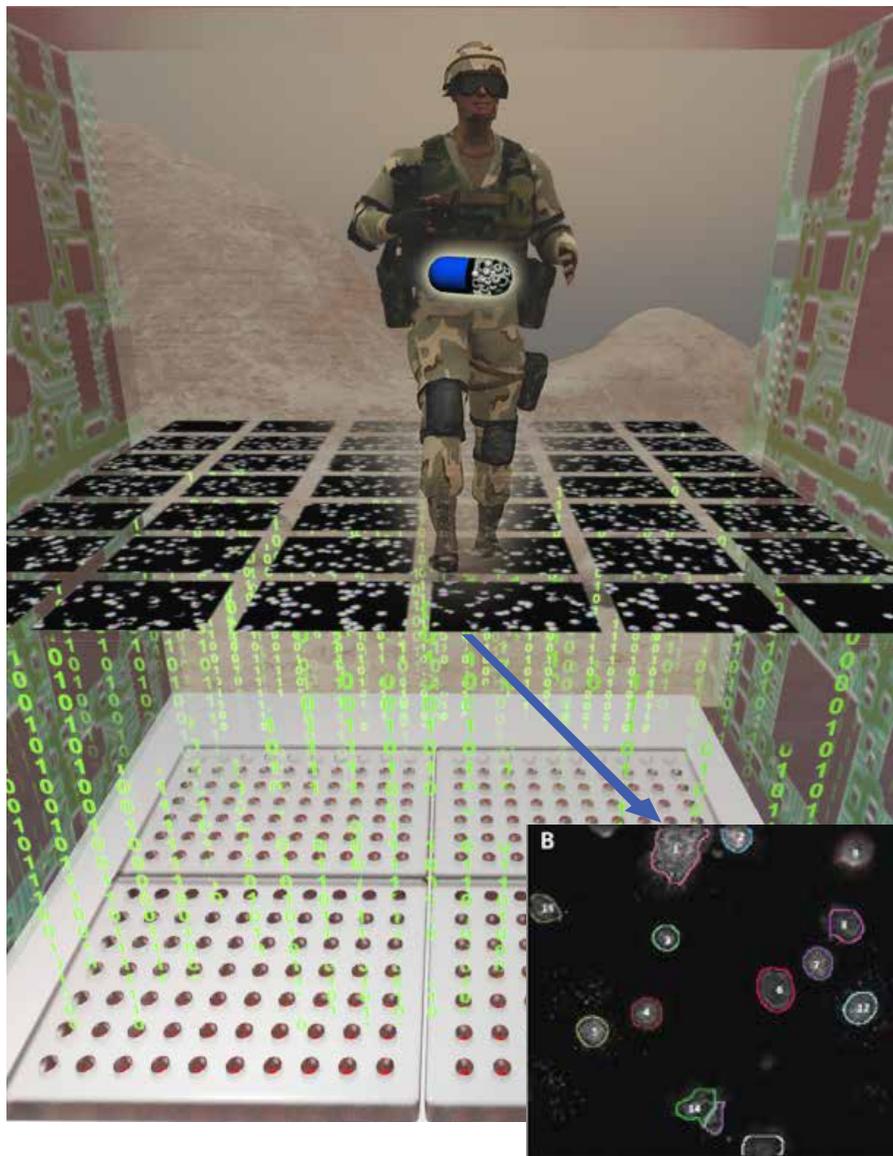
Project Purpose: *To rapidly create customized medical and human performance treatments tailored to an individual person.*

Big Data meets High Performance Computing:

After years of unsuccessful attempts, Dr. Thomas Lamkin, a researcher in AFRL/RH, was in desperate need of systems that could successfully store and process his big data. He had over 30 million files of cell images, metadata and analysis resulting from the INSIGHTS project.

INSIGHTS seeks to enhance the performance of soldiers on the battlefield by capturing thousands and thousands of cell experiments and treatments through biological screening and high content data analysis. This “big data” can also be used to treat soldiers domestically or on the battlefield. This research is applied when prescribing the “right diagnosis, care, prevention and intervention for the right person at the right time.”

The INSIGHTS team began working with AFRL’s High Performance Computing (HPC) Center where its Productivity Enhancement, Technology Transfer, and Training (PETTT) team recast the project’s code. As a result, his team was able to decrease computation time by 98% while developing novel methods to assess human cell and genetic response.



IMPACTS:

- Dramatically reduced the project’s analysis time from six months down to a few weeks
- Sped up successful drug treatment programs
- Realized advancements in understanding human performance

Graphical representation of an experiment of hundreds of millions of human cells that were exposed and analyzed for response to hundreds of thousands of chemical and genetic treatments. (Inset) Image derived from stained human cells.

Dr. Thomas J. Lamkin, a molecular cell and genetics researcher in AFRL/RH’s Molecular Signatures Section, leads the INSIGHTS project. The project pipeline used portions of AFRL DSRC’s Talon, Spirit and Utility Server systems. Over one million CPU hours were used on AFRL DSRC’s Spirit high performance computer.