Manuals for compiling the GPU code to generate the dll file

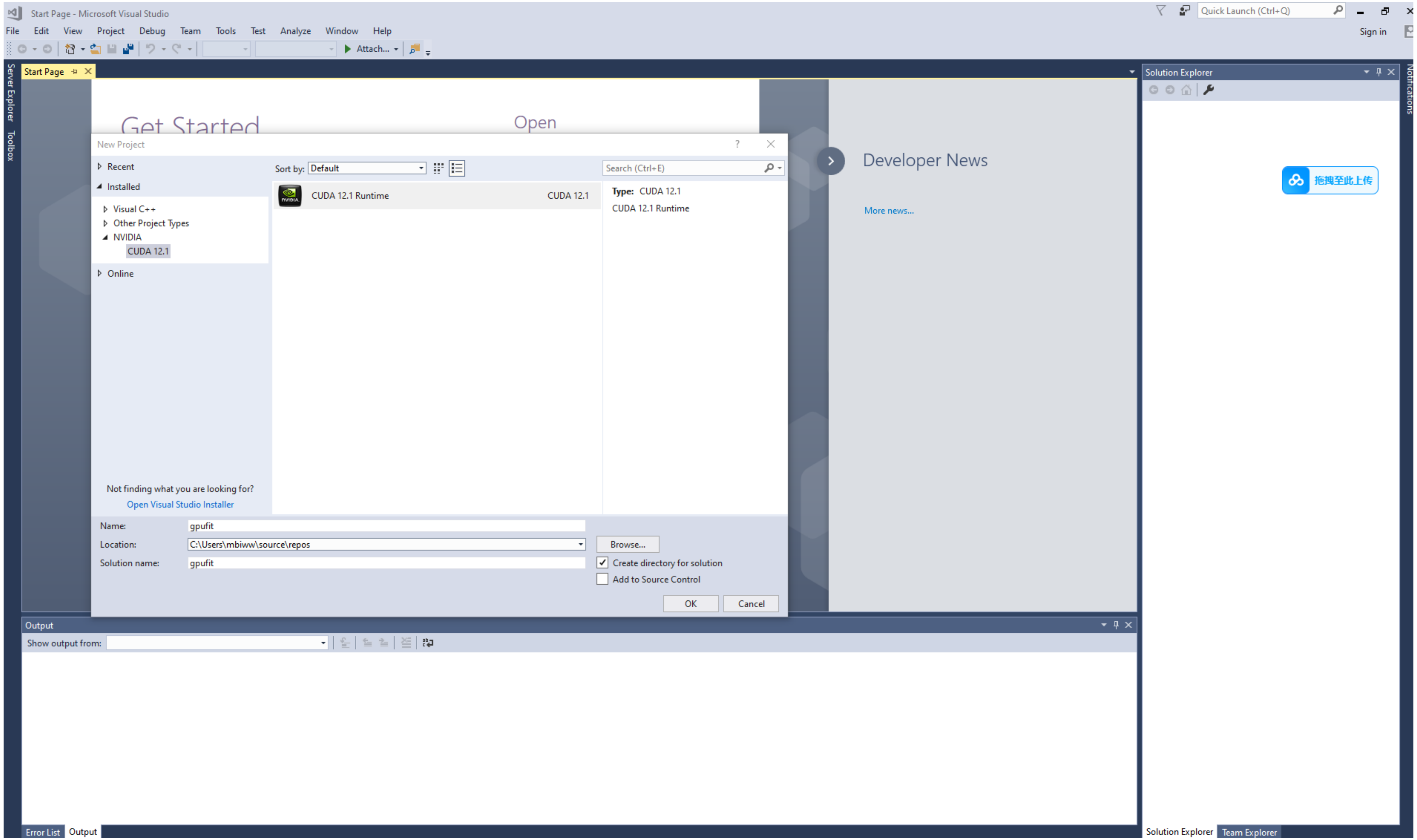
Prerequisites

- Install visual studio　(suggest vs2017 or newest versions ）
- Install CUDA toolkit　(we used CUDA 12.1)

