# Fundamentals of Accelerated Computing with OpenACC

## links:

https://www.openacc.org/resources
https://www.openacc.org/community#slack
https://docs.nvidia.com/nsight-systems/
https://developer.nvidia.com/nsight-systems
https://docs.nvidia.com/cuda/profiler-users-guide/index.html#nvtx

## cmd

### compile the code

```
!nvc  -fast -o laplace -Mprof=ccff
-I/opt/nvidia/hpc_sdk/Linux_x86_64/21.3/cuda/11.2/include jacobi.c
laplace2d.c && echo "Compilation Successful!" && ./laplace
```

### compile the code again with the -Minfo=opt flag, which instructs the compiler to print additional information how it optimized the code

```
!nvc -fast -Minfo=opt
-I/opt/nvidia/hpc_sdk/Linux_x86_64/21.3/cuda/11.2/include -o laplace
jacobi.c laplace2d.c
```

### Run Our Parallel Code on Multicore CPU

```
!nvc -fast -ta=multicore -Minfo=accel
-I/opt/nvidia/hpc_sdk/Linux_x86_64/21.3/cuda/11.2/include -o
laplace_parallel ./solutions/parallel/jacobi.c
./solutions/parallel/laplace2d.c && ./laplace_parallel
```

### Run Our Parallel Code on GPU

```
!nvc -fast -ta=tesla:managed -Minfo=accel -o laplace_managed jacobi.c
laplace2d.c && ./laplace_managed
```

# Flags

**-Minfo** : This flag will give us feedback from the compiler about code optimizations and restrictions.
**-Minfo=accel** will only give us feedback regarding our OpenACC parallelizations/optimizations.
**-Minfo=all** will give us all possible feedback, including our parallelizaiton/optimizations, sequential code optimizations, and sequential code restrictions.
**-ta** : This flag allows us to compile our code for a specific target parallel hardware. Without this flag, the code will be compiled for sequential execution.
**-ta=multicore** will allow us to compiler our code for a multicore CPU.

# Introduction to Parallel Programming with OpenACC

https://www.youtube.com/watch?v=PxmvTsrCTZg&list=PLx_s9Cz7_T429SF7gBGJ51iiZoEWYVvkq