Description of the CUDA codes

- gpufit2D: CUDA code for fitting the sum image of SiLM to 2D Gaussian function to get the center lateral positions
- gpurepeatfit2D: CUDA code for repeat fitting of the sub images in SiLM to get the intensities in sub images
- gpusaimfitzrange: CUDA codes to get the z positions in SiLM within the predeifined axial range

Step 1. Create a new CUDA project from visual studio



New Project

CUDA 12.1 Runtime — CUDA 12.1

Type: CUDA 12.1

CUDA 12.1 Runtime

Name: gpufit

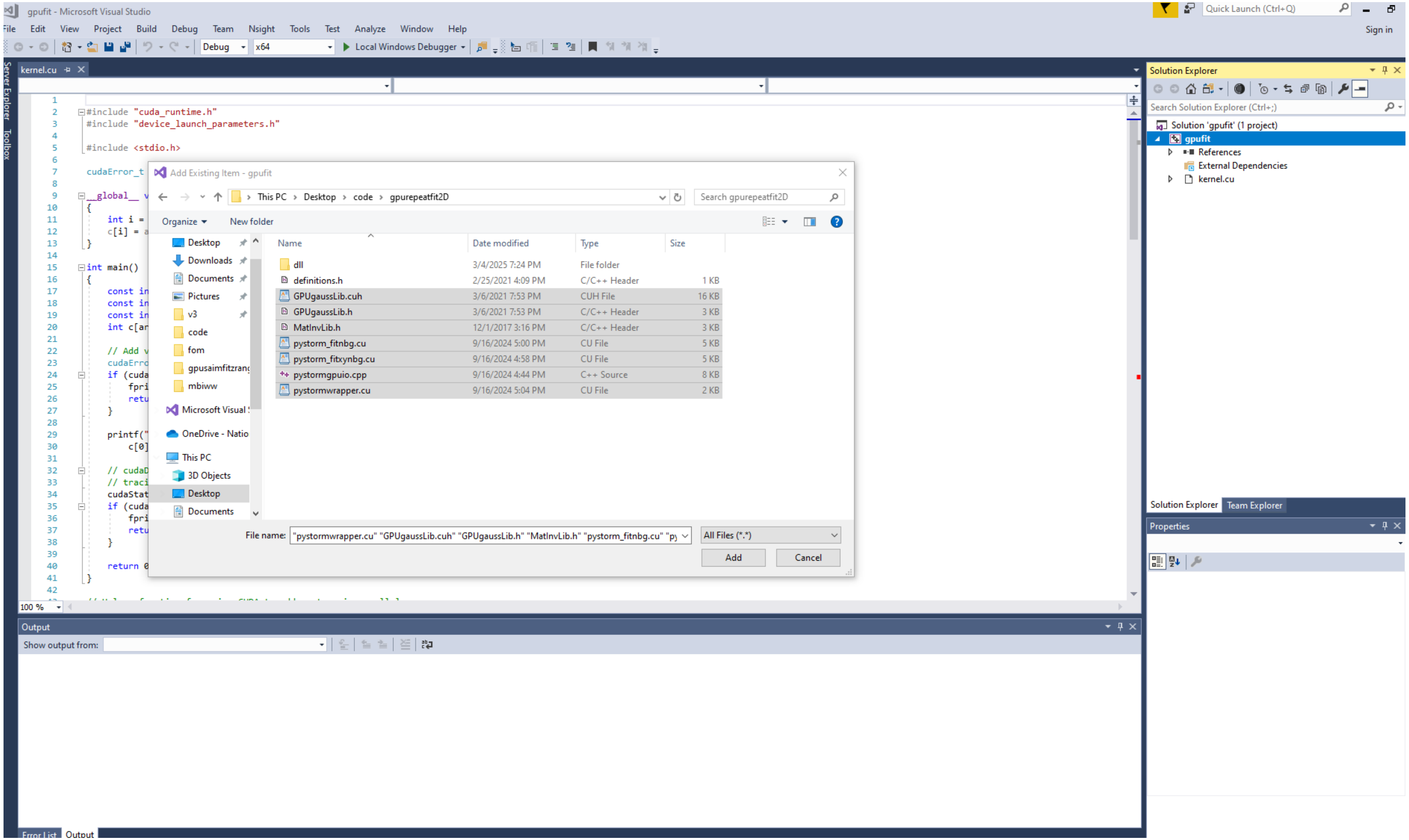
Location: C:\Users\mbiww\source\repos

Solution name: gpufit

☑ Create directory for solution

□ Add to Source Control

Step 2. Add the gpu codes to the project



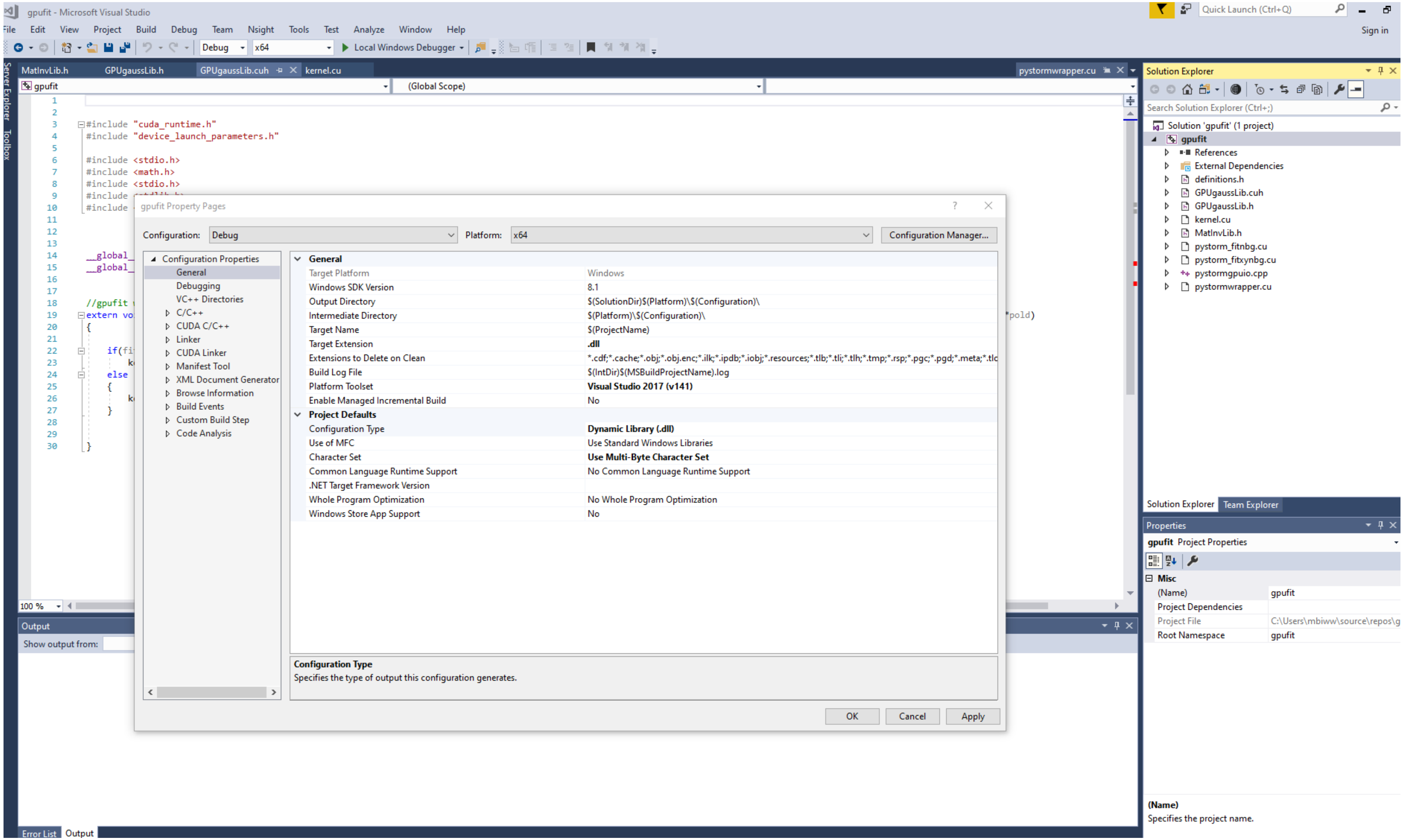
```
#include "cuda_runtime.h"
#include "device_launch_parameters.h"

#include <stdio.h>

cudaError_t

__global__ v
{
    int i =
    c[i] = a
}

int main()
{
    const in
    const in
    const in
    int c[ar

    // Add v
    cudaErro
    if (cuda
        fpri
        retu
    }

    printf("
        c[0]

    // cudaD
    // traci
    cudaStat
    if (cuda
        fpri
        retu
    }

    return 0
}
```

Name	Date modified	Type	Size
dll	3/4/2025 7:24 PM	File folder	
definitions.h	2/25/2021 4:09 PM	C/C++ Header	1 KB
GPUgaussLib.cuh	3/6/2021 7:53 PM	CUH File	16 KB
GPUgaussLib.h	3/6/2021 7:53 PM	C/C++ Header	3 KB
MatInvLib.h	12/1/2017 3:16 PM	C/C++ Header	3 KB
pystorm_fitnbg.cu	9/16/2024 5:00 PM	CU File	5 KB
pystorm_fitxynbg.cu	9/16/2024 4:58 PM	CU File	5 KB
pystormgpuio.cpp	9/16/2024 4:44 PM	C++ Source	8 KB
pystormwrapper.cu	9/16/2024 5:04 PM	CU File	2 KB

File name: "pystormwrapper.cu" "GPUgaussLib.cuh" "GPUgaussLib.h" "MatInvLib.h" "pystorm_fitnbg.cu" "py

All Files (*.*)

Step 3. Configure the target name and configuration type to dll



```
#include "cuda_runtime.h"
#include "device_launch_parameters.h"

#include <stdio.h>
#include <math.h>
#include <stdio.h>
#include <stdlib.h>
#include



__global_
__global_


//gpufit
extern vo
{

    if(fi
        k
    else
    {
        k
    }


}
```

*pold)

gpufit Property Pages

Configuration: Debug   Platform: x64

General	
Target Platform	Windows
Windows SDK Version	8.1
Output Directory	$(SolutionDir)$(Platform)\$(Configuration)\
Intermediate Directory	$(Platform)\$(Configuration)\
Target Name	$(ProjectName)
Target Extension	**.dll**
Extensions to Delete on Clean	*.cdf;*.cache;*.obj;*.obj.enc;*.ilk;*.ipdb;*.iobj;*.resources;*.tlb;*.tli;*.tlh;*.tmp;*.rsp;*.pgc;*.pgd;*.meta;*.tlc
Build Log File	$(IntDir)$(MSBuildProjectName).log
Platform Toolset	**Visual Studio 2017 (v141)**
Enable Managed Incremental Build	No
Project Defaults	
Configuration Type	**Dynamic Library (.dll)**
Use of MFC	Use Standard Windows Libraries
Character Set	**Use Multi-Byte Character Set**
Common Language Runtime Support	No Common Language Runtime Support
.NET Target Framework Version	
Whole Program Optimization	No Whole Program Optimization
Windows Store App Support	No

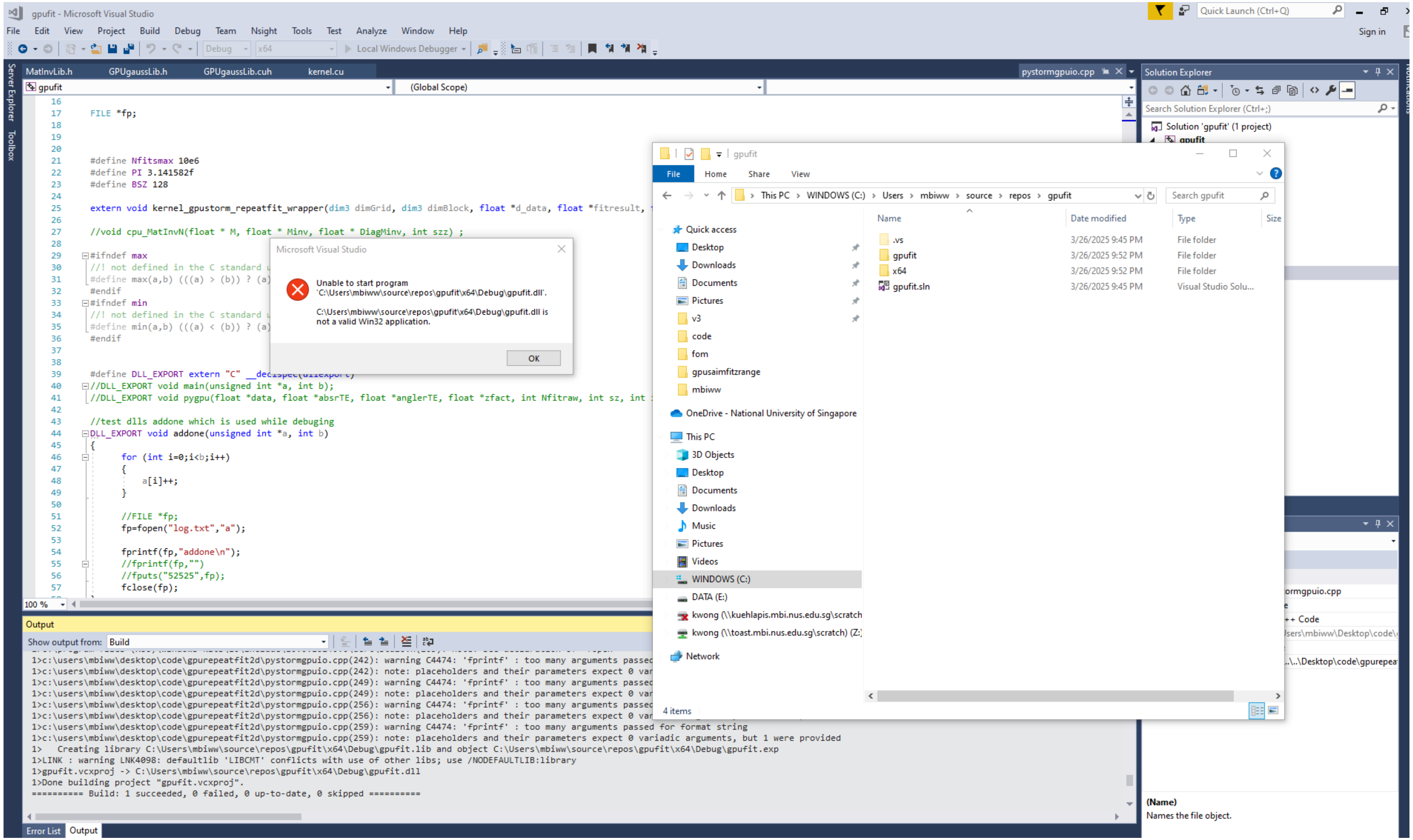
Configuration Type
Specifies the type of output this configuration generates.

gpufit Project Properties

Misc	
(Name)	gpufit
Project Dependencies	
Project File	C:\Users\mbiww\source\repos\g
Root Namespace	gpufit

(Name)
Specifies the project name.

Step4. Run the code, and copy the generated dll file to the folder where you want to run the python script, generated dll file is under x64 folder



gpufit - Microsoft Visual Studio
File Edit View Project Build Debug Team Nsight Tools Test Analyze Window Help
Debug x64 Local Windows Debugger
MatInvLib.h GPUgaussLib.h GPUgaussLib.cuh kernel.cu pystormgpuio.cpp
gpufit (Global Scope)
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'gpufit' (1 project)
gpufit
Quick Launch (Ctrl+Q)
Sign in
Server Explorer Toolbox
100 %

```
FILE *fp;



#define Nfitsmax 10e6
#define PI 3.141582f
#define BSZ 128

extern void kernel_gpustorm_repeatfit_wrapper(dim3 dimGrid, dim3 dimBlock, float *d_data, float *fitresult,

//void cpu_MatInvN(float * M, float * Minv, float * DiagMinv, int szz) ;

#ifndef max
//! not defined in the C standard u
#define max(a,b) (((a) > (b)) ? (a)
#endif
#ifndef min
//! not defined in the C standard u
#define min(a,b) (((a) < (b)) ? (a)
#endif


#define DLL_EXPORT extern "C" __declspec(dllexport)
//DLL_EXPORT void main(unsigned int *a, int b);
//DLL_EXPORT void pygpu(float *data, float *absrTE, float *anglerTE, float *zfact, int Nfitraw, int sz, int

//test dlls addone which is used while debuging
DLL_EXPORT void addone(unsigned int *a, int b)
{
    for (int i=0;i<b;i++)
    {
        a[i]++;
    }

    //FILE *fp;
    fp=fopen("log.txt","a");

    fprintf(fp,"addone\n");
    //fprintf(fp,"")
    //fputs("52525",fp);
    fclose(fp);
```

Microsoft Visual Studio

Unable to start program
'C:\Users\mbiww\source\repos\gpufit\x64\Debug\gpufit.dll'.

C:\Users\mbiww\source\repos\gpufit\x64\Debug\gpufit.dll is not a valid Win32 application.

OK

Name	Date modified	Type	Size
.vs	3/26/2025 9:45 PM	File folder	
gpufit	3/26/2025 9:52 PM	File folder	
x64	3/26/2025 9:52 PM	File folder	
gpufit.sln	3/26/2025 9:45 PM	Visual Studio Solu...	

Output

Show output from: Build

```
1>c:\users\mbiww\desktop\code\gpurepeatfit2d\pystormgpuio.cpp(242): warning C4474: 'fprintf' : too many arguments passed
1>c:\users\mbiww\desktop\code\gpurepeatfit2d\pystormgpuio.cpp(242): note: placeholders and their parameters expect 0 var
1>c:\users\mbiww\desktop\code\gpurepeatfit2d\pystormgpuio.cpp(249): warning C4474: 'fprintf' : too many arguments passed
1>c:\users\mbiww\desktop\code\gpurepeatfit2d\pystormgpuio.cpp(249): note: placeholders and their parameters expect 0 var
1>c:\users\mbiww\desktop\code\gpurepeatfit2d\pystormgpuio.cpp(256): warning C4474: 'fprintf' : too many arguments passed
1>c:\users\mbiww\desktop\code\gpurepeatfit2d\pystormgpuio.cpp(256): note: placeholders and their parameters expect 0 var
1>c:\users\mbiww\desktop\code\gpurepeatfit2d\pystormgpuio.cpp(259): warning C4474: 'fprintf' : too many arguments passed for format string
1>c:\users\mbiww\desktop\code\gpurepeatfit2d\pystormgpuio.cpp(259): note: placeholders and their parameters expect 0 variadic arguments, but 1 were provided
1>   Creating library C:\Users\mbiww\source\repos\gpufit\x64\Debug\gpufit.lib and object C:\Users\mbiww\source\repos\gpufit\x64\Debug\gpufit.exp
1>LINK : warning LNK4098: defaultlib 'LIBCMT' conflicts with use of other libs; use /NODEFAULTLIB:library
1>gpufit.vcxproj -> C:\Users\mbiww\source\repos\gpufit\x64\Debug\gpufit.dll
1>Done building project "gpufit.vcxproj".
========== Build: 1 succeeded, 0 failed, 0 up-to-date, 0 skipped ==========
```